DELAWARE GEOLOGICAL SURVEY
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DELAWARE GEOLOGICAL SURVEY
Report of Investigations No. 77
Plate 1

Location of study area. Boxed area indicates the location of the model domain.

Elevation of the base of the units
(meters*, NAVD 88)

■	24 to 1
■	0 to -99
■	-100 to -199
■	-200 to -299
■	-300 to -399
■	-400 to -499
■	-500 to -599
■	-600 to -749
☐	inactive cell area

* To convert to feet,
multiply meters by 3.28

Elevation of the Base of the Aquifers and Confining Units

The regional hydrogeologic framework of southern New Castle County has been defined by a model grid consisting of 400 columns, 320 rows, and 9 vertical layers. Each cell has dimensions of 150 m by 130 m, resulting in a total of 1,152,000 cells (681,345 active cells). The model consists of a layered sequence of six aquifers and three confining units.

Because we are using a finite-difference flow modeling code, individual model layers are required to be continuous over the entire domain (Anderson and Woessner, 1992). In general, individual model layers correspond to individual aquifers and confining units. However, several of the geologic and aquifer units are truncated toward the north and west and in some stream valleys. We followed recommendations of Reilly (2001) and assigned a minimum thickness (1 m) to areas where the aquifer(s) or confining bed(s) are missing.

The colors on these figures represent the elevation of the base of the indicated layer. Each color represents a range of values. Generally speaking, the elevation of the base of a layer is shallowest in the northwest and deepest in the southeast. However, within each color category, individual data points may be highly variable.

Layer 7 includes the combined Magothy and Potomac A aquifers, which are referred to as the Magothy/Potomac A aquifer and is included in the general category of Potomac aquifers. The Magothy/Potomac A aquifer is simulated as a single model layer because of the discontinuous nature of Magothy sands and the absence of data to describe the thickness and extent of the intervening confining unit in the study area.

Groupings of lithostratigraphic units for groundwater model layers, layer thicknesses, and elevations of layer bottoms. Confining unit names are those proposed by Dugan et al. (2008). Hydraulic properties of the Potomac aquifers are adapted from USACE (2007).
(a) = aquifer; (cu) = confining unit

Lithostratigraphic Units (Delaware nomenclature)	Hydro-stratigraphic Function	Model Layer	Thickness Range (meters)	Elevation of Layer Bottom (meters, NAVD 1988)
Scotts Corners, Lynch Heights, Columbia	Columbia (a)	1	1 to 42	17 to -15
Calvert, Shark River, Manasquan	Blackbird (cu)	2	1 to 187	10.0 to -197
(Manasquan), Vincen-town, (Hornerstown)	Rancocas (a)	3	1 to 77	8.0 to -218
Hornerstown, Navesink	Armstrong (cu)	4	1 to 54	6.0 to -230
Mt. Laurel, (Marshalltown)	Mt. Laurel (a)	5	1 to 35	4.0 to -257
Marshalltown, English-town, Merchantville	Summit (cu)	6	1 to 75	-0.6 to -260
Magothy/ upper Potomac	Magothy/ Potomac A (a)	7	1 to 215	-12 to -467
middle Potomac	Potomac B (a)	8	8 to 80	-20 to -533
lower Potomac	Potomac C (a)	9	31 to 473	-80 to -983

Elevation of the Base of the Aquifers and Confining Units (Figures 4a through 4i) Southern New Castle County, Delaware
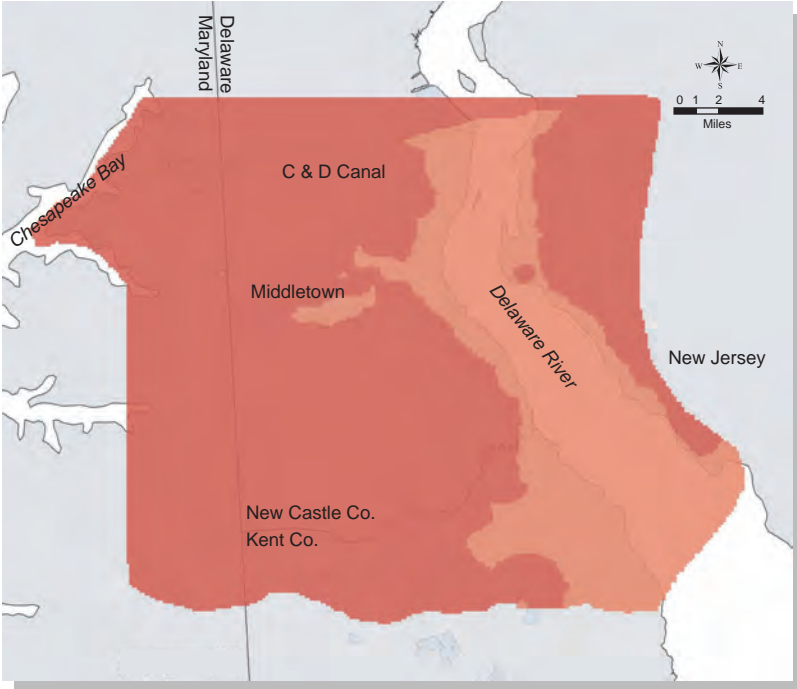

