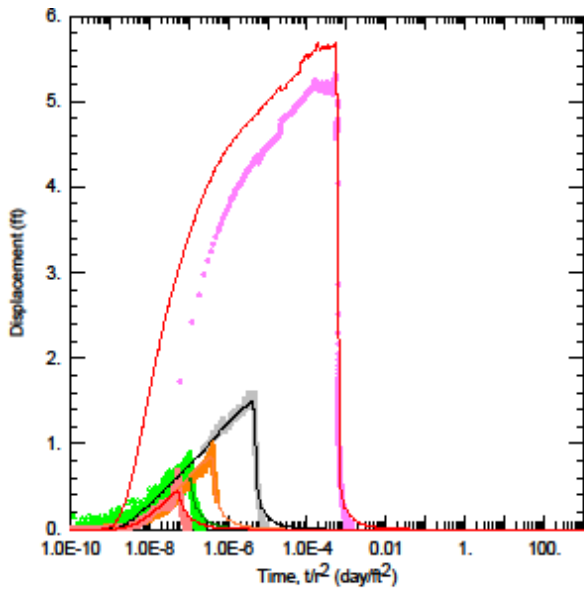


MBMG RI 32

Appendix B. Aquifer Test Results from All Recorded Tests in the Valley

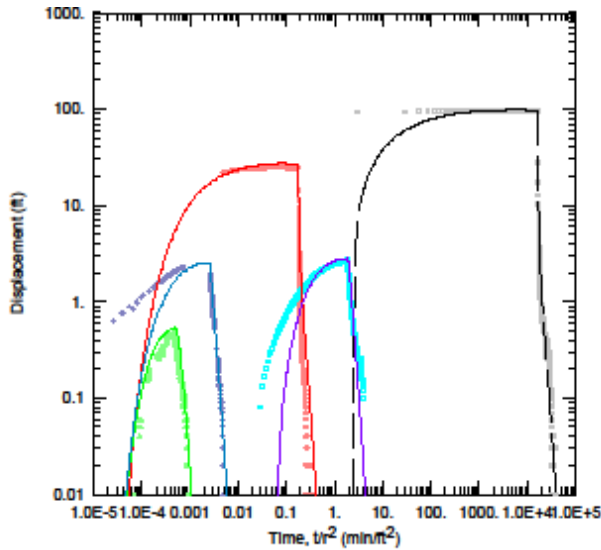
Appendix B. Aquifer test results from all recorded tests in the valley

