DEPARTMENT OF ENVIRONMENTAL PROTECTION
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GEOLOGY OF THE MEDFORD LAKES QUADRANGLE
BURLINGTON AND CAMDEN COUNTIES, NEW JERSEY
GEOLOGIC MAP SERIES GMS 21-6
pamphlet containing Table 1 accompanies map

INTRODUCTION

The Medford Lakes quadrangle is situated in the Coastal Plain physiographic province of New Jersey. Elevation in the quadrangle ranges from approximately 40 to 170 feet with the lowest elevations occurring in the northwestern part of the quadrangle near Birchwood Lakes and Lake Pine and the highest elevations occurring due east and southwest of Medford Lakes.

Geologic units range in age from Late Cretaceous (100.5 Ma; Ma = million years before present) to present day (see Correlation of Map Units). Suficial units were deposited from the late Miocene to present day and include fluvial, wetland, and eolian deposits (Tb, Tg, TQg, Qtuo, Qtu, Qtl, Qe, Qals, and artificial fill). Surficial units are underlain by older, unconsolidated bedrock units that were deposited from the Late Cretaceous to the middle Miocene and include marine and marginal marine deposits (Kp2 Kp3,Kr, Kmg, Kmv, Kwb, Ketl, Ketu, Kmt, Kw, Kml, Kns, Tht, Tvt, Tmb, Tmq, Tsr, Tkw, and Tchs/Tchc). Of these unconsolidated bedrock units, only the Manasquan, Kirkwood, and Cohansey formations crop out or subcrop within the map area. Other unconsolidated bedrock units, such as the Potomac, Raritan, Magothy, Merchantville, Woodbury, upper and lower Englishtown, Marshalltown, Wenonah, Mount Laurel, Navesink, Hornerstown, Vincentown, Marlboro Clay, and Shark River formations, are mapped within the subsurface of the map area and are shown in cross section.

Sediment lithologies for these units are described below in the Description of Map Units. Lithologies and geologic interpretations of surficial units, excavation perimeters, outlines of dune and dune remnants, and shallow topographic basins are based on new and previously collected field data, well records, 1-meter resolution LiDAR data, and aerial photography. Lithologies and geologic interpretations for outcropping or subcropping units are based on new and previously collected field data, well records, and adjacent geologic maps. Lithologies for units only present in the subsurface are based on well records, adjacent geologic maps, geophysical logs, and a corehole study at Medford (Sugarman and others, 2010), which is approximately two miles north of Birchwood Lakes within the Mount Holly U.S. Geological Survey 7.5-minute quadrangle.

Cross sections A-A', B-B', and C-C' show the lateral extent and thickness of surficial and unconsolidated bedrock units to depths of as much as 900 feet. These cross sections were constructed through use of geophysical logs (gamma, single-point resistance, and spontaneous potential) and driller's logs on file at the New Jersey Geological and Water Survey that were correlated to a stratigraphic corehole at Medford (Sugarman and others, 2010). Clarification on how the geophysical logs are shown in cross section is provided in the Explanation of Geophysical Logs.

Table 1 (in pamphlet) reports the geologic formations penetrated by New Jersey Department of Environmental Protection (NJDEP) permitted wells shown on the map. Interpretations are based upon driller's lithologic descriptions and geophysical logs. Wells within this list are drilled to depths of between 10 and 900 feet. The majority of these wells were finished in the Cohansey and Mount Laurel formations making the Kirkwood-Cohansey aquifer system and the Wenonah-Mount Laurel aquifer important groundwater producing aquifers for this area.

GEOMORPHIC HISTORY

During the late Miocene to present day, sea level dropped in several steps causing rivers and their tributaries to form wide, fluvial plains that were then carved out to eventually produce today's landscape. The oldest of these fluvial deposits is the Bridgeton Formation (Tb), which formed a broad plain of braided rivers and streams in the western part of the quadrangle that has now been eroded away leaving remnants only near Louden and on Stone Mountain located along the western edge of the quadrangle. Stratigraphic position and petrologic correlations to marine deposits in the Delmarva Peninsula suggest a late Miocene age (Owens and Minard, 1979; Pazzaglia, 1993). Decline in sea level during the latest Miocene, Pliocene, and early Pleistocene (between 6 Ma and 800 ka; "ka" = thousand years before present day) caused regional river systems to erode into and rework sediments of the Bridgeton Formation before being redeposited in floodplains, channels, and pediments. These deposits are mapped as the upland gravels (Tg and TQg). Remnants occur today on the highest uplands throughout the map area.

Further incision of the landscape and redeposition of older sediments (Tb, Tg, and TQg) with an addition of sediments from underlying unconsolidated bedrock formations (Tmq, Tkw, Tch) continued during the middle and late Pleistocene (between 800 ka and 11 ka). These deposits are mapped as upper and lower terrace deposits (Qtuo, Qtu, and Qtl). Today, these terraces occur in modern-day valleys, at elevations above modern-day rivers and streams but below the older fluvial deposits (Tb, Tg, and TQg). The deposition of some of these sediments has been influenced by periods of cold climate during the Wisconsinan glacial stage (between 115 and 80 ka) and possibly the Illinoian glacial stage (between 200 and 150 ka). During these periods, permafrost may have impeded soil infiltration causing more slope erosion and groundwater seepage that resulted in an influx of sediment in the valleys of the map area. Deposition of eolian sediments (Qe) and the development of shallow topographic basins resulting from wind erosion and the melting of permafrost (blue diagonal ruling pattern on the map) also formed during this time span. Eolian features, such as sand dunes (outlined in red on the map), are particularly widespread in the map area, occurring in Wharton State Forest, Taunton Lake, and Medford Lakes. These dunes are typically crescentic in shape or consist of crescentic segments, especially in the northern part of the map area. Some of these have axes that are oriented to the northwest-southeast indicating that the winds were blowing from the northwest (fig. 1). Shallow topographic basins (blue diagonal ruling pattern on the map) typically occur along the southeastern edge of the map area in upper terrace deposits (fig. 2). These basins are circular, shallow depressions formed from the melting of permafrost or from wind erosion, when bordered by eolian sediments.

During the Holocene (11 ka to present day), deposition has occurred within active channels, floodplains, and wetlands (Qals). Radiocarbon dates collected from basal peat located in the Pine Barrens support ages as old as 10 ka (Stanford, 2000). Artificial fill deposits (black diagonal ruling pattern on the map) have been emplaced in road and railroad grades, dams, and dikes and sediments have been excavated from sand and gravel quarries, stormwater management basins and channels, golf course sand pits, and artificial ponds (outlined in purple on the map).

DESCRIPTION OF MAP UNITS

Color designations are based on Munsell Color Company (1975).

Outcropping Units

(The Shark River Formation does not outcrop but is included here for stratigraphic continuity)

ARTIFICIAL FILL – Gray, brown, and yellow, gravel, sand, silt, and clay; organic material, construction debris, and trash. As much as 5 feet thick. Typically occurs beneath roadways, in dams and dikes, around stormwater management infrastructure, and as infill in mined areas.

Qals **ALLUVIUM** – Gray, brown, and black sand, silt, clay, and peat; gravel in places. Sand is fine- to very coarse-grained, sub- to well-rounded quartz. Gravel is white, yellow, orange, pink, and smoky gray, fine- to very coarse-grained pebbles (4-64 mm), well rounded to subangular quartz and some quartzite. As much as 13 feet thick but typically less than 5 feet. Deposited in fluvial channels, floodplains, and wetlands.

Qe **EOLIAN SAND** – Light brown, yellow, and white, very fine- to medium- grained, well rounded, well sorted quartz sand. Very few coarse grains (1% or less) in places. Forms dune ridges and dune fields especially in areas of Medford Lakes, Taunton Lake, and Wharton State Forest. Dunes are linear and crescentic in shape and as much as 1.5 miles long. Total thickness of deposit is as much as 15 feet thick. Typically underlain by upper and lower terrace deposits and bedrock formations.

Qtl **LOWER TERRACE DEPOSITS** – Light- to dark-gray and brown, thinly to thickly bedded sand, silt, and gravel. Sand is fine- to coarse-grained, sub- to well-rounded quartz. Gravel is white, yellow, and gray, very fine- to very coarse-grained (2-64 mm), sub- to well-rounded quartz and some quartzite pebbles. As much as 5 feet thick. Forms terraces and pediments with top surfaces that are within 5 feet above the modern-day flood plain.

