

McDonald Valley Calibration Exercise -- Stage 3

MODIFIED CALIBRATION USING ADDITIONAL DATA

Now that you have made a first attempt at calibrating a flow model to existing data, you have the opportunity to collect additional data in the field to help fill in the gaps in information and, we hope, improve your model of the groundwater system. After subtracting essential overhead expenses, you have a field work budget of \$20,000 for the total duration of the study. You will have three "field seasons" in which you can collect new data. You should use the three field seasons to iterate back and forth between data collection and analysis, analyzing the impact of one season's data to plan the next round of data collection.

You have the option to collect the following types of data:

1. drill wells

shallow wells -- down to a maximum elevation of -100 feet. Shallow wells provide water levels for the screened interval as well as the location of the water table. You specify the bottom elevation of the well. All wells are assumed to be screened in the lower 5 feet. Each well comes with a driller's log that includes information on major lithology changes with depth.

deep wells -- deep wells are guaranteed to reach bedrock. Water level information, screened intervals, and well log information are the same as described for shallow wells.

2. hydraulic tests

slug tests -- these tests give local values of horizontal hydraulic conductivity. You can conduct up to 7 slug tests on any of the 17 pre-existing wells and any number of slug tests on the wells that you choose to drill.

aquifer test -- this is a large-scale hydraulic test that must be conducted on a deep well. Since deep wells are always screened in the lower 5 feet, this test will give you horizontal conductivity and aquifer thickness. It will also provide a leakance coefficient if the well penetrates a confining clay layer. You cannot conduct an aquifer test on any of the original 17 wells, nor can you drill new wells in cells that already contain a well.

3. seismic analysis

Seismic sections can be run along any row or column. Each run must be the full length of a column or a row. Seismic analyses only provide information on the bedrock elevation. (Please, no arguments from surface geophysicists!)

4. Stream flow measurements

Discharge measurements are provided at several points along the Straight River.

In order to keep track of your expenditures, an accounting form has been provided. The back page is a table of costs for each data item.

Field Data Options
Table of Costs

Well drilled by district auger rig.....	\$ 1,000
(bottom elevation -100 feet)	
Well drilled by contract driller.....	\$ 3,000
(guaranteed to reach bedrock)	
Slug test	\$ 250
(limit of 7 slug tests on initial 17 wells)	
Aquifer test	\$ 4,000
(test must be on a new well drilled to bedrock)	
(cost includes drilling of new well to bedrock)	
Seismic Sections (N-S or W-E)	\$ 2,000
(seismic section provide bedrock elevation only)	
Stream Flow Measurements (seepage run)	\$ 500

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CALIBRATION EXERCISE DATA SUMMARY FORM

Group Number _____

Initial project budget = 200,000

Overhead charges = 180,000

Initial working field budget = 20,000

Funds used for request 1 =

Funds remaining after request number 1 =

Funds used for request 2 =

Funds remaining after request number 2 =

Funds used for request 3 =

Funds remaining after request number 3 =

Wells					Costs			R#
Well Number	Location							
	row	column	bottom		Drilling	Slug Test	Aquifer Test	
1	3	18	-200.74 (D)					
2	4	11	-100.00					
3	7	21	-100.00					
4	13	23	-100.00					
5	15	12	-224.62 (D)					
6	17	19	-100.00					
7	18	2	-100.00					
8	19	7	-100.00					
9	20	12	-100.00					
10	19	23	-100.00					
11	27	6	-100.00					
12	28	12	-100.00					
13	29	24	-100.00					
14	31	7	-100.00					
15	34	15	-233.22 (D)					
16	37	2	-100.00					
17	38	23	-100.00					
18								
19								
20								
21								
22								
23								
24								
25								

Wells							
Well Number	Location			Costs			R#
	row	column	bottom	Drilling	Slug Test	Aquifer Test	
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
Total Costs for Request 1							
Total Costs for Request 2							
Total Costs for Request 3							

Seismic Sections

row	column	cost	R #
Total Cost for Request 1			
Total Cost for Request 2			
Total Cost for Request 3			

Stream Flow Measurements

request #	cost