

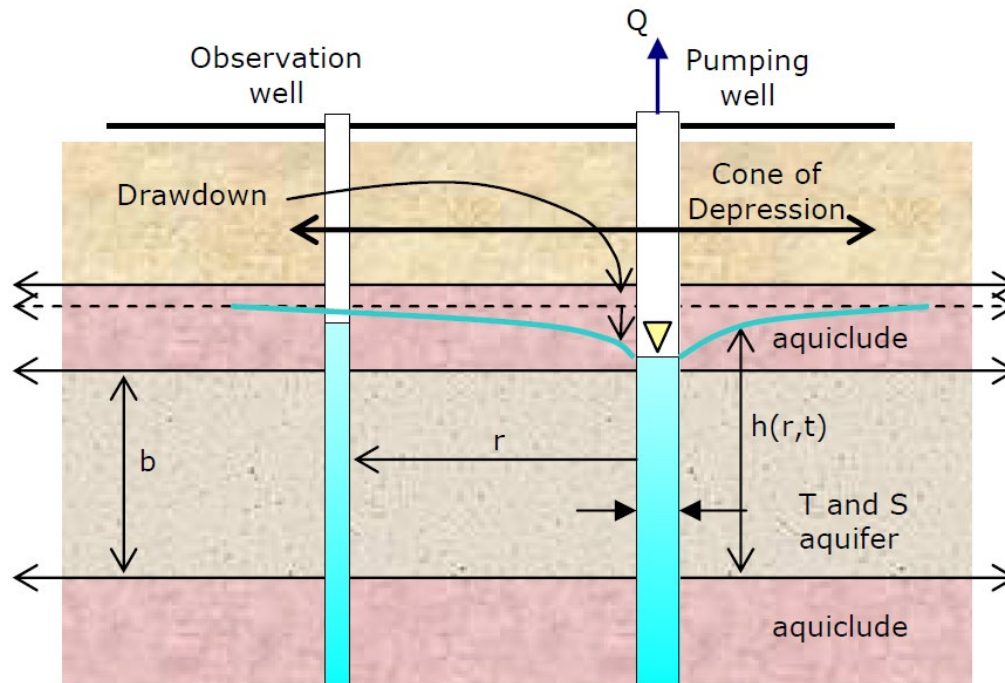
GROUNDWATER RESOURCE DIRECTED MEASURES

Well Field Model



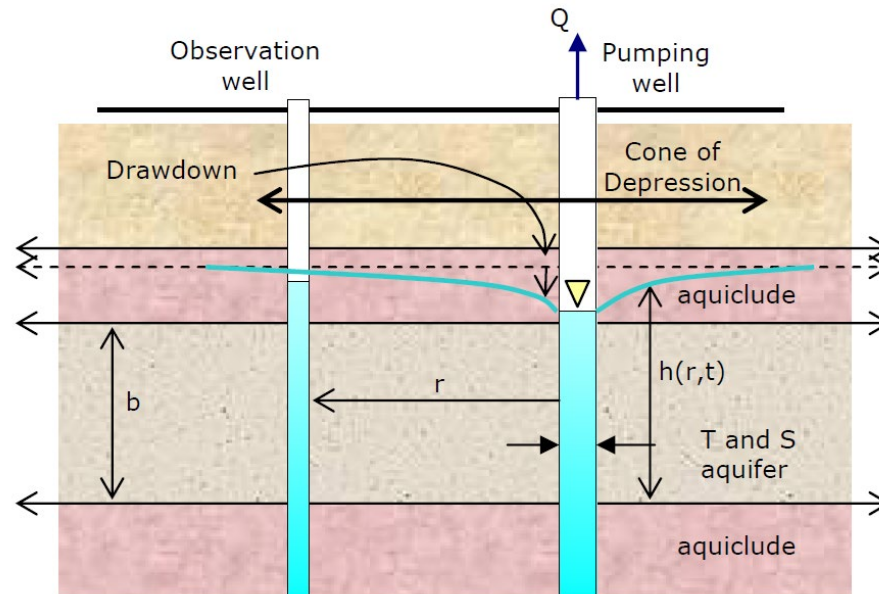
Wellfield Model (Local Scale)

