

Bluebonnet Groundwater Conservation District
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June 24, 2024

Gwen Ricco
MC 205, Office of Legal Services
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: Rule Project Number 2024-0006-230-OW
Proposed Revisions to 30 Texas Administrative Code (TAC) Chapter 230,
Groundwater Availability Certifications for Platting, §§230.0 – 230.11

The Bluebonnet Groundwater Conservation District (“District”) requests consideration of these comments by the Texas Commission on Environmental Quality (“TCEQ”) as part of the proposed amendments to 30 Texas Administrative Code (TAC) §§230.1 – 230.11 (Groundwater Availability Certification Rules). The District recognizes the primary purpose of the rule proposal is implementation of provisions of Senate Bill (SB) 2440, passed during the 88th Texas Legislature’s Regular Session in 2023. However, this rulemaking provides an opportunity for strengthening the efficiency and effectiveness of the Groundwater Availability Certification Rules that have remained unchanged since 2008. These comments address the definition of “evidence” and/or “credible evidence”, acknowledge the need to use best available sciences, add minimum well depth requirements to avoid wells going dry in the future, address cumulative impacts, and emphasize the need to modernize the TCEQ Groundwater Availability Certification form to enhance the process for all levels of decision-making from authorities, developers, and future property owners. The District’s markup of the Groundwater Availability Certification Rules is enclosed.

Adding a Definition of: “Credible Evidence” or Describe the “Evidence” to Consider When Determining Credible Evidence.

Outside the change of “may” to “must” initiated by SB 2440, the most significant term provided in the bill is “credible evidence”. A city or county may waive the groundwater availability certification if it is determined that there is “credible evidence” of groundwater availability.¹ The

¹ Under Texas Local Government Code Sections 212.0101 and 232.0032, a municipal or county authority must require a person who submits a plat application for a subdivision for which the source of the water supply intended for the subdivision is groundwater (under the subdivision tract) to have attached to the application a statement from a Texas Professional Engineer or Professional Geoscientist certifying adequate groundwater is available for that subdivision. This platting requirement may be waived by the municipality or county under certain circumstances. That is, the requirements may be waived if, based on credible evidence of groundwater availability in the vicinity of the proposed subdivision, the platting authority determines that sufficient groundwater is available and will continue to be available to the subdivided tract of land; and either: (1) the entire tract proposed to be subdivided by the plat

proposed TCEQ amendments alarmingly fall silent in defining “credible evidence”. This is an incredibly significant term in dire need of some level of guidance - preferably a definition. In discussions with counties, developers, and other interested parties within the District, all seek the meaning of this problematic term. The District urges the TCEQ to adopt the definition of “credible evidence” proposed by the Texas Alliance of Groundwater Districts that was provided during the stakeholder process.²

Because the TCEQ, like the District has no oversight or authority in the subdivision platting process, we can understand and appreciate TCEQ not overstepping its authority to define “credible evidence” when a city or county is the authority tasked with implementing the term. While the District believes TCEQ has authority to define “credible evidence”, even if it does not, TCEQ is uniquely positioned and qualified to define “evidence” as it relates to the groundwater availability certification process. That is, TCEQ could list factors or characteristics that a city or county could consider in determining evidence as “credible”. Providing even a general or broad outline, list, types, qualifications, quantifications, methods, procedures, processes, and the like would be of the utmost importance and benefit to all involved. This could be treated or addressed as industry standards or best practices. Making available this resource allows the appropriate authority a base or framework to formulate their definition of “credible”.

Incorporate the Applicable Groundwater Availability Model as Best Available Science When Conducting Groundwater Availability Certification.

Since the last amendment to TAC §§230.1 – 230.11 or the associated TCEQ form, there has been incredible work and advancement of science by Texas Water Development Board (“TWDB”), groundwater conservation districts, and others to define and make available groundwater availability models. These models, which are the best available science, are not but should be recognized within Texas Administrative Code or the TCEQ form (described in greater detail below). Providing not just additional tools but readily available tools to be utilized in the consideration and evaluation of properties and potential subdivisions regarding physical

will be supplied with groundwater from the Gulf Coast Aquifer or the Carrizo-Wilcox Aquifer; or (2) the proposed subdivision divides the tract into not more than 10 parts. If the municipality or county does not waive the requirement and exercises this authority, it must use the certification form and follow the content of TCEQ rule and 30 TAC §§230.1 - 230.11. The subdivision plat applicant also must submit the certification information to the Texas Water Development Board (TWDB) and any groundwater conservation district (GCD) whose boundaries include all or part of the subdivision. According to the Local Government Code, the information supplied to the TWDB and GCD would be useful in performing GCD activities, conducting regional water planning, maintaining the state’s groundwater database, or conducting studies for the state related to groundwater. The TWDB and GCDs have no oversight in the subdivision process under the Local Government Code or TCEQ rule. Providing the certification in the design and development phase stand to greatly benefit and protect private property rights, balance the conservation and development of groundwater to meet the needs of this state, use the best available science in the conservation and development of groundwater and to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir of it subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater.

² at a minimum the results of an aquifer test demonstrating sufficient groundwater availability that was completed no more than 3 years before the date of the plat application within a ¼-mile radius of the proposed subdivision and was conducted in compliance with any applicable rules of any groundwater conservation district in which the proposed subdivision will be located, and any other information required under the rules of such groundwater conservation district and the municipal or county authority, the municipal or county authority determines that sufficient groundwater is available and will continue to be available to the subdivision tract of land

groundwater availability affords all parties to work from a uniform, accepted standard of information to build from. Another specific benefit of recognizing and even utilizing the groundwater availability models is the planning horizon that goes well beyond thirty-years. Having all aspects of water planning on the same schedules has been a concentrated effort of the regional water planning groups, groundwater management areas, and the Legislature. The groundwater availability certification process should be no different.

Utilizing the current TWDB-approved groundwater availability model allows an outstanding desktop study-knowns of the groundwater resources, such as supplies, demands, needs, well interference, drawdown, subsidence, spring flow, etc. This practice narrows the focus for any future site-specific efforts and allows for a wide range of analysis prior to designing and directing the scope and criteria of the individual wells and pumping tests. Even though this is likely being utilized by professionals in their prudent project development and management, it is not encouraged or even acknowledged as usable information in current Groundwater Availability Certification Rules or guidance from TCEQ. The District believes this is to the detriment of all parties involved to provide and evaluate groundwater resources to the highest degree.

Identify Cumulative Impacts When Conducting Groundwater Availability Certification.

Municipal and county platted subdivisions create a unique issue where the cumulative impact of single wells on multiple subdivision lots should be considered and evaluated prior to plat approval. When the cumulative impact is not considered, the probability of localized impacts to an area increases substantially. Cumulative impacts such as drawdown, well interference, and subsidence diminish well production and damage the aquifer. Once these impacts are realized, the only solution available is tying into an existing water supplier or constructing a new water supply for the area. Advising minimum well depth to avoid dry wells in the future for proposed wells based on available data and information is a crucial best management practice allowing well informed decision-making by municipal and county authorities, developers, and future property owners. Afforded this information and acknowledging the issue allows a proactive, preventative action pre-development compared to a costly and reactionary response.

As an example, the District's hydrogeologist conducted the *Wilmeth Plat Analysis*, which is enclosed, as a model for Walker County to follow when addressing Groundwater Availability Certifications. The outcome is minimum well depths to avoid dry wells in the future as result of cumulative well production. The *Wilmeth Plat Analysis*, utilizes common practices and techniques of professional engineers and professional geoscientists. Additionally, the analysis relies on readily available data from groundwater availability models which are a construct not recognized in TCEQ groundwater availability certification rules. This example provides a simple walkthrough of the analysis that can be used on any scale of subdivision to advise minimum well depth.

Change the Groundwater Availability Certification Form to Recognize the Advances in Groundwater Science Since the Form was Adopted Sixteen Years Ago.

The District believes there are additional criteria that should be considered as a part of the rule amendment that recognizes the best available science that has been developed since the last amendment in 2008. TCEQ rule implementing 30 TAC §§230.1 – 230.11 consist of two pre-

printed forms (a transmittal form and the groundwater availability certification form) and the instructions for completing the forms and certification. The substantive requirements of the certification under the rule include requirements for projected water demand estimates, general groundwater information, and for subdivision relying on individual well on individual lots, site specific groundwater data including the results of aquifer tests and water quality analysis. A detailed availability analysis is required for a thirty-year period including a description of aquifer parameters and drawdown and well interference analyses. A Professional Engineer or Professional Geoscientists must certify, based upon the information developed, adequate groundwater is available from the underlying aquifer(s) to supply the estimated demand of the proposed subdivision. The District encourages assessment of potential impacts, individually and cumulatively, of wells in a proposed plat and to provide advice of minimum well depth for the proposed subdivision. Review of general susceptibility of various impacts including, but not limited to, drawdown, subsidence, spring flow, and cumulative impacts are pertinent to the governing body's policy development, decision-making, and the groundwater availability certification content requirements. Specific references where the existing form should be modified, and the proposed modification follows:

1. Section 230.7(b)(1-4) – Geologic and groundwater information gathered and considered in planning and designing the aquifer test should address potential impacts such as drawdown (individually and cumulatively), subsidence, spring flow where applicable. A recommended source of this information and impact analysis can be found in the District *Guidelines for Submitting Data and Information and the Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use Of Groundwater*.¹ These Guidelines describe a Phase I report that evaluates the impacts of pumping using existing data and the existing regional groundwater flow model of the area for the aquifer in which the well(s) is to be completed. These general principles could be applicable and applied within the TCEQ form.
2. Section 230.8(c) – “The aquifer test must provide sufficient information to allow evaluation of each aquifer that is being considered as a source of residential and non-residential water supply for the proposed subdivision.” Emphasis and focus on the evaluation of potential impacts such as drawdown (individually and cumulatively), subsidence, and spring flow are encouraged. The collection and review of this information in the planning state should provide clarity on the best practice to implement, individual wells and their minimum well depth or centralized distribution system and minimize costly alternative supply installation after the fact. These general principles could be applicable and applied within the TCEQ form.
3. Section 230.8(c)(8) – To adequately demonstrate groundwater availability, review and analysis for potential impacts of the proposed subdivision is critical. A recommended source of this information and impact analysis can be found in the District *Guidelines for Submitting Data and Information and the Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use Of Groundwater*. This guideline document is intended to set standards and expectations for the investigations and reports to further inform review and analysis. These general principles could be applicable and applied within the TCEQ form.
4. Section 230.10(b) – A critical consideration in groundwater availability determinations is the cumulative impact of wells over time and after full build out. Advising minimum well depth and referencing and considering the cumulative impact will minimize likelihood of

well interference, localized drawdown, subsidence, and the necessity of a centralized distribution system to resolve these impacts in the future. Addressing pumping concentration prior to construction will significantly alleviate stress and pressure on the property owner in the long run. These general principles could be applicable and applied within the TCEQ form.

