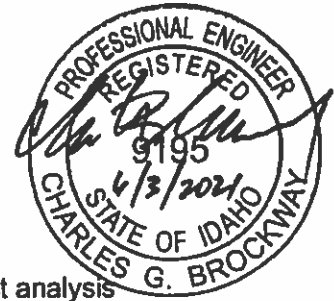




# Technical Memo

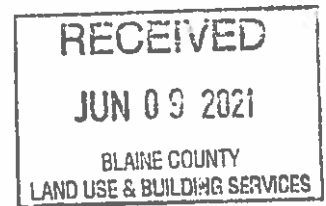
To: Blaine County Planning & Zoning  
From: Charles G. Brockway, P.E.  
Cc:  
Date: June 3, 2021  
Re: Lateral 75 Ranch domestic well aquifer impact analysis



This memo presents the results of a groundwater modeling study to estimate the drawdown in the aquifer due to domestic wells proposed for the Lateral 75 subdivision. The average monthly depletion arising from the 24 wells has been described in a memo dated May 10, 2021 and is shown in Table 1. In this table, the monthly depletion per well is expressed in terms of gallons per minute for modeling purposes. These depletions assume irrigation of 0.5 acres from each well for an entire season.

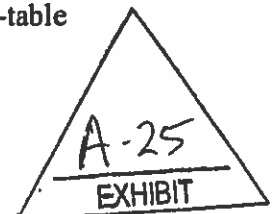
Table 1. Monthly depletion.

Month	Depletion (ac-ft)	Average monthly depletion:	
		Total (gpm)	Per well (gpm)
April	0.28	2.1	0.09
May	1.95	14.3	0.59
June	4.31	32.5	1.35
July	5.71	41.7	1.74
August	4.54	33.1	1.38
September	2.41	18.2	0.76
October	0.24	1.8	0.07



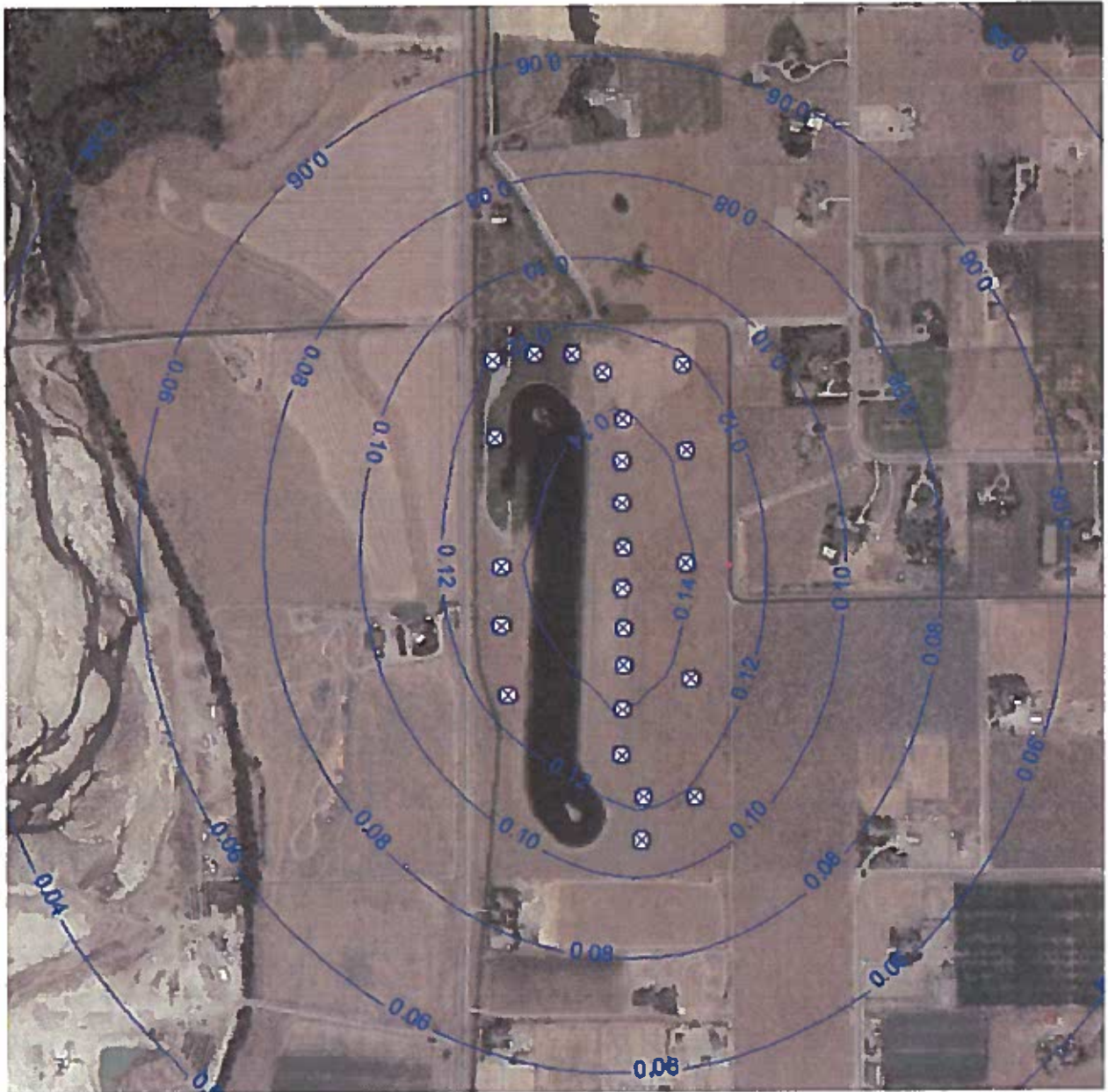
The groundwater model Winflow was utilized to simulate the effects of the well depletion. This model is an often-used analytical model that implements the Theis equations for complex situations such as multiple wells.