$$s = \frac{2.3Q}{4\pi T} \log \frac{2.25Tt}{r^2 S}$$



Cooper-Jacob Assumptions

- The aquifer is confined
- It has an infinite areal extent
- It is homogeneous, isotropic and of uniform thickness
- The piezometric surface is horizontal.
- The pumping rate is constant
- The borehole penetrates the entire aquifer



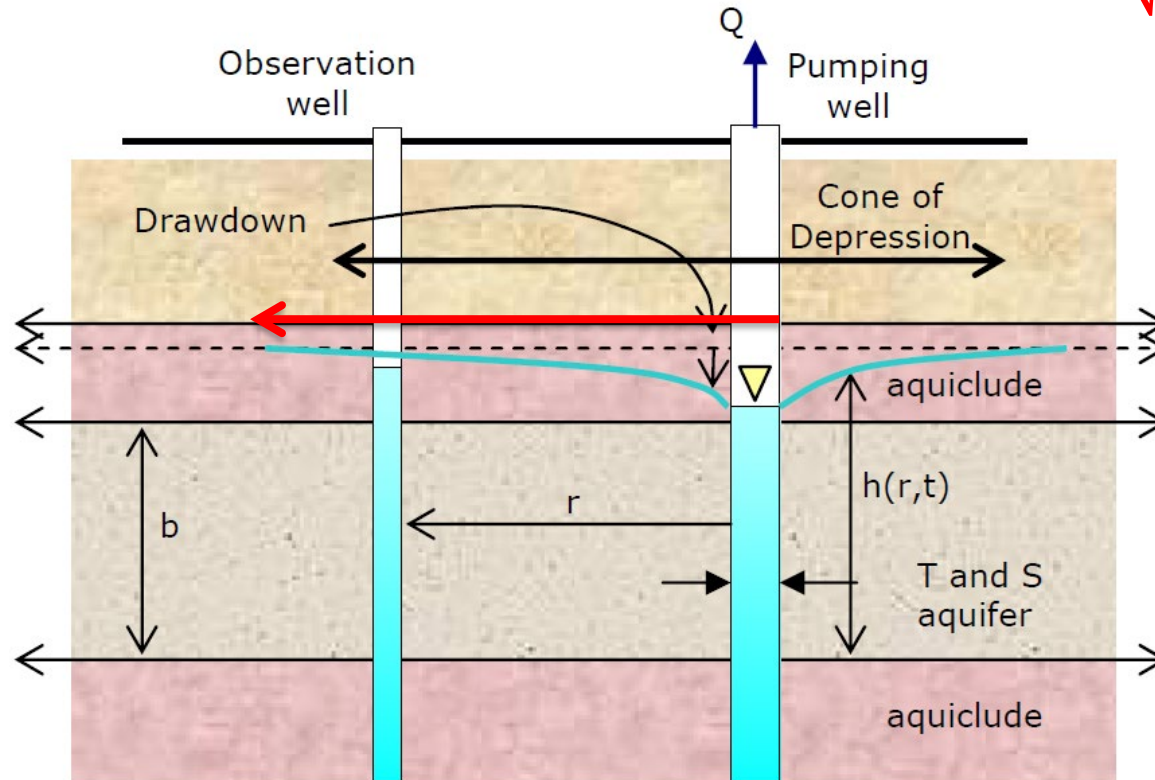
Radius of Influence

Set $s=0$ in Cooper-Jacob Equation:

