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SURFICIAL GEOLOGIC MAP OF THE CHESTER QUADRANGLE
MORRIS COUNTY, NEW JERSEY
OPEN-FILE MAP SERIES OFM 150
pamphlet containing table 1 accompanies map

INTRODUCTION

Surficial materials in the Chester quadrangle include glacial deposits of pre-Illinoian, Illinoian, and late Wisconsinan age; alluvium, wetland deposits, and hillslope sediment laid down during the latter part of the Quaternary; and weathered bedrock materials formed during the Quaternary and Neogene. Surficial geologic units are defined by their lithic characteristics, stratigraphic position, location on the landscape, and genetic and morphologic criteria. They are the parent material on which soils form. Cumulative thickness is as much as 300 feet for weathered rock, 200 feet for glacial sediment, and 80 feet for hillslope deposits. Alluvial and wetland deposits are less than 30 feet thick.

The Chester quadrangle (fig. 1) lies in the New Jersey Highlands. Main geographic features are Schooleys Mountain, Pleasant Hill, German Valley, and the Lamington River valley (fig. 2). The quadrangle is a mix of suburban and rural settings. Three main streams flow through the quadrangle: the South Branch of the Raritan River, the Lamington River, and the North Branch of the Raritan River. They all flow in a southerly direction and all are part of the Raritan River watershed. The highest point is approximately 1,210 feet above sea level on Schooleys Mountain, and the lowest point lies on the North Branch of the Raritan River, approximately 315 feet above sea level.

The physiography, history of glaciation and river drainage, and groundwater and material resources of the surficial materials in the quadrangle are described below. Records of wells and borings are provided in table 1 (in pamphlet). Figure 3 shows the thickness of surficial material (including weathered rock) in the quadrangle, based on the well and boring data and outcrop locations. Cross sections AA', BB', and CC', show the subsurface distribution of surficial materials along the line of section. Bedrock geology is provided by Volkert (2015).

PHYSIOGRAPHY

The physiography of the Chester quadrangle (fig. 2) consists of broad, highly dissected uplands of moderate to rugged relief that are chiefly underlain by Proterozoic gneiss and granite. Two southwest-trending valleys, German Valley and the Lamington River valley, separate the uplands into a northwestern part (Schooleys Mountain) and a southeastern part (unnamed). Both valleys are underlain by Cambrian carbonate rock (fig. 3) and are separated from each other by a narrow ridge of gneiss called Pleasant Hill and, to the south, the Fox Hill Range. Narrow belts of Cambrian quartzite separate the gneiss from the carbonate rock along the base of Pleasant Hill and on the southeast side of the Lamington valley. North of Pleasant Hill, a low ridge of Silurian quartzite separates the carbonate-floored valleys of the upper Lamington River and upper Drakes Brook valleys. Cambrian and Ordovician carbonate rock and Ordovician shale also underlie the valley extending southwesterly from Ralston in the southeast corner of the quadrangle. A remnant of resistant Triassic conglomerate on the west side of this valley holds up Mount Paul, and a narrow belt of Cambrian quartzite separates the gneiss from the carbonate rock on the southeast side of the valley.

The northeast-southwest topographic grain and deeply incised topography was formed by fluvial erosion, slope retreat, and glacial erosion working on the local bedrock through the Neogene and Quaternary. Because gneiss, granite, quartzite, and conglomerate resist weathering and erosion more so than carbonate rock, these rocks typically underlie uplands. On uplands, ridges chiefly follow the strike of layering in the bedrock, although discordant trends are common. In places, deep gorges, such as Hacklebarney gorge and the gorge of the North Branch in the southeast corner of the quadrangle, cut across the topographic grain. Cross-joints and fractures, which weaken rock, may control the location of these gorges. Rock outcrops are few because in most places a mantle of saprolite and weathered rock (units Qwg, Qwq, Qwc) or rock rubble (Qwgt) covers the bedrock surface.

The location and trend of German Valley and the upper Drakes Brook and Lamington River valleys is controlled by the underlying belts of carbonate rock. In many places the rock is deeply weathered by dissolution, which forms thick silty clay residuum (Qwcb). In German Valley, thin deposits of pre-Illinoian till cover the weathered rock. In the upper Drakes Brook and Lamington River valleys, thick late Wisconsinan and Illinoian glaciolacustrine deposits overlie the weathered rock and conceal the valley's rock floor. In the Ralston valley the weathered mantle on the carbonate rock and shale (Qws) is thinner than in the valleys elsewhere in the quadrangle (fig. 3).

GLACIATION AND RIVER DRAINAGE

The position and difference in weathering characteristics of glacial drift in New Jersey indicate that continental ice sheets reached the Chester quadrangle at least three times (Salisbury, 1902; Stone and others, 2002; Stanford and others, 2021). Erosion and deposition by each ice sheet modified the landscape. Valleys underlain by weathered rock were deeply scoured, and bedrock ridges, hills, and slopes were worn down by abrasion and plucking, smoothing and streamlining the bedrock surface. Most of the debris entrained by the ice sheets was deposited as till and meltwater sediment. The youngest glacial deposits laid down during the late Wisconsinan substage provide the clearest record of glaciation. The older glacial record, recorded by the Illinoian and especially the pre-Illinoian deposits, is less clear due to erosion and weathering.

The oldest glaciation, named the Jerseyan by Chamberlin and Salisbury (1906) and now represented by the Port Murray Formation (Stone and others, 2002) covered all of the quadrangle (fig. 1). The Port Murray drift appears to be chiefly till (Qpt). It is deeply weathered and lies on weathered bedrock. Constructional topography is not preserved, and the drift lies above modern valley floors in areas that are protected from hillslope and fluvial erosion. The age of this glaciation is uncertain; it may represent single or multiple glaciations during the early Pleistocene (2.5 to 0.8 Ma, Ma = million years ago). Pre-Illinoian fluvial and lacustrine deposits in New Jersey have reversed magnetic polarity at two locations (Ridge, 2004; Stanford and others, 2021), as do pre-Illinoian lacustrine deposits in central and eastern Pennsylvania (Gardner and others, 1994; Braun, 2004). The reversed polarity places the age of the deposits at older than 788 ka (ka = thousand years ago), in the early Pleistocene.

The second ice sheet likely reached the study area during the Illinoian stage (200 to 150 ka) and it covered the northern part of the quadrangle (figs. 1 and 2). This glaciation is represented by the Flanders Till (Qf) (Stone and others, 2002) and glaciolacustrine (Qid, Qil, Qilf) and glaciofluvial (Qif) deposits of the Lamington Formation, which consists of all meltwater sediments of Illinoian age (Stone and others, 2002). These deposits are moderately weathered. They lie in modern valleys and constructional topography is preserved, although subdued, and the drift in many places has not been eroded from gentle to moderate slopes, only steep slopes. The terminal position of the Illinoian glaciation is defined by an end moraine in German Valley near Flanders and an ice-marginal delta, and moraine ridges consisting of till overlying deltaic sand, in the Lamington River valley near Ironia. Meltwater sediments of Illinoian age were laid down in glacial Lake Ironia, which occupied the upper Lamington and Drakes Brook valleys, in a lake in the valley now occupied by Budd Lake, and in a glaciofluvial plain along Drakes Brook (fig. 2).

Cook (1880) and Salisbury (1902) recognized this belt of deposits south of the late Wisconsinan terminal moraine but thought it might represent an advance of late Wisconsinan ice beyond the moraine rather than a separate glaciation. Peat lying above Illinoian lacustrine sand, and in turn overlain by colluvium, at Dalrymple Pond about three miles east of Succasunna in the Mendham quadrangle, yielded a radiocarbon date of 36,070±280 years before present (calibrating to 41.1-40.4 ka with one-sigma uncertainty) (Beta 309763) (Stanford, 2012). This date indicates that the Illinoian drift is of pre-late Wisconsinan age. The stratigraphic and geomorphic relationship of Illinoian outwash to marine and estuarine deposits in the Delaware River valley and western Long Island suggests an Illinoian age for this glaciation (Stanford and others, 2021) although an early or middle Wisconsinan age is also possible.

The youngest ice sheet barely reached the quadrangle during the late Wisconsinan substage of the Wisconsinan stage (figs. 1 and 2). Radiocarbon dates from sediments in Budd Lake (Harmon, 1968), from glacial-lake deposits in eastern New Jersey (Reimer, 1984; Stanford and others, 2021), and from postglacial lakes and bogs in western New Jersey (Cotter and others, 1986) indicate that late Wisconsinan ice reached its terminus at 25 ka, stood at the terminal moraine until about 24 ka, and retreated north of New Jersey by about 22 ka. Its furthest advance is generally marked by the terminal moraine (Cook, 1880; Salisbury, 1902). In the Chester quadrangle, the deposits of this glaciation are represented by the Netcong Till (Stone and others, 2002) and glaciolacustrine deposits of the Rockaway Formation, which consists of all meltwater sediments of late Wisconsinan age (Stone and others, 2002). They are lightly weathered, generally lie on nonweathered rock, have fresh constructional morphology, and are eroded from only the steepest slopes. A small part of the south edge of the terminal moraine occurs in the quadrangle east of Budd Lake. This is the only place where late Wisconsinan ice advanced into the quadrangle. The moraine just to the north in the Stanhope quadrangle extends as much as 2 miles back from the frontal ridge (fig. 2). Elsewhere, late Wisconsinan lacustrine deposits were laid down in glacial Lake Succasunna, which occupied the upper parts of the Drakes Brook and Lamington valleys, and in glacial Lake Budd, which occupied the valley at Budd Lake (fig. 2).

The elevation of the base of surficial deposits in valleys in the Chester quadrangle (red lines on map at 50-foot contour interval) and adjacent areas (Stanford, 1989, 2012; Stanford and others, 1996) shows that the upper Lamington and Drakes Brook valleys, and the valley containing Budd Lake and extending northeastward from it, drained northward before the Illinoian glaciation, as first proposed by Cook (1880) and later by Salisbury (1902). The upper Lamington and Drakes Brook valleys drained to the Rockaway River and the Budd Lake valley drained to the Musconetcong River (fig. 2). During the Illinoian glaciation, the valleys were partly filled with till (Qf, Qim) and with glaciolacustrine deposits (units Qid, Qil, Qilf) laid down in glacial Lake Ironia in the Lamington and Drakes Brook valleys (fig. 2) and in a lake in the Budd Lake valley (Stanford and others, 1996). The elevation of the top of this Illinoian valley fill shows that drainage was still northward following the Illinoian glaciation in the upper Drakes Brook and Lamington valleys, where the top of the fill descends northward from the delta and moraine at Ironia (section AA') and in the Budd Lake valley (Stanford and others, 1996). In the Lamington valley the delta and moraine near Ironia may have blocked the valley there following the Illinoian glaciation and prevented northward drainage in the segment of the valley from there south to Milltown. A postglacial lake may have occupied that segment of the valley and drained southward through the Hacklebarney gorge from the former glacial-lake spillway at Milltown. During the late Wisconsinan glaciation there was additional filling of both the Drakes Brook-Lamington and Budd Lake valleys with till (Qwm) and glaciolacustrine sediment deposited in glacial lakes Succasunna and Budd (Qwd, Qwl) (fig. 2). This added fill raised valley-bottom elevations enough to reverse the drainage to a southerly direction into the South Branch of the Raritan River (in the case of Budd Lake and Drakes Brook) and down the Hacklebarney gorge into the North Branch of the Raritan River (in the case of the Lamington River).

INTERGLACIAL AND PERIGLACIAL DEPOSITS

Coinciding with the waxing and waning of ice sheets in the northern hemisphere, climate in the New Jersey region varied between boreal and temperate or subtropical. During warm interglacials such as the Sangamonian stage (135 to 70 ka), the rate of chemical weathering increased, and an extensive cover of vegetation helped reduce the rate of mass movements and hillslope erosion. During this period, thick soils developed, and surficial materials and bedrock were deeply weathered. In contrast, during colder periods there was an increase in the rate of physical weathering and hillslope erosion. Based on the marine O^{18} record, which is a proxy for global glacial volume, Braun (1989) suggests that the region may have experienced about 10 periods of glacial or periglacial climate in the Pleistocene. In the New Jersey region, these periods of periglacial climate generally lasted less than 20,000 years. They were marked by the development of permafrost and the replacement of deciduous forest with patchy conifer woods and grasslands. The permafrost impeded soil drainage, producing water-logged soils during thaws, and the reduced forest diminished the anchoring effect of tree roots. These changes enhanced erosion of hillslope material by solifluction, soil creep, and slope wash. The mechanical disintegration of rock outcrops by freeze and thaw provided additional sediment, some of which forms small aprons of talus at the base of larger outcrops on uplands. In other places areas of outcrop were reduced to joint-block rubble.

Colluvium produced by this erosion collected on footslopes and is the most common surficial deposit in the quadrangle (Qcg, Qcs, Qccb, Qcc). The surface colluvium is lightly weathered and primarily of late Wisconsinan age, as indicated by the 41 ka age of peat under colluvium at Dalrymple Pond described above, and by the interbedding of colluvium with late Wisconsinan glaciolacustrine deposits in the Lake Succasunna basin (sections AA', CC'). Deep exposures in colluvium typically show one or more beds of older, weathered colluvium beneath this surface colluvium, with a buried soil evident in places (fig. 4, see also the description of an outcrop west of Flanders in Stanford, 1997, p. 6.4). This stratigraphy indicates that colluviation is cyclic and occurs during cold climate and that slopes are largely stable during temperate climate. The interbedding of colluvium with both Illinoian and late Wisconsinan glacial deposits in the Lamington and Drakes Brook valleys (sections AA', BB', CC') supports this link to episodic cold climate.

Streams also deposited sediment during cold climate. In the Lamington valley between Ironia and Milltown, sandy terrace deposits (Qtl) are generally on topographic grade with the toes of colluvial aprons. This relationship suggests that the terraces may in part be slopewash deposited along the shore of Lake Succasunna and, possibly, Lake Ironia, and their postglacial successors, by water draining from or across the colluvium. Alluvial fans (Qaf) are also products of increased hillslope erosion during cold periods. They are prominent in German Valley, where steep streams draining from Schooleys Mountain and Pleasant Hill were able to transport gravelly and bouldery sediment into the valley. A fan of weathered gravel (Qof) near Bartley, where the South Branch enters German Valley, is on grade with pre-Illinoian till and may be of similar age, again indicating the episodic nature of cold-climate sedimentation.

Gradually as climate warmed following the late Wisconsinan glaciation, forest vegetation was reestablished. Pollen obtained from lakes and bogs in the vicinity of the quadrangle show that between deglaciation and about 14 ka the vegetation was a boreal grassland with patchy spruce and pine woodland, which transitioned to spruce and pine forest by 13 ka, and then to a dominantly oak forest by 10 ka (Harmon, 1968; Cotter and others, 1986; Peteet and others, 1993; Russell and Stanford, 2000). During this transition, lacustrine sedimentation, which had been dominated by clastic material, became enriched in organic material. As slope erosion slowed, the amount of sediment entering streams dropped and the streams could incise into the glacial and periglacial deposits to form the present-day floodplains (Qal, Qcal). In the Lamington valley between Ironia and Milltown, thin sandy floodplain deposits were laid down on top of the glacial silts and clays of Lake Succasunna (Qal on AA'). These sands were derived in part by erosion of the delta filling the valley north of Ironia. This erosion was aided by postglacial rebound of the northern part of the valley relative to the south, which steepened the gradient of the Lamington River by about 3 feet/mile. As the landscape became fully forested, sand deposition was replaced by organic deposition (Qs) and the Ironia-Milltown segment of the valley became a large marsh and swamp. The depth and extent of peat here is based in part on survey data in Waksman and others (1943, p. 182). Several smaller swamps and bogs also formed at this time, including one in an upland valley near Chester that was dammed by colluvium.

RESOURCES

Surficial deposits in the quadrangle provide groundwater to wells and in the past have been dug for sand and gravel for construction uses. Glaciolacustrine deposits form a productive valley-fill aquifer system in the upper Drakes Brook and Lamington valleys. This system includes an upper, shallow (generally <70 feet thick), unconfined aquifer (Qid, Qwd), a middle confining or semi-confining unit consisting of lake-bottom silt, clay, and fine sand (Qil, Qwl), and in places a lower confined or semi-confined aquifer consisting of lacustrine-fan sand and gravel (Qilf). Locally in the Lamington valley south of the Ironia area, beds and lenses of alluvial and alluvial-fan sand and gravel within colluvium (Qcg, fig. 5) may also be confined by lake-bottom deposits and yield water to wells. Silty clay carbonate-rock residuum (Qwcb) forms a lower confining unit below the surficial valley-fill deposits. Solution-channeled carbonate bedrock beneath the residuum is a third aquifer. In German Valley the glaciolacustrine deposits are absent and the surficial material above the carbonate bedrock consists of carbonate-rock residuum, pre-Illinoian till (Qpt), Illinoian till (Qf, Qim), gneiss colluvium (Qcg), and sand and gravel in floodplains and channels (Qal), fans (Qaf), terraces (Qtl), and a glaciofluvial deposit along Drakes Brook (Qif). These sand and gravel deposits are generally too thin to be aquifers, and the till, colluvium, and residuum are of low permeability and form a semi-confining or confining layer above the carbonate bedrock. However, in places, particularly along the base of Schooleys Mountain and Pleasant Hill where dissolution of the carbonate bedrock is most active, collapsed beds and lenses of alluvial, alluvial-fan, and glaciofluvial sand and gravel, and coarse beds in colluvium, within the residuum locally supply water to domestic wells (for example, wells 54, 63, 67, 68, 71, 84, 449, 452, 461, 465, and 466 in table 1), as does thick, sandy weathered quartzite east of Flanders (for example, wells 75, 78, 85, 91, 96, 114, 359 in table 1). The collapse of the carbonate bedrock due to dissolution, which lowers the surficial deposits into the residuum and into openings in the bedrock, is marked in the present landscape by solution basins, which are enclosed by blue lines on the map where observed on LiDAR imagery and aerial photography. The hydrology of the glacial valley fill and carbonate rock in the upper Lamington valley and German Valley is described and modeled by Nicholson and others (1996).

Sand and gravel were dug from glacial delta deposits (Qid, Qwd) in the upper Drakes Brook and Lamington valleys, and from weathered quartzite bedrock (Qwq) east of Flanders. The weathered quartzite sand is 98% silica and was mined for use as molding sand for steelmaking between the 1880s and the 1950s (N. J. Geological Survey permanent note 25-1-961). The glacial sands and gravels were dug for construction uses and fill. The former pits are outlined in purple on the map. None were active in 2022 and most are now lakes and ponds.

DESCRIPTION OF MAP UNITS

Color names are based on Munsell Color Company (1975) and were determined from naturally moist samples.

(ruled pattern) aft — ARTIFICIAL FILL—Excavated bedrock, gravel, sand, silt, cinders, ash, slag, brick, concrete, asphalt, and other manufactured materials emplaced by humans. Color variable but generally yellowish brown, brown, gray, dark gray. In road and railroad fills, dams, dikes, filled low ground, and a landfill containing municipal waste west of Hacklebarney (aft). As much as 80 feet thick in the landfill, 25 feet thick elsewhere.

Qal — ALLUVIUM—Stratified, moderately to poorly sorted sand, pebble-to-cobble gravel, silt; minor clay, boulder gravel, and organic material. Fine sediment is yellowish brown, brown, gray. As much as 25 feet thick. Includes planar to cross-bedded gravel and sand in channel deposits, and cross-bedded and rippled sand, massive and parallel-laminated fine sand, and silt in floodplain deposits. In places, overlain by and interlayered with thin organic material and colluvium. Includes boulder lags formed by the washing away of fine sediment from colluvium and weathered gneiss.

Qs — SWAMP DEPOSITS—Peat of reed, sedge, and woody origin, muck, and organic-rich silt and clay. Dark brown, dark gray, black. As much as 12 feet thick (Waksman and others, 1943). Locally interbedded with alluvium and thin colluvium.

Qwd — LATE WISCONSINAN DELTAIC DEPOSITS—Stratified sand, gravel, and minor silt deposited by meltwater streams as deltas in glacial lakes Succasunna and Budd. Color of fine sediment is yellowish brown, very pale brown, light gray. Includes well sorted sand, pebbly sand, pebble-to-cobble gravel, and minor boulder gravel, in glaciofluvial topset beds that are as much as 25 feet thick. Bedforms in topset beds consist of massive to horizontally bedded and imbricated coarse gravel and sand, and planar to tabular and trough cross-bedded fine gravel and sand in bars, and channel-lag deposits with minor cross-bedded sand in channel-fill deposits. Topset beds overlie and grade into foreset beds that dip 20° to 35° basinward and consist of well to moderately sorted, rhythmically bedded cobble-to-pebble gravel, pebbly sand, and sand. These beds grade downward and outward into ripple cross-laminated and parallel-laminated, sand, silt and pebble gravel that dip less than 20°. Lower foreset beds grade into gently inclined prodelta bottomset beds of rhythmically bedded, ripple cross-laminated to graded fine sand and silt with minor clay drapes. Color of fine sediment is very pale brown, yellowish brown, light gray. Overall thickness is as much as 100 feet.

