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## Hydrogeology (Domain F)

*[Note: Examples given below are descriptive only and are not all-inclusive lists of items]*

### F-1. Hydrologic cycle and hydrostratigraphy

- F-1.1 The hydrologic cycle
- F-1.2 Aquifers, aquitards, and hydrostratigraphy
- F-1.3 Saturated and unsaturated systems (e.g., vadose zone, water table, and phreatic zone)
- F-1.4 Watershed mass balance and processes (e.g., evaporation, transpiration, precipitation, infiltration, sublimation, and recharge)
- F-1.5 Stream discharge and hydrographs
- F-1.6 Groundwater/surface water interaction (e.g., streams, lakes, springs, and wetlands)
- F-1.7 Water resources management and protection (PG)

### F-2. Hydrogeologic properties and principles

- F-2.1 Hydraulic head and hydraulic gradient
- F-2.2 Hydraulic parameters (e.g., porosity, hydraulic conductivity, permeability, and transmissivity)
- F-2.3 Groundwater flow concepts (e.g., Darcy's Law, specific discharge, and average linear velocity equation)
- F-2.4 Groundwater storage (e.g., specific yield, specific retention, storativity, and specific storage)

### F-3. Groundwater flow systems

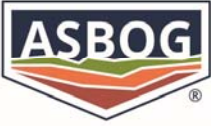
- F-3.1 Groundwater flow systems and flow nets
- F-3.2 Groundwater flow models
- F-3.3 Zones of Influence and well interference
- F-3.4 Karst and fractured rock flow systems

### F-4. Hydrogeologic methods of investigation

- F-4.1 Types of wells, well drilling methods, and construction (PG)
- F-4.2 Laboratory hydraulic tests (e.g., permeameter tests)
- F-4.3 Single-well tests (e.g., slug tests and specific capacity tests)
- F-4.4 Multiple-well tests (e.g., confined, leaky, unconfined, time-drawdown, and distance-drawdown pumping and recovery tests)
- F-4.5 Pumping test boundary conditions
- F-4.6 Investigating the unsaturated zone (e.g., tensiometers, lysimeters, gypsum blocks, and time domain reflectometry)
- F-4.7 Hydrogeophysical methods (e.g., borehole geophysics, surface resistivity, seismic, and ground penetrating radar)

### F-5. Aqueous geochemistry and contaminant hydrogeology

- F-5.1 Groundwater geochemical parameters



- F-5.2 Groundwater contaminants
  - F-5.3 Contaminant fate and transport (e.g., advection, sorption, dispersion, diffusion, degradation) and breakthrough curves
  - F-5.4 Groundwater remediation (PG)
  - F-5.5 Isotopic and tracer studies
- F-6. Project planning and development (PG only)
- F-6.1 Scope of work and cost estimation
  - F-6.2 Literature and regulatory review
  - F-6.3 Site-specific maps and health and safety plans

