

Set-up design of the Well

The typical design of wells aims to achieve a balance between two basic elements, namely, high production efficiency for the longest possible period of time on the one hand, and reasonable costs on the other hand. In practice, this requires fulfilling two main conditions: Correct determination of the dimensions of the well (depth and diameter) and checking the selection of materials used in construction.

The set-up design description of the well is as follows:

Well Casings

All well casings shall be new. They shall be manufactured of steel pipe, ASTM Designation A-53 or A120 or the American Petroleum Institute (API) Specifications 5A or 5L. The casings shall be joined by welding in accordance with the standards of the American Welding Society.

Well screen shall be continuous-slot wire-wound screen

Gravel Pack

1. The gravel pack material shall consist of clean, insoluble material, properly graded for the aquifer material.
- 2- All gravel for packing shall be hard, water-worn gravel washed clean of silt, sand, dirt, and foreign matter. Crushed gravel will not be accepted. All gravel shall be well-rounded, graded, and selected.

Well screen:

Well screen shall be 304 stainless steel, wire-wrapped, and with a slot size of 0.8 mm. Typically, well screens are designed based on the type of aquifer material encountered during drilling.

Table 1 shows the specification and construction of the well and more details are shown in Figure 1 below.

Table 1 well dimension, open space in the screen, screen diameter, slots size and expected yield

Parameter	Value
Depth of the well	60 m
Expected well yield	50-60 m ³ /h
Nominal size of pump bowls	150 mm
Size of Well casing	250 mm
Nominal screen well diameter	150 mm
Screen slot size	0.8 mm
Screen slot number	30
Steel continuous slot	19 cm ² /m

Well pump:

There are several types of well pumps. The most common are line shaft turbine with the following introduction and specification:

Vertical multistage pump with mixed or axial flow impeller design, broad hydraulic coverage provides best selection to meet specific operating conditions. Fabricated or cast iron, surface or underground discharge head, shaft and bearing combinations promote long life with options of open or enclose line shaft construction. It can be driven by VHS NEMA Standard motor, VSS motor or diesel engine through right angle gear box. Line shaft turbine pumps have the motor mounted above the waterline of the well.

Capacity: $\leq 5000 \text{ m}^3/\text{h}$

Head: $\leq 350 \text{ m}$

Motor Power: 5.5-1600kW

Rated Voltage: 380V, 6kV, 10kV
Well Diameter: 100- 950mm
Max. Discharge Diameter: 650mm

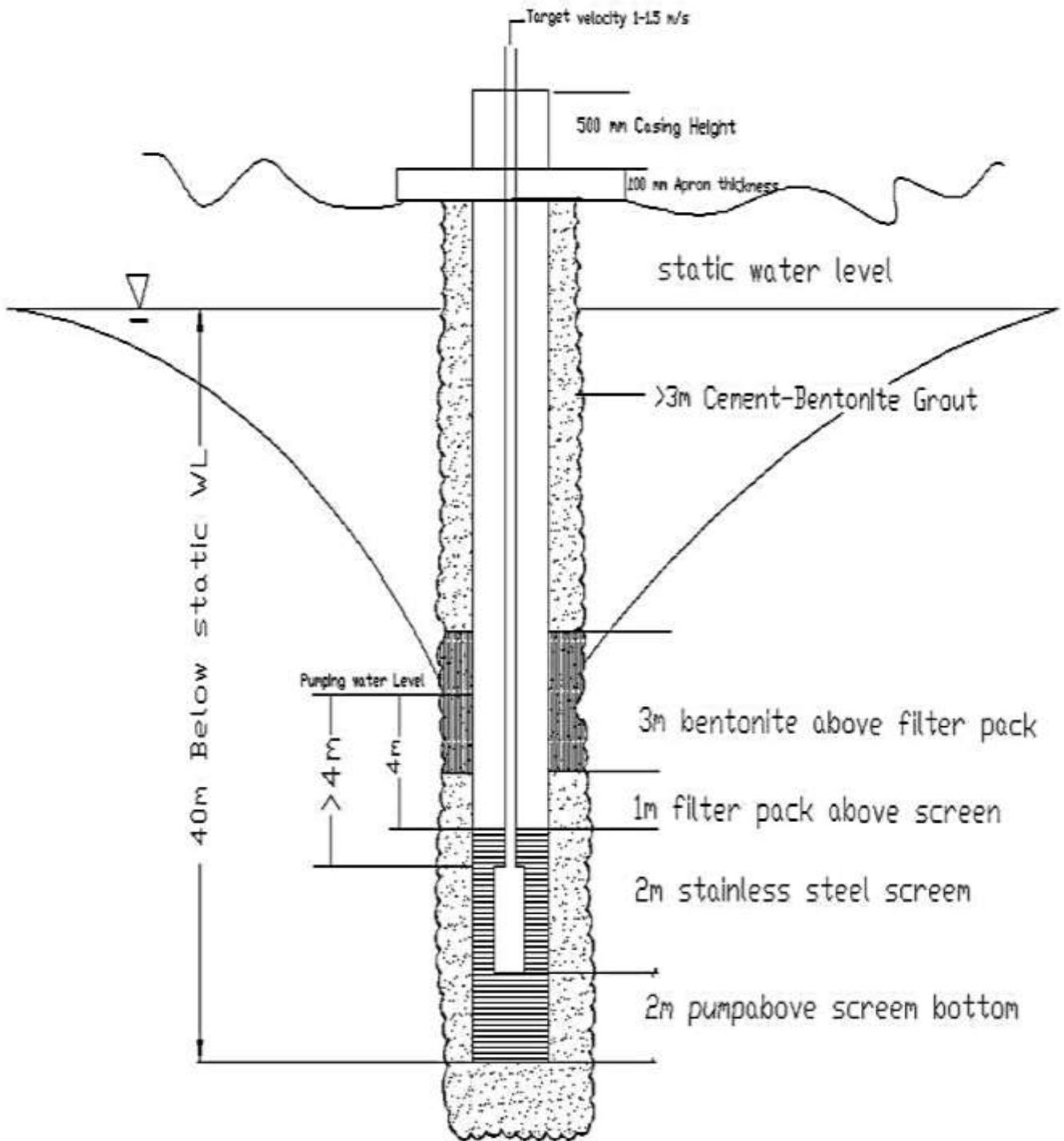


Figure 1: The schematic diagram of the well set-up design