Qtu, Qtuo **UPPER TERRACE DEPOSITS** – Light- to dark-yellow and brown, thinly to thickly bedded, sand, silt, and gravel. Sand is fine- to coarse-grained, sub- to well-rounded quartz. Gravel is white, yellow, and gray, very fine- to very coarse-grained (2-64 mm), sub- to well-rounded quartz and some quartzite pebbles. Upper terrace deposits are divided into two subunits (Qtu and Qtuo) that are distinguished from each other by elevation and age. Younger upper terrace deposits (Qtu) are as much as 20 feet thick and form terraces and pediments with top surfaces that are 5 to 20 feet above the modern-day flood plain. Older phase upper terrace deposits (Qtuo) are also as much as 20 feet thick but form terraces with surfaces 5 to 10 feet above younger upper terrace deposits.

TQg, Tg **UPLAND GRAVEL** – Reddish-yellow and brown sand and gravel. Sand is fine- to coarse-grained, sub- to well-rounded quartz with trace amounts of weathered chert and feldspar. Gravel is white, yellow, orange, pink, and gray, well- to sub-rounded quartz, some quartzite, and trace amounts of weathered chert; size ranges from very fine- to very coarse- pebbles (2-64 mm) and trace amounts of cobbles (64-160 mm). Upland gravel is divided into two subunits (TQg and Tg) that are distinguished from each other by elevation and age. Upland gravel, low phase deposits (TQg) are as much as 20 feet thick and occur on hilltops, divides, and slopes adjacent to upland gravel, high phase deposits at elevations between 110 to 140 feet. Upland gravel, high phase deposits (Tg) are as much as 30 feet thick and occur on the highest uplands at elevations of 140 feet and higher in the northern part of the map area.

Tb **BRIDGETON FORMATION** – Strong brown, reddish-brown, and yellow-brown clay, sand, and gravel. Sand is medium- to coarse-grained, sub- to well-rounded quartz with minor amounts of weathered feldspar and chert. Gravel is iron-stained white, yellow, orange, and pink, well rounded to subangular, thinly to thickly bedded (3-100 cm) quartz and minor amounts of gray and white, sub-rounded to subangular chert; size ranges from very fine- to very coarse-grained pebbles (2-64 mm) with minor amounts of cobbles (64-160 mm). As much as 15 feet thick. Deposits cap areas of 140 feet in elevation and higher on Stone Mountain and near Louden along the western edge of the quadrangle. Owens and Minard (1979) and Pazzaglia (1993) used stratigraphic position and petrologic correlations to marine deposits to suggest a late Miocene age.

COHANSEY FORMATION – Predominantly quartz sand with interbedded clay and sand. As much as 85 feet thick in the map area; eroded away in the northwestern part of the quadrangle by rivers and streams during the Neogene and Quaternary periods. Strontium isotope ratios from shells in the underlying Kirkwood Formation (Sugarman and others, 1993) suggest a middle Miocene or younger age. Unconformably overlies the Kirkwood Formation. The Cohansey Formation is divided into two subunits that are distinguished from each other by lithology:

Tchs **Sand Facies** – Very pale brown, brownish-yellow, yellow, reddish-yellow, and rarely red, medium- to coarse-grained, quartz sand with trace amounts of weathered chert and feldspar; minor amounts of fine grained quartz. Minor amounts of opaque white and gray, subround to angular, very fine grained (2-4 mm) with trace fine- to medium-grained (4-16 mm), quartz pebbles in places.

Tchc **Clay-Sand Facies** – White, yellow, brown, and light gray clay with interbedded very fine- to fine-grained sand. Minor amounts of silt. As much as 15 feet thick and may extend laterally as much as 3 miles within the subsurface of the map area.

Tkw **KIRKWOOD FORMATION** – Light- and dark-gray, yellow, white, very fine- to medium-grained, well rounded, micaceous, silty, quartz sand. Mica is white and typically very fine grained; content ranges from 5 to 20%. Heavy minerals are as much as 5%. Gamma-ray response generally shows a gradual coarsening in grain size towards the top of the formation except in well 7 (cross section B-B'). As much as 90 feet thick in the subsurface of the southeastern part of the map area and 10 feet in the subsurface of the northwestern part of the map area where it is thinned by erosion. Early Miocene in age based on strontium stable-isotopes ratios (Sugarman and others, 1993). Unconformably overlies the Shark River Formation.

Tsr **SHARK RIVER FORMATION** – Greenish-gray, gray, pale green, grayish-green, and pale olive, medium- to coarse-grained, slightly clayey in places, quartz sand underlain by glauconitic clay; trace glauconite in sand but as much as 40% glauconite in underlying clays (Miller and others, 1999). Shells present throughout. Gamma-ray response typically shows a gradual increase in grain size towards the top of the formation. This formation has been eroded away in the northwestern corner of the quadrangle but is as much as 80 feet thick in the subsurface of the southeastern part of the quadrangle. Middle Eocene in age based on nannofossils (Browning and others, 2011). Unconformably overlies the Manasquan Formation.

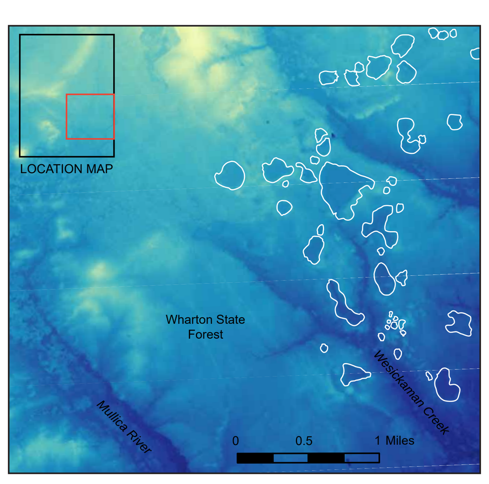

Figure 2. Digital elevation model data showing shallow topographic basins outlined in white. Lower elevations shown with dark blues.

Tmq **MANASQUAN FORMATION** – Pale green and greenish-gray, glauconitic, slightly sandy, silty clay (Miller and others, 1999). Sand is fine- to coarse-grained quartz and glauconite; glauconite content ranges from trace amounts to 50% (Sugarman and others, 2010). Small area of subcrop in the northwestern corner of the map area that is based on mapping in the adjacent Mount Holly quadrangle situated to the north of the map area (Minard and others, 1964). Thickness ranges from 15 feet to at least 30 feet in the subsurface of the map area. Early Eocene in age based on calcareous nannofossils (Owens and others, 1998). Unconformably overlies the Marlboro Clay.

Units in Subsurface Only

Tmb **MARLBORO CLAY** – White kaolinitic clay in places overlain by an olive-gray glauconitic sandy clay (Sugarman and others, 2010). Sand is fine- to coarse-grained quartz and glauconite; glauconite content ranges from trace amounts to 20% (Sugarman and others, 2010). Lower kaolinitic clay contains slightly sandier clay laminations and trace amounts of mica (Sugarman and others, 2010). Cramer and others (1999) associate this clay with the Paleocene/Eocene Thermal Maximum. Thickness ranges from 10 feet to at least 20 feet in the subsurface of the map area. Early Eocene in age based on dinoflagellates and acritarchs (Edwards, 1996). Unconformably overlies the Vincentown Formation.

Tvt **VINCENTOWN FORMATION** – Black, dark gray, and greenish-gray, fine- to coarse-grained, shelly, glauconitic, quartz sand with interbedded clay and, in places, biomicrite; glauconite content ranges from 5 to 50% (Sugarman and others, 2010). Heavily bioturbated. Patch reef biomicrite consisting of bryozoans and bivalves found at the Medford corehole site (Sugarman and others, 2010), located approximately 2.5 miles northeast of Lake Pine, and evidence of such found along Big Timber Creek (Greacen, 1941), located approximately 8.5 miles southwest of Lake Pine in the adjacent Clementon quadrangle suggests extension into the northwestern corner of this map area as well. Thickness of biomicrite is reported to be approximately 8 feet at the Medford corehole site (Sugarman and others, 2010). Total formation thickness in the map area is typically 30 feet. Late Paleocene in age, based on foraminifera (Olsson and Wise, 1987). Unconformably overlies the Hornerstown Formation.

Tht **HORNERSTOWN FORMATION** – Black and greenish-gray, fine- to medium-grained, slightly shelly, slightly quartzose, clayey-glauconite sand; glauconite ranges from 45 to 75% (Sugarman and others, 2010). Heavily bioturbated at base of formation. Thickness is typically 20 feet in the subsurface of the map area. Early Paleocene in age based on foraminifera (Olsson and Wise, 1987). Unconformably overlies the Navesink Formation.

Kns **NAVESINK FORMATION** – Black, reddish-gray, and dark gray, medium- to coarse-grained, slightly shelly, slightly quartzose, clayey glauconite sand and glauconitic sandy clay; glauconite content is commonly 70% (Sugarman and others, 2010). Basal contact represented by a large, sharp gamma-ray log increase. Thickness ranges from 30 feet to at least 40 feet in the subsurface of the map area. Late Cretaceous (Maastrichtian) in age, based on foraminifera (Olsson, 1964). Strontium stable isotope ratios indicate ages of 69 to 67 Ma (Sugarman and others, 1995). Unconformably overlies the Mount Laurel Formation.

