



## Attachment E – Hydrogeologic Evaluation Report



## **THORNHILL GROUP, INC.**

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Professional Hydrogeologists • Water Resources Specialists

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July 26, 2023

Ms. Laura Wiese Moore  
L. Wiese Moore, LLC  
2208 Churchill Loop  
Grapevine, Texas 76051

Re: Aquifer Evaluation Report –  
Drilling/Production Permit Applications for Two (2) New Simsboro Wells to be  
Completed on the Moore Property, Robertson County, Texas

Dear Ms. Moore:

Per your request and in compliance with the rules of the Brazos Valley Groundwater Conservation District (BVGCD), Thornhill Group, Inc. (TGI) provides herein an evaluation of the projected effect of L. WIESE MOORE, LLC, herein referenced as WIESE MOORE, completing two (2) new wells into the Simsboro Aquifer underlying the Moore Property in Robertson County, Texas and producing an annual allocation of 4,452 acre-feet per year.

The subject Moore Property encompasses approximately 590 contiguous acres of land. The eastern boundary of the property is three (3) miles west of the intersection of Farm Road 485 (FM 485) and State Highway 6/State Highway 79 (SH 6/SH 79) near downtown Hearne. The northern boundary of the Moore Property abuts FM 485 and the western boundary is along FM 1644. The western boundary of the farm is between 1.3 and 1.6 miles east of the Brazos River. Figure 1 provides the location of the subject property.

TGI conducted its evaluations and prepared this report in compliance with the rules and guidelines provided by the BVGCD, specifically in Rule 8.4(b)(7)(B) for wells (and multiple wells) capable of producing 800 or more acre-feet per year. TGI's evaluations focused on assessing local aquifer conditions and parameters, and the extent to which production from the subject wells may influence other groundwater users in the BVGCD. TGI's evaluations are based on previous investigations conducted in the District, including permit applications and field-testing associated with several local landowners. Additionally, TGI relied upon reported data, published reports, the applicable groundwater availability model (GAM), and TGI's extensive experience with and knowledge of the Simsboro Aquifer in Central Texas, within the BVGCD, and particularly in Robertson County. Specifically, TGI's work was conducted to accomplish the following goals:





- ❖ Assessing the local hydrogeologic setting, focusing on the physical characteristics and hydraulic parameters of the local Simsboro Aquifer;
- ❖ Estimating and calculating the potential short-term and long-term drawdown at each of the wells, including interference drawdown between wells;
- ❖ Evaluating potential interference drawdown from other pumpage in the area and predicting long-term water levels in the proposed well-field area;
- ❖ Establishing a target maximum proposed pumping rate for each well and for the aggregated well field;
- ❖ Modeling to assess the feasibility of the targeted pumping rate and the potential impacts (e.g., artesian pressure reduction) to the aquifer and other nearby well owners (e.g., drawdown); and,
- ❖ Providing this Hydrogeological Evaluation Report in compliance with District rules.

For convenience, applicable illustrations and supporting documentation are included in the following attachments:

- Attachment 1 – Figures
- Attachment 2 – Tables
- Attachment 3 – Reference Materials
- Attachment 4 – Selected References

### Proposed Pumping Locations and Permit Pumping Rates

Figure 1 illustrates the locations for the proposed Simsboro wells on the Moore Property. Proposed well identifications, coordinates, and estimated land-surface elevations in feet above mean sea level (MSL) as estimated from Google Earth are as follows:

<u>Well Identification</u>	<u>Latitude*</u>	<u>Longitude*</u>	<u>Est. Land Surface Elevation</u>
No. 1	30°52'19.14"N	96°38'55.23"W	274 feet AMSL
No. 2	30°52'03.41"N	96°39'32.28"W	273 feet AMSL

\*Coordinate system is NAD83 State Plane Texas Central (feet)

The proposed production capacities in gallons per minute (gpm) and requested permit allocations in acre-feet per year are as follows:

<u>Well Identification</u>	<u>Maximum Pumping Rate</u>	<u>Annual Permit Allocation</u>
No. 1	1,550 gpm	2,000 acre-feet
No. 2	1,900 gpm	2,452 acre-feet
<b>Total Annual Allocation</b>		<b>4,452 acre-feet</b>

The radii attributed to the pumping rates for each of the wells lie within the Moore property boundaries. The nearest known existing wells completed into the Simsboro Aquifer are mapped by the BVGCD adjacent to the Moore property; however, the proposed Simsboro wells are sufficiently distant from existing wells. The proposed well locations comply with the BVGCD rules regarding spacing between wells and allocation of acreage per well.

## Hydrogeologic Conditions and Aquifer Characteristics

### Geologic Setting

Figure 2 illustrates that the entire Moore Property is underlain by downdip portions of the Carrizo-Wilcox Aquifer, a Major Aquifer delineated by the TWDB. Figure 3 shows that essentially the western half of the Moore property lies atop the Brazos River Alluvium Aquifer, a Minor Aquifer in Texas. There are no other Major or Minor aquifers beneath the subject property.

Figure 4 is a Surface Geology Map illustrating that the entire extent of the subject Moore Property lies atop the Brazos River Alluvium deposits. The surface geology maps show that the Reklaw subcrop the alluvial deposits and an inferred trend indicates that the Reklaw (unconformably) underlies the alluvium across the entire property. The Carrizo Sand is likely relatively shallow and thin beneath the property due to proximity to the outcrop. Otherwise, the entire local sections of the Wilcox Group including, from younger to older, the Calvert Bluff, Simsboro, and Hooper formations occur beneath the subject property.

Due to the inherent nature of the floodplain and farming operations the topography across the Moore Property is relatively flat with land surface elevations ranging generally from 270 to 280 feet above mean sea level (MSL). Geologic units dip generally from the north-northwest to the south-southeast. Locally, the dip along the base of the Wilcox Group is between 90 and 100 feet per mile (see Attachment 3). There are no faults mapped locally at land surface across the subject property. Based on available structural geology maps and GAM datasets estimates of the elevations and thicknesses of hydrostratigraphic layers beneath the Moore property are summarized in the table below:

Layer	Elevation	Depth	Thickness
Land Surface	270 to 280 feet AMSL	Not Applicable	Not Applicable
Base of Alluvium	200 to 210 feet AMSL	60 to 80 feet BGL	60 to 80 feet
Base of Reklaw	155 to 165 feet AMSL	105 to 125 feet BGL	25 to 65 feet
Base of Carrizo	105 to 120 feet AMSL	150 to 175 feet BGL	25 to 70 feet
Base of Calvert Bluff	690 to 705 feet BMSL	960 to 985 feet BGL	785 to 835 feet
Base of Simsboro	1,165 to 1,185 feet BMSL	1,435 to 1,465 feet BGL	450 to 505 feet
Base of Hooper	1,690 to 1,730 feet BMSL	1,960 to 2,010 feet BGL	495 to 575 feet

## Aquifer Conditions and Hydraulic Parameters

This report focuses on proposed permitted production from the Simsboro Aquifer. The top of the Simsboro Formation is estimated to be at depths of between 950 and 1,050 feet BGL based on GAM datasets and BEG mapping (BEG, 1985). Net sand thickness maps indicate productive sands with thicknesses of between 350 and 450 feet, with sands potentially as thick as 500 feet. As most of the Simsboro Formation is comprised of sand, it is likely that Simsboro wells on the Moore Property will be between 1,400 and 1,550 feet deep. Figure 5 illustrates locations for registered and permitted Simsboro wells within five (5) miles of the proposed Moore wells. Attachment 4 provides available well records for selected nearby Simsboro wells. Figure 6 shows locations for registered and permitted Simsboro wells within one (1) mile of the proposed Moore wells locations. Figure 6a and Figure 6b provide the locations for Simsboro wells within one (1) mile of the proposed well locations on maps with a scale of 1"=1,000 feet per BVGCD Rules. Eight (8) Simsboro wells are mapped by BVGCD within one (1) mile of the Moore property. Four (4) of the wells are historic use Simsboro irrigation wells owned by Upwell/Brazos Valley Farms. Three (3) wells are domestic wells with reported depths ranging from 1,080 to 1,250 feet and one well has no record. The depths of the domestic wells ensures that groundwater can be produced in perpetuity with proper well completion.

TGI extracted hydraulic data for the subject property and nearby areas from the currently-used version of the groundwater availability model (GAM) for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (Young, et al., 2018). Note that the units for hydraulic parameters are: gallons per day per square foot (gpd/ft<sup>2</sup>) for hydraulic conductivity; gallons per day per foot (gpd/ft) for transmissivity; and, dimensionless for storativity (or storage coefficient). The following table provides a summary of estimated parameters extracted from the GAM datasets to those derived by TGI for the local Carrizo and Simsboro aquifers across the Wiese Moore property:

<u>Parameter</u>	<u>GAM</u>	
	<u>Estimates Range</u>	<u>TGI Estimates*</u>
Aquifer/Sand Thickness	470 to 480 feet	350 to 450 feet
Hydraulic Conductivity	105 to 125 gpd/ft <sup>2</sup>	125 to 175 gpd/ft <sup>2</sup>
Transmissivity	51,000 to 58,000 gpd/ft	43,750 to 78,750 gpd/ft
Storage Coefficient	0.000151	0.0001 (0.0005)

The asterisk indicates that TGI utilized a storage coefficient representative of a slightly leaky artesian aquifer for the 10-year analytical model calculations.

Figure 7 provides two hydrographs illustrating water-level measurements collected for Texas Water Development Board (TWDB) and/or BVGCD Simsboro monitoring wells: the first chart

illustrates data for TWDB Well No. 59-03-437 (BVR-1283) which is the Lee Fazzino House Well located about seven (7) miles north-northwest of the center of the Moore property; and, the second well is TWDB Well No. 59-04-701 (BVHU-0013) which is the City of Hearne Well #4, also known as the POW well, which is 2.3 miles east-northeast of the center of the subject Moore property. Water levels declined from 1979 to 1999 by approximately 40 feet and 70 feet in the Lee Fazzino well and the POW well, respectively. Additionally, Advanced Groundwater Solutions (AGS) reported that water-levels declined between 1999 and 2023 by 44 feet in the Lee Fazzino House Well and by 81 feet in Hearne’s POW well (see AGS, May 11, 2023). Also, AGS reported a 85-foot artesian pressure decline in TWDB Well No. 59-11-703 which is at the City of Gause and is about 6.8 miles southwest of the Moore property. AGS mapped water-level declines in the Simsboro of approximately 70 feet at the Moore property from 1999 to 2023 (AGS, May 11, 2023). Based on the updated data provided by AGS, current depths to water on the subject property will likely range from 150 to 250 feet BGL. Therefore, water levels will probably rise between 720 and 900 feet above the top of the aquifer in the proposed new wells, verifying that the local Simsboro is under artesian or confined conditions with hundreds of feet of artesian head.

## Projected Effects of Proposed Pumping

The immediate impacts from production will be artesian head decline (i.e., drawdown) at the pumping wells. As the wells pump, artesian pressure or potentiometric head around the wells will decline forming a cone of depression. As production continues the cone of depression will extend radially from the well field until an aquifer boundary is reached or the production rate reaches equilibrium with the captured groundwater flows. Due to the distance of the proposed wells from the outcrop of the aquifer, reduction in artesian pressure is the only anticipated measurable effect from the proposed pumping. The aquifer will remain completely full and there will be only an infinitesimal reduction in storage. Pumping from the Simsboro aquifers will cause some vertical leakage from overlying and underlying zones. While leakage can serve to dampen drawdown due to boundary effects and inflows, the leakage will likely not result in any identifiable water-level changes or water-quality variations in any of the overlying or underlying zones.

## Drawdown Simulations Using the GAM

TGI utilized the recently released revision and update of the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers GAM to calculate drawdown due to the proposed pumping for continuous pumping periods of one (1) year and 10 years from the Simsboro Aquifer. L. Wiese Moore, LLC has requested a permit allocation for the Simsboro Aquifer of 4,452 acre-feet per year. Figure 8 and Figure 9 provide maps showing modeled drawdown contours after one (1) year and 10 years of pumping at the proposed authorized annual rate,

respectively. Table 1 and Table 2 provide modeled drawdown at specific registered and permitted Simsboro well sites after one (1) year and 10 years of continuous pumping, respectively. The GAM predicts that Simsboro artesian pressure will decline by as much as 29 feet immediately adjacent to the Moore property and from 16 to 19 feet one (1) mile from the proposed wells within the first year of pumping. Declines during the initial year are simulated to be less than 5 to 7 feet five (5) miles of the wells. After 10 years of pumping the proposed Simsboro wells drawdown (i.e., artesian head decline) will be as much as 31 feet adjacent to the subject property and range from 18 to 20 feet one (1) mile from the well locations. Simulated drawdown 7 to 8 feet five (5) miles from the wells. Based on the geologic structure, estimates of current artesian head, and drawdown calculated from the GAM simulations, the Simsboro aquifer will remain full and under artesian conditions in the well-field area and within the five-mile radius. Local wells will continue to maintain a few hundred feet of artesian head.

### [Drawdown Simulations Using Analytical Modeling](#)

Due to the scale and configuration of the GAM grid, the GAM probably does not provide accurate drawdown calculations for the specific well sites and areas in the immediate vicinity of the proposed well field. Therefore, for comparison purposes and per the BVGCD rules TGI used an analytical modeling program based on the Theis non-equilibrium equation to calculate theoretical potentiometric head declines at and surrounding the proposed production wells. TGI has used the Theis model for several previous submittals to the BVGCD as well as for evaluations and submittals to numerous districts across the State of Texas. The Theis model incorporates many assumptions, most of which are sufficiently satisfied in the local Simsboro aquifer. However, the Theis model assumes an aquifer that is uniform over an infinite area. To account for recharge boundaries and possible inter-aquifer leakage into the producing aquifers, TGI modeled long-term pumping (i.e., from one to 10 years) by incorporating a leaky artesian storage coefficient. However, it is likely that, while the Theis model likely provides more reliable results within and near the well field, it probably overstates drawdown at distance from the pumping center. Also, the Theis model is more accurate for shorter pumping durations; therefore, the 10-year calculation likely overestimates drawdown from the well fields.

Figure 10 and Figure 11 provide drawdown contours from Theis calculations due to pumping the Simsboro wells proposed for the Moore Property after one (1) and 10 years, respectively. Table 1 and Table 2 provide drawdown values at specific well locations. The analytical model calculated artesian pressure declines of as much as 45 feet adjacent to the subject property after one (1) year of pumping. Drawdown at a distance of one (1) mile was modeled to be 36 to 38 feet after the first year of pumping. At five (5) miles away the drawdown calculation resulted in 22 to 23 feet after a year. After 10 years the calculated drawdown at the Moore

property line is as much as 48 feet and the drawdown at a distance of a mile was modeled to be 39 to 41 feet. The drawdown at five (5) miles was modeled to be between 26 and 27 feet.

## Conclusions

Based on our review of the BVGCD rules and the work conducted as described herein, TGI concludes the following:

- ❖ The proposed wells and pumping amounts for the Moore Property can be completed and produced in accordance with the well spacing and production-based acreage (i.e., allocation) rules set forth by the BVGCD;
- ❖ The predicted drawdown derived from the Theis analytical model are more accurate than the GAM predictions for the proposed well sites and areas near the well field;
- ❖ GAM-predicted drawdown probably provides a more reasonable estimate of future impacts at greater distances from the proposed well field and for longer time periods. The updated GAM predicts significantly less drawdown regionally than the previous version of the GAM; and,
- ❖ Production from the proposed pumping will cause only infinitesimal reduction in aquifer storage as the local Simsboro Aquifer will stay completely full and groundwater in the formation will remain under considerable artesian pressure within the well-field areas and the five-mile study radius.

We very much appreciate the opportunity to again assist you in our specialty. If you have any questions, please call.



Sincerely,  
**THORNHILL GROUP, INC.**



Michael R. Thornhill, P.G.  
President

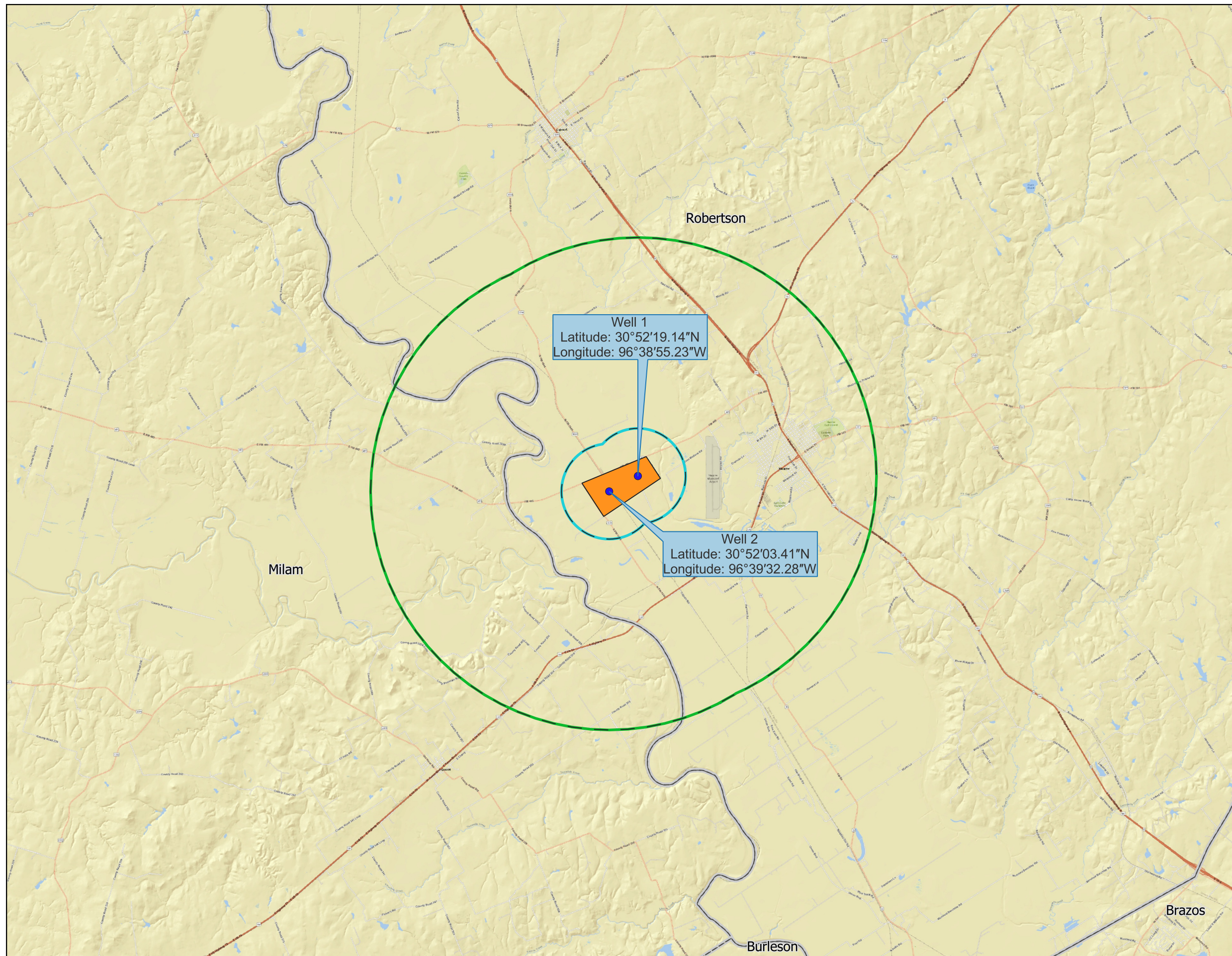
The seal appearing on this document was authorized  
by Michael R. Thornhill, P.G. on July 26, 2023.