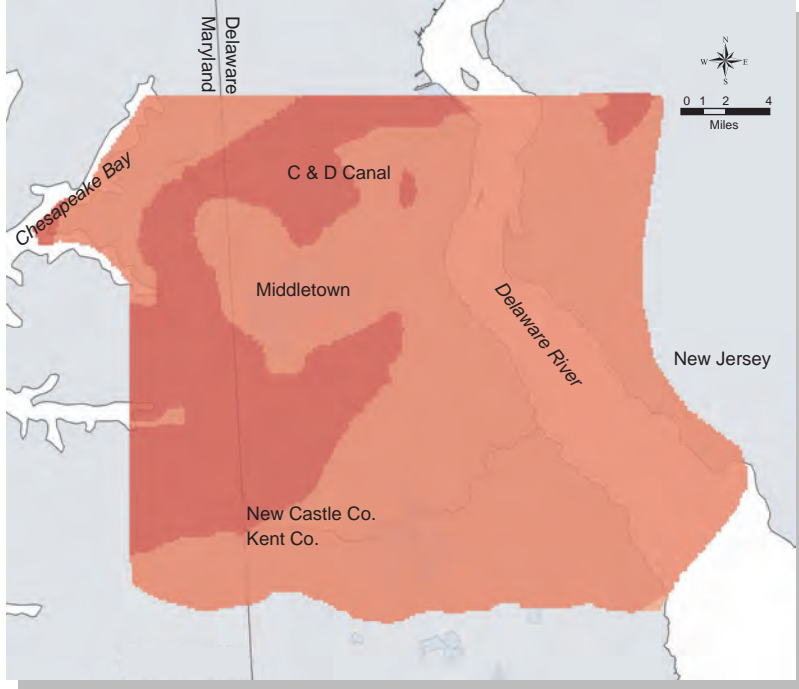Figure 4a. Elevation of layer 1 (base of the Columbia aquifer).

Figure 4b. Elevation of layer 2 (base of the Blackbird confining unit).
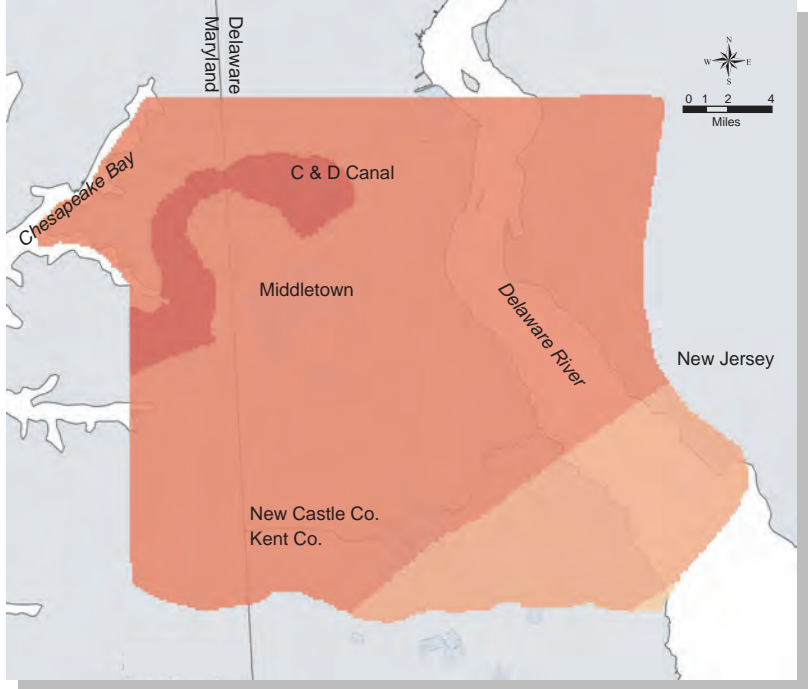

