SLR Property I, LP
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October 2, 2022

Mr. Michael Redman
Regulatory Compliance Specialist
Post Oak Savannah Groundwater Conservation District
310 East Avenue C
Milano, Texas 76556

RE: SLR Property I, LP - Application for a new 9,000 af/yr Simsboro & Hooper Drilling & Operating Permit

Dear Mr. Redman:

Thank you for your September 2, 2022 letter requesting additional information regarding the application of SLR Property I, LP ("SLR") for a new 9,000 af/yr Simsboro & Hooper Drilling & Operating Permit (the "Application"). I repeat each of your requests below by copying and pasting the request from your letter, followed by our response to that request in ***bolded italics***:

Application deficiencies:

1. Provide the GIS files outlining the Boundary of the SLR property,

   The requested GIS files are submitted with this response; the files are on the enclosed thumb drive.

2. Provide the GIS files outlining the groundwater owned and the groundwater leased (figure 2-1),

   The requested GIS files are submitted with this response; the files are on the enclosed thumb drive.

   All groundwater is owned by SLR; none is leased.

   Here are the acreage figures with respect to the Simsboro Formation, as set forth in the application:

Summary of SLR property ownership in Milam County overlying the Simsboro Formation:		
Full Ownership in Milam County Overlying Simsboro	**Groundwater Rights Only in Milam County Overlying Simsboro**	**Total of Full Ownership plus Groundwater Rights in Milam County**

		Overlying Simsboro
23,681.35 acres	906.4 acres	24,587.75 acres

As summarized in the above table, SLR holds title to a total of 24,587.75 acres of groundwater rights in Milam County overlying the Simsboro, of which 23,681.35 acres are land with groundwater rights and 906.4 acres are groundwater rights only.

And here are the acreage figures with respect to the Hooper Formation, as set forth in the application:

Summary of SLR property ownership in Milam County overlying the Hooper Formation:		
Full Ownership in Milam County Overlying Hooper	**Groundwater Rights Only in Milam County Overlying Hooper**	**Total of Full Ownership plus Groundwater Rights in Milam County Overlying Hooper**
23,668.02 acres	916.26 acres	24,584.28 acres

As summarized in the above table, SLR holds title to a total of 24,584.28 acres of groundwater rights in Milam County overlying the Hooper, of which 23,668.02 acres are land with groundwater rights and 916.26 acres are groundwater rights only.

3. Does SLR plan on drilling 30 wells that are all Hooper or all Simsboro, or will the well sites have a mixture of Hooper and Simsboro wells, and

Here is the paragraph from the Summary of the Application that addresses wells:

> SLR requests authorization to drill and operate up to a total of 60 new wells, at 30 defined well sites. Depending upon the conditions found at each of the 30 well sites, a well located at that well site could be designed and constructed to produce groundwater from either the Simsboro formation or the Hooper formation. If more than one well is constructed at a given well site, the wells will meet applicable spacing requirements for a given formation if they are screened into the same formation. SLR understands that there is no applicable spacing requirement between a well screened into the Simsboro and a well screened into the Hooper. The total combined maximum pumping rate of all wells constructed at a given site that are screened into the same formation will be less than or equal to the maximum pumping rate defined for production from that formation at that well site.

Thus, as stated in the application, SLR requests authorization to drill up to a total of 60 new wells at the 30 defined well sites, with more than one well authorized to be drilled at each well site. The center of each "well site" as the term is used in the quoted paragraph is defined by two points that are very close to each other (approximately 50 apart from each other) – one point for a possible Simsboro well, and one point for a possible Hooper well. The two wells are that close to each other because SLR understands there is no spacing requirement between a well screened into the Simsboro and a well screened into the Hooper. The 30 possible Simsboro wells are addressed in Tables 1-1, 1-2, and 1-3, and the 30 possible Hooper wells are addressed in Tables 1-4, 1-5, and 1-6.

In the application, SLR requests flexibility to deviate from the simple layout described above, depending upon the conditions found at each of the 30 "well sites." For example, it may make sense to drill 2 Simsboro wells and 1 Hooper well at a given well site, and 2 Hooper wells and no Simsboro well at another given well site, etc. If more than 1 well is drilled into a formation at a well site, the wells will be separated from each other by at least the distance required to meet the spacing requirement for that formation, and those wells will be roughly centered on the center of the well site discussed above. Additionally, the total combined maximum pumping rate of all wells constructed at a given well site that are screened into the same formation will be less than or equal to the maximum pumping rate defined for production from that formation at that well site. For clarity, SLR is not requesting in this application authorization to drill more than 30 Simsboro wells or more than 30 Hooper wells.

4. Any other information outlined in the attached request from July 15, 2022.

In Attachment A to Steve Young's June 29, 2002 letter to Gary Westbrook regarding this Application for a new 15,000 af/yr Simsboro Operating Permit, Paragraph 2 under the heading "Application Deficiencies" provides as follows:

2. Among the deliverables that POSGCD requested to be included in the application are concerns that SLR has with the GAM's representation of the Carrizo-Wilcox Aquifer and specifically the Hooper Aquifer. Relevant issues of concern are the top and bottom surfaces and the hydraulic properties (including transmissivity, faults, storativity) assigned to the Hooper and the Simsboro aquifers in Milam and Lee Counties and across the SLR property.

In response to these requests by Steve Young relating to this Application and the same requests relating to SLR's other application, Bob Harden has included a section in his Aquifer Impact Study for each of the two applications that responds to the requests. The section in each application is entitled "POSGCD Request for Comment on New GAM" and is found on page 19 of Mr. Harden's Aquifer Impact Study for this Application.

With the above response and other responses provided by this letter, SLR believes it has provided appropriate responses to all requests by the District.

Items that will need to be addressed during the application review:

1. Under response to Rule 7.4, the application, under item 4.e., states that after 90 days, SLR will produce to the District:
    a. TDLR State Well Report
    b. Geophysical Log
    c. Results of Water Quality Testing
    d. Results of Pumping Test

   According to Rule 7.15.9.2, this should be done in 60 days. Please provide the district with an updated page that confirms that change.

Enclosed is a copy of the updated page that confirms the requested change.

Respectfully,

Alan Gardenhire
Vice President of Operations,
SLR Property I, LP

Enclosures

cc: Mr. Gary Westbrook
General Manager

Response to Post Oak Savannah Rule 7.4.5 - Aquifer Impact Study

SLR Property I, LP

Application for a 9,000 af/yr Simsboro / Hooper Operating Permit

Prepared by:

HARDEN
HYDROLOGY & ENGINEERING

October 2, 2022

STATE OF TEXAS
ROBERT HARDEN
79290
LICENSED
PROFESSIONAL ENGINEER

Bob Harden

The seal appearing on this document was authorized
by Robert Harden, P.E. 79290
on October 2, 2022.
Firm Registration Number: F-19082

Response to Rule 7.4.5 - Aquifer Impact Study

SLR Property I, LP

Application for a 9,000 af/yr Simsboro / Hooper Operating Permit

At the request of Sandow Lakes Ranch I, LP (SLR), Harden Hydrology & Engineering, PLLC (HHE) has prepared this Aquifer Impact Study for purposes of addressing the requirements of Rule 7.4.5 of the Post Oak Savannah Groundwater Conservation District (District).

By this application, SLR is applying for a new drilling and operating permit to produce 9,000 af/yr of groundwater from the Simsboro & Hooper formations.

SLR requests authorization to produce up to 9,000 af/yr from the Simsboro, and up to 4,500 af/yr from the Hooper, provided that the total production in any one year may not exceed 9,000 af. Upon issuance of the new 9,000 af/yr operating permit, the entire 9,000 af/yr will be assigned to the Simsboro and zero af/yr will be assigned to the Hooper. From time to time thereafter, SLR will notify the District of the portion of the 9,000 af/yr (up to but not to exceed 4,500 af/yr) assigned to the Hooper, and the remaining portion of the 9,000 af/yr will be the amount assigned to the Simsboro. SLR understands from the General Manager that, because the maximum possible variation in assigned pumping from either formation is now only half of the 9,000 af/yr, SLR will have the right at any time to either increase or decrease the amount assigned to the Hooper (so long as such amount does not exceed 4,500 af/yr) and to decrease or increase the amount assigned to Simsboro by an equal amount.

SLR requests authorization to drill and operate up to a total of 60 new wells, at 30 defined well sites. Depending upon the conditions found at each of the 30 well sites, a well located at that site could be screened into either the Simsboro formation or into the Hooper formation. If more than one well is constructed at a given well site, the wells will meet applicable spacing requirements for a given formation if they are screened into the same formation. SLR understands that there is no applicable spacing requirement between a well screened into the Simsboro and a well screened into the Hooper. The total combined maximum pumping rate of all wells constructed at a given site that are screened into the same formation will be less than or equal to the maximum pumping rate defined for production from that formation at that well site.

SLR requests that the water produced under the new drilling and operating permit be authorized to be used for municipal, industrial, manufacturing, and commercial uses, anywhere within Milam and Burleson Counties.

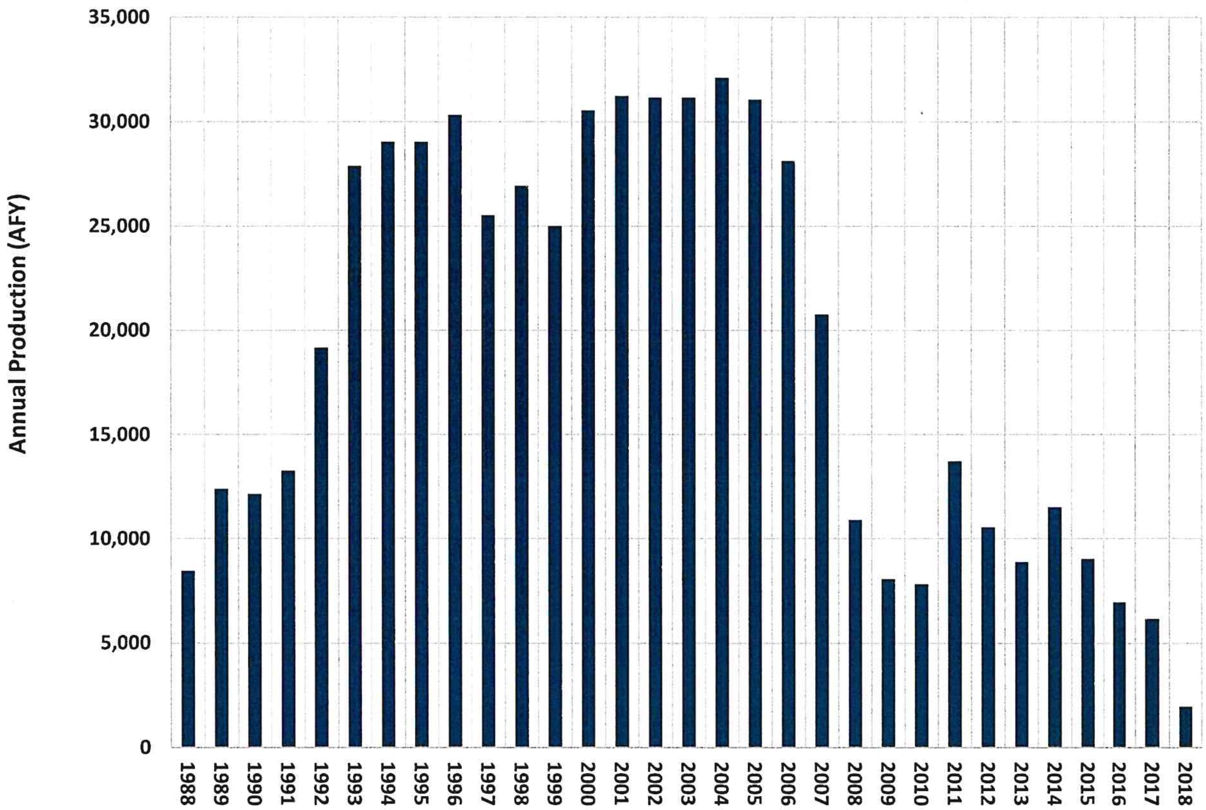
SLR requests that the term of the new operating permit be 40 years from the date of issuance of the permit.