Attachments



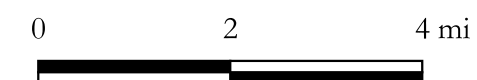
ATTACHMENT 1 –  
FIGURES





### Explanation

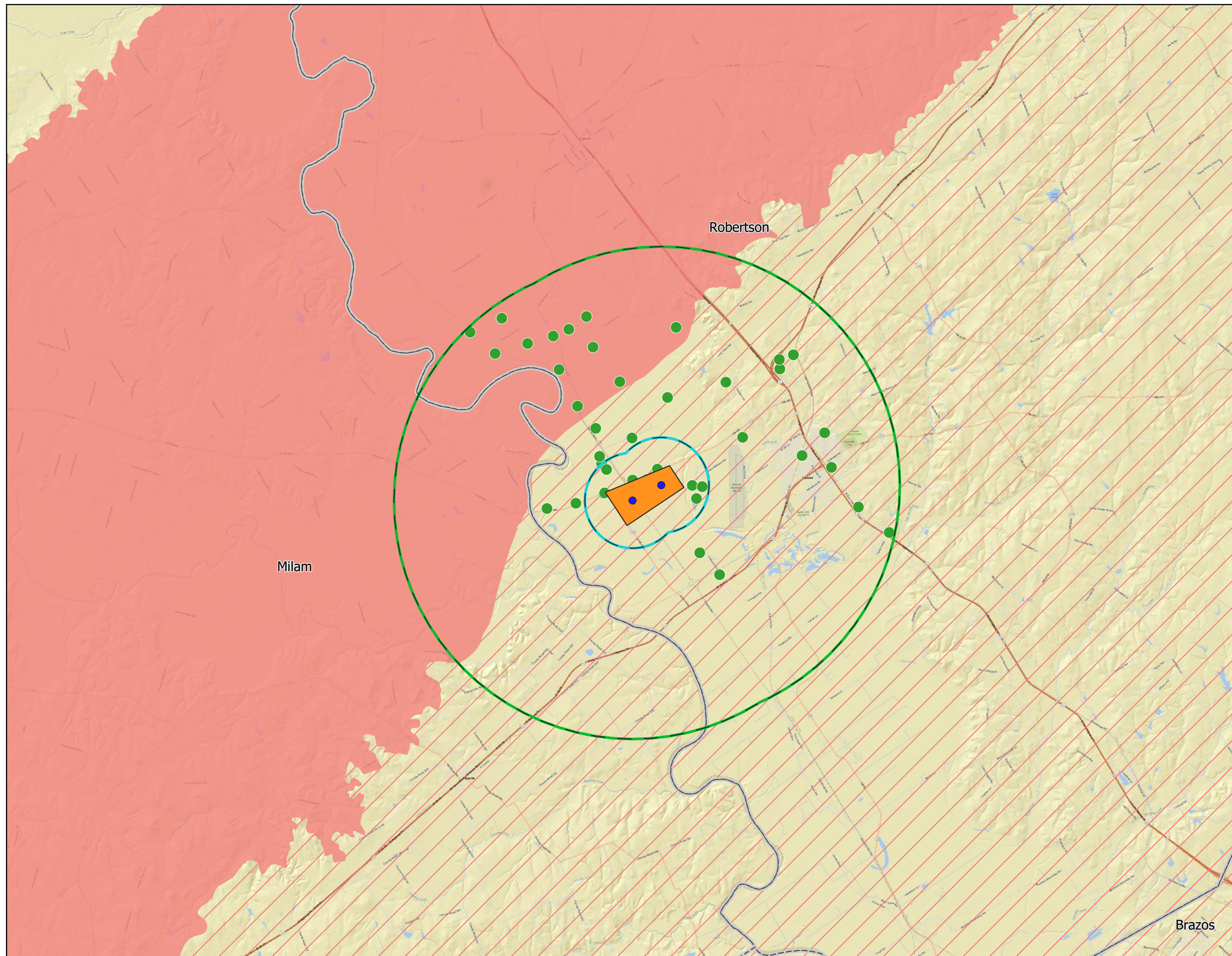
- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties



**L Wiese Moore, LLC**

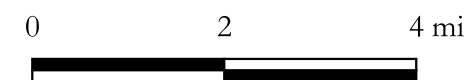
Figure 1:  
Location Map





**Explanation**

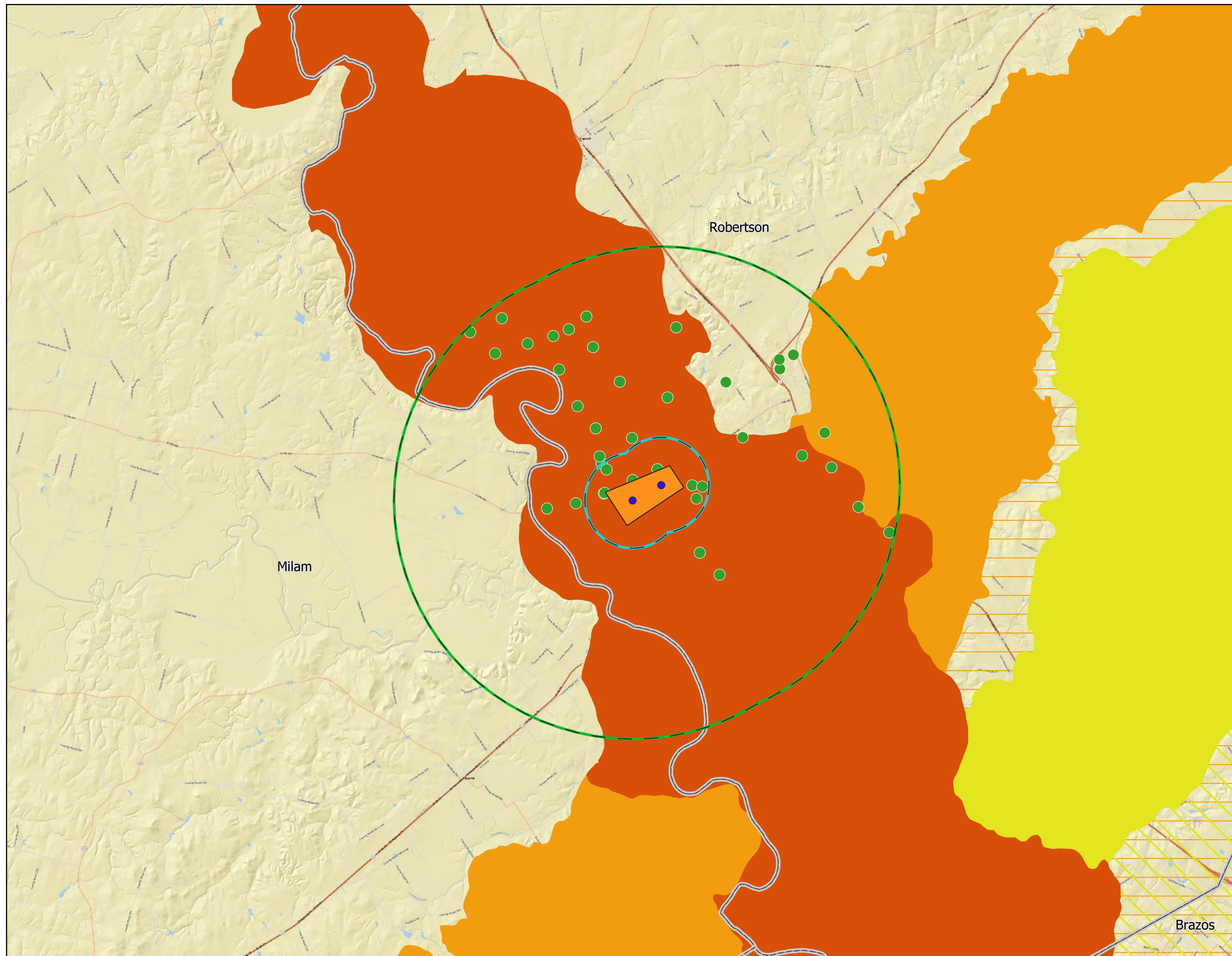
- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties
- Major Aquifers**
- Carrizo - Wilcox (outcrop)
- ▨ Carrizo - Wilcox (subcrop)
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



**L Wiese Moore, LLC**

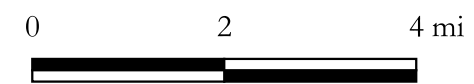
Figure 2:  
Major Aquifers





**Explanation**

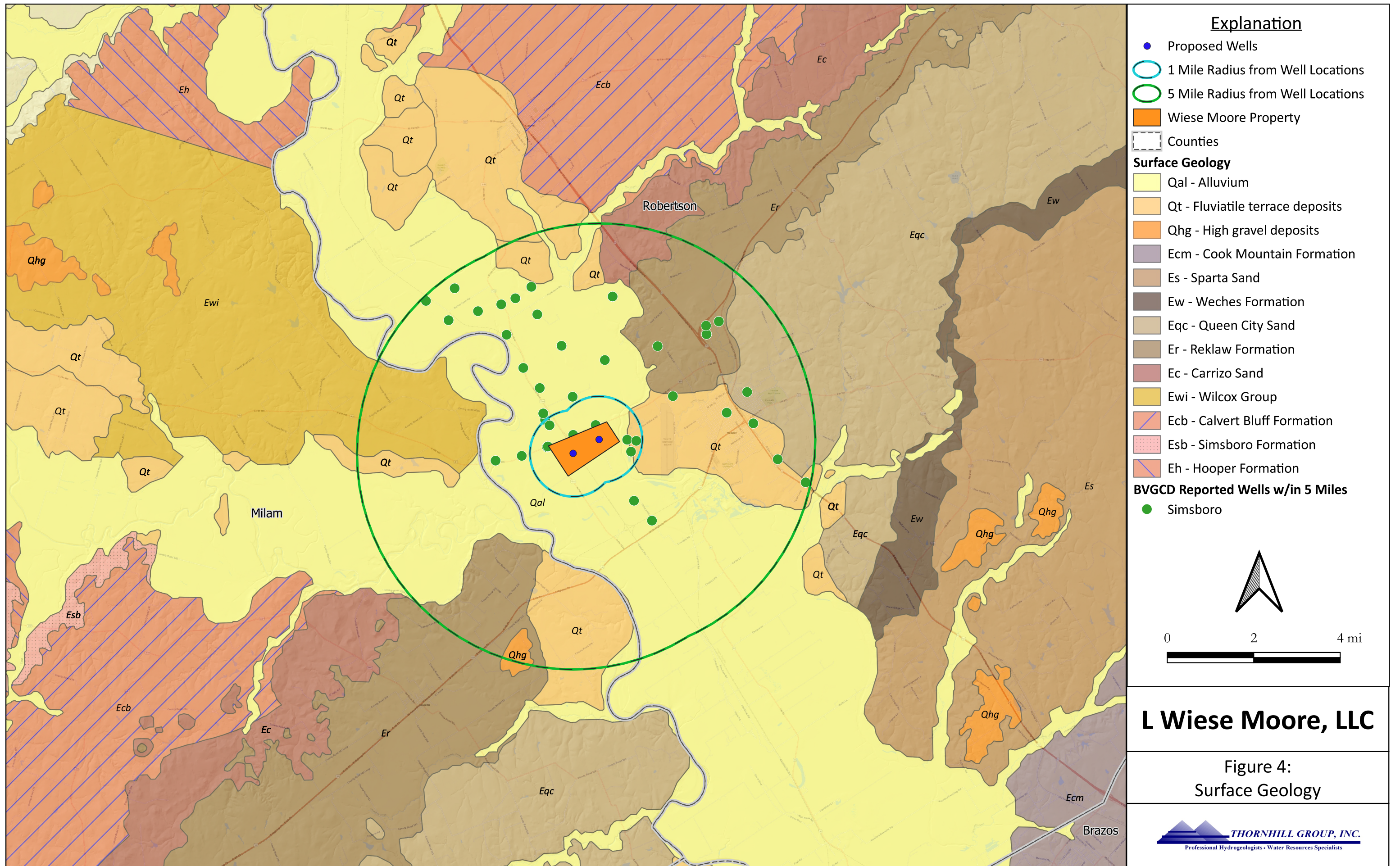
- Proposed Wells
  - 1 Mile Radius from Well Locations
  - 5 Mile Radius from Well Locations
  - Wiese Moore Property
  - ▭ Counties
- Minor Aquifers**
- Brazos River Alluvium
  - Queen City (outcrop)
  - Queen City (subcrop)
  - Sparta (outcrop)
  - Sparta (subcrop)
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