$$s = \frac{2.3Q}{4\pi T} \log \frac{2.25Tt}{r^2 S}$$

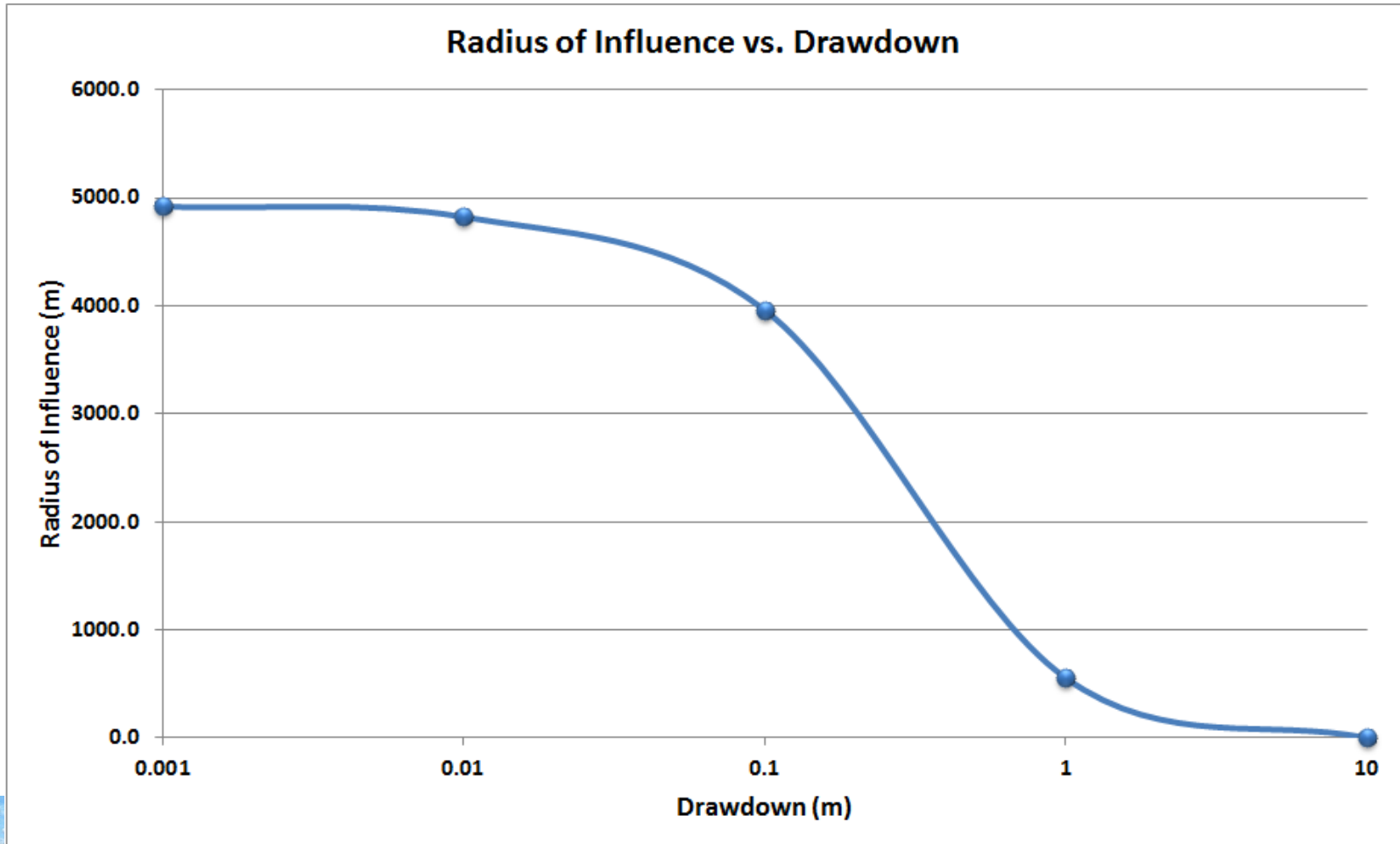


$$r = 1.5 \sqrt{\frac{Tt}{S}}$$

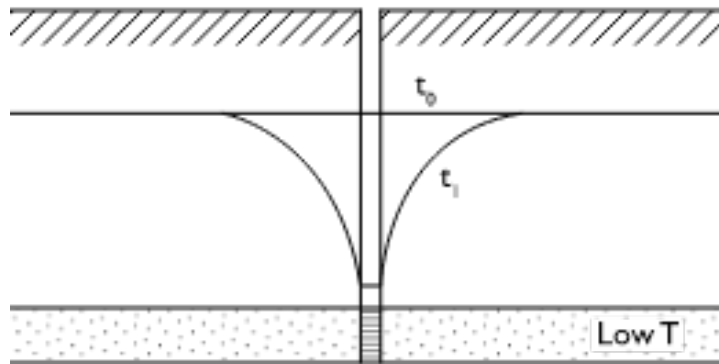


Radius of Influence – Take Note!

