

Design Discharge Rate of Tubewells	The design discharge rate depends on autonomous and design factors shown in Table 5-10.
Tubewell Operating Factor	The tubewell operating factor is the number of actual operating hours of the well per 24 hours, expressed as a fraction. The tubewell operating factor largely depends on autonomous factors, but also on a design factor like the peak drainage requirement. It will not be possible to operate all wells continuously over an extended period. Time will be lost during maintenance, inspection, and repairs, stoppage due to power failures, etc. Social factors like the presence or absence of a pump operator will also influence the possible operating factor of the wells.
Annual Drainable Surplus	The annual drainable surplus of an area is the annual discharge, in mm/day, required to maintain the design water-level criteria. It depends on many factors and one of the essential factors is the depth at which the water table is to be controlled.
Peak Drainage Requirement	To maintain a stabilised water table in tube well drainage, the system should be based on the maximum expected recharge. This, however, would result in excessive investment costs. If the system were to be based on a continuous discharge to drain the annual drainable surplus at a constant rate, the water table would fluctuate throughout the year. This variation can be reduced by adjusting the monthly tubewell operating factor. This means higher operating factors during the periods with higher recharges and lower operating factors during the periods with lower recharges.

Table 5-9 – Other Well Design Considerations

Autonomous Factors	Design factors
Design should be based on the most economic pump capacity. If larger pumps are installed, fewer pumps will be required, which generally results in lower investment costs. On the other hand, larger capacity pumps result in higher drawdowns and thus higher energy costs. Determining pump capacities on a purely economic basis could lead to very high pumping rates. There are, however, several practical constraints to these high pump capacities.	The annual drainable surplus and the peak requirements. The maximum tubewell capacity will influence the distance between the wells or the maximum spacing in the well field. Hence, for a given operating factor, the drainable surplus would be the determining factor for the discharge rate of the well.
Selection of pumps and engines should be based on their availability on the local market; spare parts, especially, should be locally available.	The horizontal and vertical hydraulic conductivity and the thickness of the aquifer, and the vertical resistance of the aquitard, determine the drawdown for a given discharge rate and the expansion of the cone of depression.
A policy of reducing the number of different pump sizes may be another major constraint on the choice of the pump capacity.	Screen and casing specifications, together with the discharge rate, determine the entrance velocity of water flowing through the screen, which has a maximum value in order to ensure a maximum lifetime for the well.