Qwl — LATE WISCONSINAN LAKE-BOTTOM DEPOSITS—Laminated silt, fine sand, and clay; and minor cross-laminated silt, fine sand, and minor clay; gray, light gray, pale brown. Deposited on the floor of glacial Lake Succasunna by density flows and settling of fines. As much as 130 feet thick. Interbedded with colluvium in places, particularly in the narrow part of the Lamington valley between Ironia and Milltown. In subsurface only.

Qwm — LATE WISCONSINAN TERMINAL MORAINE TILL—Yellowish brown, very pale brown, gray silty sand till with many subrounded to subangular pebbles and cobbles and some to many subrounded boulders. Includes minor beds of poorly stratified sand, gravel, and silt. Gravel is chiefly gneiss, some gray siltstone and sandstone and minor gray carbonate rock and white to gray quartzite. Boulders are mostly gneiss with minor quartzite. The till of the moraine is equivalent to the Netcong Till of Stone and others (2002).

Qaf — ALLUVIAL-FAN DEPOSITS—Stratified, moderately to poorly sorted, sand, pebble-to-cobble gravel, minor boulder gravel, and minor silt in fan-shaped deposits. Color of fine sediment is brown, yellowish brown, gray. Includes massive to plane-bedded sand and gravel and minor cross-bedded channel-fill sand. Bedding dips a maximum of 30 degrees toward the trunk valley. As much as 35 feet thick.

Qtl — LOWER TERRACE DEPOSITS—Stratified, well to moderately sorted, massive to laminated, and minor cross-bedded, sand, pebbly sand, and minor silt in terraces with top surface 5 to 10 feet above present floodplains. Deposits along Drakes Brook and the South Branch of the Raritan River include pebble-to-cobble gravel. Color of fine sediment is yellowish brown, reddish yellow, very pale brown, light gray. As much as 15 feet thick.

Qcal — ALLUVIUM AND COLLUVIUM, UNDIFFERENTIATED—Stratified, poorly to moderately sorted, sand, silt, and pebble-to-cobble gravel. Color of fine sediment is brown, yellowish brown, gray. Overlies and interbeds with colluvium as in units Qcg, Qcc, and Qcs. Locally includes lags of subangular cobbles and boulders of gneiss formed by the washing away of fine sediment. As much as 20 feet thick.

Qcg — GNEISS COLLUVIUM—Massive to crudely layered, slightly compact, poorly sorted silty sand and sandy silt; yellowish brown, dark yellowish brown, brown, strong brown, reddish yellow; containing as much as 60 percent lightly to moderately weathered angular to subangular cobbles, pebbles, and boulders of gneiss. As much as 50 feet thick. Matrix consists of a varied mixture of quartz sand, weathered feldspar, mica, amphibole, heavy minerals, silt, and clay. Typically consists of a surface layer of lightly weathered, yellowish brown colluvium of Wisconsinan age overlying more weathered brown to reddish yellow pre-Wisconsinan colluvium in the subsurface (fig. 4).

Qcs — SHALE COLLUVIUM—Crudely to moderately layered, noncompact, poorly sorted silty sand and clayey silt; light yellowish brown, brownish yellow, light olive-brown; containing as much as 80 percent lightly to moderately weathered angular to subangular red and gray shale and slate chips. As much as 20 feet thick. Matrix consists of a varied mixture of rock fragments, quartz sand, silt, and clay.

Qcc — CONGLOMERATE COLLUVIUM—Massive to crudely layered, slightly compact, poorly sorted sandy silt; light reddish brown to reddish brown; containing as much as 50 percent subangular red and gray sandstone and siltstone pebbles and cobbles and subrounded to subangular dark gray to purple quartz-pebble conglomerate pebbles and cobbles. As much as 20 feet thick.

Qccb — CARBONATE-ROCK COLLUVIUM—Massive to crudely layered, slightly compact, poorly sorted clayey silt; dark yellowish brown, yellowish brown, reddish yellow; containing as much as 5 percent angular to subangular chips and pebbles of leached carbonate rock and minor chert and shale. As much as 15 feet thick.

Qof — OLDER ALLUVIAL FAN DEPOSITS—Sand and gravel as in unit Qaf except gneiss pebbles and cobbles are deeply weathered or decomposed, and matrix is clayey. As much as 30 feet thick. Forms a fan near Bartley that grades topographically to pre-Illinoian till and has a top surface 10 to 20 feet higher than adjacent alluvial fans with nonweathered gravel. Of possible pre-Illinoian age.

Qf — FLANDERS TILL—Massive, compact, poorly sorted silty clay, clayey silt and sandy silt; strong-brown, pale-brown, yellow, yellowish brown; containing 5 to 15 percent gravel (fig. 6). Matrix is silty sand where till is in contact with deltaic and fan deposits in the Lake Ironia basin (section AA'). Locally reddish yellow where till is rich in weathered carbonate rock. Clasts consist of gray gneiss, gray to brown quartzite and quartz-pebble conglomerate, minor gray and red sandstone, brown to black chert, and yellow decomposed carbonate rock. Gneiss clasts have weathering rinds up to 0.5 inch thick; carbonate clasts are generally decomposed to depths exceeding 10 feet. Other clasts have weathering rinds up to 0.1 inch thick, and pitted surfaces. Matrix is a varied mixture of quartz, rock fragments, silt, clay, weathered feldspar, minor mica, and heavy minerals. Subvertical joints moderately developed to depths of at least 10 feet. Iron and iron-manganese stain the surface of clasts, sand grains, and joints to depths of at least 10 feet. As much as 70 feet thick.

Qim — ILLINOIAN TERMINAL MORAINE TILL—Flanders Till forming a moraine consisting of four segments between Flanders and Ironia. As much as 60 feet thick. Includes a double ridge in the Lake Ironia basin on the north side of the large delta west of Ironia. Exposures here show that the till forming these ridges is 10 to 15 feet thick and overlies sand and gravel (fig. 7). The underlying sand and gravel are deltaic and fan deposits that were overridden by the advancing ice. The moraine marks the most southerly position of the Illinoian ice sheet.

Qif — ILLINOIAN GLACIOFLUVIAL DEPOSITS—Stratified, well- to moderately sorted, sand, pebbly sand, pebble-to-cobble gravel, minor boulder gravel, and minor silt. Fine sediment is yellowish brown, brown, gray. Contains subrounded to well-rounded pebbles and cobbles of gneiss, quartzite, sandstone, and chert. Crystalline clasts have weathering rinds up to 0.5 inch thick, sandstone clasts have thin weathering rinds, quartzite and chert clasts are generally unweathered but may exhibit iron staining. As much as 30 feet thick. Forms a terrace in the Drakes Brook valley. Equivalent to the Drakes Brook outwash deposit of Stone and others (2002).

Qid — ILLINOIAN DELTAIC DEPOSITS—Stratified, well to moderately sorted, sand, pebbly sand, pebble-to-cobble gravel, minor boulder gravel, and minor silt deposited by meltwater streams as deltas in glacial Lake Ironia. Color, clast composition and weathering are similar to that in unit Qif. Includes sand and pebble-to-cobble gravel in glaciofluvial topset beds that are as much as 25 feet thick, with bedforms like those described for unit Qwd. The topset beds overlie and grade into foreset beds like those described for unit Qwd. As much as 70 feet thick.

Qilf — ILLINOIAN LACUSTRINE-FAN DEPOSITS— Stratified, well to moderately sorted, sand, pebbly sand, pebble-to-cobble gravel, minor boulder gravel, and minor silt deposited by meltwater as fans in glacial Lake Ironia. Color and clast composition are similar to that in unit Qif. Includes moderately to poorly sorted cobble gravel, pebbly sand, and sand in massive to plane-bedded subhorizontal beds; well- to moderately sorted sand and pebble-to-cobble gravel in massive to rhythmically bedded foreset beds that dip as much as 25° basinward and grade into ripple cross-laminated to parallel-laminated foreset beds of sand, fine gravel, and silt. Foreset beds grade outward into or overlap gently inclined bottomset beds that consist of rhythmically bedded, ripple cross-laminated and parallel-laminated fine sand and silt with minor drapes of silty clay. As much as 60 feet thick. In subsurface only (section AA').

Qil — ILLINOIAN LAKE-BOTTOM DEPOSITS—Laminated, rhythmically bedded silt, fine sand, and clay; and minor cross-laminated silt, fine sand, and minor clay. Gray, light gray, pale brown. Deposited on the floor of glacial Lake Ironia by density flows and settling of fines. As much as 140 feet thick. Interbedded with colluvium in places, particularly in the narrow part of the Lamington valley between Ironia and Milltown. In subsurface only (sections AA', BB', CC').

Qpt — PRE-ILLINOIAN TILL—Deeply weathered, compact, massive to crudely layered, sandy silt and clayey silt; reddish yellow, strong-brown, yellowish brown, reddish brown, weak-red; containing 2 to 5 percent pebbles and cobbles. Gravel consists chiefly of gray and brown quartzite and quartzite-conglomerate, gray gneiss, with minor gray and brown sandstone, shale, chert, and yellow decomposed carbonate rock, and a few boulders of quartzite and gneiss. Gneiss clasts have thick weathering rinds or are completely decomposed; carbonate clasts are fully decomposed. Quartzite, sandstone, and chert pebbles and cobble have pitted surfaces and thin weathering rinds. Matrix contains clay, quartz weathered rock fragments, minor weathered mica, and few heavy minerals. Subvertical joints are poorly to moderately developed to depths exceeding 10 feet. Clasts and joints are commonly coated with red iron and black iron-manganese oxide. As much as 30 feet thick. Equivalent to Port Murray Formation, till facies, of Stone and others (2002).

Qwg, **Qwgt** — WEATHERED GNEISS—Massive to layered, noncompact to compact, silty sand to clayey silt saprolite; brown, yellowish brown, strong-brown, white, red; and sandy, blocky rock rubble; very pale brown, yellowish brown, gray. Matrix consists of clay, quartz, minor mica and heavy minerals. As much as 100 feet thick. Includes thin stony and blocky colluvium on steeper slopes, and in places a mantle of angular to subangular cobbles and boulders of gneiss on gentle slopes; as much as 10 feet thick. Weathered zone grades downward through a bouldery zone of joint blocks into underlying unweathered bedrock, and extends deeply along joints, fractures, and bedrock layers, particularly micaceous and finely foliated and jointed gneiss units. Joint blocks and rock rubble in the subsurface typically have thick weathering rinds. Qwgt indicates areas where weathered material is thin or absent and fractured bedrock abundant (fig. 8), typically on steep slopes and narrow ridgetops.

Qwcb — WEATHERED CARBONATE BEDROCK—Massive, compact, clay and silty clay solution residuum; light-red, red, reddish yellow, strong-brown, yellowish brown, yellow, very pale brown, color locally highly variegated; containing less than 5 percent angular to subangular chips and pebbles of carbonate rock, chert, vein quartz and minor shale and sandstone. Matrix consists of clay, quartz, and iron oxide. As much as 300 feet thick but thickness is highly variable. Locally overlain by thin colluvium as much as 5 feet thick on gentle hillslopes. In places, contains sand, gravel, boulders, silt, and clay washed and collapsed into sinkholes and solution cavities from overlying colluvial, alluvial, and glacial sediment. Weathered zone typically ends at an abrupt, very irregular contact with unweathered bedrock and extends deeply along joints and fractures.

Qws — WEATHERED SHALE AND SLATE—Massive to layered, noncompact to slightly compact silty clay; reddish brown, yellowish brown; containing up to 50 percent chips, granules, and angular flat pebbles of shale and slate. As much as 30 feet thick. Locally overlain by thin shaly colluvium on hillslopes as much as 10 feet thick. Weathered zone typically grades downward through a zone of fractured rock into underlying unweathered bedrock. In southeast corner of quadrangle near Ralston.

Qwc — WEATHERED CONGLOMERATE—Massive, compact, clayey sandy silt; reddish brown; containing up to 30 percent subrounded to subangular pebbles and cobbles of reddish brown to purple conglomerate composed of white quartz and red siltstone pebbles. As much as 20 feet thick. On summit of Mount Paul in southeast corner of quadrangle.

Qwq — WEATHERED QUARTZITE—Massive, compact to slightly compact, fine sand to silty clayey sand; white, very pale brown, reddish yellow, light gray; containing up to 50 percent angular pebbles and cobbles of gray, white, red, and purple quartzite. As much as 120 feet thick. The weathered quartzite east of Flanders is overlain by discontinuous, small patches of Flanders Till less than 10 feet thick.

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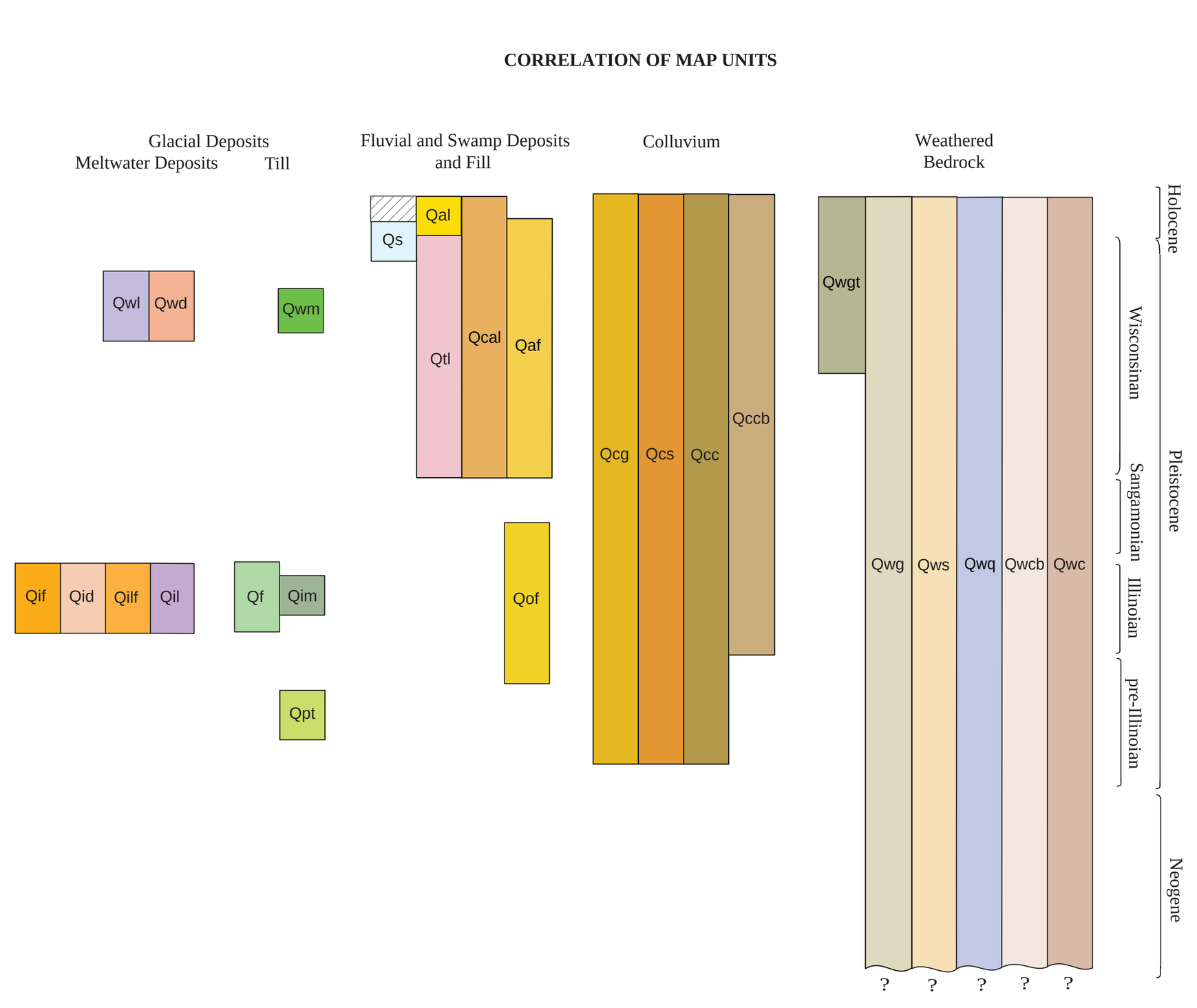
CORRELATION OF MAP UNITS



EXPLANATION OF MAP SYMBOLS

Contact—Contacts of units Qal, Qs, Qtl, Qwd, Qid, and Qif are generally well-defined by landforms and are based on LiDAR imagery and 1:12,000 stereo aerial photographs. Contacts of other units are based on landforms and field observations and are gradational, feather-edged, or approximate.

•47 Well or boring with log in table 1—Location accurate to within 500 feet.

700 Elevation of the base of surficial deposits—Contour interval 50 feet. Shown only where surficial deposits are more than 50 feet thick above weathered bedrock in the upper Drakes Brook and Lamington River valleys and at Budd Lake.

figure 5 • Photograph location

Large bedrock outcrop—Many small outcrops are not shown, including small outcrops within unit Qwgt and small outcrops in road and railroad cuts and other excavations. The locations of these are shown on figure 3 and in Volkert (2015).

Solution basin—Line encloses basin. Formed by dissolution of underlying carbonate bedrock. Identified from LiDAR and infrared imagery, and aerial photographs taken in 1951.

Thermokarst or eolian basin—Line encloses basin. Formed by melting of ground ice at shallow depth in, or by wind erosion on surface of, units Qwd and Qtl. Identified from LiDAR and infrared imagery, and aerial photographs taken in 1951. In the Lamington valley south of Succasunna and north of Milltown.

Excavation perimeter—Line encloses excavation. Shows extent of sand and gravel pits, quarries, and iron-mine pits.

Sand and gravel pit—Inactive in 2022.

Quarry—Inactive in 2022. Includes quarries in carbonate rock and shale southwest of Ralston and iron-mine pits elsewhere.

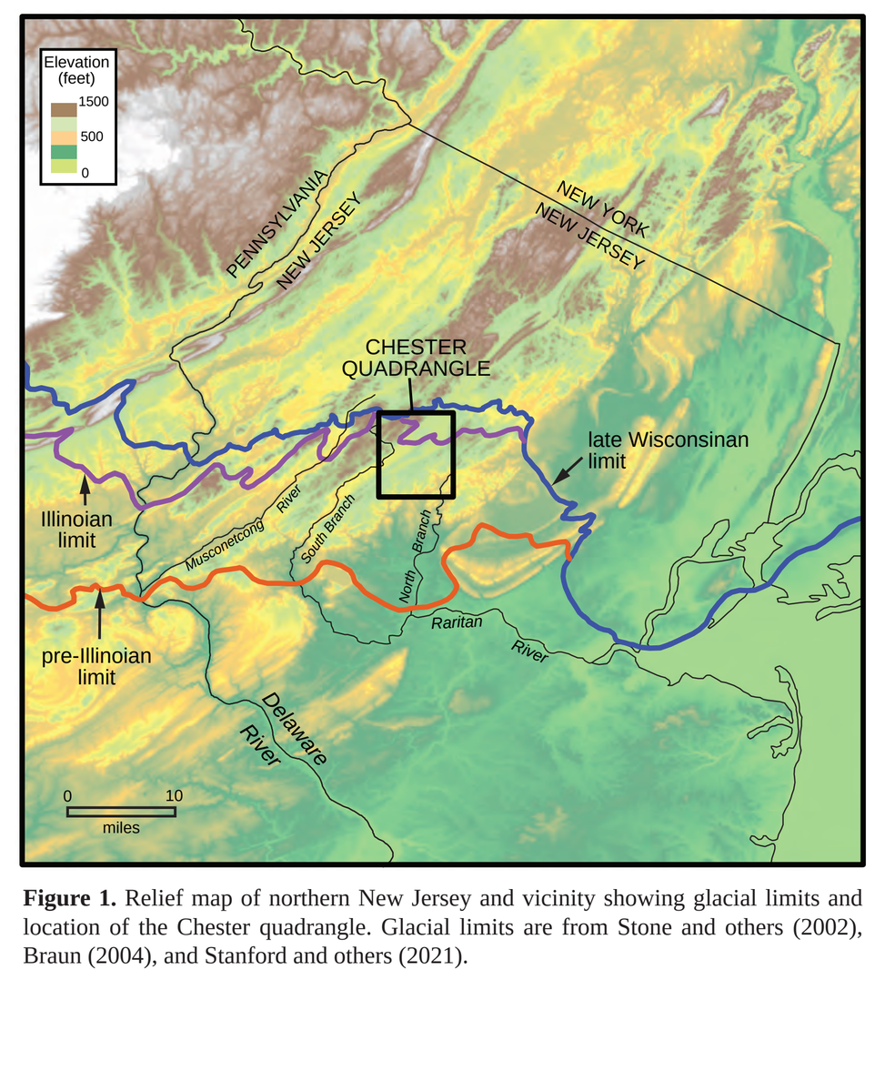


Figure 1. Relief map of northern New Jersey and vicinity showing glacial limits and location of the Chester quadrangle. Glacial limits are from Stone and others (2002), Braun (2004), and Stanford and others (2021).