GWIC ID	Site Name	Location								Results					References	
		Latitude	Longitude	T_R_S	Aquifer	Total Depth (ft)	Water Level (ft bgs)	SWL Source	Depth Water Enters (ft bgs)	Transmissivity (ft ² /d)	Storativity	Test Discharge (gpm)	Test Drawdown (ft)	Test Duration (h)	Source of Information	Referenced Source
269834	Cross, K. Gordon	48.352957	-114.262955	30-21-22	Deep alluvial aquifer	602	42	GWIC	440	1,686	9.0E-03	680	75	18	76LJ 30066293	A. Foinagy, DNRC
271524	Kalispell Regional Healthcare	48.213960	-114.325258	28-21-6	Deep alluvial aquifer	400	165	GWIC	310	2,379	1.7E-03	925	80	18	76LJ 30065861	A. Foinagy, DNRC
287423	Whitefish Partners	48.375187	-114.318577	30-21-8	Deep alluvial aquifer	237	68	GWIC	125	4.0E-03				24	76LJ 30011160	A. Foinagy, DNRC
702927	Fairview Cemetery	48.2672	-114.1827	29-20-20	Deep alluvial aquifer	142	48	GWIC	142	110						Konizeski and others, 1968
702928	E Fagerland	48.2275	-114.2561	29-20-20	Deep alluvial aquifer	100				510		50	38	1		Konizeski and others, 1968
890685	EVANS FARMS	48.2545	-114.1902	29-20-29	Deep alluvial aquifer	690	31	GWIC	591	17300	0.0E+00					Shapley, 1990, LaFave and others, 2004
	Stone Ridge Subdivision Well 1 (approx location)	48.19	-114.36	28-22-14	Deep alluvial aquifer	194	62		173	102		150	97	24	76LJ 30006144	A. Foinagy, DNRC
	Flathead Utility Company	48.195157	-114.348282		Deep alluvial aquifer	196	101			5,300	1.0E-03				76LJ 30011142	
	Monk, Ladona	48.190276	-114.391379		Deep alluvial aquifer	199	78			475	1.2E-04				76LJ 30063181	
	PWS #2 (south)	48.21700	-114.23500	28-21-2	Deep alluvial aquifer	220	54.06	WR Doc	208	2382	2.0E-04	98.1	115.3	8	Word Doc 76LJ 30046177	
	Howard Mann	48.14119	-114.09779	28-20-35	Deep alluvial aquifer	261	95.75	DNRC Permit	250	215.3	2.0E-03	123	50	8	76LJ 30007508	
	City of Whitefish Well test 1997	48.409705	-114.309933		Deep alluvial aquifer	322				14,258	2.0E-04					
	Montana State of Board of Land Commissioner	48.239451	-114.345396		Deep alluvial aquifer	396	137			21,550	4.6E-04				76LJ 30050378	
	Helena Sand and Gravel, Nupac_well_#2_jim_Lynch	48.25675	-114.35566	29-22-23	Deep alluvial aquifer	502	89	WR App	261	23,400	4.2E-04	800	12.9	24	76LJ 11705100	A. Foinagy, DNRC
	Helena Sand and Gravel, Nupac_well_#2_jim_Lynch	48.25675	-114.35566	29-22-23	Deep alluvial aquifer	502	89	WR App	261	23400	4.2E-04	800	12.9	24	76LJ 11705100, 76LJ 11705400	A. Foinagy, DNRC
	Four Seasons Nursery-Bob Fink	48.22544	-114.17267	28-20-5	Deep alluvial aquifer	512	32	Well Log in Appl.	309	8163		500	217	5.5	76LJ 111219 00	
	4CAVS LLC	48.22	-114.328	28-21-6	Deep alluvial aquifer					30,800				24	76LJ 30044584	
	Land and Water (2002) LP well	48.373667	-114.203838		Deep alluvial aquifer					21,559	6.0E-05					
260889	Big Fork Water and Sewer land farm well BFF-3	48.103523	-114.182073	27-20-18	Lacustrine-till aquitard	365	12.7	Test 5/17/11	355	0.1				85	GWIP Aquifer test report	This report
81053	STEWART & JANES CON.	48.06953	-114.25007	27-21-27	Bedrock aquifer	932	613	GWIC	302.6	13480	9.0E-05	120	182	12	76K 30044582	
164702	THE RANCH HOMEOWNERS ASSOCIATION - WELL 2 (south)	48.05080	-114.06110	26-19-6	Bedrock aquifer	424	323	GWIC	404	1489	4.4E-04	55	6.9	24	76LJ 30025436	
180724	Iron Horse Well #2	48.45147	-114.33747	31-22-13	Bedrock aquifer	307	89	GWIC	183	1672-3782	8.7E-03	350	29.2	24	76LJ 114097	
214637	HIDDEN HILLS HOA	48.45155	-114.35357	31-22-14	Bedrock aquifer	422	18.5	GWIC	379	123.5		50	65	166	76LJ 30046499	
236930	WEST RIDGE HOMEOWNERS_ASS	48.0701	-114.2476	27-21-27	Bedrock aquifer	720	465	GWIC	700	13,480	9.0E-05				76K 30044582	
242158	BUFFALO MOUNTAIN LLC	48.16806	-114.38801	28-22-22	Bedrock aquifer	900	264.5	ADDENDUM TO PERMIT APPL.	532	29.3		60	223.34	24	76LJ 30025385	
242162	BUFFALO MOUNTAIN LLC	48.17177	-114.38530	28-22-22	Bedrock aquifer	564	117	ADDENDUM TO PERMIT APPL.	384	119.4		120	253.82	24	76LJ 30025385	
242162	BUFFALO MOUNTAIN LLC	48.17177	-114.38530	28-22-22	Bedrock aquifer	564	117	ADDENDUM TO PERMIT APPL.	384	119.4		80	210	72	76LJ 30025385	
254822	IRON HORSE GOLF CLUB PWS-3	48.45237	-114.33882	31-22-13	Bedrock aquifer	725	123	GWIC	380	629.2	0.0001366 ^e	256	60.76	72	Iron Horse Application for Water Right	
	THE RANCH HOMEOWNERS ASSOCIATION - WELL 1 (north)	48.05000	-114.06000	26-19-6	Bedrock aquifer	497	175	WR Crit Adend	438	1737		15	1.31	24	76LJ 30025436	
Definitions:																
Water level is either the aquifer-test reported static water level at the beginning of the test (Test) or, if that was not available, it is from the original driller's log in GWIC (GWIC) or monitoring data (e-tape).																
Well-specific capacity-based transmissivity was estimated for some wells following the method presented in Lohman, 1979.																
Original source of information refers to an aquifer test report, a water rights application, or the technical report from the project that performed the test.																
Referenced sources are reports that presented test results and in some cases are the only known reference to the test.																
References:																
Corbett, M.K., 1994, Groundwater monitoring in the Meadow Lake golf course, Columbia Falls, Montana: Montana Department of Natural Resources and Conservation, unpublished report, 127 p.																
A. Foinagy, DNRC, oral communications from staff at the Water Resources Division, retrievals they made from files.																
Konizeski, R.L., Brietkrietz, A., and McMurtrey, R.G., 1968, Geology and ground water resources of the Kalispell Valley, northwestern Montana: Montana Bureau of Mines and Geology Bulletin 68, 42 p., 5 sheets.																
Lohman, S.W., 1979, Ground-Water Hydraulics: U.S. Geological Survey Professional Paper 708, 70 p., 9 sheets.																
Morrison-Maierle, 1994, Consulting report, personal communication.																
Shapley, M.D., 1990, Analysis of Evans Farm's aquifer test east Flathead Valley: Helena, MT, Montana Department of Natural Resources and Conservation, unpublished report, 26 p.																
Spratt, 1983, RLK Hydro, Consulting report.																
Notes:																
All aquifer test interpretations that were publicly available are included here. These include consultant tests, DNRC tests, and scientific agency tests. The MBMG has made no additional interpretation to ensure the accuracy of interpretations. These are the values being used in the valley, and are consolidated here as a convenience and service.																