Kml **MOUNT LAUREL FORMATION** – Olive gray, greenish-black, greenish-gray, medium- to very coarse-grained, slightly shelly, slightly glauconitic, quartz sand underlain by very fine- to medium-grained, glauconitic, quartz sand, silt and clay; glauconite content is typically 10% (Sugarman and others, 2010). Thickness is typically 70 feet in the subsurface of the map area. Late Cretaceous (Campanian) in age based on nannoplankton (Sugarman and others, 1995). Grades downward into the Wenonah Formation.

Kw **WENONAH FORMATION** – Greenish-black and very dark greenish-gray, very fine grained, slightly glauconitic, silty, quartz sand and slightly shelly, slightly micaceous and glauconitic, silty clay or clayey silt; glauconite content is commonly 10% (Sugarman and others, 2010). Thickness ranges from 40 to 50 feet in subsurface of the map area. Late Cretaceous (late Campanian) in age based on pollen (Wolfe, 1976) and ammonite fossils (Kennedy and Cobban, 1994). Grades downward into the Marshalltown Formation.

Kmt **MARSHALLTOWN FORMATION** – Very dark greenish-gray, heavily bioturbated, slightly shelly, slightly micaceous and glauconitic, slightly sandy, clayey silt. Sand is primarily glauconite with minor amounts of fine- to coarse-grained quartz and mica; glauconite content is typically 50% (Sugarman and others, 2010). Thickness is typically 20 feet in the subsurface of the map area. Late Cretaceous (late Campanian) in age, based on foraminifera (Olsson, 1964). Unconformably overlies the Englishtown Formation, upper.

Ketu **ENGLISHTOWN FORMATION, UPPER** – Greenish-gray, fine- to medium-grained, subround to subangular, quartz sand underlain by dark gray, grayish-brown, and gray, thinly to thickly bedded, slightly shelly, moderately bioturbated silt and clay (Sugarman and others, 2010). Trace amounts of mica and glauconite. Thickness ranges from 110 feet to at least 140 feet in the subsurface of the map area. Late Cretaceous (middle to late Campanian) in age based on nannofossils (Miller and others, 2006). Unconformably overlies the Englishtown Formation, lower.

Ketl **ENGLISHTOWN FORMATION, LOWER** – Light- to dark-gray, grayish-brown, and black, fine- to medium-grained, slightly shelly, slightly micaceous and glauconitic, quartz sand with interbedded clay and silt; glauconite content as much as 10% (Sugarman and others, 2010). Thickness ranges from 10 feet to at least 20 feet in the subsurface of the map area. Late Cretaceous (early Campanian) in age based on pollen (Wolfe, 1976). Grades downward into the Woodbury Formation.

Kwb **WOODBURY FORMATION** – Black, micaceous, heavily bioturbated, slightly glauconitic, slightly silty, sandy clay and clayey sand. Sand is primarily fine grained quartz with some glauconite; glauconite content ranges from trace amounts to 20% (Sugarman and others, 2010; Miller and others, 1999). Thickness is typically 20 feet in the subsurface of the map area. Late Cretaceous (early Campanian) in age based on pollen (Wolfe, 1976). Grades downward into the Merchantville Formation.

Kmv **MERCHANTVILLE FORMATION** – Black, fine- to medium-grained, slightly shelly, heavily bioturbated in places, slightly micaceous and quartzose, glauconite sand and interbedded glauconitic clay; glauconite content ranges from 10 to 70% (Sugarman and others, 2010). Thickness ranges from 60 to 70 feet in the map area. Late Cretaceous (late Santonian to early Campanian) in age based on nannoplankton (Mizintseva and others, 2009). Unconformably overlies the Magothy Formation.

Kmg **MAGOTHY FORMATION** – Gray and dark gray, very fine- to coarse-grained, quartz sand, clay, and silt. Quartz granules, lignite, and paleosols in places. Slightly shelly and micaceous at the bottom of the formation (Sugarman and others, 2010). Thickness is as much as 90 feet in the subsurface of the map area. Late Cretaceous (Turonian to Coniacian) in age based on pollen (Sugarman and others, 2021). Unconformably overlies the Raritan Formation.

Kr **RARITAN FORMATION** – Grayish-brown, dark gray, and gray, lignitic, clay and fine- to medium-grained, silty, quartz sand (Sugarman and others, 2010). Thickness is as much as 70 feet in the subsurface of the map area. Late Cretaceous (late Cenomanian to early Turonian) in age based on pollen (Miller and others, 1999). Unconformably overlies the Potomac Formation.

Kp3 **POTOMAC FORMATION** – Gray, greenish-gray, grayish-brown, and red, fine- to coarse-grained, lignitic, pebbly, quartz sand, clay, and silt (Sugarman and others, 2010). The Potomac Formation in the map area includes unit 3 and likely unit 2 (Owens and others, 1998) according to Sugarman and others (2018), however, only unit 3 is illustrated in cross section. Total thickness is as much as 200 feet in the subsurface of the map area. Unit 3 is Late Cretaceous (early Cenomanian) in age based on pollen (Doyle and Robbins, 1977). The Potomac Formation unconformably overlies Cambrian and Late Proterozoic bedrock.

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Sugarman, P.J., Miller, K.G., Owens, J.P., and Feigenson, M.D., 1993, Strontium-isotope and sequence stratigraphy of the Miocene Kirkwood Formation, southern New Jersey: Geological Society of America Bulletin, v. 105, p. 423-436.

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EXPLANATION OF MAP SYMBOLS

Contact of surficial deposit - Solid where well defined on LiDAR and aerial photographs; dashed where approximately located.

Contact of bedrock deposit - Kirkwood and Cohansey contact shown in brown; Kirkwood and Manasquan contact shown in green. Thick, solid line where exposed; dotted line where approximately located and covered by surficial deposits.

(Tkw) Concealed bedrock formation overlain by surficial deposits.

5Tkw, 2Qe/5Qtu Material observed in exposure, excavation, or hand auger hole - Annotation shows base depth (in feet) followed by abbreviation of unit observed. Unit to left of slash overlies unit to right. Final number is total depth of hand-auger hole rather than base of unit.

5Tg Material formerly observed in outcrop or excavation - Annotation same as above. Field notes on file at N.J. Geological and Water Survey.

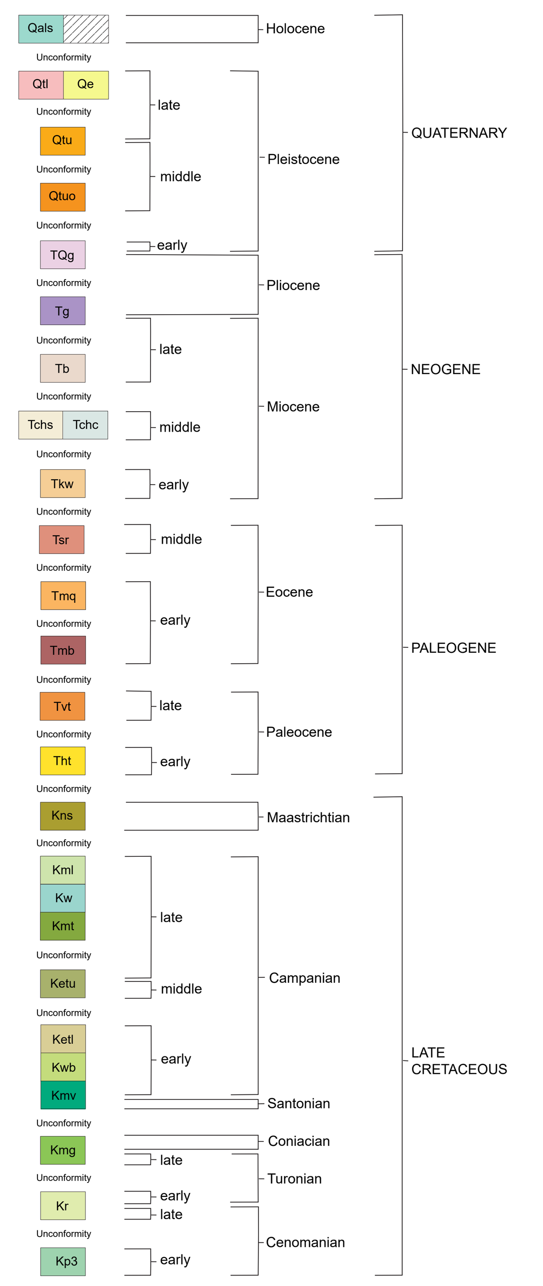
4, 106 Well with geophysical (top) and/or lithologic (bottom) log(s) - Identifier is well number shown in Table 1 (in pamphlet). List of all formations penetrated provided in Table 1. Well locations accurate to within 500 feet.

