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Dr. Aarin Teague, P.E.
General Manager
Evergreen Underground Water Conservation District
110 Wyoming Blvd.
Pleasanton, TX 78064

July 15, 2025

RE: Blumberg Well No. 1 – Hydrogeological Study Type 2

Dear Dr. Teague:

This report details the results of a hydrogeologic study to meet the rules mandated by the Evergreen Underground Water Conservation District (EUWCD) for a transport permit application. Springs Hill Special Utility District (Springs Hill) is submitting an application for a production permit to construct one new well (Blumberg Well No. 1) completed within the Carrizo-Wilcox Aquifer and incorporate it into its water system located in northeastern Wilson County (Figure 1).

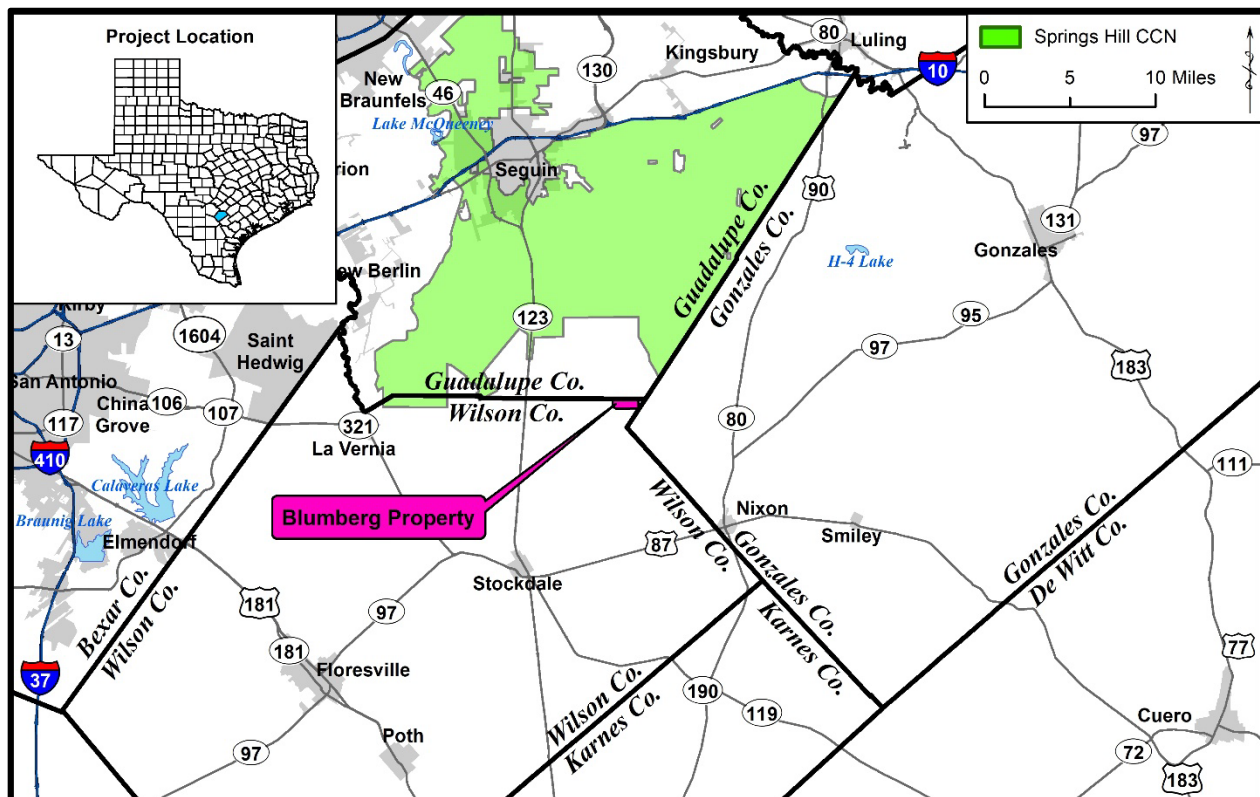


Figure 1: Location map of the Blumberg Well No. 1



Wet Rock Groundwater Services, LLC



Groundwater Specialists

Springs Hill is seeking to construct the Blumberg Well No. 1 in the Carrizo-Wilcox Aquifer (Carrizo Sands) with an annual production requested of 325,851,000 gallons (1,000 acre-ft/yr). Table 1 provides a summary of Springs Hill's proposed pumping rate (gallons per minute; gpm) and annual production amount.

Table 1: Summary of proposed permit with the EUWCD

Well Name or No.	Aquifer	Well Registration No.	Pumping Rate (gpm)	Permitted Annual Production Volume (gal.)
Blumberg Well No. 1	Carrizo	Pending	1,600	325,851,000

The purpose of this report is to provide the EUWCD with hydrogeological information with respect to the most up-to-date guidelines addressing the impacts of the proposed well and to meet the requirements of EUWCD Rule 7.2(b)(13).

Section 1: Geological Setting

General Geology

According to the Texas Water Development Board, there is one (1) major aquifer (Carrizo-Wilcox Aquifer) and one (1) minor aquifer (Queen-City Aquifer) that supply groundwater within the study area. The TWDB classifies major aquifers as aquifers that produce large amounts of water over large areas, and minor aquifers as aquifers that produce minor amounts of water over large areas or large amounts of water over small areas. For the purposes of this hydrogeologic evaluation, the focus will be on the Carrizo-Wilcox Aquifer, in which the proposed well will be completed.

The Carrizo-Wilcox Aquifer is a major aquifer extending from the Louisiana border to the border of Mexico in a wide band adjacent to and northwest of the Gulf Coast. Deposition has been influenced by regional crust subsidence, episodes of sediment inflow from areas outside the Gulf Coastal Plain, and eustatic sea-level change (Grubb, 1997). The sediments that comprise the formations underneath the subdivision were deposited approximately 65 million years ago as the sea that once dominated the interior of North America and the Gulf Coast region was regressing. For approximately 50 million years the sea regressed leaving deltaic and shoreface sediments that now make up the property and its surrounding area (Fisher and McGowen, 1967). Figure 2 provides a geologic map and stratigraphic column illustrating the geology surrounding the study area.

Making up the geologic base of the study area, lies the Tertiary aged Midway Group. The Midway Group is mostly clay, silt glauconitic sand and thin beds of limestone and sandstone. The Midway group acts as the lower confining unit of the Carrizo-Wilcox Aquifer (Figure 2). Overlying the Midway Group is the Tertiary aged Wilcox Group which consists of the Upper, Middle and lower members (Figure 2). The Wilcox Group dips southeastward at an average of about 150 feet per mile and increases in thickness in the direction of dip. The Wilcox Group is composed of mostly fine to coarse sand, sandstone, sandy clay, clay, shale and thin lenses of limestone and lignite (Follett, 1974). The Upper and Lower Wilcox formations have similar variations in porosity and permeability due to the deltaic and inter-deltaic depositional environments, which are a major contributor to variations in porosity and permeability in the formation (Grubbs, 1953).

The Tertiary aged rocks of the Claiborne Group unconformably overlie the Wilcox Group. The oldest member of the Claiborne Group is the Carrizo Sand which along with the Wilcox Group makes up



the Carrizo-Wilcox Aquifer. The Carrizo Sand dips southeastward at about 140 feet per mile and is a medium to very coarse-grained noncalcareous sandstone unit often targeted for water wells. The sand is generally white and consists largely of rounded to subangular coarse quartz grains (Follett, 1966). The overlying Reklaw Formation consists of glauconitic sandy clay and a marine shale (Stenzel, 1938). The marine shales and fine-grained sediments of the Reklaw Formation bound the upper Carrizo Sand and act as the upper confining unit for the Carrizo-Wilcox Aquifer (Figure 2). The Reklaw Formation is fairly uniform and ranges in thickness from 30 feet thick in east Texas to approximately 300 feet in south Texas (Wendlandt and Knebel, 1929; Eargle, 1968).

Above the Reklaw Formation is the Queen City Sand made up of fine to medium grained noncalcareous, quartz sandstone and forms a minor aquifer, the Queen City Aquifer (Figure 2). This aquifer is present in the study area; however, it is not considered viable for the scope of the project. In the study area, the Queen City Sand crops out at the surface (Figure 2). The other younger aquifers comprised of the Sparta Sand and Yegua Formations are located to the southeast of the study area.



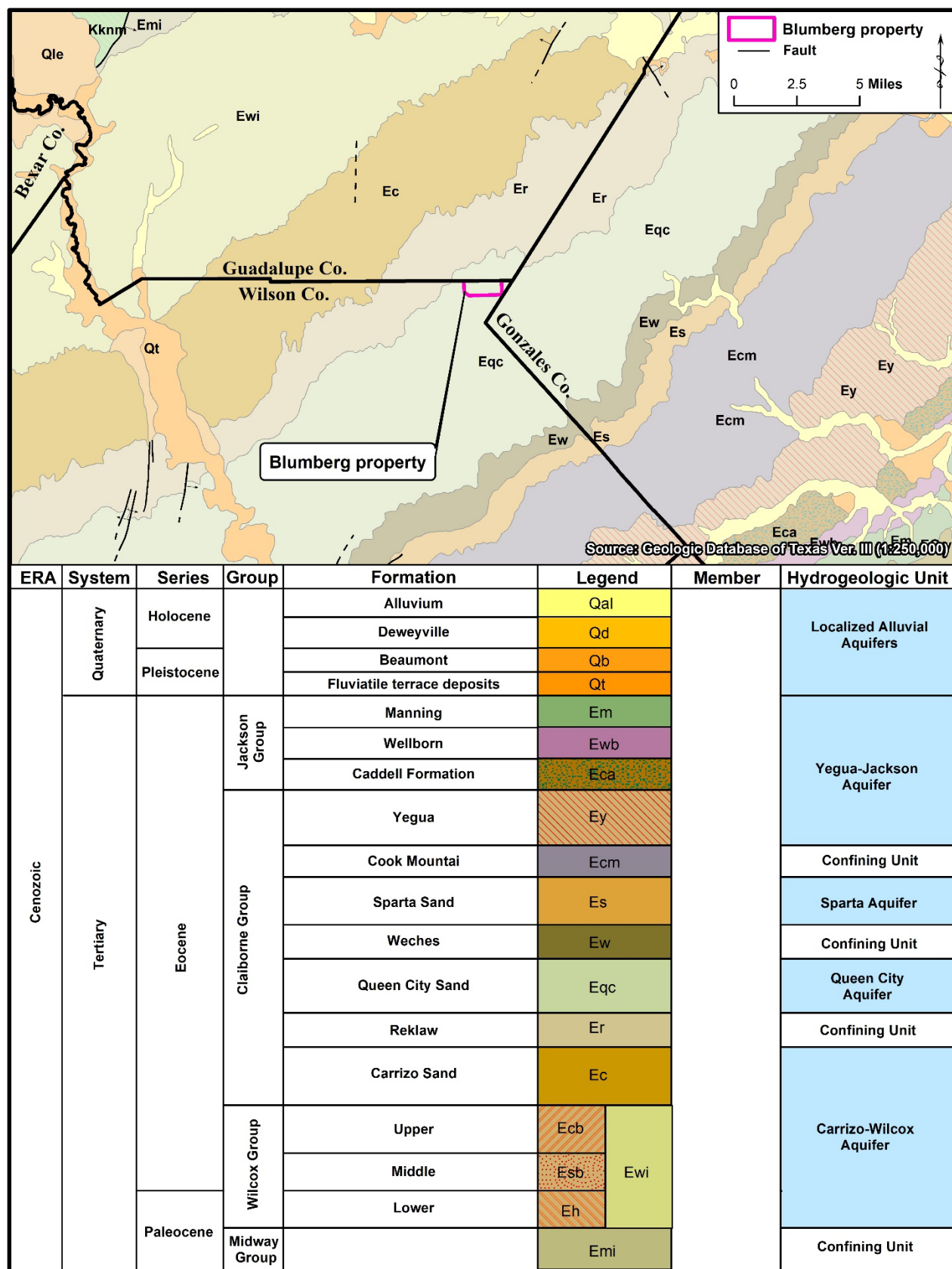


Figure 2: Geologic map and stratigraphic column (modified from Young and others, 2018)



General Hydrogeology

The Carrizo-Wilcox Aquifer is composed of fluvial and fluvial-deltaic deposits including coarse sand, silt and clay. The Carrizo-Wilcox Aquifer spans as far north as the Texas/Louisiana border and as far south as the Texas/Mexico border where fresh water can be produced. The Carrizo Sand together with the Wilcox Group make up the Carrizo-Wilcox Aquifer. The aquifer is primarily composed of sand which can be interbedded with gravel, silt, clay, and lignite. The Carrizo-Wilcox Aquifer can reach up to 3,500 feet in thickness, however the freshwater saturated thickness of the sands averages 670 feet (George and others, 2011). The Carrizo-Wilcox Aquifer is under confined conditions at the Blumberg property with an approximate depth to water of 210 ft. bgl based on nearby well data. Figure 3 provides an aquifer map of the study area. As shown in Figure 3, the Blumberg property overlies the recharge zone of the Queen City Aquifer, where the Queen City Sand Formation is present at the surface, and within the confined zone of the Carrizo-Wilcox Aquifer. The Sparta Aquifer is present to the southeast of the property.

