CONSTRUCTION OPERATIONS AND METHODS

DEWATERING & PUMPING

→Dewatering – Is the process of removing water from an excavation. The result is lowering of the ground water level, which involves pumping the water away from a given location.
**Note: changing the water table may cause settlement in other area, so be aware.

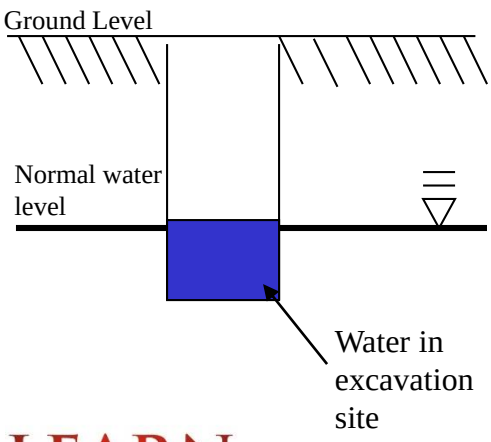
→ The question on the PE Exam for this will probably be related to cost estimating, quality take off, or just a knowledge questions dealing with this topic. They will not ask you to design or space out the wells.

→The selection of the dewatering method used depends mostly on the soil permeability, which is the ease of water flow through a soil. The soil permeability is a function of grain size.

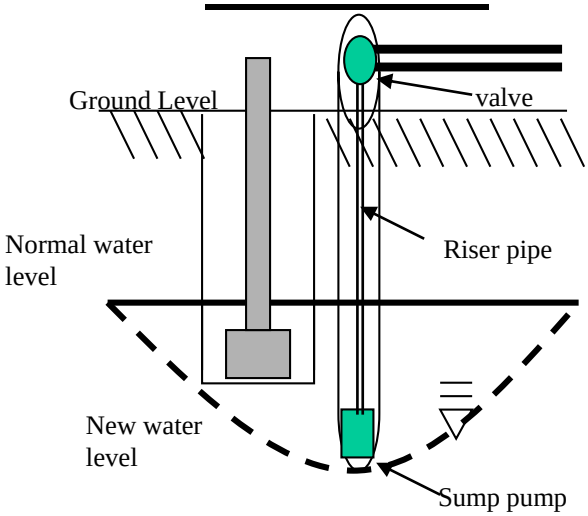
→The appropriate dewatering methods are;

Effective Grain Size (D_{10})	Dewatering Method
> .1mm (no. 150 sieve)	Sumps or Well points
.1mm - .004 mm	Vacuum Wells
.004mm - .0017 mm	Electro osmosis

The problem



The solution

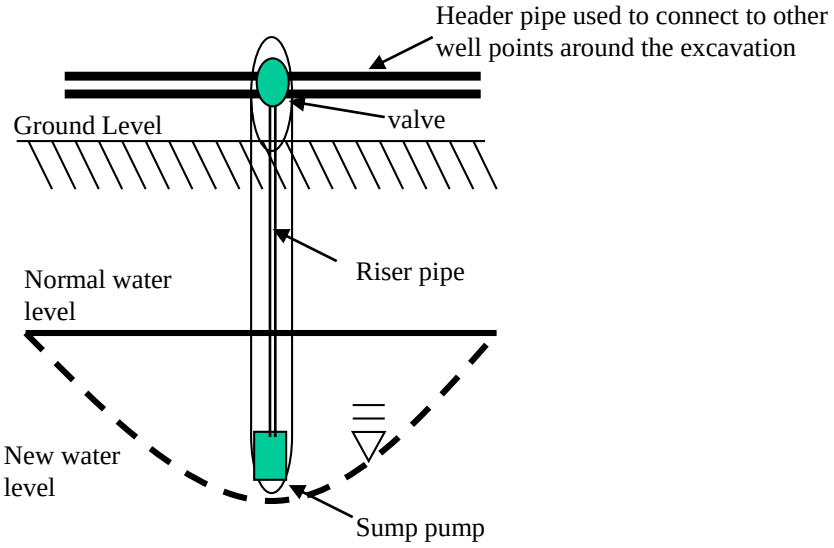


WELL POINT METHOD

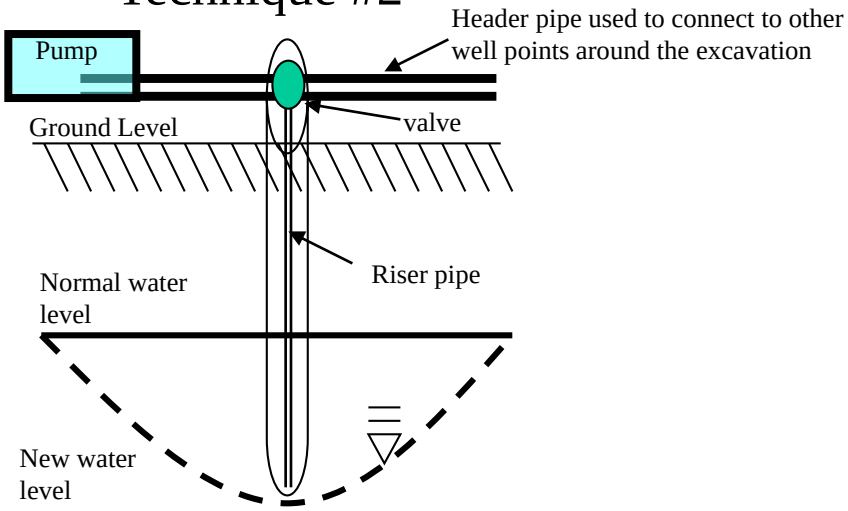
Key Facts:

- → In practice usually max effective dewatering depth is about 20 ft below ground surface.
- → Well points typical spaced 2-10 ft apart around the excavation
- → Yield flow is between 3 to 30 gal/min per well point

Technique #1



Technique #2



VACUUM WELLS

Key Facts:

- → This type is just wellpoints that are sealed at the surface at the well casing with bentonite or clay in order from the pump to get better suction.
- → In fine-grained soils, a sand filter should be used around the well point and the riser pipe

ELECTRO OSMOSIS WELLS

Key Facts:

→This method is the process of accelerating the flow of water through a soil by using direct current.

→Usually space wells at intervals of about 35 ft – then drive grounding rods between the wells. Attach a negative terminal of DC voltage at each well and the positive terminal on each grounding rod.

→A voltage of 1.5 to 4 Volts per foot between the well and ground rod is then applied. This will increase the flow of water to the well.

→The applied voltage should not exceed 12 V/ft. The typical current requirements are 15 – 30 Amps per well. Which is a power demand of .5 – 2.5KW per well

→Studies have proven this method to be extremely effective for increasing water flow through fine soil(Clay).