

DIGITAL MAPPING TECHNIQUES 2015

The following was presented at DMT'15
(May 17-20, 2015 - Utah Geological Survey,
Salt Lake City, UT)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2015)

<http://ngmdb.usgs.gov/info/dmt/>

The Layered PDF: a tool for creating custom geologic maps that meet customer needs



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**Digital Mapping Techniques
May 19, 2015**

OUTLINE



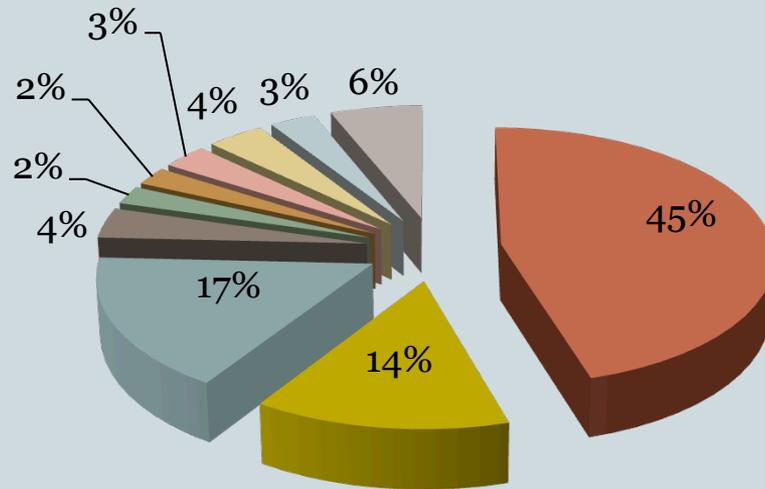
- Who uses Virginia's geologic maps and how are they used?
- Which map formats do our customers prefer?
- What is a layered PDF?
- Layered PDF example
- How we make layered PDFs

Who uses our geologic maps



- Professional geologists
- Technical staff at local, state, and federal agencies who work on natural resources/environmental issues
- Mining and gas and oil industry professionals
- Academics/researchers
- Amateur geologists and prospectors
- Property owners
- Earth science teachers

How are our maps used?

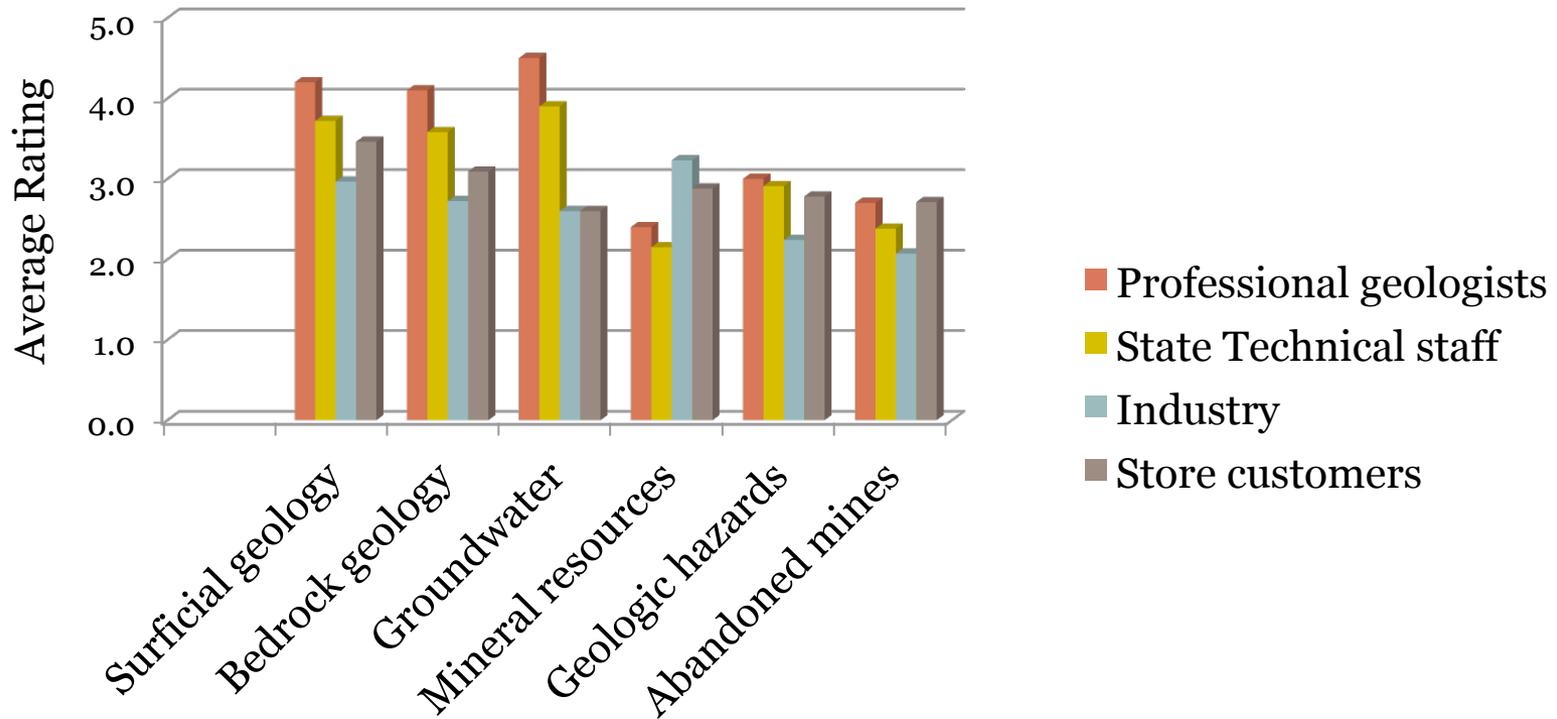


Primary work
VA Professional Geologists

- Environmental
- Geotechnical
- Water Resources
- Mineral Exploration
- Mineral Mining
- Oil and Gas
- Coal
- Land management
- Research
- Other

2015, n = 80

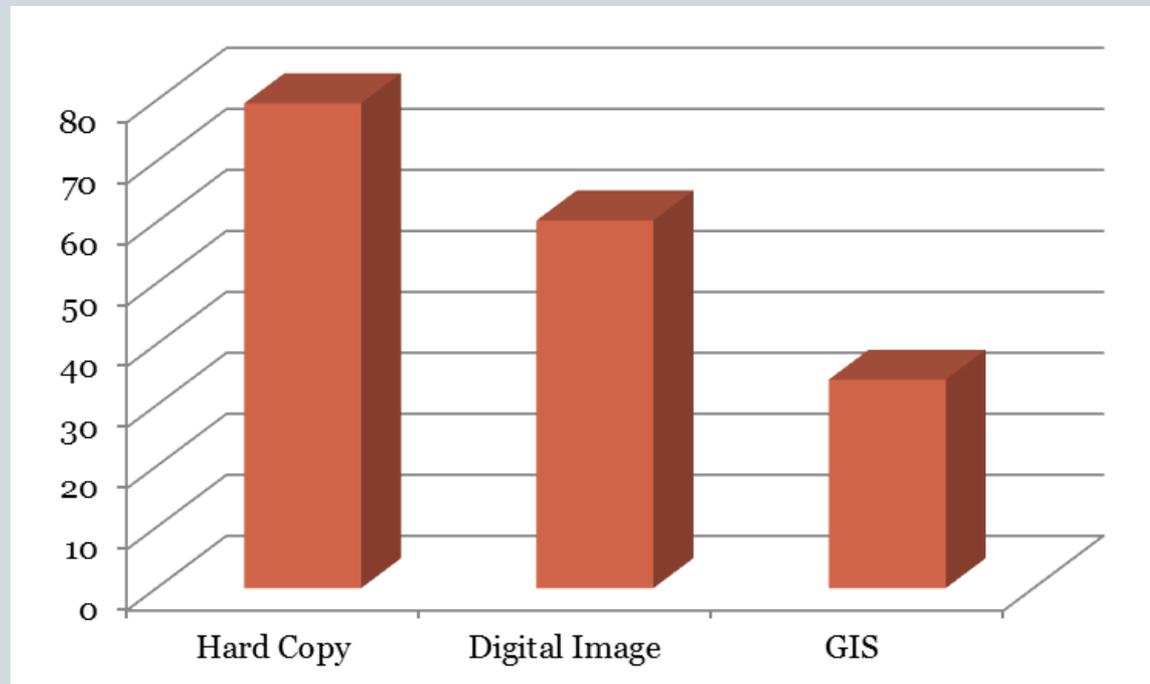
How are our maps used?



On a scale of 1-5, how important is this information to your work?

2010-2015, n = 53-79

What map format do our customers prefer?