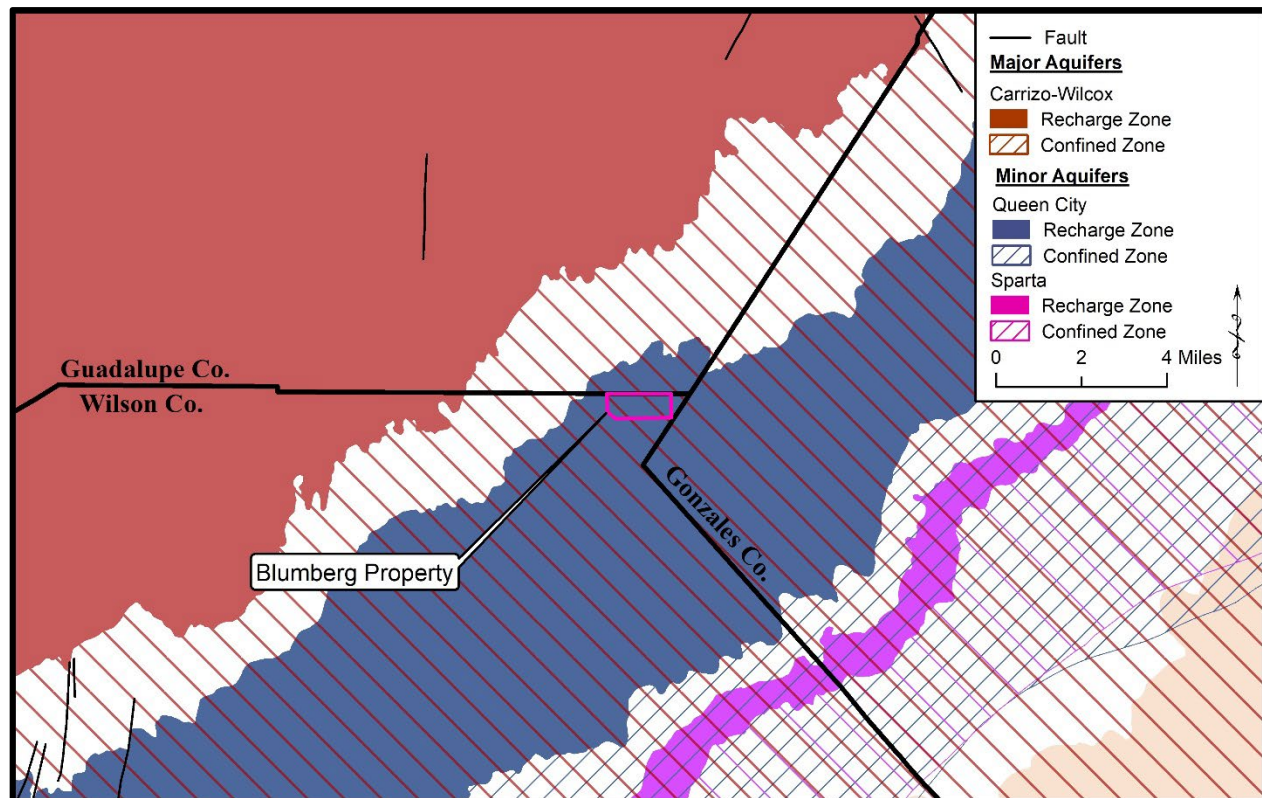


Figure 3: Aquifer map

Figure 4 provides a map showing the elevation of the land surface above Mean Seal Level (MSL) in the area surrounding the proposed well site. Elevations were obtained from Version 3.01 of the Carrizo-Wilcox Aquifer (southern portion) Groundwater Availability Model (GAM; Panday and others, 2023). Land surface elevations are highest to the northwest decreasing towards the southeast. At the proposed well the land surface elevation is approximately 458 ft. MSL, using Google Earth, we obtained a land surface elevation of 466 ft. MSL.



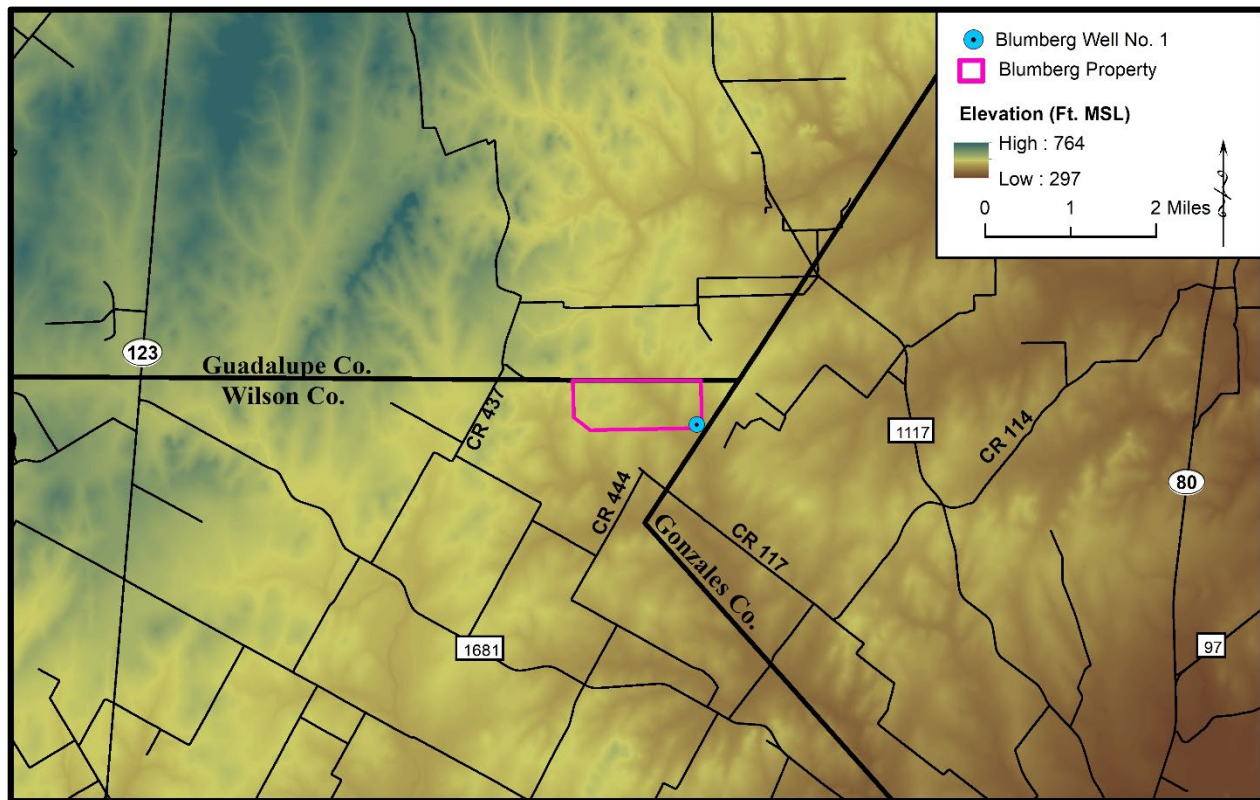


Figure 4: Land surface elevation modified from Panday and others, 2023

Figures 5, 6 and 7 provide maps showing the elevation of the top, bottom and sand percentage of the Carrizo sands, respectively. Elevations were obtained from Version 2.01 of the Carrizo-Wilcox Aquifer (southern portion) GAM (Kelley and others, 2004), which is the current GAM utilized for the EUWCD Groundwater Management Plan (Adopted November 19, 2021). Sand percentages were obtained from Version 3.01 of the Carrizo-Wilcox Aquifer (southern portion) Groundwater Availability Model (GAM; Panday and others, 2023).

According to the GAM dataset (Layer 5, Column 165, Row 64; Kelley and others, 2004), the elevation to the top of the Carrizo Sands is approximately 200.44 ft. MSL (Figure 5) or 266 ft. below ground level (bgl) at the proposed well. Plans and specifications for the Blumberg Well No. 1 estimate the top of the Carrizo Sands at approximately 450 ft. bgl based upon a review of geophysical logs in the area.

According to the GAM dataset (Layer 5, Column 165, Row 64; Kelley and others, 2004), the elevation to the bottom of the Carrizo Sands is approximately -392 ft. MSL (Figure 6) or 858 ft. below ground level (bgl) at the proposed well. Plans and specifications for the Blumberg Well No. 1 estimate the bottom of the Carrizo sands at approximately 900 ft. bgl based upon a review of geophysical logs in the area.

According to the GAM dataset (Panday and others, 2023), the sand percentage of the Carrizo Sands is approximately 86% (Figure 7) at the proposed well.



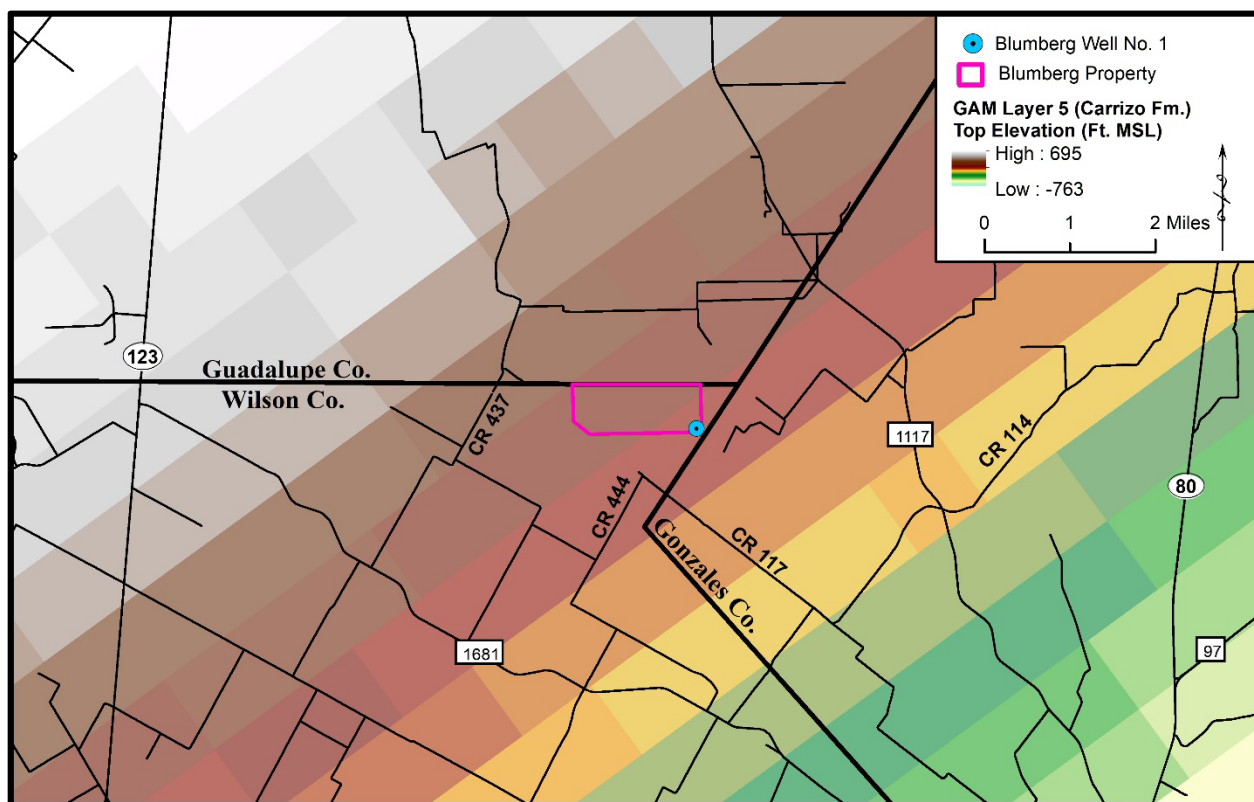


Figure 5: Top elevation of the Carrizo Sands *modified from Kelley and others, 2004*

