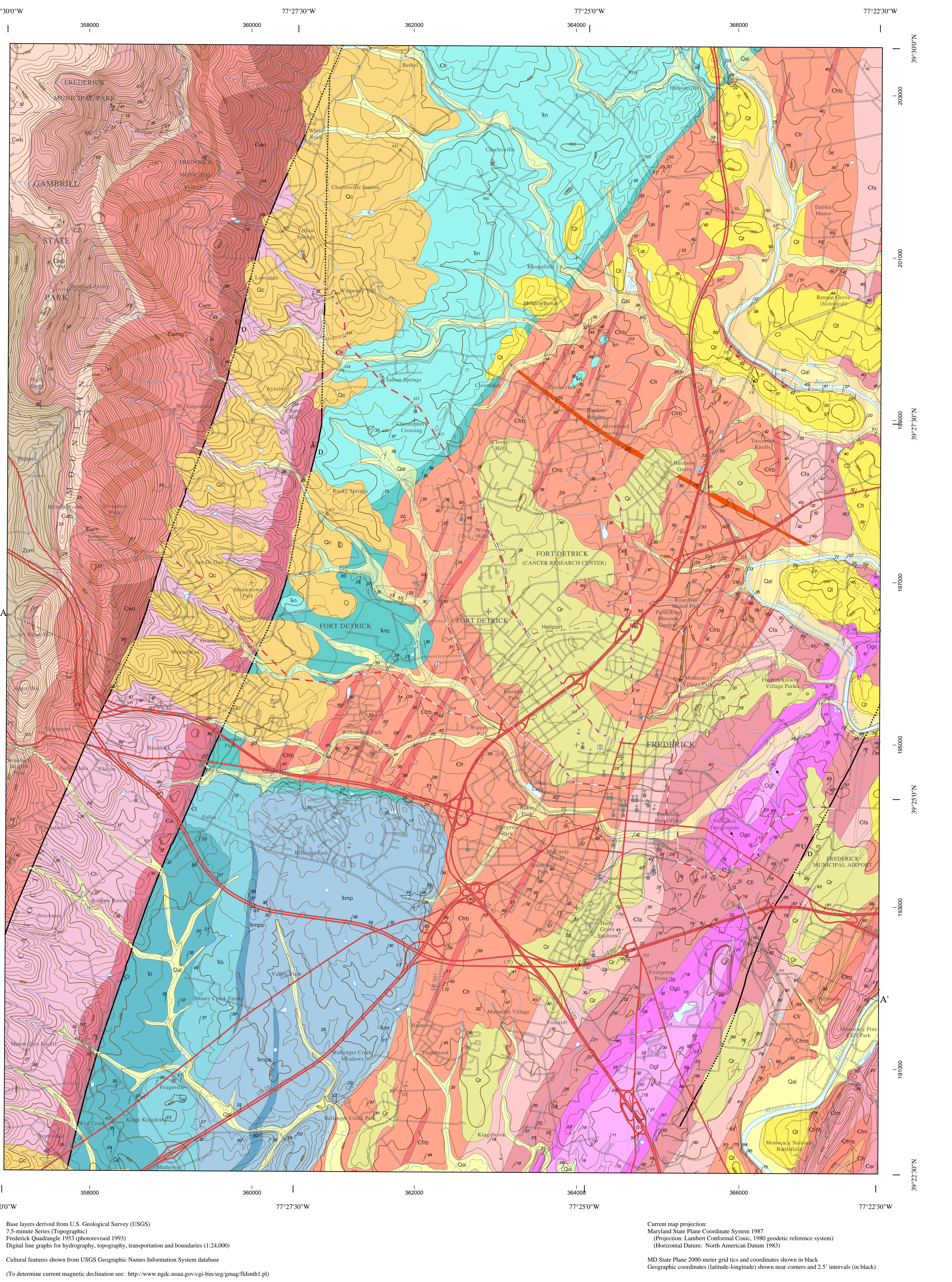


Description of Map Units

- Quaternary**
  - Qal** Alluvium: Reddish brown, poorly sorted mixture of rounded pebbles to boulders with sand, silt, and clay, and interbedded and interstitial matrix. Layers of moderately well sorted, rounded cobbles or sandy pebbles are also present. Thickness estimated at 1.0 foot to more than 15 feet (0.3 to more than 4 m) especially along the Monocacy River.
  - Qc** Colluvium: Unsorted, light gray to reddish gray, angular boulders to cobbles of quartzite and vein quartz with a reddish silty, clay matrix. Present near base of the eastern foot of Catactia Mountain. Appears to have originated by the slow down-slope movement of weathered material from the Wewerton and Loudoun Formations on Catactia Mountain. Thickness ranges from a thin veneer to more than 100 feet (30 m).
  - Qr** Weathering residuum: Mixture of moderate reddish brown soil and pebbles to blocks of grayish pink to white angular, locally euhedral, quartz. Thickness ranges from a thin veneer to 10 feet (3 m).
  - Qr** Terrace deposits: Reddish brown to brown, sandy and clayey mixture of rounded pebbles to cobbles of sandstone, vein quartz, and quartzite. Present along elevated low relief areas above the Monocacy River. Several separate levels of terrace deposits can be observed, but are not separately mapped here. Thickness ranges from a thin veneer to more than 10 feet (3 m).
- Jurassic**
  - Jd** Diabase dikes: Dark gray to black, fine-grained diabase weathering to rusty, red-brown, spheroidal boulders and cobbles. Dikes are exposed in the Frederick Quadrangle at several locations along the Monocacy River.
- CULPEPER BASIN**
  - Jl** Leesburg Formation: Light gray to light reddish gray, very thick bedded, boulder conglomerate. Clasts are mainly subangular to subrounded limestone and dolomite of Cambrian and Ordovician age, but locally Triassic age siltstone and sandstone are prevalent. Thickness ranges from 100 to 3000 feet (30 to 910 m) (Lee, 1979).
  - lb** Balls Bluff Siltstone: Brownish red to reddish brown, argillaceous, massive siltstone with thin fine-grained sandstone interbeds. Thickness is estimated at 200 to 4500 feet (60 to 1400 m) (Lee, 1979).
  - lmp** Manassas Formation: Reddish brown to reddish gray, locally greenish gray, medium-grained sandstone and reddish, variegated claystone. Sandstone beds (lmp) exhibit sharp convex-down bases, shale pebble lag conglomerates, and fining upsection character. Claystone intervals are thoroughly root mottled and contain light gray calcitic carbonate nodules. The thickness of this member is estimated at 500 to 3000 feet (150 to 910 m) (Lee, 1979).