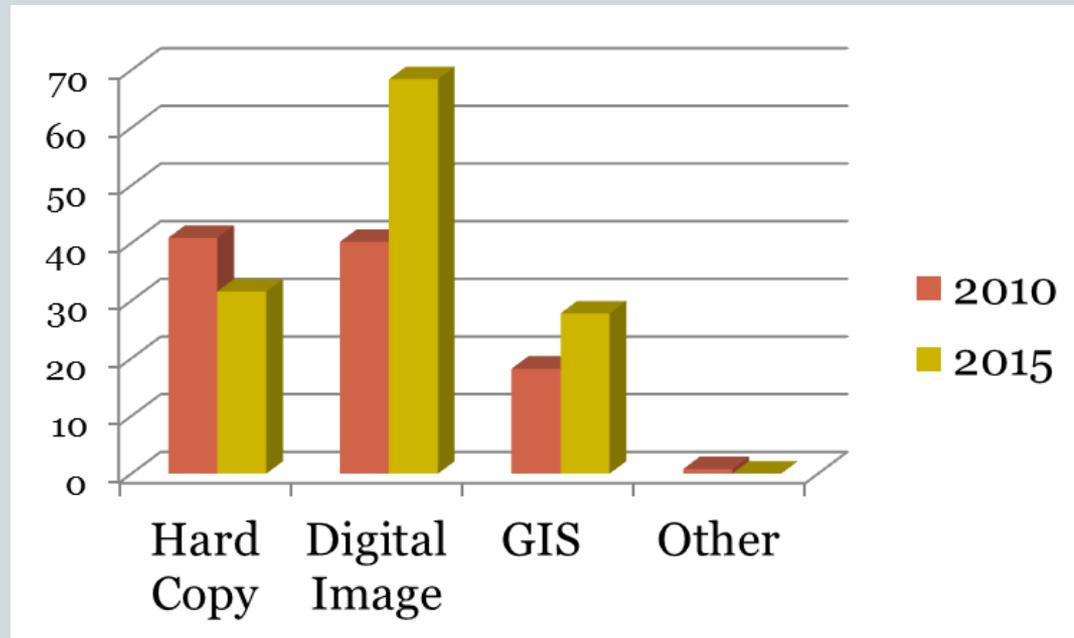


Store Customers - preferred format(s)*

*could select more than one

2014, n = 73

What map format do our customers prefer?

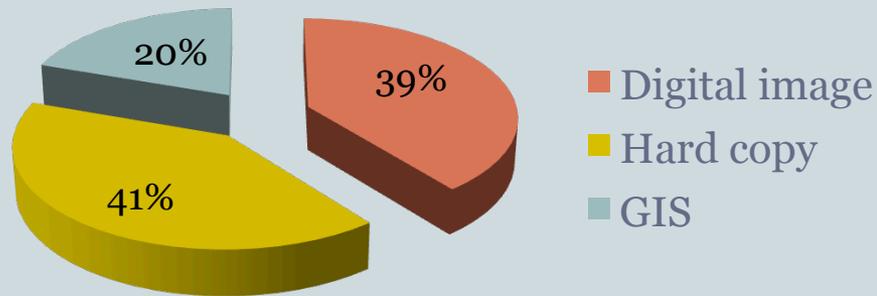


Professional Geologists - preferred format(s)*

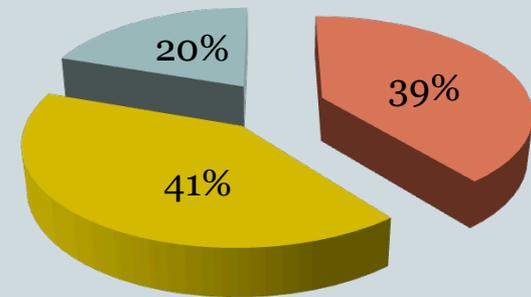
*could select more than one

n = 100 - 130

What map format do our customers prefer?



State Agency Staff
2010, n = 100



Industry
2011, n = 61

Preferred Format

What is a layered PDF?



- Adobe PDF document where the source layers are visible by default.
- Can set initial view of any layer to visible or invisible
- Layers can be locked
- Customer can make the map look the way they want it to

Example PDF

Layers

- Map Collar
- Explanation
- Cross-section
- Surficial Labels
- Bedrock Labels
- Other data
- Structural Data
- Fold Axes
- Surficial Contacts
- Bedrock Contacts
- Map boundary
- Geographic names
- Transportation
- Hydrology
- Terrain
- 1994 USGS topographi
- Topographic contours
- Surficial Polygons
- Bedrock Polygons

outside the box

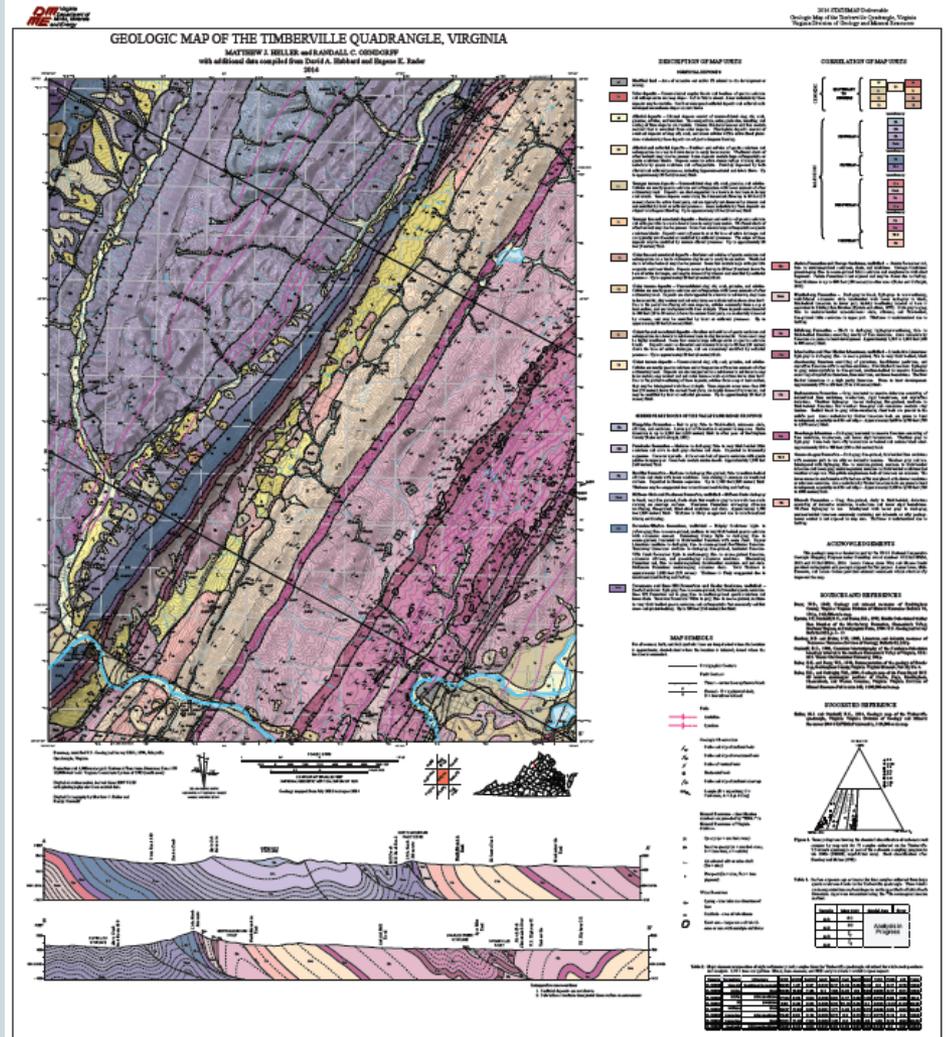
labels and point data

Line data

New topo cult/hydro

hillshade old topo contours

Polygons



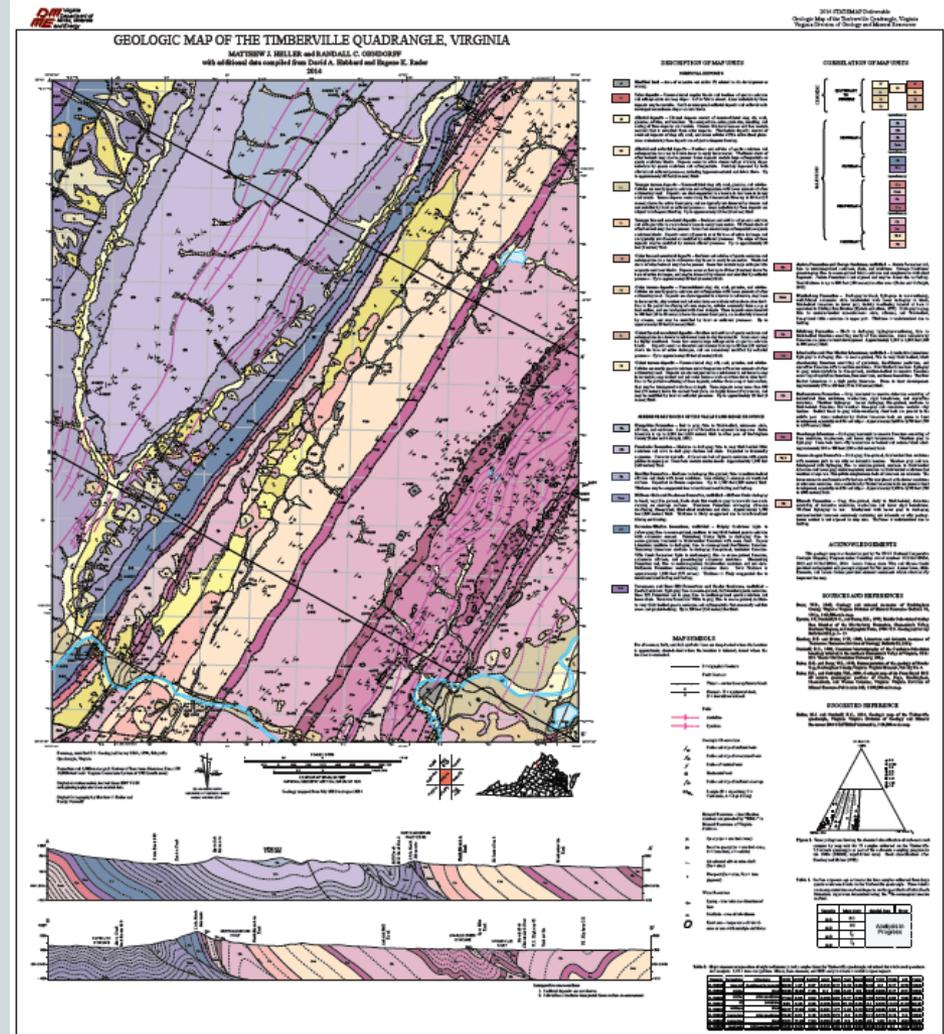
Timberville Quadrangle – Heller and Orndorff - Draft