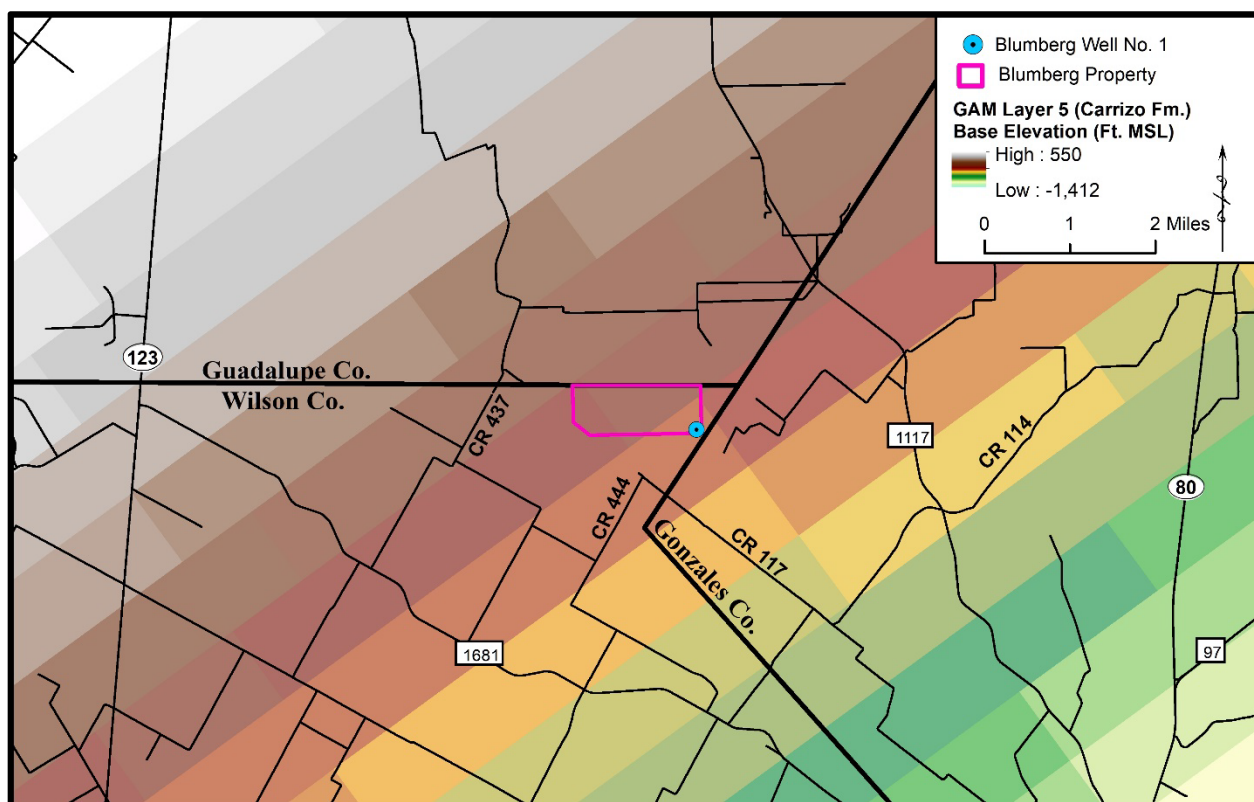


Figure 6: Base elevation of the Carrizo Sands *modified from Kelley and others, 2004*



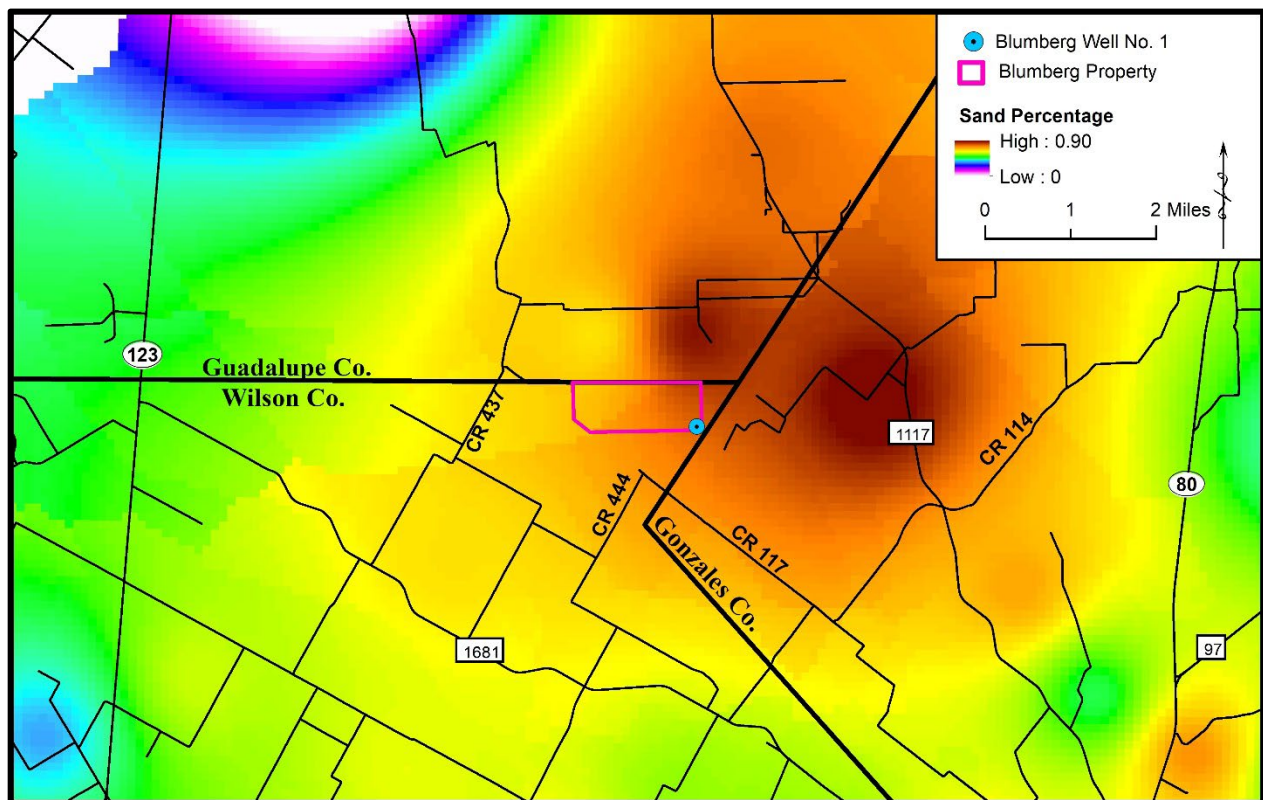


Figure 7: Percent sand within the Carrizo Sands *modified from Panday and others, 2023*



Section 2: Proposed Well

Well Construction Details

Table 2 provides a summary of the well construction for the proposed well; Figure 8 provides a well profile for the Blumberg Well No. 1 detailing the proposed construction and subsurface lithology encountered at the well location. The lithology was interpreted from nearby wells drilled to similar or deeper depths than the proposed well. Specifically, a geophysical log from the Shertz-Seguin Local Government Corporation (SSLGC) Well GU No. 2 was utilized. The well (now plugged) is located approximately 0.71 miles from the proposed Blumberg Well No. 1. The geophysical log for Well GU No. 2 (provided to EUWCD) performed by GeoCam, Inc. on 11/29/2021 does not display the right location; the correct coordinates for the well are 29.378392, -97.854114.

Table 2: Anticipated Well Construction Summary for Blumberg Well No. 1

Well	Coordinates	Elevation	Well Depth (ft. bgl)	Est. Static Water Level (ft. bgl)	Borehole (diameter; ft. bgl)	Casing (diameter; material; ft. bgl)	Screen (diameter; material; ft. bgl)	Filter Pack Interval (ft. bgl)	Aquifer
1	29.369415 -97.848372	466'	900'	150'	30" (0' – 40') 22" (40' – 700') 20" (700' – 900')	26" Steel (0' – 40') 16" Steel (+2' – 700') 10 3/4" Steel (600' – 705') (890' – 900')	10" Steel (705' – 890')	650' – 900'	Carrizo
Note: ft. = feet; bgl = below ground level; MSL = mean sea level; NA = Not applicable; *Well construction information unavailable									



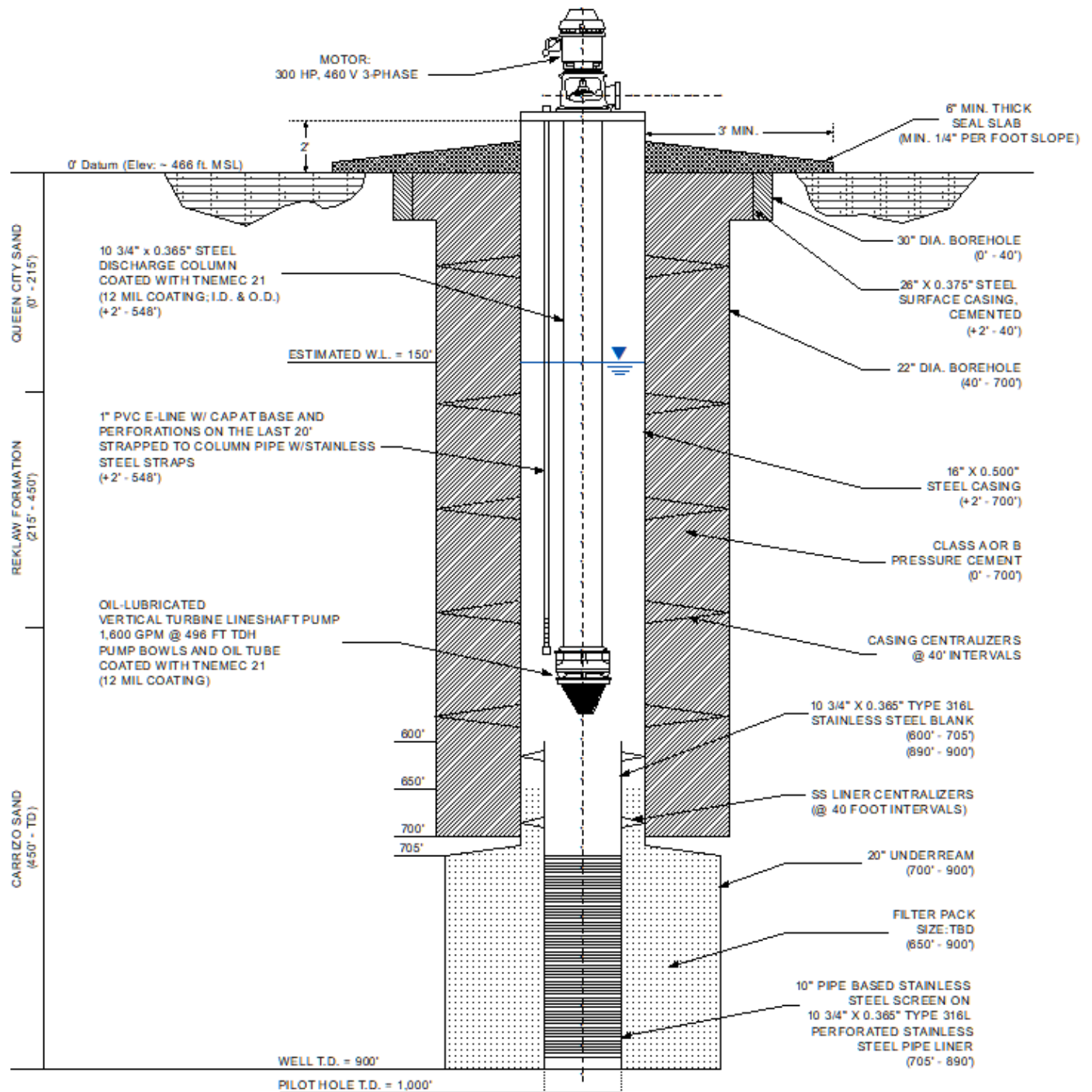


Figure 8: Well profile and estimated lithology for proposed Blumberg Well No. 1

Once the well plans have been approved, the construction project will be sent out for bidding from qualified, licensed contractors. Upon selection of the qualified contractors, Springs Hill will notify EUWCD and provide the identification and license information.



Well Spacing and Potential Sources of Contamination

Figure 9 provides a map displaying the location of the proposed well with selected registered and permitted wells located nearby. Table 3 provides a summary of the wells located near the proposed well screened within the same aquifer. EUWCD spacing rules within the Carrizo-Wilcox Aquifer require non-exempt wells to be spaced a minimum of 1.0 feet multiplied by the Pumping Rate (1,600 gpm for Blumberg Well No. 1) from all existing permitted and registered wells producing from the same aquifer. This results in a spacing of 1,600 feet from Well No. 1. According to the latest well database provided by the EUWCD, there are no wells located within 1,600 feet of the proposed well.

EUWCD spacing rules also require wells to be spaced a minimum of 150 feet from any concentrated sources of potential contamination and a minimum of 50 feet from adjacent property lines. The proposed well meets these spacing requirements.