5. Section 230.10(c) & (d) – Defining aquifer parameters is vital to understanding the susceptibility to impacts in the project area. These parameters will assist the municipal or county authority to fully understand availability. A recommended source and approach to this information is the District *Guidelines for Submitting Data and Information and the Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use Of Groundwater*. Such an analysis will provide the extent drawdown will affect all wells and provide advice on minimum well depth. It can also provide direct feedback to compare impact options between individual wells and a centralized distribution system. These general principles could be applicable and applied within the TCEQ form.
6. Section 230.11(b) – Groundwater availability determination conditions cannot be understated. Reviewing criteria to understand the potential impacts at the plat design phase can significantly reduce time, effort, and costs for construction and application. Prudent project development and best management practices ensure these considerations are at the forefront of discussion and evaluation. Advising minimum well depth is a fair and impartial protection for all parties involved, including county and municipal authorities, developers, and future property owners. Further standardizing the review, data collected, and analyzed referencing or utilize the District *Guidelines for Submitting Data and Information and the Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use Of Groundwater* criteria may be of great benefit for both the authority and developer alike. These general principles could be applicable and applied within the TCEQ form.

The District values the opportunity to participate and provide comments related to the proposed revisions. The District greatly appreciates the time, efforts, consideration, and all that is being done by all those involved.

¹ <https://www.bluebonnetgroundwater.org/wp-content/uploads/2023/08/APPROVED-Guidelines-Phase-I-and-II-reports-04-13-2023.pdf>

The Texas Commission on Environmental Quality (TCEQ) proposes amendments to 30 Texas Administrative Code (TAC) §§230.1 - 230.11.

Background and Summary of the Factual Basis for the Proposed Rules

The purpose of this rule proposal is to implement the provisions of Senate Bill (SB) 2440, passed during the 88th Texas Legislature's Regular Session in 2023. Local Government Code (LGC), §212.0101 and §232.0032 establish requirements for groundwater availability certification in the municipal and county plat application and approval process for proposed subdivisions when the groundwater beneath the land serves as the primary source of water supply. SB 2440 amended §212.0101(a) and §232.0032(a) to make groundwater availability certification a mandatory component of the plat application and approval process. SB 2440 also established specific circumstances under which a municipal or county authority may waive the certification requirement by adding §212.0101(a)(1) and (a)(2) and §232.0032(a)(1) and (a)(2). SB 2440 became effective on January 1, 2024, and requires that existing TCEQ rules are continued in effect for plat applications filed before January 1, 2024.

The charge to TCEQ under LGC, §212.0101(b) and (c) and §232.0032(b) and (c) is limited to adopting rules that establish the form and content of a groundwater availability certification and require transmittal of specific information to the Texas Water Development Board and the applicable groundwater conservation district. Currently, 30 TAC §230.1 and §§230.3 - 230.11 include references to applicability and have embedded forms. Since applicability is addressed by LGC, §212.0101(a), (a)(1) and (a)(2) and §232.0032(a), (a)(1) and (a)(2) and does not require further definition, TCEQ proposes to replace applicability provisions with general provisions that identify the purpose of the rule. And since the current rules specify transmittal requirements and groundwater availability certification contents, TCEQ also proposes to

remove the embedded forms and replace those with references to TCEQ forms so that the format of the forms can be updated as technology changes.

Section by Section Discussion

§230.1, Applicability

LGC, §212.0101(b) and (c) and §232.0032(b) and (c) charge TCEQ with adopting rules that establish the form and content of a groundwater availability certification and require transmittal of specific information to the Texas Water Development Board and the applicable groundwater conservation district. TCEQ proposes amendments to this section that eliminate the applicability provisions because those are established by LGC, §212.0101(a), (a)(1), and (a)(2) and §232.0032(a), (a)(1), and (a)(2). Those provisions are replaced by general provisions that identify the purpose of the rule consistent with LGC, §212.0101(b) and (c) and §232.0032(b) and (c) that charge TCEQ with adopting rules that establish the form and content of a groundwater availability certification.

TCEQ also proposes amendments to remove the form embedded at §230.1(c)(2) and instead require submittal of Plat Attesting Form (TCEQ-20983). Removing the form from the rule allows for the format to change with technology over time. Conforming changes are proposed throughout 30 TAC §230.1.

§230.2, Definitions

TCEQ proposes to delete the definition of “executive administrator” at §230.2(6), because “executive administrator” is not used independently from “of the Texas Water Development Board” within the chapter and, therefore, the definition is not necessary.

§230.3, Certification of Groundwater Availability for Platting

TCEQ proposes amendments that make conforming changes where these sections reference the provisions modified at §230.1. TCEQ also proposes amendments to remove the form embedded at §230.3(c) and instead require submittal of Certification of Groundwater Availability for Platting Form (TCEQ-20982). Removing the form from the rule allows for the format to change with technology over time. Conforming changes are proposed throughout 30 TAC §230.3.

§230.4, Administrative Information

TCEQ proposes amendments to §230.4 to make a conforming citation where the plat applicant “must” now follow 30 TAC Chapter 230 rules, rather than “may” or “shall” follow 30 TAC Chapter 230 rules. The word “must,” now replaces “may” and “shall,” throughout §230.4. Additionally, amendments are proposed that make conforming changes where these sections reference the provisions modified at §230.1 and §230.3.

TCEQ proposes amendments to require an email address with all contact information required by this section.

§§230.5 - 230.11

TCEQ proposes amendments to §§230.5 - 230.11 to make a conforming citation where the plat applicant “must” now follow 30 TAC Chapter 230 rules, rather than “may” or “shall” follow 30 TAC Chapter 230 rules. The word “must,” now replaces “may” and “shall,” throughout §§230.5 - 230.11. Additionally, the commission proposes amendments that make conforming changes where these sections reference the provisions modified at §230.1 and §230.3.

Fiscal Note: Costs to State and Local Government

Kyle Girtten, Analyst in the Budget and Planning Division, has determined that for the first five-year period the proposed rules are in effect, no costs are anticipated for the agency or for other units of state or local government as a result of administration or enforcement of the proposed rule.

Public Benefits and Costs

Mr. Girtten determined that for each year of the first five years the proposed rules are in effect, the public benefit would be consistency with state law, specifically SB 2440 from the 88th Regular Legislative Session (2023). The proposed rulemaking would not result in fiscal implications for businesses or individuals.

Local Employment Impact Statement

TCEQ reviewed this proposed rulemaking and determined that a Local Employment Impact Statement is not required because the proposed rulemaking does not adversely affect a local economy in a material way for the first five years that the proposed rule is in effect.

Rural Communities Impact Assessment

TCEQ reviewed this proposed rulemaking and determined that the proposed rulemaking does not adversely affect rural communities in a material way for the first five years that the proposed rules are in effect. The amendments would apply statewide and have the same effect in rural communities as in urban communities.

Small Business and Micro-Business Assessment

No adverse fiscal implications are anticipated for small or micro-businesses due to the

implementation or administration of the proposed rule for the first five-year period the proposed rules are in effect.

Small Business Regulatory Flexibility Analysis

TCEQ reviewed this proposed rulemaking and determined that a Small Business Regulatory Flexibility Analysis is not required because the proposed rule does not adversely affect a small or micro-business in a material way for the first five years the proposed rules are in effect.

Government Growth Impact Statement

TCEQ prepared a Government Growth Impact Statement assessment for this proposed rulemaking. The proposed rulemaking does not create or eliminate a government program and would not require an increase or decrease in future legislative appropriations to the agency. The proposed rulemaking does not require the creation of new employee positions, eliminate current employee positions, nor require an increase or decrease in fees paid to the agency. The proposed rulemaking amends an existing regulation to be consistent with state law. The proposed rulemaking does not increase or decrease the number of individuals subject to its applicability. During the first five years, the proposed rule should not impact positively or negatively the state's economy.

Draft Regulatory Impact Analysis Determination

TCEQ reviewed the proposed rulemaking in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking is not subject to §2001.0225 because it does not meet the definition of a “Major environmental rule” as defined in the Texas Administrative Procedure Act. A “Major environmental rule” is a rule that is specifically intended to protect the environment or reduce risks to human health from

environmental exposure, and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state.

This rulemaking does not meet the statutory definition of a “Major environmental rule” because it is not the specific intent of the rule to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the proposed rulemaking is to implement legislative changes enacted by SB 2440, which requires groundwater certification during the platting process.

In addition, the rulemaking does not meet the statutory definition of a “Major environmental rule” because the proposed rule would not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The cost of complying with the proposed rule is not expected to be significant with respect to the economy.

Furthermore, the proposed rulemaking is not subject to Texas Government Code, §2001.0225 because it does not meet any of the four applicability requirements listed in Texas Government Code, §2001.0225(a). There are no federal standards governing groundwater certification in the plat application and approval process. Second, the proposed rulemaking does not exceed an express requirement of state law. Third, the proposed rulemaking does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program. Finally, the proposed rulemaking is not an adoption of a rule solely under the general powers of the commission as the proposed rules are required by SB 2440.

TCEQ invites public comment regarding the Draft Regulatory Impact Analysis Determination during the public comment period. Written comments on the Draft Regulatory Impact Analysis Determination may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Takings Impact Assessment

TCEQ evaluated the proposed rule and performed an assessment of whether the proposed rule constitutes a taking under Texas Government Code, Chapter 2007. The specific intent of the proposed rulemaking is to implement legislative changes enacted by Senate Bill 2440, which requires groundwater certification during the platting process with certain exceptions. The proposed rule would substantially advance this purpose by amending the Chapter 230 rules to incorporate the new statutory requirements.

Promulgation and enforcement of this proposed rule would be neither a statutory nor a constitutional taking of private real property. The proposed rule does not affect a landowner's rights in private real property because this rulemaking does not relate to or have any impact on an owner's rights to property. The proposed rule would primarily affect landowners planning to use only groundwater to supply water for subdivisions; this would not be an effect on real property. Therefore, the adopted rulemaking would not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

TCEQ reviewed the proposed rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor would they affect any

action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the proposed rules are not subject to the Texas Coastal Management Program.

Written comments on the consistency of this rulemaking may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Announcement of Hearing

TCEQ will hold a hybrid virtual and in-person public hearing on this proposal in Austin on June 10, 2024, at 2:00 p.m. in building F, room 2210 at TCEQ's central office located at 12100 Park 35 Circle. The hearing is structured for the receipt of oral or written comments by interested persons. Individuals may present oral statements when called upon in order of registration. Open discussion will not be permitted during the hearing; however, commission staff members will be available to discuss the proposal 30 minutes prior to the hearing at 1:30 p.m.

Individuals who plan to attend the hearing virtually and want to provide oral comments and/or want their attendance on record must register by Thursday, June 6, 2024. To register for the hearing, please email Rules@tceq.texas.gov and provide the following information: your name, your affiliation, your email address, your phone number, and whether or not you plan to provide oral comments during the hearing. Instructions for participating in the hearing will be sent on Friday, June 7, 2024, to those who register for the hearing.

