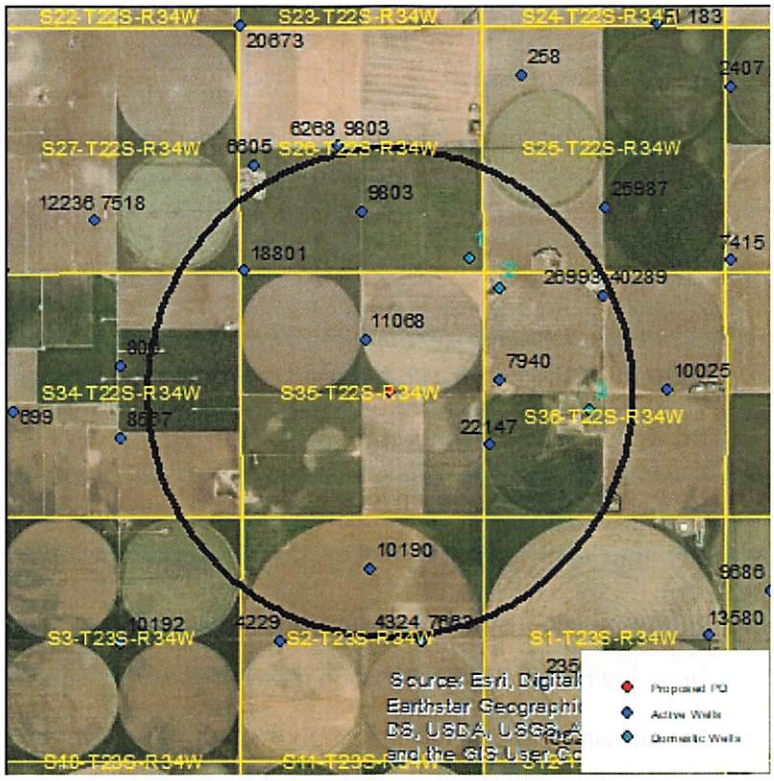
Evaluation of proposed move for Water Right No. 11068

Proposed: Move water right no. 11068 to a new well location 1,257 ft to the southeast.



Wells within 1 mile: 18801, 9803, 7940, 22147, 26993 & 40298, 10190, and three domestic wells, numbered on the above map.

The saturated thickness at the proposed well location is estimated to be 101 ft, based upon an observation well in section 26-22-34 and local driller's logs. Saturated thickness of neighboring wells ranges from 61 ft to 135 ft. For saturated thickness between 50 and 75 ft, the drawdown allowance is 1.5 ft. For saturated thickness between 100 and 125 ft, the drawdown allowance is 2.5 ft. For saturated thickness between 125 ft and 150 ft, the drawdown allowance is 3.0 ft.

50 year Theis Analysis: The following values were used to run the analysis:

S = 0.2327, T = 2440.9 ft^2/day, $tp_{current}$ = 136 days, $Q_{current}$ = 268 gpm, $tp_{proposed}$ = 59 days, $Q_{proposed}$ = 1325 gpm

Theis drawdowns were calculated as follows:

18801: Saturated thickness = 101 ft (no well log available)

Drawdown from current location = 2.49 ft

Drawdown from proposed location = 4.43 ft

Net drawdown = **1.9 ft**

9803:	Saturated Thickness = 101 ft (no well log available)
	Drawdown from current location = 2.63 ft
	Drawdown from proposed location = 4.55 ft
	Net drawdown = **1.9 ft**
7940:	Saturated Thickness = 478 ft (well is screened in both Ogallala and Dakota aqfs)
	Drawdown from current location = 2.48 ft
	Drawdown from proposed location = 6.20 ft
	Net drawdown = **3.7 ft**
22147:	Saturated Thickness = 106 ft (based on driller's log)
	Drawdown from current location = 2.26 ft
	Drawdown from proposed location = 6.14 ft
	Net drawdown = **3.9 ft**
26993 & 40298:	Saturated Thickness = 106 ft (based on driller's log)
	Drawdown from current location = 1.75 ft
	Drawdown from proposed location = 3.85ft
	Net drawdown = **2.1 ft**
10190:	Saturated Thickness = 135 ft (based on driller's log)
	Drawdown from current location = 1.83 ft
	Drawdown from proposed location = 4.64 ft
	Net drawdown = **2.8 ft**
Domestic 1:	Saturated Thickness = 64 ft
	Drawdown from current location = 2.57 ft
	Drawdown from proposed location = 4.98 ft
	Net drawdown = **2.4 ft**
Domestic 2:	Saturated Thickness = 61 ft
	Drawdown from current location = 2.45 ft
	Drawdown from proposed location = 5.07 ft
	Net drawdown = **2.6 ft**

