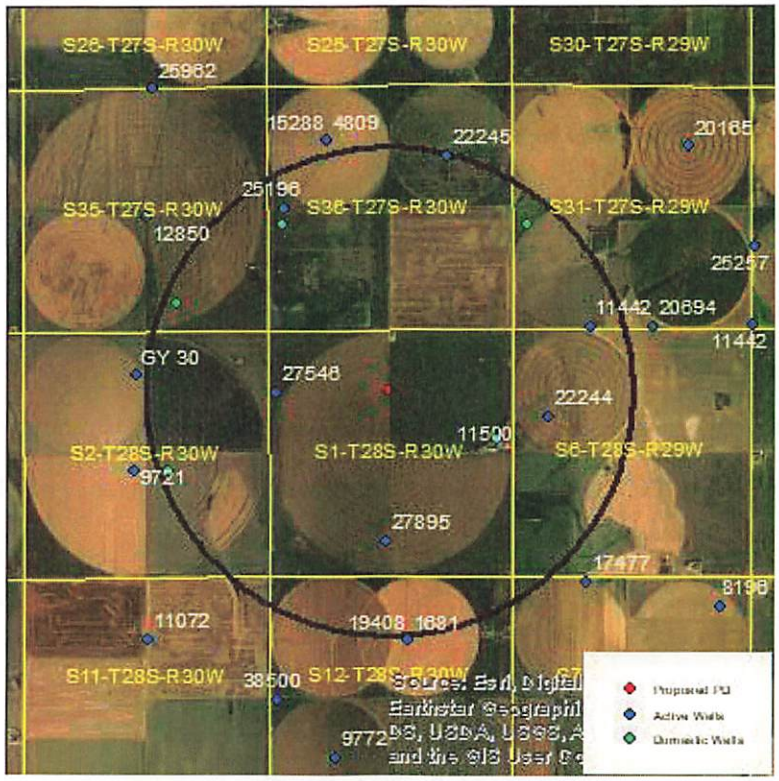
Evaluation of proposed move for Water Right No. 27546

Proposed: Move water right no. 27546 to a new well location, 2,456 ft to the east.



Wells within 1 mile: 25196, 11442, 27895, 11500, 22244, a domestic well in section 35-27-30, a domestic well in section 36-27-30, a domestic well in section 31-27-29, a domestic well in section 2-28-30, and a domestic well in section 1-28-30.

The saturated thickness at the proposed well location is estimated to be 133 ft, based upon the GMD3 model. For saturated thickness between than 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 = 0.1189, T = 2393 ft^2/day, $tp_{current}$ = 0 days, $Q_{current}$ = 0 gpm, $tp_{proposed}$ = 58 days, $Q_{proposed}$ = 840 gpm

Theis drawdowns were calculated as follows:

25196:	Net drawdown = **3.2 ft**
11442:	Net drawdown = **3.2 ft**
27895:	Net drawdown = **4.0 ft**
11500:	Net drawdown = **6.0 ft**
22244:	Net drawdown = **3.8 ft**
Domestic 35-27-30:	Net drawdown = **3.1 ft**
Domestic 36-27-30:	Net drawdown = **3.4 ft**

Domestic 31-27-29: Net drawdown = **3.2 ft**

Domestic 2-28-30: Net drawdown = **3.0 ft**

Domestic 1-28-30: Net drawdown = **4.7 ft**

Net drawdown exceeds the drawdown allowance for all wells within 1 mile of the proposed location except for the domestic well in section 2-28-30. Critical well analysis is necessary on those wells.