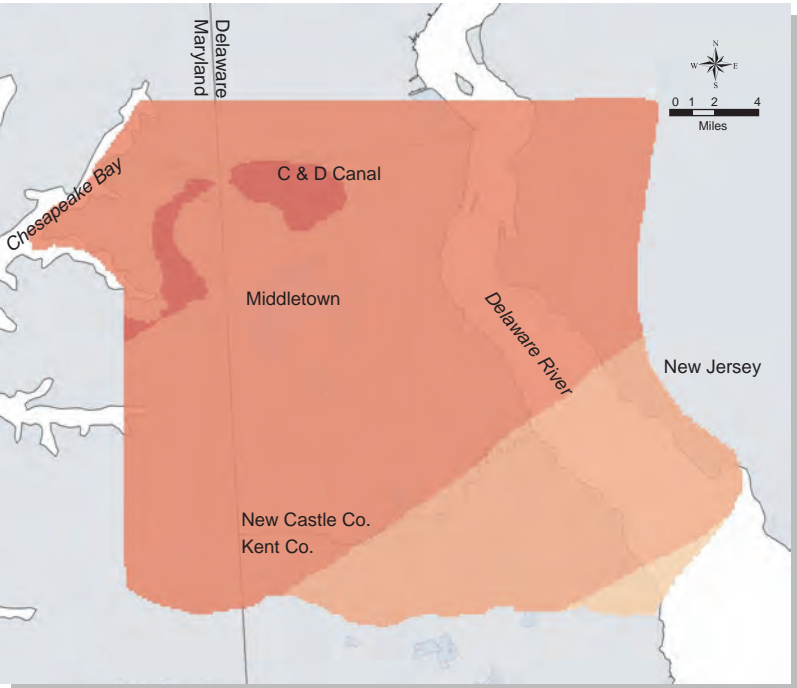Figure 4c. Elevation of layer 3 (base of the Rancocas aquifer).

Figure 4d. Elevation of layer 4 (base of the Armstrong confining unit).
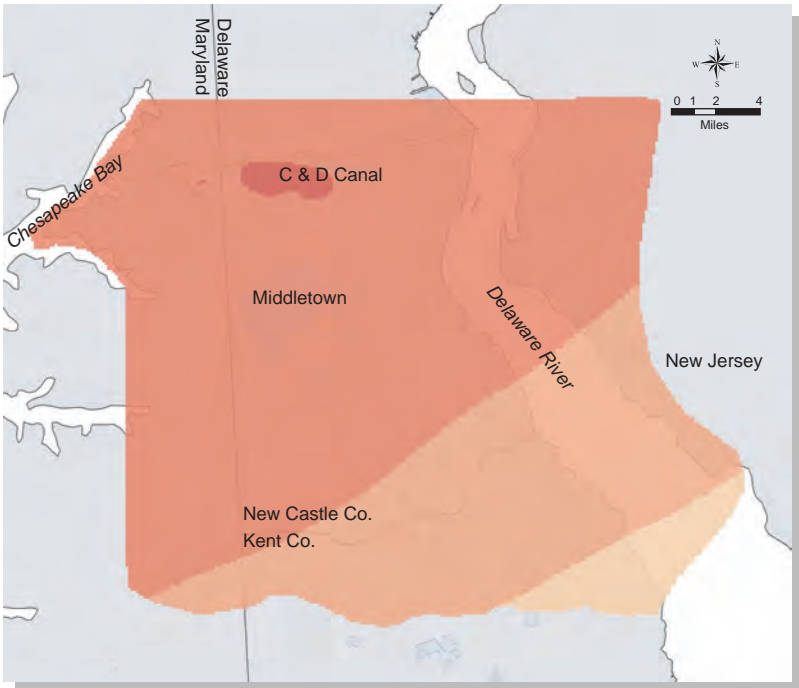

