Geological Engineering 420

Hydrogeology for Engineers

Fall Semester 2020

Due October 20th

**Lab 8: Slug Tests**

During lab we conducted slug tests on wells located at Miles Crossing near Ramsay. For this lab you will need to use the data from the well you tested and determine the hydraulic conductivity of the aquifer surrounding the well.

**Problem 1:** Plot the time vs. water level data that shows all of the slug tests performed on your well (both X and Y axes should be linear scale). This is different than the graphs you need to calculate the hydraulic conductivity. Instead, this is just time and water level from the pressure transducer. You need to show it, and explain which dataset appears to be cleanest for determining the hydraulic conductivity. (Normally, you would use all slug tests and calculate multiple K values, but you only need to use data from one of your slug tests). Be sure to cut out all the data that is before and after putting the transducer in the well.

**Problem 2:** Pick the best dataset showing the cleanest water draw up or draw down, and use the Hvorslev method to determine the hydraulic conductivity of the well you tested. The following information is needed. The length of the well screen and gravel pack together is 6 ft (Le). The well radius (r) 1 inch. The borehole diameter(R) is 4.125 inches. Be sure to include a graph showing the straight line fit and appropriate t37 pick for both datasets you chose.

**Problem 3**: Using the same dataset as problem 2, use the Bouwer and Rice slug-test method to determine hydraulic conductivity. The following is needed. Radius of well casing (rc) is 1 inch, radius of gravel envelope (R) is 4.125 inch, the length of screen is 6 ft. Also assume that the wells are drilled to the impermeable clay layer below the aquifer (i.e. h = Lw). You will need to use the total depth of the well and the depth to water table (amount in the water column) to determine the value of h (see figure 5.24 in the text).