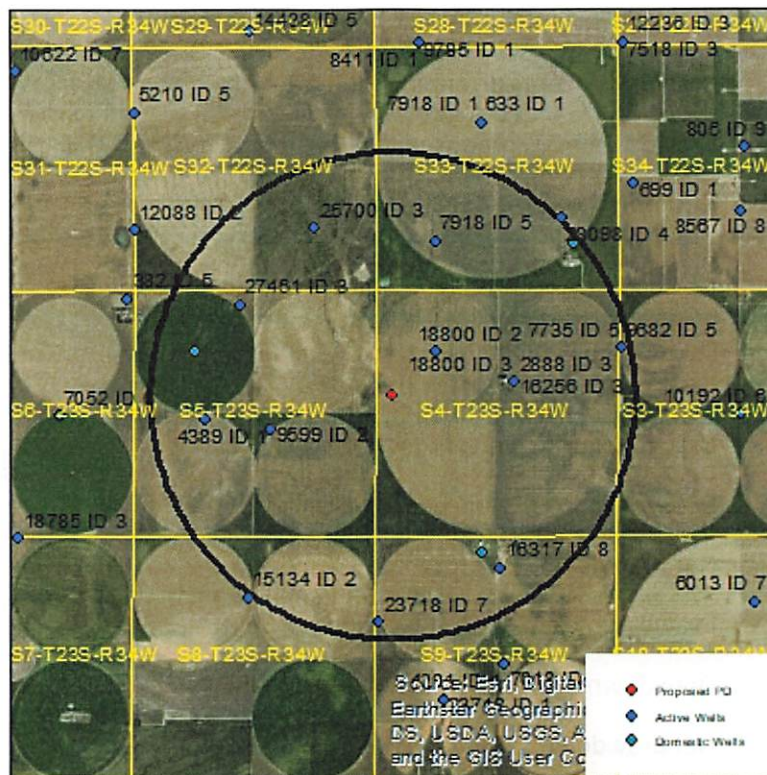


## Evaluation of proposed move for Water Right No. 18800

Proposed: Move water right no. 18800 ID2 to a new well location, 1,346 ft to the southwest.



Wells within 1 mile: 25700, 7918, 27461, 4389, 9599, 2888 & 16256 & 18800, 7735 & 9682, 23718, 16317, a domestic well in section 33-22-34, a domestic well in section 5-23-34, and a domestic well in section 9-23-34.

The saturated thickness at the proposed well location is estimated to be 144 ft, based upon the driller's log and an observation well in section 6-23-34. 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:

$S = 0.1532$ ,  $T = 4234.4 \text{ ft}^2/\text{day}$ ,  $tp_{\text{current}} = 72 \text{ days}$ ,  $Q_{\text{current}} = 466 \text{ gpm}$ ,  $tp_{\text{proposed}} = 81 \text{ days}$ ,  $Q_{\text{proposed}} = 1550 \text{ gpm}$

Theis drawdowns were calculated as follows:

25700: Drawdown from current location = 1.57 ft  
Drawdown from proposed location = 5.65 ft  
Net drawdown = 4.1 ft

7918: Drawdown from current location = 2.14 ft  
Drawdown from proposed location = 6.18 ft  
Net drawdown = **4.0 ft**

27461: Drawdown from current location = 1.42 ft  
Drawdown from proposed location = 5.82 ft  
Net drawdown = **4.4 ft**

4389: Drawdown from current location = 1.28 ft  
Drawdown from proposed location = 5.53 ft  
Net drawdown = **4.3 ft**

9599: Drawdown from current location = 1.51 ft  
Drawdown from proposed location = 7.26 ft  
Net drawdown = **5.7 ft**

2888 & 16256 & 18800: Drawdown from current location = 2.66 ft  
Drawdown from proposed location = 7.37 ft  
Net drawdown = **4.7 ft**

23718: Drawdown from current location = 1.17 ft  
Drawdown from proposed location = 4.96 ft  
Net drawdown = **3.8 ft**