**L Wiese Moore, LLC**

Figure 3:  
Minor Aquifers

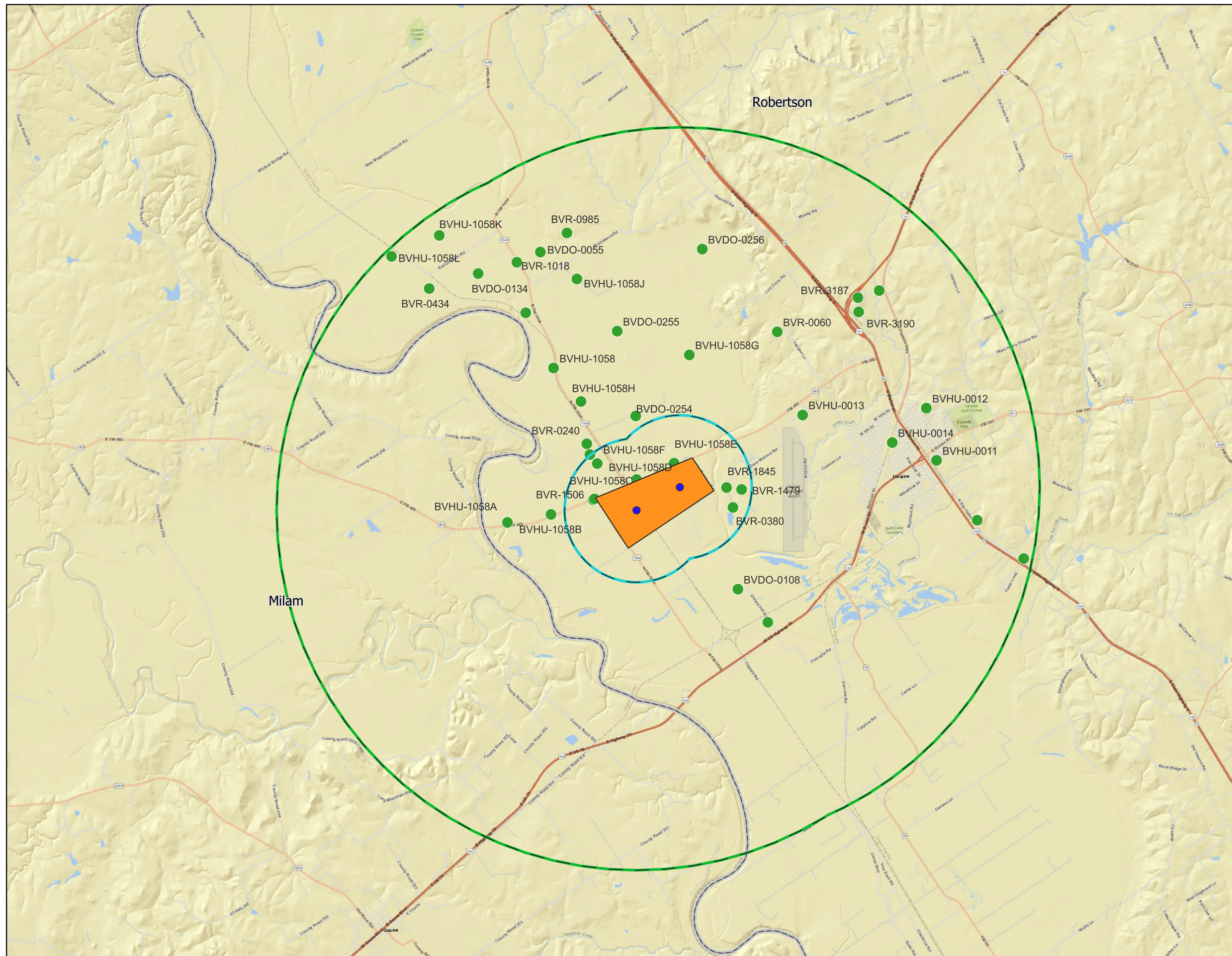




**L Wiese Moore, LLC**

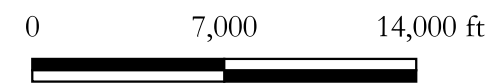
Figure 4:  
Surface Geology





**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro

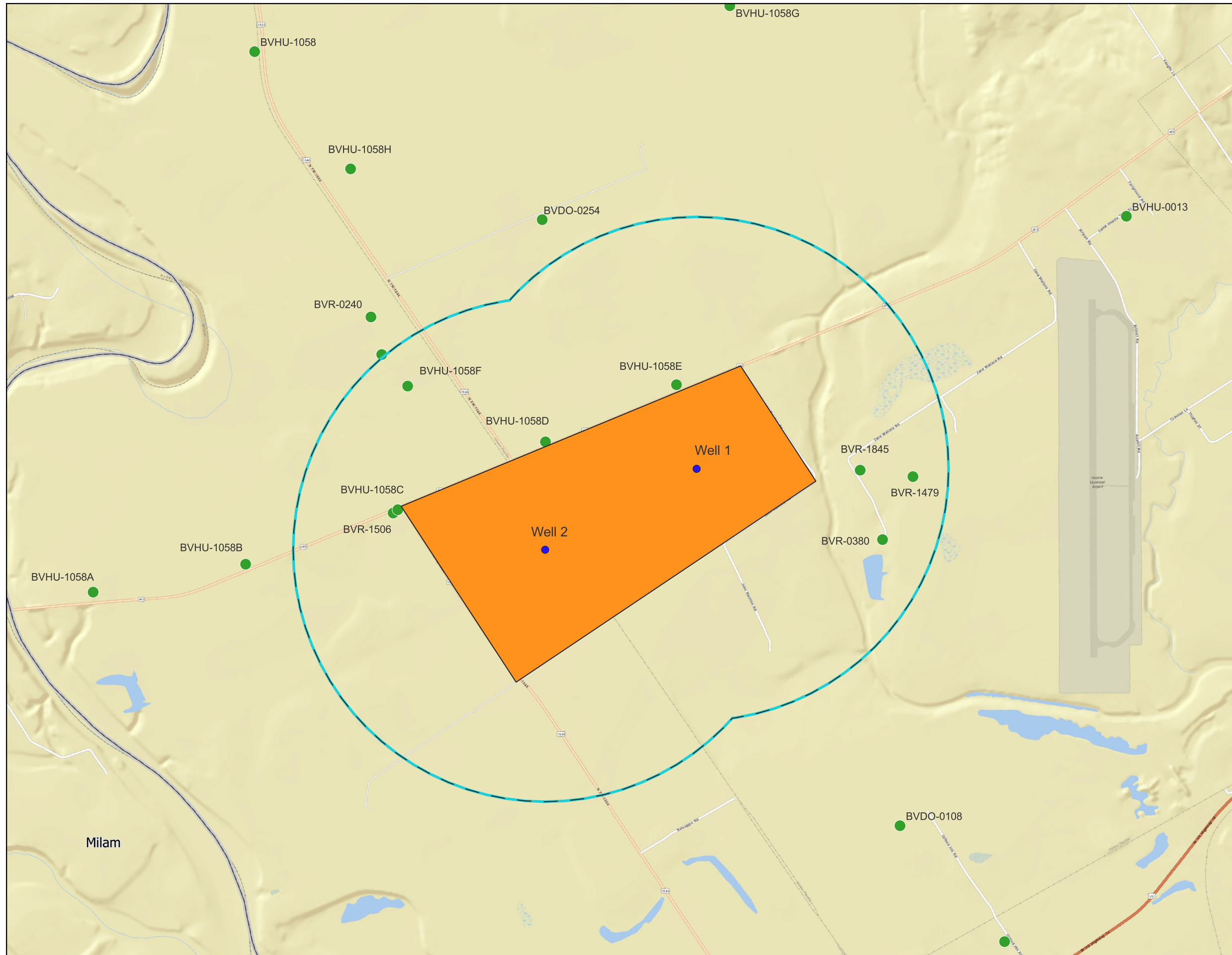


**L Wiese Moore, LLC**

Figure 5: Well Locations w/in 5 Miles of Proposed Wells

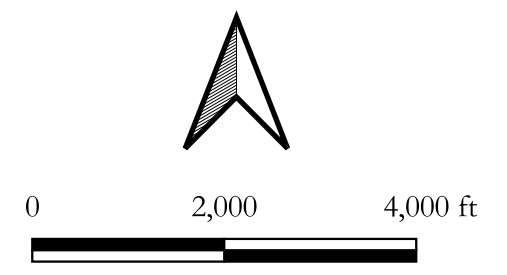






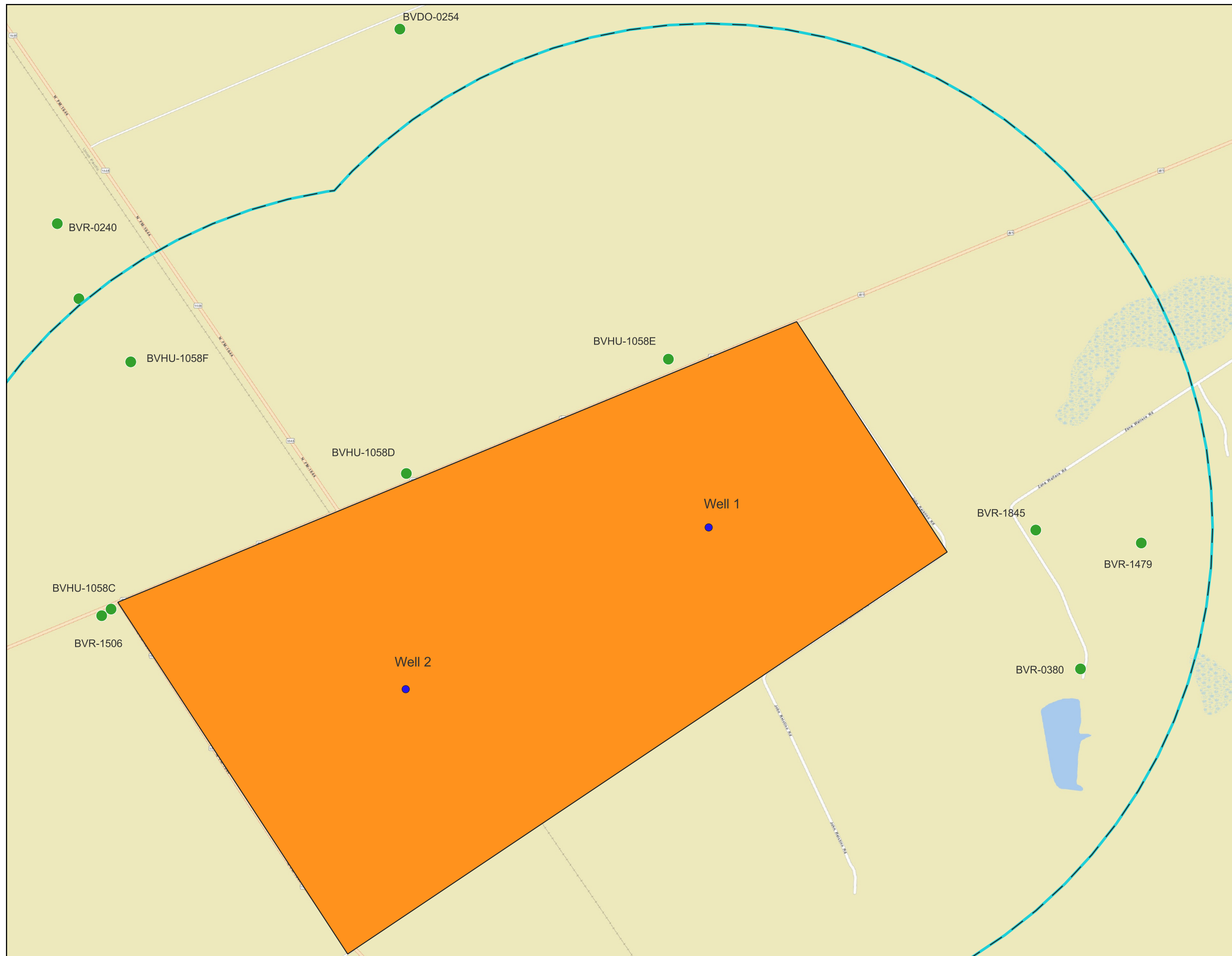
**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles
- Simsboro



**L Wiese Moore, LLC**

Figure 6: Well Locations w/in 1 Mile of Proposed Wells



**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



**L Wiese Moore, LLC**

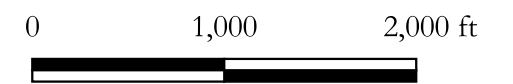
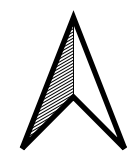
Figure 6a: Well Locations w/in 1 Mile of Proposed Wells





**Explanation**

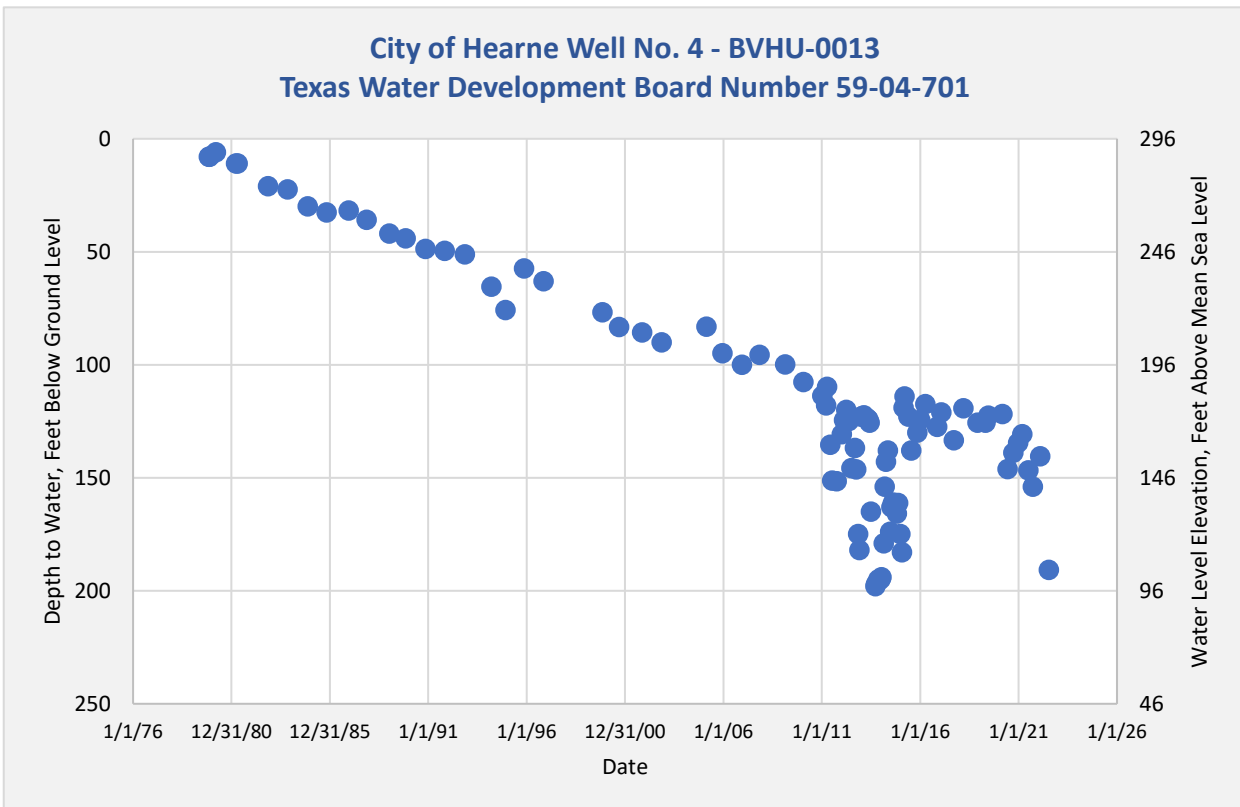
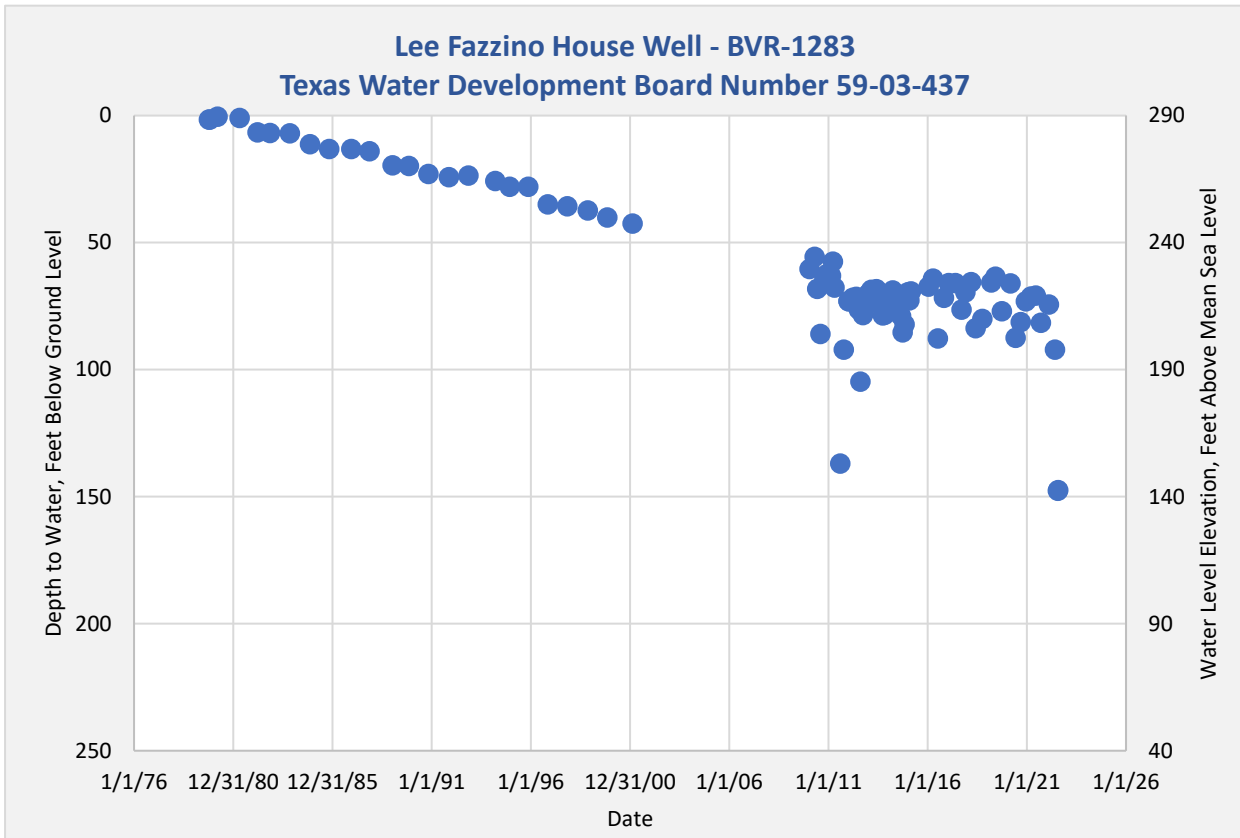
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- 1 Mile Radius from Well Locations
- Wiese Moore Property
- ▭ Counties
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- Simsboro



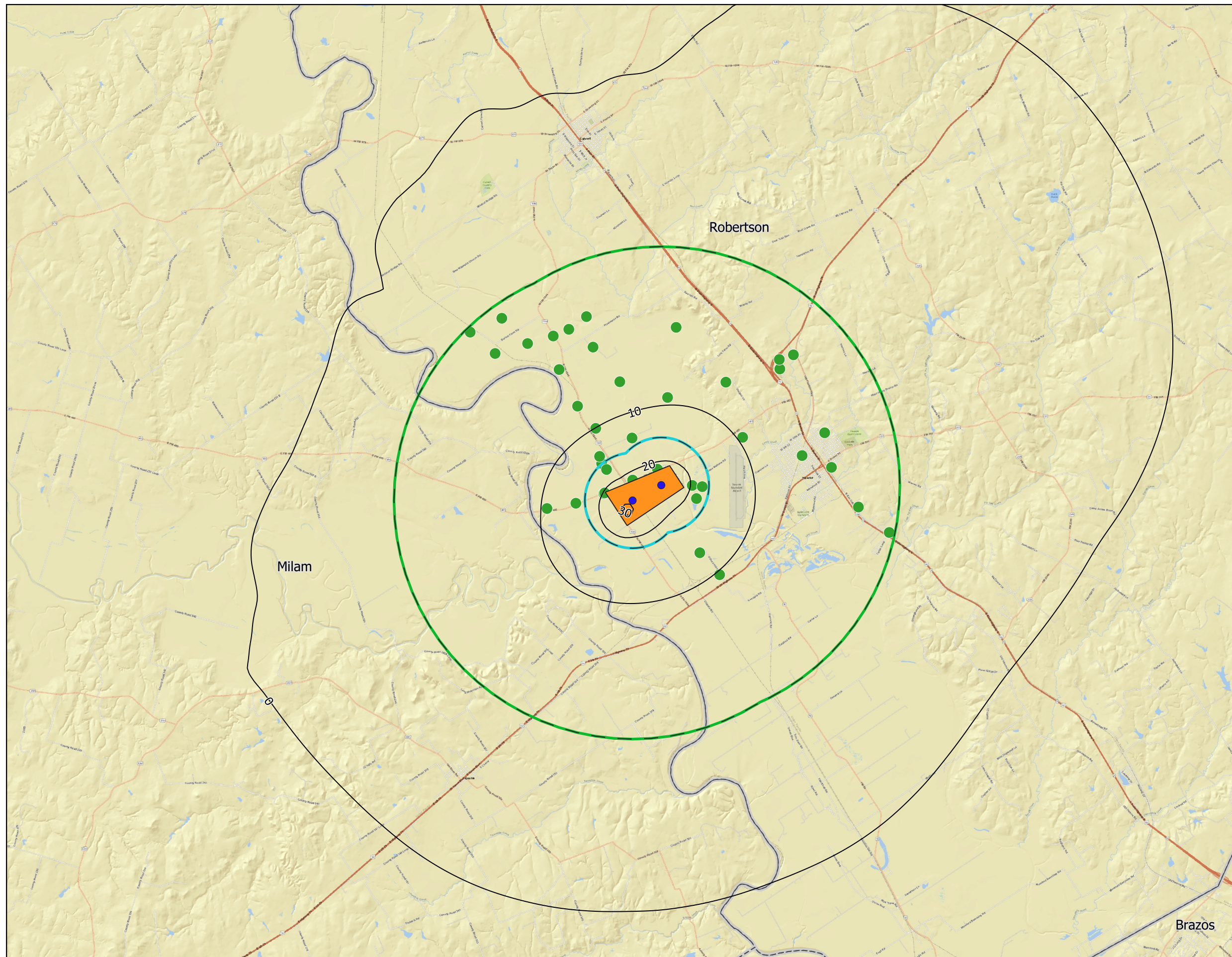
**L Wiese Moore, LLC**

Figure 6b: Well Locations w/in 1 Mile of Proposed Wells

Figure 7

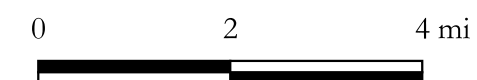






### Explanation

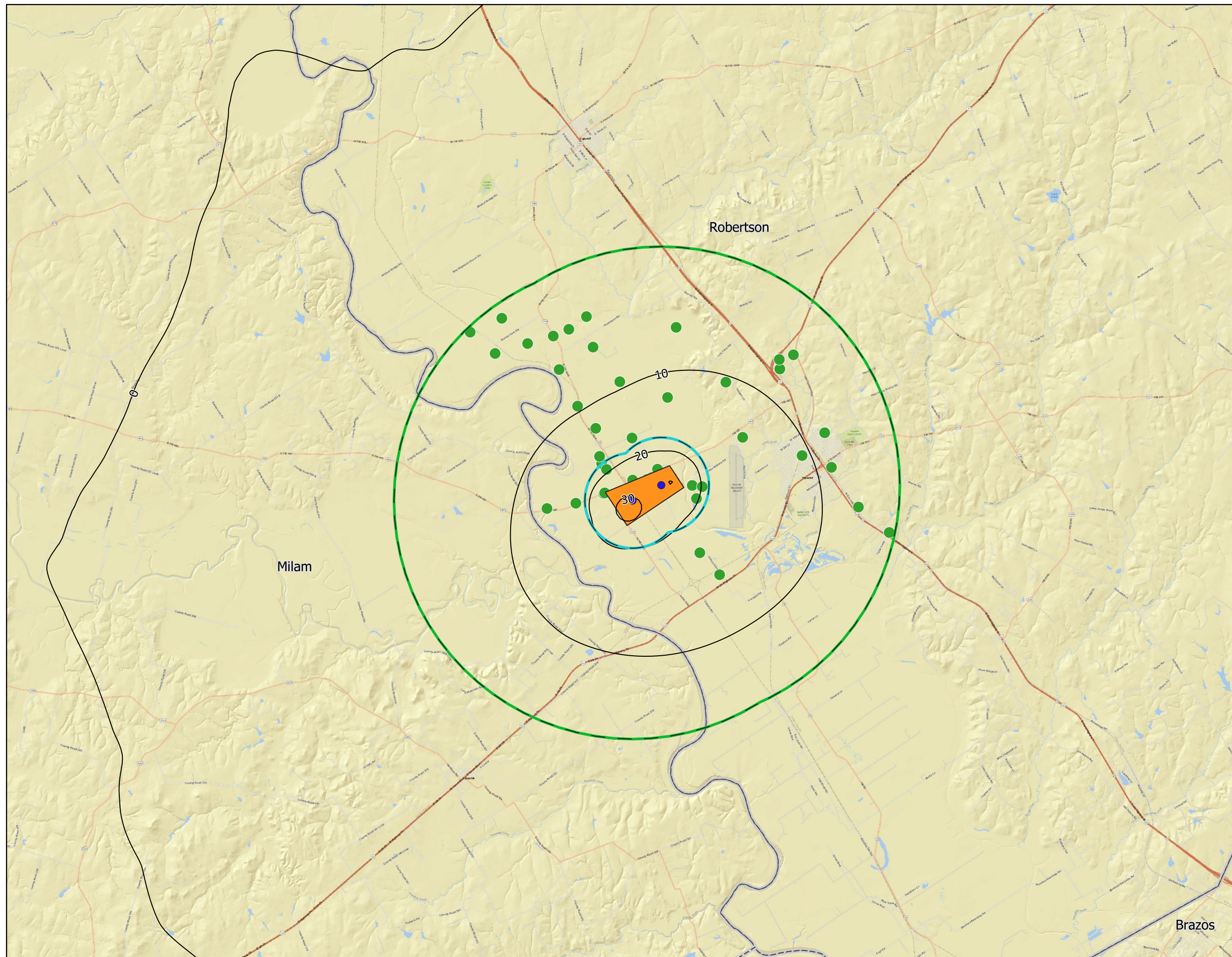
- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 1-Year Modeled Drawdown - GAM  
Contour Interval = 10 feet
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



**L Wiese Moore, LLC**

Figure 8: 1-Year GAM  
Drawdown Contours



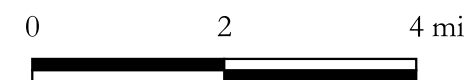


**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 10-Year Modeled Drawdown - GAM  
Contour Interval = 10 feet
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**BVGCD Reported Wells w/in 5 Miles**