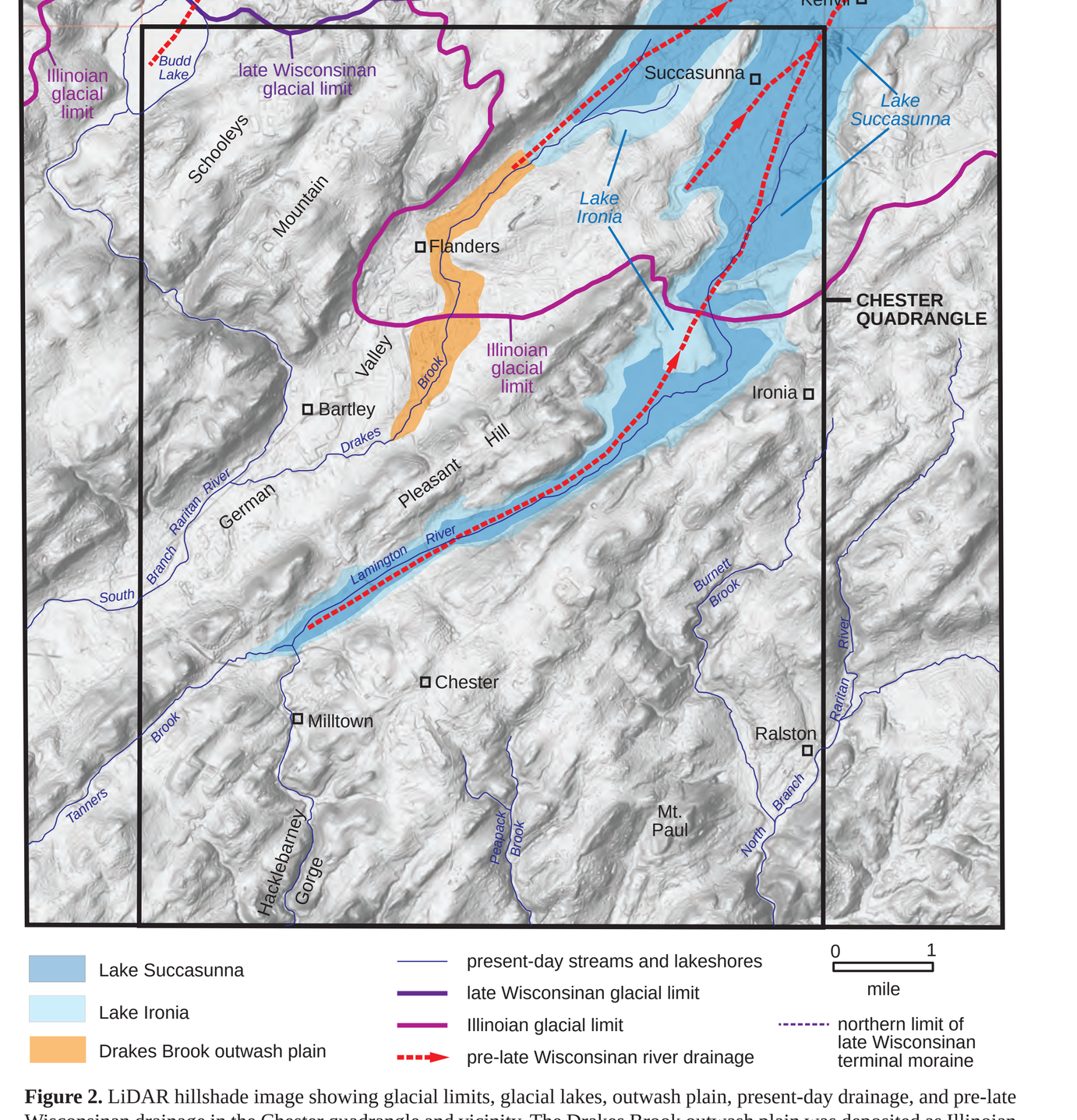


Figure 2. LiDAR hillshade image showing glacial limits, glacial lakes, outwash plain, present-day drainage, and pre-late Wisconsinan drainage in the Chester quadrangle and vicinity. The Drakes Brook outwash plain was deposited as Illinoian ice stood at and retreated from its terminus. Lake Ironia is of Illinoian age and Lake Succasunna is of late Wisconsinan age. Both occupied the upper Lamington valley and were controlled by a spillway near Milltown. Lake Ironia was 10 to 15 feet higher than Lake Succasunna, probably because the spillway was lowered by erosion during and after the Illinoian glaciation. Stream drainage in the upper Lamington and Drakes Brook valleys was northward into the Rockaway basin before the Illinoian glaciation and also before the late Wisconsinan glaciation, except for the segment of the Lamington valley between Milltown and Ironia. In this part of the valley, the delta and moraine at Ironia may have blocked northward drainage of the Lamington and ponded a postglacial lake between there and Milltown after the Illinoian glaciation. This lake may have drained southward through the Hacklebarney gorge.

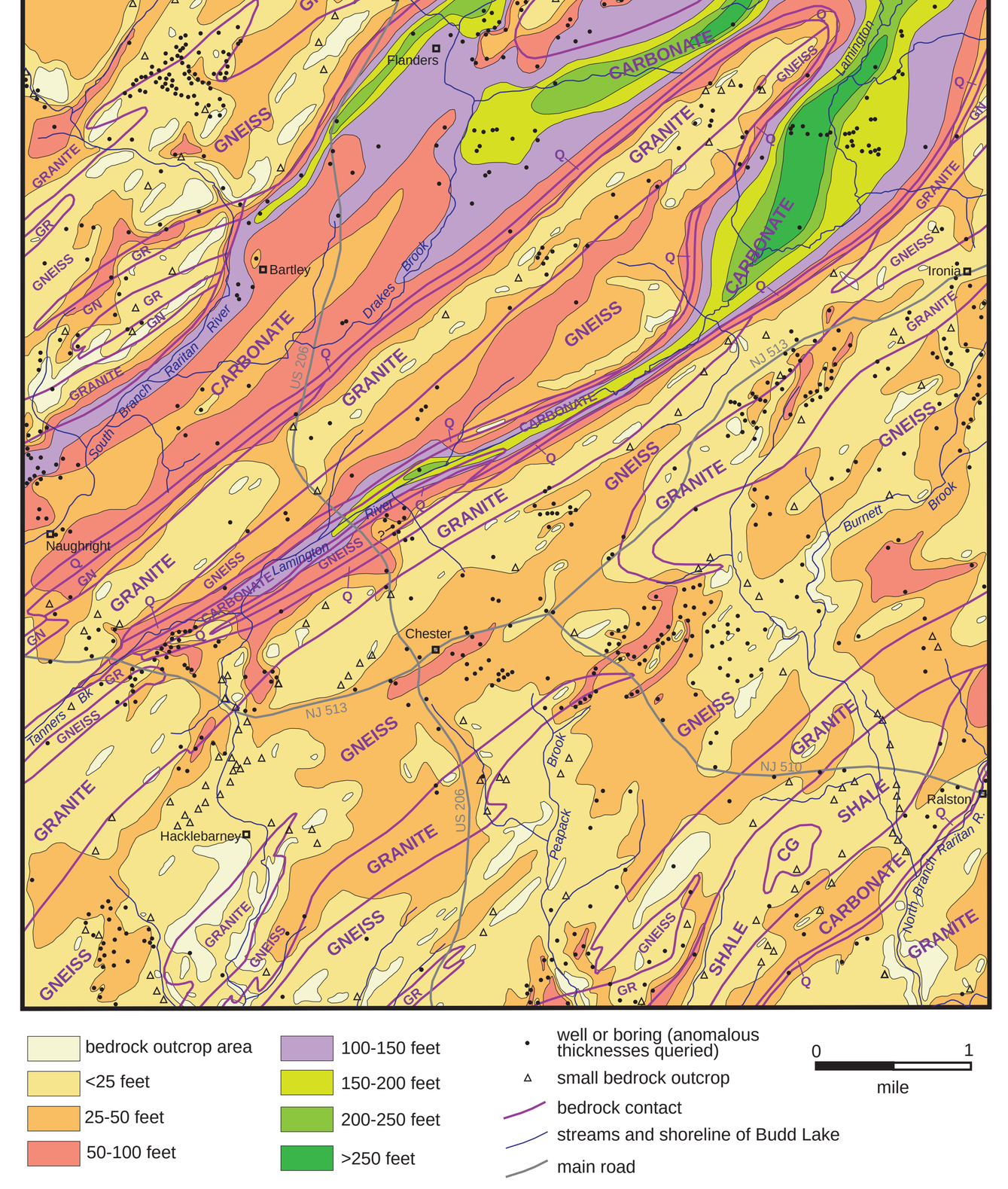
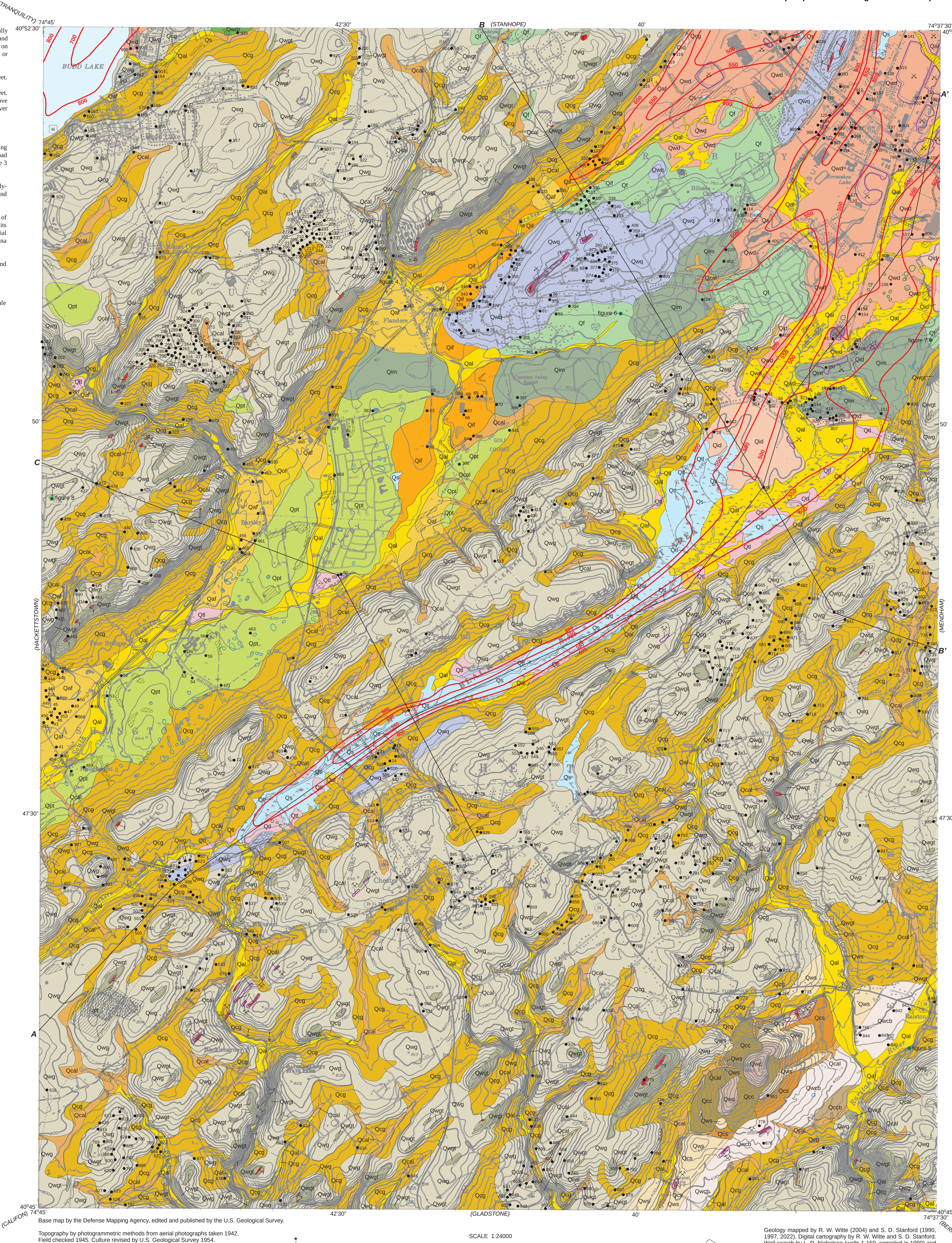


Figure 3. Thickness of surficial material, including weathered rock, in the Chester quadrangle. "Gneiss" includes metasedimentary and metavolcanic gneiss, "granite" includes gneissic granite and related intrusive rocks. Abbreviations are: CG=conglomerate, GN=gneiss, GR=granite, Q=quartzite. Note thick carbonate-rock residuum and gneiss colluvium adjacent to gneiss uplands, thick gneiss and granite saprolite and colluvium in belts on gneiss uplands, thick weathered conglomerate and carbonate-rock residuum and till between Flanders and Succasunna, and thick glaciolacustrine deposits at Budd Lake and in the upper Lamington River and Drakes Brook valleys, where they overlie carbonate-rock residuum. Bedrock outcrop areas include ridgetops and steep slopes. Bedrock contacts and most small outcrops are from Volkert (2018). Small outcrops include some bedrock exposed in shallow excavations. Anomalous thicknesses reported in a few wells (queried) are excluded from the contouring.



Base map by the Defense Mapping Agency, edited and published by the U.S. Geological Survey.

Topography by photogrammetric methods from aerial photographs taken 1942.
Field checked 1945. Culture revised by U.S. Geological Survey 1954.
Photorevised by U.S. Geological Survey 1981 from aerial photographs taken 1976.

Polyconic projection. 1927 North American Datum.

TRUE NORTH
MAGNETIC NORTH
12°
APPROXIMATE MEAN DECLINATION 2022

SCALE 1:24000

1 1/2 0 1 mile

1000 0 1000 2000 3000 4000 5000 6000 7000 feet

1 1/2 0 1 kilometer

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

NEW JERSEY
QUADRANGLE LOCATION

Geology mapped by R. W. Witte (2004) and S. D. Stanford (1990, 1997, 2022). Digital cartography by R. W. Witte and S. D. Stanford. Well search by L. R. Nicholson (wells 1-159, compiled in 1990) and S. D. Stanford (wells 160-934, compiled 2022).

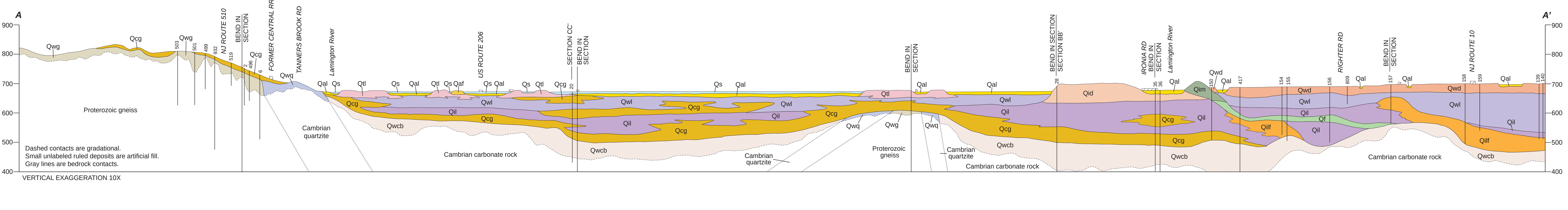
Research supported by the U. S. Geological Survey, National Cooperative Geologic Mapping Program, under USGS award number 04HQAG0026 (2004). The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U. S. Government.

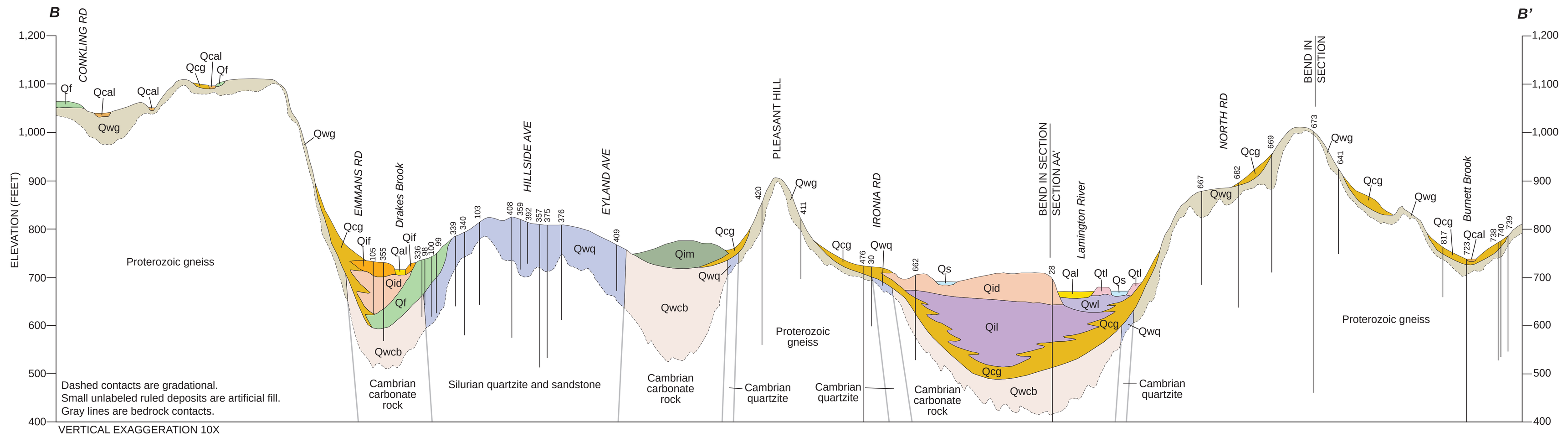
[1]Retired, N. J. Geological and Water Survey

