

DESCRIPTION OF MAP UNITS	
Qal	Alluvium Interbedded sand, gravel, and silt-clay. Sand, very fine to coarse, interbedded with pebbly sand and fine to very coarse gravel. Contains beds and lenses of silt-clay, massive to laminated, bearing in places organic matter such as leaves, twigs, and roots, as well as rare peat beds. Dark-colored silt-clay bearing organic matter and permeated with roots underlies areas of tidal marsh, concentrated in and near the mouths of major Potomac River tributaries. Color tan, brown, or shades of gray. Alluvium embraces typically heterogeneous, generally poorly-sorted sediments ranging from well-stratified to massive. Sandy lithologies are predominantly quartzose where derived from upland areas underlain by the Upland deposits or Calvert Formation, and contain glauconite where the source sediments are Nanjemoy or Aquia strata. Alluvium underlies stream channels, floodplains, tidal marsh, and adjacent low areas. Major areas of accumulation include Mattawoman Creek, and Marbury, Wards, and Reeder Runs. This unit is largely the product of channel and overbank deposition within the last 10,000 years. In the Indian Head Quadrangle, alluvium is as thick as 20 feet in places.
Qt1	Terrace deposits 1 Interbedded sand, pebbly sand, and silt-clay. Sand, fine to coarse-grained, poorly-sorted, pebbly in the basal part of this (informal) unit. Interbedded with subordinate silt-clay, massive to crudely stratified. Color gray to grayish-orange. Contains plant fragments in places, mostly in finer-grained lithologies. Qt1 is the lowest and youngest of the Potomac River terraces in the map area. It is also present along Mattawoman Creek, on Stump Neck, and underlies the former Potomac channel which cuts through the neck of the Indian Head peninsula. As such, the terrace lies between 0 (or slightly below sea level) and 40-45 feet of elevation. Good exposures of Qt1 are scarce in the area, the best being in the low bluffs bordering the south shore of Mattawoman Creek and those along the Potomac River south of Reeder Run. These deposits are probably late Pleistocene in age, and are as thick as 45-50 feet in some places, although averaging much less.
Qt2	Terrace deposits 2 Interbedded sand, silt-clay, and subordinate pebbly sand and gravel. Sand, fine to medium-grained, muddy, grading to silt-clay; pebbly sand and gravel concentrated in lower portion of this (informal) unit. Color gray, grayish-orange to brown. Bedding massive to well-stratified. Qt2 embraces fluvial terrace sediments at intermediate levels on the Indian Head peninsula and spread along the south flank of Mattawoman Creek. Other large areas of Qt2 lie west of Reeder Run. Most of the unit has a depositional base at around 50 feet and an upper surface at about 90 feet, but locally, younger sediments lying below 50 feet are mapped with this unit where the contact could not be reliably shown. Also included within Qt2 are numerous narrow terraces flanking the upper reaches of Reeder Run and along Wards Run. This unit is very probably mid to early Pleistocene in age, and is wholly fluvial in origin. It is about 25 to 50 feet thick in most places.
Tu	Upland deposits (formerly Brandywine Formation) Interbedded sand, gravel, and subordinate silt-clay. Predominantly sand, fine to coarse-grained, pebbly in places; interbedded with fine to medium gravel and minor amounts of silt-clay. Sand in this informal unit is orthoquartzitic; the gravel is vein quartz, sandstone, and chert, suggesting a mostly Appalachian source area. Sediment color is largely tan to orange or reddish-brown, although silt-clay beds may be buff, gray, or red in color. Bedding is predominantly lenticular, internally cross-bedded or flat-bedded, or rarely massive. Gravel is concentrated in the lower portion of the unit. Scattered through the unit, particularly close to the Potomac River, are boulders up to 3 feet across, mostly of sandstone or quartzite. This unit occupies the upland portions of the map area, with a base elevation of around 100 feet across the greater part of the quadrangle. As such, the unit covers nearly all of the southern half of the map, most of this area being relatively un dissected upland. The unit is a thin fluvial sediment sheet, mostly 30 to 40 feet thick, laid down by the Potomac River as it swept southward across Southern Maryland during latest Miocene and Pliocene time.