How can a customer modify this map?

Example PDF

Layers

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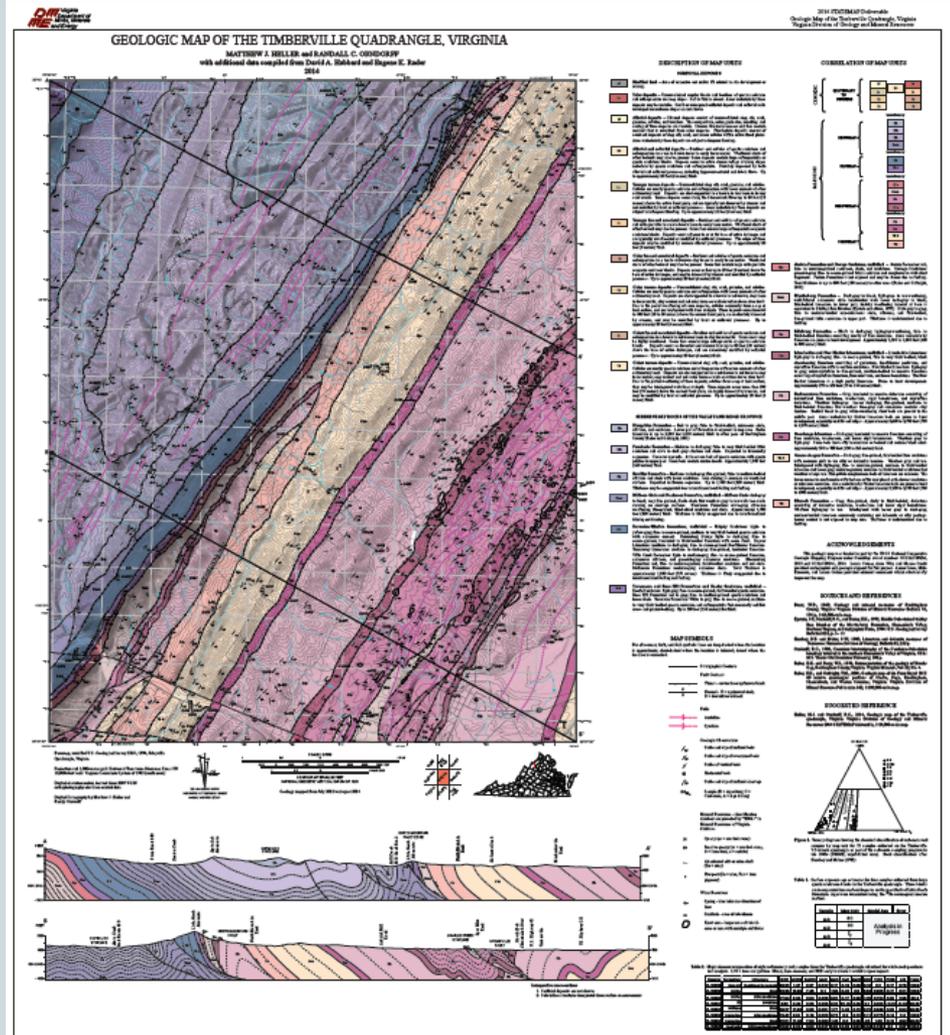


No Base maps

Example PDF

Layers

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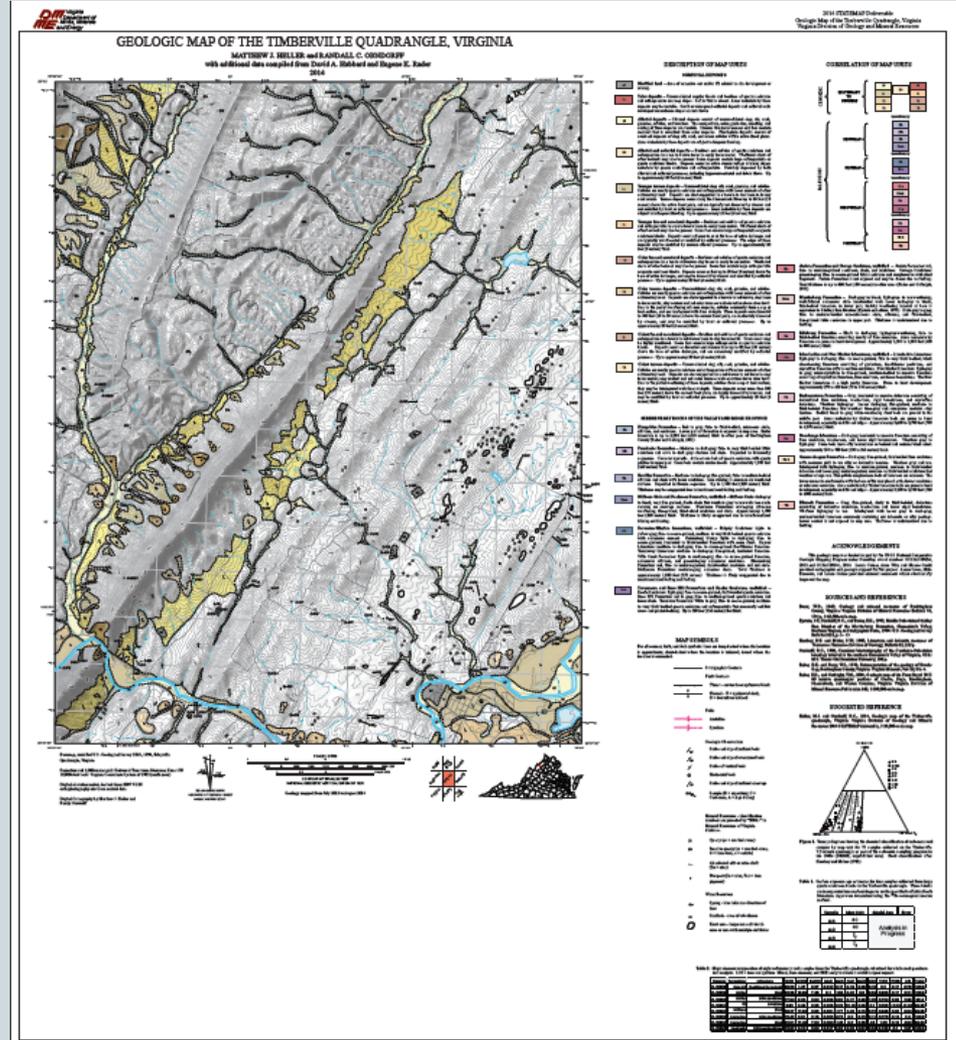


