

# Aquifer Characterization Components

*Establishing the 3-Dimensional geologic characteristics of an aquifer(s) to determine groundwater flow and contaminant transport directions and rates*

## Bedrock (left) and Surficial (right) Geologic Mapping



*The structures and rock types in the bedrock aquifer and porosity and permeability of deposits in the surficial aquifer determine how groundwater recharges, is stored, and transmitted.*

## GPS Well Locating and Log Correlation



*Groundwater wells are 3D portals into the sub-surface and their logs give information such as total depth, overburden thickness, yield, and static water level. Accurate well positions must be correlated with their logs in the State database.*

## Groundwater Flow Directions



*By integrating geologic maps with well logs and topographic maps, groundwater flow directions in bedrock and surficial aquifers can be mapped.*

## Geophysical Well Logging



*Geophysical logging tools are lowered down a well to measure 1) groundwater temperature and conductivity, 2) natural radioactivity of the rock formation, and 3) borehole diameter to detect fractures. A fourth tool constructs a 3D radar image of the well.*

## Groundwater Chemistry



*Major and trace element chemistry can be used to "fingerprint" groundwater from specific rock formations.*

## Groundwater Geochronology



*Certain anthropogenic compounds such as Chlorinated Fluorocarbons (CFCs), SF6, and Tritium can give average ages of recharge for groundwater. Ages of recharge generally tell how "old" groundwater is and can be associated with how far it has traveled.*