For the public who do not wish to provide oral comments but would like to view the hearing may do so at no cost at:

https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZmFINDM4MTktMTk0MS00ODIklWE0MjctYWExYTZiOTBhNmIl%40thread.v2/0?context=%7b%22Tid%22%3a%22871a83a4-a1ce-4b7a-8156-3bcd93a08fba%22%2c%22Oid%22%3a%22e74a40ea-69d4-469d-a8ef-06f2c9ac2a80%22%2c%22IsBroadcastMeeting%22%3a%22true%7d

Persons who have special communication or other accommodation needs who are planning to attend the hearing should contact Sandy Wong, Office of Legal Services at (512) 239-1802 or 1-800-RELAY-TX (TDD). Requests should be made as far in advance as possible.

Submittal of Comments

Written comments may be submitted to Gwen Ricco, MC 205, Office of Legal Services, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087, or faxed to fax4808@tceq.texas.gov. Electronic comments may be submitted at:

<https://tceq.commentinput.com/comment/search>. File size restrictions may apply to comments being submitted via the TCEQ Public Comments system. All comments should reference Rule Project Number 2024-006-230-OW. The comment period closes on June 11, 2024. Please choose one of the methods provided to submit your written comments.

Copies of the proposed rulemaking can be obtained from the commission's website at https://www.tceq.texas.gov/rules/propose_adopt.html. For further information, please contact Abiy Berehe, Groundwater Planning and Assessment Team, by phone at 512-239-5480 or by email at abiy.berehe@tceq.texas.gov.

§§230.1 – 230.11

Statutory Authority

These amendments are proposed under Texas Water Code (TWC), §5.102, which establishes the Commission’s general authority necessary to carry out its jurisdiction; §5.103, which establishes the Commission’s general authority to adopt rules; and §5.105, which establishes the Commission’s authority to set policy by rule. In addition, Local Government Code, §212.0101(b) and §232.0032(b) require the commission to promulgate rules that establish the appropriate form and content of a certification to be attached to a plat application.

The proposed amendments implement the language set forth in SB 2440 from the 88th Texas Legislature.

§230.1. General [Applicability].

(a) Purpose. This chapter establishes the form and content of a certification to be attached to a [Subdivisions utilizing groundwater as the source of water supply. In the] plat application [and approval process, municipal and county authorities may require certification that adequate groundwater is available for a proposed subdivision if groundwater under that land is to be the source of water supply. The municipal or county authority is not required to exercise their authority] under Texas Local Government Code, §212.0101 or §232.0032. [However, if they do exercise their authority, the form and content of this chapter must be used.]

[(b) Use of this chapter. If required by the municipal or county authority, the plat applicant and the Texas licensed professional engineer or the Texas licensed professional

geoscientist shall use this chapter and the attached form to certify that adequate groundwater is available under the land of a subdivision subject to platting under Texas Local Government Code, §212.004 and §232.001.] These rules do not replace:

(1) other state and federal requirements applicable to public drinking water supply systems; [. These rules do not replace]

(2) the authority of counties within designated priority groundwater management areas under Texas Water Code, §35.019;[,] or

(3) the authority of groundwater conservation districts under Texas Water Code, Chapter 36.

(b) [(c)] Transmittal of data. Copies [If use of this chapter is required by the municipal or county authority, the plat applicant shall:]

[(1) provide copies] of the information, estimates, data, calculations, determinations, statements, and certification required by §230.8 of this title (relating to Obtaining Site-Specific Groundwater Data), §230.9 of this title (relating to Determination of Groundwater Quality), §230.10 of this title (relating to Determination of Groundwater Availability), and §230.11 of this title (relating to Groundwater Availability and Usability Statements and Certification) must be provided with the certification to:

(1) the executive administrator of the Texas Water Development Board, and

(2) [to] the applicable groundwater conservation district or districts.[]; and]

(c) [(2)] Plat Attesting Form. The Plat Attesting Form (TCEO-20983) must be submitted with the certification, attesting [using the attached form, attest] that copies of the information, estimates, data, calculations, determinations, statements, and the certification have been provided to:

(1) the executive administrator of the Texas Water Development Board, and

(2) the applicable groundwater conservation district or districts.

[The executive director may make minor changes to this form that do not conflict with the requirements of these rules.]

[Figure: 30 TAC §230.1(c)(2)]

[TRANSMITTAL OF DATA

Use of this form: If required by a municipal authority pursuant to Texas Local Government Code, §212.0101, or a county authority pursuant to Texas Local Government Code, §232.0032 the plat applicant shall use this form to attest that information has been provided in accordance with the requirements of Title 30, TAC, Chapter 230. This form shall be provided to the municipal or county authority, the executive administrator of the Texas Water Development Board, and the applicable groundwater conservation district or districts.

Name of Proposed Subdivision: _____

Property Owner's Name(s): _____

Address: _____

Phone: _____

Fax: _____

Plat Applicant's Name: _____

Address: _____

Phone: _____

Fax: _____

I, _____, the Plat Applicant, attest that the following information has been provided in accordance with Title 30, TAC, Chapter 230.

Has the Certification of Groundwater Availability for Platting Form (Figure: 30 TAC §230.3(c)) been provided to the:	(Please Circle One)	
1. Municipal or County authority?	Yes	No
2. Executive administrator of the Texas Water Development Board?	Yes	No
3. Applicable Groundwater Conservation District or Districts?	Yes	No
Name of Groundwater Conservation District or Districts:		
Have copies of the information, estimates, data, calculations, determinations, and statements been provided to the:		
4. Executive administrator of the Texas Water Development Board?	Yes	No
5. Applicable Groundwater Conservation District or Districts?	Yes	No
Name of Groundwater Conservation District or Districts:		

Note: Mail the required information to the executive administrator of the Texas Water Development Board at the following address:

Executive Administrator
 Texas Water Development Board
 Groundwater Resources Division
 P.O. Box 13231
 Austin, Texas 78711-3231

Contact and other information for the Groundwater Conservation Districts within the state may be accessed on the following Internet pages:

- http://www.tceq.state.tx.us/permitting/water_supply/groundwater/districts.html
- <http://www.twdb.state.tx.us/GwRD/pages/gwrindex.html>
- <http://www.texasgroundwater.org/index.htm>

§230.2. Definitions.

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise. If a word or term used in this chapter is not contained in this section, it shall have the same definition and meaning as used in the practices applicable to hydrology and aquifer testing.

(1) Applicable groundwater conservation district or districts--Any district or authority created under Texas Constitution, Article III, Section 52, or Article XVI, Section 59, that:

(A) has the authority to regulate the spacing of water wells, the production from water wells, or both, and

(B) which includes within its boundary any part of the plat applicant's proposed subdivision.

(2) Aquifer--A geologic formation, group of formations, or part of a formation that contains water in its voids or pores and may be used as a source of water supply.

(3) Aquifer test--A test involving the withdrawal of measured quantities of water from or addition of water to a well and the measurement of resulting changes in water level in the aquifer both during and after the period of discharge or addition for the purpose of determining the characteristics of the aquifer. For the purposes of this chapter, bail and slug tests are not considered to be aquifer tests.

~~(4) Credible Evidence--~~

~~(4)(5)~~ Certification--A written statement of best professional judgement or opinion submitted [as attested to] on the Certification of Groundwater Availability for Platting Form

(TCEQ-20982) and attested to on the Plat Attesting Form (TCEQ-20983) [contained under §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)].

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~~(5)(6)~~ Drinking water standards--As defined in commission rules covering drinking water standards contained in Chapter 290, Subchapter F of this title (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems).

~~(6)~~ Executive administrator--The executive administrator of the Texas Water Development Board.]

~~(6)(7)~~ [(7)] Full build out--The final expected number of residences, businesses, or other dwellings in the proposed subdivision.

~~(7)(8)~~ [(8)] Licensed professional engineer--An engineer who maintains a current license through the Texas Board of Professional Engineers in accordance with its requirements for professional practice.

~~(8)(9)~~ [(9)] Licensed professional geoscientist--A geoscientist who maintains a current license through the Texas Board of Professional Geoscientists in accordance with its requirements for professional practice.

~~(9)(10)~~ [(10)] Plat applicant--The owner or the authorized representative or agent seeking approval of a proposed subdivision plat application pursuant to municipal or county authority.

~~(10)(11)~~ [(11)] Requirements applicable to public drinking water supply systems--The requirements contained in commission rules covering public drinking water supply systems in

Chapter 290, Subchapter D of this title (relating to Rules and Regulations for Public Water Systems).

§230.3. Certification of Groundwater Availability for Platting.

(a) Preparation of the certification [Certification]. The certification required by this chapter must be prepared by a Texas licensed professional engineer or a Texas licensed professional geoscientist.

(b) Certification Requirements. The certification must meet the requirements of §230.4 - 230.11 of this chapter.

(c) [(b)] Submission of information. The certification must be submitted [The plat applicant shall provide] to the following:

(1) the municipal or county authority,

(2) the executive administrator of the Texas Water Development Board, and

(3) the applicable groundwater conservation district or districts [the certification of adequacy of groundwater under the subdivision required by this chapter].

(d) [(c)] Form required. The certification required by this chapter must be submitted on the Certification of Groundwater Availability for Platting Form (TCEQ-20982). [This chapter and the following form shall be used and completed if plat applicants are required by the municipal or county authority to certify that adequate groundwater is available under the land to be

subdivided. The executive director may make minor changes to this form that do not conflict with the requirements of these rules.]

[Figure: 30 TAC §230.3(c)]

[CERTIFICATION OF GROUNDWATER AVAILABILITY FOR PLATTING FORM

Use of this form: If required by a municipal authority pursuant to Texas Local Government Code, §212.0101, or a county authority pursuant to §232.0032, Texas Local Government Code, the plat applicant and the Texas licensed professional engineer or Texas licensed professional geoscientist shall use this form based upon the requirements of Title 30, TAC, Chapter 230 to certify that adequate groundwater is available under the land to be subdivided (if the source of water for the subdivision is groundwater under the subdivision) for any subdivision subject to platting under Texas Local Government Code, §212.004 and §232.001. The form and Chapter 230 do not replace state requirements applicable to public drinking water supply systems or the authority of counties or groundwater conservation districts under either Texas Water Code, §35.019 or Chapter 36.

