U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
NEW JERSEY GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–2540–D (SHEET 1 OF 3)
Explanatory pamphlet accompanies map

LIST OF MAP UNITS

[For complete descriptions, see Description of Map Units in accompanying pamphlet.]

COASTAL PLAIN

MANMADE DEPOSITS

- cb — Cranberry bog
- af — Artificial fill
- ds — Dredge spoil
- amt — Ilmenite mine and pit spoil (titanium dioxide)
- amg — Glass sand mine and pit spoil (silica)
- amsg — Sand and gravel pit spoil
- amc — Claypit spoil

MODERN DEPOSITS

- Qb — Beach deposits (Holocene)
- Qa — Alluvium (Holocene)
- Qm — Salt-marsh deposits (Holocene to Pleistocene)
- Qs — Swamp deposits (Holocene to Pleistocene)

EOLIAN DEPOSITS

- Qe — Dune field deposits (Holocene to Pleistocene)

MARGINAL-MARINE DEPOSITS (WARM CLIMATE, HIGH SEA LEVEL)

Cape May Formation (Pleistocene)

- Qcm_1 — Unit 1 (early Wisconsinan? to late Sangamonian)
- Qcm_2 — Unit 2 (late Sangamonian)
- Qcmbl — Barrier-lagoon facies (late Sangamonian)
- Qcm_3 — Unit 3 (early Sangamonian)
- Qcmb — Beach-barrier facies (early Sangamonian)
- Qcm — Cape May Formation, undivided (early Wisconsinan? to early Sangamonian)

FLUVIAL DEPOSITS (COLD CLIMATE, LOW SEA LEVEL)

- Qvl — Fluvial deposits at Van Sciver Lake (Graywacke 1 of Owens and Minard, 1975; Van Sciver Lake beds of Owens and Minard, 1979) (late Wisconsinan)
- Qsl — Fluvial deposits at Spring Lake (Graywacke 2 of Owens and Minard, 1975; Spring Lake beds of Owens and Minard, 1979) (Sangamonian)

WEATHERED MATERIALS AND TERRESTRIAL DEPOSITS

Slope and Valley Deposits

- Qca_1 — Colluvium and alluvium unit 1 (Pleistocene)
- Qca_{1b} — Braided-channel deposits (Pleistocene)
- Qca_{1d} — Debris-flow and alluvial-fan deposits, undivided (Pleistocene)
- Qca_2 — Colluvium and alluvium unit 2 (Pleistocene)
- Qca_3 — Colluvium and alluvium unit 3 (Pleistocene)
- Qca_4 — Colluvium and alluvium unit 4 (Pleistocene)
- Qca_5 — Colluvium and alluvium unit 5 (Pleistocene)
- QTcau — Colluvium and alluvium, undivided (Pleistocene to Miocene)

Hilltop Regolith

- QTrf — Leached residuum of the Freehold uplands (Quaternary and Tertiary)
- QTrw — Leached residuum at Warrens Grove (Quaternary and Tertiary)
- Ts — Silcrete (Tertiary)

MARINE, MARGINAL-MARINE, ESTUARINE, DELTAIC, AND FLUVIAL DEPOSITS

- Tu — Unnamed unit beneath Cape May Peninsula (upper Pliocene?)
- Tps — Pensauken Formation (late Miocene? to Pliocene)
- Tbr — Bridgeton Formation (Miocene)
  - Tbrg — Channel bar forms
- Tch — Cohansey Formation (Miocene)
  - Tchd — Upper delta-front facies
  - Tchg — Fluvial gravel facies
- Tkw — Kirkwood Formation (Miocene)

OLDER ROCKS

- TKu — Marshalltown Formation to Shark River Formation, undivided (Upper Cretaceous to Eocene)
- Kw — Woodbury Formation (Upper Cretaceous)
- Ku — Potomac Formation to Merchantville Formation, undivided (Upper Cretaceous)
- PPzw — Rocks of the Wilmington terrane (Paleozoic and Proterozoic)

PIEDMONT

MANMADE DEPOSITS

- af — Artificial fill
- amd — Diabase quarry pit and tailings

EOLIAN, ALLUVIAL, AND SLOPE DEPOSITS

- Qe — Eolian sand deposits (Holocene and Pleistocene, late Wisconsinan)
- Qa — Alluvium (Holocene and Pleistocene, late Wisconsinan)
- Qalb — Boulder-lag deposits (early Holocene and late Pleistocene, late Wisconsinan)
- Qdi — Alluvium at Duck Island (early Holocene and late Pleistocene, late Wisconsinan)

TERRACE DEPOSITS

- Qml — Millstone terrace deposits (early Holocene and late Pleistocene, late Wisconsinan)
- Qst — Stream-terrace deposits (early Holocene and late Pleistocene, late Wisconsinan)
- Qf — Alluvial-fan deposits (Pleistocene)
- Qstu — Upper stream-terrace deposits (Pleistocene)

COLLUVIAL DEPOSITS

- Qcs — Sandstone-, siltstone-, conglomerate-, or shale-clast colluvium (Holocene to Pleistocene)
- Qcd — Diabase-block colluvium (Holocene to Pleistocene)
- Qcb — Basalt-block colluvium (Holocene to Pleistocene)
- Qcal — Colluvium and alluvium, undifferentiated (Holocene to Pleistocene)