Tn	Nanjemoy Formation Sand, glauconitic, and subordinate clay. Sand, very fine-grained to medium-grained, variably glauconitic, poorly-sorted, clayey. Glauconite content of sand ranges from about 10 to 40 percent. Sediment color medium-gray to dark greenish-gray where unweathered; tan to pale-gray with yellow mottles where weathered. The sand is interbedded with thin, generally lenticular beds of dark-gray silt clay. Bedding mostly obscure with evident burrow-mottling. Fossiliferous in places with <i>Venericardia</i> most prominent. Lower contact sharp with Marlboro Clay, marked in places by sand-filled burrows. Laminitic concretions and cross common in weathered sediment. In the map area, the Nanjemoy outcrops in the valley walls of a few tributary streams to Mattawoman Creek in the northern third of the quadrangle, where the unit is 25 feet or less in thickness, and along Wards Run in the southeastern part. Here, the Nanjemoy is thicker, probably around 50-75 feet. In the map area, as throughout Southern Maryland, it is a marine inner-shelf sand of Eocene age.
Tm	Marlboro Clay Clay and minor silt. Clay, dense, brittle, or slightly plastic, finely-laminated to thick-bedded, bedding lenticular, interbedded with thin lenses and partings of micaceous silt. Color of clay pale-red to brownish-gray, in complete sections, upper and lower parts are gray, and middle portion red. The contact with the underlying Aquia Formation is marked by thin interbeds of clay and greensand, whereas the top of the unit has greensand-filled burrows in the clay. Exposures of the Marlboro are limited to the northeastern portion of the map area, where several incised tributaries flow north in Mattawoman Creek. Here the clay is thin - 10 to 14 feet, but it thickens to a subsurface thickness of about 25 feet down dip to the southeast. The Marlboro is distinctive in appearance and provides an important marker bed in Charles County and elsewhere in Southern Maryland. This formation is thought to contain the Paleocene-Eocene boundary in the map area.
Ta	Aquia Formation Sand, variably glauconitic, and calcareous sandstone. Sand, very fine to fine-grained, silty, micaceous. Contains as much as 30 percent of glauconite. Interbedded with layers of calcareous sandstone, friable to well-cemented, up to 6 feet thick. Color dark greenish-gray to medium gray where unweathered; tan to brownish-gray with yellow mottles in weathered exposures. Fossils common; assemblage dominated by <i>Turritella</i> and <i>Ostrea</i> . Aquia outcrops are widespread in the map area, especially in stream valleys tributary to Mattawoman and Chicauxen Creeks. Good exposures can also be found in bluffs facing the Potomac River on Indian Head, where about 50 feet of strata is present. The formation is considerably thicker down dip to the southeast in the map area, but only a few tens of feet of this thickness are present in outcrop. The Aquia is late Paleocene in age and records shallow marine shelf deposition.
Po	Potomac Group Clay and fine sand. Clay, tough, compact, laced with fractures lending a blocky appearance in outcrop. Bedding is generally massive with obscure stratification. Clay color gray with limonitic staining and fracture fillings, in places yellow, brownish, or red. Interbedded with sand, fine- to medium-grained, pebbly in part, bedding lenticular, cross-bedded in places, color yellowish or pale-gray. The Potomac Group (probably all Patapsco Formation here) is limited to bluffs facing the Potomac River on Indian Head, and to poor outcrops in the south valley wall of Reeder Run near MD 224. The maximum thickness exposed is about 20 feet, but the unit is nearly 300 feet thick in the subsurface beneath Indian Head. The age of the Potomac Group is Early Cretaceous in this area.