Dune and dune remnants - Outlined in red.

Shallow topographic basin - Includes thermokarst basins formed from the melting of permafrost and deflation basins formed by wind erosion.

Excavation perimeter - Line encloses area of excavation. Symbol indicates former sand or gravel. All pits inactive in 2020. Areas without symbol are stormwater management basins and channels, man-made ponds, or golf course sand pits.

AGE CORRELATION OF MAP UNITS



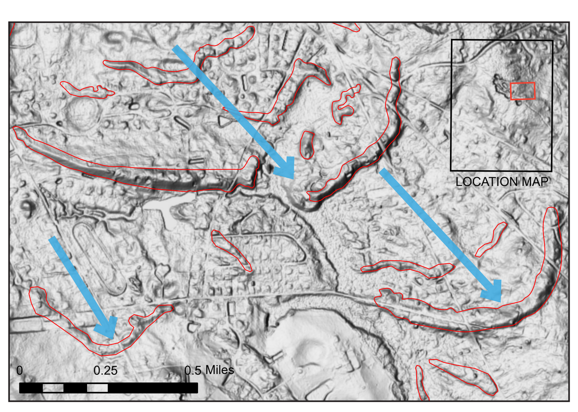
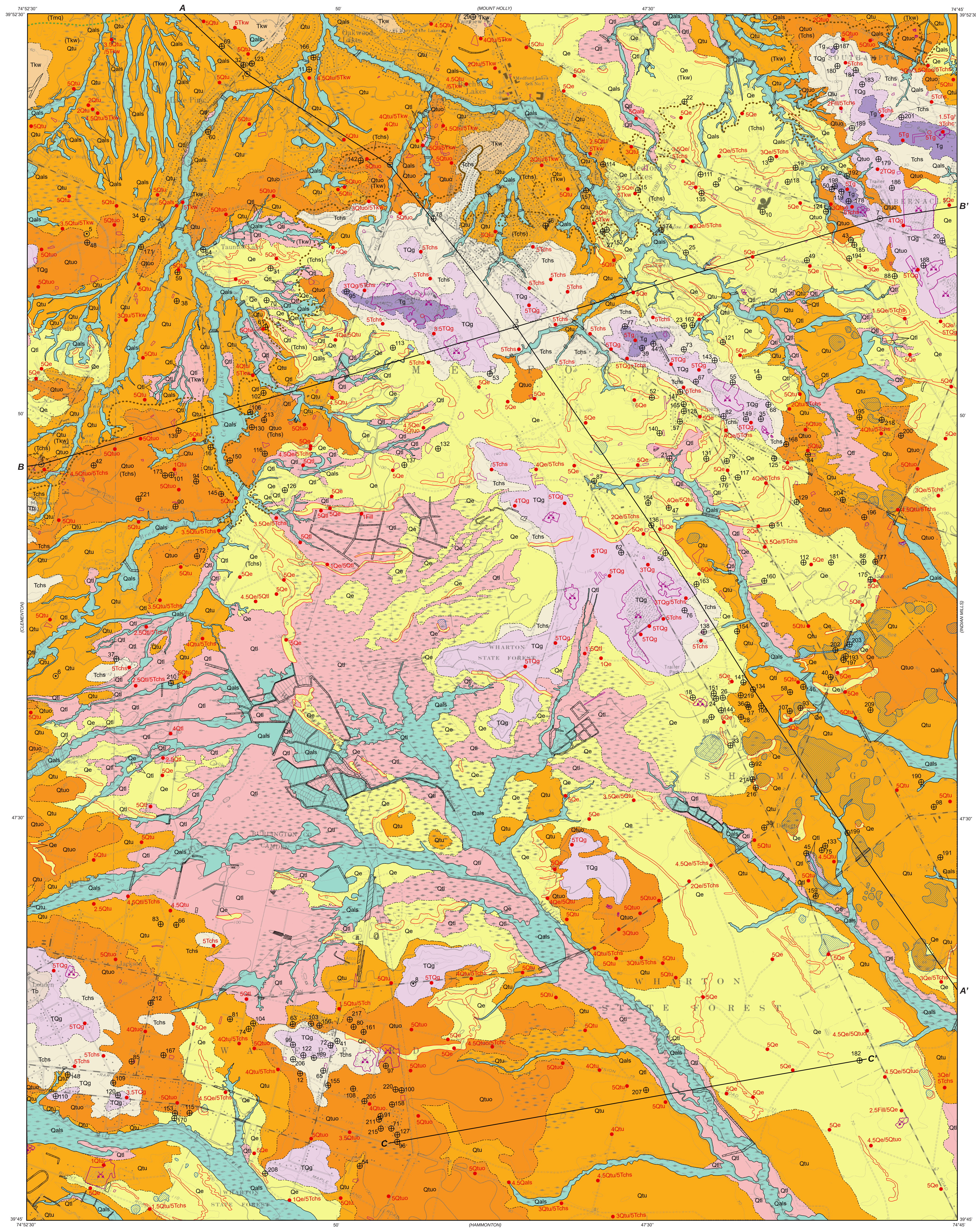


Figure 1. LiDAR image showing crescentic sand dunes and sand dune remnants (outlined in red) with axes that are oriented to the northwest-southeast indicating that the winds were blowing from the northwest (shown with blue arrows).



Basemap mapped, edited and published by the U.S. Geological Survey, 1967; photorevised 1981. Coordinate tick marks are on 1927 North American datum.

SCALE 1:24,000

1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

12°
MAGNETIC NORTH
TRUE NORTH
APROXIMATE MEAN DECLINATION, 2021

LOCATION IN NEW JERSEY

Geology mapped 2018-2019.
Cartography by Alexandra R. Carone. Helpful external reviews provided by James Browning of Rutgers University and William Doar of the South Carolina Geological Survey.

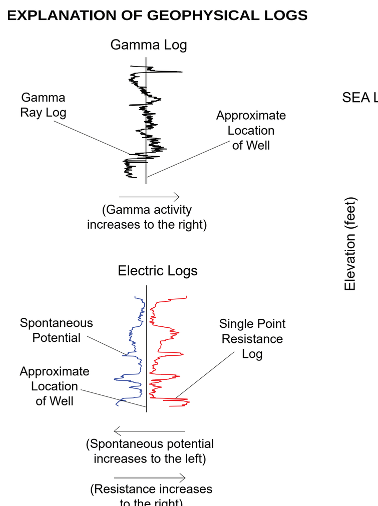
Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under U.S.G.S. award number G19AC00227. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

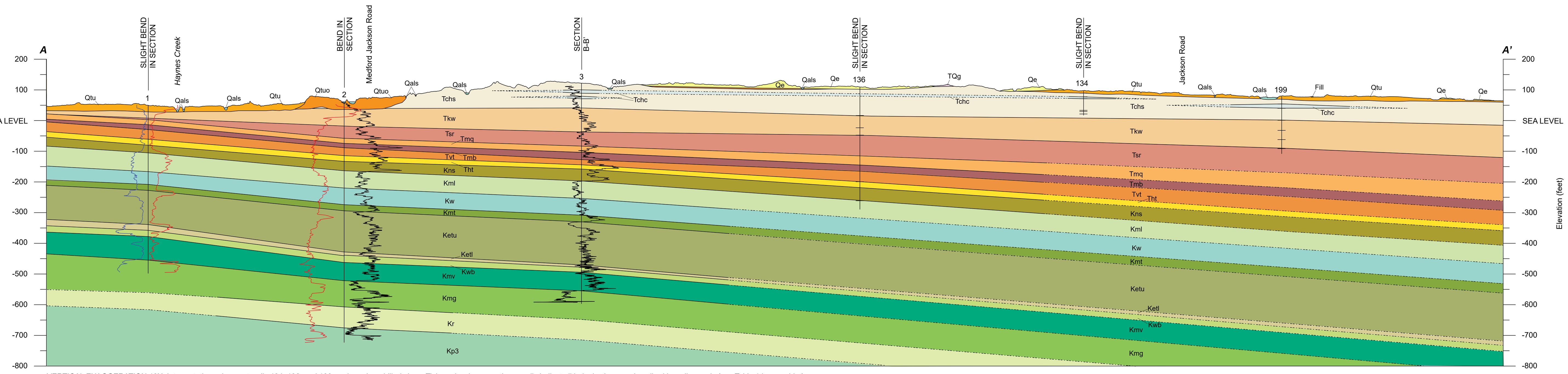
GEOLOGY OF THE MEDFORD LAKES QUADRANGLE
BURLINGTON AND CAMDEN COUNTIES, NEW JERSEY