GLACIAL MELTWATER DEPOSITS

- Qrdl — Delaware terrace deposits (of the Rockaway Formation; Stone and others, 1995, in press) (Pleistocene, late Wisconsinan)
- Qlbr — Brainards outwash deposit (of the Lamington Formation; Stone and others, 1995, in press) (Pleistocene, Illinoian)
- Qps — Stratified deposits (of the Port Murray Formation; Stone and others, 1995, in press) (Pleistocene, pre-Illinoian)

SAPROLITE, RESIDUUM, AND ROCK RUBBLE

- Qsw — Silty clayey to sandy silty sandstone, siltstone, and shale residuum, silty sandy quartzite and conglomerate, saprolite, and rock rubble (Holocene and Pleistocene)
- Qdrh — Diamicton at Rocky Hill (Pleistocene)
- QTdw — Sandy silty diabase saprolite and rock rubble (Pleistocene to Miocene)
- QTbw — Clayey silty basalt saprolite and rock rubble (Pleistocene to Miocene)

OLDER ROCKS

- JTRu — Bedrock (Jurassic and Triassic)

EXPLANATION OF MAP SYMBOLS

- **Contact**—Approximately located. Dashed contacts in cross sections are inferred based on data from drill holes (see Newell and others, 1995)
- **Scarp**—Ticks point downscarp. Dashed scarp south of Salem indicates western edge of abandoned paleochannel
- **General direction of transport of surficial deposit**
- **Buried Cohansey River channel between dashed lines**

Figure 1.—Index map showing areas of responsibility for the surficial geologic maps of central and southern New Jersey. The 1:100,000-scale bedrock geologic maps of central and southern New Jersey (Owens, Sugarman, Sohl, Parker, and others, 1995; Owens, Sugarman, Sohl, and Orndorff, 1995) were used as sources for the distribution of the Cohansey, Kirkwood, and Woodbury Formations. *A*, Reconnaissance mapping by W.L. Newell. Subsurface information was collated from bridge and highway borings by D.S. Powars and supplemented with power augering by Newell and Powars. Map compiled by Newell. Cross sections and ancillary data modified from Newell and others (1995), in which they were constructed and compiled by Powars and J.S. Schindler (U.S. Geological Survey). *B*, Reconnaissance mapping by W.L. Newell and D.S. Powars (limited in heavily urbanized areas). Subsurface information was gathered by power augering and from unpublished data by Powars. Map compiled by Newell using stratigraphic model developed from field observations in southern New Jersey. Powars refined the linework in the Woodmansie, Brookville, and Forked River quadrangles. In the Camden area, early work of H.B. Kümmel and G.N. Knapp in the Philadelphia and Trenton folios (*in* Bascom, Clark, and others, 1909; and Bascom, Darton, and others, 1909, both at a scale of 1:62,500) was found valuable to the interpretation of surficial deposits along the Delaware River and on the uplands south of Pensauken Creek and west of long 75° W. *C*, Mapped by J.P. Owens and J.P. Minard as eight 7.5-min geologic quadrangle maps (Minard and Owens, 1962, 1963; Minard and others, 1964; Owens and Minard, 1962, 1964a,b,c, 1966) with some surficial data developed by power augering by Owens and Minard. Owens and Minard (1975, scale 1:48,000) presented late Neogene and Pleistocene surficial geology for the same area and included previously unpublished data from the Trenton West 7.5-min quadrangle; sedimentary petrology of the surficial deposits was emphasized. W.L. Newell and D.S. Powars examined the area in reconnaissance. Powars contoured Owens' and Minard's subsurface data and demonstrated that their map information, although presented differently, is consistent with the morphostratigraphy of the surficial geologic map of southern New Jersey. *D*, Area of surficial deposits in the Piedmont (underlain by Mesozoic Newark Supergroup rocks) mapped and compiled by S.D. Stanford using stratigraphic framework of the surficial geologic map of northern New Jersey by Stone and others (1995). *E*, Area of surficial deposits in Central Uplands and Coastal Lowlands mapped by S.D. Stanford (at 1:24,000 scale); descriptions and interpretations of deposits are similar to those of Salisbury and Knapp (1917). Edited, integrated, and compiled by W.L. Newell for consistency with the stratigraphy of the surficial geologic map of southern New Jersey. *F*, Sandy Hook and Roosevelt 7.5-min geologic quadrangle maps of Minard (1964, 1969) used by W.L. Newell in map compilation and to define lithology, thickness, and distribution of some surficial deposits in the Central Uplands and along the Coastal Lowlands of central New Jersey. *G*, Adelphia, Farmingdale, and Asbury Park 7.5-min geologic quadrangle maps of Sugarman and others (1991) and Sugarman and Owens (1994) used by W.L. Newell in map compilation, to define the distribution and thickness of the Cohansey and Kirkwood Formations, and to identify areas of extensive thin cover and outcrop.

Base from U.S. Geological Survey, 1:100,000
Atlantic City, 1984; Cape May, 1981; Dover, 1984; Hammonton, 1984; Long Branch, 1983; Reading, 1984; Trenton, 1986; Wilmington, 1984

25,000-foot grid ticks based on New Jersey coordinate system

10,000-meter Universal Transverse Mercator grid ticks, zone 18

Contour interval 5 meters, except 10 meters in Long Branch, Trenton, and Wilmington quadrangles and 20 meters in Reading quadrangle

Supplementary 5–meter contours in Wilmington quadrangle

APPROXIMATE MEAN DECLINATION, 1999

SCALE 1:100 000

CONTOUR INTERVAL VARIES THROUGHOUT MAP
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—2001

SURFICIAL GEOLOGIC MAP OF CENTRAL AND SOUTHERN NEW JERSEY

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2000

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