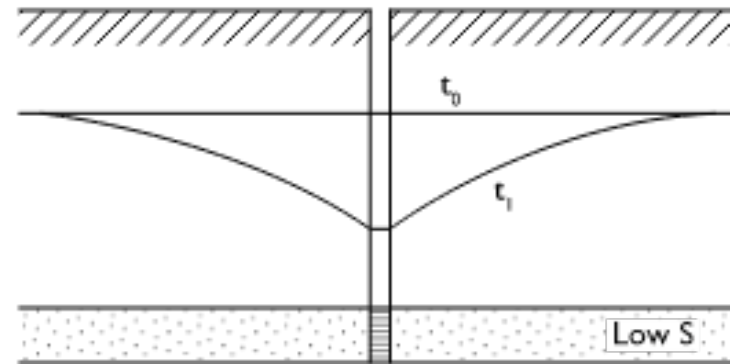
Dependent on parameter values



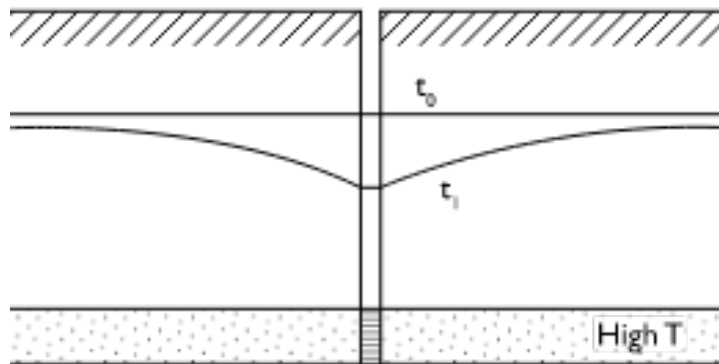
Drawdown vs T,S



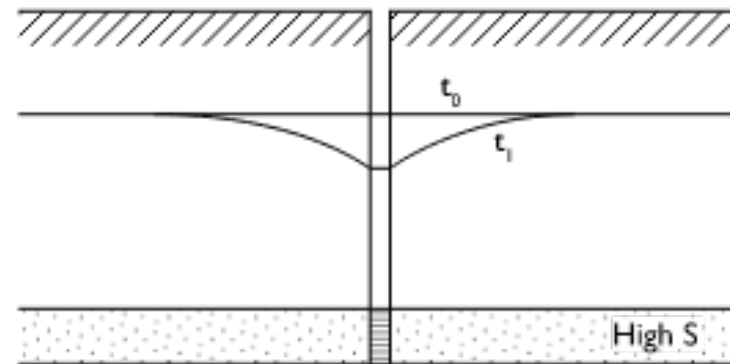
(a)



(c)



(b)