16317: Drawdown from current location = 1.33 ft  
Drawdown from proposed location = 5.26 ft  
Net drawdown = **3.9 ft**

Domestic 33-22-34: Drawdown from current location = 1.56 ft  
Drawdown from proposed location = 4.85 ft  
Net drawdown = **3.3 ft**

Domestic 5-23-34: Drawdown from current location = 1.28 ft  
Drawdown from proposed location = 5.29 ft  
Net drawdown = **4.0 ft**

Domestic 9-23-34:       Drawdown from current location = 1.41 ft  
                                 Drawdown from proposed location = 5.74 ft  
                                 Net drawdown = 4.3 ft

Net drawdown exceeds the drawdown allowance of 3.0 ft for all wells within 1 mile of the proposed location. Critical well analysis is necessary on those wells.

**Critical Well Evaluation:**

**25700:**

Water Column = 76 ft

DP = 4.1 ft (Net drawdown from the proposal indicated above)

DE = 15.6 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 71.6 ft ( $S = 0.1723$ ,  $T = 2082.4 \text{ ft}^2/\text{day}$ ,  $Q = 477 \text{ gpm}$ ,  $tp = 60 \text{ days}$ , efficiency = 70%)

DT = 91.3 ft

Total drawdown exceeds the remaining water column, so this well is critical.

**7918:**

Water Column = 102 ft

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

DE = 24.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 44.1 ft ( $S = 0.1625$ ,  $T = 2815.5 \text{ ft}^2/\text{day}$ ,  $Q = 370 \text{ gpm}$ ,  $tp = 120 \text{ days}$ , efficiency = 70%)

DT = 72.2 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 102 \text{ ft} = 40.8 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $102 \text{ ft} - 60 \text{ ft} = 42 \text{ ft}$

Total drawdown of 72.2 ft is greater than the EDC and PDC, so this well is critical.

**27461:**

Water Column = 119 ft

DP = 4.4 ft (Net drawdown from the proposal indicated above)

DE = 27.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 69.4 ft (S = 0.2084, T = 2508.9 ft<sup>2</sup>/day, Q = 543 gpm, tp = 87 days, efficiency = 70%)

DT = 101.2 ft

Economic Drawdown Constraint (EDC) = 0.4 \* 119 ft = 47.6 ft

Physical Drawdown Constraint (PDC) = 119 ft – 60 ft = 59 ft

Total drawdown of 101.2 ft is greater than the EDC and PDC, so this well is **critical**.

**4389:**

Water Column = 119 ft

DP = 4.3 ft (Net drawdown from the proposal indicated above)

DE = 27.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 71.6 ft (S = 0.2089, T = 2508.9 ft<sup>2</sup>/day, Q = 552 gpm, tp = 105 days, efficiency = 70%)

DT = 103.3 ft

Economic Drawdown Constraint (EDC) = 0.4 \* 119 ft = 47.6 ft

Physical Drawdown Constraint (PDC) = 119 ft – 60 ft = 59 ft

Total drawdown of 103.3 ft is greater than the EDC and PDC, so this well is **critical**.

**9599:**

Water Column = 119 ft

DP = 5.7 ft (Net drawdown from the proposal indicated above)

DE = 27.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 67.9 ft (S = 0.2084, T = 2508.9 ft<sup>2</sup>/day, Q = 534 gpm, tp = 78 days, efficiency = 70%)

DT = 101.0 ft

Economic Drawdown Constraint (EDC) = 0.4 \* 119 ft = 47.6 ft

Physical Drawdown Constraint (PDC) = 119 ft – 60 ft = 59 ft

Total drawdown of 101.0 ft is greater than the EDC and PDC, so this well is **critical**.

**2888 & 16256 & 18800:**

Water Column = 91 ft

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

DE = 32.9 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 47.3 ft ( $S = 0.1532$ ,  $T = 4234.4 \text{ ft}^2/\text{day}$ ,  $Q = 588 \text{ gpm}$ ,  $tp = 94 \text{ days}$ , efficiency = 70%)

DT = 84.9 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 91 \text{ ft} = 36.4 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $91 \text{ ft} - 60 \text{ ft} = 31 \text{ ft}$

Total drawdown of 84.9 ft is greater than the EDC and PDC, so this well is **critical**.