Domestic 3: Saturated Thickness = 61 ft

Drawdown from current location = 1.79 ft

Drawdown from proposed location = 4.27 ft

Net drawdown = **2.5 ft**

Net drawdown exceeds the drawdown allowance for water right number 22147 and all three domestic wells. Critical well analysis was performed for those wells.

Critical Well Evaluation:

22147:

Water Column = 106 ft

DP = 3.9 ft (Net drawdown from the proposal indicated above)

DE = 32 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 45.6 ft (S = 0.2271, T = 28,188 gpd/ft, Q = 521 gpm, tp = 94 days, efficiency = 70%)

DT = 81.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 106 ft = 42.4 ft

Physical Drawdown Constraint (PDC) = 106 ft – 60 ft = 46 ft

Total drawdown of 81.5 ft is greater than the EDC and PDC, so this well **is critical.**

Domestic 1:

Water Column = 64 ft

DP = 2.4 ft (Net drawdown from the proposal indicated above)

DE = 32 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 34.4 ft

Economic Drawdown Constraint (EDC) = 0.4 * 64 ft = 25.6 ft

Physical Drawdown Constraint (PDC) = 64 ft – 20 ft = 44 ft

Total drawdown of 34.4 ft is greater than the EDC, so this well **is critical.**

*Note that the GMD3 model showed significantly less water available in section 26-22-34 than the well log indicated, so nearby section 36-22-34 was used to project water level decline over the next 25 years.

Domestic 2:

Water Column = 61 ft

DP = 2.6 ft (Net drawdown from the proposal indicated above)

DE = 32 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 34.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 61 ft = 24.4 ft

Physical Drawdown Constraint (PDC) = 61 ft – 20 ft = 41 ft

Total drawdown of 34.6 ft is greater than the EDC, so this well **is critical.**

Domestic 3:

Water Column = 61 ft

DP = 2.5 ft (Net drawdown from the proposal indicated above)