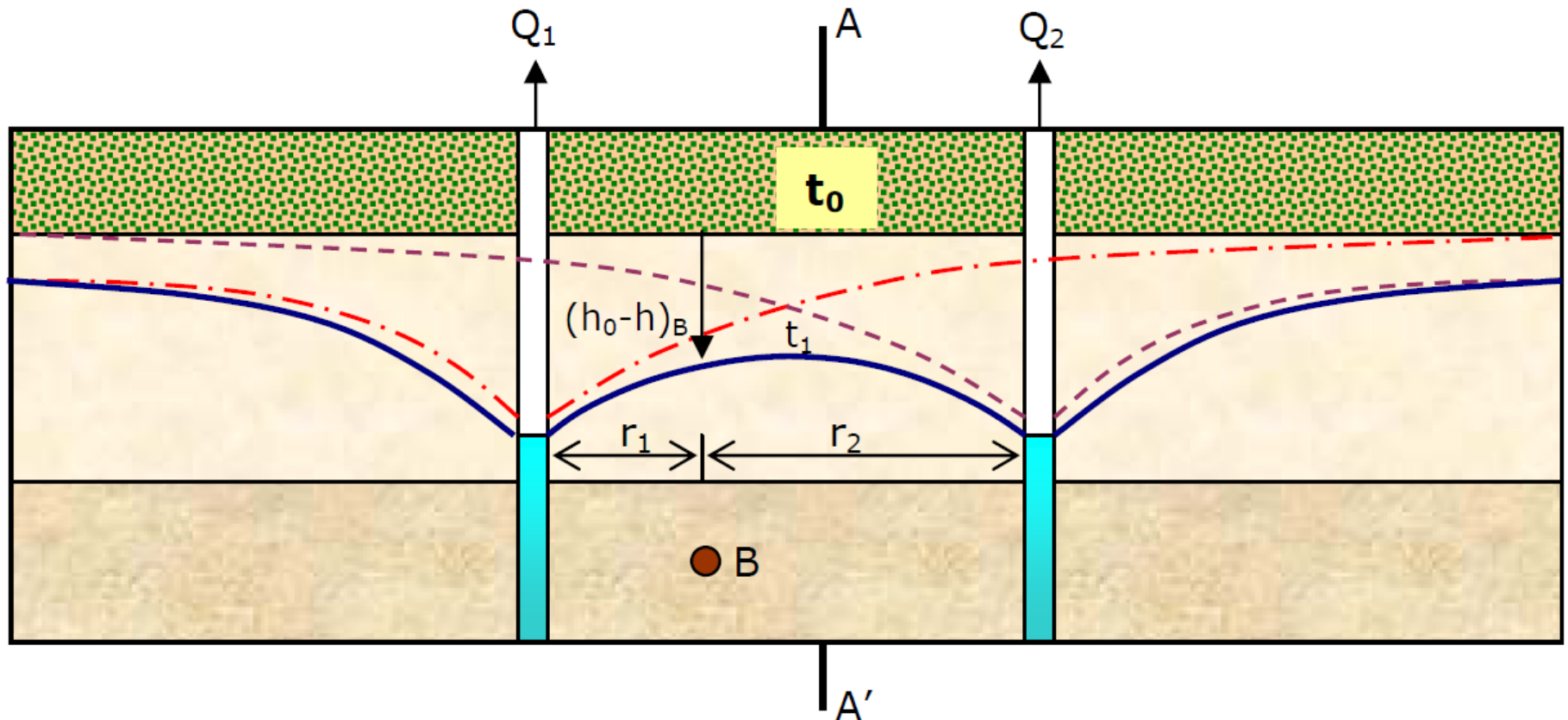


(d)