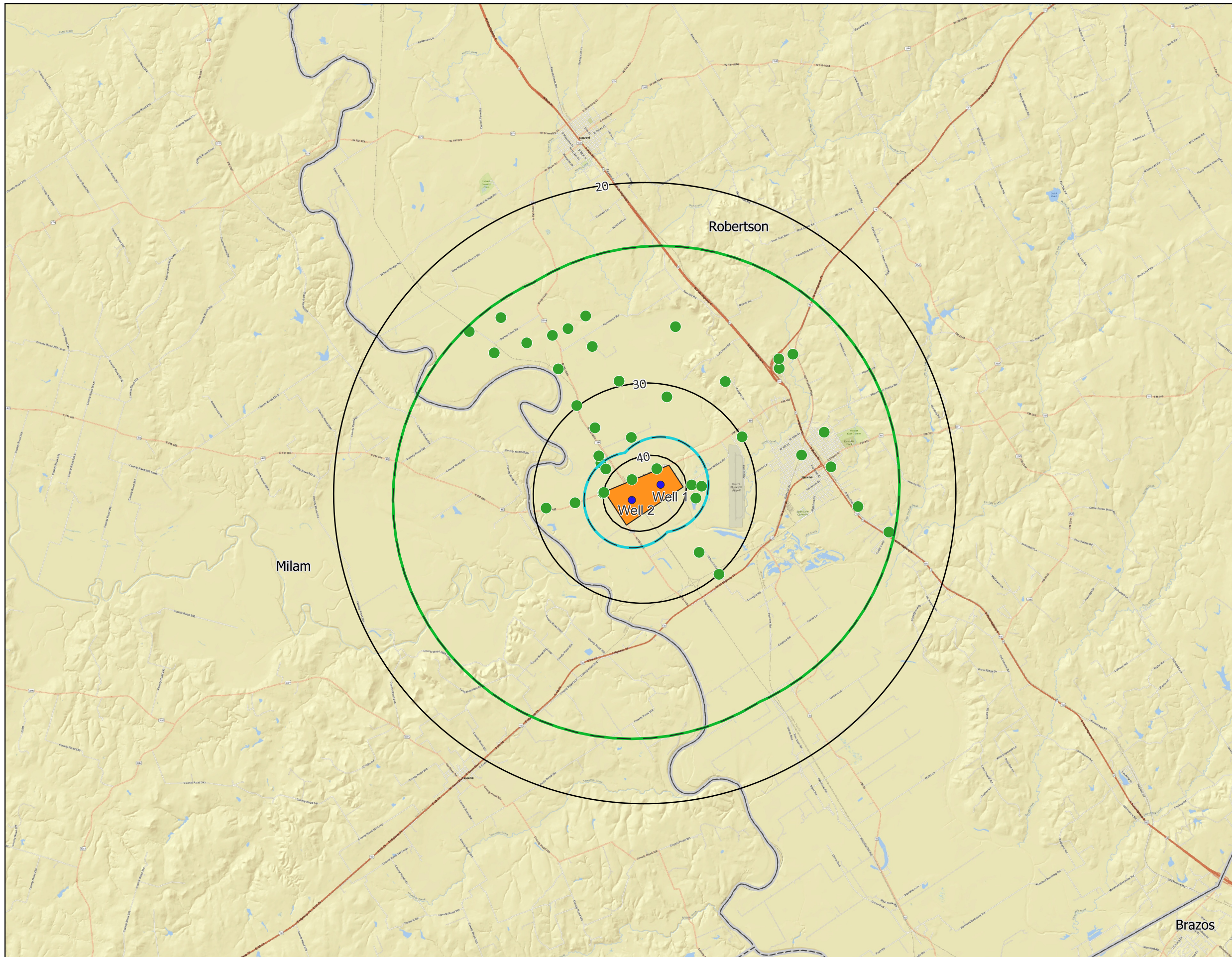
- Simsboro



**L Wiese Moore, LLC**

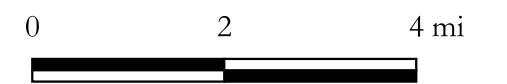
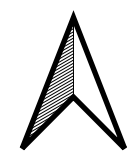
Figure 9: 10-Year GAM Drawdown Contours





**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 1-Yr Modeled Drawdown - Analytical  
Contour Interval = 10 feet
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro

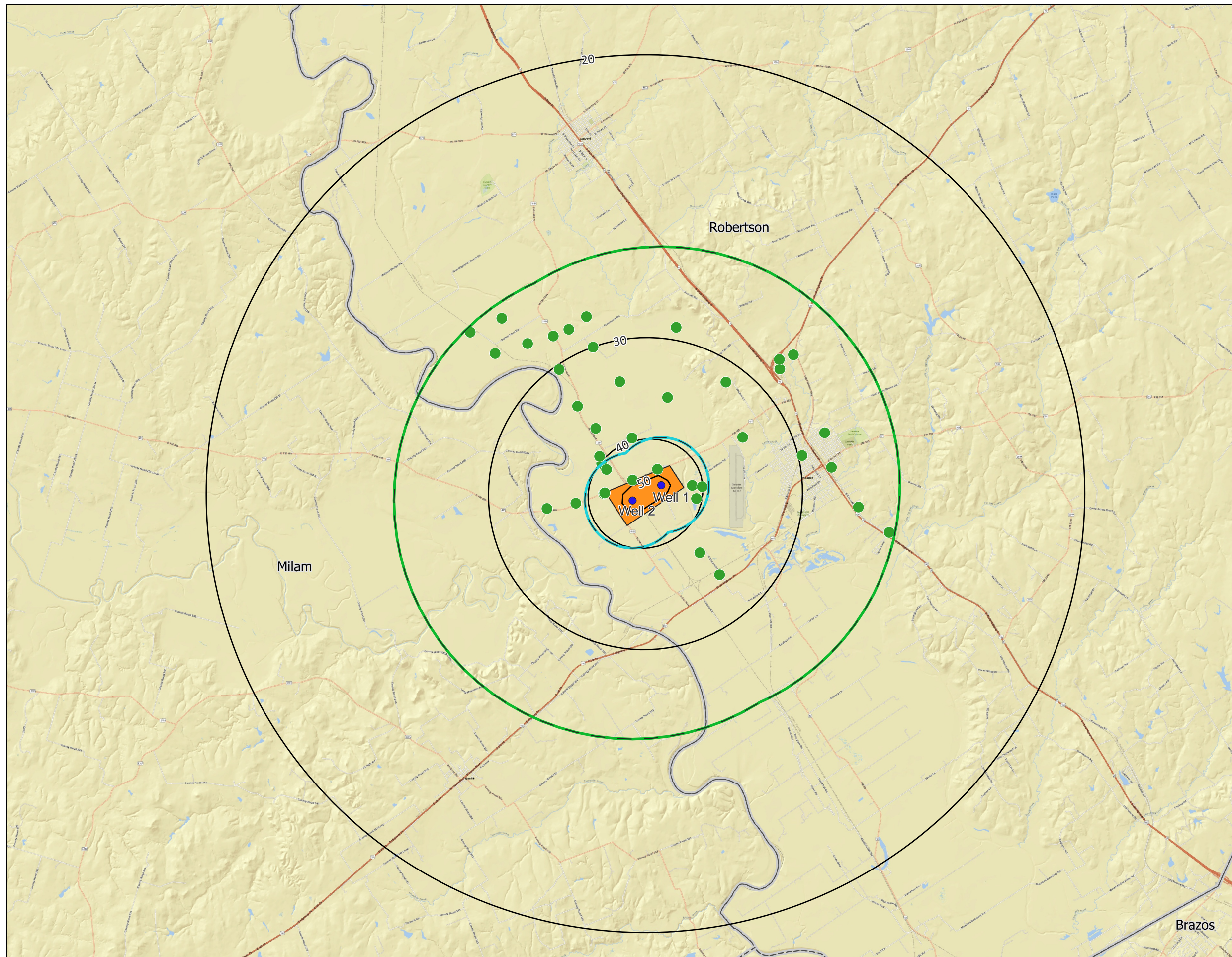


**L Wiese Moore, LLC**

Figure 10: 1-Year Analytical Drawdown Contours

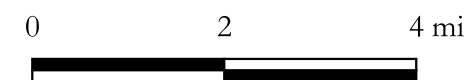






**Explanation**

- Proposed Wells
- 1 Mile Radius from Well Locations
- 5 Mile Radius from Well Locations
- 10-Yr Modeled Drawdown - Analytical  
Contour Interval = 10 feet
- Wiese Moore Property
- ▭ Counties
- BVGCD Reported Wells w/in 5 Miles**
- Simsboro



**L Wiese Moore, LLC**

Figure 11: 10-Year Analytical Drawdown Contours





ATTACHMENT 2 –  
TABLES

Table 1. Simulated Drawdown at Registered and Permitted Simsboro Wells Within a 1-Mile Radius

Owner	Registration or Permit Number	Latitude	Longitude	Well Depth	Aquifer	Casing Diameter (in)	1 Year Analytical Drawdon, ft.	10 Year Analytical Drawdown, ft.	1 Year GAM Drawdown, ft.	10 Year GAM Drawdown, ft.
CA Skiles Family Partnership, Ltd.	BVHU-1058C	30.870200	-96.668713	1,100	Simsboro	30 , 16	40	44	21	24
CA Skiles Family Partnership, Ltd.	BVHU-1058D	30.873824	-96.658706	1,131	Simsboro	30 , 16	45	48	23	26
CA Skiles Family Partnership, Ltd.	BVHU-1058E	30.876867	-96.649833	1,175	Simsboro	30 , 16	44	47	22	25
CA Skiles Family Partnership, Ltd.	BVHU-1058F	30.877300	-96.667783	1,065	Simsboro	30 , 16	38	42	17	19
Ryan, Melvin & Sandra	BVR-0380	30.867554	-96.636420	1,100	Simsboro	4 , 2	38	41	17	20
Zeig, Joey	BVR-1479	30.871121	-96.634251	1,080	Simsboro	8 , 4 , 2	37	40	17	20
Mears, Frank	BVR-1506	30.870019	-96.669033	1,250	Simsboro	2	40	43	20	23
Wallace, Zane & Virginia	BVR-1845	30.871595	-96.637759	1,100	Simsboro	4 , 2	39	42	19	22

Table 2. Simulated Drawdown at Registered and Permitted Simsboro Wells Within a 5-Mile Radius

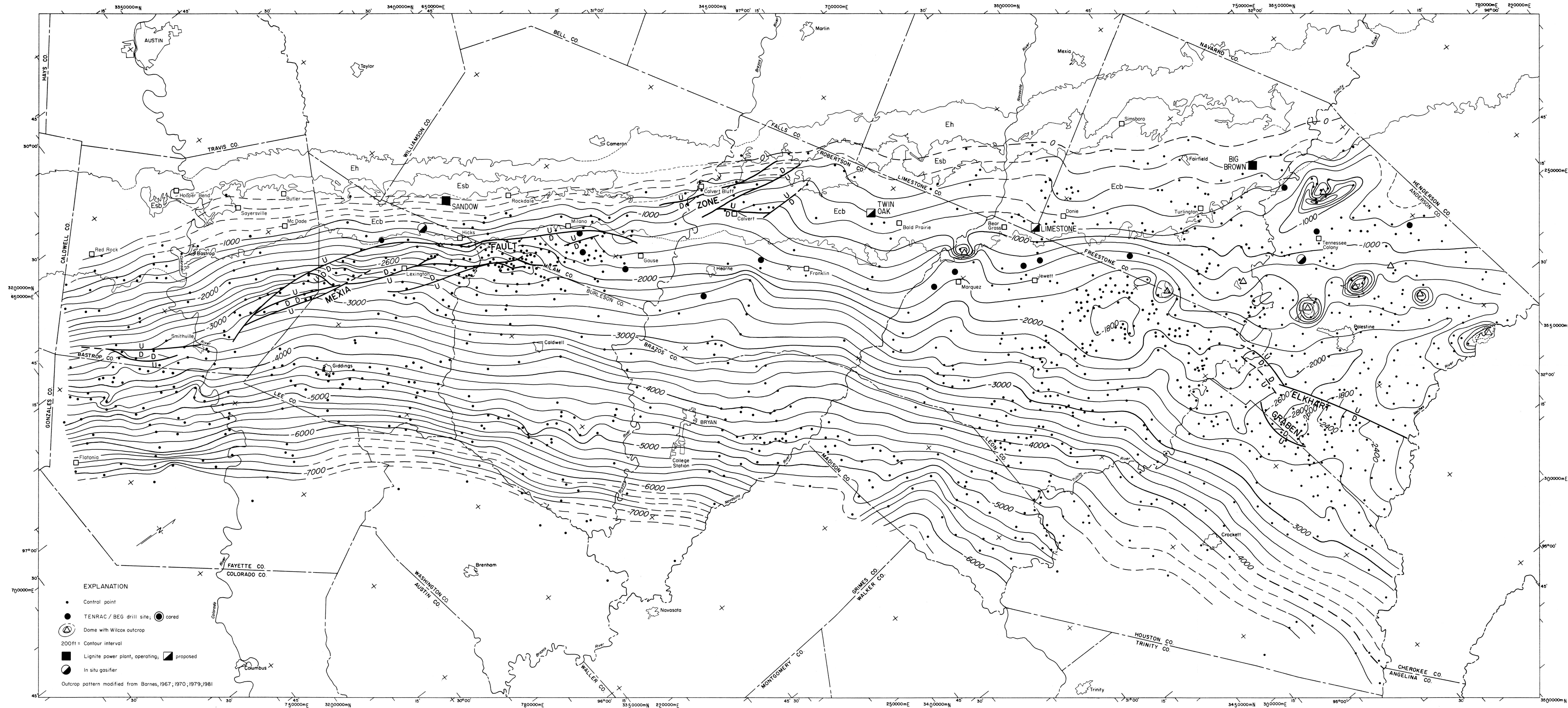
Owner	Registration or Permit Number	Latitude	Longitude	Well Depth	Aquifer	Casing Diameter (in)	1 Year Analytical Drawdown, ft.	10 Year Analytical Drawdown, ft.	1 Year GAM Drawdown, ft.	10 Year GAM Drawdown, ft.
Ryan, Sandra & Sloat, Bernadette	BVDO-0055	30.920306	-96.679457	840	Simsboro	30 , 16	25	29	4	6
Skiles, Clifford III	BVDO-0108	30.851042	-96.635889	1,242	Simsboro	30 , 16	33	36	12	15
Brien, James & Ellen	BVDO-0134	30.916389	-96.694167	778	Simsboro	30 , 16	25	28	3	5
CA Skiles Family Partnership, Ltd.	BVDO-0254	30.886626	-96.658433	1,205	Simsboro	30 , 18	36	39	13	16
CA Skiles Family Partnership, Ltd.	BVDO-0255	30.903856	-96.662094	1,240	Simsboro	30 , 18	30	33	7	10
CA Skiles Family Partnership, Ltd.	BVDO-0256	30.919825	-96.641585	1,225	Simsboro	30 , 18	26	29	5	8
City of Hearne	BVHU-0011	30.875673	-96.588479	1,433	Simsboro	14 , 8 5/8	25	28	6	9
City of Hearne	BVHU-0012	30.886263	-96.590453	1,430	Simsboro	12 , 6	25	28	6	9
City of Hearne	BVHU-0013	30.885707	-96.619201	1,441	Simsboro	10 , 8 , 6	30	33	10	13
City of Hearne	BVHU-0014	30.879554	-96.598692	1,275	Simsboro	12 , 10 , 8 , 7	26	30	7	10
CA Skiles Family Partnership, Ltd.	BVHU-1058	30.896850	-96.677267	930	Simsboro	16	30	33	7	10
CA Skiles Family Partnership, Ltd.	BVHU-1058A	30.866028	-96.689233	1,095	Simsboro	30 , 16	31	35	11	13
CA Skiles Family Partnership, Ltd.	BVHU-1058B	30.867349	-96.678991	1,090	Simsboro	30 , 16	35	38	14	17
CA Skiles Family Partnership, Ltd.	BVHU-1058C	30.870200	-96.668713	1,100	Simsboro	30 , 16	40	44	21	24
CA Skiles Family Partnership, Ltd.	BVHU-1058D	30.873824	-96.658706	1,131	Simsboro	30 , 16	45	48	23	26
CA Skiles Family Partnership, Ltd.	BVHU-1058E	30.876867	-96.649833	1,175	Simsboro	30 , 16	44	47	22	25
CA Skiles Family Partnership, Ltd.	BVHU-1058F	30.877300	-96.667783	1,065	Simsboro	30 , 16	38	42	17	19
CA Skiles Family Partnership, Ltd.	BVHU-1058G	30.898588	-96.645434	964	Simsboro	30 , 16	31	35	9	12
CA Skiles Family Partnership, Ltd.	BVHU-1058H	30.889917	-96.671117	979	Simsboro	30 , 16	33	36	10	13
CA Skiles Family Partnership, Ltd.	BVHU-1058J	30.914647	-96.671122	875	Simsboro	30 , 16	27	30	5	7
CA Skiles Family Partnership, Ltd.	BVHU-1058K	30.924333	-96.702966	720	Simsboro	30 , 16	23	26	2	4

Owner	Registration or Permit Number	Latitude	Longitude	Well Depth	Aquifer	Casing Diameter (in)	1 Year Analytical Drawdon, ft.	10 Year Analytical Drawdown, ft.	1 Year GAM Drawdown, ft.	10 Year GAM Drawdown, ft.
CA Skiles Family Partnership, Ltd.	BVHU-1058L	30.920417	-96.714283	691	Simsboro	30 , 16	23	26	2	4
Bishop, Doris & Others	BVR-0060	30.902652	-96.624694	1,193	Simsboro	4 , 2	28	31	7	10
CA Skiles Family Partnership, Ltd.	BVR-0240	30.881350	-96.670083	1,065	Simsboro	4	36	39	14	16
Ryan, Melvin & Sandra	BVR-0380	30.867554	-96.636420	1,100	Simsboro	4 , 2	38	41	17	20
Manterola, Jane Anderson	BVR-0434	30.913686	-96.705731	400	Simsboro	UNKN	24	27	3	5
Ryan, Sandra & Sloat, Bernadette	BVR-0985	30.923989	-96.673093	735	Simsboro	4 , 2	25	28	4	6
Brien, James & Ellen	BVR-1018	30.918418	-96.685023	UNKN	Simsboro	4	25	28	4	6
Zeig, Joey	BVR-1479	30.871121	-96.634251	1,080	Simsboro	8 , 4 , 2	37	40	17	20
Mears, Frank	BVR-1506	30.870019	-96.669033	1,250	Simsboro	2	40	43	20	23
Wallace, Zane & Virginia	BVR-1845	30.871595	-96.637759	1,100	Simsboro	4 , 2	39	42	19	22
Zeig, Larry J.	BVR-3187	30.908888	-96.605462	1,270	Simsboro	4 , 2	25	28	5	9
Swaner, Ronald D.	BVR-3190	30.906117	-96.605510	1,225	Simsboro	4 , 2	25	29	6	9





ATTACHMENT 3 –  
REFERENCE MATERIALS



- EXPLANATION**
- Control point
  - TENRAC / BEG drill site; ● cored
  - ⊙ Dome with Wilcox outcrop
  - 200ft = Contour interval
  - Lignite power plant, operating; ▨ proposed
  - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967, 1970, 1979, 1981

- Ecb Calvert Bluff Formation
- Esb Simsboro Formation
- Eh Hooper Formation

Base map adapted from Army Map Service base maps, 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

