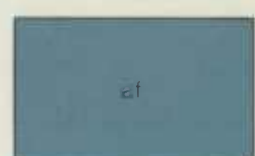
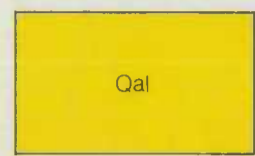


EXPLANATION



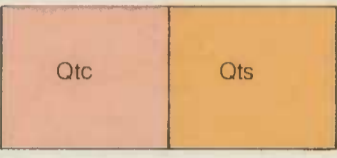
Artificial Fill

Comprised of heterogeneous materials such as: rock, unconsolidated sediment, slag, refuse, and dredge spoil. Major areas only of filled or highly disturbed ground are mapped, including filled and graded quarries, diked flood plains, and transportation corridors across topographically low areas. Most road fill has been excluded.



Alluvium

Interbedded gravel, sand, silt, and clay of variable composition and sorting. Quartz sands and polymict gravels are typically well-bedded and locally compacted; silts and clays are often poorly-bedded and water-saturated. Typically confined to flood plains of perennial streams, upland gathering areas, and marshes adjacent to estuaries. Sediment size, sorting, and mineralogy are strongly controlled by source geology and geomorphic setting. Minor amounts of colluvium (unmapped) may interfinger with alluvium at or near bases of slopes. Thickness 0.5 to 5 meters.



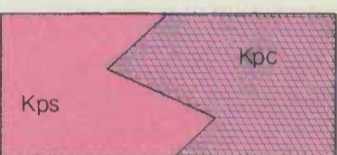
Talbot Formation

Otc Clay-silt facies. Buff to orange, poorly-sorted, poorly-bedded quartz silt with kaolinitic, illitic, and montmorillonitic clays. Sparse leaf and twig debris in bedded silts. Sediments very poorly exposed with mappable accumulations chiefly below the 20 ft. contour. Probably deposited in marsh or estuarine environment.

Ots Sand facies. Well-bedded, medium to coarse quartz sand, typically present near shorelines. Low-angle cross stratification and high degree of sorting suggest a beach or barrier bar depositional environment.

Total thickness 0.5 to 5 meters.

UNCONFORMITY

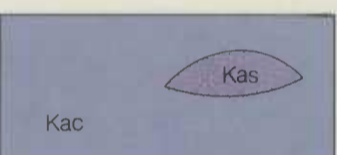


Patapsco Formation

Kps Clay facies. Typically buff, red, yellow, and brown mottled kaolinitic clay. Variable amounts of quartz sand and silt as pods and interbeds, or disseminated thru the clay. Rare siderite concretions and lignitized plant remains. Sporadic laminated silt-clay couplets bearing plant debris. Deposition in flood plain-mud flat environment under oxidizing conditions.

Kps Sand facies. Well-sorted, medium to fine quartz sand with locally abundant quartz gravel and clay clasts. Minor silt-clay matrix in sand interstices. Sands commonly planar to high-angle cross-bedded, and in places exhibit 3 to 5 meter fining-upward sequences. Ferruginous cements are typical at sand-clay contacts or as small spheroids and pods within the sand. Heavy mineral suite consists of tourmaline, zircon, and minor staurolite and rutile. Deposited in and near channels of meandering, high bed-load rivers.

Total thickness 2 to 80 meters.

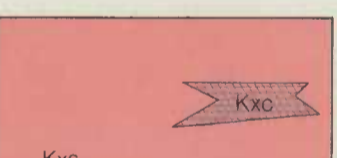


Arundel Formation

Kac Clay facies. Gray, brown, black, or red kaolinitic and illitic clay with local pods and lenses of quartz sand. Clay is typically poorly-bedded to massive with occasional color mottling. Contains sparse to abundant, irregular siderite concretions, and lignitized wood. Some flat-bedded or cross-laminated silts and clays contain fern, cycadoid, conifer, and angiosperm remains. Lithologically similar but stratigraphically distinct from Kxs. Deposition primarily within a floodplain-back swamp complex with variable sediment input.

Kac Sand facies. Well sorted, fine to medium quartz sand with locally abundant lignite fragments. Sand beds thin with typically planar cross-bedding and interstratified silt-clay laminae as well as very thin clay beds. Probable accumulation as sand influx into an oerbank-back swamp environment during major flood events.

Total thickness 2 to 30 meters.