DE = 32 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 34.5 ft

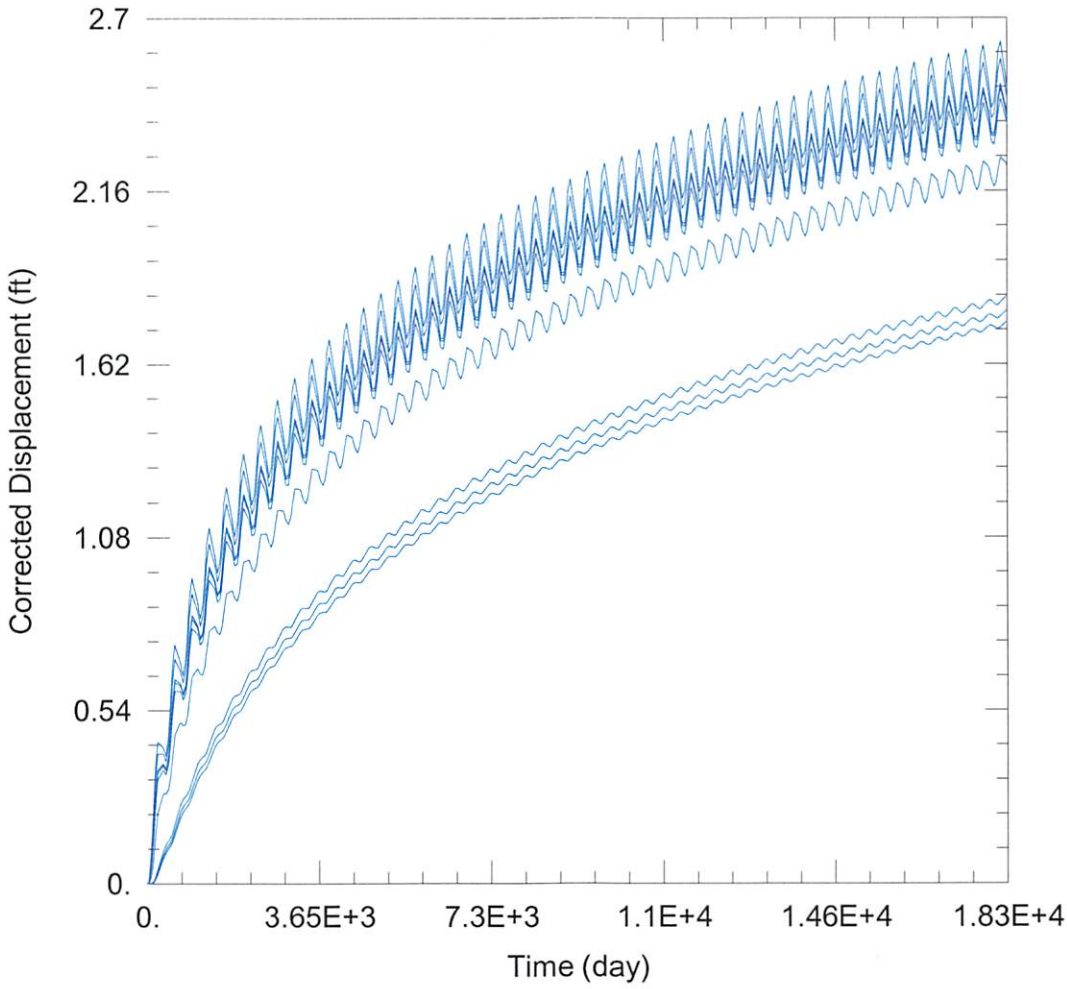
Economic Drawdown Constraint (EDC) = 0.4 * 61 ft = 24.4 ft

Physical Drawdown Constraint (PDC) = 61 ft – 20 ft = 41 ft

Total drawdown of 34.5 ft is greater than the EDC, so this well **is critical.**

Conclusion:

The proposed move is in an area with depleted saturated thickness. Nearby wells are expected to lose productivity as water levels continue to decline in the coming years. If the proposed well were to operate at its proposed rate and quantity, it is likely to create noticeable effects on nearby wells that are already losing productivity. Our analysis shows that these neighboring wells are critical because pumping season saturated thickness is projected to decline by more than 40% over the next 25 years. Well to well effects may be mitigated by limiting the allocation provided to the proposed well. Neighbors may contact GMD 3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901 to express any concerns they have. Otherwise, it is likely that the change will be approved as proposed.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\11068\11068 Current.aqt
Date: 01/05/22 Time: 16:16:28

