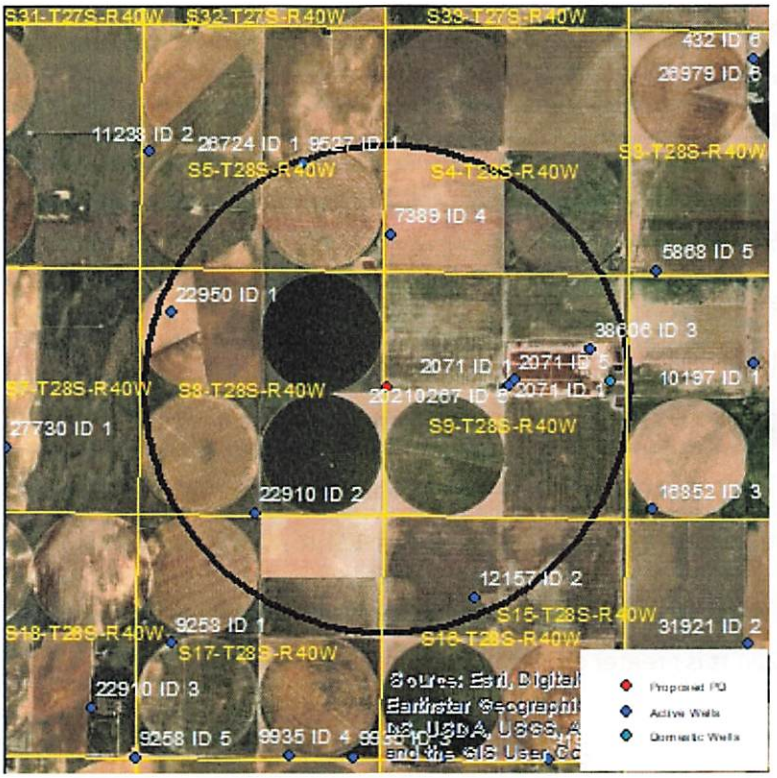
Evaluation of proposed move for Water Right No. 2071

Proposed: Move water right no. 2071 to a new well location, 2,600 ft to the southwest.



Wells within 1 mile: 9527 & 26724, 7389, 22950, 22910, 38606, 12157, and a domestic well in section 9-28-40.

The saturated thickness at the proposed well location is estimated to be 335 ft, based upon the driller's log and an observation well in section 8-28-40. This saturated thickness was used for all wells, though some wells may not be drilled that deep and there is some uncertainty as to the reasonableness of assuming they should. The saturated thickness at the domestic well is 64 ft, which was the value used for that well. For saturated thickness greater than 200 ft, the drawdown allowance is 4.0 ft.

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

S = 0.1473, T = 1,070 ft^2/day, $tp_{current}$ = 0 days, $Q_{current}$ = 0 gpm, $tp_{proposed}$ = 294 days, $Q_{proposed}$ = 385 gpm

Theis drawdowns were calculated as follows:

9527 & 26724:	Net drawdown = **10.9 ft**
7389:	Net drawdown = **14.8 ft**
22950:	Net drawdown = **11.3 ft**
22910:	Net drawdown = **13.3 ft**
38606:	Net drawdown = **12.1 ft**

12157: Net drawdown = **11.3 ft**

Domestic 9-28-40: Net drawdown = **11.4 ft**

Net drawdown exceeds the drawdown allowance for all wells within 1 mile of the proposed location. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

9527 & 26724:

Water Column = 335 ft

DP = 10.9 ft (Net drawdown from the proposal indicated above)

DE = 17.7 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 195.4 ft (S = 0.1473, T = 1070 ft^2/day, Q = 640 gpm, tp = 189 days, efficiency = 70%)

DT = 224 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 224 ft is greater than the EDC, so this well **is critical.**

7389:

Water Column = 335 ft

DP = 14.8 ft (Net drawdown from the proposal indicated above)

DE = 16.8 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 0 ft (well has not been operated in last ten years)

DT = 31.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 31.6 ft does not exceed the EDC or the PDC, so this well **is not critical.**

22950:

Water Column = 335 ft

DP = 11.3 ft (Net drawdown from the proposal indicated above)

DE = 12.6 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 42.3 ft (S = 0.1632, T = 911 ft^2/day, Q = 121 gpm, tp = 165 days, efficiency = 70%)

DT = 66.2 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 66.2 ft does not exceed the EDC or the PDC, so this well **is not critical.**

22910:

Water Column = 335 ft

DP = 13.3 ft (Net drawdown from the proposal indicated above)

DE = 12.6 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 72.7 ft (S = 0.1632, T = 911 ft^2/day, Q = 200 gpm, tp = 292 days, efficiency = 70%)

DT = 98.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 98.6 ft does not exceed the EDC or the PDC, so this well **is not critical.**

38606:

Water Column = 335 ft

DP = 12.1 ft (Net drawdown from the proposal indicated above)

DE = 13.3 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 3.4 ft (S = 0.184, T = 1357 ft^2/day, Q = 14.1 gpm, tp = 219 days, efficiency = 70%)

DT = 28.8 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 28.8 ft does not exceed the EDC or the PDC, so this well **is not critical.**

12157:

Water Column = 335 ft

DP = 11.3 ft (Net drawdown from the proposal indicated above)

DE = 14.2 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 0 ft (well has not been operated in last ten years)

DT = 25.5 ft

Economic Drawdown Constraint (EDC) = 0.4 * 335 ft = 134 ft

Physical Drawdown Constraint (PDC) = 335 ft – 60 ft = 275 ft

Total drawdown of 25.5 ft does not exceed the EDC or the PDC, so this well **is not critical.**