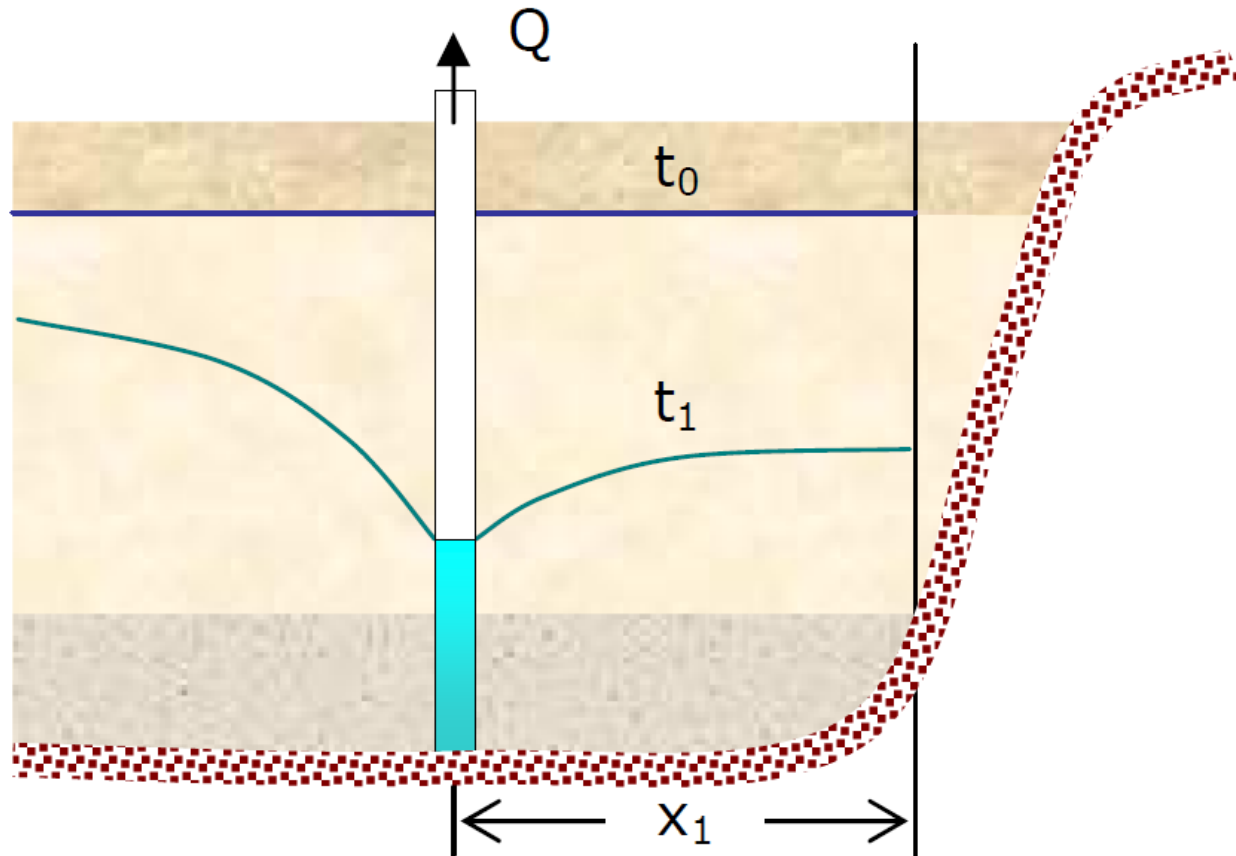


Borehole Interference

- Image well theory and superposition
- Apply Cooper-Jacob equation for each borehole
- Note each borehole can have different parameters

