



Figure 7: A typical borehole drilling rig

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◉ Water Supply Planning

- The development and utilization of available water resources require adequate planning and design. In order to select a suitable water supply source, the demand that will be placed on it must be known. The elements of water demand include the average daily water use and the peak rate of demand.
- In the planning process, the ability of the water source to meet demands during critical periods (when surface flows and groundwater tables are low) must be determined. The “peak demand rate” must be estimated in order to determine plumbing and pipe sizing, pressure losses and storage requirements necessary to supply enough water during periods of peak water demand.

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◉ Water Quality Management

- The quality of water is determined by its physical, chemical and biological properties. Naturally existing water contains impurities which need to be removed by treatment. Natural waters contains suspended solids as well as dissolved substances, these must be either removed or kept at within certain limits to make the water potable.
- The tolerable limit of impurities in water depends on the purpose for which it is to be used for, water that is completely free from suspended or dissolved matter eg. Distilled water is unpalatable.
- Water for domestic purposes must not contain disease-causing organisms, water for washing in a laundry or textile factory should be free of suspended matter.

- ◉ Substances found in surface water depend on the catchment where it was generated, impurities like clay, organic and inorganic mineral matter, algae, bacteria and protozoa may be found in suspended or colloidal form.
- ◉ Dissolved gasses like oxygen, nitrogen, carbon dioxide and hydrogen sulphide may also be present. Organic matters found in water may include ammonia, organic acids, chlorides, nitrites and nitrates; they may be found in dissolved state. Pollution of surface water may also occur as a result of the following activities of man:
 - Discharge of effluents from industries
 - Discharge of domestic wastes from homes, abattoirs etc.
 - Leaching and discharge of contaminants from agricultural lands eg. Fertilizers, herbicides, pesticides etc
 - Acid rains due to heavy air pollution from industrial estates or parks.

- ◉ Physical properties of water

- Colour
- Turbidity
- Taste
- Odour

- ◉ Chemical properties of water

- pH value
- Hardness
- Carbon dioxide
- Chlorides
- Iron
- Manganese
- Dissolved oxygen

- ◉ **Water Law**

- In regions where the available water is inadequate to meet the needs of potential users, a system of laws has been developed to determine who has the right to water when shortages occur. Water law plays a major role in the economic aspects of water development since limitations on who may develop water often control how it is developed and utilized.

- ◉ **Riparian Rights**

- The doctrine of riparian rights evolved from Europe and has been adopted world wide with little or no modification. The doctrine holds that the owner of the land adjacent to a stream is entitled to receive the full natural flow of the stream without change in quantity and quality.