Map Unit Properties Table

Age	Map Unit (Symbol)	Unit Description	Erosion Resistance	Suitability for Development	Hazards	Paleontologic Resources	Cultural Resources	Mineral Specimens	Karst Issues	Mineral Resources	Habitat	Recreation	Global Significance
QUATERNARY (HOLOCENE)	Alluvium (Qa)	Unit Qa contains broad deposits of sand, gravel, clay, and silt layers flanking active stream channels.	Very low	Avoid stream edge/riparian areas for heavy development, especially for wastewater-treatment facilities due to proximity to water and high permeability.	Unit Qa is associated with stream banks and riparian zones and may be unstable if exposed on a slope saturated with water.	Modern remains	May contain artifacts and/or settlement sites along major waterways.	None documented.	None	Sand, gravel, silt, clay.	Riparian zones and burrow habitat.	Unit Qa is suitable for some trail development.	Unit Qa contains a record of modern stream-valley development throughout the Quaternary.
QUATERNARY (HOLOCENE AND PLEISTOCENE)	Terrace deposits, low level (Qt).	Unit Qt deposits are concentrated near stream confluences and contain reworked alluvial sand, gravel, silt, and clay, as well as larger colluvium clasts.	Very low	Avoid most terrace deposits for heavy development due to instability of slopes and high permeability.	Unit is associated with stream-edge slopes deposited by gravity and water.	May contain modern remains and plant fragments, pollen(?).	May contain artifacts and/or settlement sites along major waterways.	None documented.	None	Cobbles, gravel, sand.	Forms upland areas supporting larger trees and bushes with more soil development along waterways.	Suitable for most recreation unless unstable slopes are present.	Terrace units record the evolution of local waterways and changes in channel morphology.
QUATERNARY (PLEISTOCENE)	Low-level fluvial and estuarine deposits (Qte); upper-level fluvial and estuarine deposits (Qfe).	Unit Qte contains sand, gravel, and peat interbedded with thin silt and clay beds containing scattered pebbles and cobbles. This unit is incised into younger fluvial and estuarine deposits. Unit Qfe contains modern swamp deposits overlying bedrock in Washington, D.C., area.	Low	Avoid for most development due to presence of modern swamp areas and high permeability, as well as proximity to water.	Heterogeneity of units may render them unstable on slopes, especially if undercut by local waterways.	Wood fragments, limonite-filled root zones.	May contain artifacts.	None documented.	None	Clay, sand, gravel, peat.	Units underlie much of metropolitan Washington, D.C., area.	Units should be avoided for heavy develop-ment due to the presence of modern swamp deposits.	Units may contain some record of the evolution of land use in the area.
QUATERNARY (PLEISTOCENE) AND TERTIARY	Terrace deposits, upper level (QTt).	Unit contains sand and gravel in beds as much as 50 ft thick. May be locally incised into underlying Cretaceous units.	Low	Avoid most terrace deposits for heavy development due to instability of slopes and high permeability.	Unit thickness and presence along upper valley areas may increase likelihood of slope instability and mass wasting.	Plant fragments and recent remains possible.	May contain artifacts.	None documented.	None	Sand, gravel	Upper deposits support hardwood forests.	Suitable for most recreation unless steep slopes are present.	Unit records changes in climate and tectonic uplift with more recent incised stream history.
TERTIARY	Highest level upland terrace deposits (Ttu).	Unit consists of layered mixtures of gravel and sand, interbedded with sandy gravel and gravelly quartz-sand layers containing large pebbles and cobbles of vein quartz and quartzite. Terraces occur at various altitudes above sea level, including 360 ft, 310 ft, 400 ft, and 370 ft.	Low	Suitable for light development; avoid for waste-water treatment facility development due to high permeability.	Heterogeneous nature of unit may render it unstable on slopes; unit is prone to gullying.	Plant fragments and recent remains may be present.	May contain artifacts.	None documented.	None	Sand, gravel, clay, pebbles, silt.	Unit supports upland forest along waterways.	Suitable for light recreation unless highly gullied and/or undercut on a slope.	Units record the migration of waterways across the landscape throughout the Tertiary as well as recording climatic and tectonic evidence.
CRETACEOUS	Potomac Formation, undivided (Kp).	Unit consists of alluvial and channel deposits of massive, mottled, silty clay containing minor sand and thin beds of tan, clayey sand. Some quartz and feldspar sand and pebbles locally grade into other layers. Local interbeds include unconsolidated coarse sand of feldspar and quartz grains, quartz gravel, montmorillonite and illite, clayey sand, and sandy silt with lignite.	Moderate, depending on degree of consolidation.	Variations in bedding, sediment, and degree of cementation may render unit unstable on slopes; generally suitable for most development.	Clay-rich, massively bedded layers may spall in large blocks when unit is exposed on slopes; susceptible to slumps and slides.	Plant stems, leaf and stem impressions, silicified tree trunks.	May preserve ancient campsites and relics.	Silicified coniferous tree trunks, vein quartz, quartzite, and metamorphic rock pebbles and cobbles.	None	Lignite, clays, sand.	Supports eastern hardwood forests throughout region.	Suitable for most forms of recreation unless present as bluffs along major waterways.	Very widespread unit records the Cretaceous environment along the Atlantic Coast; predominant unit of coastal plain sediments; Barre-mian(?), Aptian, and Albian pollen and leaves dated.