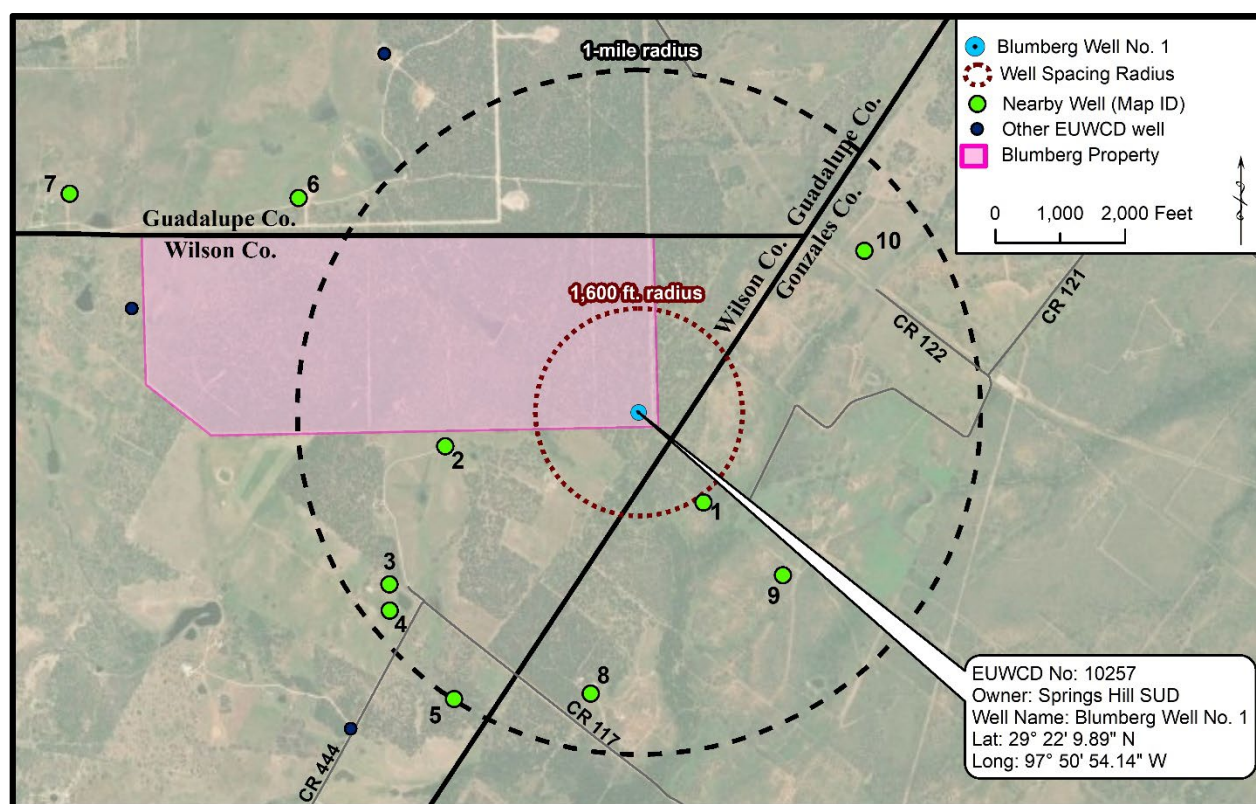


Figure 9: Location map showing Blumberg Well No. 1 with respect to nearby existing wells



Table 3: Summary of wells located near the Blumberg Well No. 1

Map ID	State Well ID	EUWCD Well ID	Owner	Well Depth (ft)	Casing Diameter and Interval (ft. bgl)	Screen Diameter and Interval (ft. bgl)	Aquifer
1	452340	4046	Nick Underhill	360	4"	4"	Carrizo
					(0' - 360')	(320' - 360')	
2	255784	2974	Rick Sprott	420	4"	4"	Carrizo
					(0' - 380')	(380' - 420')	
3	253773	2983	Kevin Houghtling	500	6"	6"	Carrizo
					(0' - 440')	(440' - 500')	
4	53216	852	Jack Houghtling	260	4"	4"	Carrizo
					(0' - 220')	(220' - 260')	
5	683540	10052	Preston Weeks	355	5"	5"	Carrizo
					(+2' - 275')	(285' - 355')	
6	675747	N/A: GU3	Schertz/Seguin LGC	760	14"	8 5/8"	Carrizo
					(+3' - 574')	(574' - 648')	
						(660' - 684')	
						(700' - 740')	
7	675748	N/A: GU4	Schertz/Seguin LGC	704	14"	8 5/8"	Carrizo
					(+3' - 572')	(572' - 634')	
						(642' - 648')	
						(656' - 664')	
8	6742106	N/A: E151	James and Patricia Jackson Family Trust	225	N/A	N/A	TWDB Notes Queen City; GCUWCD Notes Reklaw
9	N/A	N/A: C097	Batey A W Cattle Co.	300	N/A	N/A	GCUWCD Notes Carrizo
10	N/A	N/A: E041	Charles & Barbara Cowey	N/A	N/A	N/A	GCUWCD Notes Unknown
Note: ft. = feet; bgl = below ground level							



Section 3: Projected Impacts of Groundwater Production

After reviewing EUWCD's Groundwater Management Plan (Adopted November 19, 2021), we utilized Version 2.01 of the GAM for the southern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Deeds et al. (2003) and Kelley et al. (2004) for assumptions and limitations of the GAM. The model consists of eight layers, each representing a distinct hydrostratigraphic unit. Layer 5 has been designated as the Carrizo Aquifer. Each unit is modeled by dividing the region into 1 square mile grid cells, which allows for representation of large areas. The model is applicable for the assessment of groundwater availability on a regional scale; however, it is not applicable for predicting conditions at an individual well location. Pumping from several wells may be represented by a single grid cell.

The GAM utilizes MODFLOW, a modular finite-difference groundwater flow code developed by the United States Geologic Survey (USGS). MODFLOW uses a form of numerical processing known as finite-difference approximation to solve partial differential equations of groundwater flow (McDonald and Harbaugh, 1988). The flow equation, with specification of flow and/or head conditions, at the boundaries of an aquifer system and specification of initial head conditions, constitutes a mathematical representation of a groundwater flow system. MODFLOW simulates the response of the aquifer system (hydraulic heads and fluxes [flow per unit area]) to specified hydrologic stresses (recharge and/or discharge).

The GAM was developed in order to provide a tool for predicting groundwater availability into the future and assessing water management strategies developed by state water planners, Groundwater Conservation Districts, Regional Water Planning Groups, and other stakeholders. It was updated in 2004 when the Queen City and Sparta aquifers were added to the initial Carrizo-Wilcox groundwater availability model and remains the preferred instrument for determining the Carrizo-Wilcox Aquifer DFC in the EUWCD. The specific GAM modeling scenario (run) was updated in 2021 to reflect the adopted Desired Future Conditions (DFC) for Groundwater Management Area (GMA) 13. Through the joint planning process, designated representatives of GMA 13 settled upon the following DFC for the major aquifers in GMA 13 through the year 2080:

- For the unconfined portions of the Sparta, Queen City and Carrizo-Wilcox aquifers within GMA 13, the DFC is 75 percent of saturated thickness in the outcrop at the end of 2012 remains at the end of 2080; and,
- For the confined portions of the Sparta, Queen City and Carrizo-Wilcox aquifers within GMA 13, the DFC is an average drawdown of 48 feet from 2012 through 2080.

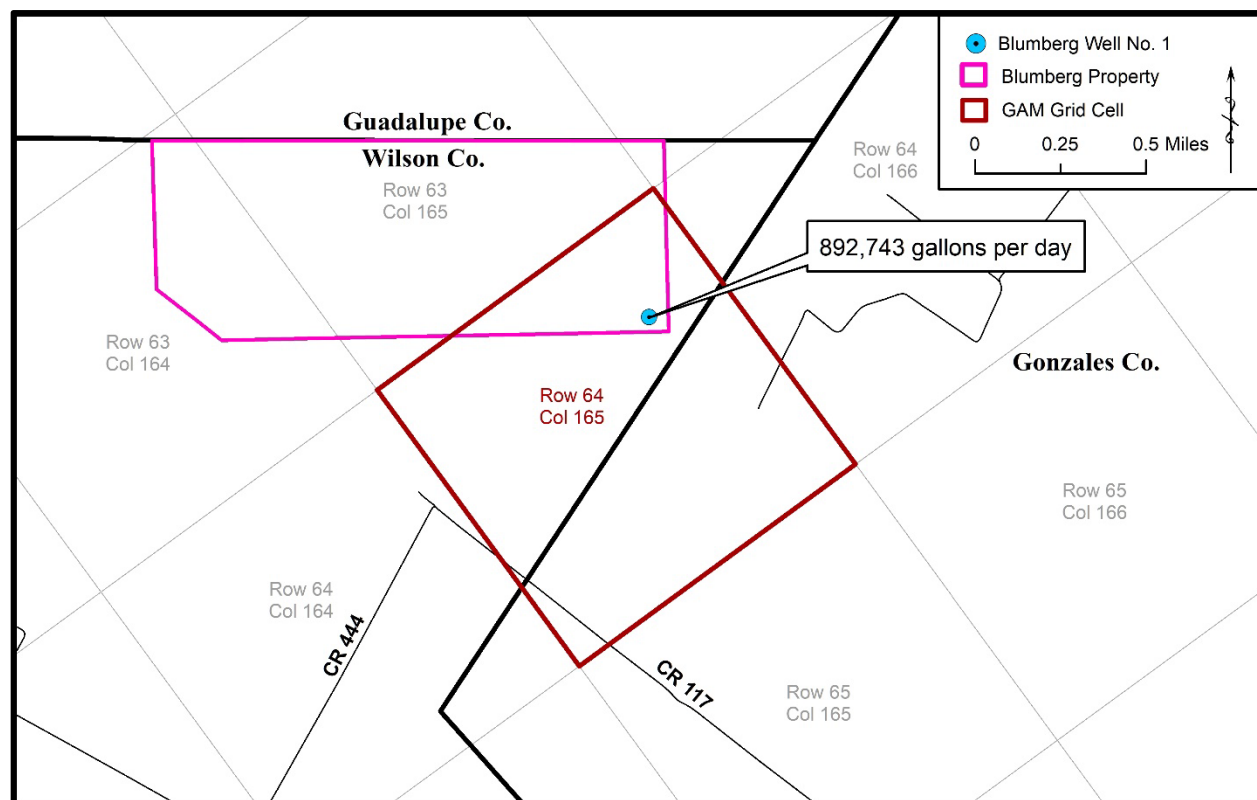
Primary Modeling Methodology

The GAM files (Furnans, 2022) were used in the modeling to compare the proposed pumping to baseline simulations, which extend to the year 2080. The model was processed using Groundwater Vistas (Version 9.07 Build 41; GWV9) software. GWV9 is utilized by many groundwater experts, including the TWDB, for GAM runs and contaminant transport modeling. In accordance with EUWCD rules, the model was run in order to estimate drawdown from the proposed well at its proposed volume for up to 30 years. To do so, the pumpage was altered for the grid cell within Layer 5 (Carrizo Aquifer) in which the proposed Blumberg Well No. 1 is located. The altered pumpage includes the additional volume to be permitted from the well (~619.96 gpm, 24 hours per day). Table 4 provides a summary of the altered pumping rates from the grid cell; Figure 10 illustrates the grid cell configuration near Blumberg Well No. 1.



Table 4: Changes to baseline pumping rates in the GAM

Well	Grid Cell	Layer	Added Pumpage Starting in 2025 (gpm)	Added Pumpage Starting in 2025 (ft ³ /day)
Blumberg Well No. 1	Row 64; Column 165	5	619.96	-119,342.3

**Figure 10: Map of proposed Blumberg Well No. 1 in relation to the GAM grid with proposed pumping**

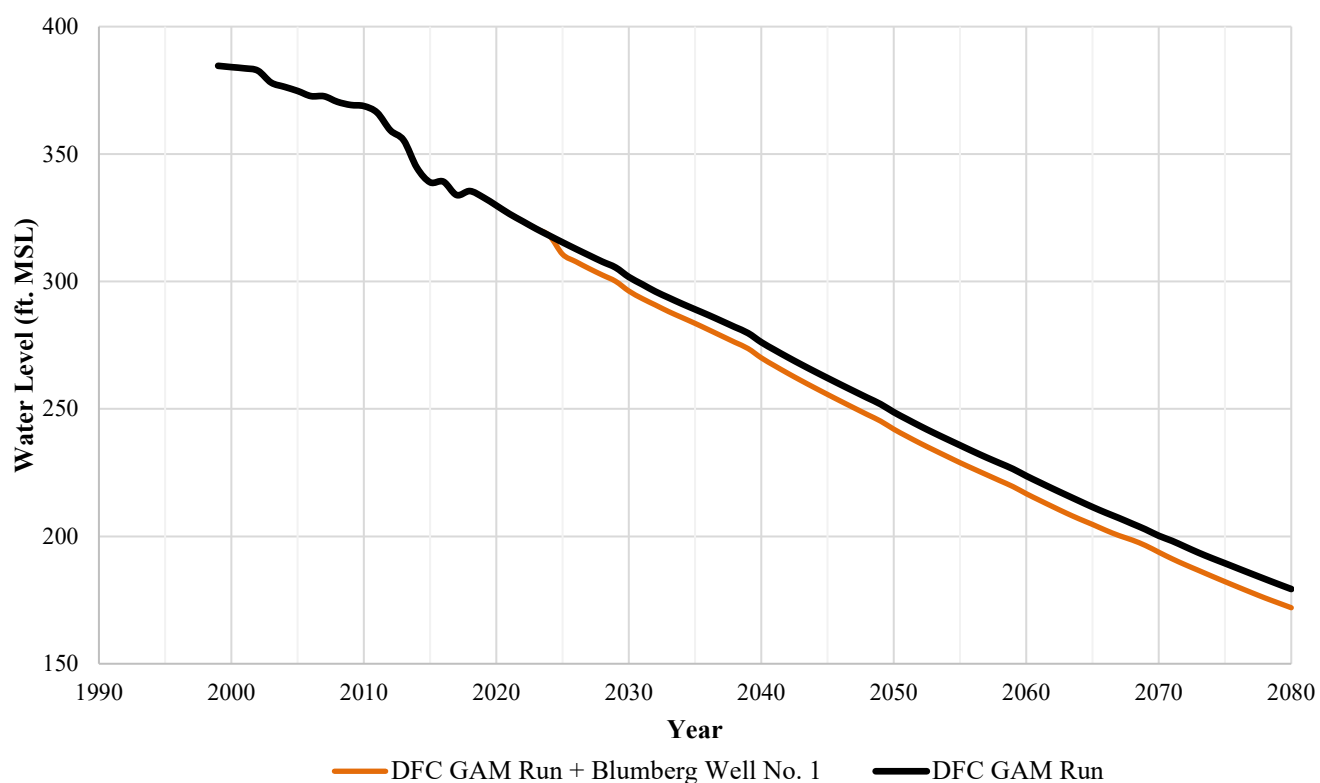
Results

The results of the modeling within Layer 5 are summarized in Table 5 and Figures 11 through 15. Figures 11 and 12 provide hydrographs over time; Figures 13 through 15 provide contour maps illustrating the difference between the DFC GAM run and the proposed pumping. Due to the low-resolution of the model, the drawdown attributed to the Blumberg Well No. 1 was taken from the center node of the cell in which the well is located, since this is where the pumping originates.