No surficial geology

Example PDF

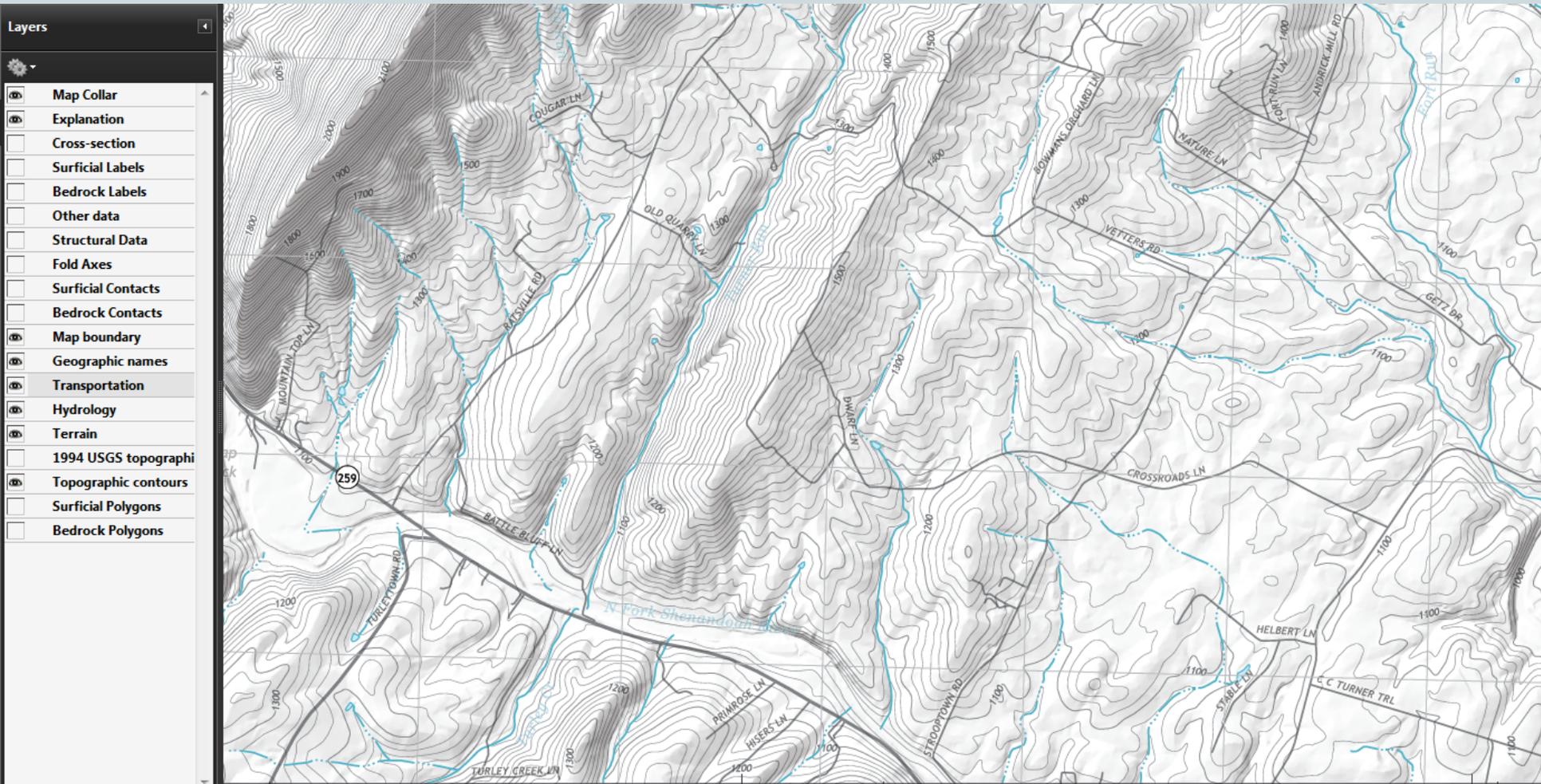
Layers

- Map Collar
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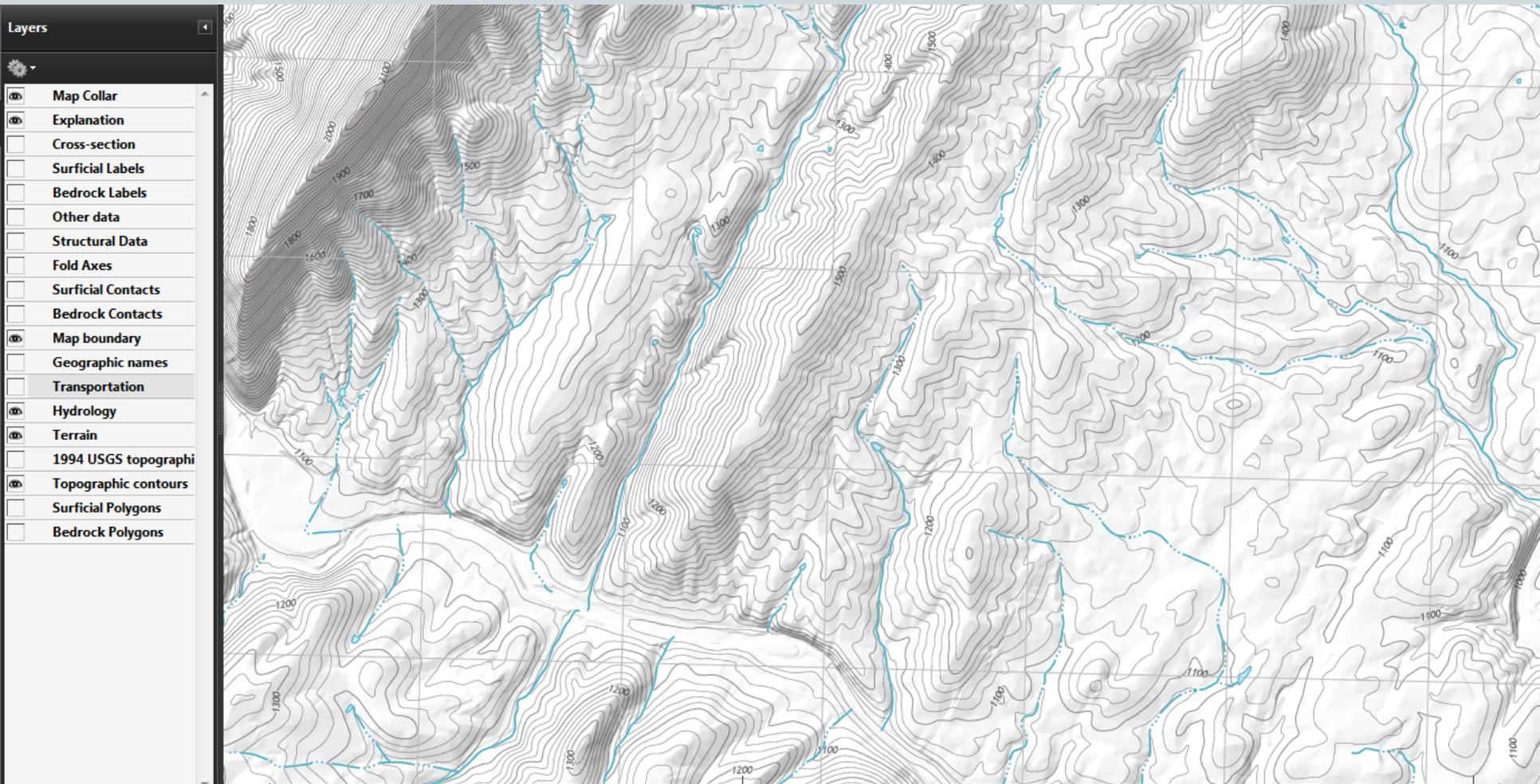
No bedrock geology