This report presents historical information collected by Alcoa regarding Alcoa's historical Simsboro production at its Sandow Mine and Rockdale Operations, as well as past well mitigation activities conducted by Alcoa in compliance with mining regulations. This report also presents the results of modeling projections of future groundwater conditions through the requested 40-year term of the propsoed operating permit in response to District Rule 7.4.5.

Alcoa Historical Simsboro Production

Alcoa began producing Simsboro aquifer groundwater in significant quantities in the 1980s, in large part to depressurize the Simsboro aquifer for safe mining of lignite to fuel the electric generation units located at Alcoa's Rockdale Operations. Before then and thereafter, Simsboro water was also used for cooling and industrial processes. Figure 4-1 shows Alcoa's annual Simsboro production from wells located at the Sandow Mine during the period from 1988 through 2018. As shown, withdrawals during the late 1980s and early 1990s averaged about 12,000 af/yr. Average production increased as mining progressed at Sandow, where an average production rate of about 30,000 af/yr was maintained for about 14 years, peaking at about 33,000 af/yr. Simsboro production from the Sandow mine area started decreasing in 2007 as primary mining operations were transferred to the neighboring Three Oaks Mine. Reclamation activities at Sandow mine continued for 10+ years with total use of about 10,000 af/yr. Most recently, after the closure of Alcoa's primary aluminum smelter and the cessation of power generation at Alcoa's Rockdale Operations, groundwater use has declined further.

Figure 4-1. Estimated Historical Simsboro Production at Sandow Mine



Note: Simsboro production shown in Figure 4-1 reflects all industrial pumping from Simsboro Formation wells associated with the Sandow Mine in Milam and Lee Counties.

Four different model runs, and 16 specific deliverables, were prepared for this application. The model runs and their assumptions, and the deliverables, are listed below in Table 1.

Table 1. Modeling Assumptions and Deliverables for Simsboro / Hooper Operating Permit of 9,000 af/yr

Item	List of Assumptions for Groundwater Model Runs
A-1	The baseline GAM simulation is GMA 12 Pumping Scenario #19 (S-19), with small additional amounts of estimated Hooper production from City of Hutto wells. This simulation is called GAM A-1 (or GAM Run A-1). GAM Run A-1 period of simulation is from January 1, 2011 through December 31, 2070.
A-2	A modified GAM A-1 simulation that includes Simsboro Aquifer pumping up to 15,000 af/yr at 61 approved well locations associated with SLR's approved Historical Permit 0330, and up to 25,000 af/yr under SLR's 25,000 af/yr Operating Permit 0148 at the operating permit's 56 approved wells from Jan 1, 2023 to Dec 31, 2062, and then continuing through December 31, 2070 to align with GAM Run A-1. This simulation is called GAM Run B-2 (or Model Run B-2).
A-3	A modified GAM Run B-2 simulation that includes up to 9,000 af/yr of Simsboro Aquifer production at 30 proposed well locations from January 1, 2025 to December 31, 2062, and then continuing through December 31, 2020 to align with GAM Run B-2. This simulation is called GAM Run B-3 (or Model Run B-3).
A-4	A modified GAM Run B-2 simulation that includes up to 9,000 af/yr of production from the Hooper Aquifer at 30 proposed well locations from January 1, 2025 to December 31, 2062, and then continuing through December 31, 2070 to align with GAM Run B-2. This simulation is called GAM Run B-4 (or Model Run B-4).
	List of Deliverables for Groundwater Model Runs
D-1	A table that contains the following information for the 30 proposed Simsboro Aquifer production wells: (1) latitude; (2) longitude; (3) estimated ground elevation; (4) proposed depth of top of well screen below current ground elevation; and (5) proposed depth of bottom of screen below current ground elevation.
D-2	A table that contains the following information for the 30 proposed Hooper Aquifer production wells: (1) latitude; (2) longitude; (3) estimated ground elevation; (4) proposed depth of top of well screen below current ground elevation; and (5) proposed depth of bottom of screen below current ground elevation.
D-3	A table that lists the maximum pumping rate and the distance to the nearest approved or proposed well in the Simsboro Aquifer for the 30 proposed well sites.
D-4	A table that lists the maximum pumping rate and the distance to the nearest proposed well in the Hooper Aquifer for the 30 proposed well sites.
D-5	A table listing of the annual pumping rates assigned to the 30 Simsboro Aquifer proposed wells from Jan 1, 2025 to December 31, 2070 for GAM Run B-3.
D-6	A table listing of the annual pumping rates assigned to the 30 Hooper Aquifer proposed wells from Jan 1, 2025 to December 31, 2070 for GAM Run B-4.
D-7	A table that lists the average drawdown for the entire Simsboro Aquifer (GAM Layer 9) within POSGCD for GAM Runs A-1, B-2, B-3, and B-4 for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.
D-8	A table that lists the average drawdown for the entire Hooper Aquifer within POSGCD for GAM Runs A-1, B-2, B-3, and B-4 for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 1. Modeling Assumptions and Deliverables for Simsboro / Hooper Operating Permit of 9,000 af/yr (con't)

D-9	A table that includes the average drawdown that occurs in model layer 2 for the Simsboro Aquifer outcrop and for entire Carrizo-Wilcox Aquifer (combined Hooper, Simsboro, Calvert Bluff and Carrizo) outcrop for GAM Runs A-1, B-2, B-3, and B-4. For each GAM Run, the average drawdowns for the two outcrop sections is provided for: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.
D-10	A table that includes the average drawdown that occurs in model layer 2 for the Hooper Aquifer outcrop and for entire Carrizo-Wilcox Aquifer (combined Hooper, Simsboro, Calvert Bluff and Carrizo) outcrop for GAM Runs A-1, B-2, B-3, and B-4. For each GAM Run, the average drawdowns for the two outcrop sections is provided for: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.
D-11	A table that includes differences between GAM Runs B-2, B-3, and B-4.
D-12	A contour map of predicted drawdown in the Hooper, Simsboro, and Calvert Bluff aquifers, and in the outcrop of the Carrizo-Wilcox aquifer from January 1, 2020 to December 31, 2062 for GAM Run B-3. In addition, a second set of contours that show the difference in drawdowns between GAM Runs B-2 and B-3 in the Hooper, Simsboro, Calvert Bluff aquifers, and in the outcrop of the Carrizo-Wilcox aquifer. Registered wells within five miles of any SLR production well should be shown in the figures.
D-13	A contour map of predicted drawdown in the Hooper and Simsboro aquifers and in the outcrop of the Carrizo-Wilcox aquifer from January 1, 2020 to December 31, 2062 for GAM Run B-4. In addition, a second set of contours that show the difference in drawdowns between GAM Runs B-2 and B-4 in the Hooper and Simsboro aquifers, and in the outcrop of the Carrizo-Wilcox aquifer. Registered wells within five miles of any SLR production well should be shown in the figures.
D-14	An assessment of changes in land subsidence that will occur from the difference in drawdown between GAM Runs A-1, B-2, B-3, and B-4. The assessment needs to discuss the applicability of the recent TWDB tool for estimating risk associated with land subsidence.
D-15	An assessment of changes in surface water -groundwater interaction that will occur from the difference in drawdown between GAM Runs A-1, B-2, B-3, and B-4.
D-16	Electronic files for model inputs and outputs for GAM Runs A-1, B-2, B-3, and B-4.

SLR representatives met with the District and its Hydrogeologist on November 30, 2021. Based on the results of this meeting, SLR provided the District, via email dated December 14, 2021, with suggested assumptions and deliverables for this permit application. SLR representatives again met with District representatives on May 20, 2022, and based on the results of this meeting SLR made certain revisions to the application.

Pumping Input Specific to Sandow Lakes Property

The first step in assembling the assumed model runs, was to assign annual production for GAM Run B-2, GAM Run B-3, and GAM Run B-4. Table 2 is a listing of the annual production simulated for GAM Run A-1 (GMA Run S-19), GAM Run B-2 (the 15,000 af/yr authorized production under the 15,000 af/yr Historic Use Permit 0330 and the 15,000 af/yr proposed new operating permit; and the 25,000 af/yr authorized production under Operating Permit 0148), and GAM Runs B-3 & B-4 (the combination of the 15,000 af/yr authorized production under the 15,000 af/yr Historic Use Permit 0330 and the 15,000 af/yr proposed new operating permit; the 25,000 af/yr authorized production under Operating Permit 0148; and the 9,000 production under the proposed new Simsboro/Hooper 9,000 af/yr operating permit).