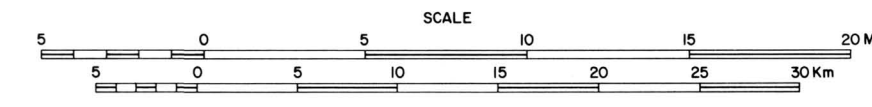
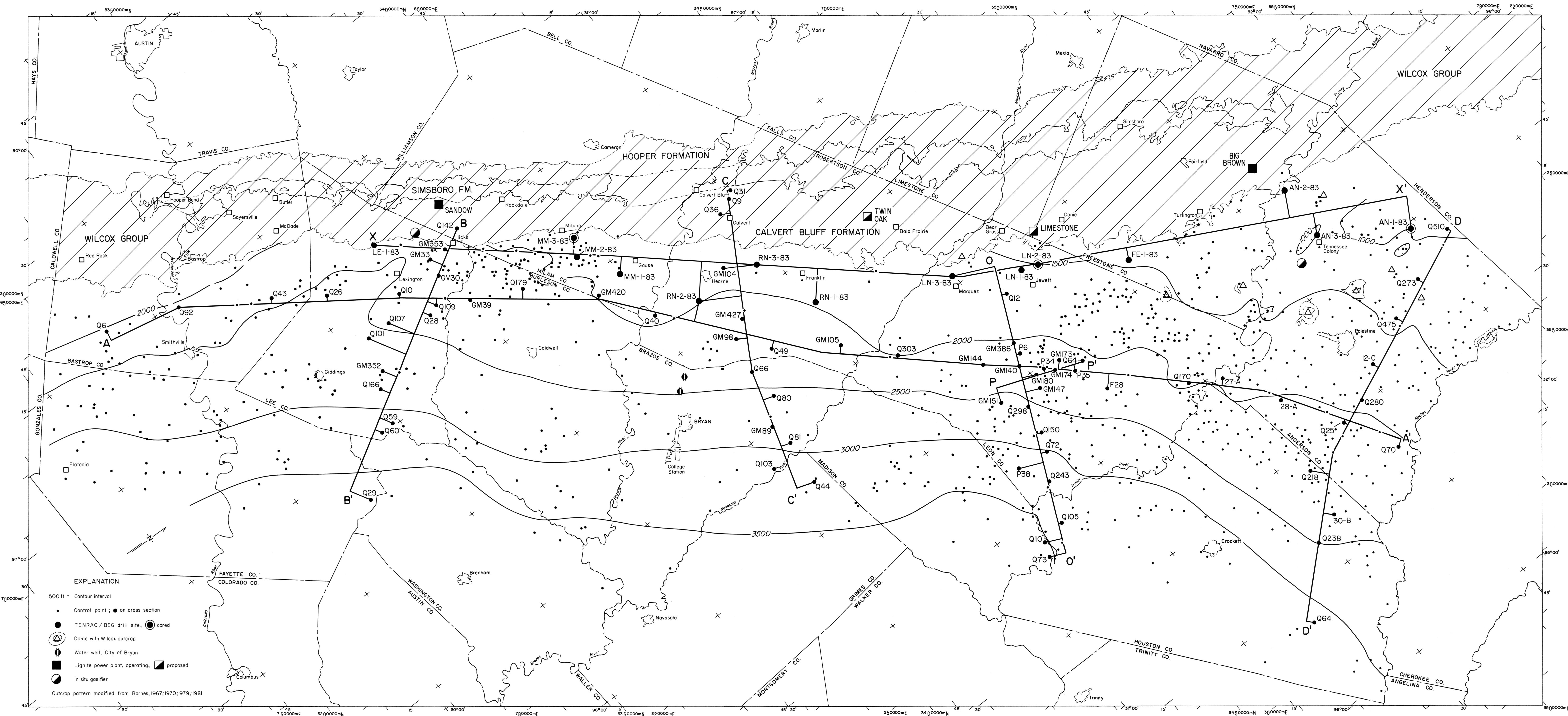


PLATE 2. WILCOX STRUCTURE MAP

1985

Generalized structure map drawn on the base of the Wilcox Group (sea-level datum) shows regional dip to the southeast. The angle of dip increases from the northeast (1/2°) to the southwest (2°). Major structural elements are the Mexia Fault Zone, the Elkhart Graben, salt structures in Anderson and Freestone Counties, and the East Texas Basin (fig. 2).





- EXPLANATION**
- 500 ft = Contour interval
  - Control point; ● on cross section
  - TENRAC / BEG drill site; ● cored
  - ⊙ Dome with Wilcox outcrop
  - ⊕ Water well, City of Bryan
  - Lignite power plant, operating; ▣ proposed
  - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967; 1970; 1979; 1981

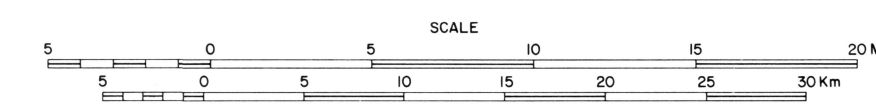


PLATE 3. WILCOX ISOPACH MAP AND LOCATIONS OF CROSS SECTIONS

1985

Base map adapted from Army Map Service base maps. 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

The Wilcox Group thickens from less than 1,000 ft (305 m) on the north to more than 3,500 ft (1,065 m) at the basinward margin of the study area. The local increase in thickness in central Lee County is attributed to syndepositional movement along the Mexia Fault Zone (fig. 2 and pl. 2).





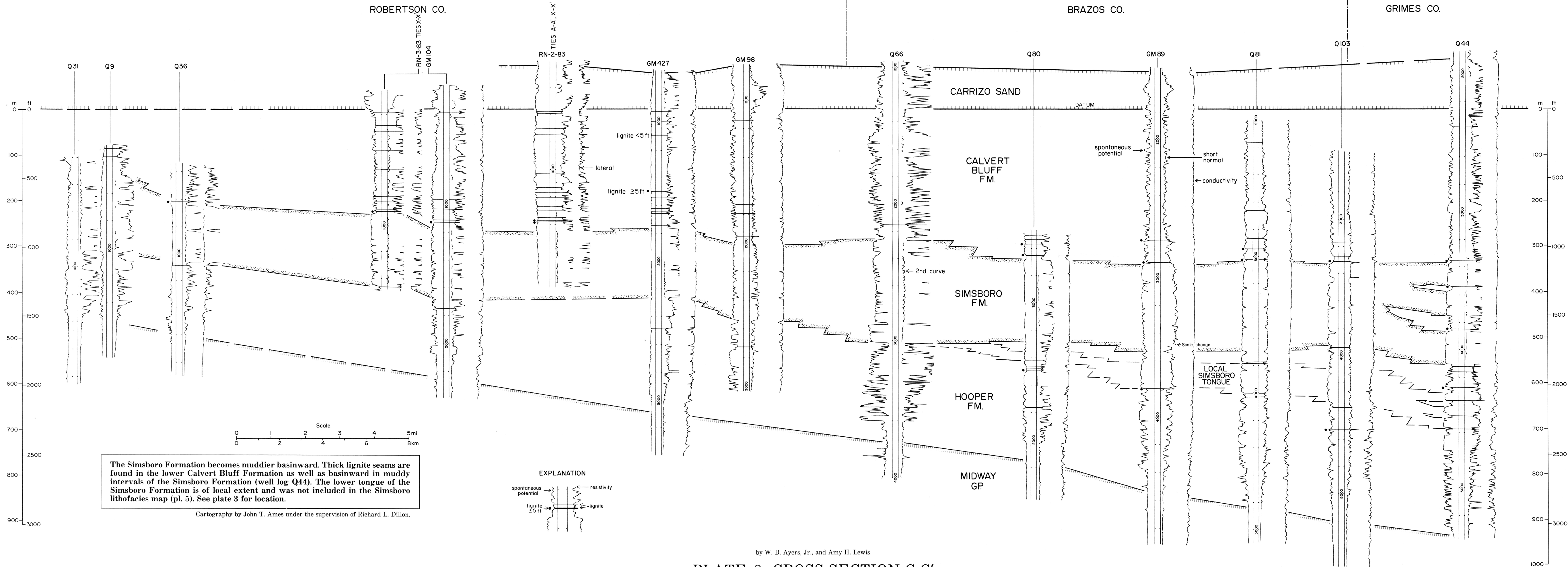


C

NORTHWEST

C'

SOUTHEAST



The Simsboro Formation becomes muddier basinward. Thick lignite seams are found in the lower Calvert Bluff Formation as well as basinward in muddy intervals of the Simsboro Formation (well log Q44). The lower tongue of the Simsboro Formation is of local extent and was not included in the Simsboro lithofacies map (pl. 5). See plate 3 for location.

Cartography by John T. Ames under the supervision of Richard L. Dillon.

EXPLANATION

spontaneous potential

resistivity

lignite <5 ft

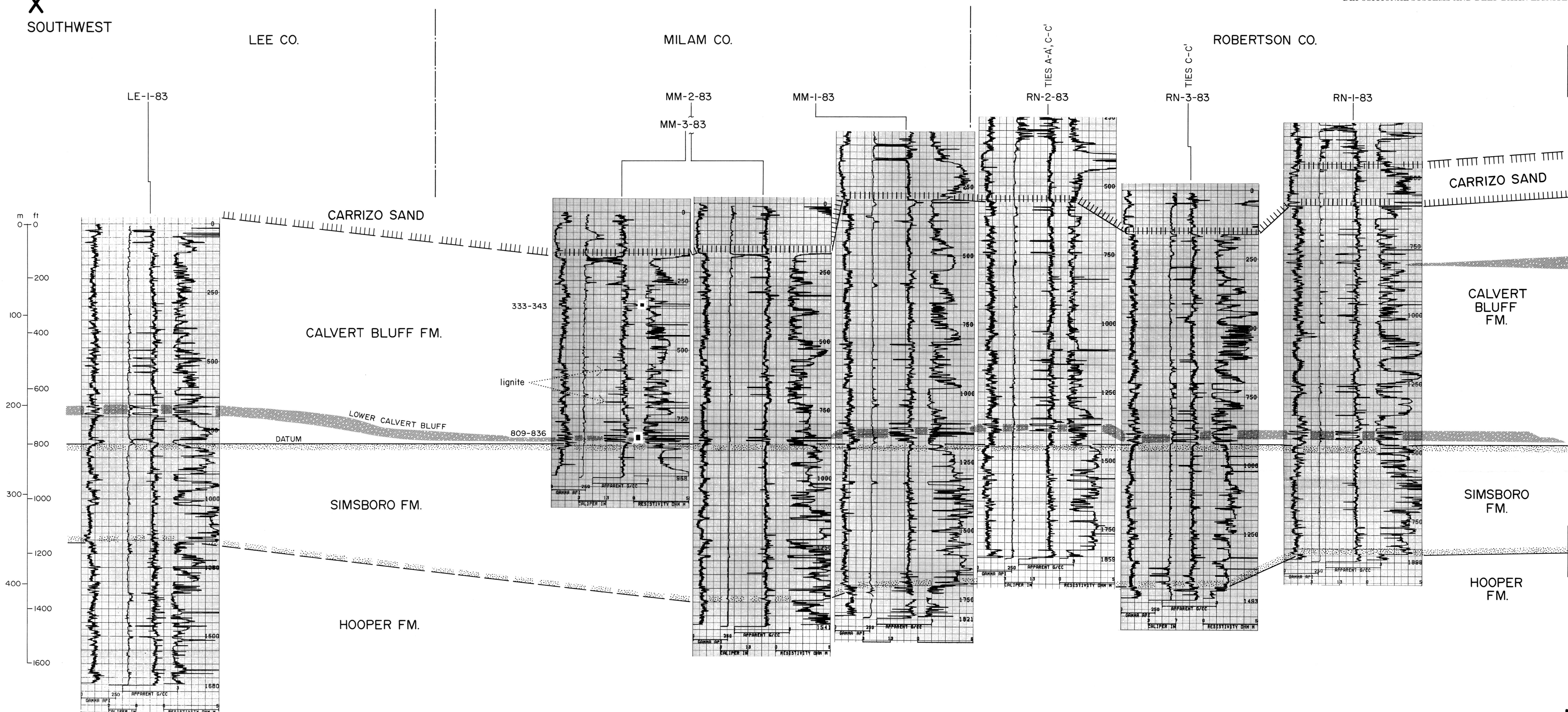
lignite >5 ft

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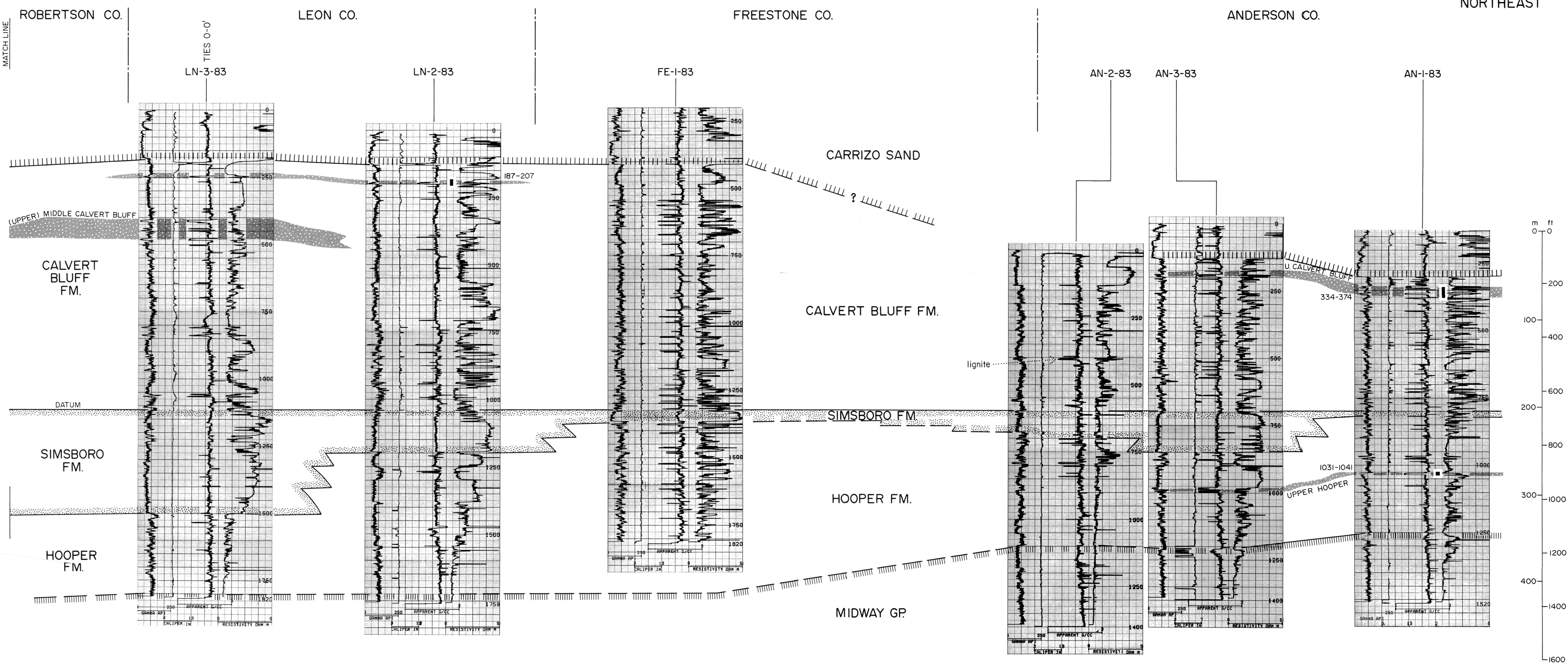
PLATE 8. CROSS SECTION C-C'  
 1985



X  
SOUTHWEST



X'  
NORTHEAST

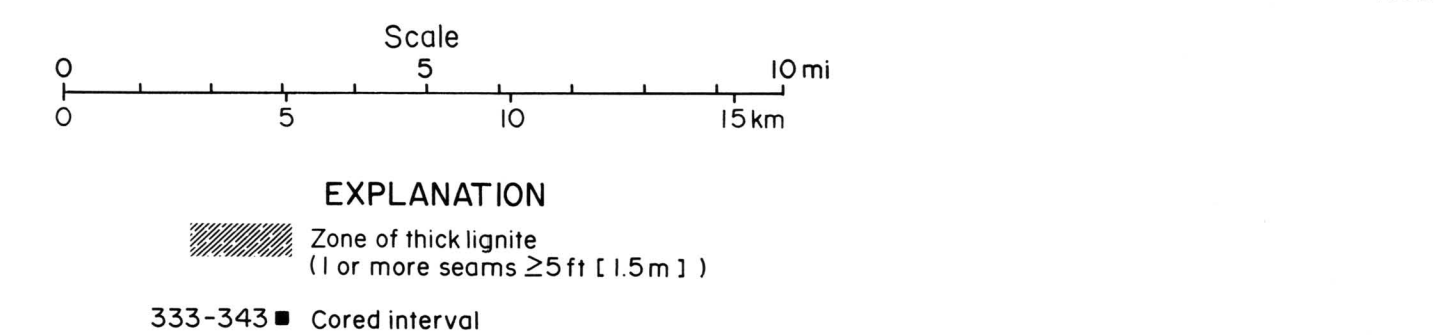


Geophysical logs from Texas Energy and Natural Resources Advisory Council/Bureau of Economic Geology wells show the stratigraphic occurrence of deep lignite (200 to 2,000 ft [61 to 610 m]) in east-central Texas. Thick lignite seams (seams 5 ft [1.5 m] or thicker) are found in the (a) upper Hooper Formation on the northeast, (b) lower Calvert Bluff Formation on the southwest, and (c) upper Calvert Bluff Formation on the northeast. Lateral continuity of individual lignite seams within the zones is neither implied nor true; wells were drilled in low-sand (floodbasin) areas between major-sand axes, which limit seam continuity. See plate 3 for location. Full-scale geophysical well logs are available from the Bureau of Economic Geology.