Example PDF- more detail



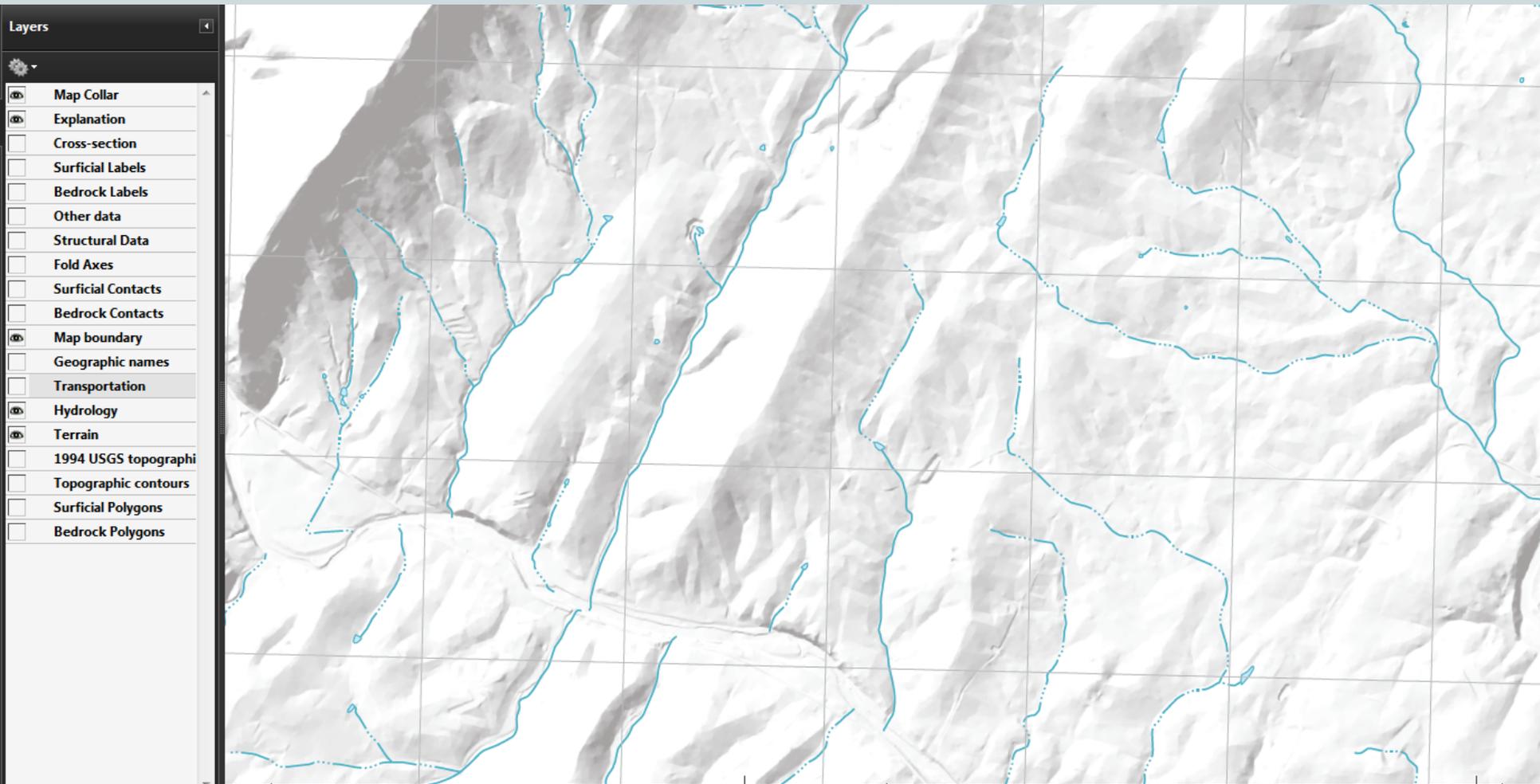
Base map

Example PDF- more detail



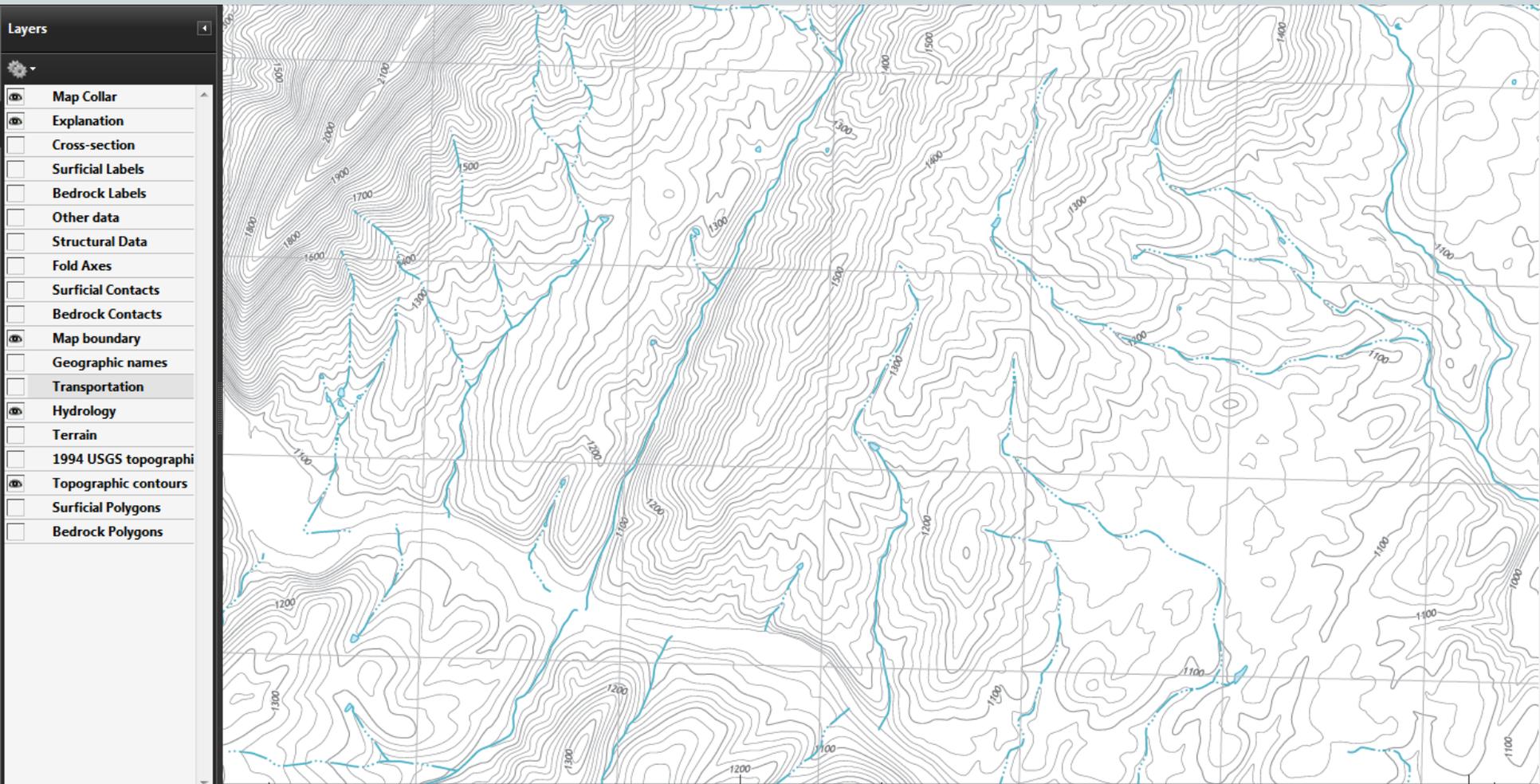
Base map –no roads

Example PDF- more detail



Base map –no roads or topo

Example PDF- more detail



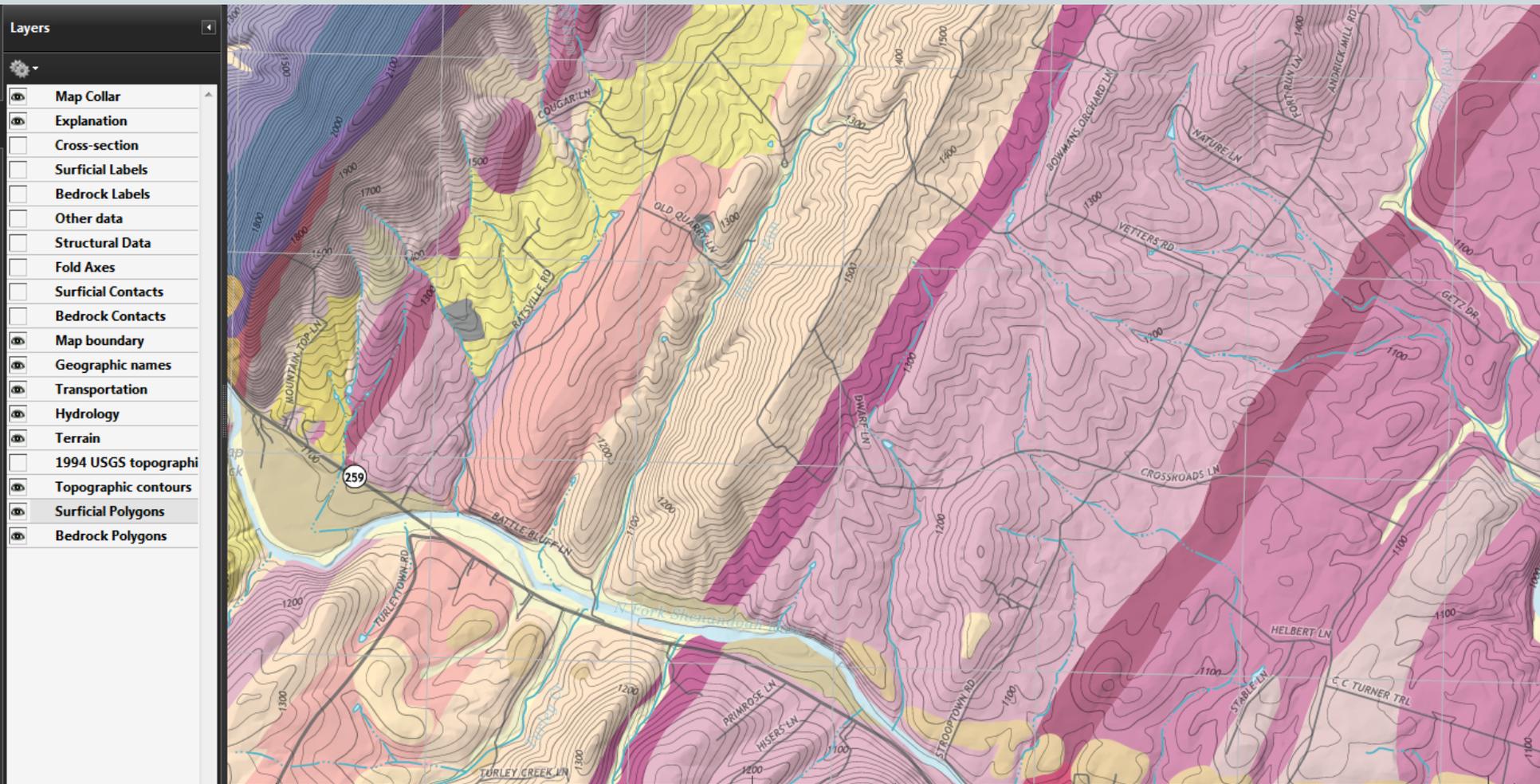
Base map –no hillshade

Example PDF- more detail



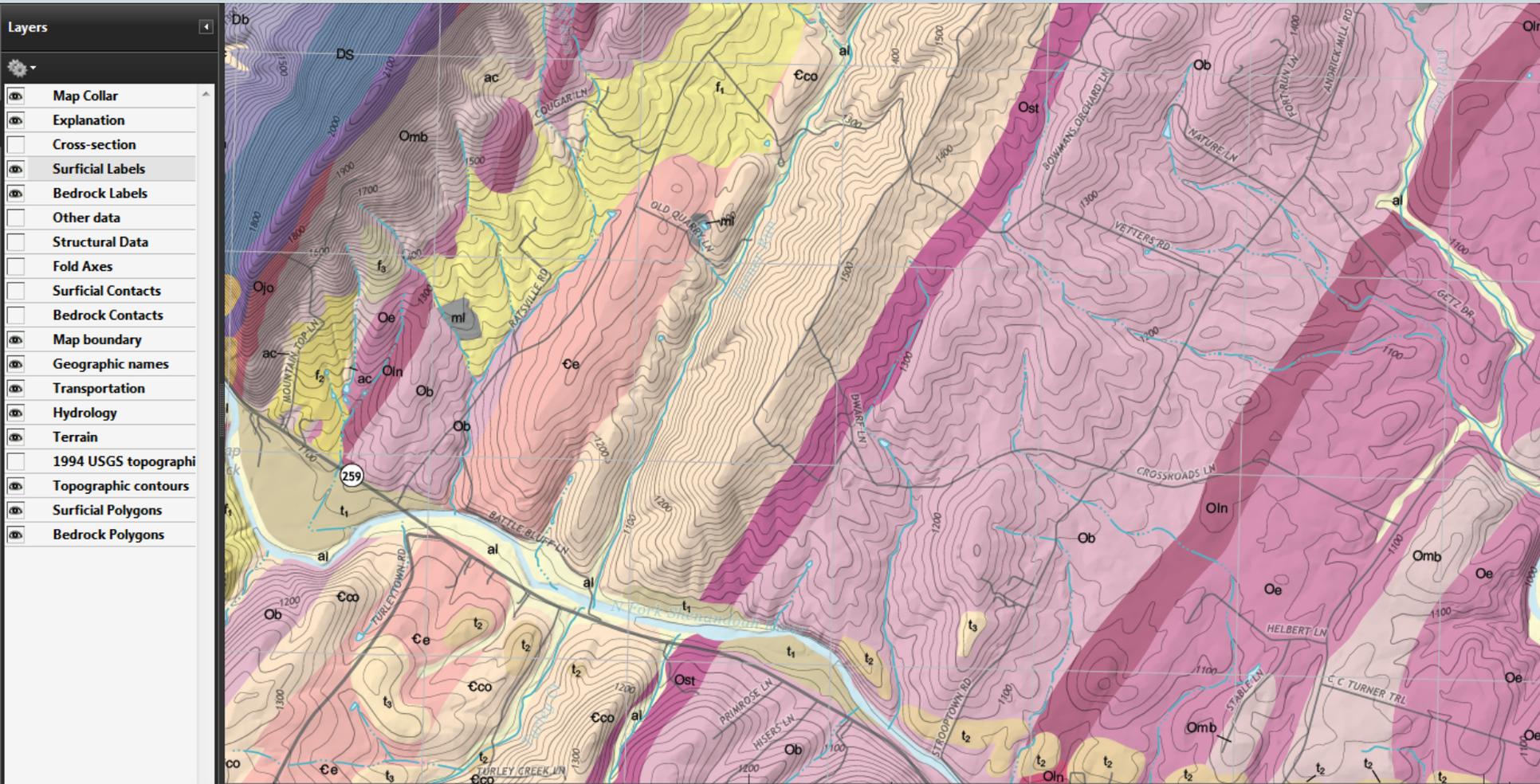
Base map –1994 topo

Example PDF- more detail



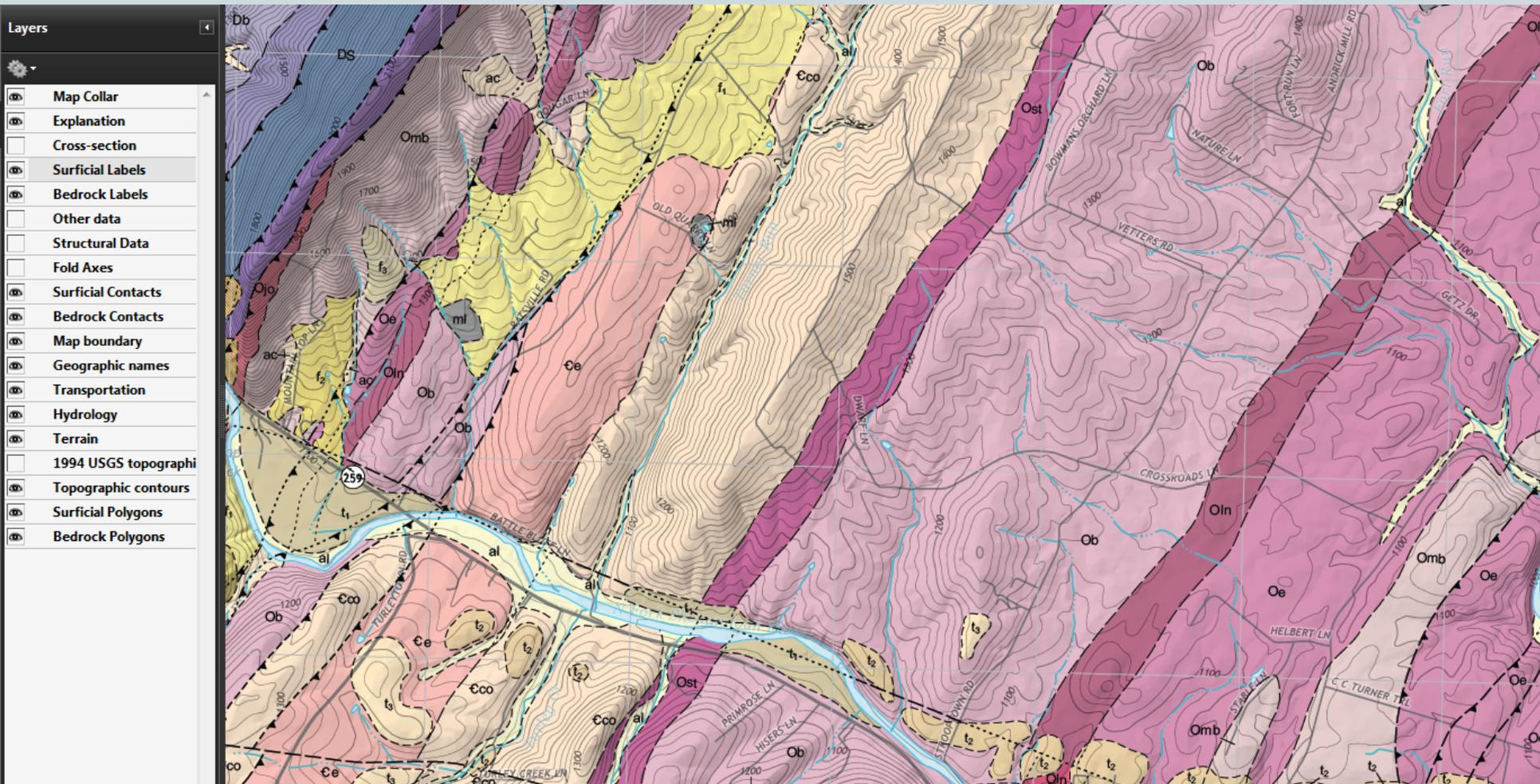
Geology – polygons only

Example PDF- more detail



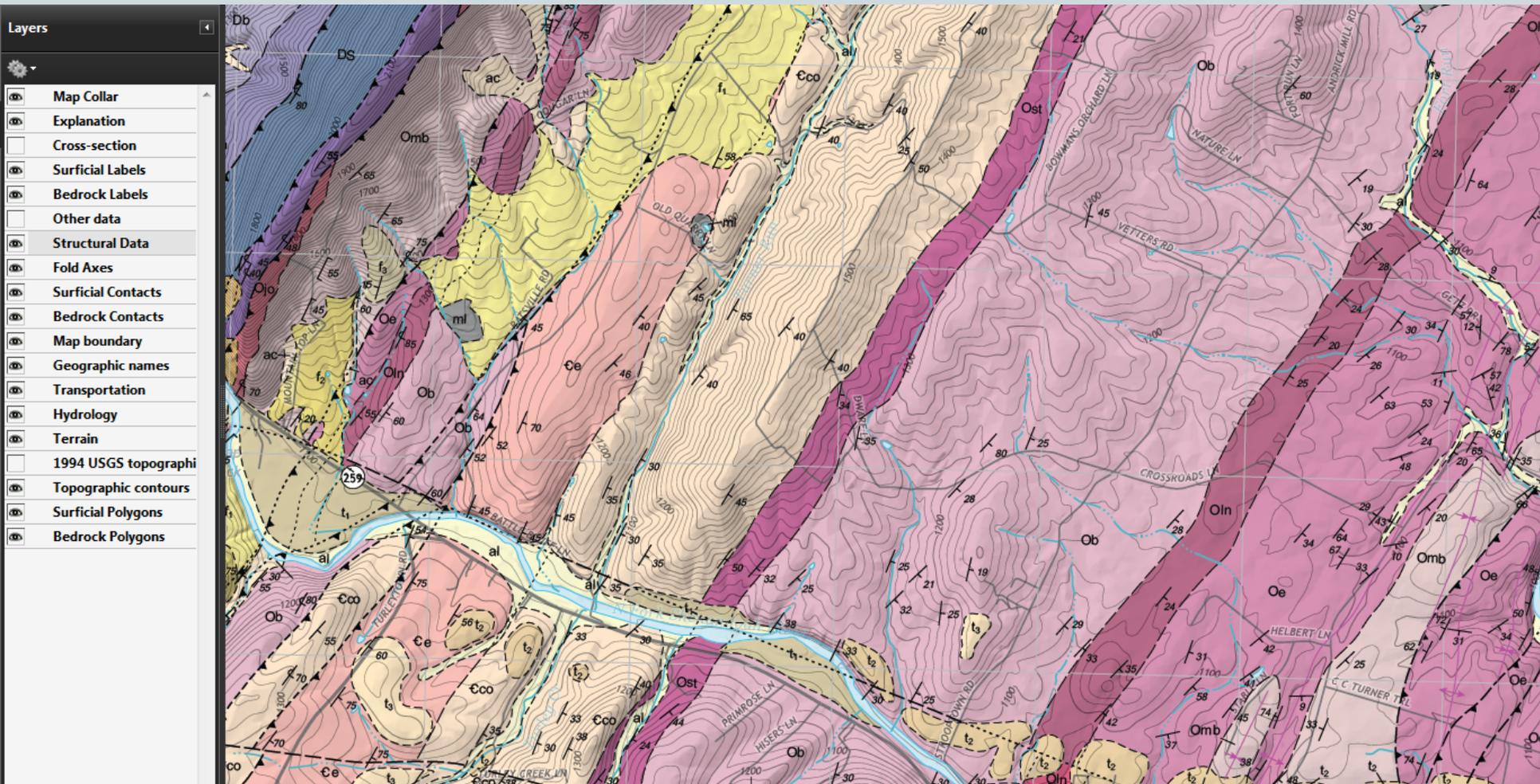