Table 2. Simulated Pumping Schedule by Year for GAM Runs A-1, B-2, B-3 and B-4 for SLR Milam County Property

		MODEL PUMPING BY YEAR (af/yr)					
		GAM Run A-1	GAM Run B-2		GAM Run B-3 / B-4		
Stress Period	Year	GMA 12 Run S-19	25,000 af/yr Production (currently authorized under Operating Permit 0148)	15,000 af/yr Production (proposed to be authorized under new Operating Permit and Historic Permit 0330)	25,000 af/yr Production (currently authorized under Operating Permit 0148)	15,000 af/yr Production (proposed to be authorized under new Operating Permit and Historic Permit 0330)	Proposed 9,000 af/yr Operating Permit
1	2011	13,139	0	0	0	0	0
2	2012	8,638	0	0	0	0	0
3	2013	8,665	0	0	0	0	0
4	2014	11,365	0	0	0	0	0
5	2015	8,489	0	0	0	0	0
6	2016	5,794	0	0	0	0	0
7	2017	4,837	0	0	0	0	0
8	2018	913	0	0	0	0	0
9	2019	47	0	0	0	0	0
10	2020	48	0	0	0	0	0
11	2021	48	0	0	0	0	0
12	2022	44	0	0	0	0	0
13	2023	45	0	2,000	0	2,000	0
14	2024	45	14,000	3,000	14,000	3,000	0
15	2025	45	17,000	5,000	17,000	5,000	4,000
16	2026	46	17,000	7,000	17,000	7,000	5,000
17	2027	46	20,000	9,000	20,000	9,000	6,000
18	2028	47	21,000	12,000	21,000	12,000	7,000
19	2029	47	23,000	13,000	23,000	13,000	8,000
20 - 60	2030 - 2070	23,609 to 23,626	25,000	15,000	25,000	15,000	9,000

Since the 15,000 af/yr Historic Use permit term is through December 31, 2038 and the requested new 15,000 af/yr operating permit term is through approximately 2062, Model Run B-2 assumes the 15,000 af/yr production authorization would be continued through 2070. Likewise, since the 25,000 af/yr operating permit term is through November 13, 2052, for modeling purposes it is assumed this authorized production would be continued through 2070. These assumptions of production through 2070 allow comparison with GAM Run A-1.

The next step in preparing Model Run B-2 was to inspect the A-1 model run and identify the amount of assumed historical Alcoa pumping and future SLR pumping in the model simulation that could be attributed to the Milam County portion of SLR's Sandow Lakes Ranch. SLR's Milam County property (which consists of nearly 25,000 acres) supports currently permitted production of 40,000 af/yr (15,000 af/yr under SLR's Historic Permit 0330 and 25,000 af/yr under SLR's Operating Permit 0148). This work effort indicates that assumed pumping of approximately 23,600 af/yr is assigned in the model nodes associated with SLR's Milam County property.[1] The assumed SLR future pumping in Model Run A-1 (23,600 af/yr) is less than SLR's currently permitted production (40,000 af/yr), and it is not documented what the basis of distributing SLR pumping was used in the pumping assumptions for GAM Run A-1. Table 3 is a summary of the assumed SLR pumping assigned by decade in GAM Run A-1 in the model nodes associated with SLR's Milam County property.

To construct Model Run B-2 pumping input, the first step was to remove the assigned SLR production from 2020 through 2070 from GAM Run A-1, and then SLR pumping was substituted for each permitted Historic Permit 0330 and Operating Permit 0148 well location considering the well's hydrogeologic location, and approved production capacity and the total of the individual permitted well approved production capacities, for each permit's wells. This ratio was then multiplied by the ratio of the simulated annual production divided by the permitted annual limit (15,000 af/yr for the new 15,000 af/yr operating permit and the 15,000 af/yr Historic Permit 0330, and 25,000 af/yr for Operating Permit 0148) to arrive at an annual production associated with each permitted well location. This creates a pumping file for GAM Run B-2 equal to SLR's currently permitted 40,000 af/yr. Table 4 shows assumed Model Run B-2 production rate for the 29 wells associated with Historic Permit 0330, the 31 dual permit wells associated with Historic Permit 330 and Operating Permit 0148, and the 24 proposed wells approved under Operating Permit 0148. Table 5 is summary of the assumed SLR pumping assigned by decade in GAM Run B-2 in the model nodes associated with SLR's Milam County property.

To construct Model Run B-3 pumping input, each proposed Simsboro well's production capacity was considered versus the total of the individual permitted well production capacities for 9,000 af/yr of Simsboro pumping. This was then multiplied by the ratio of the simulated annual production divided by the proposed annual limit of 9,000 af/yr to assign an annual production associated with each proposed Simsboro well location. This creates pumping assignments for each proposed Simsboro well. Table 6 shows the assumed Model Run B-3 production rate for each of the 30 proposed Simsboro wells. Table 7 shows a summary of the simulated 9,000 af/yr assigned by decade for each model node assuming all production is from the Simsboro aquifer. The assumed production depicted in Table 7 is aggregated with the Model Run B-2 production (Table 5) to complete the Model Run B-3 pumping file.

[1] Based on permitted well locations, it also appears there is about 45 to 65 af/yr of assumed pumping placed in the model in nodes 156238, 156239, 156888, and 157595. It is believed that pumping in nodes 156238 and 156239 represent Rockdale Country Club pumping, and it is assumed pumping in nodes 156888 and 157595 are small amounts of exempt use.

A similar approach was used for Model Run B-4 using the Hooper well characteristics, and Model Run B-4 assumes half of the proposed production limit of 9,000 af/yr would be produced in the Hooper aquifer. Table 8 is the assumed Model Run B-4 production rates for the 30 proposed Hooper wells, and Table 9 is a summary of the model input by decade assuming 4,500 af/yr were to be produced from the Hooper and 4,500 af/yr from the Simsboro. Table 9 model input is combined with Model Run B-2 (Table 5) to produce the model pumping input for Model Run B-4.

All groundwater model files (GAM Run A-1, B-2, B-3, and B-4) have been provided to the POSGCD.

Table 3. Pumping by Decade for Model Nodes Associated with Sandow Lakes Property in Milam County Model Run A-1

Model Node	MODEL A-1 PUMPING BY DECADE (af/yr)					
	2020	2030	2040	2050	2060	2070
156215		394.79	394.79	394.79	394.79	394.79
156217		394.79	394.79	394.79	394.79	394.79
156222		394.79	394.79	394.79	394.79	394.79
156225		789.58	789.58	789.58	789.58	789.58
156226		394.79	394.79	394.79	394.79	394.79
156238	22.62	22.33	24.31	26.29	28.26	30.24
156239	22.62	22.33	24.31	26.29	28.26	30.24
156888	1.29	1.42	1.57	1.73	1.91	2.11
156890		789.58	789.58	789.58	789.58	789.58
156892		394.79	394.79	394.79	394.79	394.79
156894		789.58	789.58	789.58	789.58	789.58
156898		394.79	394.79	394.79	394.79	394.79
156901		689.87	689.87	689.87	689.87	689.87
156902		789.58	789.58	789.58	789.58	789.58
157595	1.29	1.42	1.57	1.73	1.91	2.11
157597		3,947.88	3,947.88	3,947.88	3,947.88	3,947.88
157598		1,579.15	1,579.15	1,579.15	1,579.15	1,579.15
157599		394.79	394.79	394.79	394.79	394.79
157601		789.58	789.58	789.58	789.58	789.58
157604		394.79	394.79	394.79	394.79	394.79
157607		789.58	789.58	789.58	789.58	789.58
157608		394.79	394.79	394.79	394.79	394.79
157609		1,973.94	1,973.94	1,973.94	1,973.94	1,973.94
157610		1,184.36	1,184.36	1,184.36	1,184.36	1,184.36
157612		394.79	394.79	394.79	394.79	394.79
157614		394.79	394.79	394.79	394.79	394.79
157615		1,973.94	1,973.94	1,973.94	1,973.94	1,973.94
158242		368.47	368.47	368.47	368.47	368.47
158247		789.58	789.58	789.58	789.58	789.58
158248		1,973.94	1,973.94	1,973.94	1,973.94	1,973.94
Totals:	47.81	23,608.75	23,613.00	23,617.28	23,621.60	23,625.95

Table 4.
Assumed Pumping Rate by Approved Wells for Model Run B-2

Well Designation	Approved Permit	Model Node	Approved Production Capacity (GPM)	Assumed Rate for Model Run B-2	
				(gpm)	(ft3/day)
58-32-502	Dual HUP - OP	156226	500	443	85,331.89
58-32-503	Dual HUP - OP	156225	500	443	85,331.89
58-32-504	HUP	156225	500	209	40,289.86
58-32-505	HUP	156225	500	209	40,289.86
A-9-2	HUP	157601	540	226	43,513.05
A-9-3	HUP	157601	540	226	43,513.05
AT-1	Dual HUP - OP	157599	500	290	85,331.89
AT-2	HUP	157610	500	209	40,289.86
C4052A	Dual HUP - OP	157608	300	267	51,391.63
C4245	Dual HUP - OP	157609	240	214	41,113.31
C4246	Dual HUP - OP	157609	250	222	42,665.94
C4247	Dual HUP - OP	157609	240	214	41,113.31
C4248A	Dual HUP - OP	157609	230	205	39,368.17
C4250A	Dual HUP - OP	157609	290	259	49,838.99
C4440A	HUP	157612	440	184	35,455.08
C5245B	Dual HUP - OP	157614	410	361	69,433.15
C-9-12	Dual HUP - OP	157607	440	390	75,053.56
C-9-13	Dual HUP - OP	157610	320	283	54,496.91
C-9-14	Dual HUP - OP	157607	420	374	71,948.28
C-9-15	HUP	158247	250	105	20,144.93
C-9-16	HUP	158248	420	176	33,843.48
C-9-17	HUP	158248	260	109	20,950.73
C-9-18	HUP	158248	510	213	41,095.66
C-9-19	HUP	157615	460	193	37,066.67
C-9-20	Dual HUP - OP	158247	450	398	76,606.20
C-9-23	HUP	157610	420	176	33,843.48
C-9-26	HUP	157615	620	260	49,959.43
C-9-27	HUP	157615	500	209	40,289.86
C-9-29	HUP	158248	370	155	29,814.50
C-9-30	HUP	158248	420	176	33,843.48
C-9-31	HUP	157615	450	188	36,260.88
DP-S-A-3	Dual HUP - OP	156902	250	222	42,665.94
DP-S-A-4	Dual HUP - OP	156902	250	222	42,665.94
DP-S-A-5	Dual HUP - OP	156901	250	222	42,665.94
DP-S-A-6	Dual HUP - OP	156901	250	222	42,665.94
DP-S-A-7	Dual HUP - OP	156898	250	222	42,665.94
E-1	Dual HUP - OP	157613	1000	580	170,663.77
E-2	HUP	156894	1000	419	80,579.72
E-3	HUP	156894	1000	419	80,579.72
E-4	HUP	156894	1000	419	80,579.72
F1 Sims	HUP	157597	560	234	45,124.64
F10 Sims	Dual HUP - OP	157598	250	222	42,665.94

Table 4.
Assumed Pumping Rate by Approved Wells for Model Run B-2(con't)