Table 5: Summary of head and drawdown in baseline GAM run vs. GAM with Blumberg Well No. 1

Grid Cell	Layer	Stress Period [year]	Head: Baseline Model (feet MSL)	Drawdown: Baseline Model (feet)	Head: Added Blumberg Well No. 1 Pumping (feet MSL)	Drawdown: Added Blumberg Well No. 1 Pumping (feet)	Drawdown: Attributed from Added Pumping (feet)
Row 64; Column 165	5	25 [2024]	317.99	0	317.99	0	0
		26 [2025]	315.35	2.64	310.64	7.35	4.71
		35 [2034]	291.28	26.71	285.87	32.13	5.41
		55 [2054]	238.17	79.83	231.39	86.6	6.77
Notes: MSL = Mean Sea Level (elevation);							

**Figure 11: Hydrograph comparing DFC baseline and proposed Blumberg Well No. 1 pumpage (Layer 5, Row 64, Column 165)**

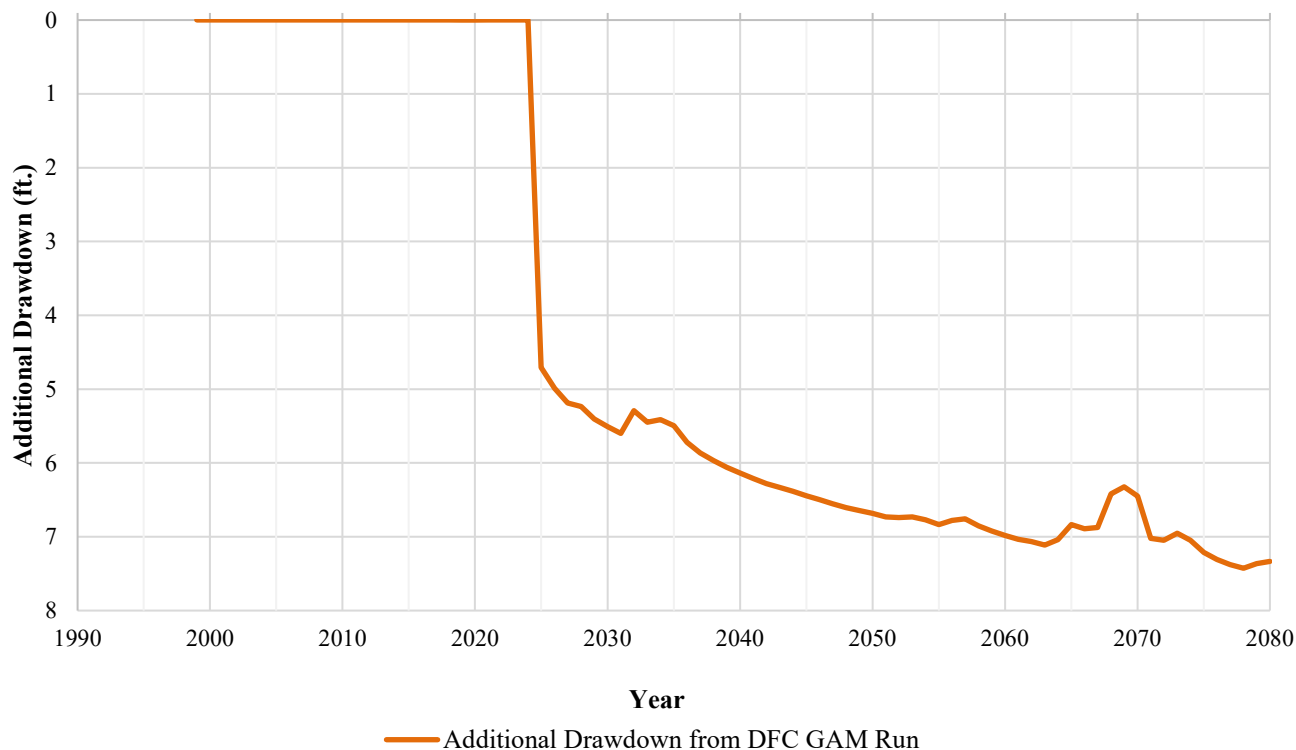


Figure 12: Additional drawdown to DFC from proposed Blumberg Well No. 1 pumpage (Layer 5, Row 64, Column 165)

The information depicted in Figures 13, 14, and 15 is derived from model output at each cell node (center of each grid cell). Proposed pumping from the Blumberg Well No. 1 was added to the .WEL file starting at Stress Period 26 (year 2025) and continued through the end of the GAM time period (2080). The simulation was then run again. The drawdown was estimated by subtracting the modeled head elevation in each resulting cell node at Stress Periods 26 (1 year of pumping), 35 (10 years of pumping), and 55 (30 years of pumping) from the modeled head at Stress Period 25 (prior to pumping). The difference in heads at each Stress Period was calculated and gridded/contoured in ArcGIS (Desktop 10.8.2). Head elevations were also compared in each Stress Period from the baseline GAM DFC run to the results from the added Blumberg Well No. 1 pumping.



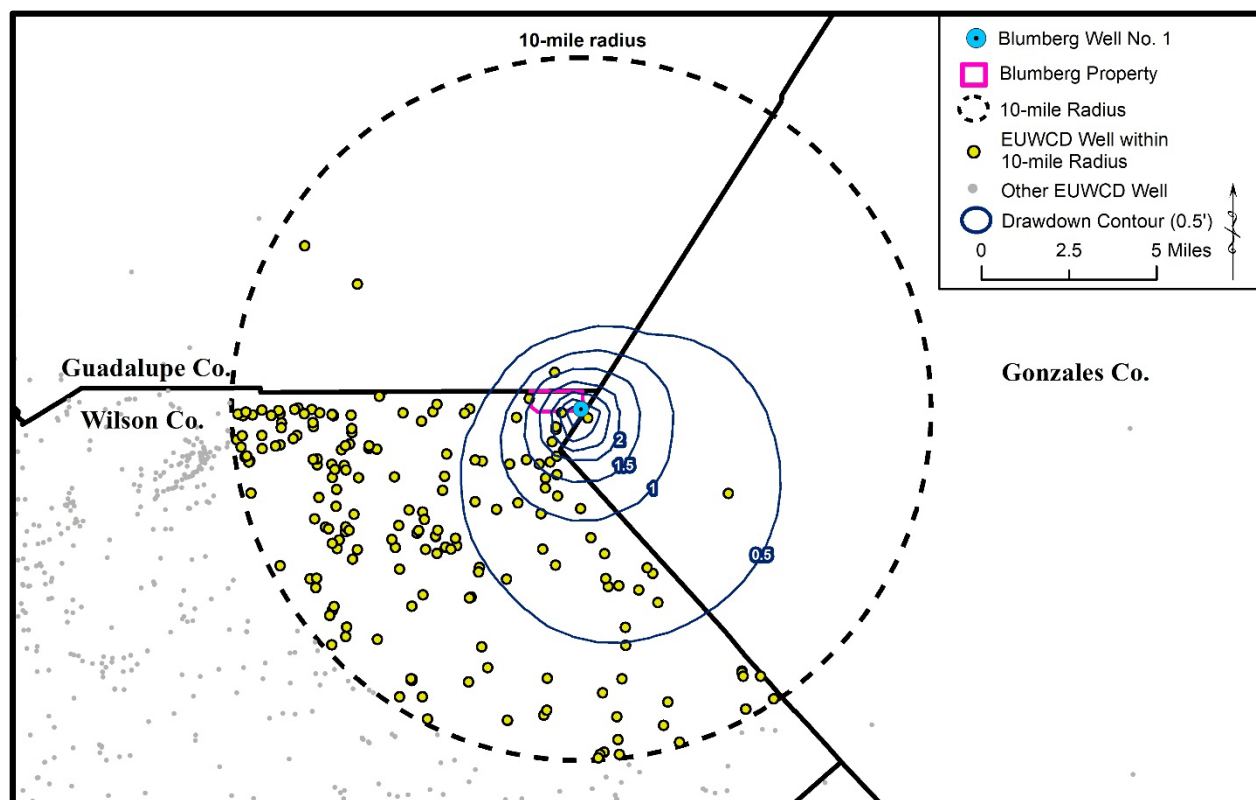


Figure 13: Modeled 1-year drawdown attributed to GAM DFC run from Blumberg Well No. 1 production

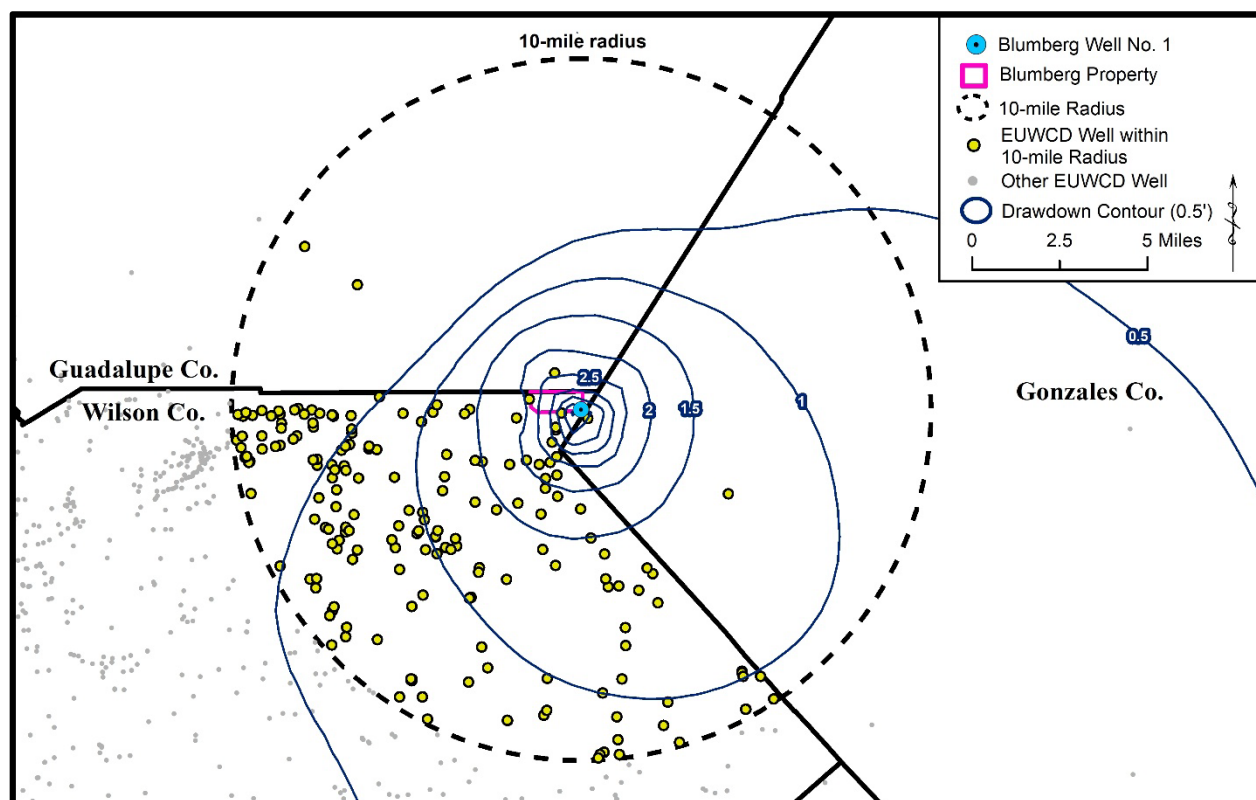


Figure 14: Modeled 10-year drawdown attributed to GAM DFC run from Blumberg Well No. 1 production