The hydraulic characteristics of the aquifer were based on a review of 20 domestic wells within 0.25 miles of the project boundary, as well as the calibrated Big Wood River groundwater model maintained by IDWR. For the nine model cells closest to the project site, the average hydraulic conductivity in the upper sand and gravel zone is 133 ft/day, which is right in line with typical values for sand and gravel aquifers. The surrounding domestic wells are not completed in the uppermost zone but penetrate to the lower sand and gravel. The average depth of the 20 wells is 141 feet, with bedrock depth at least 168 feet. The domestic wells on the project will be constructed similarly; therefore, the entire saturated depth was used to estimate drawdown in the aquifer. The average saturated thickness is 100 feet between the top of the saturated zone and bedrock is assumed to be at 170 feet. The transmissivity is therefore  $133 \text{ ft/day} \times 100 \text{ feet} = 13,300 \text{ ft}^2/\text{day}$ . Storativity was assumed to be 0.15, a normal value for alluvial water-table aquifers

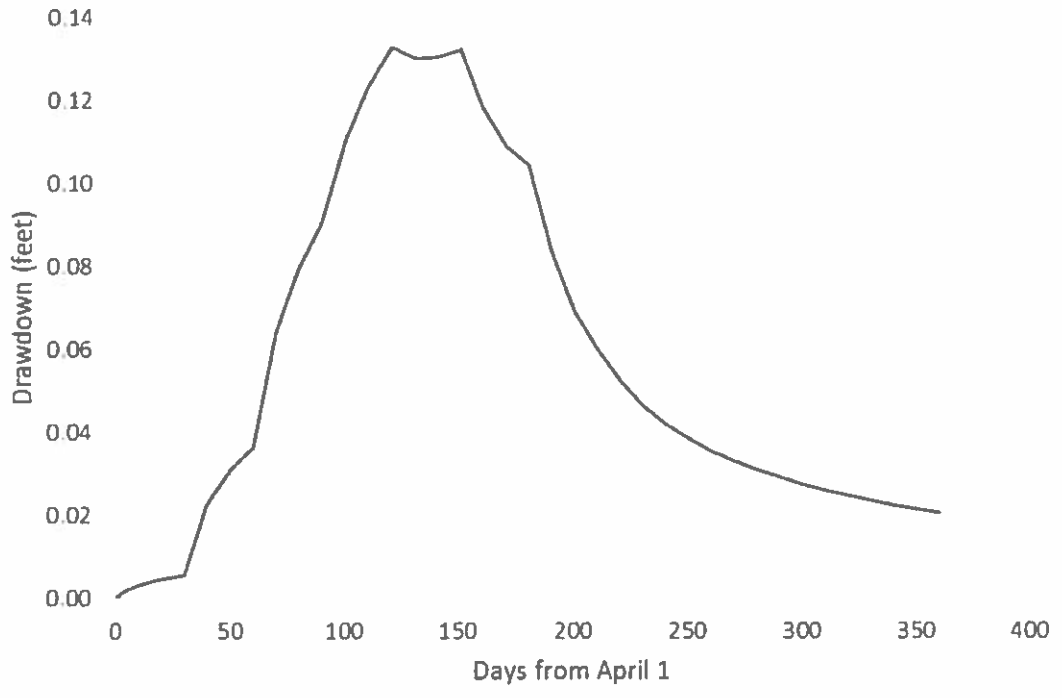


The drawdown in the aquifer will vary seasonally in accordance with the monthly depletion, with the maximum drawdown occurring at the end of August (Figure 1). The temporal pattern of drawdown is shown in Figure 2 for a location near the midpoint of the east property boundary (the maximum drawdown point).

The maximum seasonal drawdown at the east property boundary is 0.13 feet or 1.5 inches. The average drawdown at the east property boundary during the irrigation season is 0.068 feet or less than 1 inch. These drawdowns will not affect the operation of any well.



**Figure 1. Maximum seasonal modeled drawdown in feet due to depletion from the 24 domestic wells irrigating 0.5 acre per lot. The maximum drawdown occurs at the end of August.**



**Figure 2. Seasonal modeled drawdown at the maximum-drawdown point near the midpoint of the east property boundary.**