Well Designation	Approved Permit	Model Node	Approved Production Capacity (GPM)	Assumed Rate for Model Run B-2 (gpm)	(ft3/day)
F11 Sims	Dual HUP - OP	157598	250	222	42,665.94
F12 Sims	Dual HUP - OP	156892	250	222	42,665.94
F13 Sims	Dual HUP - OP	157597	250	222	42,665.94
F14 Sims	Dual HUP - OP	157597	250	222	42,665.94
F15 Sims	Dual HUP - OP	157597	250	222	42,665.94
F2 Sims	Dual HUP - OP	157597	250	222	42,665.94
F3 Sims	HUP	157597	250	105	20,144.93
F4 Sims	Dual HUP - OP	157597	250	222	42,665.94
F5 Sims	HUP	157597	250	105	20,144.93
F5222A	HUP	156890	500	209	40,289.86
F5222B	HUP	156890	200	84	16,115.94
F6 Sims	Dual HUP - OP	157597	250	222	42,665.94
F8 Sims	Dual HUP - OP	157598	250	222	42,665.94
F9 Sims	Dual HUP - OP	157598	250	222	42,665.94
NFD-02 Sims	HUP	157597	500	209	40,289.86
P-5	Dual HUP - OP	157615	500	443	85,331.89
South Crusher	HUP	156217	500	209	40,289.86
Storm Shelter	HUP	156215	500	209	40,289.86
Wash Rack	HUP	156222	500	209	40,289.86
OP-1	OP	156916	1000	120	23,100.00
OP-2	OP	156911	1000	160	30,800.00
OP-3	OP	157617	1000	180	34,650.00
OP-4	OP	157614	1000	250	48,125.00
OP-5	OP	157614	1000	265	51,012.50
OP-6	OP	158246	1000	500	96,249.99
OP-7	OP	158246	1000	500	96,249.99
OP-8	OP	158246	1000	500	96,249.99
OP-9	OP	158245	1000	500	96,249.99
OP-10	OP	158245	1000	500	96,249.99
OP-11	OP	158245	1000	500	96,249.99
OP-12	OP	158245	1000	500	96,249.99
OP-13	OP	158245	1000	500	96,249.99
OP-14	OP	158244	1000	500	96,249.99
OP-15	OP	158244	1000	500	96,249.99
OP-16	OP	158244	1000	500	96,249.99
OP-17	OP	158243	1000	500	96,249.99
OP-18	OP	157597	1000	420	80,849.99
OP-19	OP	157596	1000	350	67,375.00
OP-20	OP	157596	1000	330	63,525.00
OP-21	OP	157595	1000	330	63,525.00
OP-22	OP	157595	1000	325	62,562.50
OP-23	OP	156889	1000	325	62,562.50
OP-24	OP	156889	1000	300	57,750.00

Table 5. Pumping by Decade for Model Nodes Associated with Sandow Lakes Property in Milam County - Model Runs B-2

Model Node	MODEL B-2 PUMPING BY YEAR (af/yr)						
	2020	2024	2030	2040	2050	2060	2070
156215		67.52	337.60	337.60	337.60	337.60	337.60
156217		67.52	337.60	337.60	337.60	337.60	337.60
156222		67.52	337.60	337.60	337.60	337.60	337.60
156225		446.44	1,390.21	1,390.21	1,390.21	1,390.21	1,390.21
156226		311.40	715.02	715.02	715.02	715.02	715.02
156238	22.62	21.15	22.33	24.31	26.29	28.26	30.24
156239	22.62	21.15	22.33	24.31	26.29	28.26	30.24
156888	1.29	1.34	1.42	1.57	1.73	1.91	2.11
156889		564.55	1,008.13	1,008.13	1,008.13	1,008.13	1,008.13
156890		94.53	472.64	472.64	472.64	472.64	472.64
156892		155.70	357.51	357.51	357.51	357.51	357.51
156894		405.12	2,025.59	2,025.59	2,025.59	2,025.59	2,025.59
156898		155.70	357.51	357.51	357.51	357.51	357.51
156901		311.40	715.02	715.02	715.02	715.02	715.02
156902		311.40	715.02	715.02	715.02	715.02	715.02
156911		144.53	258.08	258.08	258.08	258.08	258.08
156916		108.39	193.56	193.56	193.56	193.56	193.56
157595	1.29	592.99	1,057.94	1,058.09	1,058.25	1,058.43	1,058.63
157596		614.23	1,096.84	1,096.84	1,096.84	1,096.84	1,096.84
157597		1,524.24	3,875.82	3,875.82	3,875.82	3,875.82	3,875.82
157598		622.80	1,430.03	1,430.03	1,430.03	1,430.03	1,430.03
157599		311.40	715.02	715.02	715.02	715.02	715.02
157601		145.84	729.21	729.21	729.21	729.21	729.21
157607		536.69	1,231.76	1,231.76	1,231.76	1,231.76	1,231.76
157608		187.74	430.62	430.62	430.62	430.62	430.62
157609		782.12	1,793.99	1,793.99	1,793.99	1,793.99	1,793.99
157610		322.99	1,077.82	1,077.82	1,077.82	1,077.82	1,077.82
157612		59.42	297.09	297.09	297.09	297.09	297.09
157613		622.80	1,430.03	1,430.03	1,430.03	1,430.03	1,430.03
157614		718.01	1,412.50	1,412.50	1,412.50	1,412.50	1,412.50
157615		585.53	2,085.67	2,085.67	2,085.67	2,085.67	2,085.67
157617		162.59	290.34	290.34	290.34	290.34	290.34
158243		451.64	806.50	806.50	806.50	806.50	806.50
158244		1,354.92	2,419.51	2,419.51	2,419.51	2,419.51	2,419.51
158245		2,258.21	4,032.51	4,032.51	4,032.51	4,032.51	4,032.51
158246		1,354.92	2,419.51	2,419.51	2,419.51	2,419.51	2,419.51
158247		313.12	810.70	810.70	810.70	810.70	810.70
158248		267.38	1,336.89	1,336.89	1,336.89	1,336.89	1,336.89
Totals:	47.81	17,044.95	40,047.49	40,051.74	40,056.02	40,060.33	40,064.69

Table 6.
Assumed Pumping Rate for Proposed Simsboro Wells for Model Run B-3

Well Designation	Model Node	Proposed Production Capacity (GPM)	Assumed Rate for Model Run B-3 (gpm)	(ft3/day)
OP9-1	156913	300	125	24,030.16
OP9-2	156914	300	125	24,030.16
OP9-3	156914	300	125	24,030.16
OP9-4	157617	300	125	24,030.16
OP9-5	157616	300	125	24,030.16
OP9-6	157616	600	250	48,060.31
OP9-7	157618	300	125	24,030.16
OP9-8	157613	600	250	48,060.31
OP9-9	157611	500	208	40,050.26
OP9-10	157606	600	250	48,060.31
OP9-12	158246	600	250	48,060.31
OP9-11	157606	600	250	48,060.31
OP9-13	158246	600	250	48,060.31
OP9-14	158246	600	250	48,060.31
OP9-19	157599	600	208	40,050.26
OP9-23	156218	500	125	24,030.16
OP9-15	158244	500	250	48,060.31
OP9-22	156893	500	125	24,030.16
OP9-16	157599	500	208	40,050.26
OP9-21	156893	500	125	24,030.16
OP9-20	157598	300	208	40,050.26
OP9-17	157598	300	208	40,050.26
OP9-18	157598	300	208	40,050.26
OP9-24	157597	500	208	40,050.26
OP9-25	157596	500	208	40,050.26
OP9-26	157596	500	208	40,050.26
OP9-27	156889	500	208	40,050.26
OP9-28	156889	300	125	24,030.16
OP9-29	156889	300	125	24,030.16
OP9-30	156889	300	125	24,030.16

Table 7. Pumping by Decade for Model Nodes Associated with Sandow Lakes Property in Milam County - Model Run B-3, Simsboro 9,000 af/yr

Model Node	MODEL RUN B-3 PROPOSED OPERATING PERMIT SIMSBORO PUMPING BY YEAR (af/yr)						
	2020	2025	2030	2040	2050	2060	2070
156218		89.55	201.49	201.49	201.49	201.49	201.49
156889		417.91	940.30	940.30	940.30	940.30	940.30
156893		179.10	402.99	402.99	402.99	402.99	402.99
156913		89.55	201.49	201.49	201.49	201.49	201.49
156914		179.10	402.99	402.99	402.99	402.99	402.99
157596		298.51	671.64	671.64	671.64	671.64	671.64
157597	22.62	149.25	335.82	335.82	335.82	335.82	335.82
157598	22.62	447.76	1,007.46	1,007.46	1,007.46	1,007.46	1,007.46
157599	1.29	298.51	671.64	671.64	671.64	671.64	671.64
157606		358.21	805.97	805.97	805.97	805.97	805.97
157611		149.25	335.82	335.82	335.82	335.82	335.82
157613		179.10	402.99	402.99	402.99	402.99	402.99
157616		268.66	604.48	604.48	604.48	604.48	604.48
157617		89.55	201.49	201.49	201.49	201.49	201.49
157618		89.55	201.49	201.49	201.49	201.49	201.49
158244		179.10	402.99	402.99	402.99	402.99	402.99
158246		537.31	1,208.96	1,208.96	1,208.96	1,208.96	1,208.96
Totals:	46.52	4,000.00	9,000.00	9,000.00	9,000.00	9,000.00	9,000.00

Note: Model Run B-3 also includes Simsboro pumping shown in Table 5.