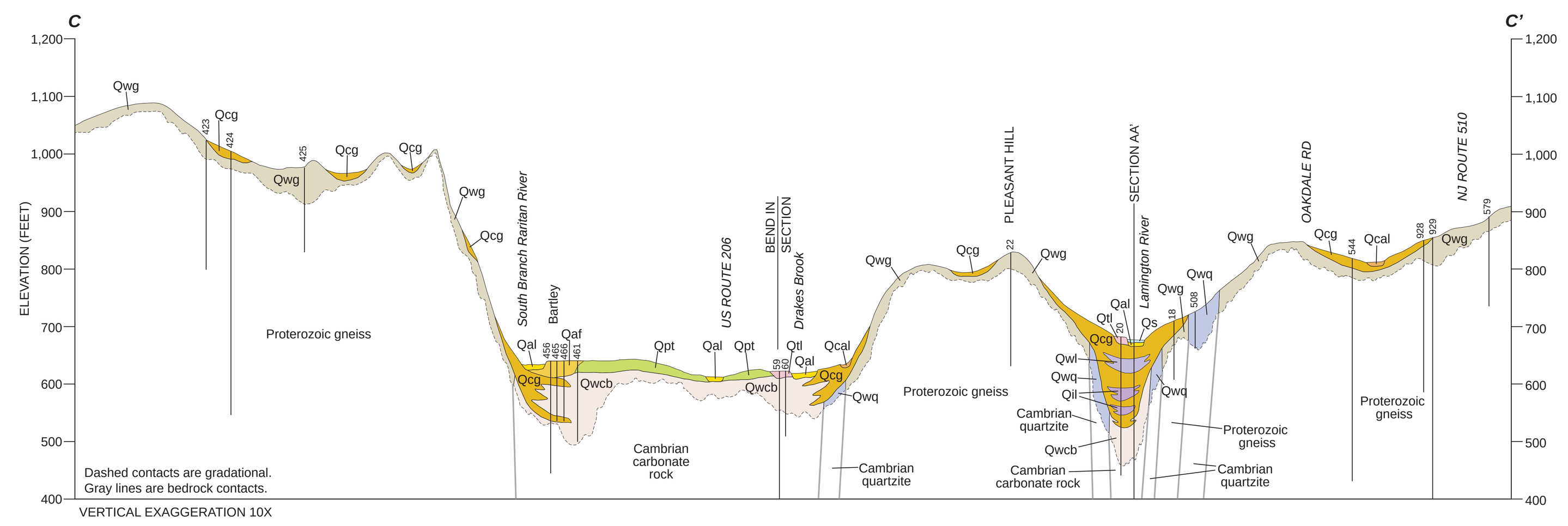
SURFICIAL GEOLOGIC MAP OF THE CHESTER QUADRANGLE MORRIS COUNTY, NEW JERSEY

By

Ron W. Witte[1] and Scott D. Stanford
2022







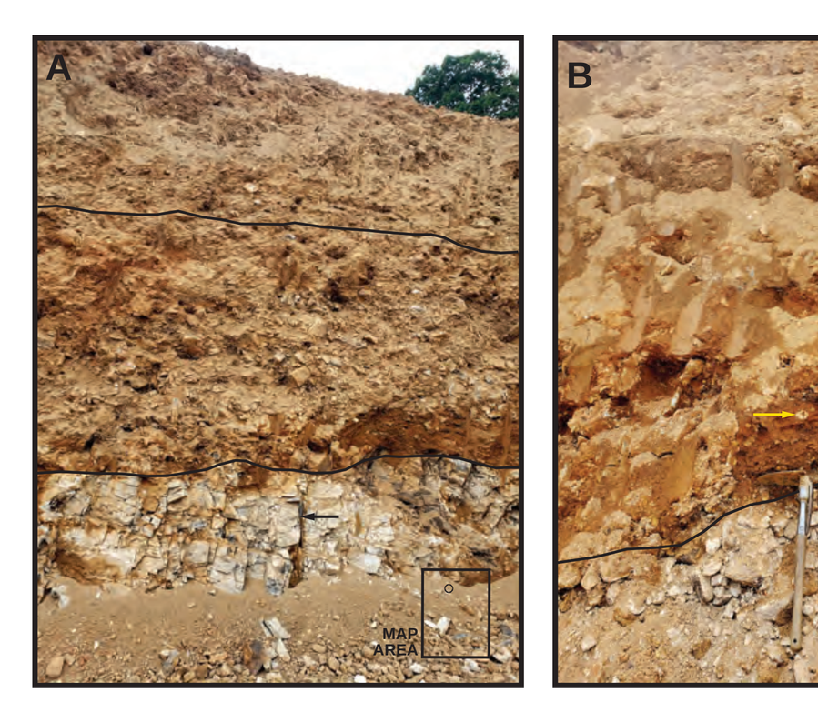


Figure 4. Temporary excavation exposing gneiss colluvium (Qcg) overlying fractured and weathered gneiss bedrdock (Qwg). Photograph A shows lightly weathered yellowish brown silty sand colluvium (above top line) of Wisconsinan age overlying more intensely weathered reddish yellow clayey sand colluvium (between lines) of pre-Wisconsinan age which rests on weathered gneiss (below bottom line). Shovel for scale (arrow). Photograph B is a close-up of the pre-Wisconsinan colluvium showing weathered and decomposed gneiss clasts (arrows) within the reddish yellow clayey matrix. Weathered gneiss is below the line. Inset map shows location. Photographs by S. Stanford.

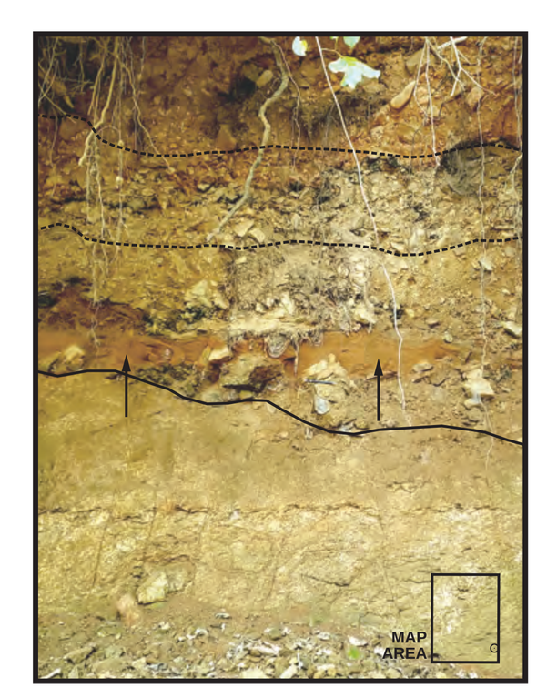


Figure 5. Bank along North Branch of the Raritan River showing gneiss colluvium (Qcg) overlying gness saprolite (Qwg, below solid line). Height of exposure approximately 12 feet. The colluvium contains a lense of reddish yellow sand (arrows) and a gravelly zone (within dashed lines). The sand shows weak horizontal bedding and may be from slopewash or from alluvial deposition by the North Branch. The gravel is angular and poorly sorted and may have formed from the washing away of fine matrix in the colluvium by seepage or runoff. Inset map shows location. Photograph by S. Stanford.

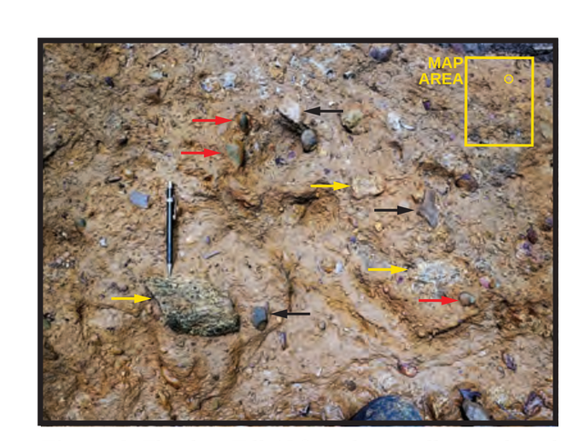


Figure 6. Flanders Till (Qf) with partially weathered gneiss clasts (yellow arrows), siltstone clasts with weathering rinds (red arrows), and unweathered quartzite and chert clasts (black arrows). Inset map shows location. Photograph by S. Stanford.

Figure 8. Fractured gneiss outcrop (Qwgt). Angular blocks of gneiss are produced by freeze and thaw of water in joints in the bedrock. Inset map shows location. Photograph by S. Stanford.

Figure 7. Flanders Till (Qf, above line) overlying deltaic sand (Qid) in temporary trench near Ironia. Height of exposure is approximately 15 feet. The till was emplaced above the sand as Illinoian ice at its terminus advanced over the delta. Inset map shows location. Photograph by S. Stanford.

Surficial Geology of the Chester Quadrangle
Morris County, New Jersey

New Jersey Geological and Water Survey
Open-File Map OFM 150
2022

Pamphlet with Table 1 to accompany map

Table 1. Records of selected wells and borings in the Chester quadrangle. Identifiers indicated by 3-, 4- or 5-digit numbers are N. J. Department of Environmental Protection well permit numbers. All are prefixed by "25-" except as indicated. Identifiers prefixed by "DOT" are N. J. Department of Transportation borings. Discharge, depth, and geologic log are from drillers' records as submitted to the N. J. Department of Environmental Protection. Discharge is in gallons per minute, depth is in feet below land surface, and geologic logs are as submitted by the driller, with minor spelling and format changes. A few surficial descriptions, and many bedrock descriptions, are condensed for brevity. "NR" indicates that the information is not reported on the well record. Note that drillers' descriptive terms, particularly for rock types, are not always geologically accurate. For example, "sandstone" in many cases is used to describe granular gneiss saprolite, and "limestone" and 'trap" are used by some drillers to refer to gneiss. For several wells, a geologist's log based on examination of mud rotary samples is available and is provided after the driller's log. Comments in brackets are authors' inferences and observations.

Well Number	Identifier	Discharge	Depth	Geologic Log
1	24351	15	0-25	overburden
			25-150	limestone
2	24356	25	0-28	overburden
			28-125	limestone
3	25081	15	0-35	sand and clay
			35-75	limestone
			75-250	granite
4	25083	15	0-30	clay, sand, and gravel
			30-100	limestone
5	25082	10	0-70	overburden
			70-200	limestone
6	25090	25	0-60	overburden
			60-225	limestone
7	24355	30+	0-15	overburden
			15-150	limestone
8	23402	15	0-50	sand and clay
			50-250	gray granite
9	25088	30	0-50	overburden
			50-250	sandstone
10	25089	30	0-40	overburden
			40-200	sandstone
11	24584	6	0-50	sand
			50-300	sandstone
12	24810	5	0-6	overburden
			6-500	granite
13	20138	12	0-13	overburden
			13-72	gray granite

Well Number	Identifier	Discharge	Depth	Geologic Log
14	23934	NR	0-10	sand
			10-16	sand with clay
			16-19	broken rock and clay
15	29997	20	0-2	soil
			2-15	clay
			15-90	clay and rotten rock
			90-230	granite
16	10694	20	0-75	clay and hardpan with limestone boulders
			75-110	granite mixed with iron ore
17	26466	9	0-4	stony hardpan
			4-323	granite
18	28107-1	1	0-2	dirt
			2-38	sand and gravel
			38-101	granite
19	23932	NR	0-10	sand with clay
			10-18	weathered granite
20	32964	NR		driller's log:
			0-10	tan sand, silt and silty clay
			10-24.5	tan clay and gravel
			24-32	boulders
			32-61.5	tan sand, silt and gravel
			61.5-62.5	boulder
			62.5-67	tan sand, silt and gravel
			67-73	boulder
			73-150	tan sand, silt, clay and gravel
			150-221	heavily weathered dolomite and siltstone with clay layers
				geologist's log:
			0-10	sandy soil
			10-15	rock fragments (quartz), pea gravel, clay
			15-20	clay, pea gravel
			20-26	clay, smaller gravel
			26-32	boulders
			32-40	gravel, pebbles, rock fragments
			40-45	same as above, with some silt
			45-50	gravel, pebbles, some silt
			50-55	gravel, pebbles, some sand, some silt
			55-61.5	gravel, pebbles, rock fragments, some silt
			61.5-62.5	boulder
			62.5-65	gravel, pebbles, rock fragments, some silt
			65-75	gravel, pebbles, rock fragments (angular pyroxenes, feldspars, quartz), some sand, clay
			75-90	rock fragments (angular quartz), gravel, some clay, silt
			90-100	medium sand, some clay
			100-105	medium to coarse sand, some clay
			105-112	clayey sand, clay, fine to medium sand
			112-120	fine to medium sand, clay, gravel, rock fragments (angular quartz, pyroxene, biotite?, chert?)
			120-130	sand, clay, rock fragments
			130-135	sandy clay
			135-140	mostly clay, some sand and gravel
			145-150	coarse to very coarse sand, clay, rock fragments, gravel

Well Number	Identifier	Discharge	Depth	Geologic Log
			150-155	clay, medium sand, some rock fragments (chert, weathered dolomite, quartz)
			155-160	same as above, more chert and weathered argillaceous, laminated, and shaly dolomite
			160-165	harder weathered yellow dolomite, shaly clay, chert, some sand
			165-170	highly weathered light brown to light gray dolomite (to clay softness), some chert, very little sand or clay
			170-180	weathered yellowish brown dolomite, red siltstone, chert, quartz
			180-185	same as above, but no quartz
			185-195	weathered yellowish brown dolomite, some harder gray-green dolomite fragments, some chert
			195-220	same as above, but fewer hard gray-green fragments, some red siltstone present
			220-225	same as above, more hard gray-green dolomite fragments, and some quartz (harder drilling)
			225-231.5	same as above, more fresh dolomite fragments
			231.5-233	fracture
			233-234	same as above, larger fragments
			234-242	mostly weathered dolomite with some harder gray-green fragments, some clay
21	40731	NR	0-63	medium to coarse sand, gravel and silt
			63-400	rock
22	22071	12	0-8	overburden
			8-30	sandstone
			30-198	granite
23	21707	30+	0-25	overburden
			222	granite
24	33678	10	0-63	sand and clay
			63-69	brown weathered rock
			69-73	hard gray rock
			73-88	dark gray rock
			88-100	weathered blue, brown, gray rock
			100-160	gray blue rock
			160-200	gray with white and black rock
25	21159	10	0-15	clay
			15-120	granite
26	23332	8	0-8	overburden
			8-175	granite
27	20462	25+	0-6	overburden with boulders
			6-30	clay and sand
			30-45	sand and gravel
			45-123	granite
28	32538-8	NR		driller's log:
			0-10	hardpan, topsoil
			10-60	sand, gravel and silt
			60-118	clay
			118-133	till
			133-137	boulders
			137-161	till or cemented gravel and silt
			161-195	sand, silt and gravel
			195-201	hard weathered rock
			201-207	soft weathered rock

Well Number	Identifier	Discharge	Depth	Geologic Log
			207-214	hard cemented gravel or weathered rock
			214-218	soft cemented gravel or weathered rock
			218-227	hard cemented gravel or weathered rock
			227-242	soft cemented gravel or weathered rock
			242-247	boulders
			247-281	till
			281-295	extremely hard till or weathered rock
			295-312	soft gravel, silt
			312-321	hard weathered rock
			321-331	soft weathered rock
			331-355	medium hard weathered rock
			355-376	very soft gravel, sand and silt
			376-382	more dense gravel and silt
			382-386	boulders
			386-409	soft weathered rock, some clay
			409-422.5	soft weathered rock that caved
				geologist's log:
			0-55	sand and gravel
			55-134	clay and sand
			134-138	boulders
			138-180	clayey medium to coarse sand
			180-195	fine to very coarse sand
			195-201	dark dolomite fragments and light brown weathered dolomite fragments
			201-208	same as above, but softer drilling
			208-214	same as above, but harder drilling
			214-218	same as above, but softer drilling
			218-227	hard, light brown weathered dolomite
			227-242	softer, light-colored dolomite, some dark fragments
			242-247	harder, light-colored dolomite fragments, some dark-colored
			247-262	very hard, light-colored clay, some dark dolomite fragments
			262-265	same as above, with some red clay and red rock, but softer drilling
			265-281	same as above, but harder drilling
			281-289	hard dark dolomite with some clay
			289-295	same as above, but no clay
			295-303	soft, light-colored, weathered dolomite and hard, dark-colored, and some white clay
			303-310	weathered dolomite fragments with red and dark bands, darker portions are crumbly
			310-312	same as above, softer drilling
			312-321	same as above, harder drilling
			321-331	same as above, softer drilling
			331-349	uncertain—many rock fragments of brown sandstone, weathered dolomite, quartz, red sandstone, some yellow-brown clay
			349-353	same as above, harder drilling
			353-359	fractures
			359-370	uncertain—too much material circulating with mud to distinguish cuttings—material includes yellow clay, weathered dolomite, red sandstone, quartz
			370-375	same as above, softer drilling
			375-380	larger rock fragments of brown sandstone, weathered dolomite, quartz, red sandstone,

Well Number	Identifier	Discharge	Depth	Geologic Log
				some yellow-brown clay
			380-382	dark and light-colored weathered, crumbly dolomite, less clay, some reddish-brown sandstone
			382-387	weathered dolomite (harder drilling)
			387-395	very soft, weathered dolomite
			395-400	same as above, with some pink sandstone
			400-409	same as above, but with dark reddish brown clay
			409-412	light brown weathered dolomite
			412-415	same as above with brown clay
			415-416.5	fracture
			416.5-422	larger, light brown, rounded, weathered dolomite fragments
29	20566	25	0-102	sand and small gravel
30	20255	20+	0-3	overburden
			3-5	clay and gravel
			5-23	rotten granite
			23-123	granite
31	24802	6	0-21	overburden
			21-250	granite
32	24187	15	0-120	sand and gravel
33	36392	20	0-2	soil
			2-35	tan sandy clay
			35-70	gray sandy clay
			70-110	dirty sand
			110-140	clean sand and gravel
34	17160	12	0-18	hardpan and large stones
			18-155	silty sand with layers of hardpan
			155-172	soft limestone
35	25610	855	0-10	tanish brown sand
			10-20	yellowish sand
			20-30	tan sand and stones
			30-60	soft gray clay
			60-80	sandy brown clay
			80-90	rock and cobbles
			90-100	brown sandy clay and stones
			100-110	hard gray clay
			110-120	hard gray clay with rocks
			120-140	hard brown clay
			140-143	cemented sand and gravel
			143-144	clay and gravel
			144-154	hard clay
			154-160	hardpan
			160-163	clay and cemented hardpan
			163-165	rocks
			165-175	hard packed cemented sand and gravel
			175-177	tan and white clay
			177-181	cemented sand and gravel
			181-183	limestone
			183-189	clay and rocks
			189-196	orange and yellow clay
			196-200	tan clay
			200-205	limestone
			205-209	layers of rock and clay
			209-214	yellow and white clay
			214-243	soft limestone
			243-265	broken limestone
			265-514	weathered limestone

Well Number	Identifier	Discharge	Depth	Geologic Log
36	21002	500	0-4	swamp muck
			4-7	green sand
			7-12	brown tannish sand
			12-19	brown gravel and stones
			19-23	mustard colored sand and gravel
			23-29	tan sand and stones
			29-31	stones
			31-38	grayish clay
			38-41	soft tan clay
			41-42	ledges of hard clay
			42-67	soft clay
			67-73	sandy clay
			73-91	rocks and cobbles
			91-119	clay, broken rocks and boulders
			119-143	hard clay
			143-144	cemented sand and gravel
			144-148	clay and gravel
			148-154	clay and sand
			154-156	hardpan
			156-163	cemented sand and gravel
			163-164	rocks
			164-169	cemented gravel with streaks of brown clay
			169-171.5	cemented gravel
			171.5-178	white and tan clay, orange clay streaks at 178
			178-180	weathered limestone
			180-310	hard rock
37	18614	20+	0-2	overburden
			2-60	fine sand
			60-78	clay
			78-80	gravel and water
38	6412	22	0-20	clay and sand
			20-70	soft limestone
			70-106	hard limestone
39	28448	NR	0-15	overburden
			15-60	limestone
40	23836	20	0-2	overburden
			2-25	clay and big gravel
			25-64	soft rotten brown granite
41	23917	40	0-52	clay and broken rock
			52-67	limestone
42	28071	7	0-10	sandy hardpan
			10-198	granite
43	23883	25	0-40	brown clay and gravel
			40-123	limestone
44	23223	40+	0-95	clay and limestone
			95-123	rotten limestone
45	23224	50+	0-110	clay and limestone
			110-120	rotten limestone
46	23882	30	0-32	clay, sand and gravel
			32-123	limestone
47	23225	50+	0-85	clay and gravel
			85-110	rotten limestone
48	21700	20+	0-50	overburden clay with boulders
			50-70	clay
			70-100	soft limestone
49	24100	30+	0-63	hardpan
			63-80	soft brown limestone
50	24101	15+	0-58	clay and hardpan
			58-148	gray limestone

Well Number	Identifier	Discharge	Depth	Geologic Log
51	34690	30	0-2	soil
			2-15	fractured rock and clay
			15-30	fractured rock
			30-225	limestone
52	8674	15	0-30	overburden
			30-90	highly weathered limestone
53	13314	25	0-34	overburden
			34-85	limestone
54	1520	6	0-31	hardpan
			31-40	clay and boulders
			40-58	sandy streaks and clay
			58-61	gravel
55	24130	100	0-2	soil
			2-12	fractured rock
			12-450	limestone
56	6747	167	0-27	yellow clay
			27-300	limestone
57	9856	12	0-76	clay and hardpan
			76-142	limestone
58	28001	20	0-40	overburden
			40-100	limestone
59	25288	506	0-68	sand, clay and gravel
			68-264	weathered limestone
60	25522	NR	0-73	overburden
			73-113	limestone
61	13051	464	0-1	top soil
			1-5	tight clay and sand mixture
			5-35	yellow clay
			35-67	decomposed limestone
			67-104	hard limestone
			104-110	large open seam
62	10455	15	0-65	clay and hardpan
			65-110	limestone
63	18359	5	0-20	clay and sand
			20-45	sand mixed with clay and boulders
			45-77	clay and gravel
			77-80	boulder
			80-90	gravel and clay
			90-98	boulders, gravel, clay and water
64	35639	NR	0-2	top soil
			2-44	orange silt
			44-90	cobbles and silty sand
			90-101	silty clay
			101-115	weathered rock
			115-118	lightly weathered rock
65	26754	100	0-66	gravel and clay
			66-140	limestone
66	33869	NR	0-2	coarse black sand
			2-6	light brown medium sand with gravel
			6-8.5	medium to coarse gray organic sand
			8.5-12	medium gray sand
			12-16	medium to fine light brown sand
67	19340	60	0-165	sand, gravel and boulders
68	20841	20+	0-40	gravel and sand
			40-135	clay and boulders
			135-140	sand, gravel and water
69	33896	50	0-15	sand, silt and small gravel
			15-28	sand, large gravel and water