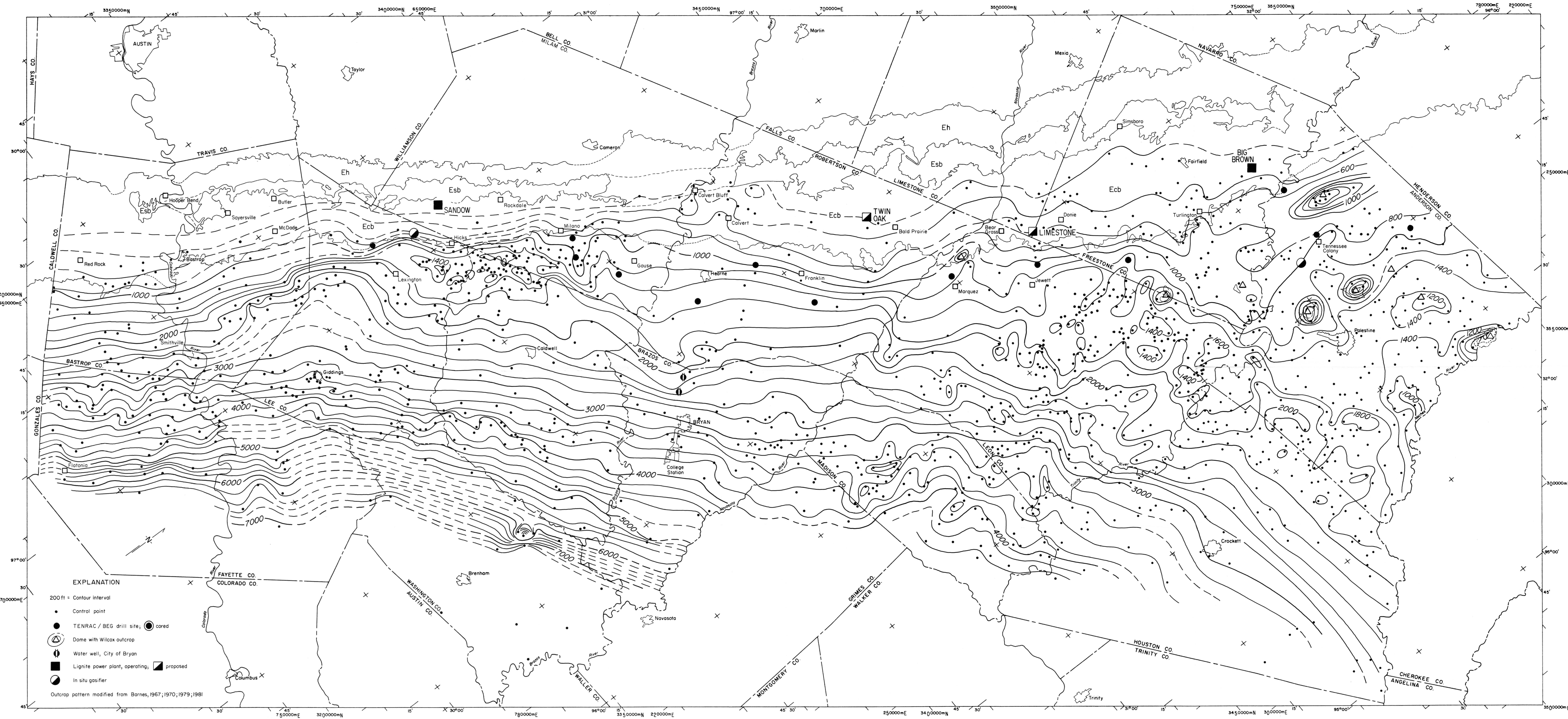
Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis

PLATE 22. LIGNITE CROSS SECTION X-X'  
1985





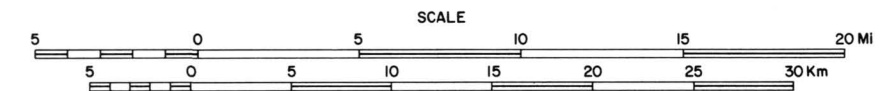


- EXPLANATION**
- 200 ft = Contour interval
  - Control point
  - TENRAC / BEG drill site; ● cored
  - ⊙ Dome with Wilcox outcrop
  - ⊕ Water well, City of Bryan
  - Lignite power plant, operating; ▣ proposed
  - ⊙ In situ gasifier
- Outcrop pattern modified from Barnes, 1967; 1970; 1979; 1981

- Ecb Calvert Bluff Formation
- Esb Simsboro Formation
- Eh Hooper Formation

Base map adapted from Army Map Service base maps, 10,000-meter Universal Transverse Mercator grid, zones 14 and 15. Cartography by John T. Ames under the supervision of Richard L. Dillon.

by W. B. Ayers, Jr., and Amy H. Lewis



**PLATE 28. SIMSBORO OVERBURDEN MAP**

1985

The depth to the top of the Simsboro (Simsboro overburden) provides an estimate of the depth required to test the entire lignite-bearing Calvert Bluff Formation.

04E1984-28

[GWDB Reports and Downloads](#)

**Well Basic Details**

[Scanned Documents](#)

State Well Number	5903437
County	Robertson
River Basin	Brazos
Groundwater Management Area	12
Regional Water Planning Area	G - Brazos G
Groundwater Conservation District	Brazos Valley GCD
Latitude (decimal degrees)	30.938611
Latitude (degrees minutes seconds)	30° 56' 19" N
Longitude (decimal degrees)	-96.741667
Longitude (degrees minutes seconds)	096° 44' 30" W
Coordinate Source	+/- 1 Second
Aquifer Code	124SMBR - Simsboro Sand Member of Rockdale Formation
Aquifer	Carrizo-Wilcox
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	290
Land Surface Elevation Method	Interpolated From Topo Map
Well Depth (feet below land surface)	460
Well Depth Source	Owner
Drilling Start Date	
Drilling End Date	0/0/1975
Drilling Method	
Borehole Completion	

Well Type	Withdrawal of Water
Well Use	Domestic
Water Level Observation	GCD Current Site Visit
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	
Power Type	Electric Motor
Annular Seal Method	
Surface Completion	
Owner	Lee Fazzino Sr.
Driller	G. P. Brien
Other Data Available	
Well Report Tracking Number	
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	
Groundwater Conservation District Well Number	
Owner Well Number	
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Water Development Board
Created Date	11/12/1992
Last Update Date	9/5/2014

**Remarks** Historical observation well.

<b>Casing</b>						
Diameter (in.)	Casing Type	Casing Material	Schedule	Gauge	Top Depth (ft.)	Bottom Depth (ft.)
4	Blank				0	160
2	Screen				450	460

**Well Tests - No Data**

**Lithology - No Data**

**Annular Seal Range - No Data**

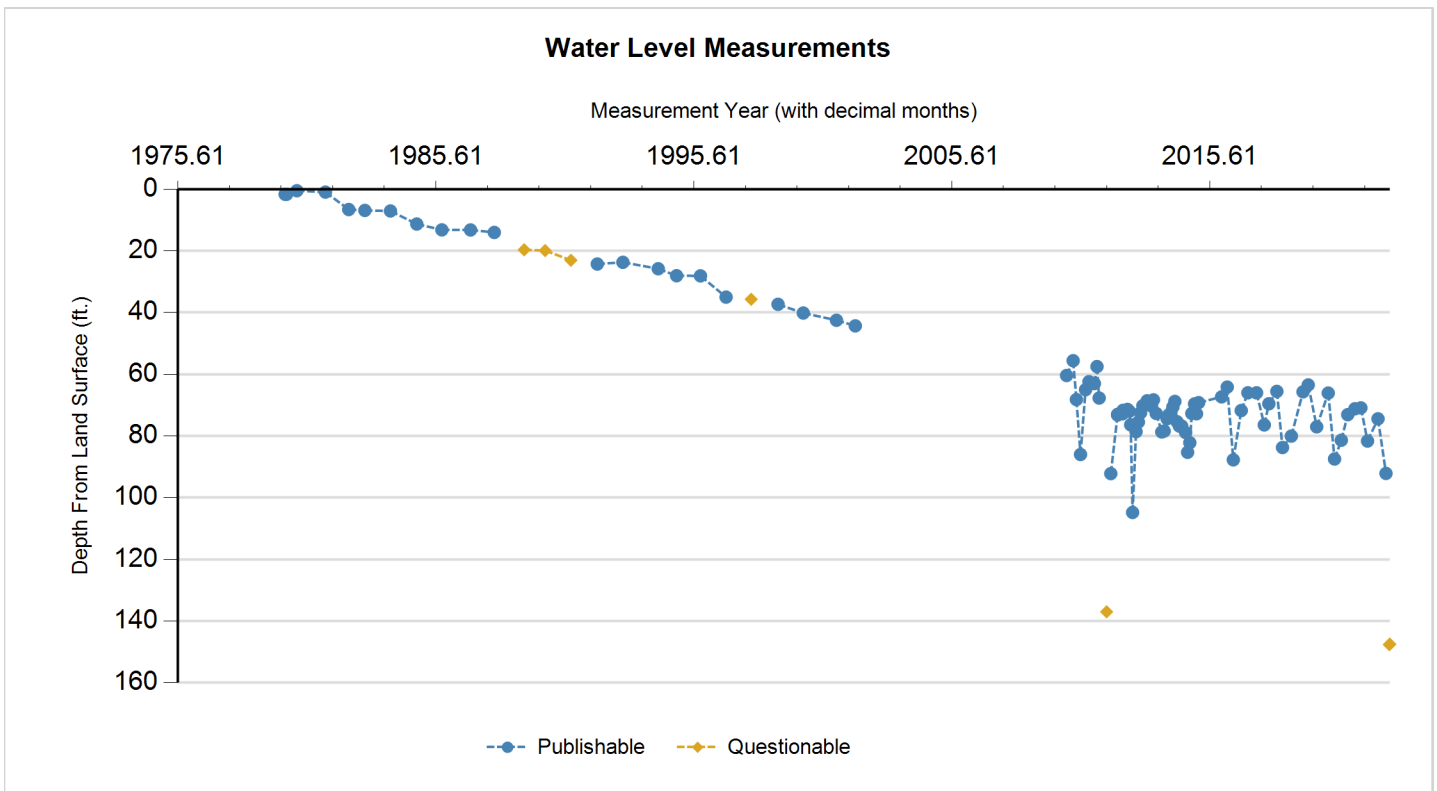
**Borehole - No Data**

**Plugged Back - No Data**

**Filter Pack - No Data**

**Packers - No Data**





Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
X	8/12/1975					1	Registered Water Well Driller		27	
P	10/9/1979		1.65		288.35	1	Other or Source of Measurement Unknown	Unknown		
P	10/29/1979		1.65	0.00	288.35	1	Texas Water Development Board	Steel Tape		
P	3/20/1980		0.5	(1.15)	289.5	1	Texas Water Development Board	Steel Tape		
P	4/29/1981		0.95	0.45	289.05	1	Texas Water Development Board	Steel Tape		
P	3/24/1982		6.6	5.65	283.4	1	Texas Water Development Board	Steel Tape		
P	11/12/1982		6.88	0.28	283.12	1	Texas Water Development Board	Steel Tape		
P	11/9/1983		7.07	0.19	282.93	1	Texas Water Development Board	Steel Tape		
P	11/16/1984		11.3	4.23	278.7	1	Texas Water Development Board	Steel Tape		
P	11/6/1985		13.19	1.89	276.81	1	Texas Water Development Board	Steel Tape		
P	12/17/1986		13.22	0.03	276.78	1	Texas Water Development Board	Steel Tape		
P	11/18/1987		14.02	0.80	275.98	1	Texas Water Development Board	Steel Tape		
Q	1/11/1989		19.65	5.63	270.35	1	Texas Water Development Board	Steel Tape	2	
Q	11/8/1989		19.9	0.25	270.1	1	Texas Water Development Board	Steel Tape	2	
Q	11/7/1990		23.05	3.15	266.95	1	Texas Water Development Board	Steel Tape	2	
P	11/15/1991		24.26	1.21	265.74	1	Texas Water Development Board	Steel Tape		
P	11/12/1992		23.7	(0.56)	266.3	1	Texas Water Development Board	Steel Tape		
P	3/22/1994		25.8	2.10	264.2	1	Texas Water Development Board	Steel Tape		
P	12/12/1994		28.05	2.25	261.95	1	Texas Water Development Board	Steel Tape		
P	11/15/1995		28.1	0.05	261.9	1	Texas Water Development Board	Steel Tape		
P	11/12/1996		35	6.90	255	1	Texas Water Development Board	Steel Tape		

**Texas Water Development Board (TWDB)  
Groundwater Database (GWDB)  
Well Information Report for State Well Number  
59-03-437**

Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
Q	11/3/1997		35.7	0.70	254.3	1	Texas Water Development Board	Steel Tape	2	
P	11/17/1998		37.32	1.62	252.68	1	Texas Water Development Board	Steel Tape		
P	11/9/1999		40.15	2.83	249.85	1	Texas Water Development Board	Steel Tape		
P	2/19/2001		42.5	2.35	247.5	1	Texas Water Development Board	Steel Tape		
P	11/15/2001		44.31	1.81	245.69	1	Texas Water Development Board	Steel Tape		
X	11/11/2002					1	Texas Water Development Board		30	
X	10/9/2003					1	Texas Water Development Board		30	
X	2/26/2005					1	Texas Water Development Board		30	
X	12/14/2005					1	Texas Water Development Board		30	
P	1/19/2010		60.4		229.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/22/2010		55.6	(4.80)	234.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/8/2010		68.2	12.60	221.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	8/6/2010		86	17.80	204	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/18/2010		65	(21.00)	225	1	Groundwater Conservation District	Sonic/Laser Device		
P	12/6/2010		62.4	(2.60)	227.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	2/17/2011		63	0.60	227	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/24/2011		57.5	(5.50)	232.5	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/25/2011		67.7	10.20	222.3	1	Groundwater Conservation District	Sonic/Laser Device		
Q	8/11/2011		137	69.30	153	1	Groundwater Conservation District	Sonic/Laser Device	12	
P	10/10/2011		92.2	(44.80)	197.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	1/10/2012		73.2	(19.00)	216.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	1/11/2012		73	(0.20)	217	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/20/2012		72.8	(0.20)	217.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/27/2012		71.7	(1.10)	218.3	1	Groundwater Conservation District	Sonic/Laser Device		
P	5/31/2012		71.4	(0.30)	218.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/26/2012		72	0.60	218	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/16/2012		76.4	4.40	213.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	8/13/2012		104.8	28.40	185.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/2/2012		78.6	(26.20)	211.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	11/5/2012		75.5	(3.10)	214.5	1	Groundwater Conservation District	Sonic/Laser Device		
P	12/6/2012		72.5	(3.00)	217.5	1	Groundwater Conservation District	Sonic/Laser Device		

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59-03-437**

Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	1/3/2013		70.2	(2.30)	219.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	2/7/2013		69.8	(0.40)	220.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/4/2013		68.6	(1.20)	221.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/2/2013		69.1	0.50	220.9	1	Groundwater Conservation District	Sonic/Laser Device		
P	5/6/2013		70.3	1.20	219.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/3/2013		68.3	(2.00)	221.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/12/2013		72.7	4.40	217.3	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/1/2013		78.7	6.00	211.3	1	Groundwater Conservation District	Sonic/Laser Device		
P	11/5/2013		78.4	(0.30)	211.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	12/16/2013		74.4	(4.00)	215.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	1/3/2014		73.2	(1.20)	216.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	2/3/2014		72.6	(0.60)	217.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/3/2014		70.6	(2.00)	219.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/1/2014		68.8	(1.80)	221.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	5/2/2014		75.4	6.60	214.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/5/2014		76.8	1.40	213.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/7/2014		76.8	0.00	213.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	9/4/2014		78.9	2.10	211.1	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/1/2014		85.3	6.40	204.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	11/3/2014		82.2	(3.10)	207.8	1	Groundwater Conservation District	Sonic/Laser Device		
P	12/1/2014		72.7	(9.50)	217.3	1	Groundwater Conservation District	Sonic/Laser Device		
P	1/5/2015		69.6	(3.10)	220.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	2/2/2015		72.8	3.20	217.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/2/2015		69.2	(3.60)	220.8	1	Groundwater Conservation District	Electric Line		
P	1/22/2016		67.33	(1.87)	222.67	1	Groundwater Conservation District	Electric Line		
P	4/12/2016		64.16	(3.17)	225.84	1	Groundwater Conservation District	Electric Line		
P	7/8/2016		87.74	23.58	202.26	1	Groundwater Conservation District	Electric Line		

**Texas Water Development Board (TWDB)  
Groundwater Database (GWDB)  
Well Information Report for State Well Number  
59-03-437**

Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	10/30/2016		71.75	(15.99)	218.25	1	Groundwater Conservation District	Electric Line		
P	1/29/2017		66.02	(5.73)	223.98	1	Groundwater Conservation District	Electric Line		
P	6/2/2017		66.02	0.00	223.98	1	Groundwater Conservation District	Electric Line		
P	9/21/2017	13:2	76.42	10.40	213.58	1	Groundwater Conservation District	Electric Line		
P	11/26/2017	17:1	69.56	(6.86)	220.44	1	Groundwater Conservation District	Steel Tape		
P	3/14/2018	10:5	65.55	(4.01)	224.45	1	Groundwater Conservation District	Electric Line		
P	6/4/2018	12:1	83.75	18.20	206.25	1	Groundwater Conservation District	Electric Line		
P	10/9/2018		80.04	(3.71)	209.96	1	Groundwater Conservation District	Electric Line		Static < 24 hrs
P	3/19/2019		65.69	(14.35)	224.31	1	Groundwater Conservation District	Electric Line		Static
P	6/3/2019		63.46	(2.23)	226.54	1	Groundwater Conservation District	Steel Tape		Static
P	10/3/2019		77.04	13.58	212.96	1	Groundwater Conservation District	Steel Tape		Static < 24 hrs
P	3/11/2020		66.09	(10.95)	223.91	1	Groundwater Conservation District	Electric Line		Static
P	6/10/2020		87.47	21.38	202.53	1	Groundwater Conservation District	Steel Tape		Static < 24 hrs
P	9/16/2020		81.38	(6.09)	208.62	1	Groundwater Conservation District	Steel Tape		
P	12/17/2020		73.1	(8.28)	216.9	1	Groundwater Conservation District	Steel Tape		
P	3/22/2021		71.2	(1.90)	218.8	1	Groundwater Conservation District	Steel Tape		
P	6/18/2021		70.89	(0.31)	219.11	1	Groundwater Conservation District	Steel Tape		
P	9/22/2021		81.64	10.75	208.36	1	Groundwater Conservation District	Steel Tape		
P	2/15/2022		74.44	(7.20)	215.56	1	Groundwater Conservation District	Steel Tape		
P	6/8/2022		92.14	17.70	197.86	1	Groundwater Conservation District	Electric Line		
Q	7/26/2022		147.65	55.51	142.35	1	Groundwater Conservation District	Steel Tape	12	Farm Pivot
Q	8/2/2022		147.5	(0.15)	142.5	1	Groundwater Conservation District	Sonic/Laser Device	12	

**Code Descriptions**

Status Code	Status Description
P	Publishable
Q	Questionable
X	No Measurement

Remark ID	Remark Description
2	Pumping-level measurement
12	Uncertain of reason for questionable measurement
27	Well flowing and unable to shut-in
30	Well temporarily inaccessible due to impassable roads, locked gate, etc.



### Water Quality Analysis

**Sample Date:** 3/20/1980    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board  
**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation  
**Analyzed Lab:** Texas Department of Health    **Reliability:** Collected from pumped well, but not filtered or preserved  
**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		5	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		318	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		375.87	mg/L	
00910	CALCIUM (MG/L)		4	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		6	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		43	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.4	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		12	mg/L	
00920	MAGNESIUM (MG/L)		0.5	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.1	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.5	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.12		
00955	SILICA, DISSOLVED (MG/L AS SiO2)		15	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		21.31		
00932	SODIUM, CALCULATED, PERCENT		96	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)		170	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		755	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		2.9	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		23	C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		426	mg/L	

### Water Quality Analysis

**Sample Date:** 7/29/1987    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** Texas Department of Health

**Reliability:** Reliability unknown or not available

**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)			5 mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)			316 mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)			373.43 mg/L	
00910	CALCIUM (MG/L)			4 mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)			6 mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)			45 mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)			0.4 mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)			14 mg/L	
00920	MAGNESIUM (MG/L)			1 mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)			0.04 mg/L	
00400	PH (STANDARD UNITS), FIELD			8.5 SU	
00937	POTASSIUM, TOTAL (MG/L AS K)			1 mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED			6.04	
00955	SILICA, DISSOLVED (MG/L AS SiO2)			15 mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)			19.7	
00932	SODIUM, CALCULATED, PERCENT			96 PCT	
00929	SODIUM, TOTAL (MG/L AS Na)			170 mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)			755 MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)			3 mg/L	
00010	TEMPERATURE, WATER (CELSIUS)			25 C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)			429 mg/L	

\* Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..

**GWDB DISCLAIMER:** Except where noted, all of the information provided in the Texas Water Development Board (TWDB) Groundwater Database (<https://www.twdb.texas.gov/groundwater/data/gwdbbrpt.asp>) is believed to be accurate and reliable; however, the TWDB assumes no responsibility for any errors appearing in rules or otherwise. Further, TWDB assumes no responsibility for the use of the information provided. PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency and/or suitability of all information themselves. TWDB makes no guarantees or warranties as to the accuracy, completeness, currency, or suitability of the information provided via the Groundwater Database (GWDB). TWDB specifically disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains. For additional information or answers to questions concerning the TWDB GWDB, contact the Groundwater Data Team at [GroundwaterData@twdb.texas.gov](mailto:GroundwaterData@twdb.texas.gov).