Table 8.
Assumed Pumping Rate for Proposed Hooper Wells for Model Run B-4

Well Designation	Model Node	Proposed Production Capacity (GPM)	Assumed Rate for Model Run B-4 (gpm)	(ft3/day)
OPH9-1	156913	150	62	12,015.08
OPH9-2	156914	150	62	12,015.08
OPH9-3	156914	150	62	12,015.08
OPH9-4	157617	150	62	12,015.08
OPH9-5	157616	150	62	12,015.08
OPH9-6	157616	300	125	24,030.16
OPH9-7	157618	150	62	12,015.08
OPH9-8	157613	300	125	24,030.16
OPH9-9	157611	250	104	20,025.13
OPH9-10	157606	300	125	24,030.16
OPH9-12	158246	300	125	24,030.16
OPH9-11	157606	300	125	24,030.16
OPH9-13	158246	300	125	24,030.16
OPH9-14	158246	300	125	24,030.16
OPH9-19	157599	300	104	20,025.13
OPH9-23	156218	250	62	12,015.08
OPH9-15	158244	250	125	24,030.16
OPH9-22	156893	250	62	12,015.08
OPH9-16	157599	250	104	20,025.13
OPH9-21	156893	250	62	12,015.08
OPH9-20	157598	150	104	20,025.13
OPH9-17	157598	150	104	20,025.13
OPH9-18	157598	150	104	20,025.13
OPH9-24	157597	250	104	20,025.13
OPH9-25	157596	250	104	20,025.13
OPH9-26	157596	250	104	20,025.13
OPH9-27	156889	250	104	20,025.13
OPH9-28	156889	150	62	12,015.08
OPH9-29	156889	150	62	12,015.08
OPH9-30	156889	150	62	12,015.08

Table 9. Pumping by Decade for Model Nodes Associated with Sandow Lakes Property in Milam County - Model Run B-4

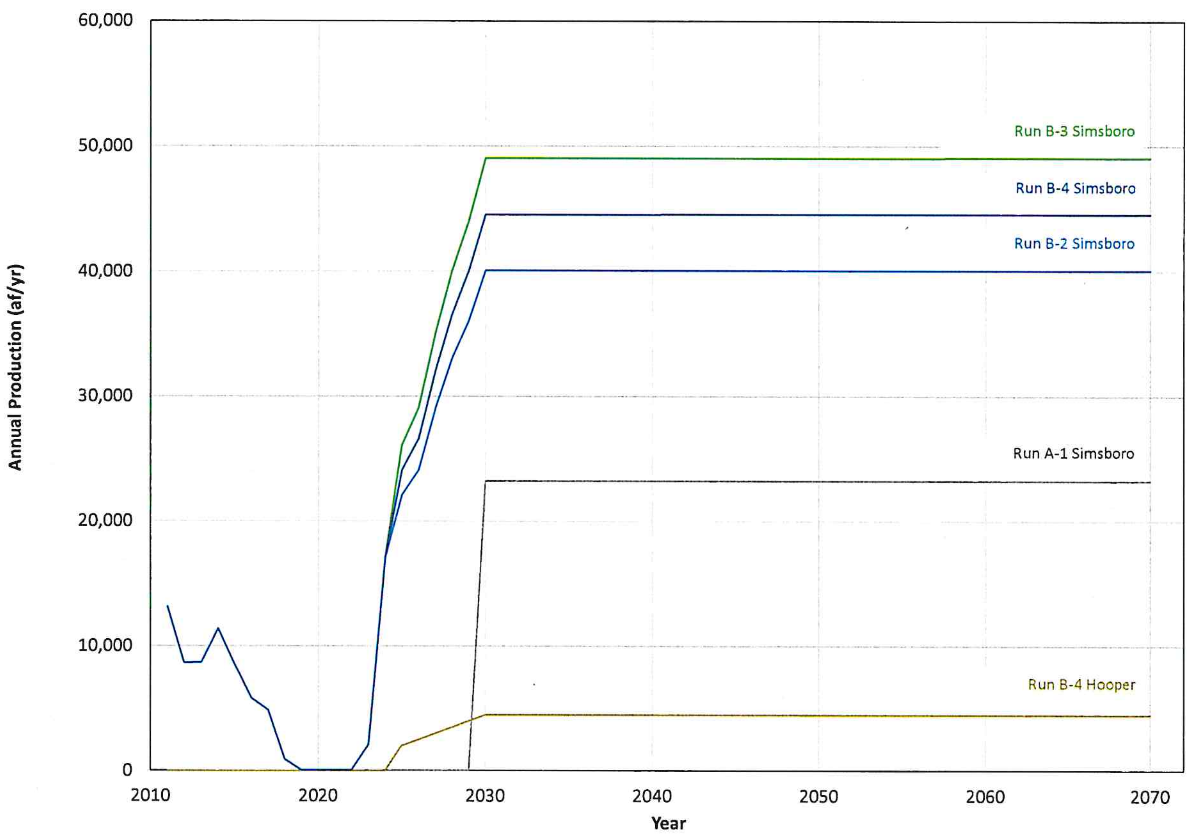
Model Node	MODEL RUN B-4 PROPOSED OPERATING PERMIT HOOPER PUMPING BY YEAR (af/yr)						
	2020	2025	2030	2040	2050	2060	2070
156218		44.78	100.75	100.75	100.75	100.75	100.75
156889		208.96	470.15	470.15	470.15	470.15	470.15
156893		89.55	201.49	201.49	201.49	201.49	201.49
156913		44.78	100.75	100.75	100.75	100.75	100.75
156914		89.55	201.49	201.49	201.49	201.49	201.49
157596		149.25	335.82	335.82	335.82	335.82	335.82
157597		74.63	167.91	167.91	167.91	167.91	167.91
157598		223.88	503.73	503.73	503.73	503.73	503.73
157599		149.25	335.82	335.82	335.82	335.82	335.82
157606		179.10	402.99	402.99	402.99	402.99	402.99
157611		74.63	167.91	167.91	167.91	167.91	167.91
157613		89.55	201.49	201.49	201.49	201.49	201.49
157616		134.33	302.24	302.24	302.24	302.24	302.24
157617		44.78	100.75	100.75	100.75	100.75	100.75
157618		44.78	100.75	100.75	100.75	100.75	100.75
158244		89.55	201.49	201.49	201.49	201.49	201.49
158246		268.66	604.48	604.48	604.48	604.48	604.48
Totals:	0.00	2,000.00	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00

Model Node	MODEL RUN B-4 PROPOSED OPERATING PERMIT SIMSBORO PUMPING BY YEAR (af/yr)						
	2020	2025	2030	2040	2050	2060	2070
156218		44.78	100.75	100.75	100.75	100.75	100.75
156889		208.96	470.15	470.15	470.15	470.15	470.15
156893		89.55	201.49	201.49	201.49	201.49	201.49
156913		44.78	100.75	100.75	100.75	100.75	100.75
156914		89.55	201.49	201.49	201.49	201.49	201.49
157596		149.25	335.82	335.82	335.82	335.82	335.82
157597	22.62	74.63	167.91	167.91	167.91	167.91	167.91
157598	22.62	223.88	503.73	503.73	503.73	503.73	503.73
157599	1.29	149.25	335.82	335.82	335.82	335.82	335.82
157606		179.10	402.99	402.99	402.99	402.99	402.99
157611		74.63	167.91	167.91	167.91	167.91	167.91
157613		89.55	201.49	201.49	201.49	201.49	201.49
157616		134.33	302.24	302.24	302.24	302.24	302.24
157617		44.78	100.75	100.75	100.75	100.75	100.75
157618		44.78	100.75	100.75	100.75	100.75	100.75
158244		89.55	201.49	201.49	201.49	201.49	201.49
158246		268.66	604.48	604.48	604.48	604.48	604.48
Totals:	46.52	2,000.00	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00

Note: Model Run B-4 also includes Simsboro pumping shown in Table 5.

Figure 4-2 shows the timing and magnitude of the pumping input for GAM Runs A-1, B-2, B-3 and B-4 for Simsboro and Hooper aquifer production from SLR property in Milam County.

Figure 4-2. Simulated SLR Milam County Production by GAM Run



Regional Pumping in GAM Run A-1

As stated earlier in this report, GAM Run A-1 is a model run scenario that was developed during the current 2022 GMA 12 Joint Planning activities. GAM Run A-1 contains the base regional pumping assumptions that are carried forward into Model Run B-2, and subsequent model runs GAM Run B-3 and GAM Run B-4. GAM Run A-1 contains increases in future pumping distributed within Bastrop, Lee, Milam, Burleson, Brazos, and Robertson counties. Tables 10, 11, 12, and 13a present the total Simsboro pumping in the Brazos Valley Groundwater Conservation District (BVGCD), the Lost Pines Groundwater Conservation District (LPGCD), and the POSGCD for GAM Runs A-1, B-2, B-3 and B-4. Table 13b presents the total Hooper pumping in the Brazos Valley Groundwater Conservation District (BVGCD), the Lost Pines Groundwater Conservation District (LPGCD), and the POSGCD for GAM Run B-4.

Table 10. Simsboro Aquifer Pumping for Model Run A-1 by Decade for Lost Pines, Post Oak Savanah, and Brazos Valley Groundwater Conservation Districts (af/yr)

GCD	2020	2030	2040	2050	2060	2070
BVGCD	76,936	91,284	105,633	119,982	134,331	147,245
LPGCD	21,274	65,845	69,941	74,045	78,161	81,875
POSGCD	40,774	66,469	75,763	78,776	79,111	79,435

Table 11. Simsboro Aquifer Pumping for Model Run B-2 by Decade for Lost Pines, Post Oak Savanah, and Brazos Valley Groundwater Conservation Districts (af/yr)

GCD	2020	2030	2040	2050	2060	2070
BVGCD	76,936	91,284	105,633	119,982	134,331	147,245
LPGCD	21,274	65,845	69,941	74,045	78,161	81,875
POSGCD	40,774	83,276	92,570	95,583	95,918	96,242

Table 12. Simsboro Aquifer Pumping for Model Run B-3 by Decade for Lost Pines, Post Oak Savanah, and Brazos Valley Groundwater Conservation Districts (af/yr)

GCD	2020	2030	2040	2050	2060	2070
BVGCD	76,936	91,284	104,198	118,547	132,896	147,245
LPGCD	21,274	65,845	69,941	74,045	78,161	81,875
POSGCD	40,774	91,348	100,640	104,551	104,883	105,242

Table 13a. Simsboro Aquifer Pumping for Model Run B-4 by Decade for Lost Pines, Post Oak Savanah, and Brazos Valley Groundwater Conservation Districts (af/yr)

GCD	2020	2030	2040	2050	2060	2070
BVGCD	76,936	91,284	104,198	118,547	132,896	147,245
LPGCD	21,274	65,845	69,941	74,045	78,161	81,875
POSGCD	40,774	86,848	96,140	100,051	100,383	100,742

Table 13b. Hooper Aquifer Pumping for Model Run B-4 by Decade for Lost Pines, Post Oak Savanah, and Brazos Valley Groundwater Conservation Districts (af/yr)

GCD	2020	2030	2040	2050	2060	2070
BVGCD	798	1,066	1,334	1,603	1,871	2,139
LPGCD	1,716	2,027	2,349	2,680	3,024	3,381
POSGCD	1,806	6,527	6,764	7,023	7,309	7,626

In tabulating Tables 10, 11, and 12, pumping in model nodes 156889, 156890, 157595, 157596, 157597, 158243, and 158244 was attributed to Milam County where the approved Operating

Permit 0148 wells, and the proposed Simsboro 9,000 af/yr operating permit wells, are located. In tabulating Table 13, pumping in model nodes 191012, 191719, 191720, and 192367 was attributed to Milam County where the proposed Hooper 4,500 af/yr operating permit wells are located.

Model Simulations

New GAM for Carrizo-Wilcox Aquifer

Groundwater Management Area 12 (GMA 12) originally adopted a new groundwater availability model (GAM) for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers for use in the third round of joint planning activities (Ewing, Jigmond, Jones & Young, 2018). This model was updated in October 2020 (D.B. Stephens, et al). Rule 7.4.5.c of the POSGCD states "if a MAG exists for the aquifer from which the water will be produced, then the predictions will include results based on using the Groundwater Availability Model run used to establish the MAG for the aquifer". Per POSGCD requirements, the new updated GAM be used to simulate the required analysis.