Well Number	Identifier	Discharge	Depth	Geologic Log
			28-110	hardpan and gravel
			110-133	dry hardpan and gravel
			133-138	dry clay, sand and gravel
			138-158	silt, sand, clay and water
			158-162	weathered gray limestone
70	21748	20	0-10	overburden with gravel
			10-140	hard brown clay
			140-153	clay and gravel
			153-175	soft limestone with clay and sand
71	29034	20	0-58	clay
			58-60	dry gravel
			60-61	boulder
			61-143	clay and gravel
72	27058	10	0-2	soil
			2-18	fractured rock
			18-280	granite
73	19089	5	0-25	sand
			25-75	clay and sand
			75-100	hardpan
			100-185	white sandstone, water at 175 feet
74	21140	6	0-136	sand and gravel
			136-198	white rotten granite
75	20503	20+	0-82	sand and clay
			82-98	gravel and decomposed rock
76	13583	5	0-12	overburden
			12-90	sand, boulders and clay
			90-101	coarse sand, gravel, boulders and clay
			101-123	rotten limestone, water and white sandstone
			123-220	white sandstone and water
77	16392	2	0-50	overburden
			50-125	white, pink sandstone
78	26154	30+	0-45	sandy hardpan
			45-173	soft white sandstone
79	28708	NR	0-50	overburden
			50-150	sandstone
80	26506	20	0-40	clay and hardpan
			40-222	white and pink sandstone
81	24646	NR	0-2	fill
			2-18	hardpan with sand and gravel
			18-255	weathered limestone
82	20042	3	0-20	sand and clay
			20-170	white sandstone
83	27889	200+	0-120	clay and gravel
			120-400	limestone
84	24098	20	0-96	clay hardpan
			96-100	gravel and sand
85	20043	10	0-22	sand, clay and gravel
			22-190	soft white sandstone
86	18806	10	0-41	clay and boulders
			41-60	gray sand
			60-80	gray silt and sand
			80-92	gray sand
			92-96	gray limestone and water
87	20536	10	0-28	red sandstone
			28-190	soft white sandstone
88	16801	50	0-45	overburden
			45-56	gravel and brown clay
			56-62	sand and gravel

Well Number	Identifier	Discharge	Depth	Geologic Log
89	24133	12	0-105	soft brown to red sandstone
			105-198	white sandstone
90	26650	16	0-35	sandy hardpan
			35-373	white sandstone
91	23782	8	0-44	clay, sand and gravel
			44-173	soft red sandstone
92	25599	16	0-30	sandy hardpan
			30-223	white and pink sandstone
93	24134	25	0-84	soft brown loose sandstone
			84-198	red and brown sandstone
94	18601	4	0-110	overburden with boulders
			110-114	rotten granite
			114-298	granite
95	21958	8	0-40	red clay
			40-80	sand
			80-87	gravel
			87-96	sand and gravel
			96-130	brown rotten rock
			130-348	soft red rock
96	25180	8	0-70	clay, sand and gravel
			70-292	soft white sandstone and white clay
97	25412	12	0-65	sandy hardpan with some gravel
			65-95	white sandstone
98	25178	15	0-66	sand, clay and gravel
			66-90	soft brown sandstone
99	25413	10	0-74	sand, clay and gravel
			74-123	soft white sandstone
100	25558	14	0-42	brown clay and gravel
			42-120	white sandstone
101	25557	40+	0-65	clay, sand and gravel
			65-200	brown clay and sand
102	20229	2	0-30	brown clay
			30-40	sand
			40-60	gravel and clay
			60-80	clay
			80-248	red rock
103	20267	12	0-30	brown clay and sand
			30-173	white sandstone
104	35919	NR		driller's log:
			0-120	glacial till
			120-290	saprolite
			290-345	weathered rock
				geologist's log:
			0-115	yellow silty coarse sand, sand consists of fragments of purple and gray quartzite, gray sandstone and shale, gneiss, feldspar, quartz
			115-126	yellow clayey silt with sand grains as above
			126-140	same as above, but siltier and sand grains are finer
			140-274	yellow clayey silt with chert chips, several intervals of coarse sand consisting of chert and quartz
			274-380	dolomite chips
105	19396	20	0-40	gravel and boulders
			40-70	sand

Well Number	Identifier	Discharge	Depth	Geologic Log
			70-105	sand and gravel
106	18955	10	0-8	overburden
			8-35	clay and gravel
			35-40	gravel
			40-80	sand
			80-98	sand and gravel
107	17846	15	0-116	overburden with clay
			116-173	granite
108	22084	16	0-115	clay, gravel and sand
			115-135	sandstone
			135-173	granite
109	18414	5	0-50	overburden with clay
			50-173	granite
110	25596	NR	0-130	sand and gravel
111	21752	2	0-2	overburden
			2-32	clay, gravel and boulders
			32-300	granite
112	20546	20+	0-7	overburden
			7-9	boulder
			9-130	sand, gravel and clay
			130-140	rotten rock
			140-198	granite
113	20465	5	0-25	overburden
			25-38	sand
			38-41	boulder
			41-48	clay
			48-50	boulder
			50-148	shale
114	18032	15	0-30	red clay
			30-90	red clay with boulders
			90-220	yellow clay
			220-237	hard clay
			237-243	red clay (gravel at 243 feet)
115	18886	20+	0-50	overburden, sand and clay
			50-98	granite
116	33188	65	0-54	sand and gravel
			54-122	yellow clay
			122-130	broken limestone
			130-603	gray limestone
			603-607	broken limestone and open voids
117	18700	20+	0-6	overburden
			6-73	granite
118	20817	NR	0-20	sand and gravel
			20-50	big gravel
			50-75	sand
			75-131	sand and clay
119	26964	20	0-20	sand
			20-75	sand and gravel
			75-95	sandstone
120	15271	7	70-38	brown sand
			38-140	gray silt
			140-150	brown sand
			150-152	gravel and water
121	33680	7	0-23	sand and gravel
			23-27	fine brown sand
			27-31	coarse sand
			31-37	fine dirty black sand
			37-82	fine gray sand

Well Number	Identifier	Discharge	Depth	Geologic Log
			82-87	gray silt
			87-120	gray silty clay
			120-127	brown sand and clay
			127-130	clay
			130-133	brown to gray sand and clay
			133-137	brown sand
			137-146	coarse gravel
			146-155	fine sand with gravel
			155-157	brown sand and clay
			157-160	clay
			160-189	brown clay and gravel
			189-201	gravel with little clay
			201-203	gravel with less clay
			203-205	gravel
			205-208	gravel and brown clay
			208-210	clay
			210-223	broken limestone
122	21016	20+	0-5	overburden
			5-18	sand
			18-30	sand and gravel
			30-80	fine sand
			80-121	clay
			121-180	clay and gravel
			180-290	red and brown clay
			290-325	brown shale
123	35999	20	0-40	sand
			40-100	clay
			100-150	red rock
124	38874	20	0-4	overburden
			4-40	sand and gravel
			40-100	clay and gravel
			100-175	red rock
125	22500	100+	0-45	sand and gravel
			45-100	clay
			100-130	sand and gravel
126	19201	8	0-18	sand
			18-25	sand and gravel
			25-60	sand
			60-72	fine sand
			72-150	clay
			150-202	gravel, clay and sand
127	18061	10	0-32	choice sand
			32-155	silty fine sand
			155-168	clay
			168-175	conglomerated limestone
128	24174	20	0-39	sand and gravel
			39-60	weathered conglomerated rock
129	18970	12	0-20	sand and gravel
			20-60	sand
			60-132	clay
			132-135	sand and gravel
			135-150	sand
			150-154	gravel and sand
			154-175	brown sand
			175-196	sand
			196-347	silt
130	27446	NR	0-2	asphalt, fill
			2-5	orange to brown coarse sand, trace of silt and fine gravel

Well Number	Identifier	Discharge	Depth	Geologic Log
			5-15	olive to brown very coarse to medium sand, trace of silt and fine gravel
			15-24	olive to tan very coarse to medium sand, little medium to fine gravel, trace of silt
131	30934	20+	0-40	sand
			40-150	clay
			150-204	fine sand
			204-220	clay with gravel
			220-225	limestone with clay and water
132	24511	25	0-8	overburden
			8-235	sand and gravel
133	27758	15	0-208	sand and gravel
134	20771	20+	0-80	sand, gravel and clay
			80-148	sandstone
135	23551	100+	0-35	sand
			35-195	sand and gray clay
			195-230	brown clay, sand and gravel
			230-242	granite
136	10769	40	0-12	stones and sand
			12-45	yellow clay and stones
			45-76	yellow clay and gravel
			76-91	gray clay and gravel
			91-117	gray clay mixed with soft gray rock
			117-223	gray rock
137	16995	20+	0-42	overburden
			42-65	sand, gravel and water
			65-150	clay and silt
			150-154	hard clay
			154-160	sand, gravel and water
138	12296	4	0-2	overburden
			2-49	sand with small gravel
			49-127	fine sand
			127-139	fine sand with clay
			139-181	clay
			181-195	sand and very small gravel
139	20193	30	0-33	sand
			33-180	gray clay
			180-190	sand, water and gravel
140	23552	40	0-28	sand
			28-171	gray clay
			171-178	brown clay and gravel
			178-180	sand and gravel
141	9535	NR	0-5	fill dirt
			5-15	yellow sandy clay
			15-25	coarse sand and medium gravel
			30	medium sand, very little gravel
			30-35	medium sand and gravel seams
			35-40	medium sand, no gravel\
			40-75	medium fine sand
			75-80	medium sand, very little gravel
			80-85	medium and coarse sand
			85-91	medium and coarse sand and gravel
			91-103	fine sand and some clay
142	21006	NR	0-1	top soil
			1-4	clay and rocks
			4-20	boulders and cobbles
			20-34	clay and small stones
			34-37	tan soft sandy clay
			37-42	hardpacked clay and stones

Well Number	Identifier	Discharge	Depth	Geologic Log
			42-44	soft brown clay and stones
			44-48	sandy clay
			48-53	orange clay and stones
			53-105	brown clay
			105-112	tight, light tan clay
			112-122	very hard brown clay
			122-123	rock
143	25791	8	0-39	sand
			39-67	sand and clay
			67-124	sand and gravel
144	21669	10+	0-2	overburden
			2-20	sand
			20-80	clay
			80-95	sand
			95-100	sand and gravel
145	14790	NR	0-1	vegetation
			1-13	brown sand
			13-22	clay
			22-35	sand, gravel and large stones
			35-44	clay
			44-50	sandy clay
			50-70	sand, gravel and stones
			70-94	clay
			94-99	sand and clay mixed
			99-102	sand and gravel mixed with clay
			102-106	clay
			106-108	sand and gravel mixed with clay
146	14791	100	0-3	marl vegetation
			3-11	sand
			11-22	gray clay
			22-31	sand and clay mixed
			31-45	sand and gravel
			45-49	sandy clay
			49-60	coarse sand
			60-64	sandy clay
			64-82	coarse sand and gravel
			82-93	clay
			93-102	sand and gravel
			102-108	hard layer of crust
			108-138	coarse sand, gravel, 20% clay
			138-140	clay
			140-161	silty clay
			161-172	orange medium to fine sand
			172-174	hard clay
			174-178	weathered material
147	20386	10	0-2	overburden
			2-70	sand
			70-183	clay
			183-184	gravel
148	21008	NR	0-3	fill
			3-4	muck
			4-13	medium to coarse sand
			13-24	large gravel
			24-26	green clay and gravel
			26-33	soft sandy clay
			33-68	soft gray clay
			68-99	supersoft gray clay
			99-102	hardpan
			102-116	gravel and fine clayey sand

Well Number	Identifier	Discharge	Depth	Geologic Log
			116-131	tan clay
			131-134	brown clay
			134-150	brown clay with streaks of rock
149	17050	700	0-2	fill
			2-3	muck
			3-12	dirty sand with water
			12-34	clay
			34-37	sand and gravel
			73-43	clay and hardpan
			43-48	hard sandy clay and rocks
			48-52	hardpan and stones
			52-56	large gravel and sand
			56-73	sand and gravel
			73-74	fine sand and some gravel
			74-75	clay
			75-78	fine sand and clayey silt
150	21004	NR	0-2	brown sand
			2-13	stone and boulders
			13-14	clay and stones
			14-36	tight-packed clay
			36-48	tight-packed sandy clay
			48-49	hardpan
			49-50	tight sandy clay
			50-62	hard laminated clay
			62-69	reddish brown clay
			69-73	hard, tight, dry, brown clay
			73-149	reddish clay
			149-152	cemented sand
			152-157	clay
			157-159	sandy clay
			159-160	lenses of cemented sand
			160-162	very fine sand
			162-180	sand- and clay-filled rock ledges
			180-184	cracked rock
151	23443	9	0-2	overburden
			2-14	sand and gravel
			14-30	sand
			30-118	clay
			118-122	sand and gravel
152	14800	5	0-2	vegetation and dirt
			2-11	brown sand
			11-23	gray clay
			23-25	sandy clay
			25-37	sand, gravel and stones mixed with clay
			37-44	sandy clay
			44-50	sand, gravel and stones
			50-59	sandy clay
			59-68	sand and gravel with streaks of clay
			68-74	clay
			74-95	sand and gravel mixed with clay
			95-97	hard layer of crust
			97-132	sand and gravel with 20% clay
			132-134	clay
			134-188	sand, gravel, clay and layers of hardpan
			188-198	weathered zone
153	31624	NR	0-10	brown medium to coarse sand
			10-30	brown clayey, medium to coarse sand
			30-40	brown gravel, slightly clayey
			40-50	brown clayey gravel

Well Number	Identifier	Discharge	Depth	Geologic Log
			50-60	orange brown gravel
			60-80	clayey orange brown sand
			80-120	orange brown clay, some fine sand
			120-150	gray brown clay, some sand
			150-180	gray brown sand
			180-190	light medium gray dolomite
			190-210	brown sand
			210-260	yellow brown shale and siltstone
			260-265	yellow brown dolomite and shale
			265-270	yellow brown shale and siltstone
			270-340	light gray dolomite
			340-350	orange brown sand
			350-390	light gray to tan dolomite
			390-440	orange brown clay
			440-450	yellow brown dolomite and shale
154	22600	NR	0-11	coarse yellow to brown sand and gravel
			11-27	coarse gray sand and gravel
			27-91	gray silt and clay
			91-95	medium gravel
			95-99	clay
			99-101.5	gravel
			101.5-103	clay
			103-114	sand and gravel with clay lenses
			114-127	fine to coarse sand and gravel
			127-135	gravel
			135-143.5	coarse sand and gravel
			143.5-156	coarse sand and fine gravel
			156-157	cobbles with trace of clay
			157-161.5	rock (conglomerate)
155	21005	NR	0-1	pine needles and marsh
			1-2	black soil
			2-5	yellow sandy clay
			5-12	rusty brown sand
			12-20	gray sand and stones
			20-27	gray clay
			27-36	tight clay, streaks of stones
			36-39	dirty gray sand
			39-43	gray clay with streaks of fine sand
			43-72	very soft, light gray clay
			72-73	sand
			73-93	light brown clay
			93-94	hardpan or cemented sand
			94-95	clay
			95-96	cemented hard sand
			96-99	clay with some stones
			99-128	clay with rocks and small stones
			128-134	clay
			134-137	clay and sand
			137-138	clay and coarse sand
			138-140	gravel and sand with some clay
			140-153	clay
			153-154	hardpan
			154-155	clayey fine sand
			155-157	large stones and sand
			157-183	hard rock
156	21007	NR	0-1	top soil
			1-7	orange sand
			7-15	clay and stones
			15-17	boulders

