

Geophysics and Geology

Selection Table for Geophysical Methods

Target of Interest		Lateral Geologic Variation	Stratigraphy/ Depth to Bedrock	Faults & Fracture Zones	Void Detection	Water Bearing Zones	Seepage Zones	Buried debris & Burial Pit Boundaries	Abandoned Well Location	Buried Utilities & Tank Location	Concrete Thickness	Rebar in Concrete	Structures, Foundations and Pavement	Borehole Logging
Seismic	Refraction	Lower resolution than reflection	Excellent for depth to rock	Lower resolution than reflection		Good for water table definition								
	Reflection	Better for deep surveys	Better for deep surveys	Better for deep surveys	Cost-effectiveness questionable									
Ground Penetrating Radar		Better for shallow depth	Better for shallow depth	Better for shallow depth	Better for shallow depth	Better for shallow depth			Success highly sensitive to grid parameters					
Electromagnetic		Qualitative results		Method not available in-house	Lower resolution than GPR and resistivity	Method not available in-house		Qualitative Results						
Electrical	Resistivity	Profiling arrays yield best results	Profiling and sounding arrays good					Less cost-effective. Reduced penetration in conductive debris		Adequate for larger utilities/tanks				
	Induced Polarization		Good delineation of sands and clays			Good for definition of aquitards and aquicludes								
	Self Potential						Best for active seepage							
Magnetics		Qualitative results						Best where ferromagnetic debris is present (iron, steel)	Best for ferromagnetic casing	Best for ferromagnetic pipes/tanks			Detects embedded ferrous rebar	
Borehole Geophysics			Best, but increased cost for drilling	Several borehole imaging tools available			Flow within boreholes only							Correlation with physical properties
Guide to color coding:		Not Recommended		May be effective under specific site conditions			Effective for typical applications							

More information on selecting geophysical methods is available from the Federal Highway Administration at the following link:

<http://www.cflhd.gov/resources/agm/solutionMatrix/index.cfm>