POSGCD Request for Comment on New GAM

At the request of the POSGCD, the following comments on the new GAM's representation of the Carrizo-Wilcox Aquifer are provided as part of each of SLR's applications. POSGCD requested comments on the Hooper Aquifer, and issues related to the structure delineation of the top and bottom surface and hydraulic properties assigned to the Hooper and Simsboro aquifers in Lee and Milam Counties and across the SLR property. Due to the large number of model parameter inputs, no attempt was made to identify and comment on all of the model input. This evaluation is not intended to be either comprehensive or detailed. It consists of various comments that may be of interest to POSGCD.

The Hooper Aquifer is the deepest zone of the Carrizo-Wilcox Aquifer group. Correspondingly, the Hooper zone is relatively undeveloped throughout Milam County, because of the abundance of groundwater resources in overlying and shallower portions of the Carrizo-Wilcox Aquifer. Throughout the area covered by the model, most wells are constructed in either the Carrizo, Calvert Bluff, or Simsboro aquifers. The lack of well development in the Hooper limits the number of data points from which estimations of aquifer parameters were derived for the model. Thus, the current model inputs for the Hooper are relatively coarse estimates.

Based on test drilling conducted to date on the SLR property, there are sequences of interbedded clays and sands through the Simsboro, and the lowest sands in such sequences should be considered to be Simsboro sands. At some test hole locations, the lowest Simsboro sands exhibit thin sand thickness and low resistivity similar to, or even lower than, deeper sands of the Hooper. In other locations, the lowest Simsboro sands are thicker and more massive. As such, the boundary between the base of the Simsboro and top of the Hooper cannot always be defined simply. As a general approach, however, it is suggested that at the sites where the lower massive sands exist, the elevation of the base of the more massive sands be used as structural delineation of the base of the Simsboro, and then this elevation be interpolated to include the thinner and less productive sands at the locations where the more massive sands are not present.

Estimates of transmissivity of Hooper sand layers encountered thus far at SLR range from less than 1,000 gpd/ft to 3,000 gpd/ft, while the GAM currently represents transmissivity of 5,000 gpd/ft to 8,000 gpd/ft for the Hooper aquifer. The SLR testholes, completed in 2022, do not penetrate the full thickness of the Hooper as represented in the GAM. Based on review of a few scattered oil and gas logs, it is currently believed the most productive sands occur in the upper 200 feet of the Hooper.

The vertical conductivity assigned in the model is sometimes less than the previous GAM. Model inspection at a few of the model cells in the most downdip, and unmined portions of SLR property indicates the vertical conductivity of the Simsboro is less than the more clay rich Calvert Bluff. Throughout the SLR property, the base of unmined Calvert Bluff sands, and the base of reclaimed Calvert Bluff materials, are separated from the top of the Simsboro sands by a low permeability clay layer. These clays have been characterized as "practically impermeable" with hydraulic conductivity of 5×10^{-9} cm/sec or less (Mathewson, 1979). More recently, Alcoa conducted core sampling of clay zones in conjunction with site characterization for the Three Oaks Mine. These efforts documented the vertical conductivity of these clays with laboratory test results in the 2×10^{-8} cm/sec to 5×10^{-10} cm/sec (Alcoa, 2000). Experience is these clays provide an effective seal, and the sealing quality was the reason mine depressurization of the Simsboro was required to prevent heave of the clays in the separation zone.

In the Central portion of the Carrizo-Wilcox Aquifer, faulting is challenging to simulate with groundwater models. Typically, in the Carrizo-Wilcox model layers are a composite of multiple sand, silt and clay layers. The fault displacement can disconnect the individual sand layers across the fault location, and my experience is even when the major sand layers are only partially displaced there can be important effects on the hydraulics of lateral flow. Additionally, the large displacements associated with the Mexia-Talco fault zone can completely offset the full thickness of sand zones or the thickness of a model layer.

Faulting in the GAM model is implemented using the Horizontal Flow Barrier (HFB) package. The HFB package assumes lateral connection of a model layer across a fault and the HFB package does not operate between different model layers. Thus, faulting can only be approximated within typical MODFLOW models.

It is likely with additional test drilling, well drilling, groundwater pumping, and water level measurements that much greater heterogeneity of the aquifer characteristics will be discovered. This is a normal experience with GAMs even with more developed aquifer zones. GAMs are regional models and periodically undergo modification as additional data and experience become available.

Required Deliverables

As shown in Table 1, a series of drawdown tabulations and contour maps are provided to satisfy the requirements of District Rule 7.4.5.

Drawdown Tabulations

Table 14 lists the average drawdown for Model Layer 9 (the confined portion) of the Simsboro aquifer within POSGCD, for GAM model runs A-1, B-2, B-3, and B-4 and for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 14. Average Drawdown in Model Layer 9 (confined portion) of the Simsboro Aquifer (feet)

Area	GAM Run#	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	A-1	57	152	207	244	271	295
POSGCD	B-2	57	163	219	258	286	313
POSGCD	B-3	57	166	224	265	294	321
POSGCD	B-4	57	165	224	264	293	321

Table 15 lists the average drawdown for Model Layer 10 (the confined portion) of the Hooper aquifer within POSGCD, for GAM model runs A-1, B-2, B-3, and B-4 and for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 15. Average Drawdown in Model Layer 10 (confined portion) of the Hooper Aquifer (feet)

Area	GAM Run#	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	A-1	20	76	117	147	170	190
POSGCD	B-2	20	82	124	156	180	201
POSGCD	B-3	20	83	127	160	185	207
POSGCD	B-4	20	89	133	166	191	214

Table 16 lists the average drawdown for Model Layer 2 (the outcrop portion) of the Simsboro aquifer within POSGCD, for GAM model runs A-1, B-2, B-3, and B-4 and for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 16. Average Drawdown in Model Layer 2 (outcrop portion) of the Simsboro Aquifer (feet)

Area	GAM Run#	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	A-1	3	6	11	16	22	28
POSGCD	B-2	3	6	12	19	25	31
POSGCD	B-3	3	7	13	20	26	32
POSGCD	B-4	3	7	13	20	27	33

Table 17 lists the average drawdown for Model Layer 2 (the outcrop portion) of the Hooper aquifer within POSGCD, for GAM model runs A-1, B-2, B-3, and B-4 and for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 17. Average Drawdown in Model Layer 2 (outcrop portion) of the Hooper Aquifer (feet)

Area	GAM Run#	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	A-1	1	3	5	7	9	12
POSGCD	B-2	1	3	5	7	10	13
POSGCD	B-3	1	3	5	8	10	13
POSGCD	B-4	1	3	5	8	11	14

Table 18 lists the average drawdown for Model Layer 2 for the entire Carrizo-Wilcox Aquifer (combined Hooper, Simsboro, Calvert Bluff, and Carrizo) outcrop within POSGCD, for GAM model runs A-1, B-2, B-3, and B-4 and for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070.

Table 18. Average Drawdown in Model Layer 2 for the Entire Carrizo-Wilcox Aquifer Outcrop (feet)

Area	GAM Run#	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	A-1	1	3	6	9	12	15
POSGCD	B-2	1	4	7	10	14	17
POSGCD	B-3	1	4	7	11	14	18
POSGCD	B-4	1	4	7	11	15	18

For the area of the POSGCD, Table 19 through Table 23 show the differences in changes in drawdown, between GAM Run B-2 (the 15,000 af/yr authorized production under the Historic Permit 0330 and the proposed new 15,000 operating permit; the 25,000 af/yr authorized production under Operating Permit 0148), and the 9,000 af/yr Simsboro pumping under the proposed new 9,000 af/yr Simsboro/Hooper operating permit (Model Run B-3), and the 4,500 af/yr Hooper pumping and 4,500 af/yr Simsboro pumping under that 9,000 af/yr permit (Model Run B-4), all previously described. In each table, the changes in drawdown are provided for time periods: 2010 to 2020, 2010 to 2030, 2010 to 2040, 2010 to 2050, 2010 to 2060, and 2010 to 2070. Table 19 lists the differences in drawdown for Model Layer 9 (the confined portion) of the Simsboro aquifer, Table 20 lists the average drawdown for Model Layer 10 (the confined portion) of the Hooper aquifer, Table 21 lists the average drawdown for Model Layer 2 (the outcrop portion) of the Simsboro aquifer, Table 22 lists the average drawdown for Model Layer 2 (the outcrop portion) of the Hooper aquifer, and Table 23 list the average drawdown for Model Layer 2 for the entire Carrizo-Wilcox Aquifer (combined Hooper, Simsboro, Calvert Bluff, and Carrizo) outcrop.

Table 19. Changes in Drawdown in Model Layer 9 (confined portion) of the Simsboro Aquifer (feet)

Area	GAM Run Difference	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	B-2 and B-3	0	3	5	7	8	9
POSGCD	B-2 and B-4	0	3	5	6	7	8

Table 20. Changes in Drawdown in Model Layer 10 (confined portion) of the Hooper Aquifer (feet)

Area	GAM Run Difference	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	B-2 and B-3	0	1	3	4	5	6
POSGCD	B-2 and B-4	0	7	9	10	12	12

Table 21. Changes in Drawdown in Model Layer 2 (outcrop portion) of the Simsboro Aquifer (feet)

Area	GAM Run Difference	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	B-2 and B-3	0	0	0	1	1	1
POSGCD	B-2 and B-4	0	0	1	1	2	2

Table 22. Changes in Drawdown in Model Layer 2 (outcrop portion) of the Hooper Aquifer (feet)

Area	GAM Run Difference	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	B-2 and B-3	0	0	0	0	0	0
POSGCD	B-2 and B-4	0	0	1	1	1	1

Table 23. Changes in Drawdown in Model Layer 2 for the Entire Carrizo-Wilcox Aquifer Outcrop (feet)

Area	GAM Run Difference	2010 to 2020	2010 to 2030	2010 to 2040	2010 to 2050	2010 to 2060	2010 to 2070
POSGCD	B-2 and B-3	0	0	0	1	1	1
POSGCD	B-2 and B-4	0	0	0	1	1	1

<u>**Contour Maps of Drawdown and Differences in Drawdown**</u>

Two series of maps reflect the changes in water levels (drawdown) for the period January 1, 2021 through December 31, 2062 (Model Run B-3 and Model Run B-4). For naming simplicity, these maps are designated as declines in piezometric surface from Year 2020 to Year 2062, and are intended to demonstrate effects over the proposed operating permit term. Two additional set of maps are for the period January 1, 2021 through December 31, 2062, and one set of maps represents the difference in simulated piezometric head for GAM Run B-2 and GAM Run B-3, and a second set of maps represents the difference in simulated piezometric head for GAM Run B-2 and GAM Run B-4. These maps are labeled with the descriptive timeframe of Year 2020 to Year 2062.