Well Number	Identifier	Discharge	Depth	Geologic Log
			17-19	sand and clay
			19-20	green clay
			20-23	black clay and sand
			23-34	sand
			34-89	gray clay
			89-97	brown clay
			97-99	hardpan
			99-110	red cemented sand
			110-114	hardpan
			114-122	hardpacked sand
			122-131	streaks of cemented clayey sand
			131-145	streaks of clayey sand
			145-169	hardpacked laminated clay
			169-170	rock or hardpan
			170-181	laminated clay
			181-187	broken rock
			187-197	rock
157	26977	545	0-2	topsoil
			2-10	fine to medium sand
			10-12	fine sand and coarse gravel
			12-18	fine to medium sand’
			18-26	very fine hardpacked sand
			26-32	soft clay and sand
			32-34	clay
			34-38	clay with coarse sand
			38-40	medium to coarse sand
			40-41	fine sand
			41-42	clay and coarse gravel
			42-62	gravel, large rocks and yellow clay
			62-70	fine to medium gravel
			70-79	boulders with sand and gravel
			79-102	fine sand with clay streaks
			102-130	brown clay
			130-131	rock
158	26999	20	0-202	sand, gravel and clay
159	20580	50+	0-30	fine sand
			30-151	gray clay and silt
			151-160	sand and medium gravel
160	31153	15	0-8	overburden
			8-250	granite
161	27311	25	0-55	clay
			55-70	granite
162	28886	NR	0-30	sandy clay
			30-61	granite
163	19265	10	0-14	overburden
			14-30	soft granite
			30-110	granite
164	18989	20	0-20	clay
			20-44	sand and clay
			44-80	granite
165	27610	5	0-18	overburden
			18-50	yellow granite
			50-225	granite
166	21840	50	0-20	overburden
			20-285	granite
167	30313	10	0-8	overburden
			8-300	granite
168	22096	1	0-55	overburden with gravel and clay
			55-247	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
169	21341	12	0-18	sandy clay
			18-22	sandstone
			22-153	granite
170	22254	10	0-5	sandstone
			5-140	granite
171	28070	5.5	0-8	hardpan
			8-648	granite
172	23749	5	0-2	overburden
			2-5	clay
			5-274	granite
173	20564	12	0-38	sandy overburden
			38-124	granite
174	31324	7	0-37	overburden
			37-250	granite
175	19422	0	0-3	overburden
			3-270	granite
176	16728	3	0-8	overburden
			8-10	boulder
			10-40	clay and boulders
			40-173	granite
177	22013	20	0-2	overburden
			2-5	clay
			5-45	rotten granite
			45-173	granite
178	13802	60	0-14	overburden
			14-280	hard granite
179	16617	1	0-5	overburden
			5-340	granite
180	12791	2.5	0-5	overburden clay
			5-340	granite
181	25378	30	0-20	clay, boulders
			20-30	sandstone
			30-77	granite
182	18413	3.5	0-9	overburden
			9-220	granite
183	28384	NR	0-14	overburden
			14-150	granite
184	28385	8	0-16	overburden
			16-200	granite
185	26611	20	0-24	overburden
			24-250	granite
186	15919	60	0-65	sand and loose rocks
			65-100	sandstone and granite
187	22533	20	0-16	overburden
			16-148	granite
188	22807	20	0-14	hardpan
			14-98	granite
189	26904	32	0-17	sand, clay, gravel
			17-173	granite
190	26905	5	0-16	sand, clay, gravel
			16-198	granite
191	27528	20	0-18	hardpan
			18-298	granite
192	27529	8	0-16	hardpan
			16-173	granite
193	19032	20	0-35	sandy hardpan
			35-73	granite
194	25704	30	0-35	hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			35-48	soft sandstone
			48-123	granite
195	26567	60	0-8	stony hardpan
			8-647	granite
196	26566	100	0-9	stony hardpan
			9-485	granite
197	15700	5	0-5	overburden
			5-198	granite
198	30083	14	0-20	hardpan and rocks
			20-499	granite
199	27606	15	0-75	clay
			75-95	granite
200	28090	50	0-26	overburden
			26-272	granite
201	25677	7	0-29	overburden
			29-275	granite
202	23141	5	0-12	clay, rock
			12-400	granite
203	25099	10	0-15	overburden
			15-150	granite
204	25147	21	0-18	sandy hardpan
			18-148	granite
205	24048	5	0-15	overburden
			15-300	granite
206	24972	7	0-40	clay hardpan
			40-298	granite
207	24973	9	0-15	sandy hardpan
			15-298	granite
208	25584	22	0-10	sandy hardpan
			10-285	granite
209	25585	20	0-22	sandy hardpan
			22-123	granite
210	25586	10	0-22	sandy hardpan
			22-148	granite
211	25587	35	0-18	sandy hardpan
			18-73	granite
212	25588	7	0-17	sandy hardpan
			17-323	granite
213	25589	8	0-14	sandy hardpan
			14-298	granite
214	25590	3	0-22	sandy hardpan
			22-498	granite
215	25280	5	0-16	sandy hardpan
			16-430	granite
216	25735	29	0-23	sandy hardpan
			23-98	granite
217	25736	7	0-19	sandy hardpan
			19-198	granite
218	25737	5	0-14	sandy hardpan
			14-523	granite
219	25738	3	0-9	sandy hardpan
			9-50	granite
220	25739	12	0-12	sandy hardpan
			12-298	granite
221	25740	10	0-10	sandy hardpan
			10-323	granite
222	25741	40	0-8	sandy hardpan
			8-380	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
223	25742	15	0-13	sandy hardpan
			13-173	granite
224	25744	20+	0-18	sandy hardpan
			18-173	granite
225	25745	13	0-21	sandy hardpan
			21-148	granite
226	25746	23	0-13	sandy hardpan
			13-173	granite
227	25747	12	0-15	sandy hardpan
			15-145	granite
228	25749	35	0-9	sandy hardpan
			9-148	granite
229	25758	20+	0-20	sandy hardpan
			20-173	granite
230	25759	10	0-17	sandy hardpan
			17-173	granite
231	25761	19	0-34	sandy hardpan
			34-123	granite
232	25762	25	0-22	sandy hardpan
			22-148	granite
233	25765	19	0-20	sandy hardpan
			20-148	granite
234	25521	30	0-10	overburden
			10-200	limestone
235	25643	3	0-16	sandy hardpan
			16-448	granite
236	25644	20	0-30	sandy hardpan
			30-123	granite
237	25645	17	0-23	sandy hardpan
			23-123	granite
238	27158	5	0-5	overburden
			5-140	granite
239	27159	5	0-3	overburden
			3-170	granite
240	30059	15	0-10	sand, clay, fractured rock
			10-248	granite
241	30062	40+	0-28	sandy stony hardpan
			28-148	granite
242	21101	15	0-30	clay and boulders
			30-50	soft granite
			50-148	granite
243	27220	20	0-45	overburden
			45-100	granite
244	21606	17	0-11	sandy hardpan
			11-198	granite
245	23339	10	0-20	clay and boulders
			20-150	granite
246	15638	60	0-5	clay, sand, boulders
			5-15	sand and gravel
			15-25	limestone and glacial drift
			25-38	coarse-grained, rudely foliated hornblende granite
247	21902	8	0-8	overburden
			8-33	granite
			33-35	large void
			35-198	granite
248	23618	5	0-20	overburden
			20-370	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
249	23686	5	0-12	sand, clay, gravel
			12-398	granite
250	31552	5	0-21	overburden
			21-250	granite
251	25989	10	0-10	overburden
			10-40	fractured rock
			40-450	granite
252	31172	15	0-35	fractured and rotten rock
			35-305	granite, occasional weathering
253	24291	4	0-9	sandy hardpan
			9-449	granite
254	27059	15	0-18	fractured rock
			18-255	granite
255	28836	NR	0-30	overburden
			30-80	limestone
			80-260	granite
256	9845	20	0-63	clay, hardpan, boulders
			63-110	mixture of rock, mostly granite
257	24369	7	0-16	sandy hardpan
			16-197	granite
258	24532	22	0-9	sandy hardpan
			9-123	granite
259	24533	20+	0-9	sandy hardpan
			9-548	granite
260	24534	11	0-15	sandy hardpan
			15-223	granite
261	24535	6	0-18	sandy hardpan
			18-398	granite
262	24536	12	0-22	sandy hardpan
			22-323	granite
263	24537	20	0-22	sandy hardpan
			22-198	granite
264	24538	7	0-12	stony hardpan
			12-298	granite
265	24539	20	0-8	stony hardpan
			8-123	granite
266	24540	8	0-16	stony hardpan
			16-223	granite
267	24541	50+	0-25	clay and sand
			25-123	granite
268	24542	50+	0-28	clay and sand
			28-148	granite
269	24543	35+	0-33	brown clay and sand
			33-98	granite
270	24544	50+	0-20	sand, clay, gravel
			20-98	granite
271	24509	15	0-6	hardpan
			6-173	granite
272	22794	50+	0-23	hardpan
			23-298	granite
273	22795	50+	0-22	hardpan
			22-298	granite
274	23257	5	0-24	stony hardpan
			24-198	granite
275	23258	20	0-8	overburden
			8-147	granite
276	23259	40	0-6	stony hardpan
			6-148	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
277	23260	5	0-21	sandy hardpan
			21-396	granite
278	23420	20	0-7	stony hardpan
			7-198	granite
279	23867	15	0-15	stony hardpan
			15-198	granite
280	29794	18	0-7	hardpan
			7-249	granite
281	29795	20	0-13	stony hardpan
			13-198	granite
282	29796	25	0-10	hardpan
			10-173	granite
283	29797	14	0-19	sandy hardpan
			19-199	granite
284	29985	30	0-16	stony hardpan
			16-28	granite
			28-37	sandstone
			37-348	granite
285	29986	25	0-32	hardpan
			32-41	sandstone
			41-298	granite
286	24856	12	0-6	stony hardpan
			6-198	granite
287	25010	14	0-7	sandy hardpan
			7-148	granite
288	25011	30	0-19	stony sandstone
			19-148	granite
289	25012	5	0-8	stony hardpan
			8-298	granite
290	25014	20	0-8	stony hardpan
			8-173	granite
291	25016	12	0-9	sandy hardpan
			9-123	granite
292	25018	9	0-8	stony hardpan
			8-148	granite
293	25020	14	0-7	stony hardpan
			7-298	granite
294	25022	10	0-6	stony hardpan
			6-248	granite
295	25024	18	0-6	stony hardpan
			6-198	granite
296	22056	17	0-8	stony hardpan
			8-122	granite
297	16882	10	0-30	overburden
			30-70	fine sand and clay
			70-90	clay and gravel
			90-110	brown granite
			110-123	black white granite
298	23869	8	0-16	sandy hardpan
			16-148	granite
299	24037	12	0-7	stony hardpan
			7-198	granite
300	24040	7	0-6	stony hardpan
			6-173	granite
301	25996	12	0-5	sandy hardpan
			5-198	granite
302	25997	40+	0-18	sandy hardpan
			18-123	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
303	25999	12	0-14	sandy hardpan
			14-173	granite
304	26000	3	0-13	sandy hardpan
			13-523	granite
305	26002	20+	0-6	stony hardpan
			6-123	granite
306	26004	9	0-12	sandy hardpan
			12-198	granite
307	26005	5	0-20	NR
			20-44	granite
			44-55	very soft loose sandstone
			55-448	granite
308	26125	7	0-8	stony hardpan
			8-373	granite
309	26214	15	0-21	stony hardpan
			21-348	granite
310	30437	30	0-19	stony hardpan
			19-123	granite
311	23184	5	0-5	stony hardpan
			5-298	granite
312	23445	12	0-8	stony hardpan
			8-198	granite
313	23448	20	0-6	stony hardpan
			6-223	granite
314	23730	14	0-8	stony hardpan
			8-123	granite
315	24117	5	0-7	sandy hardpan
			7-423	granite
316	24283	8	0-6	stony hardpan
			6-399	granite
317	24286	12	0-8	stony hardpan
			8-423	granite
318	24563	15+	0-7	hardpan
			7-172	granite
319	29662	15	0-11	stony hardpan
			11-298	granite
320	29791	6	0-20	stony hardpan
			20-297	granite
321	29792	18	0-16	stony hardpan
			16-25	sandstone
			25-197	granite
322	30859	15	0-21	sandy hardpan and rock
			21-298	granite
323	23168	20	0-15	stony hardpan
			15-98	granite
324	23868	10	0-16	sandy hardpan
			16-173	granite
325	27494	10	0-6	overburden
			6-150	granite
326	29790	6	0-10	stony hardpan
			10-248	granite
327	20774	6	0-22	overburden
			22-148	granite
328	DOT B0022164	NR	0-11	orange-brown to brown sand, some clayey silt and gravel
			11-28	gneiss, highly weathered
329	2807	12	0-30	hardpan and slabby boulders
			30-90	yellow clay

Well Number	Identifier	Discharge	Depth	Geologic Log
			90-272	blue and gray sticky clay, red clay at 260
			272-276	slabby loose limestone
330	15524	50+	0-128	sand, clay, water, gravel
331	21038	15	0-89	clay and gravel
			89-250	granite
332	18956	15-20	0-20	overburden
			20-40	clay, gravel
			40-45	gravel
			45-100	sand, clay
			100-101	sand. gravel
333	15173	20+	0-23	overburden
			23-60	gravel, no water
			60-130	sand, gravel
334	21041	20+	0-75	overburden with boulders
			75-198	granite
335	24793	20+	0-55	sand, clay, gravel
			55-60	sand, gravel
336	25179	18	0-118	sand, clay, gravel
337	27245	14	0-206	sand, clay, gravel
338	28683	10	0-90	layers of clay and gravel
			90-200	soft conglomerate
339	7195	12	0-51	clay, boulders, hardpan
			51-142	red and white silica rock
340	8046	15	0-44	clay and hardpan
			44-210	white and red silica rock
341	24-5674	15	0-33	overburden and gravel
			33-75	sand
			75-110	brown clay and gravel
			110-119	green white granite
			119-150	soft limestone
			150-153	sand gravel
342	24-5675	22	0-16	clay and sand, boulder
			16-92	stone and clay
			92-105	fractured limestone, dark gray
343	31132	8	0-150	sand, gravel, clay
344	15455	20+	0-12	overburden
			12-30	sand gravel
			30-190	brown sand and clay
			190-240	white and pink sandstone
345	23866	50+	0-240	sand, clay, gravel
346	6880	NR	0-192	boulders, hardpan, boulders, limestone, well screened in sand and gravel from 183-192
347	12337	5-10	0-20	top soil, clay and sand
			20-40	loose rocky boulders, hard sandstone
			40-125	spots of hard sandstone, caves, clay, sand
348	29616	15	0-120	overburden
			120-175	granite
349	24367	12	0-14	sandy hardpan
			14-148	granite
350	2905	12	0-120	clay, boulders, and hardpan
			120-134	white and red silica rock
351	24417	10	0-95	layers of clay with gravel
			95-100	soft rock
352	13624	20+	0-60	sand and gravel
			60-75	white sandstone
			75-100	soft spots
			100-130	white sandstone with white clay
353	31952	20	0-4	clay

Well Number	Identifier	Discharge	Depth	Geologic Log
			4-177	sandstone
354	23232	10	0-18	clay
			18-25	boulders
			25-62	clay and gravel
			62-68	boulders
			68-75	gravel and clay
			75-97	boulder
355	25544	6	0-160	overburden with layers of clay and silty sand and gravel
356	17304	10	0-28	overburden
			28-40	white granite
			40-122	red, brown, tan sandstone
357	24199	15	0-85	hardpan and soft sandstone
			85-298	white and red sandstone
358	15182	15	0-100	yellow hardpan and boulders
			100-103	sand
359	10533	15	0-70	yellow hardpan and boulders
			70-106	fine sand, coarse sand at 106
360	19600	6	0-5	overburden
			5-18	sand and gravel
			18-20	boulder
			20-40	sand and gravel
			40-130	sand, gravel, clay, water
361	19601	10	0-5	overburden
			5-30	sand and gravel
			30-126	sand, gravel, clay
			126-130	sand, gravel, water
362	13267	2	0-38	overburden with clay
			38-42	boulder
			42-75	hardpan
			75-77	side of boulder
			77-138	gravel and clay
			138-323	purple shale or red shale with sandstone
363	13630	5-7	0-23	hard pack sand and large gravel
			23-37	white clay and sand
			37-98	brown clay
			98-101	fine sand and fine gravel
			101-105	hard fractured limestone, clay and sand
364	20226	8	0-180	sand, clay, gravel
			180-248	red and white sandstone
365	28053	5	0-40	sandy hardpan
			40-298	granite
366	7304	45	0-80	clay and hardpan
			80-232	blue and gray clay, very sticky and gummy
			232-250	orange clay and hardpan
			250-265	sandstone rock
367	24561	10	0-40	layers of gravel and sand
			40-50	fine sand
			50-87	clay
			87-100	soft rock
368	16801	40-50	0-45	overburden
			45-56	gravel, brown clay
			56-62	sand, gravel
369	24098	20	0-96	clay hardpan
			96-100	gravel and sand
370	17353	50	0-100	sand and clay
			100-144	sand
			144-160	sand, 50 gpm

Well Number	Identifier	Discharge	Depth	Geologic Log
371	19495	5	0-5	overburden
			5-20	clay
			20-190	rotten rock
			190-200	white rock
			200-212	white rotten rock
			212-215	brown, some water
			215-223	white rotten rock
372	21394	30-40	0-3	overburden
			3-20	clay and gravel
			20-40	boulder, very hard
			40-75	clay and gravel
			75-80	sand, gravel, some clay
373	21889	8	0-40	red clay
			40-80	sand and clay
			80-85	gravel
			85-97	sand and gravel
			97-185	brown rotten rock
			185-298	red rock
374	23783	17	0-41	sandy hardpan
			41-148	red and white sandstone
375	24036	30	0-47	soft brown hardpan
			47-91	soft brown sandstone
			91-272	medium red-brown sandstone
376	24334	15	0-55	hardpan and soft sandstone
			55-198	white and red sandstone
377	24335	20+	0-85	sandy hardpan and soft sandstone
			85-173	red sandstone
378	19960	8-10	0-25	overburden
			25-35	white sandstone
			35-43	brown soft sandstone
			43-80	white pink sandstone
			80-88	soft brown sandstone
			88-105	hard white sandstone
			105-107	soft brown sandstone
			107-172	soft and hard white pink sandstone
379	24603	18	0-12	sandy hardpan
			12-173	granite
380	28413	6	0-6	stony hardpan
			6-35	soft sandstone
			35-323	granite
381	28069	30	0-23	sandy hardpan
			23-123	granite
382	28422	10	0-7	soft hardpan
			7-35	soft sandstone
			35-323	granite
383	20936	20	0-120	clay and gravel
			120-130	rotten limestone
			130-148	limestone
			148-150	soft, water
384	23871	6	0-180	sand, clay, gravel
385	24646	NR	0-2	muck fill
			2-18	hardpan with lenses of sand and gravel, brown
			18-64	conglomerated decomposed limestone, light brown, darker below 59
			64-90	conglomerated limestone with very fine silica sand, brown, water bearing
			90-130	same as above, with fine sand
			130-134	clay, light brown

Well Number	Identifier	Discharge	Depth	Geologic Log
			134-178	conglomerated limestone mixture of silica sand and pieces of rock, small lenses of clay, brown
			178-183	humus mixed with clay, very dark brown
			183-199	water bearing coarser broken limestone mixture with fine silica sand, brown
			199-220	fine and coarse silica sand mixed with clay, brown
			220-255	large pieces of broken limestone and silica sand, dark brown
386	17406	15	0-50	gravel, clay, boulders
			50-64	clay, boulders
			64-66	boulder
			66-90	clay
			90-104	clay and boulders
			104-124	layers of rock and clay
387	42357	650	0-3	soil
			3-10	yellow clay
			10-165	soft broken tan limestone
			165-245	gray limestone with openings
388	41497	2035	0-6	overburden
			6-37	fine to coarse brown and white sand
			37-46	cobbles
			46-88	hard cobbles, brown, gray and white sand
			88-98	fine to medium sand streaks with clay
			98-113	clay, streaks sand and limestone
			113-121	soft streaks clay
			121-210	hard clay and soft limestone
			210-258	hard limestone with voids
389	41592	2016	0-6	overburden
			6-37	fine, coarse white sand, some clay
			37-46	cobbles, hard rock, brown sand
			46-88	cobbles, brown, gray, white sand
			88-98	fine-medium sand with clay
			98-113	brown clay, water, sand, and limestone
			113-297	hard and soft limestone
390	15550	10	0-25	overburden with gravel
			25-60	brown clay with gravel
			60-71	sand, stone
			71-72	brown water
			72-94	white sandstone
			94-102	brown white sandstone
			102-123	white sandstone
391	16103	10	0-40	red clay
			40-80	sand, clay
			80-87	gravel (10 gpm)
392	16106	5	0-25	red clay
			25-41	sand
			41-46	boulder
			46-80	sand, gravel
			80-85	gravel (5 gpm)
393	24855	6	0-106	sand and gravel
394	25367	15	0-192	sand and clay
395	27338	10	0-200	sand, clay and gravel
396	31942	20	0-30	sand
			30-60	clay
			60-68	sand and gravel
			68-125	red rock
397	13268	50+	0-40	sand gravel

Well Number	Identifier	Discharge	Depth	Geologic Log
			40-79	fine sand
			79-141	gray clay
			141-150	brown clay with gravel
			150-210	brown clay
			210-229	looks like brown clay and granite
			229-230	brown granite
398	16768	20+	0-20	sand
			20-35	sand, gravel
			35-70	fine sand
			70-148	gray clay
			148-152	sand, gravel
399	18705	15	0-20	muck
			20-50	brown sand
			50-90	gray silt
			90-92	gravel, sand, water
			92-106	sand, silt
			106-109	boulder, water at 109
400	17453	5	0-3	fill
			3-86	fine brown sand
			86-168	fine clay and sand
			168-210	granite, silty, rotten rock
401	28426	12	0-17	soft hardpan
			17-34	sandstone
			34-298	granite
402	14992	7.5	0-20	clay and gravel
			20-30	boulder
			30-75	clay, gravel, boulders
			75-80	gravel
403	20238	4	0-25	clay
			25-35	gravel
			35-38	boulder
			38-50	clay
			50-80	sand
			80-102	sand, gravel
			102-104	boulder
			104-110	sand gravel
404	25671	5	0-150	sand, clay, and gravel
405	5279	100	0-4	black muck
			4-48	blue clay
			48-49	very fine gray sand
			49-99	clay
			99-118	hardpan
			118-128	silica rock
			128-160	rotten rock
406	18304	20	0-20	overburden
			20-43	clay boulder
			43-45	boulder
			45-57	clay
			57-59	boulder
			59-71	clay
			71-77	boulder
			77-81	clay
			81-84	boulder
			84-90	clay
			90-93	boulder
			93-114	clay
			114-116	boulder
			116-130	clay with gravel
			130-142	gravel, clay

Well Number	Identifier	Discharge	Depth	Geologic Log
			142-146	gravel, clay, water
407	31280	10	0-116	sand, gravel, clay
			116-125	white rock
408	20229	2	0-30	brown clay
			30-40	sand
			40-60	gravel, clay
			60-80	clay
			80-201	red rock
			201-220	brown area
			220-248	red rock
409	3775	10	0-96	red sandy clay with gravel
			96-98	gravel and sand
410	20255	20+	0-5	clay and gravel
			5-23	rotten granite
			23-123	granite
411	20375	10+	0-24	dirt
			24-123	trap rock
412	9387	NR	0-20	coarse sand
			20-37	fine sand
			37-40	fine sand and clay
			40-80	clay
413	20800	35	0-21	hardpan and rocks
			21-298	granite
414	20301	20+	0-147	sand and gravel
415	20466	7	0-8	overburden
			8-248	granite
416	27824	15	0-20	overburden
			20-40	soft granite
			40-245	granite
417	38211	NR	0-35	sand
			35-110	clay and sand streaks
			110-130	sand, fine to very coarse, with pea gravel and cobbles
			130-370	brown clay with decomposed dolomite fragments
			370-450	weathered grayish-tan dolomite
			450-575	light gray dolomite
418	64783	603	0-7	coarse brown sand
			7-21	brown sand, clay, cobbles
			21-44	fine brown sand
			44-56	cobbles, boulders
			56-69	medium cobbles
			69-158	brown tan clay
			158-170	fine-coarse white sand gravel
			170-175	very fine sand
			175-180	fine-coarse sand
			180-183	bedrock
419	21003	NR	0-4	sand, clayish
			4-10	stones
			10-20	clayish sand, brown
			20-26	clay, lam[inated?], brown
			26-42	clay, gray
			42-51	sandish clay
			51-58	clay
			58-68	sand, clayish and hard
			68-73	clay, lam[inated?], hard
			73-86	hard clay
			86-86.5	rock
420	20430	4	0-50	overburden