  - lmt** Tuscarora Creek Member: Light gray to light reddish gray, subangular to subrounded, limestone and dolomite conglomerate. Clasts are predominantly tan dolomite, but locally reddish siltstone and sandstone and some limestone clasts are prevalent. Matrix is a reddish brown calcareous mudstone to reddish clayey carbonate. Thickness ranges from a feather edge to 100 feet (30 m) (Lee, 1979).
- Triassic**
  - ltp** Gettysburg Conglomerate: Medium red to reddish gray, limestone conglomerate, with reddish brown, calcareous, claystone matrix. Present along the base of Catactia Mountain at the Triassic border fault. Marks the western edge of the Gettysburg Basin in Maryland, and is not exposed in outcrop in the Frederick Quadrangle. Thickness is in question, but may be as much as 1000 feet (305 m).
  - ln** New Oxford Formation: Brownish red to reddish gray, locally light greenish gray, medium- to coarse-grained sandstone interbedded with red, variegated claystone. Sandstone units exhibit sharp bases with shale pebble lag conglomerates and fine upsection. Claystone intervals are thoroughly root mottled and contain light gray calcitic carbonate nodules. Poorly exposed and thickness is in question. Limestone and quartz-pebble conglomerate (lnc) at base.
  - lnc** Grove Formation: Thick-bedded to massive, medium to light gray limestone with interbedded tan to medium gray dolomite. Three members are recognized and mapped in the Frederick Valley, but only the lower two are present in the Frederick Quadrangle (Brezinski, 2004).
  - Ogf** Fountain Rock Member: Very thick bedded, medium light gray, locally sandy, thrombolitic and stromatolitic algal limestone and medium gray, laminated dolomitic limestone and olive gray dolomite. Thickness is probably greater than 450 feet (140 m).
  - Ogc** Ceresville Member: Medium light gray to medium gray, thick-bedded and cross-bedded, arenaceous limestone and sandy dolomitic limestone with thin interbeds (1 foot; 0.3 m) of medium light gray, sandy dolomite. Thickness is approximately 150 to 200 feet (45 to 60 m).
- Ordovician**
  - Ocm** Maryland Heights Member: Interbedded, light olive gray to olive gray, medium- to coarse-grained, medium-bedded, locally ferruginous, micaceous, silty sandstone and very fine grained, silty sandstone to sandy siltstone. Thickness is estimated at 300 feet (100 m).
  - Car** Araby Formation: Thick bedded, greenish black to grayish black, very fine grained to fine-grained, burrow-mottled silty sandstone, interbedded with medium gray to grayish black, phyllitic shale 1 to 3 m thick. Top of the formation consists of grayish black phyllitic shale 50 to 66 feet (15 to 20 m) thick. The Araby Formation is present on the eastern side of the Frederick Valley synclorium. Thickness of the Araby Formation is estimated at 300 feet (100 m).
  - Ca** Anletian Formation: Interbedded, light olive gray to olive gray, medium- to coarse-grained, medium-bedded, locally ferruginous, micaceous, silty sandstone and very fine grained, silty sandstone to sandy siltstone. Thickness is estimated at 300 feet (100 m).