Critical Well Evaluation:

25196:

Water Column = 116 ft

DP = 3.2 ft (Net drawdown from the proposal indicated above)

DE = 47.3 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 65.9 ft (S = 0.1633, T = 2000 ft^2/day, Q = 401 gpm, tp = 120 days, efficiency = 70%)

DT = 116.4 ft

Total drawdown of 116.4 ft is greater than the remaining saturated thickness, so this well is **critical.**

11442:

Water Column = 101 ft

DP = 3.2 ft (Net drawdown from the proposal indicated above)

DE = 43.9 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 18.5 ft (S = 0.1592, T = 7349 ft^2/day, Q = 381 gpm, tp = 120 days, efficiency = 70%)

DT = 65.6 ft

Economic Drawdown Constraint (EDC) = 0.4 * 101 ft = 40.4 ft

Physical Drawdown Constraint (PDC) = 101 ft – 60 ft = 41.0 ft

Total drawdown of 65.6 ft exceeds the EDC and the PDC, so this well **is critical.**

27895:

Water Column = 133 ft

DP = 4.0 ft (Net drawdown from the proposal indicated above)

DE = 50.9 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 71.8 ft (S = 0.1189, T = 2393 ft^2/day, Q = 567 gpm, tp = 73 days, efficiency = 70%)

DT = 132.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 133 ft = 53.2 ft

Physical Drawdown Constraint (PDC) = 133 ft – 60 ft = 73.0 ft

Total drawdown of 132.7 ft exceeds the EDC and the PDC, so this well **is critical.**

11500:

Water Column = 133 ft

DP = 6.0 ft (Net drawdown from the proposal indicated above)

DE = 50.9 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 93.4 ft (S = 0.1189, T = 2393 ft^2/day, Q = 662 gpm, tp = 111 days, efficiency = 70%)

DT = 150.3 ft

Total drawdown of 150.3 ft is greater than the remaining saturated thickness, so this well **is critical.**

22244:

Water Column = 113 ft

DP = 3.8 ft (Net drawdown from the proposal indicated above)

DE = 46.7 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DD = 81.0 ft (S = 0.1953, T = 3042 ft^2/day, Q = 774 gpm, tp = 60 days, efficiency = 70%)

DT = 131.5 ft

Total drawdown of 113 ft is greater than the remaining saturated thickness, so this well **is critical.**

Domestic 35-27-30:

Water Column = 127 ft

DP = 3.1 ft (Net drawdown from the proposal indicated above)

DE = 64.0 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DT = 67.1 ft

Economic Drawdown Constraint (EDC) = 0.4 * 127 ft = 50.8 ft

Physical Drawdown Constraint (PDC) = 127 ft – 20 ft = 107 ft

Total drawdown of 67.1 ft is greater than the EDC, so this well **is critical.**

Domestic 36-27-30:

Water Column = 116 ft

DP = 3.4 ft (Net drawdown from the proposal indicated above)

DE = 47.3 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DT = 50.7 ft

Economic Drawdown Constraint (EDC) = 0.4 * 116 ft = 46.4 ft

Physical Drawdown Constraint (PDC) = 116 ft – 20 ft = 96.0 ft

Total drawdown of 50.7 ft is greater than the EDC, so this well **is critical.**

Domestic 31-27-29:

Water Column = 101 ft

DP = 3.2 ft (Net drawdown from the proposal indicated above)

DE = 43.9 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DT = 47.1 ft

Economic Drawdown Constraint (EDC) = 0.4 * 101 ft = 40.4 ft

Physical Drawdown Constraint (PDC) = 101 ft – 20 ft = 81.0 ft

Total drawdown of 47.1 ft is greater than the EDC, so this well **is critical.**

Domestic 1-28-30:

Water Column = 133 ft

DP = 4.7 ft (Net drawdown from the proposal indicated above)

DE = 50.9 ft (Water level decline from 2023 through 2048 based upon GMD3 model)