Geology – add labels

Example PDF- more detail



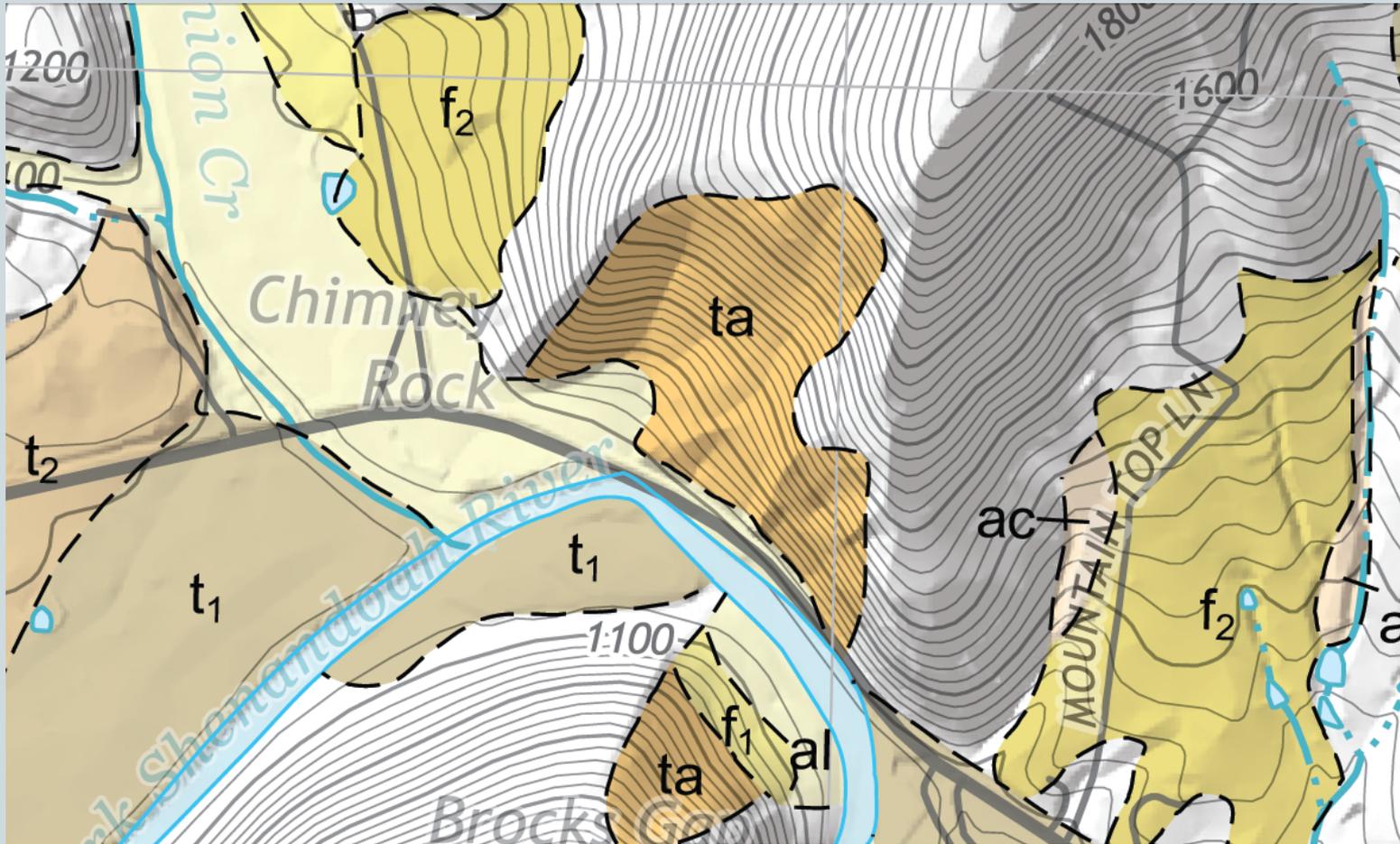
Geology – add contacts

Example PDF- more detail



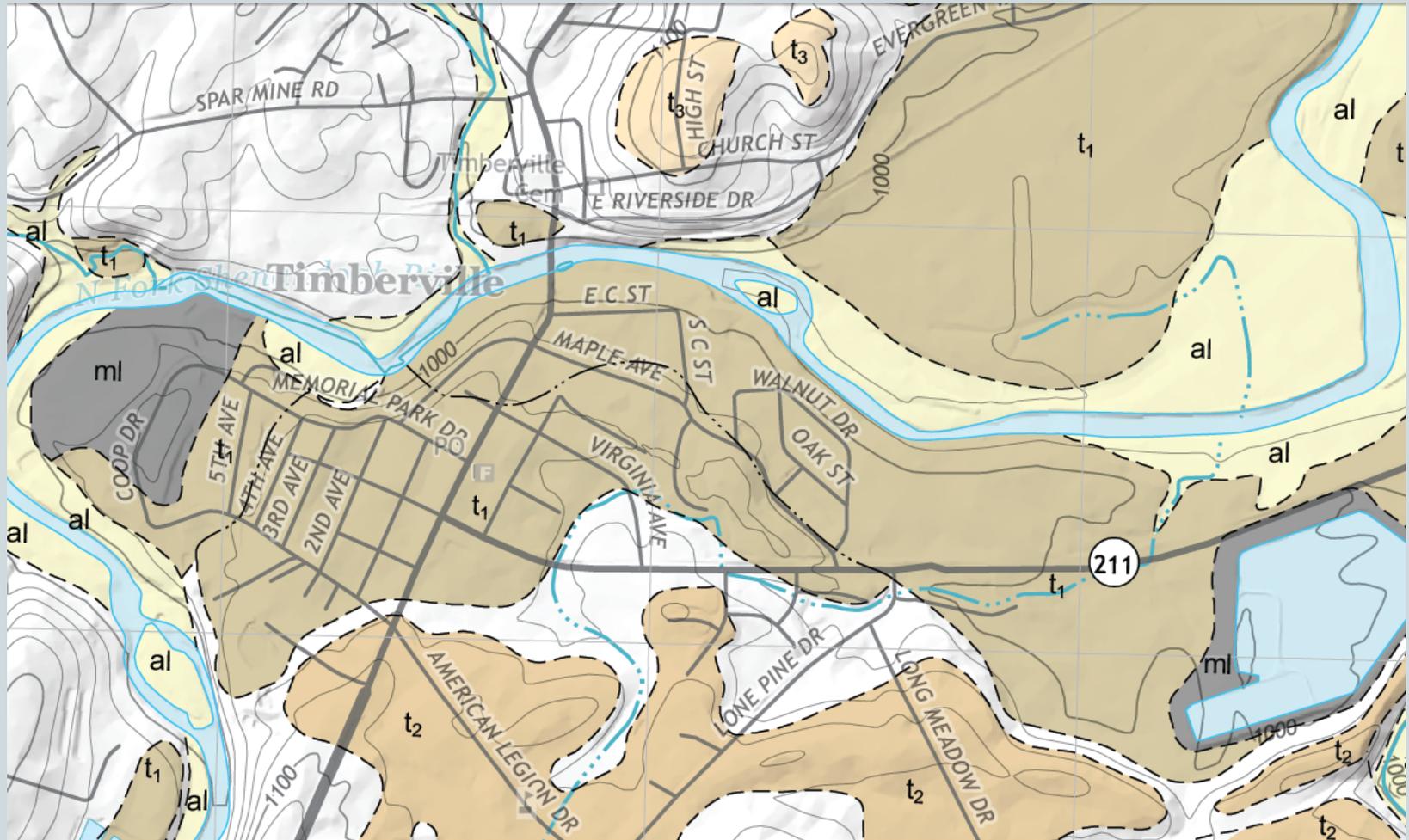
Geology – add structural data

Example PDF- specialized maps for users

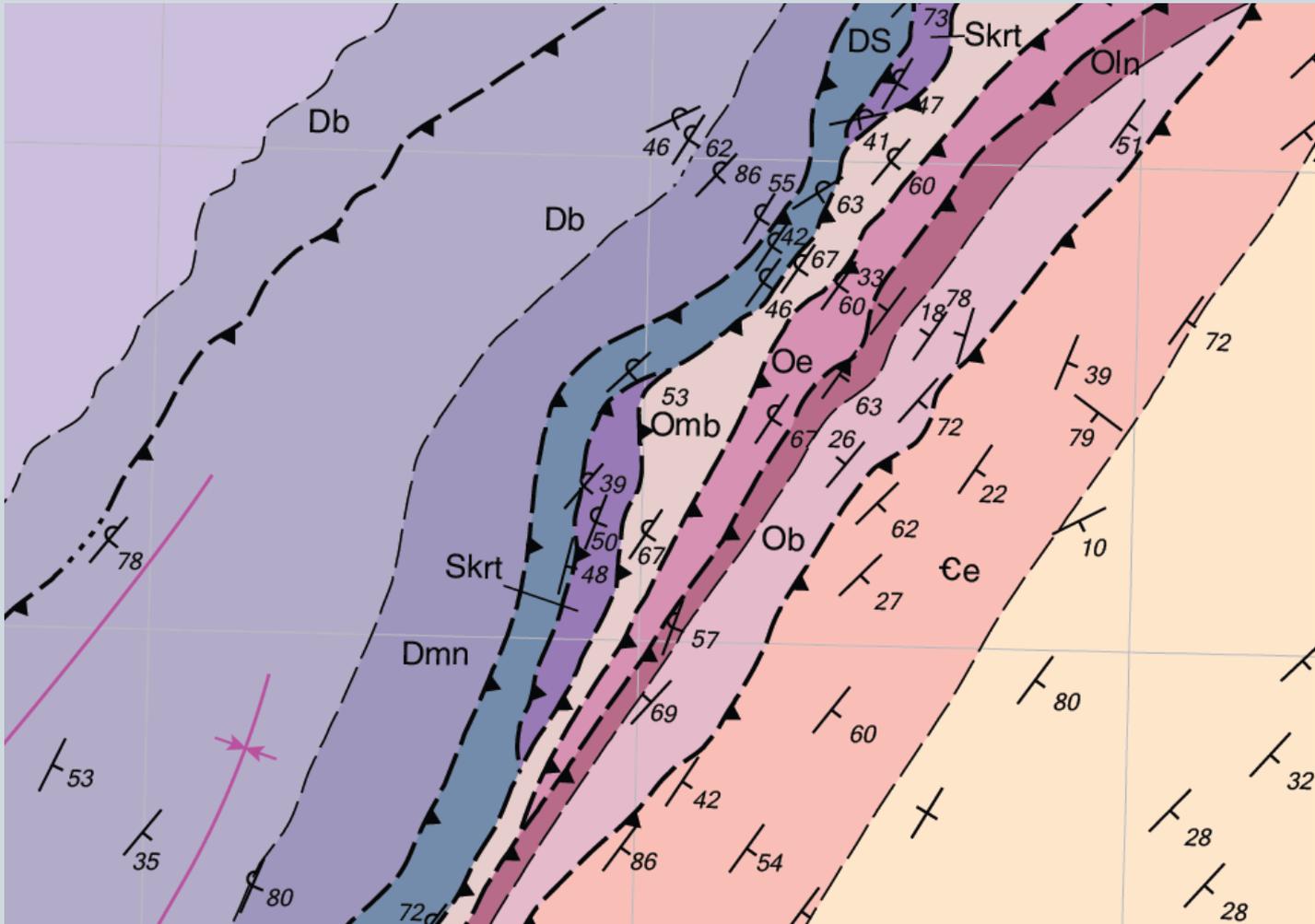


For Geotechnical – slope stability report

Example PDF- specialized maps for users



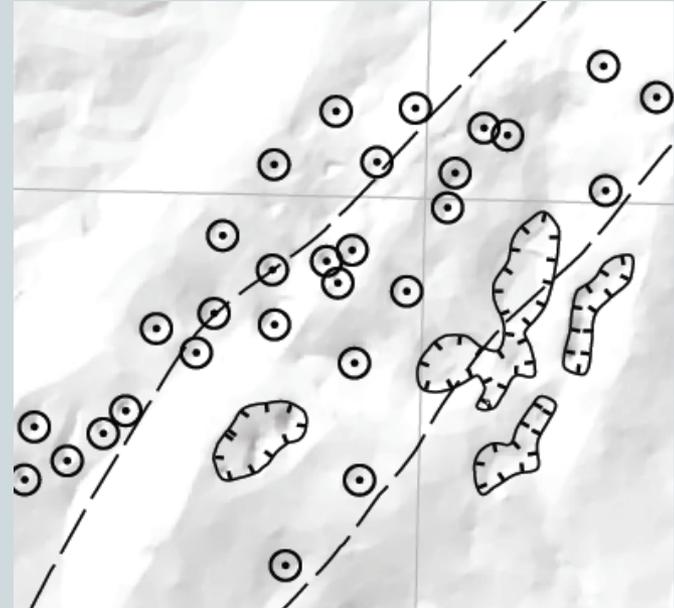
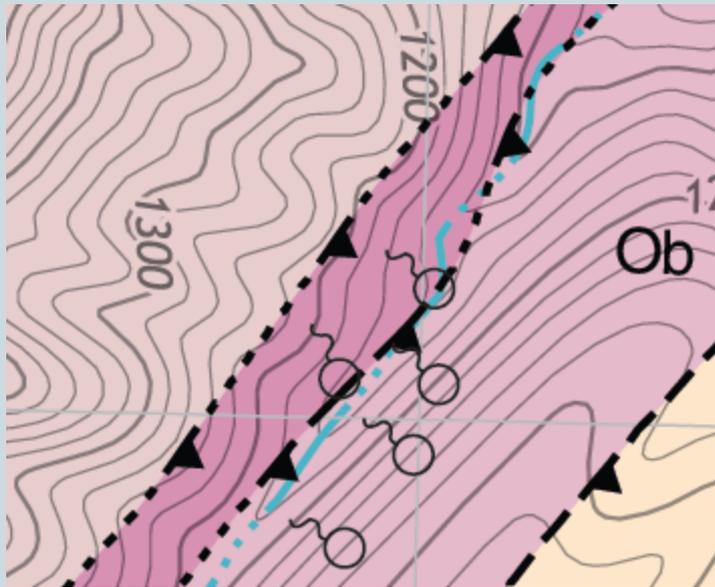
For land use planning report



For geologic field trip guidebook



For mineral resources study



For groundwater – hydrology report

How do we make layered PDFs?



- Geology is compiled in ESRI ArcMAP using NCGMP09 template, represented using FGDC symbology, and exported to Adobe Illustrator.
- New topographic map layers are exported separately from the PDF as EPS files. Old topographic map is added as a JPEG
- Hillshade is exported from Esri ArcGIS as a JPEG – brightness is adjusted so that flat areas are nearly white
- Map Collar, Explanation and Cross-section are completed in Adobe Illustrator
- Layers are organized and ordered for best appearance and given user friendly names. Extraneous layers are deleted
- The Adobe Illustrator map saved as Adobe PDF
- In Adobe Acrobat, properties set to show layers panel on open. Old topographic map is set to not be shown as a default.

Conclusions



- Virginia has a diverse map users who use geologic maps for a variety of purposes.
- Digital images are a preferred format for the majority of our customers.
- Providing access to map layers in PDF allows map users to customize a map to suit their needs.
- Customer feedback has been very positive.

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