Base map from U.S. Geological Survey
7.5-minute Series (Topographic)
Indian Head, 1966 (photorevised 1978), Bathymetry added 1982
1978 magnetic north declination (center of sheet): 7 degrees west
To determine current magnetic declination see: <http://www.ngdc.noaa.gov/cgi-bin/seg/mag10dath1.pl>
Note:
Hydrography layer shown is from USGS digital line graph (DLG) for this quadrangle.
Topography and cultural/transportation layers from USGS base separate.

Current map projection:
Maryland State Plane Coordinate System 1987
(Projection: Lambert Conformal Conic, 1980 geodetic reference system)
(Horizontal Datum: North American Datum 1983)
State Plane (NAD83) 2000-meter ties, grid ticks and coordinates shown in black
Geographic coordinates (latitude-longitude) shown at 2.5' intervals in black
**Note: Black grid lines are the remnant UTM MADD7 lines from the base mylar.
**Note: This layer has been reprojected to State Plane NAD83 meters.

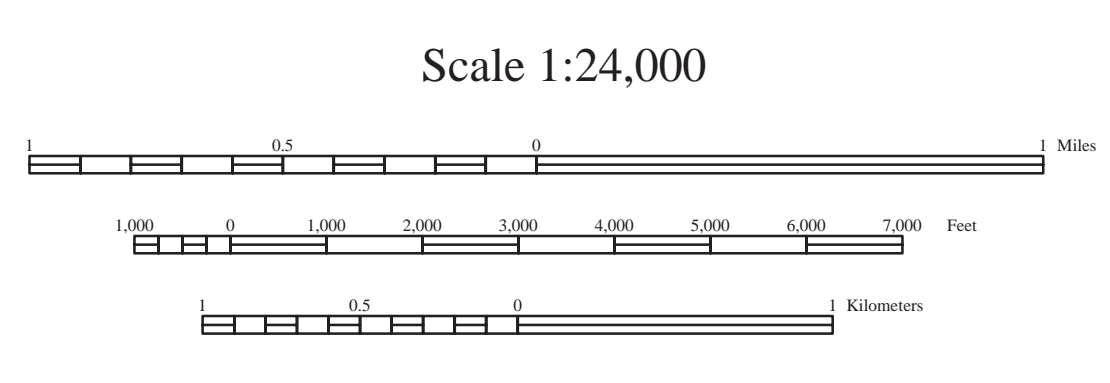
Geologic Map of Indian Head Quadrangle, Charles County, Maryland

By
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2002

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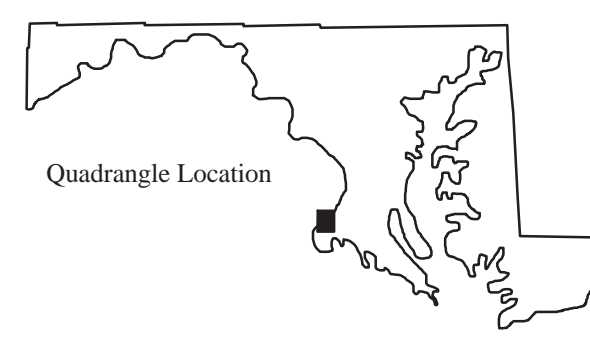
Adjacent 7.5' Quadrangle Names Indian Head Quadrangle, shaded			
1	2	3	1 Occoquan
2	3	4	2 Fort Belvoir
3	4	5	3 Mount Vernon
4	5	6	4 Quantico
5	6	7	5 Port Tobacco
6	7	8	6 Widewater
7	8		7 Nanjemoy
8			8 Mathias Point



Contour Interval 10 Feet
Bathymetric contour interval 1 meter with supplementary 0.5 meter contours.
Datum is mean low water.
The relationship between the two vertical datums (bathymetric and topographic) is variable.
The mean range of tide is approximately 0.5 meter.

Explanation of Map Symbols

- Topographic and Hydrologic Symbols**
- Topographic Contour - Index (100-ft interval)
 - Topographic Contour - Intermediate (10-ft interval)
 - Stream
 - Water body (including lakes, ponds, streams)
 - Marsh, wetland, swamp, or bog
 - Spring



Copies of this map are available
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