

Lower Cambrian and/or Neoproterozoic

Qal	<b>Alluvium (Holocene)</b>	
	Polyto- to well-sorted, stratified mixtures of unconsolidated clay, silt, sand, gravel, and cobbles underlying flood plains of nearly all rivers and tributaries. Channels of tributaries are commonly incised into bedrock with alluvium covering and exposed along the banks. Thickness of alluvium is highly variable, and is a function of bedrock, topography, and land-use practices. Locally, thick deposits of alluvium result from accumulation of silt eroded due to agricultural practices of the 19th century (Southworth et al., 2008). Notably thick (>7 ft) and laterally extensive (>400 ft wide) deposits of alluvium are present in Cabin Branch and Kings Valley.	
di	<b>Diabase dikes and sills (Early Jurassic)</b>	
	Medium to dark gray, medium-grained crystalline and equigranular, massive diabase that weathers to characteristic rusty orange to brown surface and rounded boulders. One linear dike from south of Damascus to northeast of Mount Airy mapped on presence of rounded boulders in stream valleys and previous maps (Closs and Cooke, 1953; Froelich, 1975; Jones, 1928; Stose and Stose, 1946).	
CZCq	<b>Quartz bodies (Neoproterozoic-Ordovician?)</b>	
	White, massive, and intensely fractured irregular bodies of quartz. The largest, Annapolis Rock, is over 100 feet thick and was once quarried (Closs et al., 1964). It occurs just east of the Potomac River in the Master Gorge Formation. Four other smaller (6-12 ft thick) quartz bodies are found in the Marburg Formation.	
<b>Sams Creek Formation (Lower Cambrian? and Neoproterozoic?)</b>		
CZczb	<b>Metabasalt</b>	
	Greenish gray to medium bluish gray, aphanitic to porphyritic, massive to schistose metabasalt. Includes some breccia composed of angular, fine-grained, dusky blue clasts in fractured green basalt matrix, as well as interlaminated, fine-grained, dark bluish gray to gray quartz-grain metabasalt and white calcite anglyonites. Metabasalt is mapped based on float found just northeast of the map area on the Libertytown Quadrangle.	
CZCzo	<b>Phyllite</b>	
	Grayish-purple, grayish blue, and dark greenish gray phyllite containing white vein quartz and minor slate. No exposures were found on the Damascus Quadrangle; it is mapped based on Libertytown Quadrangle exposures (Jonas and Stose, 1938; Meyer, 1955; Southworth, 1999).	
<b>Ijamsville Phyllite, undifferentiated (Lower Cambrian? and Neoproterozoic?)</b>		
Czi	<b>Phyllite</b>	
	Grayish-purple, grayish blue, and dark greenish gray phyllite containing white vein quartz and minor slate. Folded and sheared with abundant quartz veins near the Hyattstown Fault. No exposures were found on the Damascus Quadrangle; it is mapped based on Libertytown Quadrangle exposures (Brezinski and Kavage Adams, 2023).	
<b>Marburg Formation (Lower Cambrian? and Neoproterozoic?)</b>		
CZnnp	<b>Phyllite</b>	
	Silver light gray to grayish purple, lustrous, tan-weathering, muscovite-chlorite phyllite interlayered with quartz-grain metasilstone. Coarsens gradually to the east with corresponding decrease in luster.	
CZnbp	<b>Metasilstone</b>	
	Medium to dark greenish gray highly variable and with quartz-pargamite-muscovite-chlorite phyllite. Chlorite laminae commonly alternate with mica-albite quartz layers. Locally, intervals of dark grayish blue to dark grayish purple phyllite with light gray, quartz-rich layers occur, containing minute (<0.01 mm) disseminated flakes of kyanite and pyrite. Much of the apparent layering is clearly metamorphic cleavage, but some may be relict bedding.	
CZnbpq	<b>Quartzite</b>	
	Light to medium olive gray, medium- to coarse-grained quartzite. Can be foliated, blocky, or massive. Massive intervals are up to 3 feet thick and comprised of subrounded quartz grains in a foliated, fine-grained, recrystallized quartz and mica matrix. Coarse grains of quartz appear bluish in hand sample and euhedral limonite pseudomorphs after pyrite are occasionally present.	
CZnbpq	<b>Metagraywacke</b>	
	Dark grayish-green, foliated metagraywacke comprised of very fine- to fine-grained quartz and plagioclase grains in a chlorite-rich matrix. The largest of these bodies occurs west of Mount Airy. In this location, dark green layers of metagraywacke are divided by 1-3 mm thick, parallel bands of muscovite and chlorite, forming a crenulation cleavage that indicates compressional folding.	
CZnbpq	<b>Calcareous material (in cross section only)</b>	
	Calcareous material found in bluish green schist in well cuttings at approximately 50-foot depth in a well field in Mount Airy (Meyer, 1955; Meyer and Beall, 1958). No surficial exposures were found on the Damascus Quadrangle, but may be related to limestone or marble associated with the Ijamsville Formation (Stose and Stose, 1946; Brezinski and Kavage Adams, 2023) or the Silver Run Phyllosite of the Sams Creek Formation (Stose and Stose, 1946; Fisher, 1978).	
CZnbpq	<b>Chlorite phyllonite</b>	
	Greenish gray, chlorite-sericite phyllonite containing white vein quartz to foliation surfaces frequently have abundant euhedral magnetic grains ranging from 0.04 to 0.2 inch (1 to 5 mm) in size. 100- to 300-foot (30- to 90-m) wide zones of intense shear are exposed in NE-SW trending ridges cut by the Potomac River and Scott Branch and marked with wavy lines as seen in lower half of shield. Sheared outcrops frequently give perspective S-C shear fabric and thin (0.04- to 0.2 mm), linear quartz ribbons that are often isoclinally folded. S-C shear bands on outcrop indicate distal sense of shear. "A" at dating of white mica in this zone yielded ages of 348 and 363 mya, indicating late Devonian-Mississippian deformation (Kroft et al., 1999; Wintsch et al., 2010).	
<b>Master Gorge Formation (Lower Cambrian? and Neoproterozoic?)</b>		
CZnmg	<b>Quartz-mica schist and quartzitic metagraywacke interbedded in layers and lenses on a millimeter to meter scale.</b>	
	Quartz-muscovite-chlorite-plagioclase-epidote-magnetite-garnet schist in a foliated, lustrous greenish gray to gray. Metagraywacke is light to dark olive gray, fine- to medium-grained, with quartz pebbles and graded bedding occasionally visible. Stringers and pods of isoclinally folded and boudinaged white quartz veins are abundant.	
CZnmgp	<b>Sheared</b>	
	Interbedded quartz-mica schist and quartzitic metagraywacke with penetrative S-C metomorphic fabric, formed by the intersection of the dominant foliation (S) and the shear plane (C) near the Pleasant Grove Fault (Kroft and Muller, 1995; Muller, 1994). Mapped on distinct appearance of rotated foliation although lithologically is similar to CZnmg.	
CZnmg	<b>Mafic and Ultramafic Rocks</b>	
	Undifferentiated serpentine, magnesian schist, and metabasalt that occur within rocks of the Master Gorge Formation. The core of the largest body is comprised of light gray to light greenish gray, magnetite-latic schist with yellow, native sulfur and dark green bodies of magnetite with a distinctive, relict, rounded, waffle-like texture. Surrounding this body is fine- to coarse-grained hornblende.	