  - Ch** Harpers Formation: Brownish gray to dark greenish gray, silty phyllitic shale to highly sheared phyllitic siltstone with intervals of brownish gray, medium-grained, silty sandstone. Thickness is estimated at greater than 900 feet (300 m).
  - W** Wewerton Formation: Primarily light gray to gray quartzite, conglomerate, and graywacke. Three members make up the Wewerton Formation on Catactia Mountain. These are in ascending order: the Buzzard Knob, Maryland Heights, and Owens Creek Members (Brezinski, 1992). Owing to truncation by Triassic faulting, only the Buzzard Knob Member is present in the south of Interstate 70.
  - Owo** Owens Creek Member: Medium to dark gray, medium-bedded, pebbly, ferruginous conglomerate, and conglomeratic, cross-bedded, coarse-grained sandstone to quartzite. Member occurs on the dip slope of Catactia Mountain, and rarely is a ridge-forming unit within the Wewerton Formation. Thickness is 150 to 200 feet (45 to 60 m).
  - Ocm** Maryland Heights Member: Interbedded, dark greenish gray, phyllitic, highly cleaved, sandy siltstone, and silty sandstone, medium gray, pebbly, coarse-grained sandstone to conglomerate, with a massive, light gray quartzite near top of member (Ocmn). The massive quartzite near the top of the member is a major ridge-forming quartzite within the formation, but rarely exceeds 50 feet (15 m). Thickness of the member is estimated at 200 to 300 feet (60 to 90 m).
  - Ocb** Buzzard Knob Member: Light gray to medium gray, medium-bedded quartzite with dark gray, argillaceous layers up to 4 cm thick, separating the quartzite beds. Crossbedding within individual quartzite strata is pervasive. The Buzzard Knob Member has an estimated thickness of 50 to 150 feet (15 to 45 m).
  - Ocl** Loudoun Formation: Medium to dark gray, medium-bedded conglomerate and black, tuffaceous phyllite. Lithology is very variable, ranging from a cross-bedded quartz-pebble conglomerate to a highly cleaved polymictic conglomerate with a matrix of flattened phyllite pebbles. The localized distribution of this formation may be the result of the original deposition or omission by faulting; however, owing to the colluvial apron of the Wewerton, this relationship remains obscure. The Loudoun Formation ranges in thickness from 30 to 200 feet (9 to 60 m) in the Frederick Quadrangle.
- Late Proterozoic - Cambrian**
  - Zcm** Catoclin Formation: Predominantly greenish-gray, highly cleaved, metabasalt, with gray phyllites and metachalchites mapped separately.
  - Zm** Metabasalt: Medium to dark greenish gray, chloritic, locally amygdaloidal, epithermal, metabasalt. Some areas are composed of highly sheared chloritic schist. Epidote occurs as light green veins and nodules. Thickness estimated at greater than 1000 feet (300 m) by Fauth (1977).