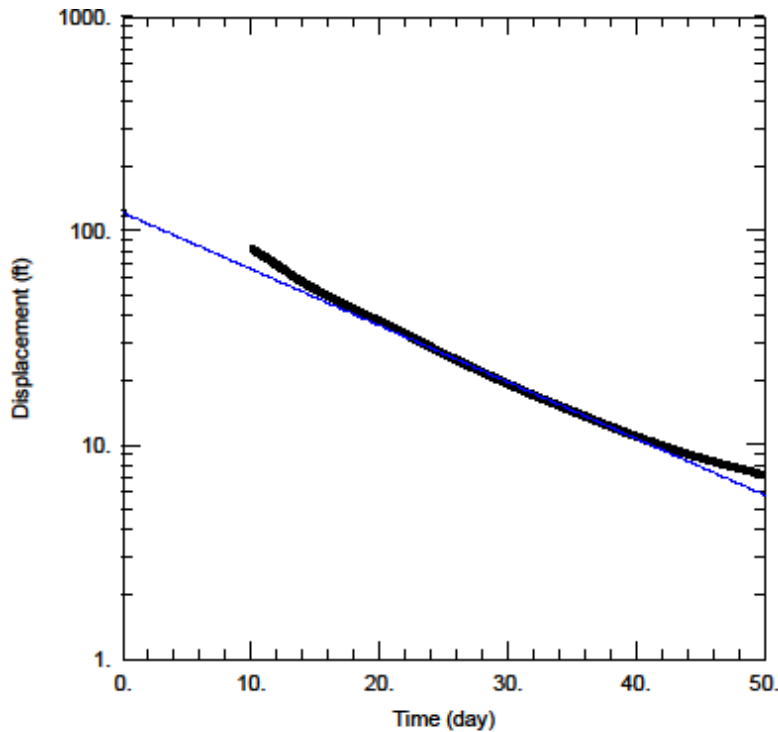
BIG FORK FARM AQUIFER TEST					
Data Set: <u>M:_HOWs_This.agt</u>			Time: <u>11:37:58</u>		
Date: <u>04/16/15</u>					
PROJECT INFORMATION					
Company: <u>MBMG</u>					
Client: <u>BFF CR Test</u>					
Project: <u>BWIPKL</u>					
Location: <u>Flathead Valley</u>					
Test Well: <u>BFF-01</u>					
Test Date: <u>6/7/2011</u>					
WELL DATA					
Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
BFF-01	0	0	BFF-02	108	0
			Boon	-322	1158
			Broston	-3197	-7281
			NSD	1188	3823
			Brevick	-10808	3870
SOLUTION					
Aquifer Model: <u>Confined</u>			Solution Method: <u>This</u>		
T = <u>3.5E+4 ft²/day</u>			S = <u>0.00052</u>		
Kz/Ki = <u>1</u>			b = <u>2125 ft</u>		