Well Number	Identifier	Discharge	Depth	Geologic Log
			50-298	granite
421	17732	602	0-18	brown sand
			18-31	brown clay with stones
			31-63	sand with gravel streaks
			63-85	brown clay
			85-90	sand and gravel
			90-97	brown clay
			97-99	gravel
			99-102	brown clay
			102-104	sand and gravel
			104-147	brown clay
			147-149	brown sand
			149-151	brown clay
			151-155	brown sand
			155-163	brown clay
			163-175	sand and gravel
			175-177	brown clay
			177-180	sand and gravel
			180-181	brown clay
			181-182	sand and gravel
			182-183	hard rock
422	26521	18	0-106	sand, clay, gravel
423	21683	4	0-30	dirt
			30-225	granite
424	26756	8	0-12	overburden
			12-25	fractured rock
			25-453	granite
425	20687	4	0-68	dirt, sand, boulders
			68-108	limestone
			108-147	trap rock
426	23840	7	0-20	clay
			20-200	granite
427	25386	12	0-5	hardpan
			5-398	granite
428	29735	35	0-8	hardpan
			8-148	granite
429	23884	30+	0-31	sandy hardpan
			31-122	granite
430	20315	3	0-8	overburden
			8-472	granite
431	21079	10	0-10	overburden
			10-123	granite (soft 64-65)
432	21967	0.5	0-7	hardpan
			7-350	granite
433	27724	4	0-14	sandy clay
			14-352	granite
434	30120	35	0-35	overburden
			35-150	granite
435	27068	15	0-22	fractured rock
			22-230	granite
436	27373	15	0-12	fractured rock
			12-260	granite
437	21448	5	0-10	hardpan and sand
			10-398	granite
438	21729	6	0-6	stony sand
			6-373	granite
439	25201	4	0-15	sandy hardpan
			15-498	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
440	26507	40+	0-60	fractured rock
			60-105	granite
441	20613	5	0-6	stony overburden
			6-348	gray granite
442	28430	7	0-7	stony hardpan
			7-298	granite
443	19154	15	0-7	overburden
			7-300	gray granite
444	19171	30	0-11	sand hardpan
			11-98	gray granite
445	19172	30	0-18	hardpan and sand
			18-73	gray granite
446	19173	8	0-54	hardpan-sandstone
			54-215	granite
447	24757	10	0-40	overburden
			40-175	sandstone
448	22319	5	0-68	clay, sand, gravel
			68-448	granite
449	22748	40	0-100	sand, clay, lime gravel
450	23549	55	0-57	clay, sand, gravel
			57-73	soft fractured limestone
451	23639	26	0-100	clay, sand, lime gravel
452	22622	44	0-120	clay, sand, gravel, hardpan, limestone gravel
453	23630	50+	0-140	clay, sand, gravel
			140-145	rotten lime
454	27523	30	0-20	soil
			20-60	rotten limestone
			60-230	granite
455	18875	20	0-20	overburden with gravel
			20-125	granite
456	23310	5	0-41	clay and boulders
			41-106	clay
			106-198	granite
457	24995	5.5	0-10	brown granite
			10-174	granite
458	25569	10	0-10	overburden
			10-175	granite
459	21598	5	0-7	stony hardpan
			7-248	granite
460	29754	30	0-15	sandy soil and boulders
			15-98	clay and gravel
			98-105	broken limestone
			105-150	limestone
461	30219	30	0-10	overburden
			10-14	gravel, water
			14-126	clay
			126-132	gravel, water
462	8486	16	0-30	broken rock with some boulders
			30-80	clay with some boulders
			80-204	clay
			204-237	clay with some streaks of soft rock
			237-280	limestone rock
463	28001	20	0-40	overburden
			40-100	limestone
464	20152	20+	0-25	clay and stone mixed
			25-92	brown granite
465	21912	25+	0-2	overburden
			2-35	sand and heavy gravel, some small boulders

Well Number	Identifier	Discharge	Depth	Geologic Log
			35-95	sand and clay
			95-100	sand and gravel
466	21910	5	0-2	overburden
			2-40	sand and gravel
			40-60	clay
			60-95	clay and gravel
			95-100	sand and gravel
467	8016	380	0-45	yellow clay
			45-49	boulders
			49-68	clay
			68-72	sand
			72-198	limestone rock
468	9170	NR	0-5	sand and gravel, very dirty
			5-15	fine yellow sand
			15-22	very fine sand
			22-30	fine sand with a few large boulders
			30-50	fine yellow sand with thin streaks of clay
			50-70	clay with sand streaks
			70-78	hardpan with broken granite mixed in
			78-85	soft rotten rock
			85-90	yellow clay
			90-105	brownish yellow clay
			105-115	soft clay with gravel
			115-171	broken and weathered rock with clay seams
469	24977	7	0-20	overburden
			20-40	soft granite
			40-250	granite
470	26425	8	0-20	overburden
			20-250	granite
471	31028	20	0-70	fractured rocks, clay
			70-105	granite
472	28212	NR	0-30	overburden
			30-50	granite
473	20390	5	0-6	overburden
			6-148	granite
474	24794	18	0-13	stony hardpan
			13-173	granite
475	22425	20	0-25	overburden
			25-80	brown granite
			80-123	granite
476	28118	NR	0-30	overburden
			30-475	granite
477	21226	12	0-30	fractured rock
			30-275	granite
478	28062	50	0-350	overburden
			350-375	limestone
479	21837	20	0-30	overburden, clay, sand
			30-98	granite
480	24032	25-30	0-3	overburden
			3-525	granite
481	21830	7	0-30	sand, brown clay
			30-80	brown granite
			80-100	brown granite gradually turning gray
			100-398	gray granite
482	28600	8	0-30	fractured
			30-135	granite
483	19177	20	0-30	overburden, dirt, sand, rotten rock with water
			30-122	gray granite, brown and rotten 72-112

Well Number	Identifier	Discharge	Depth	Geologic Log
484	20683	5	0-20	overburden
			20-55	brown granite
			55-198	granite
485	29405	20	0-30	overburden
			30-200	granite
486	28427	20	0-36	hardpan
			36-46	sandstone
			46-198	granite
487	28094	15	0-23	rock, sandy
			23-400	lime
488	27178	5	0-8	overburden
			8-400	granite
489	32098	20	0-94	sandy clay and brown lime
			94-100	soft brown lime
490	24723	3.5	0-4	stony hardpan
			4-398	granite
491	24353	65	0-25	overburden
			25-150	limestone
492	29413	15	0-30	sandy overburden
			30-250	granite
			250-305	blue stone
493	24453	20	0-3	overburden
			3-223	granite
494	23555	30	0-30	sand and clay
			30-175	gray granite
495	23556	15	0-50	sandy clay
			50-175	gray granite
496	23401	50	0-70	sand, clay
			70-110	gray granite
497	30999	15	0-25	sandy overburden
			25-140	granite
498	20752	7	0-24	sandy hardpan
			24-145	granite
499	20753	13	0-8	stony hardpan
			8-123	granite
500	20796	35	0-26	sandy hardpan
			26-97	granite
501	20952	20	0-67	sandy hardpan
			67-180	granite
502	20953	7	0-19	hardpan
			19-148	gray granite
503	21110	16	0-4	overburden
			4-183	gray granite
504	21378	13	0-7	sandy hardpan
			7-198	granite
505	20070	17	0-12	stony overburden
			12-148	gray granite
506	25095	13	0-7	sandy hardpan
			7-18	sandstone
			18-173	granite
507	24328	10	0-78	clay and fractured rock
			78-150	granite
508	22504	20	0-70	sand, clay, gravel
509	20524	25	0-5	overburden
			5-32	brown granite
			32-110	gray granite
510	21449	16	0-24	hardpan and sand and gravel
			24-148	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
511	28097	12	0-4	dirt
			4-104	fractured rock
			104-113	sandstone
			113-116	granite
512	28102	5	0-35	clay and sand
			35-39	broken rock
			39-76	granite
513	25086	20	0-30	overburden
			30-200	sandstone
514	4762	50	0-40	hardpan and sand
			40-44	rotten granite
			44-57	granite
515	21774	40+	0-38	hardpan and sand
			38-73	soft brown granite
516	26072	30	0-40	overburden
			40-50	weathered gneiss
			50-175	gneiss
517	17674	7	0-14	clay, gravel, granite
			14-55	brown gray granite, water 50-55
			55-97	granite
518	24265	20+	0-36	stony hardpan
			36-52	medium brown granite
			52-98	granite
519	25092	20	0-30	overburden
			30-75	sandstone
520	25469	4	0-58	overburden
			58-300	gray rock
521	24580	30	0-50	overburden
			50-150	sandstone
522	24583	30	0-60	overburden
			60-250	sandstone
523	24998	8	0-75	sand and gravel
			75-300	granite
524	25085	20	0-30	overburden
			30-100	sandstone
525	24581	20	0-40	overburden
			40-75	limestone
526	21319	35	0-43	sand, clay
			43-173	granite
527	23569	7	0-15	hardpan
			15-300	granite
528	21804	5	0-15	overburden
			15-198	granite (brown, 29-31, 83-84, 137-138)
529	21456	3	0-30	overburden
			30-420	gneiss
530	30388	NR	0-55	brown sand mixed with clay
			55-295	hard gray granite
531	28610	NR	0-39	overburden
			39-185	granite
532	19009	NR	0-16	stony overburden
			16-199	gray granite
533	21100	50+	0-18	hardpan
			18-73	gray gneiss
534	25833	8	0-39	overburden
			39-200	granite
535	28800	NR	0-20	overburden
			20-80	sandstone
			80-300	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
536	28801	NR	0-20	overburden
			20-50	sandstone
			50-300	granite
537	28811	NR	0-20	overburden
			20-110	rotten granite
			110-300	granite
538	28817	NR	0-35	overburden
			35-200	granite
539	28819	NR	0-25	overburden
			25-325	limestone and granite
540	28468	NR	0-25	overburden
			25-200	granite
541	25952	30	0-40	fractured rock
			40-305	granite
542	20006	6	0-16	sandy overburden
			16-98	granite
543	21302	20+	0-3	overburden
			3-21	clay
			21-38	rotten granite
			38-98	granite, soft 52-55 and 95-98
544	21330	87	0-30	sand and gravel
			30-390	sandstone
545	24960	NR	0-24	overburden
			24-100	granite
546	27984	20	0-11	hardpan
			11-173	granite
547	27985	6	0-11	sandy hardpan
			11-248	granite
548	27986	50+	0-6	stony hardpan
			6-273	granite
549	28162	30	0-6	clay
			6-33	sandstone
			33-148	granite
550	28163	10	0-28	clay hardpan
			28-38	sandstone
			38-148	granite
551	27898	28	0-12	stony hardpan
			12-148	granite
552	27900	5	0-64	sandy clay hardpan
			64-373	granite
553	28074	35	0-8	sandy hardpan
			8-248	gray granite
554	28077	12	0-10	sandy hardpan
			10-27	sandstone
			27-198	granite
555	28078	14	0-23	hardpan
			23-122	granite
556	28164	14	0-6	brown hardpan
			6-37	sandstone
			37-198	granite
557	28165	40	0-9	hardpan
			9-24	sandstone
			24-273	granite
558	28167	10	0-7	stony hardpan
			7-373	granite
559	23843	20	0-28	fractured rock
			28-200	granite
560	23803	5	0-27	sandy hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			27-55	soft loose brown granite
			55-398	granite
561	25391	40	0-6	overburden
			6-475	granite
562	29665	6	0-40	overburden
			40-700	limestone
563	30126	6	0-18	fractured rock and soil
			18-305	granite
564	23309	NR	0-11	overburden
			11-23	brown granite
			23-298	granite
565	24141	15	0-15	overburden
			15-125	granite
566	28304	NR	0-40	overburden
			40-290	granite
567	29092	35	0-10	sandy hardpan, gravel
			10-30	sandstone
			30-198	granite
568	29094	20	0-33	sandy hardpan
			33-198	gray granite
569	29096	20	0-21	sandy, clay, gravel
			21-69	brown granite
			69-173	gray granite
570	29098	35	0-29	sandy hardpan
			29-45	sandstone
			45-116	brown granite
			116-198	gray granite
571	29106	40	0-45	sandy hardpan
			45-148	granite
572	29114	30	0-33	stony hardpan
			33-50	sandstone
			50-298	granite
573	29113	22	0-11	sandy hardpan
			11-196	granite
574	25343	15-20	0-15	overburden
			15-55	brown granite
575	9141	57	0-7	earth
			7-15	broken rock
			15-25	sand and clay
			25-200	granite
576	19767	8	0-8	sand, clay, broken rock
			8-98	gray granite
577	21710	25+	0-6	overburden
			6-35	rotten granite
			35-125	granite, soft 120-125
578	16212	15+	0-15	overburden
			15-45	soft brown limestone
			45-73	limestone, soft 63-65
579	14512	9	0-17	overburden with boulders
			17-155	granite
580	15408	15	0-35	overburden
			35-64	brown granite
			64-123	granite
581	21485	NR	0-64	clay hardpan
			64-67	loose fractured rock
			67-248	granite
582	21501	50+	0-18	stony overburden
			18-46	sandstone

Well Number	Identifier	Discharge	Depth	Geologic Log
			46-210	granite
583	22808	25	0-32	fill and clay
			32-200	gray granite
584	27350	30	0-8	fill
			8-26	fractured rock
			26-280	granite
585	10402	50	0-8	earth and clay
			8-30	soft granite
			30-199	hard granite
586	17879	6	0-35	clay
			35-40	boulders
			40-58	clay, sand
			58-70	brown granite
			70-83	brown and gray granite
			83-147	granite
587	31676	4	0-21	overburden
			21-380	granite
588	27218	10	0-55	clay
			55-200	lime
589	27219	12	0-50	clay
			50-250	limestone
590	17876	2.5	0-50	clay, sand, very soft rock
			50-233	granite
591	25167	4	0-40	sandy subsoil
			40-260	blue rock
592	32117	20	0-30	sandy overburden with water
			30-140	fractured granite
593	25168	7	0-30	sandy soil
			30-200	blue stone
594	25733	5	0-30	overburden
			30-45	soft granite
			45-200	granite
595	25734	12	0-20	overburden
			20-40	soft granite
			40-150	granite
596	28414	7	0-41	soft hardpan
			41-61	soft sandstone
			61-298	granite
597	28415	15+	0-24	soft hardpan
			24-57	soft sandstone
			57-173	granite
598	28418	15	0-17	soft hardpan
			17-79	soft sandstone
			79-173	granite
599	28423	40	0-13	stony hardpan
			13-415	granite
600	24-21070	12	0-18	sandy hardpan
			18-70	sandstone
			70-173	granite
601	27826	30	0-39	sandy hardpan
			39-149	granite
602	27828	30	0-14	sandy hardpan
			14-123	granite
603	27830	45	0-21	hardpan
			21-98	granite
604	27832	20	0-42	sandy hardpan
			42-448	granite
605	28412	15	0-23	soft hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			23-66	sandstone
			66-198	granite
606	24290	20+	0-23	sandy hardpan
			23-249	granite
607	28420	14	0-16	sandy hardpan
			16-72	sandstone
			72-198	granite
608	30628	3	0-39	sand and clay
			39-49	fractured rock and sand
			49-71	brown granite
			71-398	gray granite
609	26605	30	0-10	sandstone
			19-373	granite
610	20464	7	0-46	hardpan
			46-172	gray granite
611	28321	12	0-30	sandy overburden
			30-320	blue rock
612	28575	15	0-30	sandy with broken rock
			30-200	blue rock
613	28111	10	0-40	sandy with broken rock
			40-360	blue rock
614	29279	15	0-8	hardpan
			8-173	granite
615	21248	5	0-3	overburden
			3-18	brown granite
			18-273	gray granite
616	26478	50	0-30	fractured rock and soil
			30-500	granite
617	22831	24	0-26	sandy hardpan
			26-173	granite
618	24099	8	0-8	sandy hardpan
			8-298	granite
619	22365	10	0-6	clay
			6-40	rotten granite
			40-175	soft granite and water
620	21957	5	0-6	clay and boulders
			6-20	rotten granite
			20-198	granite, soft 100-110, 175-185, 195-198
621	23832	15	0-25	overburden
			25-160	granite
622	21864	55	0-16	stony hardpan
			16-46	granite
			46-58	soft dark brown sandstone
			58-72	medium granite
623	23405	22	0-18	stony hardpan
			18-98	granite
624	22926	10	0-14	hardpan
			14-46	sandstone
			46-148	granite
625	22927	4.5	0-18	sandy hardpan
			18-42	sandstone
			42-50	granite
626	24114	6	0-21	sandy hardpan
			21-148	granite
627	22916	NR	0-8	clay
			8-40	brown granite
			40-273	granite
628	25622	1-1.5	0-40	overburden

Well Number	Identifier	Discharge	Depth	Geologic Log
			40-660	granite
629	25436	10	0-20	clay and hardpan
			20-30	soft rock
			30-150	granite
630	23907	11	0-10	overburden
			10-28	soft brown granite
			28-223	granite
631	25986	30	0-14	fractured rock
			14-440	granite
632	8118	1	0-45	earth, clay, broken rock
			45-239	very hard granite
633	7180	50	0-10	earth, clay, broken rock
			10-50	rotten granite
			50-130	granite
634	7516	50	0-10	earth, clay, stone
			10-156	hard granite
635	20844	2	0-7	overburden
			7-298	gray granite
636	2929	65	0-16	clay and stones
			16-30	soft granite
			30-418	granite
637	22985	27	0-8	hardpan
			8-123	granite
638	22986	7	0-5	NR [surficial material]
			5-160	granite
639	22987	8	0-11	hardpan
			11-198	granite
640	22988	38	0-18	hardpan
			18-60	soft loose sandstone
			60-198	granite
641	24612	15+	0-14	sand, clay, gravel
			14-173	granite
642	23417	15	0-25	fractured rock
			25-175	granite
643	22920	20	0-10	overburden
			10-20	dirt and loose rock
			20-300	gray-white limestone
644	23442	30+	0-12	fractured rock
			12-180	granite
645	22969	50+	0-7	sandy hardpan
			7-98	sandstone
646	28059	12	0-50	clay
			50-250	lime
647	26903	3	0-8	hardpan
			8-573	granite
648	27526	22	0-12	hardpan
			12-198	granite
649	28706	5	0-40	overburden
			40-600	Byram gneiss
650	29987	30	0-20	sandy overburden
			20-300	rock
651	28058	40	0-70	clay
			70-175	lime
652	32034	8	0-7	clay hardpan
			7-58	soft sandstone and clay layers
			58-848	granite
653	28705	15	0-40	overburden
			40-200	gneiss