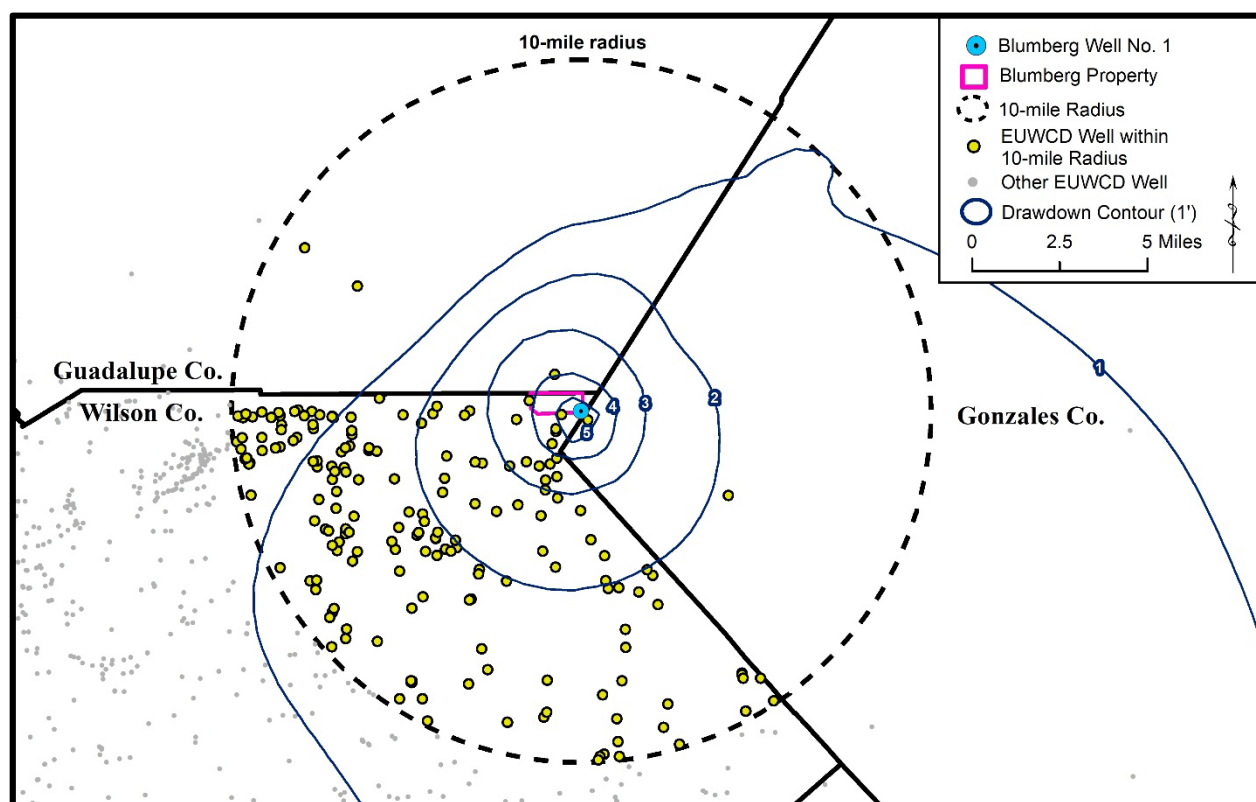


Figure 15: Modeled 30-year drawdown attributed to GAM DFC run from Blumberg Well No. 1 production

Table 6 provides a summary of the modeling results on existing EUWCD registered and permitted Carrizo Aquifer wells near the Blumberg Well No. 1 (Map IDs correspond to Figure 2 and Table 2). An excel worksheet with the registered/permited Carrizo Aquifer wells and respective calculated drawdown within 10 miles of the Blumberg Well No. 1 will be provided to EUWCD along with this report.

Table 6: Summary of estimated drawdown at wells located near Blumberg Well No. 1

Map ID	State Well ID	EUWCD Well ID	Owner	Grid Cell	Time	Drawdown: Baseline Model with Blumberg Well No. 1 (feet)	Drawdown: Attributed from Added Pumping (feet)
1	452340	4046	Nick Underhill	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.13	5.41
					T = 30 Years	86.60	6.77
2	255784	2974	Rick Sprott	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.13	5.41



					T = 30 Years	86.60	6.77
3	253773	2983	Kevin Houghtling	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.80	2.23
					T = 10 Years	28.88	2.84
					T = 30 Years	82.11	4.24
4	53216	852	Jack Houghtling	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.80	2.23
					T = 10 Years	28.88	2.84
					T = 30 Years	82.11	4.24
5	683540	10052	Preston Weeks	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.80	2.23
					T = 10 Years	28.88	2.84
					T = 30 Years	82.11	4.24
6	675747	N/A: GU3	Schertz/Seguin LGC	Row 63 Column 165	T = 0 Years	0	0
					T = 1 Year	4.94	2.22
					T = 10 Years	30.33	3.03
					T = 30 Years	86.41	4.61
7	675748	N/A: GU4	Schertz/Seguin LGC	Row 62 Column 164	T = 0 Years	0	0
					T = 1 Year	3.36	0.66
					T = 10 Years	29.43	1.83
					T = 30 Years	84.15	3.36
8	6742106	N/A: E151	James and Patricia Jackson Family Trust	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.13	5.41
					T = 30 Years	86.60	6.77
9	N/A	N/A: C097	Batey A W Cattle Co	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.13	5.41
					T = 30 Years	86.60	6.77
10	N/A	N/A: E041	Charles & Barbara Cowey	Row 64 Column 166	T = 0 Years	0	0
					T = 1 Year	5.03	2.34
					T = 10 Years	30.34	3.04
					T = 30 Years	85.55	4.31



Based upon the drawdown calculated from the model, the maximum drawdown attributed to production at the proposed rate (325,851,000 gallons per year) from the Blumberg Well No. 1 is approximately 6.77 feet after 30 years (Table 6). Table 7 provides a 30-year summary of the modeled groundwater budget (for Layer 5 – Carrizo Aquifer) in the GAM DFC run with added pumping from the Blumberg Well No. 1. From the results, after 30 years of production at 1,000 acre-feet per year, approximately 23,064.46 acre-feet of water is removed from aquifer storage.

Table 7: Groundwater budget for GAM DFC Run and Blumberg Well No. 1 production (Layer 5)

	Baseline DFC GAM Run	GAM Run + Blumberg Well No. 1	Difference
Inflow (acre-feet per year)			
West	0.00	0.00	0.00
East	0.00	0.00	0.00
North	0.00	0.00	0.00
South	0.00	0.00	0.00
Top	2,990,021.93	2,994,298.39	4,276.46
Bot	1,275,878.14	1,277,057.67	1,179.53
Storage	4,487,024.41	4,510,081.85	23,057.44
Constant Head	0.00	0.00	0.00
Well	0.00	0.00	0.00
River	0.00	0.00	0.00
Drain	0.00	0.00	0.00
General Head Boundary	170,303.00	170,584.44	281.43
Stream	717,060.46	717,457.95	397.49
Recharge	2,018,076.82	2,018,076.82	0.00
ET	0.00	0.00	0.00
Lake	0.00	0.00	0.00
Total	11,658,364.76	11,687,557.11	29,192.35
Outflow (acre-feet per year)			
West	0.00	0.00	0.00
East	0.00	0.00	0.00
North	0.00	0.00	0.00
South	0.00	0.00	0.00
Top	-48,236.64	-48,122.84	113.81
Bot	-641,137.73	-640,582.45	555.29
Storage	-184,609.69	-184,602.68	7.01
Constant Head	0.00	0.00	0.00
Well	-10,691,235.46	-10,721,235.42	-29,999.96
River	0.00	0.00	0.00
Drain	0.00	0.00	0.00



General Head Boundary	-59,089.22	-59,080.47	8.76
Stream	-30,047.81	-29,919.14	128.67
Recharge	0.00	0.00	0.00
ET	-4,032.28	-4,032.28	0.00
Lake	0.00	0.00	0.00
Total	-11,658,388.85	-11,687,575.27	-29,186.42
Inflow - Outflow	-24.09	-18.16	5.93
Storage In - Storage Out	4,302,414.71	4,325,479.17	23,064.46

Table 8 provides a summary of the average drawdown by County (within EUWCD) after 1, 10, and 30 years of proposed production at the Blumberg Well No. 1. The drawdown was estimated by subtracting the modeled head elevation in each resulting cell node at Stress Periods 26 (1 year of pumping), 35 (10 years of pumping), and 55 (30 years of pumping) from the modeled head at Stress Period 25 (prior to pumping). The difference in heads at each node was calculated in ArcGIS (Desktop 10.8.2), plotted, and averaged for each respective county.

Table 8: Average drawdown by County after 1, 10, and 30 years of pumping

County	Average Drawdown: 1 year (feet)	Average Drawdown: 10 years (feet)	Average Drawdown: 30 years (feet)
Atascosa	2.93	25.87	66.40
Frio	0.78	9.96	28.02
Karnes	2.66	24.23	67.13
Wilson	2.62	24.00	68.40

Secondary Modeling Methodology

In accordance with a request from the EUWCD district manager, the model was run in order to estimate drawdown from the proposed well at its proposed volume for up to 30 years *and* from the nearby SSLGC wellfield with updated production volumes provided by both the EUWCD and the Guadalupe County Groundwater Conservation District (GCGCD). To do so, the pumpage was altered for each grid cell within Layer 5 (Carrizo Aquifer) in which the proposed Blumberg Well No. 1 and the SSLGC wellfield wells are located. Changes to the model for the proposed Blumberg Well No. 1 are shown in Table 4. Changes to the model for the SSLGC wellfield occur within 4 grid cells located in Rows 62 and 63; Columns 164, 165, and 166 with varying discharge rates through the year 2080 (spreadsheet and shapefiles will be provided to EUWCD along with this report).

Results

The results of the updated modeling within Layer 5 are summarized in Table 9 and Figures 16 through 20. Figures 16 and 17 provide hydrographs over time; Figures 18 through 20 provide contour maps illustrating the difference between the DFC GAM run (with updated SSLGC pumping) and the proposed pumping from Blumberg Well No. 1. Due to the low-resolution of the model, the drawdown attributed to the Blumberg Well No. 1 was taken from the center node of the cell in which the well is located, since this is where the pumping originates.



Table 9: Summary of head and drawdown in baseline GAM run, GAM with updated SSLGC pumping, and GAM with Blumberg Well No. 1

Grid Cell [Well]	Layer	Stress Period [year]	Head: Baseline Model (feet MSL)	Drawdown: Baseline Model (feet)	Head: Baseline Model + updated SSLGC Pumping (feet MSL)	Drawdown: Baseline Model + updated SSLGC Pumping (feet)	Head: Added Blumberg Well No. 1 Pumping (feet MSL)	Drawdown: Added Blumberg Well No. 1 Pumping (feet)	Drawdown Attributed only from Blumberg Well No. 1 Pumping (feet)
Row 64; Column 165 [Blumberg Well No. 1]	5	25 [2024]	317.99	0	317.99	0	317.99	0	0
		26 [2025]	315.35	2.64	315.35	2.64	310.64	7.35	4.71
		35 [2034]	291.28	26.71	291.28	26.71	285.87	32.12	5.41
		55 [2054]	238.17	79.83	223.81	94.18	217.06	100.93	6.76
Row 62; Column 164 [SSLGC Wellfield]		25 [2024]	340	0	340	0	340	0	0
		26 [2025]	337.3	2.7	337.3	2.7	336.64	3.36	0.66
		35 [2034]	312.4	27.6	312.4	27.6	310.57	29.43	1.83
		55 [2054]	259.21	80.79	241.51	98.49	238.15	101.85	3.36
Row 63; Column 165 [SSLGC Wellfield]		25 [2024]	326.87	0	326.87	0	326.87	0	0
		26 [2025]	324.15	2.72	324.15	2.72	321.93	4.94	2.22
		35 [2034]	299.57	27.3	299.57	27.3	296.54	30.33	3.03
		55 [2054]	245.08	81.79	220.66	106.21	216.02	110.85	4.64
Row 63; Column 166 [SSLGC Wellfield]		25 [2024]	323.04	0	323.04	0	323.04	0	0
		26 [2025]	320.27	2.77	320.27	2.77	318.7	4.34	1.57
		35 [2034]	295.08	27.96	295.08	27.96	292.94	30.1	2.14
		55 [2054]	240.48	82.56	220.56	102.48	216.74	106.3	3.82
Row 62; Column 166 [SSLGC Wellfield]		25 [2024]	334.09	0	334.09	0	334.09	0	0
		26 [2025]	331.17	2.92	331.17	2.92	330.55	3.54	0.62
		35 [2034]	305.94	28.15	305.94	28.15	304	30.09	1.94
		55 [2054]	250.89	83.2	231.19	102.9	227.9	106.19	3.29