Figure B-1. AqTesolv curves and interpretation for the deep alluvial aquifer at well 260892.



KEN SMITH AQUIFER TEST					
Data Set: M:\1..Smith Thels varied rate Swells_2.aqt					
Date: 05/14/15			Time: 13:46:51		
PROJECT INFORMATION					
Company: MBMG					
Client: BWIPKL					
Project: Flathead					
Location: Ken Smith					
Test Well: KS					
Test Date: 9/28/11					
AQUIFER DATA					
Saturated Thickness: 2483.6 ft			Anisotropy Ratio (Kz/Kr): 0.025		
Aquitard Thickness (b'): 300. ft			Aquitard Thickness (b''): 1. ft		
WELL DATA					
Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
KS	0	0	KS	0	0
			KS3	-128	7
			Arint	-723	-2387
			School	-1050	199
			KS1	-35	-19
SOLUTION					
Aquifer Model: Leaky			Solution Method: Hantush-Jacob		
T = 1.7E+4 ft ² /day			S = 0.007584		
1/B = 0.0007454 ft ⁻¹			Sw = -4.203		
C = 0. min ² /m ⁵			P = 2.		
Step Test Model: Jacob-Rorabaugh			s(t) = 0.325Q + 0.Q ²		
Time (t) = 1. min Rate (Q) in cu. ft/min			W.E. = 117.4% (Q from last step)		

Figure B-2. AqTesolv curves and interpretation for the deep alluvial aquifer at well 82279.



<u>RECOVERY FROM PUMPING CONFINING LAYER</u>	
Data Set: <u>M:\...\BFF-03_recovery - y0=121pt45.aqt</u>	Time: <u>08:58:31</u>
Date: <u>04/09/15</u>	
<u>PROJECT INFORMATION</u>	
Company: <u>MBMG</u>	
Client: <u>BWIPKL</u>	
Location: <u>Big Fork Farm</u>	
Test Well: <u>BFF-03</u>	
Test Date: <u>5/17/2011</u>	
<u>AQUIFER DATA</u>	
Saturated Thickness: <u>300</u> ft	Anisotropy Ratio (Kz/Kr): <u>1</u>
<u>WELL DATA (BFF-03)</u>	
Initial Displacement: <u>121.5</u> ft	Static Water Column Height: <u>359.4</u> ft
Total Well Penetration Depth: <u>290</u> ft	Screen Length: <u>10</u> ft
Casing Radius: <u>0.25</u> ft	Well Radius: <u>0.25</u> ft
<u>SOLUTION</u>	
Aquifer Model: <u>Confined</u>	Solution Method: <u>Hvorslev</u>
K = <u>0.0007</u> ft/day	y0 = <u>121.5</u> ft

Figure B-3. AqTesolv curves and solution for the lacustrine-till aquitard at well 260889.