[GWDB Reports and Downloads](#)

**Well Basic Details**

[Scanned Documents](#)

State Well Number	5904701
County	Robertson
River Basin	Brazos
Groundwater Management Area	12
Regional Water Planning Area	G - Brazos G
Groundwater Conservation District	Brazos Valley GCD
Latitude (decimal degrees)	30.885834
Latitude (degrees minutes seconds)	30° 53' 09" N
Longitude (decimal degrees)	-96.619444
Longitude (degrees minutes seconds)	096° 37' 10" W
Coordinate Source	Global Positioning System - GPS
Aquifer Code	124SMBR - Simsboro Sand Member of Rockdale Formation
Aquifer	Carrizo-Wilcox
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	296
Land Surface Elevation Method	Interpolated From Topo Map
Well Depth (feet below land surface)	1441
Well Depth Source	Driller's Log
Drilling Start Date	
Drilling End Date	11/13/1942
Drilling Method	Mud (Hydraulic) Rotary
Borehole Completion	Gravel Pack w/Screen

Well Type	Withdrawal of Water
Well Use	Public Supply
Water Level Observation	GCD Current Site Visit
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	
Power Type	Electric Motor
Annular Seal Method	
Surface Completion	
Owner	City of Hearne Well #4 POW Camp
Driller	Layne-Texas Co.
Other Data Available	Drillers Log
Well Report Tracking Number	
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	G1980004D
Groundwater Conservation District Well Number	
Owner Well Number	4 POW Camp
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Water Development Board
Created Date	3/13/1998
Last Update Date	4/19/2017

Remarks

<b>Casing</b>						
Diameter (in.)	Casing Type	Casing Material	Schedule	Gauge	Top Depth (ft.)	Bottom Depth (ft.)
10	Blank	Steel			0	110
8	Blank	Steel			0	1203
6	Blank	Steel			1163	1221
6	Screen	Stainless Steel			1221	1261
6	Screen	Stainless Steel			1276	1316
6	Screen	Stainless Steel			1326	1426

**Well Tests - No Data**

<b>Lithology</b>		
Top Depth (ft.)	Bottom Depth (ft.)	Description
0	40	Yellow Sand
40	46	Shale
46	48	Rock

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48	69	Sand
69	73	Shale
73	74	Rock
74	87	Shale
87	264	Sand
264	288	Shale
288	299	Hard Sand
299	300	Rock
300	325	Hard Sand
325	409	Shale and Sand
409	427	Sand
427	493	Shale
493	504	Sandy Shale
504	505	Rock
505	521	Shale
521	522	Rock
522	556	Shale and Sand
556	560	Sand
560	596	Shale and Lignite
596	628	Shale and Sand
628	629	Rock
629	656	Shale
656	678	Sand
678	708	Shale and Sand
708	718	Hard Shale and Sand
718	723	Shale and Sand
723	845	Shale
845	856	Sand
856	901	Shale
901	916	Sand
916	927	Shale
927	943	Gumbo
943	993	Sand
993	1004	Sand and Shale
1004	1045	Shale
1045	1049	Sand and Rock
1049	1062	Sandy Shale
1062	1123	Shale
1123	1190	Sandy Shale
1190	1193	Sandy Shale
1193	1262	Sand
1262	1268	Shale
1268	1315	Sand
1315	1316	Rock
1316	1430	Sand



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1430

1440 Shale

**Annular Seal Range - No Data**

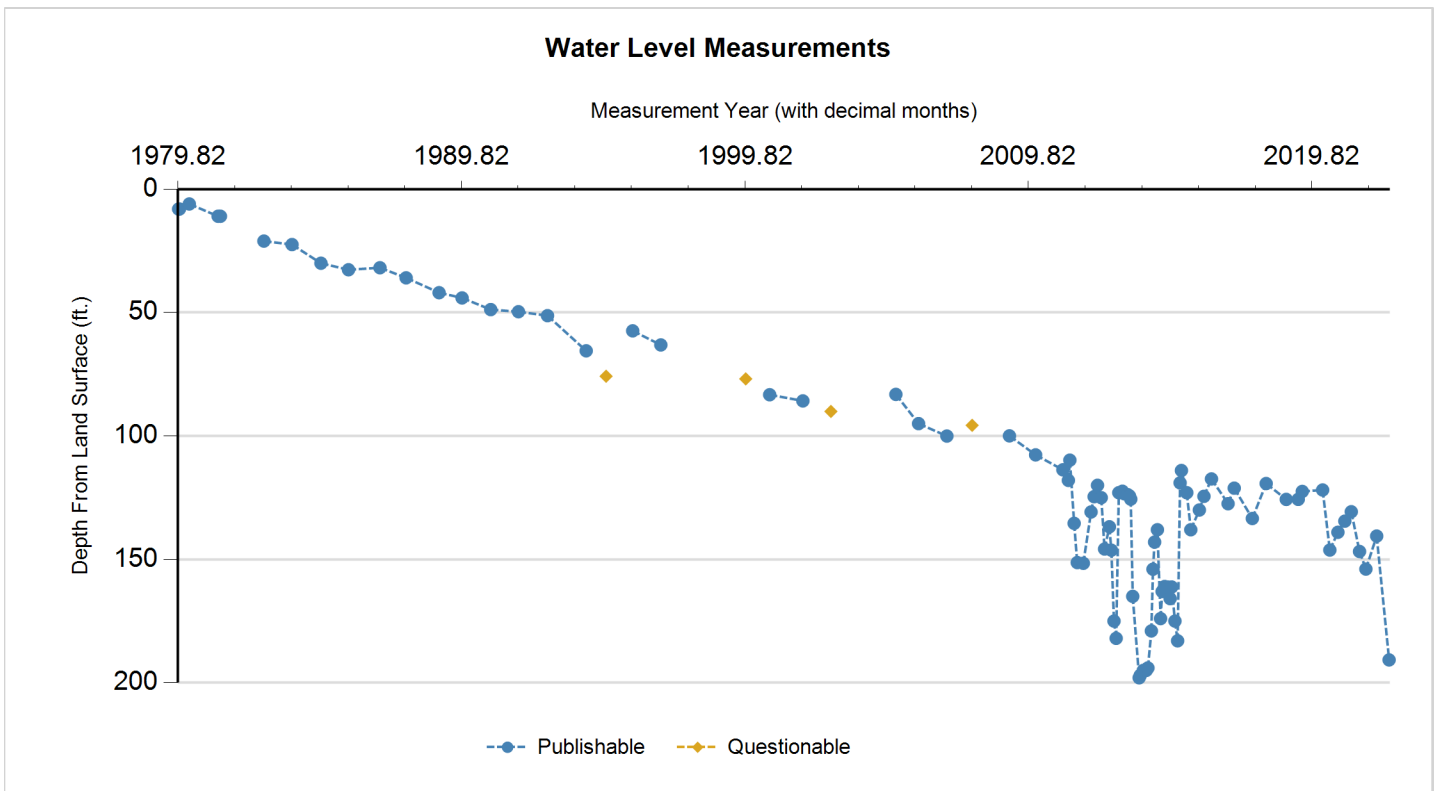
**Borehole - No Data**

**Plugged Back - No Data**

**Filter Pack - No Data**

**Packers - No Data**

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Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	11/9/1979		8.05		287.95	1	Other or Source of Measurement Unknown	Unknown		
P	11/19/1979		8.05	0.00	287.95	1	Texas Water Development Board	Steel Tape		
P	3/21/1980		6	(2.05)	290	1	Texas Water Development Board	Steel Tape		
P	3/27/1981		10.98	4.98	285.02	1	Other or Source of Measurement Unknown	Unknown		
P	4/27/1981		10.98	0.00	285.02	1	Texas Water Development Board	Steel Tape		
X	3/24/1982					1	Texas Water Development Board		19	
P	11/12/1982		21.04		274.96	1	Texas Water Development Board	Steel Tape		
P	11/9/1983		22.45	1.41	273.55	1	Texas Water Development Board	Steel Tape		
P	11/16/1984		30	7.55	266	1	Texas Water Development Board	Steel Tape		
P	11/6/1985		32.65	2.65	263.35	1	Texas Water Development Board	Steel Tape		
P	12/16/1986		31.84	(0.81)	264.16	1	Texas Water Development Board	Steel Tape		
P	11/18/1987		35.92	4.08	260.08	1	Texas Water Development Board	Steel Tape		
P	1/12/1989		41.95	6.03	254.05	1	Texas Water Development Board	Steel Tape		
P	11/8/1989		44.07	2.12	251.93	1	Texas Water Development Board	Steel Tape		
P	11/12/1990		48.79	4.72	247.21	1	Texas Water Development Board	Steel Tape		
P	11/4/1991		49.66	0.87	246.34	1	Texas Water Development Board	Steel Tape		
P	11/13/1992		51.25	1.59	244.75	1	Texas Water Development Board	Steel Tape		
P	3/21/1994		65.5	14.25	230.5	1	Texas Water Development Board	Steel Tape		
Q	12/8/1994		75.8	10.30	220.2	1	Texas Water Development Board	Steel Tape	2	
P	11/15/1995		57.4	(18.40)	238.6	1	Texas Water Development Board	Steel Tape		

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Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	11/12/1996		63.12	5.72	232.88	1	Texas Water Development Board	Steel Tape		
X	11/5/1997					1	Texas Water Development Board		19	
X	11/17/1998					1	Texas Water Development Board		19	
Q	11/10/1999		76.88		219.12	1	Texas Water Development Board	Steel Tape	4	
P	9/13/2000		83.3	6.42	212.7	1	Texas Water Development Board	Steel Tape		
P	11/16/2001		85.79	2.49	210.21	1	Texas Water Development Board	Steel Tape		
Q	11/12/2002		90.06	4.27	205.94	1	Texas Water Development Board	Steel Tape	16	
X	10/10/2003					1	Texas Water Development Board		19	
P	2/23/2005		83.15		212.85	1	Texas Water Development Board	Steel Tape		
P	12/15/2005		95	11.85	201	1	Texas Water Development Board	Steel Tape		
P	12/15/2006		100.04	5.04	195.96	1	Texas Water Development Board	Steel Tape		
Q	11/5/2007		95.7	(4.34)	200.3	1	Texas Water Development Board	Steel Tape	4	
P	2/25/2009		99.96	4.26	196.04	1	Texas Water Development Board	Steel Tape		
P	1/27/2010		107.67	7.71	188.33	1	Texas Water Development Board	Steel Tape		
P	1/13/2011		113.72	6.05	182.28	1	Texas Water Development Board	Steel Tape		
P	3/24/2011		118	4.28	178	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/13/2011		109.8	(8.20)	186.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/8/2011		135.4	25.60	160.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/18/2011		151.3	15.90	144.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/6/2011		151.6	0.30	144.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	1/11/2012		130.8	(20.80)	165.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	2/20/2012		124.6	(6.20)	171.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/4/2012		120	(4.60)	176	1	Groundwater Conservation District	Sonic/Laser Device		
P	5/22/2012		125	5.00	171	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/5/2012		145.8	20.80	150.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	9/7/2012		136.8	(9.00)	159.2	1	Groundwater Conservation District	Sonic/Laser Device		
P	10/2/2012		146.3	9.50	149.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	11/6/2012		175	28.70	121	1	Groundwater Conservation District	Air Line		
P	12/4/2012		182	7.00	114	1	Groundwater Conservation District	Air Line		
P	1/3/2013		123	(59.00)	173	1	Groundwater Conservation District	Electric Line		
P	2/20/2013		122.4	(0.60)	173.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	3/13/2013		123.4	1.00	172.6	1	Groundwater Conservation District	Sonic/Laser Device		
P	4/29/2013		123.8	0.40	172.2	1	Groundwater Conservation District	Sonic/Laser Device		

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Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	5/20/2013		124.3	0.50	171.7	1	Groundwater Conservation District	Sonic/Laser Device		
P	6/7/2013		125.6	1.30	170.4	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/2/2013		165	39.40	131	1	Groundwater Conservation District	Air Line		
P	9/25/2013		198	33.00	98	1	Groundwater Conservation District	Air Line		
P	10/9/2013		197	(1.00)	99	1	Groundwater Conservation District	Air Line		
P	11/19/2013		195	(2.00)	101	1	Groundwater Conservation District	Air Line		
P	12/27/2013		195	0.00	101	1	Groundwater Conservation District	Air Line		
P	1/13/2014		194	(1.00)	102	1	Groundwater Conservation District	Air Line		
P	2/27/2014		179	(15.00)	117	1	Groundwater Conservation District	Air Line		
P	3/18/2014		154	(25.00)	142	1	Groundwater Conservation District	Air Line		
P	4/9/2014		143	(11.00)	153	1	Groundwater Conservation District	Air Line		
P	5/15/2014		138	(5.00)	158	1	Groundwater Conservation District	Air Line		
P	6/26/2014		174	36.00	122	1	Groundwater Conservation District	Sonic/Laser Device		
P	7/16/2014		163	(11.00)	133	1	Groundwater Conservation District	Air Line		
P	8/19/2014		161	(2.00)	135	1	Groundwater Conservation District	Air Line		
P	9/25/2014		161.2	0.20	134.8	1	Groundwater Conservation District	Air Line		
P	10/29/2014		165.9	4.70	130.1	1	Groundwater Conservation District	Air Line		
P	11/19/2014		161.2	(4.70)	134.8	1	Groundwater Conservation District	Air Line		
P	12/31/2014		175	13.80	121	1	Groundwater Conservation District	Air Line		
P	1/30/2015		183	8.00	113	1	Groundwater Conservation District	Air Line		
P	3/2/2015		119	(64.00)	177	1	Groundwater Conservation District	Electric Line		
P	3/19/2015		114	(5.00)	182	1	Groundwater Conservation District	Electric Line		
P	5/28/2015		123	9.00	173	1	Groundwater Conservation District	Electric Line		
P	7/20/2015		138	15.00	158	1	Groundwater Conservation District	Air Line		
P	11/10/2015		130	(8.00)	166	1	Groundwater Conservation District	Electric Line		
P	1/4/2016		124.45	(5.55)	171.55	1	Groundwater Conservation District	Electric Line		
P	4/11/2016		117.42	(7.03)	178.58	1	Groundwater Conservation District	Electric Line		

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Groundwater Database (GWDB)  
Well Information Report for State Well Number  
59-04-701**

Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	11/15/2016		127.45	10.03	168.55	1	Groundwater Conservation District	Electric Line		
P	1/29/2017		121.15	(6.30)	174.85	1	Groundwater Conservation District	Electric Line		
P	9/22/2017	15:4	133.45	12.30	162.55	1	Groundwater Conservation District	Steel Tape		
P	3/15/2018	8:08	119.28	(14.17)	176.72	1	Groundwater Conservation District	Steel Tape		
P	12/4/2018		125.7	6.42	170.3	1	Groundwater Conservation District	Steel Tape		Static
P	5/3/2019		125.69	(0.01)	170.31	1	Groundwater Conservation District	Steel Tape		Static
P	6/25/2019		122.48	(3.21)	173.52	1	Groundwater Conservation District	Steel Tape		Static < 24 hrs
P	3/12/2020		121.9	(0.58)	174.1	1	Groundwater Conservation District	Steel Tape		Static
P	6/15/2020		146.23	24.33	149.77	1	Groundwater Conservation District	Steel Tape		Static
P	9/29/2020		139.03	(7.20)	156.97	1	Groundwater Conservation District	Steel Tape		
P	12/28/2020		134.52	(4.51)	161.48	1	Groundwater Conservation District	Steel Tape		
P	3/16/2021		130.71	(3.81)	165.29	1	Groundwater Conservation District	Steel Tape		
P	7/2/2021		146.81	16.10	149.19	1	Groundwater Conservation District	Steel Tape		
P	9/24/2021		153.94	7.13	142.06	1	Groundwater Conservation District	Steel Tape		
P	2/8/2022		140.56	(13.38)	155.44	1	Groundwater Conservation District	Steel Tape		
P	7/18/2022		190.75	50.19	105.25	1	Groundwater Conservation District	Steel Tape		

**Code Descriptions**

Status Code	Status Description
P	Publishable
Q	Questionable
X	No Measurement

Remark ID	Remark Description
2	Pumping-level measurement
4	Well pumped recently
16	Tape marked with oil or gasoline
19	Well pumping



### Water Quality Analysis

**Sample Date:** 4/6/1943    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Registered Water Well Driller

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** Curtis Lab

**Reliability:** Reliability unknown or not available

**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		0	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		385.25	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		470.14	mg/L	
00910	CALCIUM (MG/L)		3.6	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		0	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		52	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		12	mg/L	
01045	IRON, TOTAL (UG/L AS FE)		200	ug/L	
00920	MAGNESIUM (MG/L)		0.8	mg/L	
00400	PH (STANDARD UNITS), FIELD		8	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		7.46		
00955	SILICA, DISSOLVED (MG/L AS SiO2)		21	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		33.07		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)	calculate d	208	mg/L	
00945	SULFATE, TOTAL (MG/L AS SO4)		0	mg/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		516	mg/L	



### Water Quality Analysis

**Sample Date:** 12/0/1956    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Texas Department of Health

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** Texas Department of Health

**Reliability:** Reliability unknown or not available

**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		0	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		296.72	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		362.1	mg/L	
00910	CALCIUM (MG/L)		4	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		0	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		50	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.4	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		18	mg/L	
01045	IRON, TOTAL (UG/L AS FE)		300	ug/L	
00920	MAGNESIUM (MG/L)		2	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.4	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.2	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		5.57		
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		19.27		
00932	SODIUM, CALCULATED, PERCENT		95	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)	calculate d	189	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		830	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		27	mg/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		450	mg/L	



### Water Quality Analysis

**Sample Date:** 7/22/1980    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board  
**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation  
**Analyzed Lab:** Texas Department of Health    **Reliability:** Collected from pumped well, but not filtered or preserved  
**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		11	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		345	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		394.17	mg/L	
00910	CALCIUM (MG/L)		2.8	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		13.2	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		51	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.4	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		9	mg/L	
00920	MAGNESIUM (MG/L)		0.73	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.1	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.8	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.7		
00955	SILICA, DISSOLVED (MG/L AS SiO2)		17	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		23.37		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)		183	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		805	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		1.9	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		21	C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		463	mg/L	

### Water Quality Analysis

**Sample Date:** 7/29/1987    **Sample Time:** 0000    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** Texas Department of Health

**Reliability:** Reliability unknown or not available

**Collection Remarks:** No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		7	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		339	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		396.61	mg/L	
00910	CALCIUM (MG/L)		3	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		8.4	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		41	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.4	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		11	mg/L	
01045	IRON, TOTAL (UG/L AS FE)		30	ug/L	
00920	MAGNESIUM (MG/L)		1	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.04	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.7	SU	
00937	POTASSIUM, TOTAL (MG/L AS K)		1	mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.55		
00955	SILICA, DISSOLVED (MG/L AS SiO2)		17	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		23.37		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00929	SODIUM, TOTAL (MG/L AS Na)		183	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		800	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		6	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		34	C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		455	mg/L	

### Water Quality Analysis

**Sample Date:** 7/10/1989   
**Sample Time:** 1000   
**Sample Number:** 1   
**Collection Entity:** Texas Water Development Board

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** Texas Department of Health

**Reliability:** Sampled using TWDB protocols

**Collection Remarks:** faucet

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		6	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		327	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		384.41	mg/L	
00915	CALCIUM, DISSOLVED (MG/L AS Ca)		2.8	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		7.2	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		43	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.4	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		9	mg/L	
71865	IODIDE (MG/L AS I)	<	0.1	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)		46	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.5	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)	<	20	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.04	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.51	SU	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		2.6	mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.36		
00955	SILICA, DISSOLVED (MG/L AS SiO2)		17	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		28.06		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00930	SODIUM, DISSOLVED (MG/L AS Na)		194	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		755	MICR	
00946	SULFATE, DISSOLVED (MG/L AS SO4)		6	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		33	C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		462	mg/L	



### Water Quality Analysis

**Sample Date:** 10/7/2009    **Sample Time:** 1400    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** LCRA - Lower Colorado River Authority    **Reliability:** Sampled using TWDB protocols

**Collection Remarks:** Lab Calculated Anion/Cation Chg Bal set to TWDB Calculated Value due to an error in the lab calculated formula