Administrative Information (30 TAC §230.4)
1. Name of Proposed Subdivision:
2. Any Previous Name Which Identifies the Tract of Land:
3. Property Owner's Name(s):
Address:
Phone:
Fax:
4. Plat Applicant's Name:
Address:
Phone:
Fax:
5. Licensed Professional Engineer or Geoscientist:
Name:
Address:
Phone:
Fax:

Certificate Number:
6. Location and Property Description of Proposed Subdivision:
7. Tax Assessor Parcel Number(s).
Book:
Map:
Parcel:

Proposed Subdivision Information (30 TAC §230.5)		
8. Purpose of Proposed Subdivision (single family/multi-family residential, non-residential, commercial):		
9. Size of Proposed Subdivision (acres):		
10. Number of Proposed Lots:		
11. Average Size of Proposed Lots (acres):		
12. Anticipated Method of Water Distribution.		
Expansion of Existing Public Water Supply System?	Yes	No
New (Proposed) Public Water Supply System?	Yes	No
Individual Water Wells to Serve Individual Lots?	Yes	No
Combination of Methods?	Yes	No
Description (if needed):		
13. Additional Information (if required by the municipal or county authority):		
Note: If public water supply system is anticipated, written application for service to existing water providers within a 1/2-mile radius should be attached to this form (30 TAC §230.5(f) of this title).		

Projected Water Demand Estimate (30 TAC §230.6)
14. Residential Water Demand Estimate at Full Build Out (includes both single family and multi-family residential).
Number of Proposed Housing Units (single and multi-family):

been confined to the zone(s) of origin (§230.8(c)(5) of this title)?		
23. Has an aquifer test been conducted which meets the requirements of §230.8(c)(1) and (6) of this title?	Yes	No
24. Were existing wells or previous aquifer test data used?	Yes	No
25. If yes, did they meet the requirements of §230.8(c)(7) of this title?	Yes	No
26. Were additional observation wells or aquifer testing utilized?	Yes	No
Note: If expansion of an existing public water supply system or a new public water supply system is the anticipated method of water distribution for the proposed subdivision, site-specific groundwater data shall be developed under the requirements of 30 TAC, Chapter 290, Subchapter D of this title (relating to Rules and Regulations for Public Water Systems) and the applicable information and correspondence developed in meeting those requirements shall be attached to this form pursuant to §230.8(a) of this title.		

Determination of Groundwater Quality (30 TAC §230.9)		
27. Have water quality samples been collected as required by §230.9 of this title?	Yes	No
28. Has a water quality analysis been performed which meets the requirements of §230.9 of this title?	Yes	No

Determination of Groundwater Availability (30 TAC §230.10)		
29. Have the aquifer parameters required by §230.10(c) of this title been determined?	Yes	No
30. If so, provide the aquifer parameters as determined.		
Rate of yield and drawdown:		
Specific capacity:		
Efficiency of the pumped well:		
Transmissivity:		
Coefficient of storage:		
Hydraulic conductivity:		
Were any recharge or barrier boundaries detected?	Yes	No

Commented [BG2]: This general information can be referenced by the groundwater availability model to get a better scope and understanding prior to devoting significant dollars to wells. See Wilmeth Plat Analysis for a demonstration.

If yes, please describe:		
Thickness of aquifer(s):		
31. Have time-drawdown determinations been calculated as required under §230.10(d)(1) of this title?	Yes	No
32. Have distance-drawdown determinations been calculated as required under §230.10(d)(2) of this title?	Yes	No
33. Have well interference determinations been made as required under §230.10(d)(3) of this title?	Yes	No
34. Has the anticipated method of water delivery, the annual groundwater demand estimates at full build out, and geologic and groundwater information been taken into account in making these determinations?	Yes	No
35. Has the water quality analysis required under §230.9 of this title been compared to primary and secondary public drinking water standards as required under §230.10(e) of this title?	Yes	No
Does the concentration of any analyzed constituent exceed the standards?	Yes	No
If yes, please list the constituent(s) and concentration measure(s) which exceed standards:		

Groundwater Availability and Usability Statements (30 TAC §230.11(a) and (b))
36. Drawdown of the aquifer at the pumped well(s) is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period.
37. Drawdown of the aquifer at the property boundary is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period.
38. The distance from the pumped well(s) to the outer edges of the cone(s)-of-depression is estimated to be _____ feet over a 10-year period and _____ feet over a 30-year period.
39. The recommended minimum spacing limit between wells is _____ feet with a recommended well yield of _____ gallons per minute per well.
40. Available groundwater is / is not (circle one) of sufficient quality to meet the intended use of the platted subdivision.

Commented [BG3]: Consider standardizing and tying to the current DFC period and the DFCs for the area.

41. The groundwater availability determination does not consider the following conditions (identify any assumptions or uncertainties that are inherent in the groundwater availability determination):

Certification of Groundwater Availability (30 TAC §230.11(c))
Must be signed by a Texas Licensed Professional Engineer or a Texas Licensed Professional Geoscientist.

42. I, _____, Texas Licensed Professional Engineer or Texas Licensed Professional Geoscientist (circle which applies), certificate number _____, based on best professional judgment, current groundwater conditions, and the information developed and presented in this form, certify that adequate groundwater is available from the underlying aquifer(s) to supply the anticipated use of the proposed subdivision.

Date: _____ (affix seal)

]

§230.4. Administrative Information.

At a minimum, the following general administrative information [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting),] must [shall] be provided for a proposed subdivision for which groundwater under the land will be the source of water supply:

(1) the name of the proposed subdivision;

(2) any previous or other name(s) which identifies the tract of land;

(3) the name, address, phone number, email address, and facsimile number of the property owner or owners;

(4) the name, address, phone number, email address, and facsimile number of the person submitting the plat application;

(5) the name, address, phone number, email address, facsimile number, and registration number of the licensed professional engineer or the licensed professional geoscientist preparing the certification as required in this chapter;

(6) the location and property description of the proposed subdivision; and

(7) the tax assessor parcel number(s) by book, map, and parcel.

§230.5. Proposed Subdivision Information.

At a minimum, the following information pertaining to the proposed subdivision must [shall] be provided [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)]:

- (1) the purpose of the proposed subdivision, for example, single family residential, multi-family residential, non-residential, commercial, or industrial;
- (2) the size of the proposed subdivision in acres;
- (3) the number of proposed lots within the proposed subdivision;
- (4) the average size (in acres) of the proposed lots in the proposed subdivision;
- (5) the anticipated method of water distribution to the proposed lots in the proposed subdivision including, but not limited to:
 - (A) an expansion of an existing public water supply system to serve the proposed subdivision (if groundwater under the subdivision is to be the source of water supply);
 - (B) a new public water supply system for the proposed subdivision;
 - (C) individual water wells to serve individual lots; or
 - (D) a combination of methods;

(6) if the anticipated method of water distribution for the proposed subdivision is from an expansion of an existing public water supply system or from a proposed public water supply system, evidence required under §290.39(c)(1) of this title (relating to Rules and Regulations for Public Water Systems) which must [shall] be provided demonstrating that written application for service was made to the existing water providers within a 1/2-mile radius of the subdivision; and

(7) any additional information required by the municipal or county authority as part of the plat application.

§230.6. Projected Water Demand Estimate.

(a) Residential water demand estimate. Residential water demand estimates at full build out must [shall] be provided [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)]. Residential demand estimates must [shall], at a minimum, be based on the current demand of any existing residential well including those identified under §230.8(b) of this title (relating to Obtaining Site-Specific Groundwater Data), or §290.41(c) of this title (relating to Rules and Regulations for Public Water Systems), and:

- (1) the number of proposed housing units at full build out;
- (2) the average number of persons per housing unit;
- (3) the gallons of water required per person per day;

(4) the water demand per housing unit per year (acre feet per year); and

(5) the total expected residential water demand per year for the proposed subdivision (acre feet per year).

(b) Non-residential water demand estimate. Water demand estimates at full build out must [shall] be provided for all non-residential uses [as specified in §230.3(c) of this title]. Non-residential uses must [shall] be specified by type of use and groundwater demand per year (acre feet per year) for each type of use. The estimate must [shall] also include the existing non-residential demand of any well including those identified under §230.8(b) of this title or §290.41(c) of this title.

(c) Total annual water demand estimate. An estimate of the total expected annual groundwater demand, including residential and non-residential estimates at full build out (acre feet per year), must [shall] be provided [as specified in §230.3(c) of this title].

(d) Submission of information. The sources of information used and calculations performed to determine the groundwater demand estimates as required by this section must [shall] be made available to the municipal or county authority if requested. The plat applicant must [shall] provide any additional groundwater demand information required by the municipal or county authority as part of the plat application.

§230.7. General Groundwater Resource Information.

(a) Aquifer identification. Using Texas Water Development Board aquifer names, the aquifer(s) underlying the proposed subdivision which is planned to be used as the source of

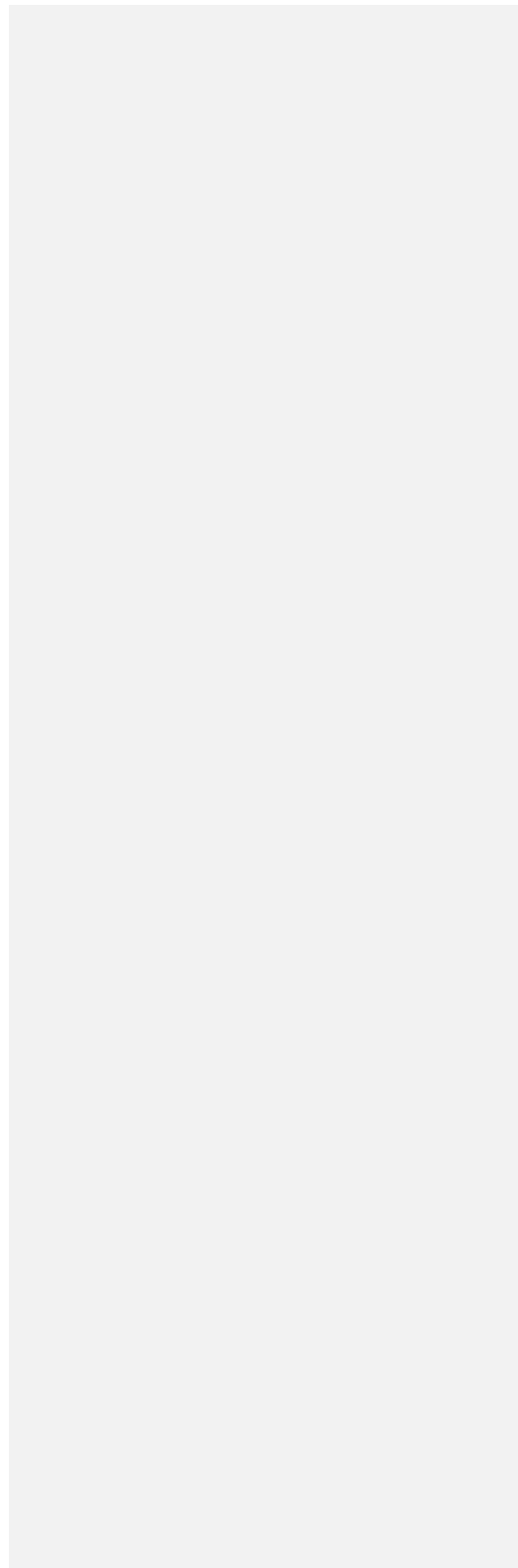
water for the subdivision must [shall] be identified and generally described [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)].