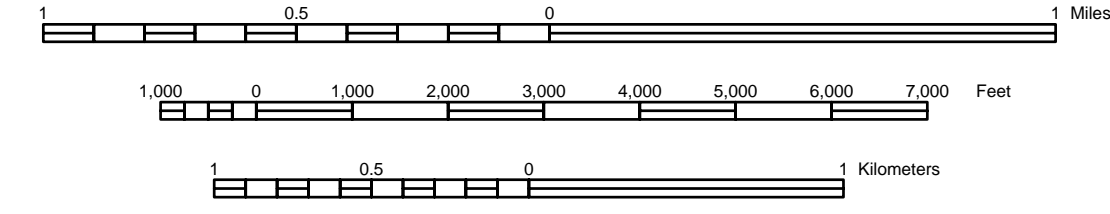
Base layers derived from U.S. Geological Survey (USGS) 7.5-minute Series (Topographic) Frederick Quadrangle 1951 (photorevised 1993) Digital line graphs for hydrography, topography, transportation and boundaries (1:24,000) Cultural features shown from USGS Geographic Names Information System database (To determine current magnetic declination see: <http://www.ngdc.noaa.gov/cgi-bin/seg/mag13dst1.pl>)

Current map projection: Maryland State Plane Coordinate System 1983 (Projection: Lambert Conformal Conic, 1980 geodetic reference system) (Horizontal Datum: North American Datum 1983) MD State Plane 2000-meter grid lines and coordinates shown in black. Geographic coordinates (latitude/longitude) shown near corners and 2.5° intervals (in black)

Geologic Map of the Frederick Quadrangle, Frederick County, Maryland

By David K. Brezinski 2004

Scale 1:24,000



Contour Interval 20 Feet National Geodetic Vertical Datum of 1929 (To convert elevations to the North American Vertical Datum of 1988, subtract 1 foot) (To convert from feet to meters, multiply by 0.3048)

Adjoining 7.5' Quadrangle Names Frederick Quadrangle, shaded

1	2	3
4	5	6
7	8	

1. Myersville  
2. Catactia Furnace  
3. Woodboro  
4. Middletown  
5. Walkersville  
6. Point of Rocks  
7. Buckeystown  
8. Urbana

**Explanation of Map Symbols**

**Geologic Symbols**

**Contacts**  
Geologic contact, approximately located dotted where concealed

**Planar Features**  
Inclined bedding strike and degree of dip shown  
Vertical bedding strike shown  
Overturned bedding strike and degree of dip shown  
Inclined cleavage strike and degree of dip shown  
Vertical cleavage strike shown  
Inclined joint strike and degree of dip shown  
Vertical joint strike shown

**Faults**  
U Uplifted side  
D Downthrown side  
Fault, concealed  
Minor syncline bearing and degree of plunge shown  
Minor anticline bearing and degree of plunge shown

**Base Map Symbols**

**Transportation**  
Primary route, class 1 (divided, lanes separated)  
Primary route, class 1 (undivided)  
Secondary route, class 2  
Light duty road or street, class 3  
Unimproved road or street, class 4  
Trail  
Railroad, railroad siding or spur  
Power transmission line  
Substation

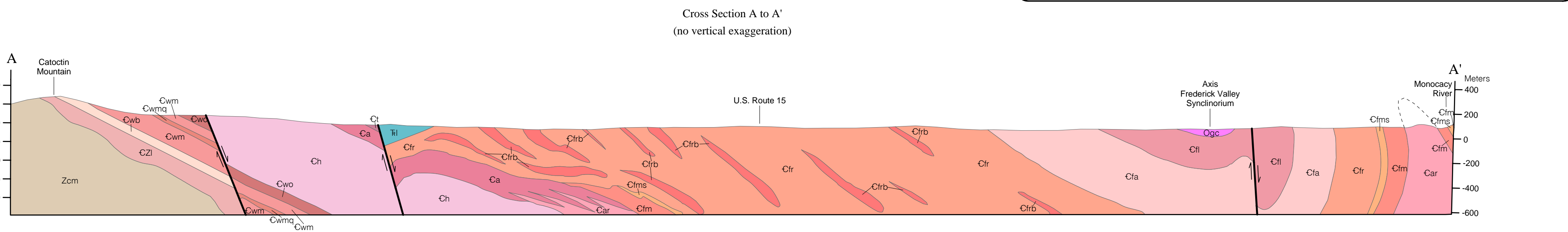
**Topography**  
Topographic index contour (100-ft interval)  
Topographic intermediate contour (20-ft interval)

**Hydrography**  
Stream  
Water body (eg. lakes, ponds, rivers)

**Culture**  
Boundary, incorporated city, village, or town  
Park or reservation boundary  
Small park boundary  
Cemetery  
Church  
School  
Airport  
Hospital

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- Supplemental Information**
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