For GAM Run B-3, contour maps of the declines in piezometric surface are provided for the model layers corresponding to the confined portions of the Simsboro, Hooper, and Calvert Bluff aquifers, as well as the shallow portion of the combined outcrop areas of the Carrizo-Wilcox group which comprise portions of model layer 2. Figures 4-3 through 4-6 show these maps for the period of Year 2020 to Year 2062 (Model Run B-3), and Figures 4-7 through 4-10 depict the differences between GAM Run B-2 and GAM Run B-3 in piezometric surface from the Year

2020 to 2062, and for the confined portions of the Simsboro, Hooper, and Calvert Bluff aquifers, as well as the shallow portion of the combined outcrop areas of the Carrizo-Wilcox group.

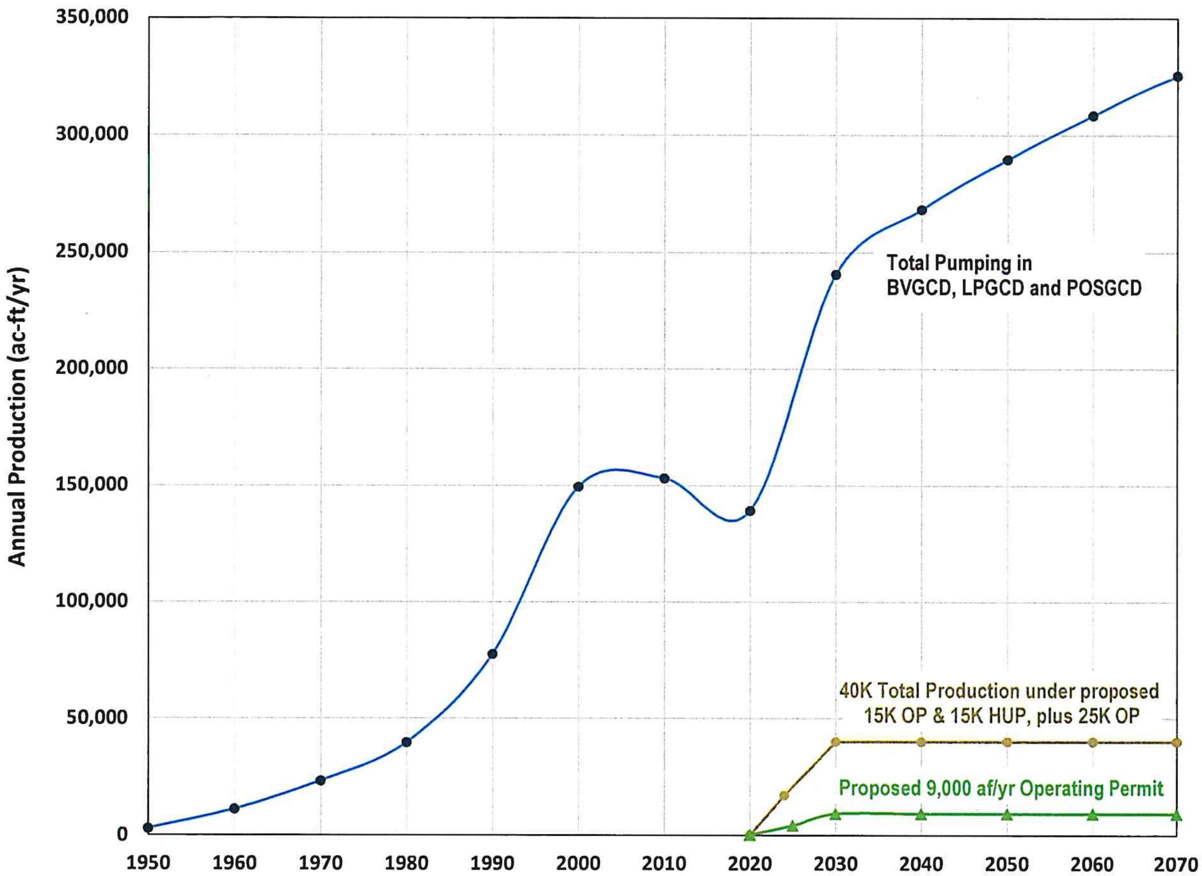
For GAM Run B-4, contour maps of the declines in piezometric surface are provided for the model layers corresponding to the confined portions of the Simsboro and Hooper aquifers, as well as the shallow portion of the combined outcrop areas of the Carrizo-Wilcox group which comprise portions of model layer 2. Figures 4-11 through 4-13 show these maps for the period of Year 2020 to Year 2062 (Model Run B-4), and Figures 4-14 through 4-16 depict the differences between GAM Run B-2 and GAM Run B-4 in piezometric surface from the Year 2020 to 2062, and for the confined portions of the Simsboro and Hooper aquifers, as well as the shallow portion of the combined outcrop areas of the Carrizo-Wilcox group.

Discussion of Modeling Results

The model results indicate the regional effects of pumping on reductions in artesian pressure and water table decline. Model results shown on Figures 4-3 through 4-5, Figures 4-7 through 4-9, Figures 4- 11 and 4-12, and Figures 4-14 and 4-15 are largely changes in artesian pressure, while changes shown on Figures 4-6, 4-10. 4-13, and 4-16 represent smaller changes in water table decline (GAM Layer 2). These predicted changes are the result of: 1) the assumed continuation of regional existing pumping, 2) assumed increases in future regional pumping, and 3) the assumed future pumping by SLR as discussed above under Pumping Input Specific to Sandow Lakes Property.

Figure 4-17 shows the total historical and future Simsboro aquifer production assumed in the model through 2060 for the POSGCD, the LPGCD and the BVGCD. Also shown is SLR's current authorized production of 40,000 af/yr from the Simsboro consisting of the 15,000 af/yr production under the proposed new 15,000 af/yr operating permit and Historic Use Permit 0330, together with the 25,000 af/yr production under Operating Permit 0148. And also shown is the 9,000 af/yr production from the Simsboro and Hooper under the proposed new 9,000 af/yr Simsboro/Hooper operating permit. Figure 4-17 demonstrates that the 9,000 af/yr production under the proposed new operating permit is quite small compared to both the historical pumping that has occurred regionally, and the total future production rates assumed in GAM Run A-1 in the LPGCD, BVGCD, and the POSGCD.

Figure 4-17. Estimated Historical and Future Simulated Simsboro Production in BVGCD, LPGCD, and POGCD - GAM Run B-2



Future increases in pumping will cause regional effects that are primarily reductions in artesian pressure, and as these pressure reductions propagate to the shallower zones of the Simsboro outcrop, then subsequent reductions in the water table can occur. The degree and magnitude of these responses is largely dependent on the aquifer's vertical hydraulic conductivity, recharge rates, the amount of groundwater that is naturally discharged via direct evaporation, transpiration by plants, and seeps and springs, and the degree of capture of the natural discharge that occurs in response to aquifer pumping. Each of these components of the groundwater system are difficult to measure directly. Nevertheless, the subsequent response of the capture of recharge will naturally occur, and this can reduce wasteful discharge to the extent it is occurring, and will naturally increase the sustainability of water supplies.

Experience has shown that any reductions in the water table zones will be very slow to occur or will occur in a very gradual, mostly unnoticeable manner. For example, groundwater pumping from the Carrizo aquifer in the Wintergarden Area occurred for many decades with total pumping rates between 200,000 to over 300,000 af/yr. Long-term water level records in shallow, water table wells exhibited little or relatively small response. Similar experience has been documented over the past century of pumping in the Northern Trinity aquifer and the Gulf Coast aquifer, as well.

Analysis of Potential for Land-Surface Subsidence

Land-surface subsidence is known to occur in some groundwater settings. Groundwater pumping from sand and gravel zones can cause seepage of water from adjacent clay or silt zones. The loss of pore water pressure in the clay or silt reduces the load bearing capacity of the clays or silts, and the overbearing weight of soil, groundwater and buildings causes the clay or silt zones to compact. This compaction occurs at the depth of the clays or silts, and some amount of this compaction can translate into subsidence at land surface.

In Texas, subsidence is documented to have occurred in the greater Houston area (Gabrysch, 1984). Near Pecos, Texas (Chi and Reilinger, 1984), and in the area of El Paso, Texas (Land and Armstrong, 1985).

TWDB Subsidence Risk Study

In 2016, the TWDB contracted with LRE Water, LLC "to identify and characterize areas within Texas' major and minor aquifers that are susceptible to land subsidence related to groundwater pumping" (TWDB, 2020). In 2017, a report was issued and titled "Final Report: Identification of the Vulnerability of the Major and Minor Aquifers of Texas to Subsidence with Regard to Groundwater Pumping", and an EXCEL analytical model was released for assigning a risk factor for subsidence based on lithologic, geotechnical, water level change and other factors (Furnans et al. 2017).

Based on the risk methodology employed, the authors state that of the 9 major aquifers in Texas, 5 of these aquifers are classified with a "high subsidence risk over large areas of the aquifer" (Furnans, 2017). The major aquifers of Texas with a high-risk subsidence rating are the Gulf Coast, Pecos Valley, Hueco-Mesilla Bolson, Ogallala, and Carrizo-Wilcox aquifers. Two minor aquifers, the Yegua-Jackson, and the Brazos River Alluvium are ranked as high risk for subsidence.

It is helpful to look at the underlying technique and data the authors used to determine the subsidence risk rating for an aquifer. The factors used to calculate the subsidence risk are saturated clay thickness, an estimate of clay compressibility, the assumed type of aquifer lithology, historic water levels compared to current water levels (pre-consolidation water level), and the potential of for future water level declines. Of these factors, the authors state they were unable to gather actual geotechnical data on clays, and instead relied on generalized values of clay compressibility based on aquifer lithology.

Factors not considered in the study are the permeability, depth, age, or lateral continuity of the clays, nor the degree of compaction at depth that may translate to actual land surface subsidence. The study also does not try to calibrate the methodology utilized in the report with known data on clay thickness, water level change, and measured subsidence.

Past Experience in the Carrizo-Wilcox

As addressed previously, Alcoa has conducted groundwater pumping in Milam County for the safe mining of lignite reserves, and for power generation and industrial processes. The largest amounts of this pumpage were related to depressurization of the Simsboro aquifer for mining operations. Pressure declines in the Simsboro occurred over a multi-decade period with maximum pressure decline of about 200 feet occurring. Numerous high-capacity wells were originally constructed prior to this depressurization pumping, and the construction included cementing of steel casing and stainless steel screen at the depths of the Simsboro aquifer. If land-surface subsidence had occurred due to compaction of overlying sediments, then the well casings and foundations would have been noticeably higher relative to adjoining ground level. No land-surface subsidence was ever detected or revealed as a result of the Alcoa pumping.