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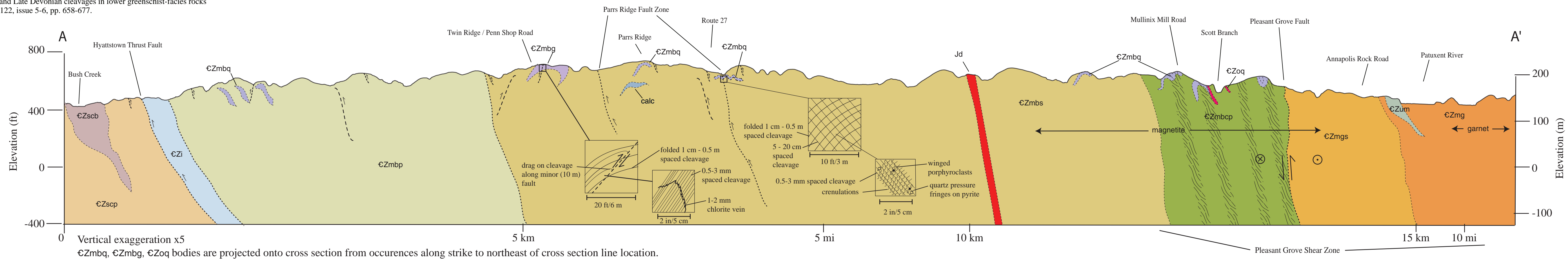
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

















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# Geologic Map of the Damascus Quadrangle, Carroll, Frederick, Howard and Montgomery Counties, Maryland

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### Explanation of Map Symbols

A' — Cross section line		Planar Features	Multiple measurements at a single locality
<b>Contacts</b>			
-----	Geologic contacts; approximately located, dotted where concealed	 Inclined bedding; showing strike and dip	
		 Inclined joint; showing strike and dip	
<b>Faults</b>			
	Strike-slip fault, location approximate. Arrows show dextral motion. Dotted where concealed.	 Vertical or near-vertical joint; showing strike	
	Thrust fault, location approximate. Sawtooth on upper (tectonically higher) plate. Dotted where concealed.	 Vertical cleavage, showing strike	
	Small, minor fault, showing strike and dip of fault plane	 Inclined shear band cleavage, right hand sense of shear, showing strike and dip	
	Shear zone (overlay on map units)	 Vertical, shear band cleavage, right hand sense of shear, showing strike	
	Strike-slip movement toward viewer	 Inclined foliation, showing strike and dip	
	Strike-slip movement away from viewer	 Inclined phyllonitic foliation, showing strike and dip	
<b>Folds</b>			
	Small, horizontal antiform; showing strike	 Vertical phyllonitic foliation, showing strike	
	Small, plunging antiform, showing strike and plunge	 Inclined schistosity, showing strike and dip	
	Small, plunging synform, showing strike and plunge		
	Small, inclined folds, showing strike and plunge	 Inclined lineation at intersection of bedding and cleavage, showing bearing and plunge	
<b>Other Features</b>			
	Chromite Mine (historic)	 Inclined lineation at intersection of foliation and cleavage, showing bearing and plunge	
	Pyrite porphyroblasts, 1-10 mm	 Inclined aligned deformed mineral lineation, showing bearing and plunge	
	Magnetite porphyroblasts, 1-5 mm		
	Garnet porphyroblasts, 1-5 mm	 Inclined slickenline/striation on fault surface	

## Base Map Symbols

**Transportation**

- Primary highway, divided by median strip
- Primary route, class 1 (divided, lanes separated)
- Primary route, class 1 (undivided)
- Secondary route, class 2
- Light duty road or street, class 3
- Railroad

**Topography**

- Topographic index contour (100-ft interval)
- Topographic intermediate contour (20-ft interval)

**Hydrography**

- Stream
- Water body (e.g., lakes, ponds, rivers)



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