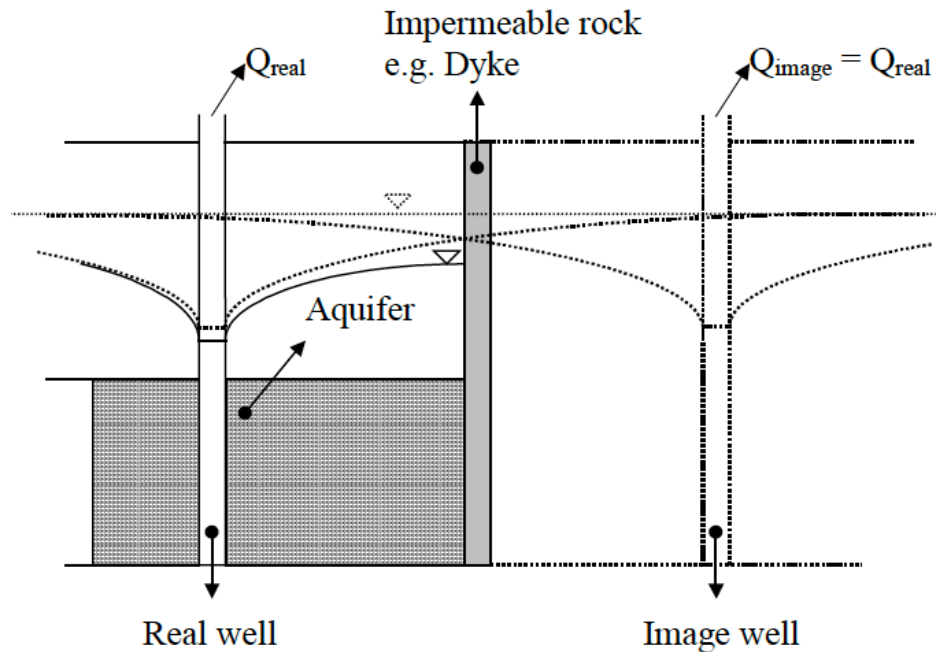


No-Flow Boundary

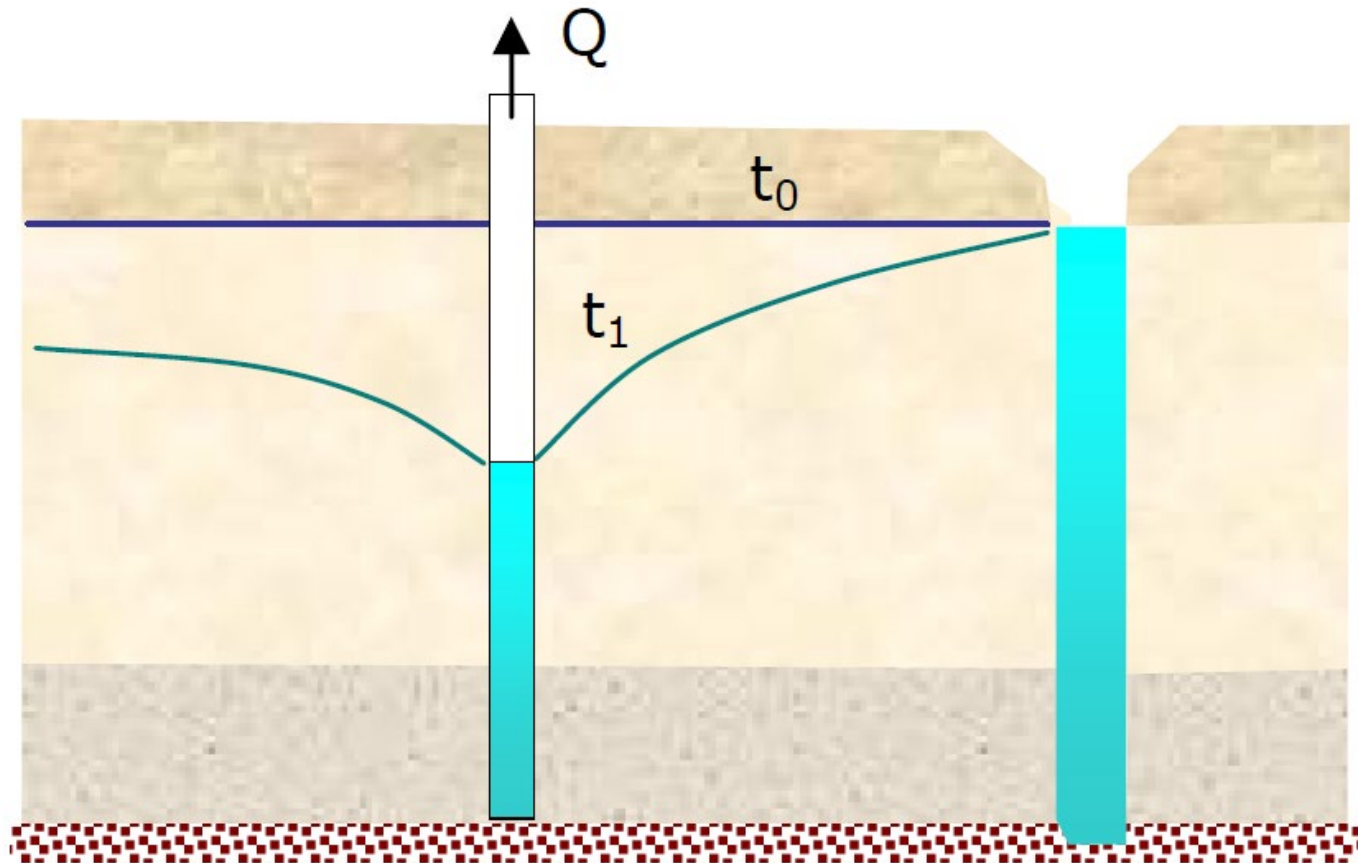


No-flow Boundary Solution

- Place an image well with exactly the same parameter set the same distance away from the boundary feature
- Apply the superposition principle

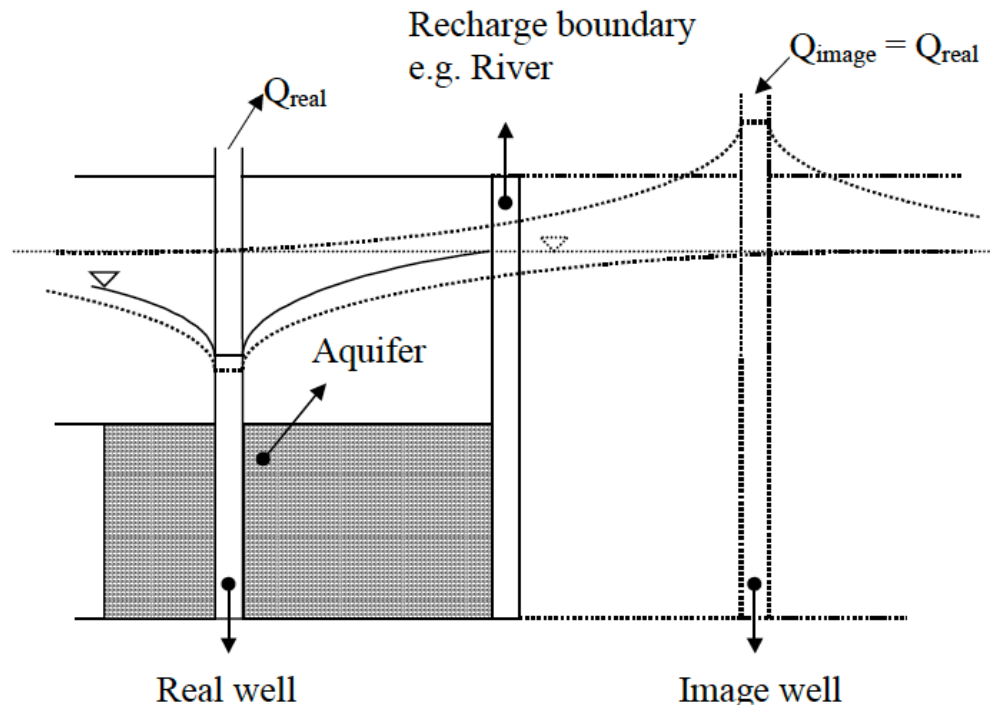


Fixed-head Boundary



Fixed-head Boundary Solution

- Place an image well with exactly the same parameter set, but with opposite Q the same distance away from the boundary feature
- Apply the superposition principle



Distance to River/Sea

$$Area = \frac{Q}{R_e} \rightarrow L = \frac{Ti}{R_e}$$