By

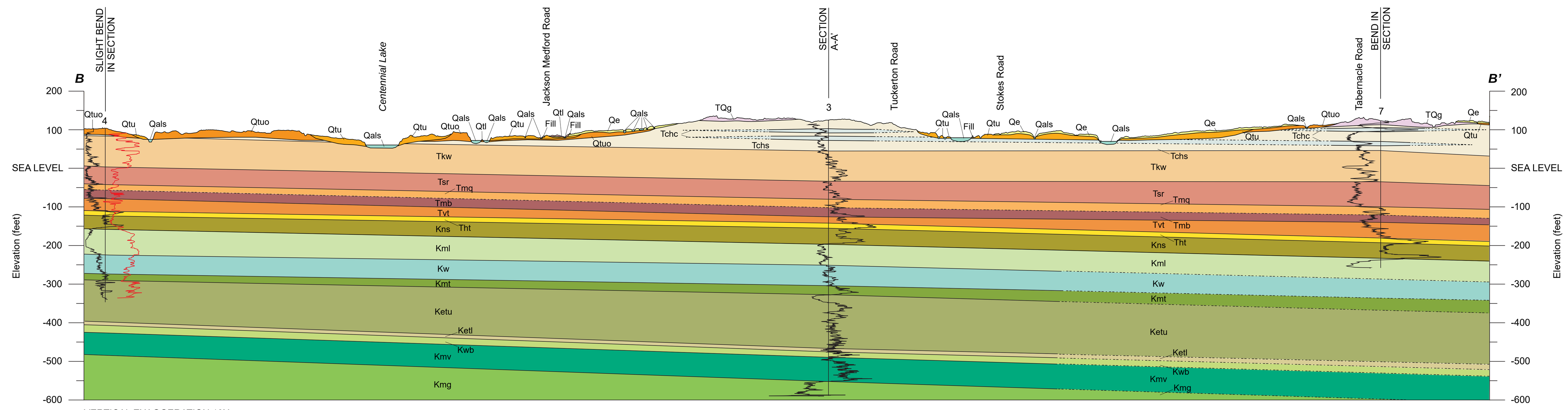
Alexandra R. Carone
2021

EXPLANATION OF GEOPHYSICAL LOGS

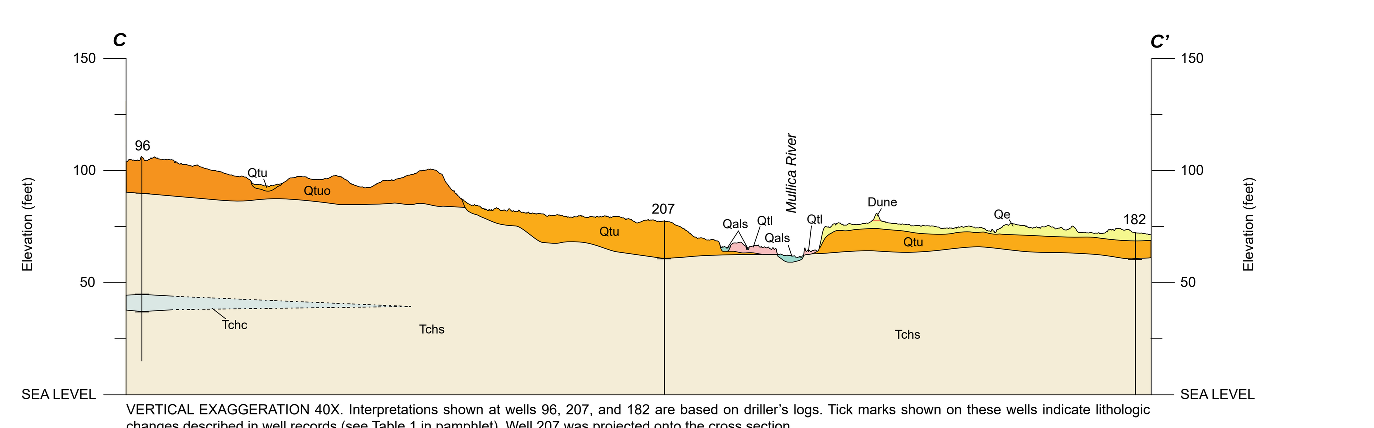




VERTICAL EXAGGERATION 10X. Interpretations shown at wells 134, 136, and 199 are based on driller's logs. Tick marks shown on these wells indicate lithologic changes described in well records (see Table 1 in pamphlet).



VERTICAL EXAGGERATION 10X



VERTICAL EXAGGERATION 40X. Interpretations shown at wells 96, 207, and 182 are based on driller's logs. Tick marks shown on these wells indicate lithologic changes described in well records (see Table 1 in pamphlet). Well 207 was projected onto the cross section.

Geology of the Medford Lakes Quadrangle
Burlington and Camden Counties, New Jersey

New Jersey Geological and Water Survey
Geologic Map Series GMS 21-6
2021

Pamphlet containing Table 1 to accompany map.

Table 1. Selected well records. Footnotes at end of table (p. 5).

Well Number	Permit Number[1]	Inferred Stratigraphy[2]
1	**31-05282**, E	20 Qtu, 40 Tkw, 48 Tsr, 62 Tmq, 79 Tmb, 110 Tvt, 130 Tht, 153 Kns, 215 Kml, 256 Kw, 276 Kmt, 387 Ketu, 407 Ketl, 426 Kwb, 504 Kmv, 548 Kmg
2	**31-16976**, G & E	5 Qals, 22 Qtuo, 77 Tkw, 120 Tsr, 133 Tmq, 147 Tmb, 175 Tvt, 192 Tht, 222 Kns, 280 Kml, 333 Kw, 352 Kmt, 489 Ketu, 500 Ketl, 522 Kwb, 580 Kmv, 667 Kmg, 736 Kr, 782 Kp_3
3	**31-21189**, G	20 Tchs, 32 Tchc, 40 Tchs, 52 Tchc, 80 Tch, 157 Tkw, 204 Tsr, 226 Tmq, 251 Tmb, 265 Tvt, 280 Tht, 320 Kns, 375 Kml, 430 Kw, 450 Kmt, 590 Ketu, 600 Ketl, 615 Kwb, 675 Kmv, 716 Kmg
4	**31-38293**, G & E	17 Qtu, 20 Tchs, 100 Tkw, 145 Tsr, 161 Tmq, 180 Tmb, 214 Tvt, 228 Tht, 261 Kns, 328 Kml, 378 Kw, 394 Kmt, 450 Ketu
5	31-39515, G & E	50 Qtu+Tkw, 75 Tsr, 105 Tmq+Tmb, 140 Tvt, 160 Tht, 190 Kns, 245 Kml, 265 Kw, 315 Kmt, 425 Ketu, 465 Ketl, 470 Kwb, 550 Kmv, 625 Kmg, 700 Kr, 900 Kp_3+Kp_2
6	31-40388, G	62 Qtu+Tch, 154 Tkw, 200 Tsr, 220 Tmq+Tmb, 280 Tvt, 300 Tht, 330 Kns, 404 Kml, 448 Kw, 472 Kmt, 514 Ketu
7	**32-00637**, G	11 TQg, 20 Tchs, 30 Tchc, 55 Tchs, 65 Tchc, 77 Tchs, 160 Tkw, 220 Tsr, 245 Tmq, 265 Tmb, 305 Tvt, 315 Tht, 355 Kns, 380 Kml
8	32-01525, Mullica 1-D, G	20 TQg, 40 Tchs, 50 Tchc, 80 Tchs, 168 Tkw, 225 Tsr
9	31-07852	75 Qe+Tch+Tkw, 225 Tsr+Tmq+Tmb+Tvt, 285 Tht+Kns, 300 Kml
10	31-09102	115 Qe+Tch, 240 Tsr+Tmq+Tmb+Tvt, 296 Tht+Kns, 323 Kml
11	31-12265	6 Qtu, 23 Tkw, 105 Tsr+Tmq+Tmb+Tvt, 150 Tht+Kns, 165 Kml
12	31-14403	20 Qtuo, 33 Tch, 45 Tchc, 60 Tch, 90 Tchs
13	31-19025	11 Qe, 114 Tch+Tkw, 214 Tsr+Tmq+Tmb+Tvt, 292 Tht+Kns, 331 Kml
14	31-22908	25 Qe+Qtu+Tchs, 90 Tkw
15	31-24329	90 Qe+Tkw, 187 Tsr+Tmq+Tmb+Tvt, 256 Tht+Kns, 288 Kml
16	31-24379	95 Qtu+Tkw, 170 Tsr+Tmq+Tmb, 215 Tvt, 265 Tht+Kns
17	31-24662	17 Qtu, 66 Tchs, 70 Tchc, 75 Tchs, 86 Tkw
18	31-24892	5 Qe, 14 Qtu, 19 Tchc, 87 Tchs, 90 Tkw
19	31-25514	7 Qe, 16 Qtu, 118 Tch+Tkw, 223 Tsr+Tmq+Tmb+Tvt, 298 Tht+Kns, 332 Kml
20	31-25879	13 TQg, 75 Tchs, 80 Tkw
21	31-26435	7 Qtl+Qe, 60 Tchs, 65 Tkw
22	31-26865	83 Qe+Tkw, 174 Tsr+Tmq+Tmb+Tvt, 242 Tht+Kns, 305 Kml
23	31-27009	74 Qe+Tch, 132 Tkw, 254 Tsr+Tmq+Tmb+Tvt+Tht, 325 Kns, 363 Kml
24	31-27508	6 Qe, 13 Qtu, 80 Tchs
25	31-27580	46 Qe+Qtu+Tch, 99 Tkw, 198 Tsr+Tmq+Tmb+Tvt, 272 Tht+Kns, 320 Kml
26	31-27607	9 Qe, 16 Qtu, 80 Tchs
27	31-27856	91 Qe+Tkw, 197 Tsr+Tmq+Tmb+Tvt, 266 Tht+Kns, 305 Kml
28	31-28028	19 Qtu, 79 Tchs, 85 Tkw
29	31-28111	55 Tkw, 170 Tsr+Tmq+Tmb+Tvt+Tht, 200 Kns, 225 Kml
30	31-29299	65 Qtu+Tch, 161 Tkw, 194 Tsr
31	31-29955	8 Qe, 105 Tkw, 160 Tsr+Tmq+Tmb+Tvt, 220 Tht+Kns, 260 Kml