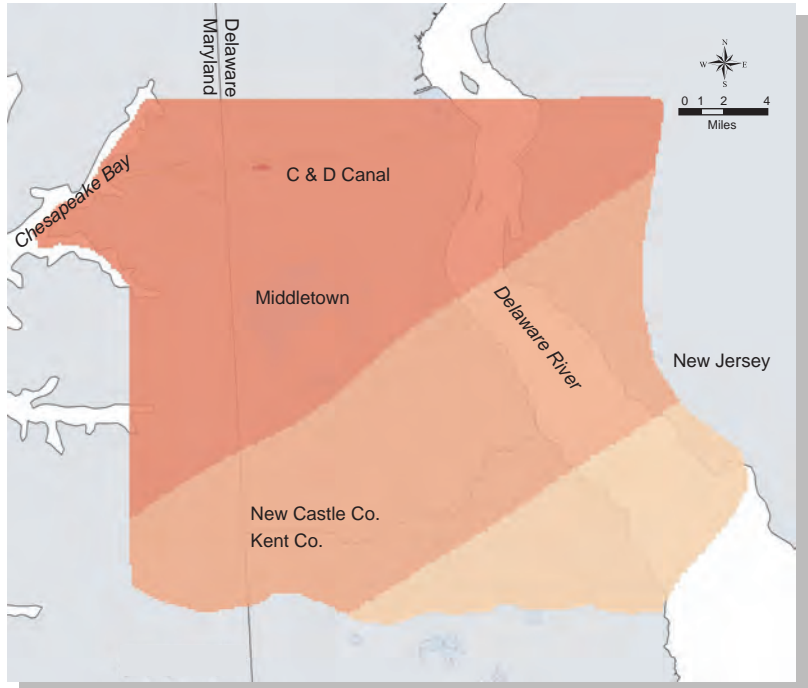Figure 4e. Elevation of layer 5 (base of the Mt. Laurel aquifer).

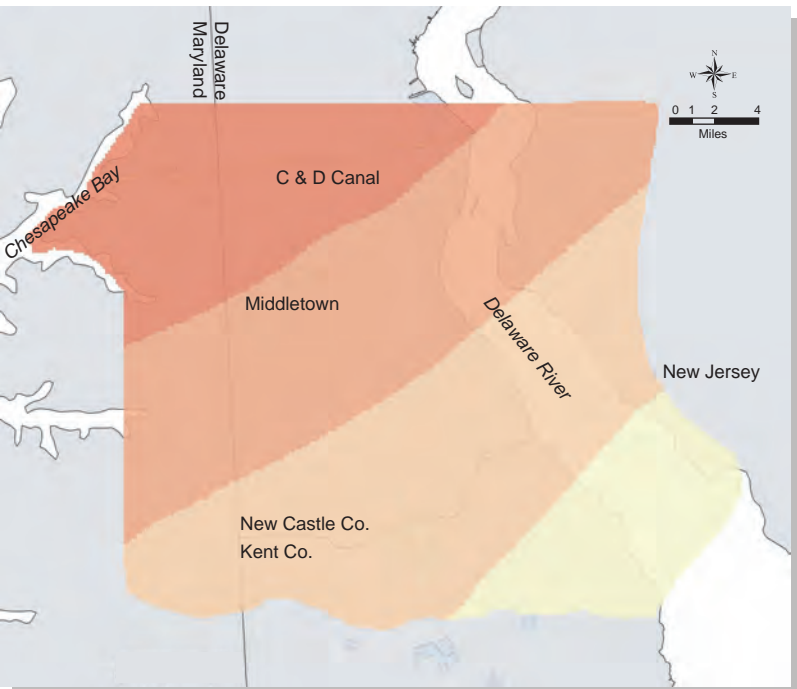Figure 4f. Elevation of layer 6 (base of the Summit confining unit).