Groundwater pumping has also occurred in the Carrizo-Wilcox aquifer in Texas for many decades. Production has historically occurred in the Wintergarden Area of Southwest Texas, the Tyler area of Northeast Texas, and the Bryan-College Station area in Central Texas. Numerous Texas Water Development Board (TWDB) groundwater availability reports from early 1960 to the near present and spanning the extents of the Carrizo-Wilcox in Texas have studied the groundwater conditions, and/or effects of groundwater pumping (Ex: Reports 4, 032, 109, 110, 150, 160, 210, 327, 332). No concerns of land-surface subsidence resulting from pumping groundwater from the Carrizo-Wilcox are presented in these historical reports.

The Explanatory Report developed by GMA 12 during the second round of joint planning (Ewing et al., 2017) states subsidence has not been detected anywhere within GMA 12 despite large-scale pumping and associated drawdowns, and concluded the risk for land-surface subsidence is negligible.

The TWDB GAM for the Gulf Coast aquifer in southeast Texas, known as the Houston Area Groundwater Model (HAGM), was developed for an area of Texas where land-surface subsidence is a known issue. The HAGM specifically includes a subsidence modeling package for purposes of simulating land-surface subsidence due to groundwater pumping (Kasmarek, 2012). In contrast, the new GAM for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers does not include a subsidence modeling package (Ewing et al., 2018). Similarly, other historic and current GAMs of the Carrizo-Wilcox, including all Southern, Central and Northern portion models, have not included a subsidence modeling package. This is empirical evidence that across the State of Texas, subsidence has not been a concern in the Carrizo-Wilcox over the many decades of actual groundwater development experience.

The natural conditions of the Carrizo-Wilcox, and past experience with development and documented long-term effects, support the position there are little concerns for subsidence being a factor in limiting development of the resource.

Analysis of Effect on Surface and Groundwater Interaction

POSGCD Rule 7.6(3) requires consideration of what impact a permit application will have on surface water resources. As described by C.V. Theis, the source of the produced water from a well follows a natural dynamic from 1) a reduction of artesian storage to the extent artesian conditions exist at the well site, 2) subsequent propagation of the cone of depression laterally and possibly vertically until the cone of influence encounters water table conditions, at which time pore water storage is reduced, 3) the reduction of pore water storage causes a redirection towards the pumping well of groundwater that previously was discharged naturally through evaporation, transpiration, seepage, or larger springflow (Theis, 1940). This natural, dynamic response to pumping has been occurring in the Carrizo-Wilcox for many decades.

Alcoa, in conjunction with its prior mining operations at both the Sandow Mine and the Three Oaks Mine near Elgin, Texas, conducted numerous surveys related to surface and groundwater interaction. Both surface water resources and groundwater resources were surveyed and studied. Studies included aerial surveys stretching from the Colorado River to the Brazos River, ground surveys along creek beds to identify areas of groundwater seepage and springflow prior to mining, as well as surface water flow monitoring in area creeks to identify the nature of rainfall-runoff and baseflow characteristics of local drainages.

These studies indicate there were no large springs present in eastern Bastrop, Lee or Milam Counties, and no State parks are designated throughout this area to recognize culturally or environmentally important springflows. Area streams are classified as intermittent yet with the headwaters classified as ephemeral where the stream channel is above the local water table. Areas of seepage and wet, muddy locations were observed in low-lying areas, of the intermittent streams, and many of which would be dry in summer months. Additionally, many stock ponds have been built throughout the area. All of these features increase discharge of groundwater via transpiration plants and/or direct evaporation.

Due to the location of historic and likely future pumping in combination with the regional transmissivity and artesian pressure conditions, a regional response spanning many counties and GCDs will occur. Figure 4-3 indicates any effects of Simsboro groundwater pumping on surface water resources in the Central portions of GMA 12 will be attributable to groundwater production in numerous counties including groundwater production located in the LPGCD, the POSGCD, and the BVGCD. This includes both any affects which have occurred to date, and any long-term effects into the future.

Most importantly for review of this permit application, any effects on surface water resources due to the proposed operating permit , or the renewal of the historic use permit through 2062 would necessarily be small considering the past history of Alcoa production, the comparatively low amount of HUP and proposed operating permit pumping compared to total regional aquifer pumping, and the regional response of pumping that can span across many counties of GMA 12.

Past Mitigation Activities of Alcoa

A large part of Alcoa's historical Simsboro pumping levels shown in Figure 4-1 were necessary to safely and successfully mine the lignite reserves at the Sandow mine. Alcoa historically produced up to 33,000 af/yr from the Simsboro and demonstrated the aquifer response and groundwater availability characteristics of this production. Groundwater production associated with mining operations at the Sandow Mine was permitted and regulated by the Railroad Commission of Texas, which required monitoring of the ongoing, regional impacts associated with that pumpage and mitigation of any affected water supplies. The monitoring and mitigation program was conducted for more than 20 years and included:

- Conducting field inventories/assessments of over 1,600 well sites in order to document both pre-mining, active-mining, and post-mining hydrogeologic conditions,
- Monitoring of an extensive network of both Alcoa and private wells specifically to document and establish mitigation responsibility under the regulations of the Railroad Commission,
- Lowering of pumps or other modifications in more than 360 wells in which water level declines due mining-related pumping were observed or predicted to occur, and
- Construction of over 125 deeper, replacement wells for landowners whose original wells were completed in the shallowest, upper portions of the Simsboro Formation.

The locations of past well mitigations are coincident with the area of primary effects from the approved historic use permit and proposed operating permit production of 15,000 af/yr. Consequently, many existing users in the area are uniquely protected from adverse hydrologic impacts due to past mitigations efforts of Alcoa. In addition, since cessation of mine reclamation and monitoring activities, Alcoa assisted the POSGCD to convert Alcoa's regional monitoring well program to be incorporated into the POSGCD monitoring well network.

Summary

The proposed operating permit production will partially replicate the effects of historic pumping conducted by Alcoa for mining operations beginning in 1988. The primary effect of this production is the reduction of artesian pressure, and the amount of reduction is largely related to the peak pumping rate. Alcoa mining production reached a peak rate of about 33,000 af/yr, and the same type of effects associated with this past pumping will re-occur upon a return to this pumping rate. Unique to this area, Alcoa has also conducted extensive mitigation efforts to address these effects, and the benefit of these past efforts will continue into the future.

The proposed operating permit production is much smaller than known, existing, and potential future pumping located in Bastrop, Lee, Burleson, Robertson, and Brazos Counties. Cumulative hydrologic effects will occur throughout a large part of GMA 12 due to current and future collective pumping primarily in LPGCD, POSGCD, and BVGCD, and the regional, continuous extent of the sands of the Simsboro. The effects of pumping are primarily reductions in artesian pressure, with subsequent reductions in the water table. Any effects on the water table will be very slow and gradual compared to the changes in artesian pressure, and the water table effects will be quite small compared to aquifer storage.

Overall, it is most likely that further development of the groundwater resources will occur, and in some cases modifications to existing wells will be required to sustain the supplies in the region. As demonstrated by past efforts of Alcoa, this is very feasible to conduct, and the Post Oak Savanah Groundwater District is one of the few groundwater districts in Texas with an established mitigation program. From a State Water planning perspective, the potential increase in regional Simsboro production can provide meaningful, drought-proof groundwater supplies useful for enhancing supply reliability and increasing conjunctive use on a regional basis for a growing area of the State.

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See Section 3 for this information. All water will be used beneficially and consistent with the District management plan.

e. the maximum rate at which groundwater is proposed to be withdrawn from each well and a map showing the location of the well and the property owned or controlled by the applicant for the production of water; [Amended July 2, 2019]

See Table 1-1 in Section 1 for the location of each of the 30 well sites referred to in the Summary of Application, above, unique property description, and total combined maximum pumping rate for all wells located at each of the 30 well sites that are screened into the same formation. See Figure 5-1 in Section 5 for a map of the location of each of the 30 well sites and SLR property utilized in support of this application. If more than one well is constructed at a given well site, the wells will meet applicable spacing requirements for a given formation if they are screened into the same formation. SLR understands that there is no applicable spacing requirement between a well screened into the Simsboro and a well screened into the Hooper. The total combined maximum pumping rate of all wells constructed at a given site that are screened into the same formation will be less than or equal to the total combined maximum pumping rate defined for production from that formation at that well site.

The following information is common to all wells:

For each of the 30 well sites, no part of the water rights has been leased, sold, or transferred. SLR owns all rights to the surface estate and groundwater rights for each of the 30 well sites.

No exemption under POSGCD rule 7.10 is requested for any well.

Upon drilling, completing and testing of any well, within 60 days SLR will submit to the POSGCD the following:

1. **TDLR State Well Report**
2. **Geophysical Log**
3. **Results of Water Quality Testing**
4. **Results of Pump Testing**

f. a water well closure plan or a declaration that the applicant will comply with well plugging guidelines and report closure to the District;

SLR will comply with all TCEQ, Texas Department of Licensing and Regulation, and/or District well plugging guidelines. SLR will also furnish well plugging records to the POSGCD.

g. a drought contingency plan if required by state law;

the District management plan.

e. the maximum rate at which groundwater is proposed to be withdrawn from each well and a map showing the location of the well and the property owned or controlled by the applicant for the production of water; [Amended July 2, 2019]

See Table 1-1 in Section 1 for the individual well's approved location, unique property information, approved production capacity for each approved well, and the production capacity at which the well can be pumped based on the District's current spacing requirements for property line setback or spacing from an adjoining landowner's well, if such capacity is less than the approved production capacity. The wells so affected by the current spacing requirements are further identified by shading on Table 1-1. See Figure 5-1 in Section 5 for a map of the location of each well and SLR property utilized in support of this application.

The following information is common to all wells:

For every well location, no part of the water rights has been leased, sold, or transferred. SLR owns all rights to the surface estate and groundwater rights for the location of every well proposed.

No exemption under POSGCD rule 7.10 is requested for any well.

Upon drilling, completing and testing of any replacement well, within 60 days SLR will submit to the POSGCD the following:

1. **TDLR State Well Report**
2. **Geophysical Log**
3. **Results of Water Quality Testing**
4. **Results of Pump Testing**

f. a water well closure plan or a declaration that the applicant will comply with well plugging guidelines and report closure to the District;

SLR will comply with all TCEQ, Texas Department of Licensing and Regulation, and/or District well plugging guidelines. SLR will also furnish well plugging records to the POSGCD.

g. a drought contingency plan if required by state law;

See Section 3 for this information.

h. an alternative supply plan if required by state law or District Rule;