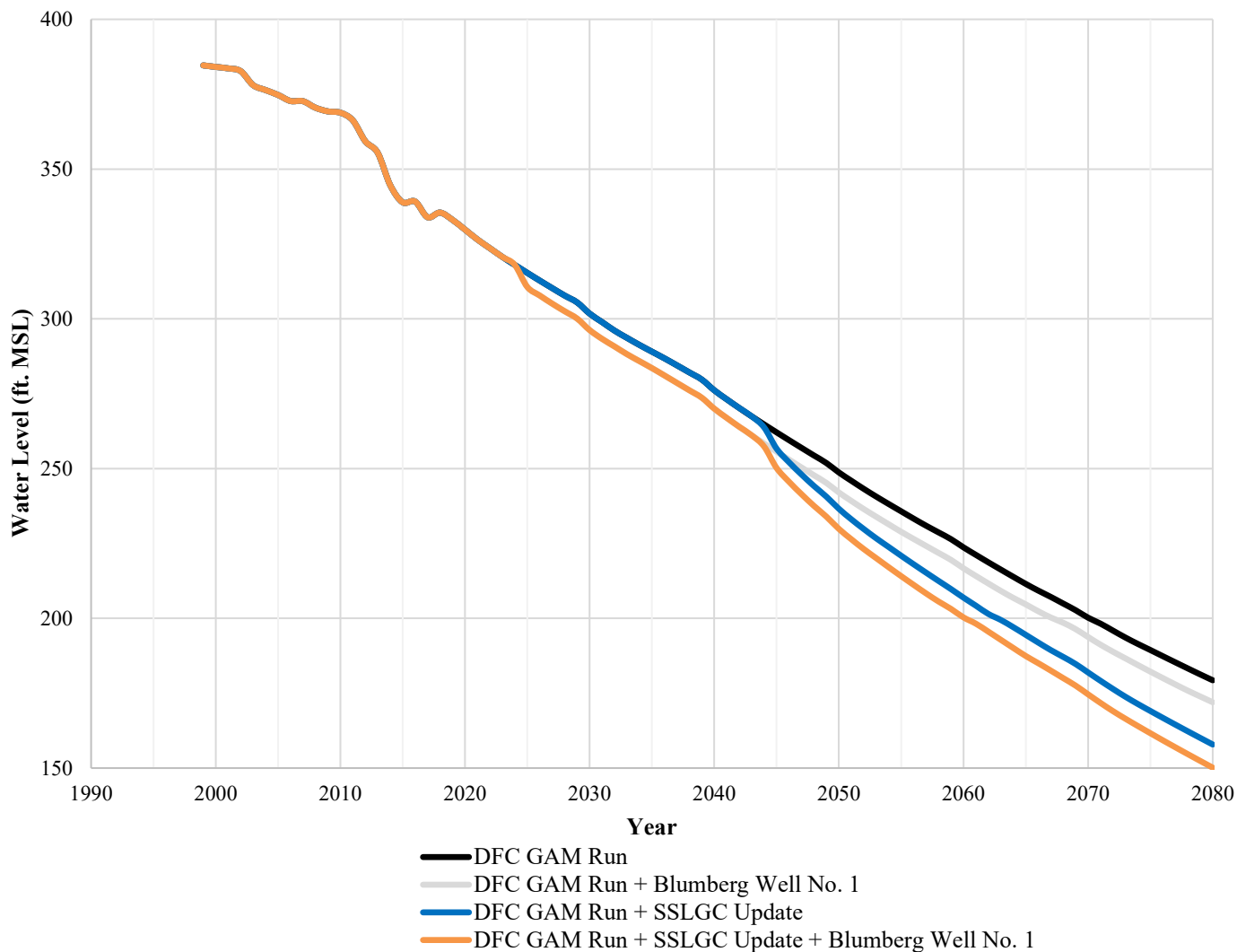


Figure 16: Hydrograph comparing baseline GAM run, GAM with updated SSLGC pumping, and GAM with Blumberg Well No. 1 (Layer 5, Row 64, Column 165)

Based on the updated groundwater modeling, water level elevations within the Carrizo Aquifer at the proposed Blumberg Well No. 1 are projected to decline by approximately 100 feet over a 30-year period (Table 9; Figure 16). By 2055, the modeled water level is estimated at 217.06 feet above mean sea level (approximately 249 feet below ground level). Given the anticipated well construction, the model indicates that sufficient aquifer saturation and pump submergence will be maintained to support continued well operation (Figure 8). Drawdown specifically attributed to the proposed Blumberg Well No. 1 remains below 7 feet after 30 years in the updated modeling.



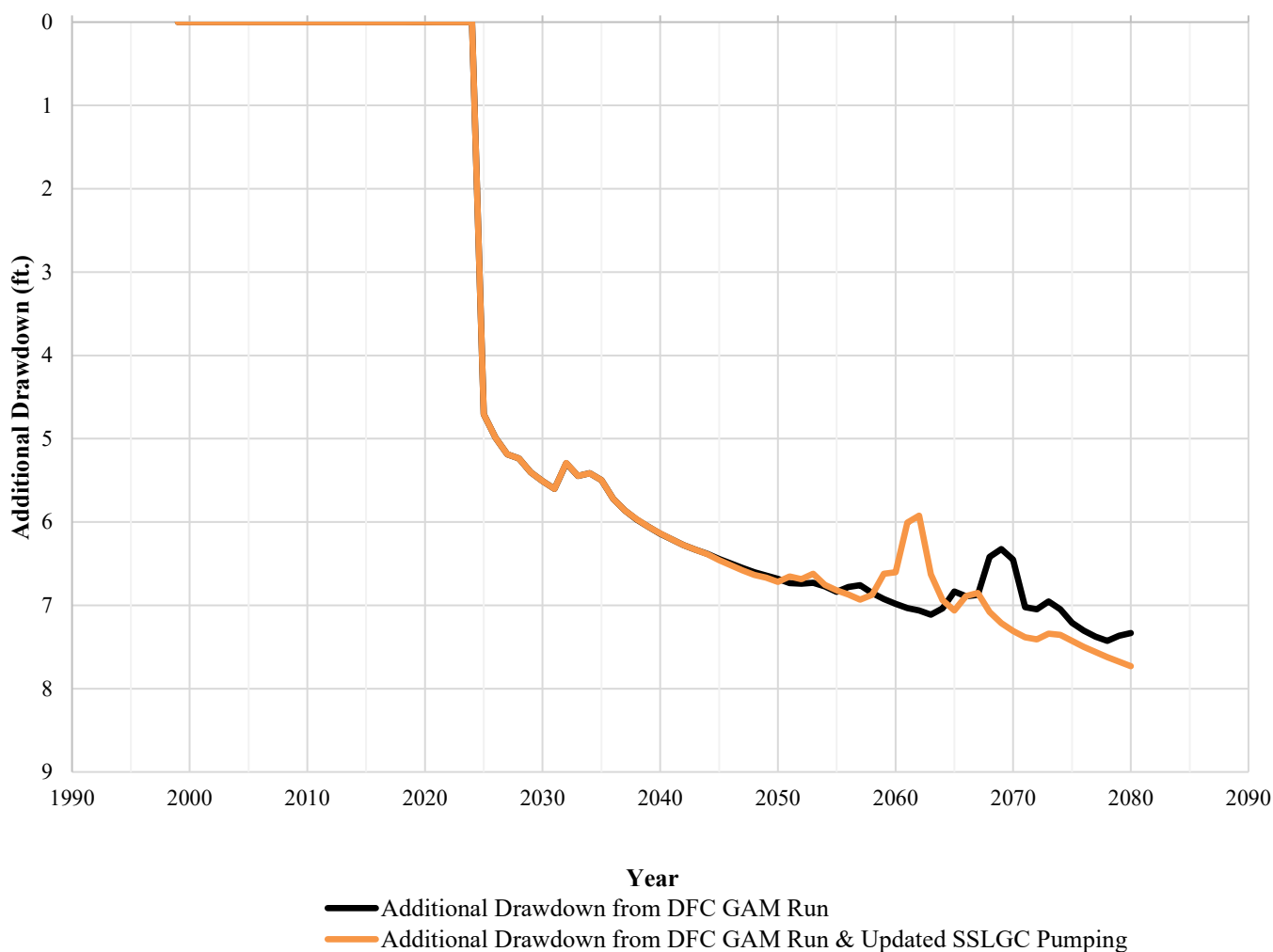


Figure 17: Comparison of additional drawdown to baseline GAM run and updated SSLGC pumping attributed to Blumberg Well No. 1 (Layer 5, Row 64, Column 165)

The information depicted in Figures 18, 19, and 20 is derived from model output at each cell node (center of each grid cell). Proposed pumping volumes from the Blumberg Well No. 1 and from the SSLGC wellfield were added to the .WEL file starting at Stress Period 26 (year 2025) and continued through the end of the GAM time period (2080). The simulation was then run again. The drawdown was estimated by subtracting the modeled head elevation in each resulting cell node at Stress Periods 26 (1 year of pumping), 35 (10 years of pumping), and 55 (30 years of pumping) from the modeled head at Stress Period 25 (prior to pumping). The difference in heads at each Stress Period was calculated and gridded/contoured in ArcGIS (Desktop 10.8.2). Head elevations were also compared in each Stress Period from the modified baseline GAM DFC run to the results from the added Blumberg Well No. 1 pumping.



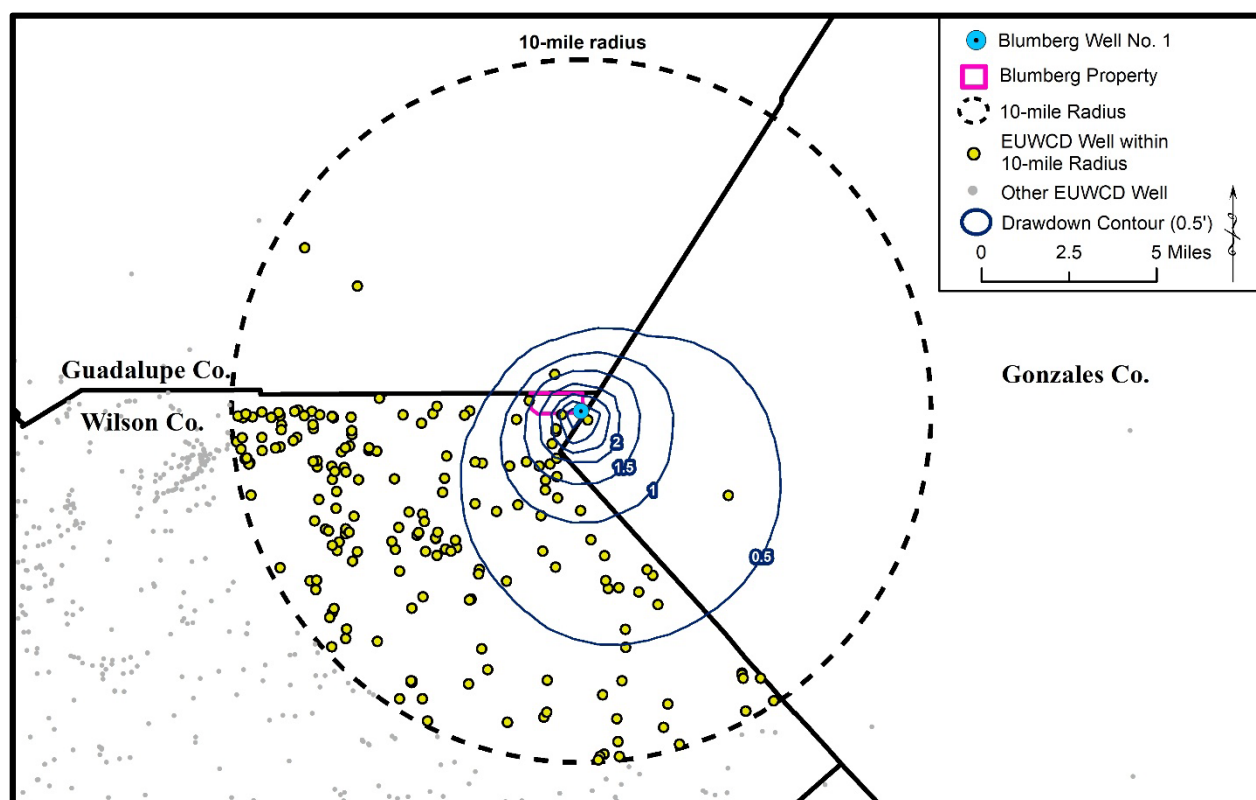


Figure 18: Modeled 1-year drawdown attributed to modified GAM DFC run from Blumberg Well No. 1 production

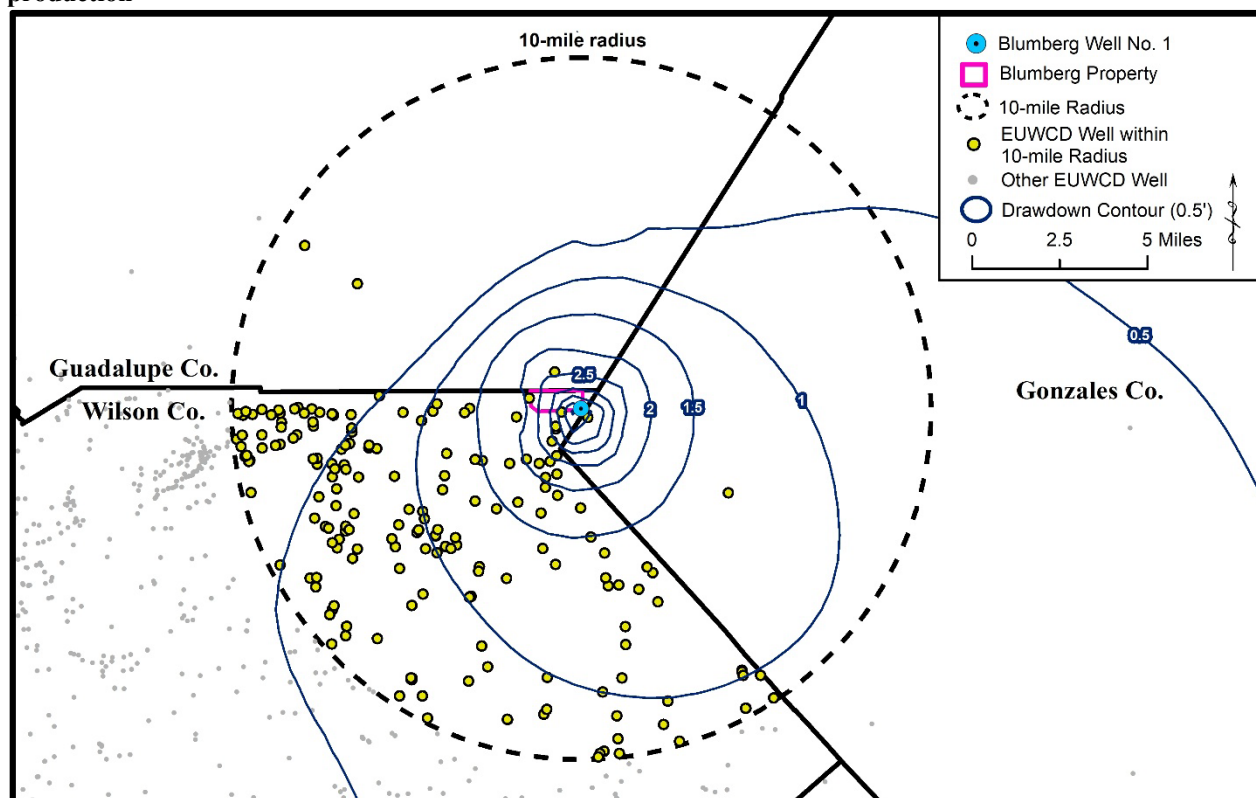


Figure 19: Modeled 10-year drawdown attributed to modified GAM DFC run from Blumberg Well No. 1 production