(b) Geologic and groundwater information. The current groundwater availability model approved by the Texas Water Development Board provides baseline geologic and groundwater information to be supplemented by site-specific data for inclusion and consideration. To meet the requirements of this chapter, the following geologic and groundwater information must [shall] be considered in planning and designing the aquifer test [under §230.8(c) of this title (relating to Obtaining Site-Specific Groundwater Data)]:

- (1) the stratigraphy of the geologic formations underlying the subdivision;
- (2) the lithology of the geologic strata;
- (3) the geologic structure;
- (4) the characteristics of the aquifer(s) and their hydraulic relationships;
- (5) the recharge to the aquifer(s), and movement and discharge of groundwater from the aquifer(s); and
- (6) the ambient quality of water in the aquifer(s).

§230.8. Obtaining Site-Specific Groundwater Data.

(a) Applicability of section. This section is applicable only if the proposed method of water distribution for the proposed subdivision is individual water wells on individual lots. If



supply system is the proposed method of water distribution for the proposed subdivision, site-specific groundwater data must [shall] be developed under the requirements of Chapter 290, Subchapter D of this title (relating to Rules and Regulations for Public Water Systems) and the information developed in meeting these requirements must [shall] be attached to the [form required under §230.3 of this title (relating to) Certification of Groundwater Availability for Platting Form ()].

(b) Location of existing wells. All known existing, abandoned, and inoperative wells within the proposed subdivision must [shall] be identified, located, and mapped by on-site surveys. Existing well locations must [shall] be illustrated on the plat required by the municipal or county authority.

(c) Aquifer testing. Utilizing the information considered under §230.7(b) of this title (relating to General Groundwater Resource Information), an aquifer test must [shall] be conducted to characterize the aquifer(s) underlying the proposed subdivision. The aquifer test must provide sufficient information to allow evaluation of each aquifer that is being considered as a source of residential and non-residential water supply for the proposed subdivision. Appropriate aquifer testing must [shall] be based on typical well completions. An aquifer test conducted under this section utilizing established methods must [shall] be reported [as specified in §230.3(c) of this title] and must [shall] include, but not be limited to, the following items.

(1) Test well and observation well(s). At a minimum, one test well (i.e., pumping well) and one observation well, must [shall] be required to conduct an adequate aquifer test under this section. Additional observation wells must [shall] be used for the aquifer test if it is

practical or necessary to confirm the results of the test. The observation well(s) must [shall] be completed in the same aquifer or aquifer production zone as the test well. The locations of the test and observation well(s) must [shall] be shown on the plat required by the municipal or county authority.

(2) Location of wells. The test and observation well(s) must be placed within the proposed subdivision and must [shall] be located by latitude and longitude. The observation well(s) must [shall] be located at a radial distance such that the time-drawdown data collected during the planned pumping period fall on a type curve of unique curvature. In general, observation wells in unconfined aquifers should be placed no farther than 300 feet from the test well, and no farther than 700 feet in thick, confined aquifers. The observation well should also be placed no closer to the test well than two times the thickness of the aquifer's production zone. The optimal location for the observation well(s) can be determined by best professional judgement after completion and evaluation of the test well as provided in paragraph (4) of this subsection.

(3) Lithologic and geophysical logs. The test and observation wells must [shall] be lithologically and geophysically logged to map and characterize the geologic formation(s) and the aquifer(s) in which the aquifer test(s) is to be performed.

(A) A lithologic log must [shall] be prepared showing the depth of the strata, their thickness and lithology (including size, range, and shape of constituent particles as well as smoothness), occurrence of water bearing strata, and any other special notes that are relevant to the drilling process and to the understanding of subsurface conditions.

(B) Geophysical logs must [shall] be prepared which provide qualitative information on aquifer characteristics and groundwater quality. At a minimum, the geophysical logs must [shall] include an electrical log with shallow and deep-investigative curves (e.g., 16-inch short normal/64-inch long normal resistivity curves or induction log) with a spontaneous potential curve.

(C) The municipal or county authority may, on a case-by-case basis, waive the requirement of geophysical logs as required under this section if it can be adequately demonstrated that the logs are not necessary to characterize the aquifer(s) for testing purposes.

(4) Well development and performance. The test and observation well(s) must [shall] be developed prior to conducting the aquifer test to repair damage done to the aquifer(s) during the drilling operation. Development must [shall] ensure [insure] that the hydraulic properties of the aquifer(s) are restored as much as practical to their natural state.

(A) Well development procedures applied to the well(s) may vary depending on the drilling method used and the extent of the damage done to the aquifer(s).

(B) During well development, the test well must [shall] be pumped for several hours to determine the specific capacity of the well, the maximum anticipated drawdown, the volume of water produced at certain pump speeds and drawdown, and to determine if the observation well(s) are suitably located to provide useful data.

(C) Water pumped out of the well during well development must [shall] not be allowed to influence initial well performance results.

(D) Aquifer testing required by this section must [shall] be performed before any acidization or other flow-capacity enhancement procedures are applied to the test well.

(5) Protection of groundwater. All reasonably necessary precautions must [shall] be taken during construction of test and observation wells to ensure that surface contaminants do not reach the subsurface environment and that undesirable groundwater (water that is injurious to human health and the environment or water that can cause pollution to land or other waters) if encountered, is sealed off and confined to the zone(s) of origin.

(6) Duration of aquifer test and recovery. The duration of the aquifer test depends entirely on local and geologic conditions. However, the test must [shall] be of sufficient duration to observe a straight-line trend on a plot of water level versus the logarithm of time pumped. Water pumped during the test must [shall] not be allowed to influence the test results. Aquifer testing must [shall] not commence until water levels (after well development) have completely recovered to their pre-development level or at least to 90% of that level.

(A) At a minimum, a 24-hour uniform rate aquifer test must [shall] be conducted. Testing must [shall] continue long enough to observe a straight-line trend on a plot of water level versus the logarithm of time pumped. If necessary, the duration of the test should be extended beyond the 24-hour minimum limit until the straight-line trend is observed.

(i) If it is impractical to continue the test until a straight-line trend of water level versus the logarithm of time pumped is observed within the 24-hour limit, the

test must [shall] continue at least until a consistent pumping-level trend is observed. In such instances, failure to observe the straight-line trend must [shall] be recorded.

(ii) If the pumping rates remain constant for a period of at least four hours and a straight-line trend is observed on a plot of water level versus the logarithm of time pumped before the 24-hour limit has been reached, the pumping portion of the test may be terminated.

(iii) The frequency of water level measurements during the aquifer test must [shall] be such that adequate definition of the time-drawdown curve is made available. As much information as possible must [shall] be obtained in the first ten minutes of testing (i.e., pumping).

(B) Water-level recovery data must [shall] be obtained to verify the accuracy of the data obtained during the pumping portion of the test. Recovery measurements must [shall] be initiated immediately at the conclusion of the pumping portion of the aquifer test and must [shall] be recorded with the same frequency as those taken during the pumping portion of the aquifer test. Time-recovery measurements must [shall] continue until the water levels have recovered to pre-pumping levels or at least to 90% of that level. If such recovery is not possible, time-recovery measurements should continue until a consistent trend of recovery is observed.

(7) Use of existing wells and aquifer test data.

(A) An existing well may be utilized as an observation well under this section if sufficient information is available for that well to demonstrate that it meets the requirements of this section.

(B) The municipal or county authority may accept the results of a previous aquifer test in lieu of a new test if:

(i) the previous test was performed on a well located within a 1/4-mile radius of the subdivision;

(ii) the previous test fully meets all the requirements of this section;

(iii) the previous test was conducted on an aquifer which is being considered as a source of water supply for the proposed subdivision; and

(iv) aquifer conditions (e.g., water levels, gradients, etc.) during the previous test were approximately the same as they are presently.

(8) Need for additional aquifer testing and observation wells. Best professional judgement must [shall] be used to determine if additional observation wells or aquifer tests are needed to adequately demonstrate groundwater availability. The Theis and Cooper-Jacob nonequilibrium equations, and acceptable modifications thereof, are based on well documented assumptions. To determine if additional information is needed, best professional judgement must [shall] be used to consider these assumptions, the site-specific information derived from

the aquifer test required by this section, the size of the proposed subdivision, and the proposed method of water delivery.

(d) Submission of information. The information, data, and calculations required by this section must [shall] be made available to the municipal or county authority, if requested, to document the requirements of this section as part of the plat application.

§230.9. Determination of Groundwater Quality.

(a) Water quality analysis. Water samples must [shall] be collected near the end of the aquifer test for chemical analysis. Samples must [shall] be collected from each aquifer being considered for water supply for the proposed subdivision and reported on or attached to the Certification of Groundwater Availability Form (TCEQ-20982) [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)].

(1) For proposed subdivisions where the anticipated method of water delivery is from an expansion of an existing public water supply system or a new public water supply system, the samples must [shall] be submitted for bacterial and chemical analysis as required by Chapter 290, Subchapter F of this title (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements For Public Water Systems).

(2) For proposed subdivisions where the anticipated method of water delivery is from individual water supply wells on individual lots, samples must [shall] be analyzed for the following:

(A) chloride;

(B) conductivity;

(C) fluoride;

(D) iron;

(E) nitrate (as nitrogen);

(F) manganese;

(G) pH;

(H) sulfate;

(I) total hardness;

(J) total dissolved solids; and

(K) presence/absence of total coliform bacteria.

(3) Conductivity and pH values may be measured in the field, and the other constituents must [shall] be analyzed in a laboratory accredited by the agency according to Chapter 25, Subchapters A and B of this title (relating to General Provisions and Environmental Testing Laboratory Accreditation, respectively) or certified by the agency according to Chapter

25, Subchapters A and C of this title (relating to General Provisions and Environmental Testing Laboratory Certification, respectively).

(b) Submission of information. The information, data, and calculations required by this section must [shall] be made available to the municipal or county authority, if requested, to document the requirements of this section as part of the plat application.

§230.10. Determination of Groundwater Availability.

(a) Time frame for determination of groundwater availability. At a minimum, both a short- and long-term determination of groundwater availability must [shall] be made, each considering the estimated total water demand at full build out of the proposed subdivision. Groundwater availability must [shall] be determined for ten years, ~~and 30 years,~~ the current planning period in the Texas Water Development Board approved groundwater availability model, and for any other time frame(s) required by the municipal or county authority.

(b) Other considerations in groundwater availability determination. Groundwater availability determinations must [shall] take into account the anticipated method of water delivery as identified under §230.5 of this title (relating to Proposed Subdivision Information) and will be compared to annual demand estimates at full build out as determined under §230.6 of this title (relating to Projected Water Demand Estimate).