PROJECT INFORMATION

Company: GMD 3
Project: 11068
Location: Finney County

WELL DATA

Pumping Wells

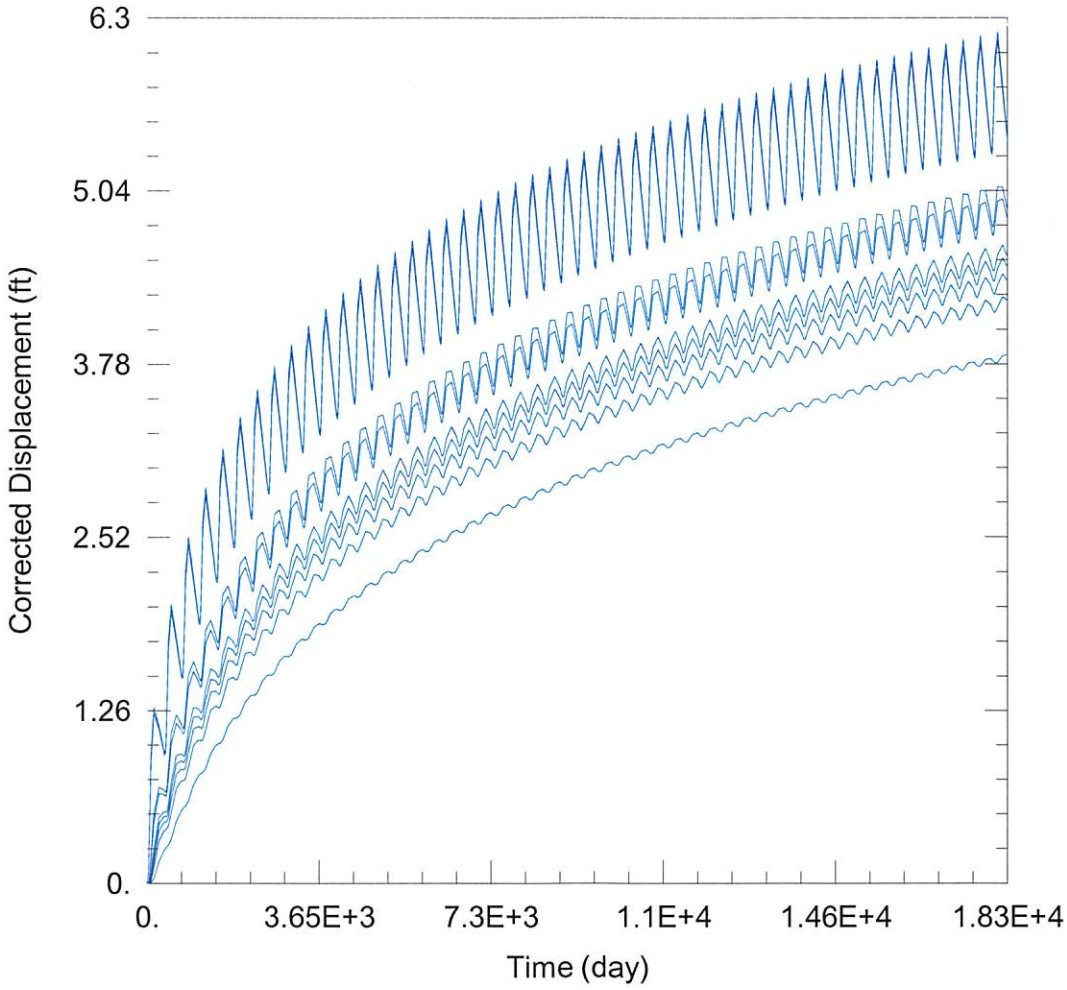
Well Name	X (ft)	Y (ft)
11068	-63499	446578

Observation Wells

Well Name	X (ft)	Y (ft)
▫	-63499	446578
▫ 18801	-66142	448070
▫ 9803	-63578	449353
▫ 7940	-60565	445708
▫ 22147	-60799	444288
▫ 26993 & 40298	-58317	447535
▫ 10190	-63395	441636
▫ Domestic 1	-61239	448362
▫ Domestic 2	-60575	447699
▫ Domestic 3	-58607	445055

SOLUTION

Aquifer Model: Unconfined Solution Method: Theis



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2022_moves\11068\11068 Proposed.aqt
Date: 01/05/22 Time: 16:16:20

PROJECT INFORMATION

Company: GMD 3
Project: 11068
Location: Finney County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
11068	-62963	445441

Observation Wells

Well Name	X (ft)	Y (ft)
▫	-62963	445441
▫ 18801	-66142	448070
▫ 9803	-63578	449353
▫ 7940	-60565	445708
▫ 22147	-60799	444288
▫ 26993 & 40298	-58317	447535
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SOLUTION

Aquifer Model: Unconfined Solution Method: Theis