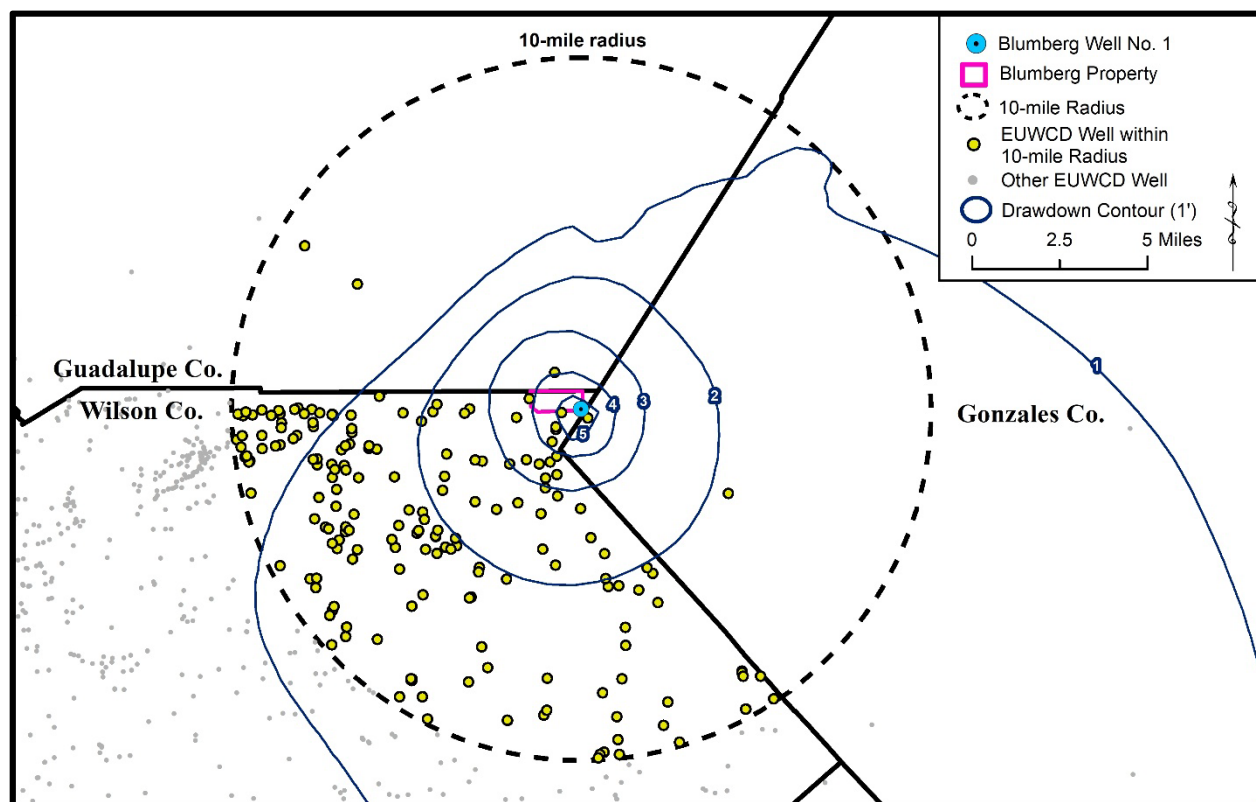


Figure 20: Modeled 30-year drawdown attributed to modified GAM DFC run from Blumberg Well No. 1 production

Table 10 provides a summary of the modeling results on existing EUWCD registered and permitted Carrizo Aquifer wells near the Blumberg Well No. 1 (Map IDs correspond to Figure 2 and Table 2). An excel worksheet with the registered/permited Carrizo Aquifer wells and respective calculated drawdown within 10 miles of the Blumberg Well No. 1 will be provided to EUWCD along with this report.

Table 10: Summary of estimated drawdown at wells located near Blumberg Well No. 1

Map ID	State Well ID	EUWCD Well ID	Owner	Grid Cell	Time	Drawdown: Modified Baseline Model and Blumberg Well No. 1 (feet)	Drawdown: Attributed only from Added Pumping (feet)
1	452340	4046	Nick Underhill	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.12	5.41
					T = 30 Years	100.93	6.76



2	255784	2974	Rick Sprott	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.12	5.41
					T = 30 Years	100.93	6.76
3	253773	2983	Kevin Houghtling	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.17	1.55
					T = 10 Years	28.78	1.89
					T = 30 Years	98.81	3.82
4	53216	852	Jack Houghtling	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.17	1.55
					T = 10 Years	28.78	1.89
					T = 30 Years	98.81	3.82
5	683540	10052	Preston Weeks	Row 63 Column 164	T = 0 Years	0	0
					T = 1 Year	4.17	1.55
					T = 10 Years	28.78	1.89
					T = 30 Years	98.81	3.82
6	675747	N/A: GU3	Schertz/Seguin LGC	Row 63 Column 165	T = 0 Years	0	0
					T = 1 Year	4.94	2.22
					T = 10 Years	30.33	3.03
					T = 30 Years	110.85	4.64
7	675748	N/A: GU4	Schertz/Seguin LGC	Row 62 Column 164	T = 0 Years	0	0
					T = 1 Year	3.36	0.66
					T = 10 Years	29.43	1.83
					T = 30 Years	101.85	3.36
8	6742106	N/A: E151	James and Patricia Jackson Family Trust	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.12	5.41
					T = 30 Years	100.93	6.76



9	N/A	N/A: C097	Batey A W Cattle Co	Row 64 Column 165	T = 0 Years	0	0
					T = 1 Year	7.35	4.71
					T = 10 Years	32.12	5.41
					T = 30 Years	100.93	6.76
10	N/A	N/A: E041	Charles & Barbara Cowey	Row 64 Column 166	T = 0 Years	0	0
					T = 1 Year	5.03	2.34
					T = 10 Years	30.34	3.04
					T = 30 Years	98.39	4.26

Based upon the drawdown calculated from the model, the maximum drawdown attributed to production at the proposed rate (325,851,000 gallons per year) from the Blumberg Well No. 1 is approximately 6.76 feet after 30 years (Table 10), which is approximately 0.01 feet less than the original GAM model run analysis (primary methodology). Table 11 provides a 30-year summary of the modeled groundwater budget (for Layer 5 – Carrizo Aquifer) in the modified GAM DFC run with added pumping from the SSLGC well field and the Blumberg Well No. 1. From the results, after 30 years of production at 1,000 acre-feet per year, approximately 23,090.45 acre-feet of water is removed from aquifer storage, which is approximately 25.99 acre-feet more than the original GAM DFC modeling scenario (Table 7).

Table 11: Groundwater budget for modified GAM DFC Run and Blumberg Well No. 1 production (Layer 5)

	Modified DFC GAM Run	Modified GAM Run + Blumberg Well No. 1	Difference
Inflow (AFY)			
West	0.00	0.00	0.00
East	0.00	0.00	0.00
North	0.00	0.00	0.00
South	0.00	0.00	0.00
Top	2,992,691.94	2,996,944.32	4,252.38
Bot	1,276,497.35	1,277,673.16	1,175.81
Storage	4,533,159.27	4,556,243.50	23,084.23
CH	0.00	0.00	0.00
Well	0.00	0.00	0.00
River	0.00	0.00	0.00
Drain	0.00	0.00	0.00
GHB	170,370.96	170,651.70	280.74
Stream	717,105.36	717,502.64	397.28
Recharge	2,018,076.82	2,018,076.82	0.00
ET	0.00	0.00	0.00



Lake	0.00	0.00	0.00
Total	11,707,901.69	11,737,092.13	29,190.44
Outflow (AFY)			
West	0.00	0.00	0.00
East	0.00	0.00	0.00
North	0.00	0.00	0.00
South	0.00	0.00	0.00
Top	-48,212.00	-48,098.92	113.08
Bot	-640,602.14	-640,051.07	551.06
Storage	-184,608.69	-184,602.46	6.22
CH	0.00	0.00	0.00
Well	-10,741,329.66	-10,771,327.69	-29,998.03
River	0.00	0.00	0.00
Drain	0.00	0.00	0.00
GHB	-59,088.00	-59,079.27	8.73
Stream	-30,047.60	-29,919.14	128.46
Recharge	0.00	0.00	0.00
ET	-4,032.28	-4,032.28	0.00
Lake	0.00	0.00	0.00
Total	-11,707,920.37	-11,737,110.83	-29,190.46
Inflow - Outflow	-18.69	-18.70	-0.02
Storage In - Storage Out	4,348,550.58	4,371,641.03	23,090.45

Table 12 provides a summary of the average drawdown by County (within EUWCD) after 1, 10, and 30 years of proposed production at the Blumberg Well No. 1. The drawdown was estimated by subtracting the modeled head elevation in each resulting cell node at Stress Periods 26 (1 year of pumping), 35 (10 years of pumping), and 55 (30 years of pumping) from the modeled head at Stress Period 25 (prior to pumping). The difference in heads at each node was calculated in ArcGIS (Desktop 10.8.2), plotted, and averaged for each respective county.

Table 12: Average drawdown by County after 1, 10, and 30 years of pumping (modified GAM)

County	Average Drawdown: 1 year (feet)	Average Drawdown: 10 years (feet)	Average Drawdown: 30 years (feet)
Atascosa	2.93	25.87	66.47
Frio	0.78	9.96	28.02
Karnes	2.67	24.23	68.07
Wilson	2.62	24.00	69.62

Use of Water

Springs Hill SUD provides water utility service to approximately 11,880 connections within Guadalupe and Wilson counties via three (3) active wells completed within the Carrizo-Wilcox Aquifer located in Guadalupe County. In addition to the wells, the system also has groundwater supplies via Canyon



Regional Water Authority (CRWA) Wells Ranch and the Schertz-Seguin Local Government Corporation and surface water from the CRWA Lake Dunlap Water Treatment Plant, an intake at Lake Placid, the City of Seguin and the City of New Braunfels. The water system is seeking add a new well for redundancy and in order to meet future demand. Water from the proposed Blumberg Well No. 1 will not be leased, resold, transferred or transported to other users than the customers of Springs Hill within their CCN.

The pumping schedule for water to be produced from the well will be dependent upon water system demand. Peak pumping demand hours are projected for the early morning and evening hours to accommodate typical public water supply demand; peak pumping demand will also be subject to seasonal change, such as increased usage in the summer and decreased usage in the winter.

According to the TCEQ Drinking Water Watch website (2025), Springs Hill currently provides public water supply to 11,880 connections. The average daily usage for the water system is 2,422,000 gallons (203.87 gallons per connection per day), with a maximum daily demand of 4,950,000 gallons (416.67 gallons per connection per day).

Subsidence

Based upon the updated results of the TWDB's Texas Aquifer Potential Subsidence Prediction Screening Tool (Keester and Bauer, 2018) for the well, the risk for subsidence is low. From the calculations within the tool, the total weighted risk for the well is 3.75; subsidence prediction was 0.0 feet from 2025 to 2080. The results from the tool output will be provided to EUWCD upon delivery of the permit application.

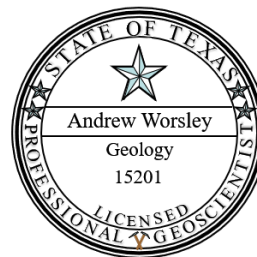
Please feel free to reach out if you have any questions about this report.

Respectfully,

Wet Rock Groundwater Services, L.L.C.



Andrew Worsley, P.G.
Senior Hydrogeologist
Wet Rock Groundwater Services, LLC
TBPG Firm Registration No. 50038



The seal appearing on this document was
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