

Chapter 11

Surface Investigation of GW

Techniques to provide information concerning its occurrence and even its quality from surface or above surface locations.

Less costly.

11.1 Geologic methods

Collection, analysis and hydrogeologic interpretation of existing topographic maps, aerial photographs, geologic maps and logs and other pertinent records.

Supplement by geologic field reconnaissance and by evaluation of available hydrologic data on stream flow and springs, well yields, gw recharge, discharge, levels. Water quality

Knowledge of the depositional and erosional events in an area may indicate the extent and regularity of water-bearing formations.

11.2 Remote Sensing

Photographs of the earth taken from air plane or satellite at various electromagnetic wavelength range.

Stereoscopic examination of black-and-white aerial photographs to distinguish differences in geology, soils, soil moisture, vegetation and land use.

Aerial photographs also reveal fracture patterns in rocks (porosity, permeability, ultimately well yield)

Table 11.2.1

11.3 Geophysical exploration

Scientific measurement of physical properties of the earth's crust for investigation of mineral deposits or geologic structure.

Geophysical methods detect differences or anomalies of physical properties within the earth's crust.

Density, magnetism, elasticity and **electrical resistivity** are properties most commonly measured.

11.4 Electrical resistivity method

The electrical resistivity of a rock formation limits the amount of current passing through the formation when an electrical potential is applied

Eq 11.4.1

Fig 11.4.1, 11.4.2

Fig 11.4.4, 11.4.5

11.5 Seismic refraction method

The creation of a small **shock** at the earth's surface and measuring the time required for the resulting sound or shock, wave to travel known distances.

Fig 11.5.1

Fig 11.5.2

11.6 Gravity and magnetic methods

Differences in density on the earth's surface that may indicate geologic structure.

Little application due to the cost and differences in water content.

Magnetic method enables magnetic fields of the earth to be mapped.