32	31-30076	15 Qtuo, 18 Tkw
33	31-30209	7 Qe, 12 Qtu, 41 Tchs, 44 Tchc, 78 Tchs, 85 Tkw
34	31-30618	10 Qtu, 48 Tkw, 112 Tsr+Tmq+Tmb+Tvt, 175 Tht+Kns, 192 Kml
35	31-31267	7 TQg, 16 Tchs, 21 Tchc, 76 Tchs, 80 Tch
36	31-31693	9 Qtu, 80 Tch
37	31-34032	12 Tchs, 16 Tchc, 60 Tchs
38	31-36000	9 Qtu, 17 Tkw
39	31-36825	12 Tg, 34 Tchs, 39 Tchc, 80 Tchs
40	31-36983	10 Qtu+Tchs, 25 Tch, 32 Tchc, 38 Tchs, 45 Tchc, 65 Tchs
41	31-38186	27 Tchs, 36 Tchc, 100 Tchs
42	31-38619	28 Qtu+Tchs, 112 Tkw, 208 Tsr+Tmq+Tmb+Tvt, 242 Tht, 279 Kns, 332 Kml
43	31-39425	16 Tchs, 22 Tchc, 40 Tchs, 68 Tkw
44	31-41029	23 TQg, 50 Tchs, 86 Tkw
45	31-41321	13 Qtu, 45 Tchs, 56 Tchc, 75 Tchs, 167 Tkw, 200 Tsr
46	31-41436	13 Qtu, 86 Tch+Tkw, 185 Tsr+Tmq+Tmb+Tvt, 252 Tht+Kns, 300 Kml
47	31-42987	13 Qe+Qtu, 41 Tchs, 53 Tchc, 64 Tchs, 70 Tkw
48	31-44924	80 Qtuo+Tkw, 145 Tsr+Tmq+Tmb+Tvt, 183 Tht+Kml, 276 Kml+Kw
49	31-45303	75 Qe+Tch, 132 Tkw, 255 Tsr+Tmq+Tmb+Tvt, 322 Tht+Kns, 360 Kml
50	31-45643	32 TQg+Tchs, 38 Tchc, 42 Tchs, 64 Tchs, 72 Tkw
51	31-45899	7 Qe+Qtu, 18 Tchs, 22 Tchc, 72 Tchs, 75 Tkw
52	31-47839	6 Qe, 31 Tchc, 48 Tchs, 54 Tkw
53	31-48870	60 Tchs, 125 Tkw, 255 Tsr+Tmq+Tmb+Tvt, 320 Tht+Kns, 350 Kml
54	31-49226	40 Qtuo+Tchc, 50 Tchs, 75 Tch, 85 Tchs
55	31-49390	36 Tchs, 49 Tch, 55 Tchs
56	31-49432	8 Qe, 13 Qtu, 34 Tchs, 39 Tchc, 75 Tchs, 80 Tkw
57	31-49683	13 Qe+Qtu, 19 Tchc, 28 Tch, 49 Tchs, 53 Tch, 60 Tchs
58	31-49807	19 Qtu, 83 Tch, 173 Tkw, 200 Tsr
59	31-49988	22 Qtu+Tkw, 77 Tkw, 128 Tsr, 166 Tmq+Tmb, 191 Tvt, 245 Tht+Kns, 286 Kml
60	31-50015	10 Qtu, 31 Tkw, 106 Tsr+Tmq+Tmb+Tvt, 153 Tht+Kns, 221 Kml, 246 Kw
61	31-51133	8 Qtu, 42 Tkw, 184 Tsr+Tmq+Tmb+Tvt, 207 Tht, 227 Kns, 262 Kml
62	31-51154	15 Tchs, 18 Tchc, 75 Tchs, 80 Tkw
63	31-51358	20 Qtuo, 30 Tchc, 50 Tchs, 65 Tchc, 80 Tchs
64	31-51448	90 Qe+Tkw, 195 Tsr+Tmq+Tmb+Tvt, 260 Tht+Kns+Kml
65	31-51538	8 Tchs, 16 Tchc, 22 Tchs, 27 Tchc, 71 Tchs
66	31-51581	15 Qtu+Tchs, 35 Tchc, 80 Tchs
67	31-51659	32 TQg+Tchs, 37 Tchc, 45 Tchs, 51 Tch, 64 Tchs, 71 Tkw
68	31-51738	16 Tch, 19 Tchc, 27 Tchs, 38 Tch, 63 Tchs, 68 Tkw
69	31-51774	22 Qtuo, 28 Tkw, 93 Tsr+Tmq+Tmb+Tvt+Tht, 140 Kns, 180 Kml
70	31-52252	15 Qe+Qtu+Tch, 17 Tchc, 23 Tchs, 41 Tkw, 175 Tsr+Tmq+Tmb+Tvt, 191 Tht, 226 Kns, 265 Kml
71	31-52723	28 Qtuo+Tchs, 40 Tchc, 60 Tchs, 75 Tch, 95 Tchs
72	31-53033	30 TQg+Tchs, 37 Tchc, 80 Tchs
73	31-53340	24 Tchs, 27 Tchc, 29 Tchs, 55 Tch, 65 Tchs, 85 Tkw
74	31-54128	16 Qtu, 28 Tchs, 34 Tchc, 80 Tchs
75	31-54384	14 Qtu, 85, Tchs, 173 Tkw, 200 Tsr
76	31-54438	50 Tchs, 58 Tchc, 75 Tchs, 170 Tkw, 255 Tsr, 360 Tmq+Tmb+Tvt+Tht, 400 Kns, 440 Kml
77	31-54653	15 TQg, 60 Tchs
78	31-54670	60 Tchs, 120 Tkw, 200 Tsr+Tmq+Tmb+Tvt, 240 Tht, 265 Kns, 300 Kml
79	31-54921	51 Qe+Tchs, 53 Tchc, 153 Tkw, 307 Tsr+Tmq+Tmb+Tvt, 370 Tht+Kns, 420 Kml
80	31-55739	30 Qtuo+Tchs, 38 Tchc, 90 Tchs
81	31-56022	15 Qtu+Tchs, 22 Tchc, 80 Tchs
82	31-56041	8 TQg, 68 Tchs, 72 Tch
83	31-56097	14 Qtu, 45 Tchs, 60 Tchc, 80 Tchs