Figure 4g. Elevation of layer 7 (base of the Magothy/Potomac A aquifer).
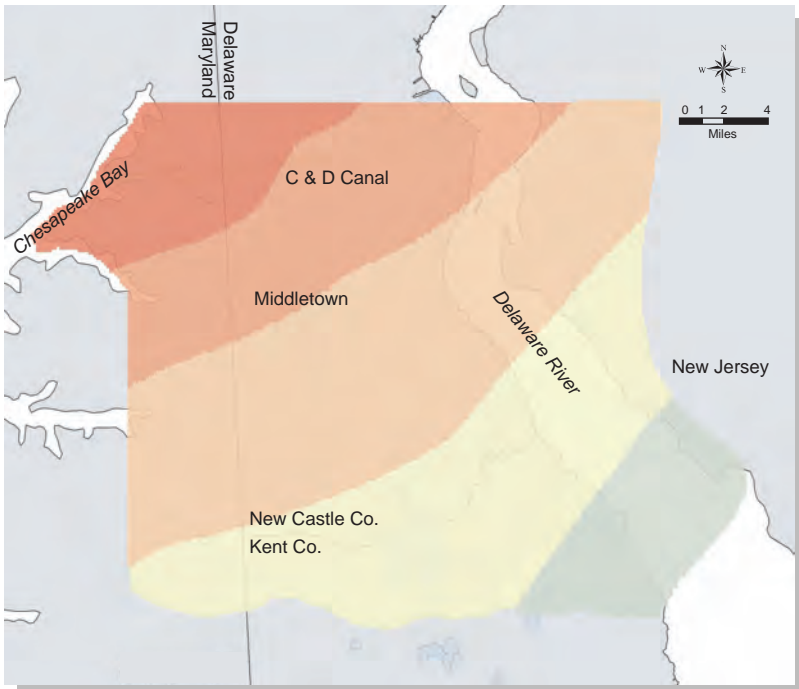

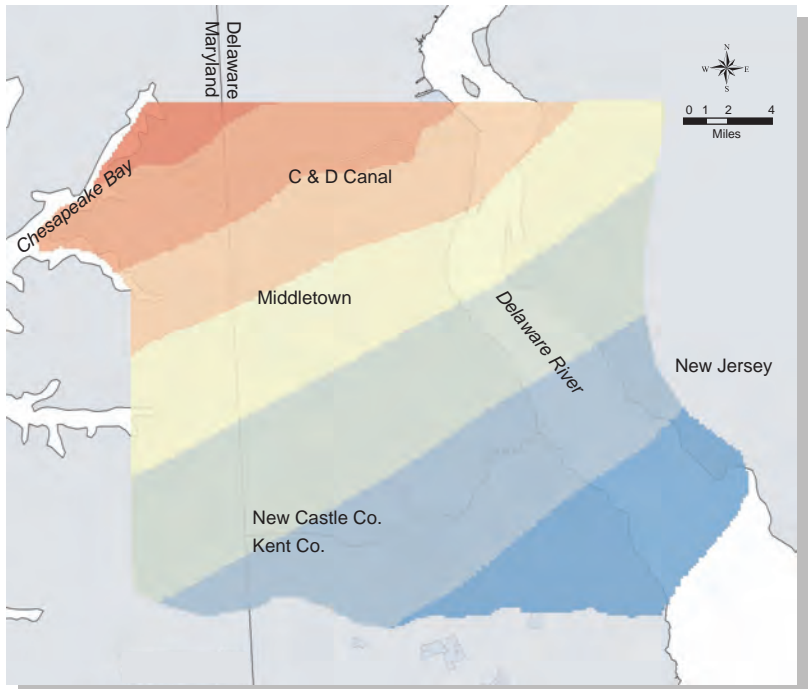Figure 4h. Elevation of layer 8 (base of the Potomac B aquifer).

Figure 4i. Elevation of layer 9 (base of the Potomac C aquifer).

Reference Cited
Anderson, M.P., and Woessner, W. W., 1992, Applied groundwater modeling: San Diego, Academic Press, 381 p.
Dugan, B. L., Neimeister, M. P., and Andres, A. S., 2008, Hydrologeologic framework of southern New Castle County: Delaware Geological Survey Open-File Report No. 49, 22 p., 2 pl.
Reilly, T. E., 2001, System and boundary conceptualization in ground-water flow simulation: Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 3, Chapter B8, 30 p.
United States Army Corps of Engineers, Philadelphia District (USACE), 2007, Groundwater Model Production Run report, Upper New Castle County, Delaware: report prepared for the Delaware Department of Natural Resources and Environmental Control, December, 2006, 44 p.