



**SURFICIAL GEOLOGY OF THE KEYPORT QUADRANGLE
MIDDLESEX AND MONMOUTH COUNTIES, NEW JERSEY**

by
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MAP UNITS

Age of unit indicated in parentheses. For units spanning more than one period, principal age is listed first.
Order of map units in list does not necessarily indicate chronologic sequence.

-  **ARTIFICIAL FILL**—Sand, silt, clay, gravel; brown, gray, yellowish brown; may include demolition debris (concrete, brick, asphalt, glass) and trash. As much as 40 feet thick. In road and railroad embankments, solid-waste landfills, and made land. Many small areas of fill in urban areas are not shown.
-  **Qal** **ALLUVIUM** (Holocene and late Pleistocene)—Sand, silt, clay, peat; yellowish brown, dark brown, gray; and pebble gravel. Abundant organic matter. Sand is chiefly quartz, with some glauconite and mica. Gravel is quartz and quartzite with minor ironstone. As much as 15 feet thick. Deposited in floodplains, channels, and ground-water seepage areas.
-  **Qs** **SWAMP AND MARSH DEPOSITS** (Holocene and late Pleistocene)—Freshwater peat and organic silt, sand, and clay; dark brown to black. As much as 10 feet thick.
-  **Qcal** **COLLUVIUM AND ALLUVIUM** (Holocene and late Pleistocene)—Interbedded alluvium and colluvium in headwater valleys. As much as 15 feet thick.
-  **Qbs** **BEACH SAND AND BAY MUD** (Holocene)—Sand, very pale brown to light gray; and pebble gravel; in beaches and nearshore areas. Sand is overlain or replaced by dark gray silt and clay, with shell hash, away from the shoreline. As much as 20 feet thick. May overlie estuarine deposits, alluvium, or lower terrace deposits. Deposited during Holocene sea-level rise.
-  **Qmm** **ESTUARINE DEPOSITS** (Holocene)—Salt-marsh peat, organic silt and clay; dark brown to black; sand and minor pebble gravel; very pale brown, white, gray. As much as 70 feet thick. May overlie alluvium or lower terrace deposits. Deposited during Holocene sea-level rise.
-  **Qe** **EOLIAN DEPOSITS** (late Pleistocene and Holocene)—Fine-to-medium sand, very pale brown to reddish yellow. Sand is chiefly quartz with minor glauconite and mica in places. As much as 20 feet thick. Forms a dune ridge in Keansburg.
-  **Qtl** **LOWER TERRACE DEPOSITS** (late Pleistocene)—Sand and minor silt; yellow, yellowish brown, reddish yellow; and pebble gravel. Sand is chiefly quartz with some glauconite and mica. Gravel is quartz and quartzite with minor ironstone. As much as 50 feet thick but generally less than 30 feet thick. Forms stream terraces with surfaces 5 to 20 feet above the modern floodplain.
-  **Qcl** **LOWER COLLUVIUM** (late Pleistocene)—Sand, silt, minor clay; yellow, yellowish brown, reddish yellow, light gray; some quartz and ironstone pebbles. As much as 20 feet thick, generally less than 10 feet thick. Forms aprons graded to lower terraces or the modern floodplain.
-  **Qtu** **UPPER TERRACE DEPOSITS** (middle Pleistocene)—Sand, minor silt; yellow, reddish yellow; and pebble gravel. Sand is chiefly quartz; glauconite and mica are generally less abundant than in the lower terrace deposits and alluvium. Gravel is quartz, quartzite, and minor ironstone. As much as 20 feet thick. Forms stream terraces with surfaces 20 to 50 feet above the modern floodplain.
-  **Qcu** **UPPER COLLUVIUM** (middle Pleistocene)—Sand, silt, minor clay; pale brown, yellow, reddish yellow; some quartz, quartzite and ironstone pebbles. As much as 20 feet thick. Forms aprons graded to upper terraces.
-  **TQg** **UPLAND GRAVEL, LOWER PHASE** (late Pliocene-middle Pleistocene)—Sand, minor silt; yellow to reddish yellow; and pebble gravel. Sand is chiefly quartz with minor glauconite and mica. Gravel is quartz and quartzite. As much as 10 feet thick. In erosional remnants on lower uplands and interfluvies.
-  **Tg** **UPLAND GRAVEL** (Pliocene-early Pleistocene)—Sand, yellow to reddish yellow, and pebble gravel; minor fine-cobble gravel. Sand is chiefly quartz, with minor glauconite and mica. Gravel is quartz and quartzite with minor weathered chert. Locally iron-cemented. As much as 10 feet thick. In erosional remnants on hilltops and interfluvies.
-  **Tbh** **BEACON HILL GRAVEL** (late Miocene)—Sand, reddish yellow to yellow; pebble gravel and minor cobble gravel. Sand is chiefly quartz; gravel is quartz and quartzite with some weathered chert and mudstone. Locally iron-cemented. As much as 30 feet thick. In erosional remnants on highest hills, above 320 feet in elevation.
-  **Qwcp** **WEATHERED COASTAL PLAIN FORMATIONS**—Exposed sand and clay of Coastal Plain bedrock formations. May be overlain by thin, patchy alluvium and colluvium. Quartz and ironstone pebbles left from erosion of surficial deposits may be present on the surface and in the upper several feet of the formation.

MAP SYMBOLS

 **Contact**—Contacts of alluvium, beach deposits, and estuarine deposits are well-defined by landforms and are drawn from 1:12,000 scale aerial stereophotos. Contacts of other units are approximately located based on both landforms and field observation points.

 **Material observed in hand-auger hole, exposure, or excavation.**

 **Well or boring**—Upper number (italicized) is identifier, lower number is thickness of surficial material, in feet. Identifiers of the form '29-xxxx' are N. J. Department of Environmental Protection well permit numbers. Identifiers of the form 'xx-xx-xxx' are N. J. Atlas Sheet grid locations of entries in the N. J. Geological Survey permanent note collection. Identifiers of the form 'Bx' or 'B-xxx' are engineering test borings on file at the N. J. Geological Survey. Identifiers of the form '25-xxx' and '85-xxx' are from Gronberg, J. M., Birkelo, B. A., and Pucci, A. A., 1989, Selected borehole geophysical logs and drillers' logs, northern Coastal Plain of New Jersey; U. S. Geological Survey Open-File Report 87-243, 133 p. Identifiers of the form 'Gxx' are from Gaswirth, S. B., 1999, The late Pleistocene to Holocene glacial history of Raritan Bay, New Jersey; M. S. thesis, Rutgers University, New Brunswick, N. J., 157 p.