84	31-56249	20 Qtu+Tchs, 26 Tchc, 36 Tch, 53 Tchs, 55 Tch, 65 Tchs
85	31-56250	28 Qtuo+Tchs, 34 Tchc, 80 Tchs
86	31-56562	22 Qe+Tchs, 40 Tch, 85 Tchs, 175 Tkw, 195 Tsr
87	31-56721	14 Qe+Tchs, 16 Tchc, 60 Tchs
88	31-56867	14 Qe+Tchs, 23 Tch, 28 Tchc, 60 Tchs
89	31-56908	7 Qe, 10 Qtu, 46 Tchs, 51 Tchc, 80 Tchs
90	31-57612	52 Qtuo+Tchs, 115 Tkw, 220 Tsr+Tmq+Tmb+Tvt+Tht, 265 Kns, 310 Kml
91	31-57627	15 Qtuo, 35 Tchs, 40 Tchc, 55 Tchs, 65 Tchc, 100 Tchs
92	31-57710	81 Qe+Qtu+Tch, 164 Tkw, 195 Tsr
93	31-58217	2 Fill, 19 Qtu+Tchs, 28 Tchc, 70 Tchs, 165 Tkw, 185 Tsr
94	31-58244	15 Qtuo, 30 Tchs, 105 Tkw, 210 Tsr+Tmq+Tmb+Tvt, 270 Tht+Kns, 305 Kml
95	31-58271	19 TQg+Tchs, 27 Tchc, 57 Tchs, 100 Tkw, 230 Tsr+Tmq+Tmb+Tvt, 300 Tht+Kns, 340 Kml
96	31-58938	15 Qtuo, 60 Tchs, 68 Tchc, 90 Tchs
97	31-59533	4 Fill, 12 Qtuo, 33 Tchs, 41 Tch, 57 Tchs, 59 Tchc, 95 Tchs
98	31-60045	12 Q+Tchs, 26 Tch, 63 Tchs, 174 Tkw, 195 Tsr
99	31-60393	19 TQg+Tchs, 28 Tchc, 85 Tchs
100	31-60546	22 Qtuo, 36 Tchs, 40 Tchc, 80 Tchs
101	31-60581	30 Qtuo+Tchs, 100 TKw, 180 Tsr+Tmq+Tmb+Tvt, 260 Tht+Kns, 300 Kml
102	31-60744	88 Qtu+Tch+Tkw, 183 Tsr+Tmq+Tmb+Tvt, 247 Tht+Kns, 295 Kml
103	31-60928	18 Qtuo, 43 Tchs, 48 Tchc, 80 Tchs, 85 Tch
104	31-61368	20 Qtu+Tchs, 26 Tchc, 34 Tchs, 38 Tchc, 70 Tchs
105	31-61728	7 Qtu, 17 Tchs, 23 Tchc, 80 Tchs
106	31-61772	16 Qtu, 35 Tch, 100 Tkw, 190 Tsr+Tmq+Tmb+Tvt+Tht, 240 Kns, 280 Kml
107	31-62487	88 Qtu+Tch, 170 Tkw, 210 Tsr
108	31-62780	7 Qtuo, 26 Tchs, 32 Tchc, 51 Tchs, 53 Tchc, 75 Tchs
109	31-62801	7 Qtuo, 23 Tch, 29 Tchc, 85 Tchs
110	31-62816	11 TQg, 21 Tchs, 29 Tchc, 90 Tchs
111	31-62876	75 Qe+Tch, 108 Tkw, 201 Tsr+Tmq+Tmb+Tvt, 275 Tht+Kml, 325 Kml
112	31-62921	27 Qe+Tchs, 38 Tchc, 70 Tchs
113	31-62922	8 Qe+Qtu, 44 Tchs, 59 Tkw
114	31-62933	5 Qtu, 41 Tch, 76 Tkw, 163 Tsr+Tmq+Tmb+Tvt, 235 Tht+Kns, 275 Kml
115	31-63065	16 Qtuo, 80 Tchs
116	31-63142	75 Qtuo+Tch+Tkw, 210 Tsr+Tmq+Tmb+Tvt+Tht, 265 Kns, 300 Kml
117	31-63271	12 Qe+Qtuo, 23 Tchs, 29 Tchc, 64 Tchs, 75 Tkw
118	31-63364	86 Qe+Tchs, 124 Tkw, 232 Tsr+Tmq+Tmb+Tvt, 298 Tht+Kns, 340 Kml
119	31-63564	110 TQg+Tch, 152 Tkw, 269 Tsr+Tmq+Tmb+Tvt, 339 Tht+Kns, 380 Kml
120	31-63685	19 TQg+Tchs, 23 Tchc, 56 Tchs, 63 Tchc, 85 Tchs
121	31-63841	9 Qe, 28 Tchs, 33 Tchc, 55 Tchs, 65 Tkw
122	31-63996	8 TQg, 31 Tchs, 36 Tchc, 80 Tchs
123	31-64113	8 Qtu
124	31-64125	79 Qe+Tchs, 131 Tkw, 258 Tsr+Tmq+Tmb+Tvt, 318 Tht+Kns, 358 Kml
125	31-64265	19 Qe+Tchs, 25 Tchc, 66 Tchs, 70 Tkw
126	31-64302	46 Qe+Tch, 110 Tkw, 213 Tsr+Tmq+Tmb+Tvt, 274 Tht+Kns, 325 Kml
127	31-64451	19 Qtuo, 42 Tch, 90 Tchs
128	31-64588	6 Qe+Qtu, 35 Tchs, 39 Tchc, 60 Tchs, >60 Tkw
129	31-65552	14 Qe+Qtuo, 22 Tchs, 28 Tchc, 80 Tchs
130	31-65756	104 Qtuo+Tch+Tkw, 213 Tsr+Tmq+Tmb+Tvt, 269 Tht+Kns, 332 Kml
131	31-66013	17 Qe+Tchs, 25 Tchc, 35 Tch, 67 Tchs, 73 Tkw
132	31-66346	3 Fill, 42 Qe+Tch, 42 Tkw
133	31-66516	84 Qtu+Tch, 175 Tkw, 207 Tsr
134	**31-66668**	8 Qtu, 20 Tchs, 26 Tchc, 80 Tchs
135	31-67316	111 Qe+Tch+Tkw, 212 Tsr+Tmq+Tmb+Tvt, 279 Tht+Kns, 314 Kml
136	**31-67355**	93 Qe+Tch, 155 Tkw, 307 Tsr+Tmq+Tmb+Tvt, 369 Tht+Kns, 398 Kml
137	31-67848	9 Qtu, 50 Tchs

138	31-67990	30 Tchs, 42 Tchc, 80 Tchs, 180 Tkw, 355 Tsr+Tmq+Tmb+Tvt+Tht, 410 Kns, 460 Kml
139	31-68079	47 Qtuo+Tchs, 120 Tkw, 180 Tsr+Tmq+Tmb+Tvt, 260 Tht+Kns, 305 Kml
140	31-68244	15 Qe+Qtuo, 56 Tchs, 57 Tkw
141	31-68969	19 Qtu+Tchs, 27 Tchc, 60 Tchs
142	31-69347	81 Qtuo+Tkw, 144 Tsr+Tmq+Tmb+Tvt, 214 Tht+Kns, 250 Kml
143	31-69574	62 Tchs, 63 Tkw
144	31-70262	110 Qe+Qtu+Tch, 175 Tkw, 357 Tsr+Tmq+Tmb+Tvt, 431 Tht+Kns, 466 Kml
145	31-70292	45 Qtuo+Tch, 112 Tkw, 201 Tsr+Tmq+Tmb+Tvt, 265 Tht+Kns, 310 Kml
146	31-70334	78 Qtu+Tch, 163 Tkw, 194 Tsr
147	31-70985	8 Qe, 21 Tchs, 30 Tchc, 57 Tchs, 65 Tkw
148	31-71201	14Qtu, 28 Tchs, 39 Tchc, 80 Tchs
149	31-71441	19 TQg, 31 Tchs, 37 Tchc, 57 Tchs, 60 Tch, 75 Tchs
150	31-72079	31 Qtuo+Tch, 53 Tchs, 100 Tkw, 230 Tsr+Tmq+Tmb+Tvt+Tht, 270 Kns, 375 Kml
151	31-72142	13 Qe+Qtu, 105 Tch, 178 Tkw, 354 Tsr+Tmq+Tmb+Tvt, 426 Tht+Kns, 465 Kml
152	31-72337	17 Qe+Qtu, 48 Tchs, 150 Tkw, 210 Tsr+Tmq+Tmb+Tvt+Tht, 260 Kns, 305 Kml
153	31-72800	11 Qtuo, 19 Tchs, 39 Tchc, 85 Tchs
154	31-72899	78 Qe+Qtu+Tch, 179 Tkw, 348 Tsr+Tmq+Tmb+Tvt, 418 Tht+Kns, 463 Kml
155	31-72930	17 Qtuo, 52Tchc, 86 Tchs
156	31-73009	16 Qtuo, 38 Tchc, 54 Tchs, 61 Tchc, 80 Tchs
157	31-73209	76 Qtu+Tkw, 168 Tsr+Tmq+Tmb+Tvt, 236 Tht+Kns, 284 Kml
158	31-73449	19 Qtuo, 28 Tchs, 42 Tchc, 58 Tchs, 62 Tchc, 90 Tchs
159	31-73636	14 Qtu, 18 Tchc, 70 Tchs, 84 Tch, 171 Tkw, 199 Tsr
160	31-73923	2 Fill, 10 Qe, 13 Qtu, 36 Tchs, 42 Tchc, 57 Tchs, 61 Tch, 68 Tkw
161	31-74012	26 Qtuo+Tch, 46 Tchc, 82 Tchs
162	31-74791	16 Qe+Tchs, 22 Tchc, 46 Tchs, 72 Tkw
163	31-74797	8 Qe+Qtu, 33 Tchs, 39 Tchc, 74 Tchs, 78 Tkw
164	31-74955	26 Qe+Tchs, 32 Tchc, 67 Tchs, 70 Tchc
165	31-75290	21 Qe+Tchs, 40 Tchc, 62 Tchs
166	31-75370	9 Qtu, 31 Tkw, 105 Tsr+Tmq+Tmb+Tvt, 145 Tht+Kns, 180 Kml
167	31-75561	11 Qtuo, 37 Tchs, 58 Tchc, 87 Tchs
168	31-75581	8 Qtuo, 18 Tchs, 24 Tchc, 57 Tchs, 59 Tch, 64 Tchs, 70 Tkw
169	31-75768	15 Tchs, 38 Tch, 50 Tchc, 80 Tchs
170	31-76168	14 Qe+Qtu, 30 Tchs, 47 Tchc, 80 Tchs
171	31-76565	57 Qtu+Tkw, 120 Tsr+Tmq+Tmb+Tvt, 183 Tht+Kns, 227 Kml
172	31-76760	22 Qe+Tchs, 220 Tkw+Tsr+Tmq+Tmb+Tvt, 292 Tht+Kns, 325 Kml
173	31-76799	23 Qtuo, 38 Tchs, 103 Tkw, 204 Tsr+Tmq+Tmb+Tvt, 263 Tht+Kns, 316 Kml
174	32-09903	100 Qe+Tkw, 215 Tsr+Tmq+Tmb+Tvt, 248 Tht, 290 Kns, 322 Kml
175	32-12834	16 Qe, 20 Qtuo, 65 Tchs, 100 Tkw
176	32-13296	25 Qe+Tchs, 32 Tchc, 61 Tchs
177	32-13746	18 Qtuo, 77 Tchs, 100 Tkw
178	32-14289	46 Tg+Tchs, 60 Tch, 74 Tchs, 80 Tkw
179	32-15662	9 TQg, 81 Tchs, 87 Tchc, 92 Tchs, 98 Tkw
180	32-16067	16 Tch, 22 Tchs, 46 Tchs+Tchs, 53 Tchc, 70 Tchs, 80 Tkw
181	32-16963	15 Qe, 20 Qtuo, 65 Tchs, 174 Tkw, 366 Tsr+Tmq+Tmb+Tvt, 420 Tht+Kns, 468 Kml
182	32-18826	12 Qe+Qtu, 80 Tchs, 93 Tkw
183	32-19521	14 Tg, 55 Tch, 60 Tchc, 100 Tkw
184	32-19565	14 Tch, 19 Tch, 72 Tch, 82 Tchs, 90 Tkw
185	32-20755	16 Qe+Tchs, 22 Tchc, 50 Tchs, 60 Tkw
186	32-21176	12 TQg, 120 Tkw, 240 Tsr+Tmq+Tmb+Tvt, 300 Tht+Kns, 380 Kml
187	32-21672	18 Tchs, 26 Tch, 35 Tchc, 70 Tchs, 75 Tkw
188	32-21706	15 TQg, 40 Tchs, 50 Tchc, 75 Tchs