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SILURIAN	Felsic igneous rocks (Si).	Unit comprises biotite metatonalite and hornblende-quartz diorite. These rocks are well-foliated.	Moderately high, depending on degree of alteration.	Avoid areas of intense preferential compositional weathering (along foliation). Suitable for most development unless highly weathered and/or fractured.	Unit is associated with high banks and may pose a rock-fall hazard along trails, especially if foliation is aligned parallel to slope angle.	None	None documented.	Biotite, quartz, plagioclase.	None	None documented.	None documented.	Suitable for most recreation unless highly weathered along foliation.	Unit has U-Pb SHRIMP age of 434 ± 6 Ma.
ORDOVICIAN	Metavolcanic and metasedimentary rocks of Chopawamsic Formation (Ocw); breccia and metabasalt of Chopawamsic Formation (Ocg).	Unit Ocw consists of metavolcanic and metasedimentary rocks, including porphyritic volcanic flows, breccia, and tuff of andesitic and basaltic composition. Metavolcanic rocks are interlayered with dark-gray slate, phyllite, schist, and metasandstone formed from sediments shed from the volcanic areas. Unit Ocg consists of coarse breccia and thin metabasalt layers interbedded with slate and metasiltstone.	High; may be moderately high in areas of high fracture density or alteration.	Units are foliated and contain small lenses of many rock types. This variability may render the units unstable for heavy development.	Units are associated with steep slopes along waterways and pose mass-wasting hazard along trails and in undercut areas.	Some remnant burrows may be present.	None documented.	Muscovite, microperthitic microcline, albite, and quartz crystals.	None	Lead and zinc ores were mined in Virginia.	Units are widespread and support many kinds of habitat.	Units are suitable for most recreation unless highly deformed or weathered.	Chopawamsic rocks have an age of 454 ± 5 Ma; other ages include 470 ± 1.4 Ma. Units record ancient island arc accreted onto North American during Appalachian orogeny.
ORDOVICIAN	Lunga Reservoir Formation (Olr); Quantico Formation (Oq); Lake Jackson pluton (Olj).	Unit Olr is a metasedimentary mélange in which diamictite resembles granitic rock containing xenoliths. Unit contains abundant pebbles and cobbles of clear and milky quartz, mica schist, calc-silicate rocks, and mafic to ultramafic rocks in a quartz-plagioclase matrix. Unit Oq contains dark-gray slate, metagraywacke, and tuffaceous metavolcanic layers. Unit Olj contains biotite and muscovite metatonalite interspersed locally with phyllite of unit OCp.	Moderately high to high depending on degree of alteration and brittle deformation	Units are foliated, the weaker micaceous layers separating more resistant layers, and contain small lenses of many rock types. This variability may render the units unstable for heavy development	Units are associated with steep slopes along waterways and pose mass wasting hazard along trails and in undercut areas. Unit Olj is associated with boulders of metamorphic vein quartz that may pose rock-fall hazard on slopes	Crinoids, cephalopods, pelecypods bivalve *Pterinea*, brachiopod *Pholidops* or *Leptobolus*, echinoderm crinoid stem fragments, nautiloids.	Pyrite was mined from 1889 to 1919 at Cabin Branch Mine as a source of sulfur for gun powder, especially during World War I.	Vein quartz	Not enough carbonate present for significant dissolution.	Graphite, sulfide minerals (pyrite, sulfur).	Units are widespread and support many kinds of habitat.	Units are suitable for most recreation unless highly weathered, fractured.	Unit Olr records deep-water deposition of island- arc debris. Unit Oq lapilli-tuff layer has a U-Pb SHRIMP age of 451 ± 6 Ma; unit Olj has U-Pb SHRIMP age of 461 ± 7 Ma.
ORDOVICIAN AND CAMBRIAN	Phyllite (OCp)	Unit OCp contains phyllite and interlayered metasiltstone, both of which are fine grained.	Moderate	Highly deformed and altered nature of unit may render it weak for foundations.	Unit has strong cleavage that renders it weak if exposed on slopes and may fail as large sheets in mass-movement events.	None	None documented.	White vein quartz, lustrous micaceous phyllite.	None	Slate	Unit supports a wide variety of habitat.	Unit may be too friable and cleaved for heavy recreation.	Unit records a depositional basin present during the Ordovician and Cambrian periods.
CAMBRIAN AND/OR NEOPROTOEROZOIC	Mafic and ultramafic rocks (CZum).	Unit CZum contains a mixed suite of ultramafic to mafic rocks, including epidote-hornblende gneiss and amphibolite.	Moderately high, depending on degree of alteration.	Heavily altered and/or foliated zones may be points of weakness in unit to avoid for development.	Rock fall possible where units are exposed on high-angle slopes.	None	None documented.	Amygdules, olivine, epidote.	None	None documented.	Units weather to iron- and magnesium-rich soils.	Avoid heavily altered areas for recrea-tional develop-ment.	Unit may record an island-arc accreted onto the North American continent.