



DESCRIPTION

The central part of the county is underlain by crystalline rocks covered by a mantle of deeply weathered residual material (sapolite). Solid contours show a generalized configuration of the base of the sapolite (or top of hard rock). This surface forms the contact between unweathered dense bedrock (except for fractures) and the overlying porous, weathered material. Outcrop control points, springs that occur at the base of sapolite, and drill holes (mainly water wells) used as subsurface elevation control are shown on the map. Dashed contours are the projection of the regional bedrock surface where the base of the sapolite is absent, usually across valleys. Areas where the contoured horizon projects above the topographic surface are generally underlain by unweathered bedrock, except where locally covered by alluvium.

In the eastern part of Fairfax County, crystalline bedrock is covered by a wedge of Coastal Plain sediments that thickens eastward. The generalized eastward sloping sapolite-hard rock interface in the Coastal Plain is mainly defined by sparse drill hole data. In the western portion of the county, Triassic sedimentary rocks deeply bury the sapolite-hard rock surface, thus the Triassic area is not contoured due to the paucity of valid control points. Furthermore, contours at the base of the veneer of residue that overlies sedimentary bedrock are nearly coincident with the topographic contours.

In a regional overview, the base of the sapolite generally parallels the topographic surface of the county, as shown by the cross-section. Bedrock "high" and "low" are superimposed on the regional slopes of the sapolite-hard rock interface.

Comparing this map with the Thickness of Overburden map (in prep.) and the Bedrock map (Drake and Froelich, 1977) shows that many of the closed bedrock "high" coincide with areas of thin sapolite on mafic rocks (Unit G), ultramafic rocks (Unit H) or quartz bodies (Unit K); and that many of the depressions in the bedrock surface are formed on schist (Unit B) or gneiss (Unit D) overlain by thick sapolite.

Comparing this map with the Drainage Basin map (Nohler, 1977) indicates that the surface drainage divides commonly occur above ridges in the underlying bedrock. The bedrock highs and lows at the base of the sapolite are commonly aligned parallel to the foliation of nicas and clays or to the trends of major joint sets. The probable direction of greatest permeability within the crystalline rocks is along the major joints and parallel to foliation planes. Thus the alignment of bedrock highs and lows may be indicative of the preferred direction of ground-water movement.

Possible Uses of the Map

The Base of Sapolite map used in conjunction with the Bedrock map (Drake and Froelich, 1977) may help in preliminary evaluation for construction and excavation purposes, particularly for planning linear subsurface excavations such as tunnels and underground pipelines or other utilities. Used with the Topographic map, the Base of Sapolite map suggests possible avenues where ground-water may discharge into surface streams. Areas of aligned subsurface depressions that are overlain by a thick mantle of porous sapolite, as shown on the Thickness of Overburden map (in prep.) may suggest favorable areas for developing ground-water supplies from wells in fractured bedrock that are replenished from the storage capacity of the overlying saturated sapolite. As the direction of greatest permeability in crystalline rocks is along major joints and parallel to the foliation planes, the alignment of bedrock highs and lows may indicate preferred directions of ground-water movement. Such information may be useful in selecting sites and particularly for determining optimum spacing between wells.

Selected References

- Drake, A. A., Jr., and Froelich, A. J., 1977. Preliminary Bedrock map of Fairfax County, Va.: U.S. Geol. Survey open-file report no. 77-253.
Froelich, A. J., 1975. Contour map of the base of sapolite, Montgomery County, Maryland: U.S. Geol. Survey Misc. Inv. Series I-920-C.
Froelich, A. J., and Heironimus, T. L., 1977. Map showing thickness of overburden in Fairfax County, Va. (in prep.).
Nohler, E. H., 1977. Map showing drainage basins and locations of stream flow-measuring sites, Fairfax County, Virginia: U.S. Geol. Survey open-file report no. 77-270.

EXPLANATION

- DATA CONTROL POINT
Bedrock outcrop, unweathered, showing approximate altitude, in feet. Not all outcrops or elevations shown.
Drill hole, approximately located, showing approximate altitude of unweathered bedrock, in feet, estimated from drillers' logs or inferred from depth of casing in water wells. Not all wells shown.
Spring, showing approximate altitude, in feet.
GENERALIZED CONTOURS ON BASE OF SAPROLITE, IN FEET ABOVE SEA LEVEL—Contour interval 50 feet. Dashed contours are projection of regional bedrock surface where sapolite is absent. Queried where inferred.

MAP SHOWING CONTOURS ON THE BASE OF SAPROLITE, FAIRFAX COUNTY, VIRGINIA

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1977

U.S. Geological Survey
OPEN FILE MAP
This map is preliminary and has not
been edited for conformity with
Geological Survey standards or
nomenclature.