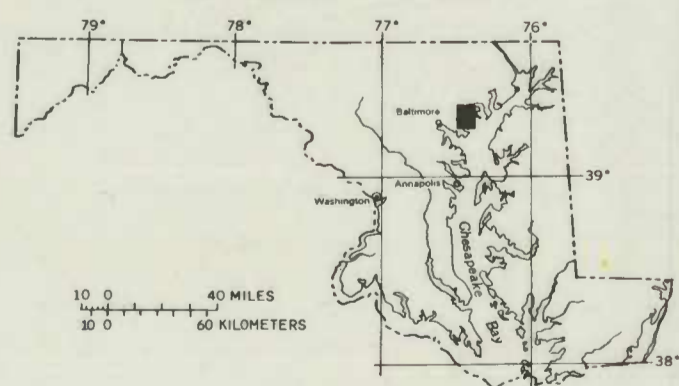
Patuxent Formation

Kxs Sand facies. Highly-variable, interbedded sand, gravel, silt, and clay with hematite or limonite cementation in places. Sand-gravel typically quartzose and well-rounded; commonly contains buff kaolinitic silt-clay matrix. Sediments commonly organized into fining-upward packages, 3 to 5 meters thick, with flat-bedded gravel or cross-bedded sand at base, and laminated or massive silt-clay at top. Elsewhere, vertical sequences show abrupt sediment size changes and erosive contacts. Heavy mineral suite characterized by staurolite, zircon, tourmaline, and kyanite. Silicified (rare) and iron oxide (common) replacements or pseudomorphs of cycadoids and conifers occur in places. Sediments deposited in a high-gradient braided and meandering stream complex.

Kxs Clay facies. Light-gray to brown or black clay containing variable amounts of silt with local concentrations of lignite, partially pyritized wood or macerated leaf and cone debris. Thin planar sand beds and/or gravelly clay interbedded with massive clay. These isolated clay pods are thought to be accumulations on deflated surfaces such as abandoned stream channels or pre-Cretaceous topographic lows.

contact  
generally approximate or inferred.

QUADRANGLE LOCATION



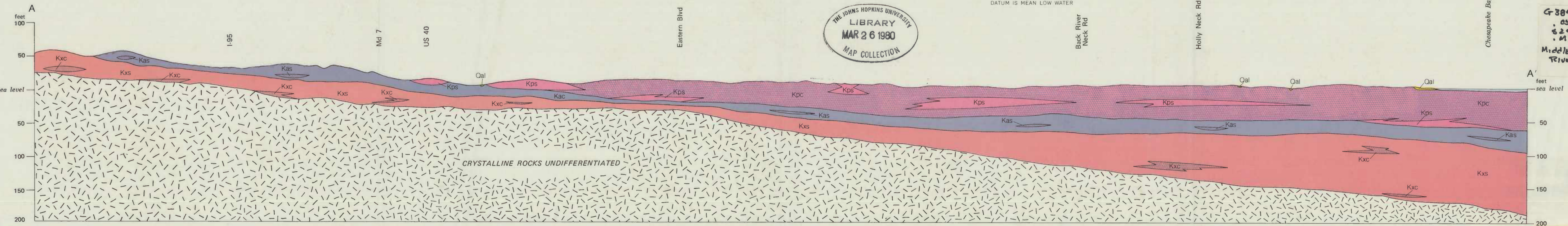
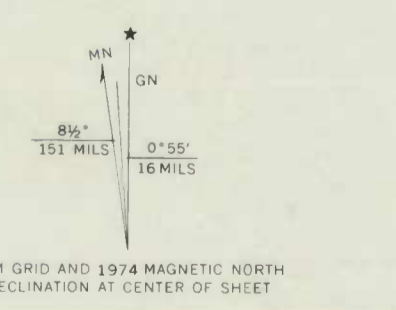
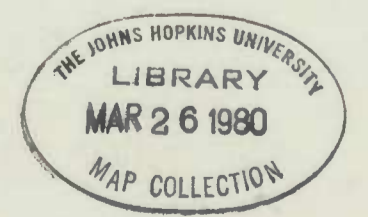
Base map from U.S. Geological Survey, 1969  
Photorevised 1974 Middle River Quadrangle  
7 1/2 Minute Series.  
Map scribbled by Margaret P. McCabe.

GEOLOGIC MAP OF THE MIDDLE RIVER QUADRANGLE, MARYLAND

By  
Juergen Reinhardt  
1977

SCALE 1:24,000  
1000 2000 3000 4000 5000 6000 7000 FEET  
1 2 3 4 5 6 7 8 9 10 KILOMETER

CONTOUR INTERVAL 10 FEET  
DATUM IS MEAN LOW WATER



43841  
05  
024  
013  
Middle River