Well Number	Identifier	Discharge	Depth	Geologic Log
654	28707	25	0-50	overburden
			50-860	gneiss
655	24293	6	0-12	stony hardpan
			12-473	granite
656	29793	2.5	0-4	hardpan
			4-548	granite
657	25961	12	0-10	sandy hardpan
			10-573	granite
658	29129	30	0-59	overburden
			59-100	limestone
659	29128	20	0-15	overburden
			15-300	limestone
660	29130	12	0-25	overburden
			25-640	limestone
661	29126	18	0-30	overburden
			30-250	limestone
662	30714	15	0-72	sand and clay
			72-138	soft loose sandstone
			138-173	medium sandstone
663	21303	20+	0-3	overburden
			3-6	clay and boulders
			6-12	rotten granite
			12-123	granite, soft 20-22, 120-123
664	20131	11	0-123	sand and gravel
665	20745	9	0-16	sandy hardpan
			16-98	granite
666	20218	10	0-18	overburden
			18-148	granite
667	21298	25	0-3	overburden
			3-8	clay
			8-56	rotten granite
			56-198	granite, soft 195-198
668	26119	25	0-12	stony hardpan
			12-248	granite
669	28405	15	0-28	sandy hardpan
			28-72	rotten sandstone
			72-248	granite
670	29278	35	0-27	hardpan
			27-39	brown fractured rock
			39-198	granite
671	27906	26	0-36	sandy hardpan
			36-123	granite
672	27907	20	0-6	sandy hardpan
			6-248	granite
673	27909	5	0-11	stony hardpan
			11-548	granite
674	27910	7	0-8	stony hardpan
			8-248	granite
675	27911	8+	0-9	hardpan
			9-398	granite
676	27913	18	0-27	hardpan
			27-248	granite
677	27916	8	0-13	hardpan
			13-273	granite
678	27922	15+	0-35	stony hardpan
			35-69	soft green rock
			69-148	granite
679	27923	15+	0-32	sandy hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			32-98	granite
680	27924	7	0-17	sandy hardpan
			17-248	granite
681	29298	35	0-30	hardpan
			30-43	soft sandstone
			43-198	granite
682	27812	15	0-26	fractured rock
			26-255	granite
683	20334	3.5	0-5	stony overburden
			5-299	gray granite
684	27627	2	0-19	sandy hardpan
			19-548	granite
685	26717	5	0-16	sandy hardpan
			16-423	granite
686	26718	15	0-38	sandy hardpan
			38-175	granite
687	26719	9	0-38	sandy hardpan
			38-53	soft sandstone
			53-198	granite
688	26720	15	0-38	sandy hardpan
			38-173	granite
689	26723	8	0-18	sandy hardpan
			18-148	granite
690	26725	4.5	0-21	sandy hardpan
			21-298	granite
691	20554	10	0-6	overburden
			6-15	brown granite
			15-400	granite
692	21080	16	0-25	overburden
			25-50	rotten gneiss
			50-498	granite
693	28437	NR	0-20	overburden
			20-400	granite
694	25554	9	0-9	stony hardpan
			9-248	granite
695	25556	12	0-15	sandy hardpan
			15-147	granite
696	24959	8	0-27	sandy hardpan
			27-248	granite
697	24674	9	0-7	stony hardpan
			7-123	granite
698	24831	9	0-5	stony hardpan
			5-273	granite
699	27322	11	0-10	stony hardpan
			10-223	granite
700	25770	15	0-9	sandy hardpan
			9-124	granite
701	25772	30	0-8	stony hardpan
			8-148	granite
702	25774	9	0-11	sandy hardpan
			11-198	granite
703	26006	13	0-8	hardpan
			8-173	granite
704	25300	15	0-10	stony hardpan
			10-273	granite
705	29816	27	0-5	stony hardpan
			5-198	granite
706	30611	40+	0-38	sandy hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			38-52	weathered rock
			52-198	granite
707	30617	35	0-13	hardpan
			13-39	weathered rock
			39-198	granite
708	30618	10	0-35	sand, hardpan, fractured rock
			35-298	granite
709	31536	12	0-8	sandy hardpan
			8-15	weathered rock
			15-323	granite
710	31537	18	0-30	sandy hardpan and rock
			30-42	sandstone
			42-223	granite
711	27264	12	0-9	stony hardpan
			9-198	granite
712	28581	18	0-12	stony hardpan
			12-148	granite
713	26734	15	0-5	stony hardpan
			5-198	granite
714	30330	30	0-7	sandy hardpan
			7-398	granite
715	30439	12	0-14	sand, brown clay, rocks
			14-64	sandy hardpan
			64-87	sandstone
			87-273	granite
716	22749	80+	0-77	clay and gravel
			77-98	rotten fractured limestone
717	20455	6	0-56	hardpan, soft decomposed granite
			56-198	gray granite
718	26087	1+	0-7	stony hardpan
			7-548	granite
719	27237	5	0-20	sandy clay
			20-30	sandstone
			30-302	granite
720	24613	8-9	0-11	stony hardpan
			11-198	granite
721	26118	14	0-26	sandy hardpan
			26-123	granite
722	21917	16	0-9	stony hardpan
			9-173	granite
723	27903	5	0-10	overburden
			10-400	granite
724	28559	40	0-23	sandy hardpan
			23-43	sandstone
			43-123	granite
725	28602	12	0-15	clay
			15-60	fractured rock
			60-455	granite
726	20297	10	0-14	sandy overburden
			14-373	gray granite
727	21312	5-6	0-15	stones and dirt
			15-225	granite
728	19710	1	0-5	stony overburden
			5-474	gray granite
729	20490	3	0-2	overburden
			2-148	granite
730	24678	10	0-10	overburden
			10-40	fractured rock

Well Number	Identifier	Discharge	Depth	Geologic Log
			40-205	granite
731	28603	8	0-8	overburden
			8-125	granite
732	29099	25	0-21	sandy hardpan
			21-41	sandstone
			41-248	granite
733	29101	20	0-27	sandy hardpan
			27-35	sandstone
			35-298	granite
734	29942	3.5	0-5	clay
			5-30	gravel and sand
			30-80	broken rock
			80-500	granite
735	27403	7	0-8	sandy hardpan
			8-223	granite
736	27807	20	0-40	conglomerate
			40-200	gray gneiss
737	28892	20	0-35	clay, sand, and gravel
			35-260	gray gneiss
738	28515	10	0-30	conglomerate
			30-240	gray gneiss
739	28516	25	0-20	conglomerate
			20-240	gray gneiss
740	30064	18	0-40	conglomerate
			40-240	gray gneiss
741	21179	NR	0-54	hardpan
			54-63	sandstone
			63-273	gray granite
742	27670	7	0-12	fractured rock
			12-405	granite
743	19445	10+	0-26	overburden
			26-90	brown and gray granite
			90-122	gray granite
744	27404	9	0-7	sandy hardpan
			7-198	granite
745	27862	50+	0-8	fractured rock
			8-150	granite
746	24128	15	0-35	fractured rock
			35-150	rock
747	23207	7	0-18	hardpan
			18-198	granite
748	25549	15	0-40	sandy hardpan
			40-173	granite
749	25550	20	0-8	stony hardpan
			8-198	granite
750	25551	1	0-29	hardpan
			29-62	soft sandstone
			62-673	granite
751	25552	10	0-37	sandy hardpan
			37-198	granite
752	29100	30	0-14	hardpan
			14-32	sandstone
			32-198	granite
753	25067	15	0-16	sandy hardpan
			16-198	granite
754	29104	35	0-38	hardpan
			38-248	granite
755	29109	15	0-46	hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			46-297	granite
756	25496	22	0-22	sandy hardpan
			22-148	granite
757	31817	30+	0-5	hardpan
			5-16	weathered rock
			16-223	granite
758	26155	25+	0-12	sandy hardpan
			12-299	granite
759	27926	18	0-10	sandy hardpan
			10-248	granite
760	25387	15	0-36	hardpan
			36-172	granite
761	26626	20	0-20	overburden
			20-225	granite
762	30009	10	0-12	hardpan
			12-50	sandstone
			50-798	granite
763	21042	2	0-65	clay and boulders
			65-70	rotten limestone
			70-298	limestone
764	23827	12	0-18	fractured rock
			18-250	granite
765	27888	2	0-85	overburden
			85-900	limestone
766	27808	8	0-60	overburden
			60-775	limestone
767	21604	11	0-17	stony hardpan
			17-197	granite
768	25094	7	0-5	stony hardpan
			5-40	sandstone
			40-248	granite
769	31725	45	0-8	fractured rock
			8-300	granite
770	19408	15	0-16	sandy overburden
			16-123	gray granite
771	21665	20+	0-2	overburden
			2-223	granite
772	21474	12	0-56	soft sandstone
			56-125	granite
773	28558	40	0-16	hardpan
			16-198	medium brown granite
774	19848	10	0-20	sand, clay
			20-40	rotten trap rock
			40-46	dirt
			46-48	gray trap
			48-70	sand, white stone
			70-75	gray trap
775	26728	15	0-9	stony hardpan
			9-298	granite
776	23293	12	0-35	hardpan and sand
			35-55	soft brown sandstone
			55-123	medium granite
777	26272	90+	0-4	soil
			4-70	fractured rock
			70-280	granite
778	30291	10	0-30	rotten lime and fractures
			30-405	limestone, occasional fractures
779	22792	17	0-16	sandy hardpan

Well Number	Identifier	Discharge	Depth	Geologic Log
			16-199	granite
780	24102	15	0-12	stony hardpan
			12-273	granite
781	28867	15	0-12	overburden
			12-135	granite
782	26641	12	0-8	overburden
			8-475	granite
783	20261	4	0-40	sandy overburden
			40-350	granite
784	29666	15	0-2	overburden
			2-300	limestone
785	25219	25+	0-18	fractured rock
			18-300	granite
786	23886	20	0-25	overburden
			25-200	granite
787	21450	20	0-18	loose sandy rock
			18-225	limestone, gray
788	23206	5	0-24	hardpan
			24-67	soft sandstone
			67-448	granite
789	23656	20	0-2	soil
			2-10	subsoil
			10-18	fractured rock
			18-350	granite
790	29117	12	0-18	sand and gravel
			18-25	sandstone
			25-298	granite
791	24604	20	0-20	sandy hardpan
			20-123	granite
792	24688	12	0-31	sandy hardpan
			31-148	granite
793	24689	15+	0-28	sandy hardpan
			28-147	granite
794	24690	15	0-8	overburden
			8-35	soft rock
			25-225	granite
795	22009	30	0-2	overburden
			2-22	sand and gravel
			22-28	boulder
			28-40	sand and gravel
			40-200	granite, soft 190-200
796	24251	25	0-1	overburden
			1-50	sand
			50-170	clay
			170-175	gravel
797	32791	15	0-171	sand
798	18339	5	0-20	sand and water
			20-40	brown sand
			40-204	gray silt, bed of brown sand at 175
			204-209	gravel and water
799	19967	20	0-50	sand
			50-175	clay
			175-206	sand
			206-209	gravel
800	5732	260	0-35	fine to medium sand and some gravel
			35-40	fine to coarse sand, a little gravel and clay
			40-45	fine to coarse sand and gravel
			45-65	medium and coarse sand, small and large

Well Number	Identifier	Discharge	Depth	Geologic Log
				gravel
801	31323	10	0-195	sand and gravel
802	23672	20	0-30	sand
			30-175	gray clay
			175-179	brown clay and gravel
			179-180	gravel
803	23450	50+	0-25	sand
			25-170	gray clay
			170-178	brown clay and gravel
			178-180	gravel and sand
804	893	NR	0-5	brown sand
			5-14	gravel
			14-25	fine salt and pepper sand
			25-35	salt and pepper sand
			35-48	fine sand, some few stones
			48-55	very fine sand
			55-85	fine hard sand
			85-97	sandy clay
			97-140	soft gray clay
805	25990	30	0-6	soil
			6-40	fractured rock
			40-155	granite
806	17130	30	0-2	clay
			2-35	sand
			35-68	clay
			68-70	gravel
807	17274	10	0-40	overburden
			40-90	sand packed clay
			90-120	gravel and clay
			120-125	gravel
808	17930	15	0-3	overburden
			3-75	fine sand
			75-110	clay and sand
			110-112	gravel, water
809	36795	NR	0-36	fine, medium, coarse sand
			36-51	very fine sand and silt
			51-61	silt and clay
810	23348	4	0-40	sandy overburden
			40-400	granite
811	19299	1	0-8	sandy overburden
			8-398	granite
812	28579	5	0-8	overburden
			8-300	granite
813	30684	30	0-30	hardpan, fractured rock
			30-150	granite
814	32434	10	0-11	overburden
			11-175	granite
815	22210	NR	0-35	clay, gravel
			35-55	rotten granite
			55-373	granite
816	20892	20	0-20	fractured rock
			20-325	granite
817	19339	15	0-9	overburden
			9-99	gray granite
818	29371	7	0-18	overburden
			18-45	rotten rock
			45-175	granite
819	28089	20	0-8	overburden

Well Number	Identifier	Discharge	Depth	Geologic Log
			8-124	granite
820	27565	10	0-15	overburden
			15-200	granite
821	36085	10	0-15	rotten rock
			15-255	granite with occasional seams
822	43846	20	0-240	sand and gravel
823	34662	9.5	0-20	clay, sand, gravel
			20-500	granite
824	44284	20	0-175	sand and gravel
825	23957	3.5	0-4	boulders, clay
			4-298	granite
826	21893	10	0-40	brown sand
			40-90	brown silt
			90-100	gravel, sand, etc.
			100-110	gravel, sand, water area
827	5595	78	0-15	clay and boulders
			15-41	sand and gravel
			41-45	decomposed granite rock
			45-195	very hard granite rock
828	27053	6	0-18	fractured rock
			18-300	granite
829	21894	2	0-8	hardpan overburden
			8-322	granite
830	20788	20+	0-20	sand, gravel, clay
			20-173	granite
831	29433	NR	0-39	overburden
			39-100	granite
832	42362	10	0-19	overburden
			19-150	granite
833	8008	20	0-62	yellow hardpan
			62-100	tan rock
834	21092	10	0-38	fractured rock
			38-175	granite
835	21090	10	0-40	fractured rock
			40-150	granite, brown seam and water 120-122
836	23750	15-20	0-10	clay, boulders
			10-122	granite
837	30414	30	0-5	fill dirt
			5-29	hardpan
			29-198	granite
838	30723	35	0-30	overburden
			30-250	granite
			250-270	sandstone
839	13907	42	0-22	overburden
			22-159	granite
840	26271	5	0-21	fractured rock
			21-305	granite
841	42864	15	0-12	clay
			12-300	limestone
842	33026	30	0-20	overburden
			20-500	limestone
843	26710	7	0-20	fractured rock
			20-280	granite
844	25458	100+	0-10	fractured rock
			10-105	limestone
845	36368	4	0-8	hardpan
			8-60	fractured shale
			60-1000	Martinsburg shale, gray, red, black, white

Well Number	Identifier	Discharge	Depth	Geologic Log
846	28546	6	0-8	cobbles, boulders
			8-300	granite
847	26482	30+	0-35	fractured rock
			35-130	granite
848	20716	5	0-63	sand, gravel, clay
			63-92	rotten granite
			92-148	granite
849	28537	40	0-35	sand, gravel
			35-200	granite
850	21716	2.5	0-10	sand, boulders
			10-18	sand, clay
			18-26	sandstone
			26-250	gray granite
851	28126	1	0-20	overburden
			20-39	clay
			39-425	limestone
852	15286	40	0-27	overburden
			27-125	limestone, seamy
853	28682	20	0-55	clay
			55-80	red granite
854	30249	NR	0-20	overburden
			20-25	hardpan
			25-400	granite
855	21218	10+	0-3	overburden
			3-248	granite
856	39030	10	0-13	clay
			13-63	weathered rock
			63-305	granite
857	39029	30	0-33	clay
			33-56	soft weathered rock
			56-255	granite
858	40592	18	0-12	clay
			12-38	weathered rock
			38-305	granite
859	40860	10	0-22	clay
			22-37	weathered rock
			37-355	granite
860	40861	18	0-16	clay
			16-34	weathered rock
			34-305	granite
861	40593	30	0-21	clay
			21-37	weathered rock
			37-300	granite
862	40578	12	0-55	weathered rock
			55-430	granite
863	40594	15	0-7	clay
			7-16	weathered rock
			16-405	granite
864	40591	15	0-18	clay
			18-76	weathered rock
			76-580	granite
865	40579	10	0-58	weathered rock
			58-305	granite
866	24-15374	30	0-5	overburden
			5-200	granite
867	17068	3	0-20	overburden
			20-57	rotten granite
			57-348	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
868	24-14852	20+	0-45	clay
			45-80	limestone, rotten 45-50, soft 75-80
869	24-11807	10	0-27	overburden
			27-325	granite
870	24-17003	7	0-70	clay sand
			70-204	sandstone
871	24-19793	20	0-20	overburden
			20-60	sandstone
			60-120	limestone
872	24-7317	15	0-7	overburden
			7-91	granite, soft 44-47, 83-91
873	24360	30	0-5	topsoil
			5-25	rotten granite
			25-200	granite
874	24676	20	0-18	fractured rock
			18-130	granite
875	24679	10	0-16	overburden
			16-30	hardpan
			30-235	granite
876	27811	16	0-40	clay and rock
			40-95	granite
877	39130	22	0-58	weathered rock
			58-422	granite
878	38738	50	0-9	clay
			9-55	granite
879	31769	20	0-36	hardpan and weathered rock
			36-51	sandstone
			51-298	granite
880	29134	7	0-25	overburden
			25-700	limestone
881	29142	30	0-30	overburden
			30-325	limestone
882	29143	35	0-15	overburden
			15-400	limestone
883	24196	15	0-5	overburden
			5-200	granite
884	35080	8	0-20	overburden
			20-123	granite
885	28431	30	0-40	clay hardpan
			40-55	brown sandstone
			55-198	gray granite
886	22679	22	0-19	hardpan and gravel, water
			19-198	granite
887	34116	45	0-10	hardpan
			10-30	fractured rock
			30-310	granite
888	12208	30	0-36	hardpan and water
			36-72	granite
889	12097	30	0-5	overburden
			5-19	sand, clay, gravel
			19-72	sandstone
890	12596	100	0-40	sand and gravel
			40-65	rotten rock
			65-78	hard and soft seams
			78-135	soft rock
891	17885	20	0-20	overburden
			20-273	granite
892	16079	14	0-15	overburden

Well Number	Identifier	Discharge	Depth	Geologic Log
			15-98	granite
893	18506	34+	0-43	overburden
			43-248	granite
894	19770	2.5-3	0-38	overburden
			38-78	gray hard granite
			78-253	granite
895	18279	8		[anomalous log, not included in thickness mapping]
			0-35	brown sand
			35-100	gray silt
			100-110	brown sand and gravel
			110-120	brown sand
			120-122	gravel and water
896	17313	20+	0-40	sand and gravel
			40-115	gray clay
			115-135	sand and gravel
			135-140	gravel and water
897	19526	15	0-5	overburden
			5-20	sand
			20-50	clay, sand
			50-54	sand
			54-60	sand and gravel
898	22020	15	0-40	sand
			40-60	brown sand
			60-80	gray silt
			80-105	yellow clay
			105	gray shale
			105-122	water
899	13892	18	0-42	sand
			42-121	gray clay
			121-125	sand, gravel
900	16663	20+	0-2	overburden
			2-30	sand
			30-89	fine sand with clay
			89-91	boulders
			91-115	brown clay with gravel
			115-120	red gravel
901	16790	10+	0-40	overburden
			40-223	granite
902	16918	20+	0-20	gravel and sand
			20-45	gray silt
			45-95	yellow clay
			95-104	fine sand and gravel
			104-122	hard packed gravel
903	17693	20	0-29	brown sand
			29-110	gray clay
			110-129	sand and gravel
904	17801	22	0-15	fill
			15-27	clay
			27-200	granite
905	19397	20	0-45	gravel
			45-70	sand, gravel, and boulders
			70-105	coarse sand and gravel
906	20495	1.5	0-61	overburden
			61-296	granite
907	20718	10	0-20	overburden with clay
			20-173	granite
908	21244	12	0-30	sand

Well Number	Identifier	Discharge	Depth	Geologic Log
			30-94	sand and clay
			94-107	soft sandstone
			107-122	gray granite
909	22499	3	0-40	sand
			40-95	clay
			95-102	gravel
			102-107	gravel and water and sand
910	22713	3	0-11	overburden
			11-13	boulder
			13-90	clay
			90-370	granite
911	22714	15	0-65	clay and gravel
			65-123	granite
912	23550	30+	0-29	sand
			29-210	gray clay
			210-268	brown clay and gravel
			268-270	granite, fractured
913	23595	18	0-18	overburden
			18-202	granite
914	27139	120	0-30	rotten rock, till, and overburden
			30-40	weathered granite
			40-285	granite
			285-340	soft granite
			340-342	granite
915	test well on file at NJGWS	NR	0-5	dirty sand
			5-10	sand, some gravel
			10-15	sand and gravel
			15-20	sand, gravel, brown clay
			20-25	sand, egg-size gravel
			25-30	sand
			30-49	fine sand, clay
			49-68	fine to medium sand, gravel
			68-70	medium to coarse sand
			70-100	fine sand, clay
916	DOT 446W-15	NR	0-15	brown sand and silt, trace gravel and clay
			15-16	orange-brown sand and silt, little gravel
			16-28	brown sand, little silt
			28-61	brown, orange-brown clayey silt, some to little sand and gravel
			61-76	gray fractured siliceous limestone
917	60607	50	0-19	clay hardpan and cobbles
			19-41	brown granite
			41-656	gray granite
918	66157	70	0-35	dirt, sand, and gravel
			35-63	broken formation
			63-90	sandstone
			90-507	limestone
919	66156	70	0-30	broken formation and clay
			30-807	granite
920	18429	30+	0-13	overburden
			13-422	granite, soft 64-66
921	64825	65	0-6	boulders and clay
			6-505	granite
922	53774	60	0-16	sand, clay, gravel overburden
			16-472	granite
923	26025	60	0-2	overburden
			2-48	brown clay
			48-170	granite

Well Number	Identifier	Discharge	Depth	Geologic Log
924	44470	640	0-137	boulders, sand, clay
			137-162	limestone
			162-168	clay and sand
			168-182	limestone
925	53713	175	0-50	overburden
			50-292	granite
926	23162	90	0-55	overburden
			55-205	granite
927	60756	8	0-2	soil
			2-42	rock
			42-522	granite
928	28836	NR	0-30	overburden
			30-80	limestone
			80-260	granite
929	48785	40	0-12	gritty overburden
			12-47	fractured rock
			47-515	granite
930	53877	120	0-15	soil and gravel
			15-30	broken granite
			30-450	granite
931	DOT B0022175	NR	0-6	orange-brown sand and gravel, little silt
			6-16	gneiss, highly weathered
932	29147	6	0-18	sandy overburden
			18-320	rock