(c) Determination of aquifer parameters. The parameters of the aquifer(s) being considered to supply water to the proposed subdivision must [shall] be determined utilizing the information considered under §230.7 of this title (relating to General Groundwater Resource Information) and data obtained during the aquifer test required under §230.8 of this title (relating to Obtaining Site-Specific Groundwater Data) for individual water wells or under

Chapter 290, Subchapter D of this title (relating to Rules and Regulations for Public Water Systems) and reported on or attached to the Certification of Groundwater Availability Form (TCEQ-20982) [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)]. The time-drawdown and time-recovery data obtained during the aquifer test must [shall] be used to determine aquifer parameters utilizing the nonequilibrium equations developed by Theis or Cooper-Jacob, or acceptable modifications thereof. The following aquifer parameters must [shall] be determined:

- (1) rate of yield and drawdown;
- (2) specific capacity;
- (3) efficiency of the pumped (test) well;
- (4) transmissivity;
- (5) coefficient of storage;
- (6) hydraulic conductivity;
- (7) recharge or barrier boundaries, if any are present; and
- (8) thickness of the aquifer(s).

(d) Determination of groundwater availability. Using the information and data identified and determined in subsections (b) and (c) of this section, the following calculations must [shall] be made.

(1) Time-drawdown. The amount of drawdown at the pumped well(s) and at the boundaries of the proposed subdivision must [shall] be determined for the time frames identified under subsection (a) of this section.

(2) Distance-drawdown. The distance(s) from the pumped well(s) to the outer edges of the cone(s)-of-depression must [shall] be determined for the time frames identified under subsection (a) of this section.

(3) Well interference. For multiple wells in a proposed subdivision, calculations must [shall] be made to:

(A) determine how pumpage from multiple wells will affect drawdown in individual wells for the time frames identified under subsection (a) of this section; and

(B) determine a recommended minimum spacing limit between individual wells and minimum well depth and well yields from the wells that will allow for the continued use of the wells for the time frames identified under subsection (a) of this section.

(e) Determination of groundwater quality. The water quality analysis required under §230.9 of this title (relating to Determination of Groundwater Quality) must [shall] be compared to primary and secondary public drinking water standards and the findings documented on or

attached to the Certification of Groundwater Availability Form (TCEQ-20982) [as specified in §230.3(c) of this title].

(f) Submission of information. The information, data, and calculations required by this section must [shall] be made available to the municipal or county authority, if requested [required], to document the requirements of this section as part of the plat application.

§230.11. Groundwater Availability and Usability Statements and Certification.

(a) Groundwater availability and usability statements. Based on the information developed under §230.10 of this title (relating to Determination of Groundwater Availability), the following information must [shall] be provided on or attached to the Certification of Groundwater Availability Form (TCEQ-20982) [as specified in §230.3(c) of this title (relating to Certification of Groundwater Availability for Platting)]:

(1) the estimated drawdown of the aquifer at the pumped well(s) over a ten-year period and over a 30-year period;

(2) the estimated drawdown of the aquifer at the subdivision boundary over a ten-year period and over a 30-year period;

(3) the estimated distance from the pumped well(s) to the outer edges of the cone(s)-of-depression over a ten-year period and over a 30-year period;

(4) the recommended minimum spacing limit between wells and recommended minimum well depth and the recommended well yield; and

(5) the sufficiency of available groundwater quality to meet the intended use of the platted subdivision.

(b) Groundwater availability determination conditions. The assumptions and uncertainties that are inherent in the determination of groundwater availability must [should] be clearly identified [as specified in §230.3(c) of this title]. These conditions must be identified to adequately define the basis[bases] for the availability and usability statements. These basis[bases] may include, but are not limited to, uncontrollable and unknown factors such as:

(1) future pumpage from the aquifer or from interconnected aquifers from area wells outside of the subdivision or any other factor that cannot be predicted that will affect the storage of water in the aquifer;

(2) long-term impacts to the aquifer based on climatic variations; and

(3) future impacts to usable groundwater due to unforeseen or unpredictable contamination,

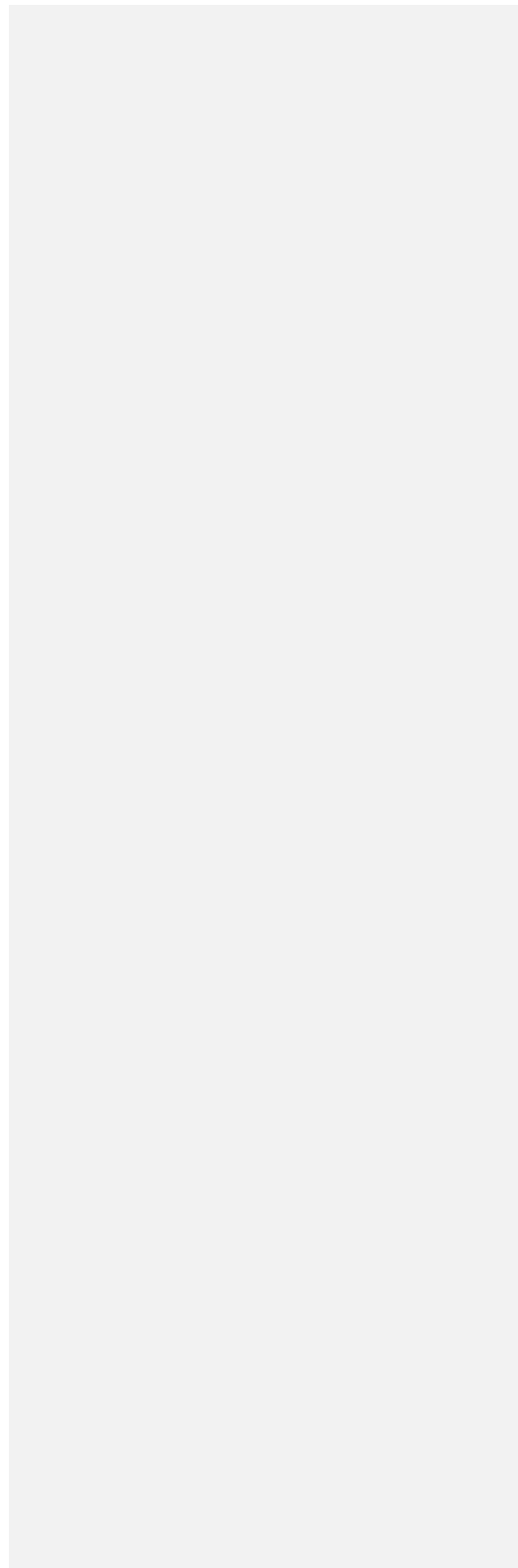
(3)(4) Compare aquifer tests to Texas Water Development Board approved groundwater availability model using adopted desired future conditions for analysis and understanding of potential measurable impacts.

(c) Certification. Based on best professional judgement, current groundwater conditions, and the information developed and presented on or attached to the Certification of Groundwater Availability Form (TCEO-20982), [in the form specified by §230.3(c) of this title], the licensed professional engineer or licensed professional geoscientist must certify [certifies] by signature, seal, and date that adequate groundwater is available from the underlying

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Texas Commission on Environmental Quality
Chapter 230 - Groundwater Availability Certification for Platting
Rule Project No. 2024-006-230-OW
aquifer(s) to supply the estimated demand of the proposed subdivision.

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William R. Hutchison, Ph.D., P.E., P.G.
Independent Groundwater Consultant

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April 18, 2023

Mr. Zach Holland
General Manager
Bluebonnet Groundwater Conservation District
PO Box 269
Navasota, TX 77868-0269

RE: Wilmeth Plat Analysis

Dear Mr. Holland,

Overview

Pursuant to your request, I have completed an analysis that yields a recommendation for minimum well depths in the proposed Wilmeth Plat in Walker County.

The analysis consists of two elements described in this letter:

- A presentation of Phase I-a tables with existing information from the HAGM (the Groundwater Availability Model of the northern portion of the Gulf Coast Aquifer).
- An analysis of future drawdown in the area.

Based on the analysis described below, I recommend that, if the subdivision is approved, the well depth for each lot should be no less than 300 feet to avoid dry wells in the future. Factors considered in making this recommendation are:

- Historic depth to water from a well less than two miles from the proposed subdivision,
- Drawdown associated with pumping all 15 wells in the proposed subdivision,
- The historic drawdown in a well less than two miles from the proposed subdivision during a drought period in the late-1980s/early-1990s, and
- Potential drawdown in the region due to growth.

Phase I-a Analysis

On April 14, 2023, you provided two kml files and a pdf of the proposed plat. The land is proposed to be subdivided into 15 lots of varying sizes.

Initially, I used the kml files to pick coordinates at the western tip, northern tip, and eastern tip of the subdivision. Based on these coordinates, the proposed subdivision lies within two model cells of the HAGM: Row 25, Column 129 and Row 26, Column 129.

The data from these cells was extracted from the Excel file *BGCD Parameters.xlsx*. The associated tables are the information normally prepared for a Phase I-a report, and are provided below:

Table 1. Model Grid Parameters

County Name	Walker	Walker	Walker	Walker
County Code	236	236	236	236
Outcrop Layer	3	3	3	3
Layer	3	4	3	4
Row	25	25	26	26
Column	129	129	129	129
x-coordinate (GAM-ft)	6350031.5	6350031.5	6353253.5	6353253.5
y-coordinate (GAM-ft)	19466594	19466594	19462412	19462412
Surface Elevation (ft MSL)	375	375	366	366
Cell Top Elevation (ft MSL)	375	143	366	78
Cell Bottom Elevation (ft MSL)	143	-727	78	-790
Cell Thickness (ft)	232	870	288	868
Clay Thickness (ft)	26	506	37	499
Clay Thickness (% of Cell Thickness)	11.23	58.16	12.82	57.49

Table 2. HAGM Aquifer Parameters

County Name	Walker	Walker	Walker	Walker
County Code	236	236	236	236
Outcrop Layer	3	3	3	3
Layer	3	4	3	4
Row	25	25	26	26
Column	129	129	129	129
Hydraulic Conductivity (ft/day)	0.02	3.62	0.02	8.69
Transmissivity (gpd/ft)	33	23,574	40	56,447
Leakage (1/day)	1.16E-09	0.00E+00	6.95E-09	0.00E+00
Storativity (dimensionless)	5.00E-02	3.29E-04	5.00E-02	3.34E-04
Elastic Storativity (dimensionless)	2.60E-07	1.41E-06	3.20E-07	1.38E-06
Inelastic Storativity (dimensionless)	2.60E-05	1.41E-04	3.20E-05	1.38E-04

Table 3. HAGM Results

County Name	Walker	Walker	Walker	Walker
County Code	236	236	236	236
Outcrop Layer	3	3	3	3
Layer	3	4	3	4
Row	25	25	26	26
Column	129	129	129	129
Groundwater Elevation in 2009 (ft MSL)	316	157	316	145
Groundwater Elevation in 2080 (ft MSL)	316	-76	314	-93
DFC Drawdown (ft)	0	233	2	238
Artesian Head (ft)	-59	14	-50	67
Subsidence in 2009 (ft)	0.01	0.01	0.01	0.01
Subsidence in 2080 (ft)	0.05	0.05	0.05	0.05
Subsidence from 2009 to 2080 (ft)	0.04	0.04	0.04	0.04
Cell Pumping in 2009 (AF/yr)	0	13.36	0	13.36
Cell Pumping in 2080 (AF/yr)	0	74.06	0	74.06

Table 4. Theis Parameters

County Name	Walker	Walker
County Code	236	236
Outcrop Layer	3	3
Layer	4	4
Row	25	26
Column	129	129
Drawdown in Production Well at 100 gpm for 36 hours	9.08	3.97
Drawdown 1/2 mile from Production Well at 100 gpm for 36 hours	0.80	0.50
Drawdown 1/2 miles from Production Well at 100 gpm for 1 year	3.42	1.60
Drawdown-Pumping Ratio for Production Well for 36 hours	0.09080	0.03966
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 36 hours	0.00803	0.00496
Drawdown-Pumping Ratio for 1/2 mile from Production Well for 1 yr	0.03417	0.01601

Simulation of Pumping

Please note that in Table 4, there is an assumption of pumping at 100 gpm for drawdown calculations. Phase I-a reports are prepared for permitted wells with casing diameters greater than 8 inches. Because this analysis involves 15 small domestic wells, the Theis calculations used in the Phase I-a report are not suitable, and the analysis was modified to meet the objectives.