**7735 & 9682:**

Water Column = 114 ft

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

DE = 28.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 60.3 ft ( $S = 0.1532$ ,  $T = 4234.4 \text{ ft}^2/\text{day}$ ,  $Q = 746 \text{ gpm}$ ,  $tp = 101 \text{ days}$ , efficiency = 70%)

DT = 92.1 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 114 \text{ ft} = 45.6 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $114 \text{ ft} - 60 \text{ ft} = 54 \text{ ft}$

Total drawdown of 92.1 ft is greater than the EDC and PDC, so this well is **critical**.

**23718:**

Water Column = 131 ft

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

DE = 29.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 36.6 ft ( $S = 0.1291$ ,  $T = 3983.2 \text{ ft}^2/\text{day}$ ,  $Q = 434 \text{ gpm}$ ,  $tp = 69 \text{ days}$ , efficiency = 70%)

DT = 69.5 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 131 \text{ ft} = 52.4 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $131 \text{ ft} - 60 \text{ ft} = 71 \text{ ft}$

Total drawdown of 69.5 ft is greater than the EDC, so this well is **critical**.

**16317:**

Water Column = 139 ft

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

DE = 29.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DD = 38.9 ft ( $S = 0.1291$ ,  $T = 3983.2 \text{ ft}^2/\text{day}$ ,  $Q = 466 \text{ gpm}$ ,  $t_p = 58 \text{ days}$ , efficiency = 70%)

DT = 71.9 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 139 \text{ ft} = 55.6 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $139 \text{ ft} - 60 \text{ ft} = 79 \text{ ft}$

Total drawdown of 71.9 ft is greater than the EDC, so this well is **critical**.

**Domestic 33-22-34:**

Water Column = 124 ft

DP = 3.3 ft (Net drawdown from the proposal indicated above)

DE = 24.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 27.4 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 124 \text{ ft} = 49.6 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $124 \text{ ft} - 20 \text{ ft} = 104 \text{ ft}$

Total drawdown of 27.4 ft is less than the EDC and PDC, so this well is **not critical**.

**Domestic 5-23-34:**

Water Column = 114 ft

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

DE = 27.4 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 31.4 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 114 \text{ ft} = 45.6 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $114 \text{ ft} - 20 \text{ ft} = 94 \text{ ft}$

Total drawdown of 31.4 ft is less than the EDC and PDC, so this well is **not critical**.

**Domestic 9-23-34:**

Water Column = 128 ft

DP = 4.3 ft (Net drawdown from the proposal indicated above)

DE = 29.1 ft (Water level decline from 2022 through 2047 based upon GMD3 model)

DT = 33.4 ft

Economic Drawdown Constraint (EDC) =  $0.4 * 128 \text{ ft} = 51.2 \text{ ft}$

Physical Drawdown Constraint (PDC) =  $128 \text{ ft} - 20 \text{ ft} = 108 \text{ ft}$

Total drawdown of 33.4 ft is less than the EDC and PDC, so this well is **not critical**.

**Conclusion:**

The proposed move is in an area with less than 150 ft saturated thickness. Modeled aquifer properties require well drawdown from 40-70 ft to achieve observed pumping rates, leaving little remaining thickness for area wells to work with. The GMD3 model predicts aquifer declines up to about 30 ft. If the proposed well were to pump its full authorized authority, there would likely be a noticeable drawdown effect on all neighboring wells. Critical well analysis shows that all the neighboring irrigation wells are critical because there is insufficient saturated thickness to operate near current capacity for the foreseeable future. Nearby domestic wells were not flagged as critical because domestic wells do not require high pumping capacity to operate and drawdown requirements are much lower. Concerned neighbors should contact GMD3 at (620) 275-7147 or the Division of Water Resources at (620) 276-2901.