Domestic 9-28-40:

Water Column = 64 ft

DP = 11.4 ft (Net drawdown from the proposal indicated above)

DE = 13.3 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 24.7 ft

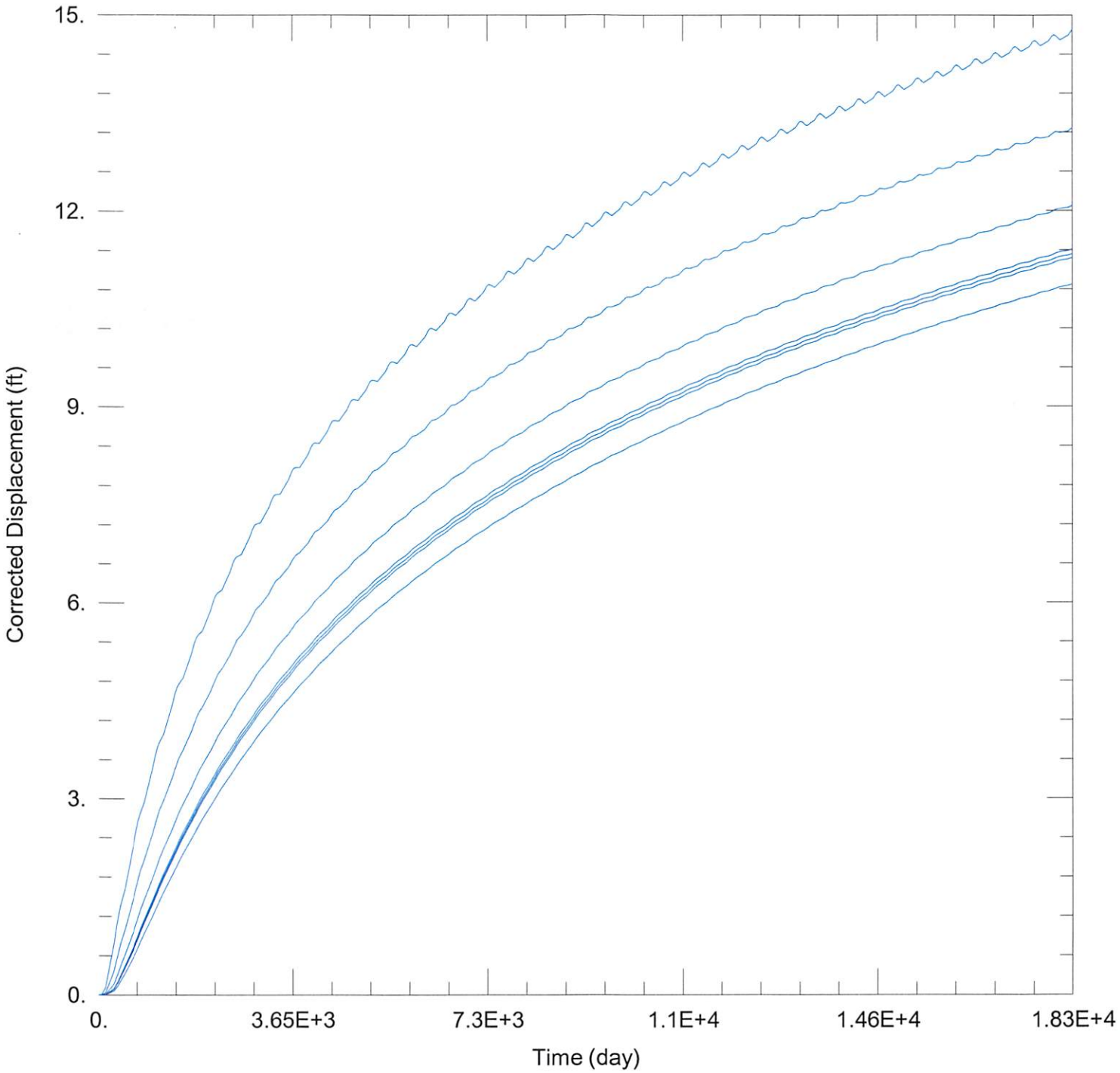
Economic Drawdown Constraint (EDC) = 0.4 * 64 ft = 25.6 ft

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

Total drawdown of 24.7 ft does not exceed the EDC or the PDC, so this well **is not critical.**

Conclusion:

The proposal is to drill a well to a depth of 622 ft. The GMD3 model does not provide information at those depths. The S and T values were calculated using typical values for geologic materials shown in the drillers log. The analysis showed that the well operated under water right nos. 9527 & 26724 is critical. This is largely due to the high average annual use at the well and the low likelihood of the aquifer being able to provide a similar quantity of water into the future. Note that the saturated thickness of 335 ft that was used for neighboring certified wells was based on the assumption that those landowners will drill deep wells to access all available water. The reasonableness of that assumption is uncertain. If the saturated thickness from the model were used, nearly all neighboring wells would be critical. It should also be noted that the well being moved provides no current effect due to not being operated in the last ten years. Concerned neighbors should contact GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901.



WELL TEST ANALYSIS

Data Set: C:\Users\trevora\Documents\2023_moves\2071\2071 proposed.aqt
Date: 05/22/23 Time: 14:03:47

PROJECT INFORMATION

Company: GMD 3
Project: 2071
Location: Stanton County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
2071	-263089	275572

Observation Wells

Well Name	X (ft)	Y (ft)
□	-263089	275572