I used the kml files in Google Earth to pick coordinates near the center of each lot. These latitude and longitude coordinates were then converted to GAM coordinates (in feet) using Surfer (a commercial gridding program) to complete distance calculations between each lot.

It was assumed that a well would be constructed on each lot. The analysis consisted of simulating pumping of each well at a rate of 17.5 gallons per minute for 10 years and calculating the drawdown in each well due to the pumping of all 15 wells. Admittedly, this would be considered a worst-case scenario.

The spreadsheet (*TheisAnalysis 15 lots.xlsx*) attached to the email transmitting this letter was used to complete the calculations and provide some supplementary data and information in developing the minimum well depth recommendation. The spreadsheet consists of eight tabs:

- *Input and Summary Output*
- *Drawdown Detail*
- *Theis Calcs*
- *Lot Distance Grid*
- *Quad 712 Annual Precipitation Graph*
- *Well 60-29-403 Hydrograph*
- *Well 60-29-402 Data*
- *MAG Pumping*

The *Input and Summary Output* is presented below as Table 5.

Table 5. *Input and Summary Output* Tab of *TheisAnalysis 15 lots.xlsx*

One Layer Analytical Model (Theis Equation)

Project Name: Proposed Wilmeth Plat
Date: 4/17/2023

Aquifer Characteristics and Pumping Parameters

Transmissivity (gpd/ft) 23,974
 Storativity 3.29E-04
 Pumping Rate (gpm) 17.5
 Time (days) 3,650

Lot Data and Summary Results

Lot	X-Coordinate (GAM - ft)	Y-Coordinate (GAM - ft)	Lowest Recorded DTW (in 1967) in 425' Well < 2 miles away (ft) (GAM in 2009 = 218 ft)	Pumping Well Drawdown (ft)	Subdivision Interference (ft)	Total Subdivision Draw down (ft)	Historic Drawdown (1975 to 1989) Measured in 425' Well < 2 miles away (ft)	Potential Drawdown with Area Growth (ft) (GAM prediction = 233 ft)	Minimum Well Depth (ft)
1	6349620	19463781	145	2.33	11.26	13.60	93	40	292
2	6350320	19464076			11.90	14.23			292
3	6350285	19463407			11.71	14.04			292
4	6351425	19464294			12.85	15.18			293
5	6351777	19465042			12.73	15.06			293
6	6352157	19465208			12.63	14.96			293
7	6352390	19464704			13.33	15.66			294
8	6352323	19464470			13.65	15.98			294
9	6352129	19464076			14.19	16.52			295
10	6352490	19464207			13.78	16.12			294
11	6352649	19464010			13.70	16.03			294
12	6352251	19463711			13.47	15.80			294
13	6352883	19463748			13.33	15.66			294
14	6352918	19463604			13.10	15.44			293
15	6352552	19463712			13.57	15.91			294

Aquifer transmissivity and storativity were obtained from Table 1 (Layer 4, Row 25, Column 129). The pumping rate and time of pumping were assumed. Characteristic of a Theis analysis, a pumping time of one year is not much different than a pumping time of 10 years because drawdown responds logarithmically (not linearly) to pumping.

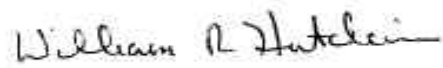
The “Lot Data and Summary Results” section includes:

- The lot number (Column A).
- The coordinates for each lot obtained from the kml file as described above (Columns B and C).
- The lowest recorded depth to water in Well 92-29-402 (located 1.8 miles from the proposed subdivision) in 1967. Please note that the HAGM estimates the December 2009 depth-to-water at this location as 218 feet (Column D, assumed equal for all lots).
- The pumping well drawdown of the individual well on the listed lot (Column E, calculated as equal for all lots).
- The drawdown associated with pumping the other 14 wells in the proposed subdivision. Details of these estimated drawdowns are in the *Drawdown Detail* and *Theis Calcs* tabs in the spreadsheet (Column F).
- The total drawdown in each well in the subdivision due to its own pumping and the interference from other wells in the subdivision (Column G).

- Column H estimates the historic drawdown from 1975 to 1989 in Well 92-29-402 from 1975 to 1989 (assumed equal for all lots). The large drawdown in the late 1980s/early 1990s coincided with a drought period (please refer to Quad 712 annual precipitation graph in spreadsheet). The data for Well 92-29-402 is presented in the spreadsheet due to the unusual history of depth-to-water measurements. Prior to 1970, the depth-to-water was much greater than in more recent years. Monitoring of the well stopped in 1994. The early data may have been measured in a different well than in more recent years, and the well identification was erroneous. Without further details that are beyond the downloaded record, it is not possible to explain the discrepancy.
- Column I estimates the potential drawdown due to area growth was estimated to be 40 feet (assumed equal for all lots). As noted in Table 3, DFC drawdown from 2010 to 2080 is estimated to be over 200 feet. This is likely an unrealistic estimate as the estimated pumping (modeled available groundwater, or MAG) is over 40,000 AF/yr as can be seen on the *MAG Pumping* tab of the spreadsheet.
- Column J presents the sum of the depth to water, total subdivision drawdown, historic drawdown, and potential drawdown due to area growth is the final column. This represents the recommended minimum well depth (about 300 feet).

I appreciate the opportunity to work with you on this effort. Please call me at 512-745-0599 or email me at billhutch@texasgw.com if you have any questions.

Sincerely,



William R. Hutchison, Ph.D., P.E., P.G.

County Name	Walker	Walker	Walker	Walker
County Code	236	236	236	236
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Date: 4/17/2023

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1	6349620	19463781	145	2.33	11.26	13.60	93	40	292
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11	6352649	19464010			13.70	16.03			294
12	6352251	19463711			13.47	15.80			294
13	6352883	19463748			13.33	15.66			294
14	6352918	19463604			13.10	15.44			293
15	6352552	19463712			13.57	15.91			294

Drawdown (ft)

Obs Well	Pumping Well															Total Drawdown (ft)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	2.33	0.99	0.99	0.84	0.79	0.77	0.77	0.77	0.79	0.77	0.76	0.78	0.75	0.74	0.76	13.60
2	0.99	2.33	1.01	0.92	0.85	0.82	0.82	0.82	0.85	0.81	0.80	0.83	0.79	0.78	0.81	14.23
3	0.99	1.01	2.33	0.88	0.81	0.78	0.79	0.81	0.83	0.80	0.80	0.83	0.78	0.78	0.81	14.04
4	0.84	0.92	0.88	2.33	0.98	0.92	0.94	0.96	1.00	0.93	0.91	0.94	0.87	0.86	0.90	15.18
5	0.79	0.85	0.81	0.98	2.33	1.09	1.00	0.98	0.94	0.93	0.89	0.89	0.86	0.84	0.87	15.06
6	0.77	0.82	0.78	0.92	1.09	2.33	1.04	0.99	0.92	0.94	0.90	0.88	0.86	0.85	0.87	14.96
7	0.77	0.82	0.79	0.94	1.00	1.04	2.33	1.18	1.01	1.06	0.99	0.94	0.93	0.91	0.94	15.66
8	0.77	0.82	0.81	0.96	0.98	0.99	1.18	2.33	1.08	1.14	1.04	0.99	0.96	0.94	0.98	15.98
9	0.79	0.85	0.83	1.00	0.94	0.92	1.01	1.08	2.87	1.10	1.05	1.10	0.98	0.96	1.04	16.52
10	0.77	0.81	0.80	0.93	0.93	0.94	1.06	1.14	1.10	2.33	1.17	1.04	1.03	0.99	1.06	16.12
11	0.76	0.80	0.80	0.91	0.89	0.90	0.99	1.04	1.05	1.17	2.33	1.06	1.12	1.06	1.14	16.03
12	0.78	0.83	0.83	0.94	0.89	0.88	0.94	0.99	1.10	1.04	1.06	2.33	1.02	1.01	1.15	15.80
13	0.75	0.79	0.78	0.87	0.86	0.86	0.93	0.96	0.98	1.03	1.12	1.02	2.33	1.26	1.13	15.66
14	0.74	0.78	0.78	0.86	0.84	0.85	0.91	0.94	0.96	0.99	1.06	1.01	1.26	2.33	1.11	15.44
15	0.76	0.81	0.81	0.90	0.87	0.87	0.94	0.98	1.04	1.06	1.14	1.15	1.13	1.11	2.33	15.91