189	32-22128	14 Tchs, 18 Tchc, 27 Tchs, 30 Tchc, 55 Tchs, 62 Tch, 65 Tchc, 70 Tchs, 76 Tkw
190	32-22988	15 Qtu, 45 Tch, 85 Tch, 175 Tkw, 190 Tsr
191	32-23159	18 Qtu, 35 Tch, 40 Tchc, 80 Tchs, 185 Tkw, 200 Tsr
192	32-24688	18 Qals+Tchs, 40 Tch, 80 Tchs, 160 Tkw, 270 Tsr+Tmq+Tmb+Tvt+Tht, 315 Kns, 350 Kml
193	32-25961	14 Qtu, 22 Tchs, 31 Tchc, 68 Tchs, 170 Tkw, 190 Tsr
194	32-25984	18 Qe+Tchs, 35 Tch, 44 Tchc, 90 Tchs, 155 Tkw, 260 Tsr+Tmq+Tmb+Tvt, 330 Tht+Kns, 375 Kml
195	32-26029	9 Qtu, 68 Tch, 151 Tkw, 314 Tsr+Tmq+Tmb+Tvt, 370 Tht+Kns, 420 Kml
196	32-26233	39 Qtuo+Tchs, 43 Tchc, 69 Tchs, 72 Tkw
197	32-26270	78 Qtu+Tch, 167 Tkw, 195 Tsr
198	32-26600	29 TQg+Tchs, 33 Tchc, 63 Tchs, 65 Tkw
199	**32-26846**	23 Qtu+Tchs, 38 Tchc, 170 Tchs + Tkw, 185 Tsr
200	32-26940	19 Qtuo, 27 Tchs, 38 Tchc, 60 Tchs
201	32-27621	27 Tg, 50 Tchs, 55 Tch, 85 Tchs, 143 Tkw, 252 Tsr+Tmq+Tmb+Tvt, 317 Tht+Kml, 353 Kml
202	32-27790	25 Qtu+Tchs, 68 Tch, 164 Tkw, 193 Tsr
203	32-28468	13 Qals, 32 Tchc, 84 Tch, 166 Tkw, 200 Tsr
204	32-29736	17 Qtu+Tchs, 30 Tchc, 67 Tchs
205	E201009634	12 Qtuo, 38 Tch, 70 Tchc, 95 Tchs, 110 Tchs
206	E201011375	12 Tchs, 26 Tch, 59 Tchc, 90 Tchs
207	E201013479	17 Qtu, 90 Tchs
208	E201014488	1 Fill, 11 Qe
209	E201016067	7 Qtu, 69 Tchs, 70 Tchc
210	E201104255	39 Qtl+Tchs, 113 Tch, 132 Tkw, 241 Tkw+Tsr, 305 Tmq+Tmb, 350 Tvt
211	E201210392	16 Qtuo, 30 Tch, 62 Tchc, 90 Tchs
212	E201217593	21 Qtuo, 26 Tchc, 71 Tchs, 84 Tch, 156 Tchs, 209 Tkw, 300 Tkw+Tsr
213	E201303920	10 Qtuo, 63 Tch+Tkw
214	E201513313	14 Qtu, 85 Tch, 173 Tkw, 209 Tsr
215	E201609882	15 Qtuo, 39 Tchc, 90 Tchs
216	E201706234	19 Qtu, 31 Tch, 59 Tchs, 99 Tch, 140 Tchs, 174 Tkw, 203 Tkw+Tsr
217	E201801198	18 Qtuo, 30 Tchs, 60 Tchc, 90 Tchs
218	E201804123	18 Qtu, 24 Tchc, 55 Tchs, 59 Tch, 74 Tchs
219	E201902992	30 Qtu+Tch, 45 Tchc, 70 Tchs
220	E201911041	20 Qtuo, 35 Tch, 60 Tchc, 90 Tchs
221	E201911315	35 Qtuo+Tch, 110 Tkw, 200 Tsr+Tmq+Tmb+Tvt, 260 Tht+Kns, 305 Kml

[1] Permit numbers in the form of 31-xxxxx and Exxxxxxxxx are N.J. Department of Environmental Protection well permit numbers; “Mullica 1-D” is the name used to specify which well under well permit number 32-01525 since such well permit number covers multiple wells. Well and permit numbers are **bolded** when depicted on cross-sections. A “G” following the identifier indicates that a gamma-ray log is on file at the New Jersey Geological and Water Survey (NJGWS); an “E” indicates that an electric log (single-point resistance and/or spontaneous potential) is on file at the NJGWS. Well locations are shown on the map to an accuracy of within 500 feet.

[2] Number preceding the unit abbreviation is the depth (in feet below land surface) of the unit’s base. For example, “17 Qtu, 90 Tchs” indicates Qtu from 0 to 17 feet below ground surface and Tchs from 17 to 90 feet below ground surface. The last number in the sequence represents the total depth reported in the log, which is not necessarily the base of the unit. A “+” sign between units indicates that such units but could not be differentiated in the lithologic and/or geophysical log. Many logs do not distinguish surficial units from the uppermost bedrock unit. In these cases, the surficial unit is included in the uppermost bedrock unit. Lithologic descriptions for the Cohansey Formation can sometimes group sands and clays together rather than identify each separately. If clays and sands are grouped together in the lithologic description, “Tch” is indicated. Unit abbreviations are explained in the Description of Map Units. Units are inferred from drillers’, geologists’, or engineers’ lithologic descriptions in well records filed with the N.J. Department of Environmental Protection or geophysical logs on file at the NJGWS. Interpretation of sediments described in the logs may not match the map and sections due to variability in drillers’ descriptions and lag times involved in the drilling process.