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39086	ALKALINITY FIELD DISSOLVED AS CaCO3		344	mg/L	
82244	ALKALINITY PHENOLPHTHALEIN FIELD DATA (MG/L)		2	mg/L	
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		9	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		332	mg/L	
01503	ALPHA, DISSOLVED (PC/L)		9.2	PC/L	1.9
01106	ALUMINUM, DISSOLVED (UG/L AS AL)	<	4.08	ug/L	
50938	ANION/CATION CHG BAL, PERCENT		-0.54	PCT	
01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1.02	ug/L	
01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	2.04	ug/L	
01005	BARIUM, DISSOLVED (UG/L AS BA)		54.9	ug/L	
01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1.02	ug/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		383.18	mg/L	
01020	BORON, DISSOLVED (UG/L AS B)		284	ug/L	
71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.2	mg/L	
01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1.02	ug/L	
00915	CALCIUM, DISSOLVED (MG/L AS CA)		2.89	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		10.8	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		47	mg/L	
01030	CHROMIUM, DISSOLVED (UG/L AS CR)		1.35	ug/L	
01035	COBALT, DISSOLVED (UG/L AS CO)	<	1.02	ug/L	
01040	COPPER, DISSOLVED (UG/L AS CU)	<	1.02	ug/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.42	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		11	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)	<	51	ug/L	
01049	LEAD, DISSOLVED (UG/L AS PB)	<	1.02	ug/L	
01130	LITHIUM, DISSOLVED (UG/L AS LI)		17.6	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.78	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)		8.16	ug/L	
71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1.02	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
00300	OXYGEN, DISSOLVED (MG/L)		1.3	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.34	SU	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		1.38	mg/L	
09511	RADIUM 226, DISSOLVED, RADON METHOD, PC/L	<	0.2	PC/L	0.12

**Texas Water Development Board (TWDB)**  
**Groundwater Database (GWDB)**  
**Well Information Report for State Well Number**  
**59-04-701**

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
81366	RADIUM 228, DISSOLVED (PC/L AS RA-228)	<	1.1	PC/L	0.7
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.43		
01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	4.08	ug/L	
00955	SILICA, DISSOLVED (MG/L AS SI02)		17.1	mg/L	
01075	SILVER, DISSOLVED (UG/L AS AG)	<	1.02	ug/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		23.85		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00930	SODIUM, DISSOLVED (MG/L AS NA)		177	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		790	MICR	
01080	STRONTIUM, DISSOLVED (UG/L AS SR)		191	ug/L	
00946	SULFATE, DISSOLVED (MG/L AS SO4)		2.2	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		33.7	C	
01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1.02	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		448	mg/L	
22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1.02	ug/L	
01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1.02	ug/L	
01090	ZINC, DISSOLVED (UG/L AS ZN)	<	4.08	ug/L	

### Water Quality Analysis

**Sample Date:** 8/6/2014    **Sample Time:** 1112    **Sample Number:** 1    **Collection Entity:** Texas Water Development Board

**Sampled Aquifer:** Simsboro Sand Member of Rockdale Formation

**Analyzed Lab:** LCRA - Lower Colorado River Authority    **Reliability:** Sampled using TWDB protocols

**Collection Remarks:** Lab Calculated Anion/Cation Chg Bal set to TWDB Calculated Value due to an error in the lab calculated formula

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39086	ALKALINITY FIELD DISSOLVED AS CaCO3		344	mg/L	
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)	<	20	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CaCO3)		331	mg/L	
01503	ALPHA, DISSOLVED (PC/L)		4.68	PC/L	3.38
01106	ALUMINUM, DISSOLVED (UG/L AS AL)		4.7	ug/L	
50938	ANION/CATION CHG BAL, PERCENT		-1.92	PCT	
01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	2	ug/L	
01005	BARIUM, DISSOLVED (UG/L AS BA)		57.5	ug/L	
01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		403.93	mg/L	
01020	BORON, DISSOLVED (UG/L AS B)		290	ug/L	
71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.214	mg/L	
01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
00915	CALCIUM, DISSOLVED (MG/L AS CA)		2.95	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		0	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		47.8	mg/L	
01030	CHROMIUM, DISSOLVED (UG/L AS CR)		1.15	ug/L	
01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
01040	COPPER, DISSOLVED (UG/L AS CU)		1.98	ug/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.45	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CaCO3)		11	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
01130	LITHIUM, DISSOLVED (UG/L AS LI)		16.2	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.76	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)		8.12	ug/L	
71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.2	ug/L	
01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.02	mg/L	
00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.34	SU	
00666	PHOSPHORUS, DISSOLVED (MG/L AS P)		0.0693	mg/L	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		1.49	mg/L	
09503	RADIUM 226, DISSOLVED, PC/L	<	0.98	PC/L	0.15
81366	RADIUM 228, DISSOLVED (PC/L AS RA-228)	<	0.9	PC/L	0.32



**Texas Water Development Board (TWDB)  
Groundwater Database (GWDB)  
Well Information Report for State Well Number  
59-04-701**

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.41		
01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	4	ug/L	
00955	SILICA, DISSOLVED (MG/L AS SI02)		18.3	mg/L	
01075	SILVER, DISSOLVED (UG/L AS AG)	<	1	ug/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		22.96		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00930	SODIUM, DISSOLVED (MG/L AS NA)		171	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		810	MICR	
01080	STRONTIUM, DISSOLVED (UG/L AS SR)		180	ug/L	
00946	SULFATE, DISSOLVED (MG/L AS SO4)	<	2	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		34.4	C	
01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		442	mg/L	
22703	URANIUM, NATURAL, DISSOLVED (UG/L AS U)	<	1	ug/L	
01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
01090	ZINC, DISSOLVED (UG/L AS ZN)	<	4	ug/L	

\* Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..

**GWDB DISCLAIMER:** Except where noted, all of the information provided in the Texas Water Development Board (TWDB) Groundwater Database (<https://www.twdb.texas.gov/groundwater/data/gwdb rpt.asp>) is believed to be accurate and reliable; however, the TWDB assumes no responsibility for any errors appearing in rules or otherwise. Further, TWDB assumes no responsibility for the use of the information provided. PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency and/or suitability of all information themselves. TWDB makes no guarantees or warranties as to the accuracy, completeness, currency, or suitability of the information provided via the Groundwater Database (GWDB). TWDB specifically disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains. For additional information or answers to questions concerning the TWDB GWDB, contact the Groundwater Data Team at [GroundwaterData@twdb.texas.gov](mailto:GroundwaterData@twdb.texas.gov).

Attention Owner:  
Confidentiality Privilege Notice  
on reverse side of owner's copy.

**Texas Department of License and Regulation**  
Water Well Driller/Pump Installer Program  
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616  
Toll free (800)803-9202  
Email address: [water.well@license.state.tx.us](mailto:water.well@license.state.tx.us)

This form must be completed  
and filed with the department  
and owner within 60 days  
upon completion of the well.

**WELL REPORT**

**A. WELL IDENTIFICATION AND LOCATION DATA**

**1) OWNER**

Name Goodland Farms#3	Address Rt. 1 Box 250	City Hearne	State Tx	Zip 77859
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**2) WELL LOCATION**

County Robertson	Physical Address FM 485	City Hearne	State Tx	Zip 77859
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**3) Type of Work**

New Well     Reconditioning  
 Replacement     Deepening

Lat. \_\_\_\_\_ Long. \_\_\_\_\_ Grid # 59-03-9

**4) Proposed Use (check)**     Monitor     Environmental Soil Boring     Domestic  
 Industrial     Irrigation     Injection     Public Supply     De-watering     Test well  
 Rig Supply    If Public Supply well, were plans submitted?     Yes     No

**5) \_\_\_\_\_**    **↑**

**6) Drilling Date**

Started 11 / 18 / 02  
Completed 12 / 13 / 02

**Diameter of Hole**

Dia. (in)	From (ft)	To (ft)
36	0	67
24	67	1187

**7) Drilling Method (check)**

Driven  
 Air Rotary     Mud Rotary     Pored  
 Air Hammer     Cable Tool     Jetted  
 Other Rev. Circulation

**8) Borehole Completion**     Open Hole     Straight Wall  
 Under-reamed     Gravel Packed     Other  
If Gravel Packed give the interval from 825 ft. to 1187 ft.

From (ft)	To (ft)	Description and color of formation material
0 - 40		Sand & Clay
40 - 60		Gravel
60 - 142		Sandy Shale
142 - 495		Shale & Rocks
495 - 555		Shale
555 - 582		Sand
582 - 747		Shale & Coal
747 - 838		Shale & Sand
838 - 985		Shale & Sandy Shale
985 - 1127		Sandy Shale

**Casing, Blank Pipe, and Well Screen Data**

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft)		Gage Casing Screen
			From	To	
		See Details back page			

(Use reverse side of Well Owner's copy, If necessary)

**13) Plugged**

Well plugged within 48 hours  
Casing left in well: Cement/Bentonite placed in well:  
From (ft)    To (ft)    From (ft)    To (ft)    Sacks used  
N/A

**9) Cementing Data**    0 - 10 50 sks  
Cementing from 48 ft. to 75 ft. # of sacks used 50  
784 ft. to 825 ft. # of sacks used 50  
Method Used Grout Pressure  
Cementing By P. Brien  
Distance to septic system field or other concentrated contamination 0 ft.  
Method of verification of above distance IDLH MFL M/ADM SH

**14) Type Pump**

Turbine     Jet     Submersible     Cylinder  
 Other N/A  
Depth to pump bowls, cylinder, jet etc., \_\_\_\_\_ ft.

**10) Surface Completion**  
 Specified Surface Slab Installed    29 2003  
 Specified Surface Sleeve Installed  
 Pitless Adapter Used  
 Approved Alternative Procedure Used  
**RECEIVED**

**15) Water Test**

Typetest  Pump     Bailer     Jetted     Estimated  
Yield: 750 gpm with 112 ft. drawdown after 2 hrs.

**11) Water Level**  
Static level 62 ft. below    Date 12/13/02  
Artesian Flow \_\_\_\_\_ gpm    Date NOV 18 2004

**16) Water Quality**

Did you knowingly penetrate a strata which contain undesirable constituents.  
 YES     NO If yes, did you submit a REPORT OF UNDESIRABLE WATER  
Type of water \_\_\_\_\_    Depth of Strata \_\_\_\_\_  
Was a chemical analysis made     Yes     No

**12) Packers**    Type \_\_\_\_\_    Depth \_\_\_\_\_  
N/A  
**TCEQ - CENTRAL FILE ROOM**

Company or individual's Name (type or print)    Brien Water Wells    Lic. No. 52000 WI

Address    Rt. 1 Box 702    City Hearne    State Tx    Zip 77859

Signature Donald Cooper    Date 12.24.02    Signature \_\_\_\_\_    Date \_\_\_\_\_  
Licensed Driller/Pump Installer    Apprentice

**IMPORTANT NOTICE FOR PERSONS  
HAVING WELL DRILLED CONCERNING  
CONFIDENTIALITY**

Section 32.005 of the Texas Water Code, concerning confidentiality information in the Reporting of Well Reports, reads as follows:

Every licensed driller drilling, deepening, or otherwise altering a water well in this state shall make and keep a legible and accurate well log in accordance with department rule on forms prescribed by the department. Not later than the 60th day after the completion or cessation of drilling, deepening, or otherwise altering the well, the licensed driller shall deliver or transmit by certified mail a copy of the well log to the department, the Texas Natural Resource Conservation Commission, and the owner of the well or the person for whom the well was drilled. The well log shall be recorded at the time of drilling and must show the depth, thickness, and character of the strata penetrated, the location of water-bearing strata, the depth, size, and character of casing installed, and any other information required by department rule. The department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner or the person for whom the well was drilled.

The last sentence specifies the means whereby you may, if you wish, assure that logs of your wells will be kept confidential.

From (ft)	To (ft)	Description and color of formation material
1127	- 1187	Sand
Casing, Blank Pipe, & Well Screen Data		
Dia.	New	Fr. to
30	N Steel	0 - 65
16	N Steel	+2 - 984
16	N Pipe Base S.S.Scr.	984 - 1005
16	N Steel	1005 - 1033
16	N Steel	1033 - 1054
16	N Steel	1054 - 1082
16	N Pipe Base S.S.Scr.	1082 - 1103
16	N Steel	1103 - 1131
16	N Pipebase S.S.Scr	1131 - 1173
16	N Steel	1173 - 1175

Gage

.028

.028

.028





Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	<b>985-1085</b>	<b>Potable</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Brien Water Wells**  
**5214 S Hwy 6**  
**Hearne, TX 77859**

Driller Name: **G. P. Brien** License Number: **1750**

Comments: **Septic system not installed.**  
**^EO**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>72</b>	<b>clay and gravel and sand</b>
<b>72</b>	<b>118</b>	<b>sand and sandy shale</b>
<b>118</b>	<b>171</b>	<b>shale</b>
<b>171</b>	<b>190</b>	<b>sand and sandy shale</b>
<b>190</b>	<b>198</b>	<b>shale</b>
<b>198</b>	<b>212</b>	<b>s-shale</b>
<b>212</b>	<b>213</b>	<b>rock</b>
<b>213</b>	<b>241</b>	<b>shale</b>
<b>241</b>	<b>243</b>	<b>rock</b>
<b>243</b>	<b>285</b>	<b>s-shale and sand and rock</b>
<b>285</b>	<b>315</b>	<b>sand(b)</b>
<b>315</b>	<b>320</b>	<b>s-shale</b>
<b>320</b>	<b>337</b>	<b>shale</b>
<b>337</b>	<b>470</b>	<b>s-shale and rocks</b>
<b>470</b>	<b>570</b>	<b>sandy shale and shale</b>
<b>570</b>	<b>590</b>	<b>shale and soft rocks</b>
<b>590</b>	<b>730</b>	<b>shale</b>

<i>Dia. (in.)</i>	<i>New/Used</i>	<i>Type</i>	<i>Setting From/To (ft.)</i>
<b>30 N Steel</b>	<b>+1-68</b>		
<b>16 N Steel</b>	<b>+2-1011</b>		
<b>16 N Pipe Base SS Screen</b>	<b>1011-1111</b>	<b>.030</b>	
<b>16 N Steel</b>	<b>1111-1113</b>		

730	810	sand and rocks
810	880	shale
880	925	shale and sandy shale
925	926	rock
926	955	sand(b)
955	1004	sand (some streaks of shale)
1004	1010	rock
1010	1024	sand(b)
1024	1042	sand and streak of coal
1042	1049	rock
1049	1118	sand
1118	1120	shale and coal
1120	1130	sand
1130	1131	rock

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**IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY**

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Please include the report's Tracking Number on your written request.

**Texas Department of Licensing and Regulation  
P.O. Box 12157  
Austin, TX 78711  
(512) 334-5540**



## STATE OF TEXAS WELL REPORT for Tracking #443534

Owner: <b>Zeig, Joey</b>	Owner Well #: <b>No Data</b>
Address: <b>510 Calvert Street Hearne, TX 77859</b>	Grid #: <b>59-11-3</b>
Well Location: <b>Zane Wallace Road Hearne, TX 77859</b>	Latitude: <b>30° 52' 16.02" N</b>
Well County: <b>Robertson</b>	Longitude: <b>096° 38' 03.6" W</b>
	Elevation: <b>284 ft. above sea level</b>
Type of Work: <b>New Well</b>	
	Proposed Use: <b>Domestic</b>

Drilling Start Date: **2/6/2017**      Drilling End Date: **2/14/2017**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	<b>9.875</b>	<b>0</b>	<b>35</b>
	<b>6.75</b>	<b>35</b>	<b>860</b>
	<b>3.875</b>	<b>860</b>	<b>1080</b>

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Screened**

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	<b>0</b>	<b>10</b>	<b>Concrete 10 Bags/Sacks</b>
	<b>650</b>	<b>850</b>	<b>Cement 23 Bags/Sacks</b>

Seal Method: **Pressure**

Sealed By: **Driller**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **100+**

Method of Verification: **stepped**

Surface Completion: **Surface Sleeve Installed**

**Surface Completion by Driller**

Water Level: **135 ft. below land surface on 2017-02-13**      Measurement Method: **Electric Line**

Packers: **K-Packer at 619 ft.  
Burlap at 966 ft.  
Burlap at 987 ft.**

Type of Pump: **Submersible**      Pump Depth (ft.): **260**

Well Tests: **Jetted**      Yield: **50+ GPM with 70 ft. drawdown after 12 hours**

Water Quality:	<i>Strata Depth (ft.)</i>	<i>Water Type</i>
	<b>996 - 1080</b>	<b>good</b>

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Brien Water Wells**  
**5214 South Highway 6**  
**Hearne, TX 77859**

Driller Name: **Pete Brien** License Number: **1750**

Comments: **No Data**

Lithology:  
DESCRIPTION & COLOR OF FORMATION MATERIAL

Casing:  
BLANK PIPE & WELL SCREEN DATA

<i>Top (ft.)</i>	<i>Bottom (ft.)</i>	<i>Description</i>
<b>0</b>	<b>27</b>	<b>gravel and sand</b>
<b>27</b>	<b>55</b>	<b>sandy shale and sand</b>
<b>55</b>	<b>90</b>	<b>shale</b>
<b>90</b>	<b>326</b>	<b>sandy shale</b>
<b>326</b>	<b>440</b>	<b>rocks and shale</b>
<b>440</b>	<b>625</b>	<b>sandy shale and sand (B)</b>
<b>625</b>	<b>726</b>	<b>tight shale</b>
<b>726</b>	<b>893</b>	<b>sandy shale and Rocks</b>
<b>893</b>	<b>946</b>	<b>sand</b>
<b>946</b>	<b>986</b>	<b>sandy shale and coal</b>
<b>986</b>	<b>996</b>	<b>sandy shale and sand</b>
<b>996</b>	<b>1080</b>	<b>sand</b>

<i>Dia (in.)</i>	<i>Type</i>	<i>Material</i>	<i>Sch./Gage</i>	<i>Top (ft.)</i>	<i>Bottom (ft.)</i>
<b>8</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>		<b>0</b>	<b>35</b>
<b>4</b>	<b>Blank</b>	<b>New Plastic (PVC)</b>	<b>40</b>	<b>1.5</b>	<b>850</b>
<b>2</b>	<b>Blank</b>	<b>New Galvanized Steel</b>	<b>40</b>	<b>819</b>	<b>1050</b>
<b>2.5</b>	<b>Screen</b>	<b>New Rod Base Stainless Steel</b>	<b>0.014</b>	<b>1050</b>	<b>1070</b>
<b>2</b>	<b>Blank</b>	<b>New Galvanized Steel</b>	<b>40</b>	<b>1070</b>	<b>1080</b>

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**IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY**

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ATTACHMENT 4 –  
SELECTED REFERENCES

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Ayers, W. B. Jr, Lewis, Amy H., *The Wilcox Group and Carrizo Sand (Paleogene) in East Central Texas : Depositional Systems and Deep-Basin Lignite*, Bureau of Economic Geology, 1985.

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Intera, Inc., 2015, Update on Monitoring Program, Presented at the Post Oak Savannah Groundwater Conservation District Offices, PowerPoint Presentation, November 10, 2015.

Intera, Inc. *Groundwater Availability Models for the Queen City and Sparta Aquifers*. GAM, Austin. Texas, Water Development Board, 2004.

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<http://www.twdb.texas.gov/groundwater/data/index.asp>

Theis, C.V., 1935, *The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Groundwater Storage: Transactions of the American Geophysical Union*, v. 16, p. 519-524.

Thornhill Group, Inc., 2018, Calvert Mine, Permit No. 27H – 2017 Annual Simsboro Depressurization/Drawdown Report, Prepared for Walnut Creek Mining Company for Submittal to the Surface Mining Division of the Texas Railroad Commission, October 19, 2018.

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Young, Steven, PhD, PE, Jigmond, Marius, Jones, Toya, and Ewing, Tom, PhD, PE, Final Report: Groundwater Availability Model for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers, Texas Water Development Board Report ###, September 2018.