DT = 55.6 ft

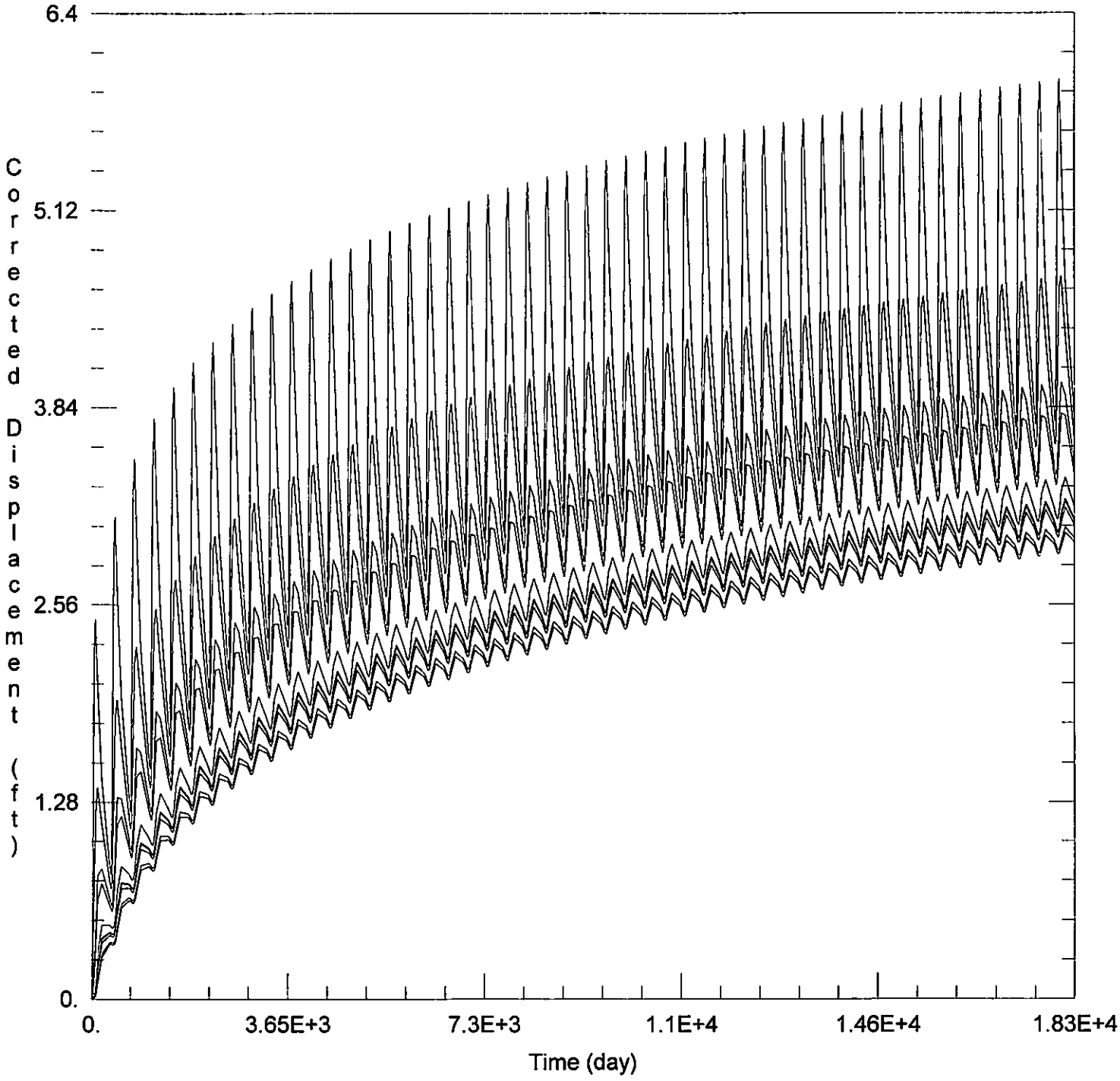
Economic Drawdown Constraint (EDC) = 0.4 * 133 ft = 53.2 ft

Physical Drawdown Constraint (PDC) = 133 ft – 20 ft = 113 ft

Total drawdown of 55.6 ft is greater than the EDC, so this well **is critical.**

Conclusion:

The proposed move may create noticeable effects on nearby critical wells, due to the low remaining saturated thickness and high rate of projected decline. Nearby wells were flagged as critical because they are projected to lose more than 40% of their usable water supply over the next 25 years, after accounting for well drawdown effects. 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\27546\27546 Proposed.aqt
Date: 10/20/23 Time: 16:42:31

PROJECT INFORMATION

Company: GMD 3
Project: 27546
Location: Gray County

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
27546	71582	280838

Observation Wells

Well Name	X (ft)	Y (ft)
□	71582	280838
□ 25196	69324	284805