Lot	Obs	T	S	Q	t	r	U	WU	DD
1	1	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
1	2	23974	0.00033	17.5	3650	760	4.06E-06	1.18E+01	0.99
1	3	23974	0.00033	17.5	3650	763	4.09E-06	1.18E+01	0.99
1	4	23974	0.00033	17.5	3650	1876	2.48E-05	1.00E+01	0.84
1	5	23974	0.00033	17.5	3650	2498	4.39E-05	9.46E+00	0.79
1	6	23974	0.00033	17.5	3650	2911	5.96E-05	9.15E+00	0.77
1	7	23974	0.00033	17.5	3650	2919	5.99E-05	9.15E+00	0.77
1	8	23974	0.00033	17.5	3650	2790	5.47E-05	9.24E+00	0.77
1	9	23974	0.00033	17.5	3650	2526	4.49E-05	9.43E+00	0.79
1	10	23974	0.00033	17.5	3650	2902	5.92E-05	9.16E+00	0.77
1	11	23974	0.00033	17.5	3650	3037	6.49E-05	9.07E+00	0.76
1	12	23974	0.00033	17.5	3650	2632	4.87E-05	9.35E+00	0.78
1	13	23974	0.00033	17.5	3650	3263	7.49E-05	8.92E+00	0.75
1	14	23974	0.00033	17.5	3650	3303	7.67E-05	8.90E+00	0.74
1	15	23974	0.00033	17.5	3650	2933	6.05E-05	9.14E+00	0.76
2	1	23974	0.00033	17.5	3650	760	4.06E-06	1.18E+01	0.99
2	2	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
2	3	23974	0.00033	17.5	3650	669	3.15E-06	1.21E+01	1.01
2	4	23974	0.00033	17.5	3650	1126	8.91E-06	1.11E+01	0.92
2	5	23974	0.00033	17.5	3650	1748	2.15E-05	1.02E+01	0.85
2	6	23974	0.00033	17.5	3650	2158	3.27E-05	9.75E+00	0.82
2	7	23974	0.00033	17.5	3650	2162	3.29E-05	9.75E+00	0.82
2	8	23974	0.00033	17.5	3650	2041	2.93E-05	9.86E+00	0.82
2	9	23974	0.00033	17.5	3650	1809	2.30E-05	1.01E+01	0.85
2	10	23974	0.00033	17.5	3650	2174	3.32E-05	9.74E+00	0.81
2	11	23974	0.00033	17.5	3650	2329	3.81E-05	9.60E+00	0.80
2	12	23974	0.00033	17.5	3650	1965	2.71E-05	9.94E+00	0.83
2	13	23974	0.00033	17.5	3650	2583	4.69E-05	9.39E+00	0.79
2	14	23974	0.00033	17.5	3650	2640	4.90E-05	9.35E+00	0.78
2	15	23974	0.00033	17.5	3650	2261	3.59E-05	9.66E+00	0.81
3	1	23974	0.00033	17.5	3650	763	4.09E-06	1.18E+01	0.99
3	2	23974	0.00033	17.5	3650	669	3.15E-06	1.21E+01	1.01
3	3	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
3	4	23974	0.00033	17.5	3650	1444	1.47E-05	1.06E+01	0.88
3	5	23974	0.00033	17.5	3650	2213	3.44E-05	9.70E+00	0.81
3	6	23974	0.00033	17.5	3650	2598	4.74E-05	9.38E+00	0.78
3	7	23974	0.00033	17.5	3650	2472	4.30E-05	9.48E+00	0.79
3	8	23974	0.00033	17.5	3650	2299	3.71E-05	9.62E+00	0.81
3	9	23974	0.00033	17.5	3650	1961	2.70E-05	9.94E+00	0.83
3	10	23974	0.00033	17.5	3650	2346	3.87E-05	9.58E+00	0.80
3	11	23974	0.00033	17.5	3650	2439	4.18E-05	9.50E+00	0.80
3	12	23974	0.00033	17.5	3650	1990	2.78E-05	9.91E+00	0.83
3	13	23974	0.00033	17.5	3650	2620	4.83E-05	9.36E+00	0.78
3	14	23974	0.00033	17.5	3650	2640	4.90E-05	9.35E+00	0.78
3	15	23974	0.00033	17.5	3650	2287	3.68E-05	9.63E+00	0.81
4	1	23974	0.00033	17.5	3650	1876	2.48E-05	1.00E+01	0.84
4	2	23974	0.00033	17.5	3650	1126	8.91E-06	1.11E+01	0.92
4	3	23974	0.00033	17.5	3650	1444	1.47E-05	1.06E+01	0.88
4	4	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
4	5	23974	0.00033	17.5	3650	827	4.80E-06	1.17E+01	0.98
4	6	23974	0.00033	17.5	3650	1171	9.64E-06	1.10E+01	0.92
4	7	23974	0.00033	17.5	3650	1048	7.72E-06	1.12E+01	0.94
4	8	23974	0.00033	17.5	3650	915	5.89E-06	1.15E+01	0.96
4	9	23974	0.00033	17.5	3650	737	3.82E-06	1.19E+01	1.00
4	10	23974	0.00033	17.5	3650	1069	8.03E-06	1.12E+01	0.93
4	11	23974	0.00033	17.5	3650	1256	1.11E-05	1.08E+01	0.91
4	12	23974	0.00033	17.5	3650	1011	7.19E-06	1.13E+01	0.94
4	13	23974	0.00033	17.5	3650	1557	1.70E-05	1.04E+01	0.87
4	14	23974	0.00033	17.5	3650	1645	1.90E-05	1.03E+01	0.86
4	15	23974	0.00033	17.5	3650	1268	1.13E-05	1.08E+01	0.90
5	1	23974	0.00033	17.5	3650	2498	4.39E-05	9.46E+00	0.79
5	2	23974	0.00033	17.5	3650	1748	2.15E-05	1.02E+01	0.85
5	3	23974	0.00033	17.5	3650	2213	3.44E-05	9.70E+00	0.81
5	4	23974	0.00033	17.5	3650	827	4.80E-06	1.17E+01	0.98
5	5	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
5	6	23974	0.00033	17.5	3650	415	1.21E-06	1.30E+01	1.09
5	7	23974	0.00033	17.5	3650	700	3.45E-06	1.20E+01	1.00
5	8	23974	0.00033	17.5	3650	791	4.40E-06	1.18E+01	0.98
5	9	23974	0.00033	17.5	3650	1029	7.44E-06	1.12E+01	0.94
5	10	23974	0.00033	17.5	3650	1098	8.48E-06	1.11E+01	0.93
5	11	23974	0.00033	17.5	3650	1351	1.28E-05	1.07E+01	0.89
5	12	23974	0.00033	17.5	3650	1413	1.40E-05	1.06E+01	0.89
5	13	23974	0.00033	17.5	3650	1703	2.04E-05	1.02E+01	0.86
5	14	23974	0.00033	17.5	3650	1836	2.37E-05	1.01E+01	0.84
5	15	23974	0.00033	17.5	3650	1539	1.67E-05	1.04E+01	0.87
6	1	23974	0.00033	17.5	3650	2911	5.96E-05	9.15E+00	0.77
6	2	23974	0.00033	17.5	3650	2158	3.27E-05	9.75E+00	0.82
6	3	23974	0.00033	17.5	3650	2598	4.74E-05	9.38E+00	0.78

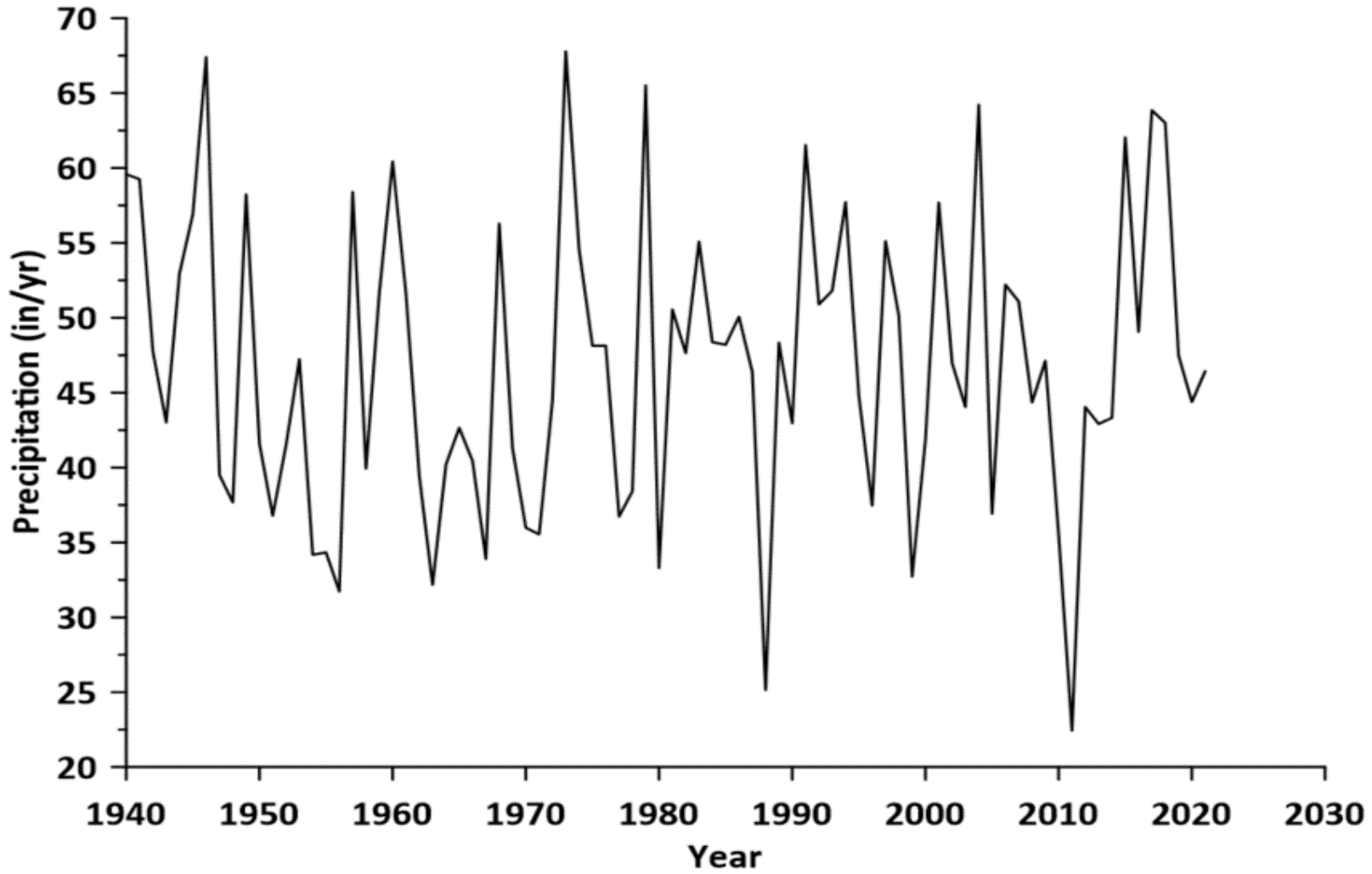
0.25 Pumping Well Radius Assumption

6	4	23974	0.00033	17.5	3650	1171	9.64E-06	1.10E+01	0.92
6	5	23974	0.00033	17.5	3650	415	1.21E-06	1.30E+01	1.09
6	6	23974	0.00033	17.5	3650	0.25	4.39E-13	2.79E+01	2.33
6	7	23974	0.00033	17.5	3650	555	2.17E-06	1.25E+01	1.04
6	8	23974	0.00033	17.5	3650	756	4.02E-06	1.18E+01	0.99
6	9	23974	0.00033	17.5	3650	1132	9.01E-06	1.10E+01	0.92
6	10	23974	0.00033	17.5	3650	1054	7.82E-06	1.12E+01	0.94
6	11	23974	0.00033	17.5	3650	1295	1.18E-05	1.08E+01	0.90
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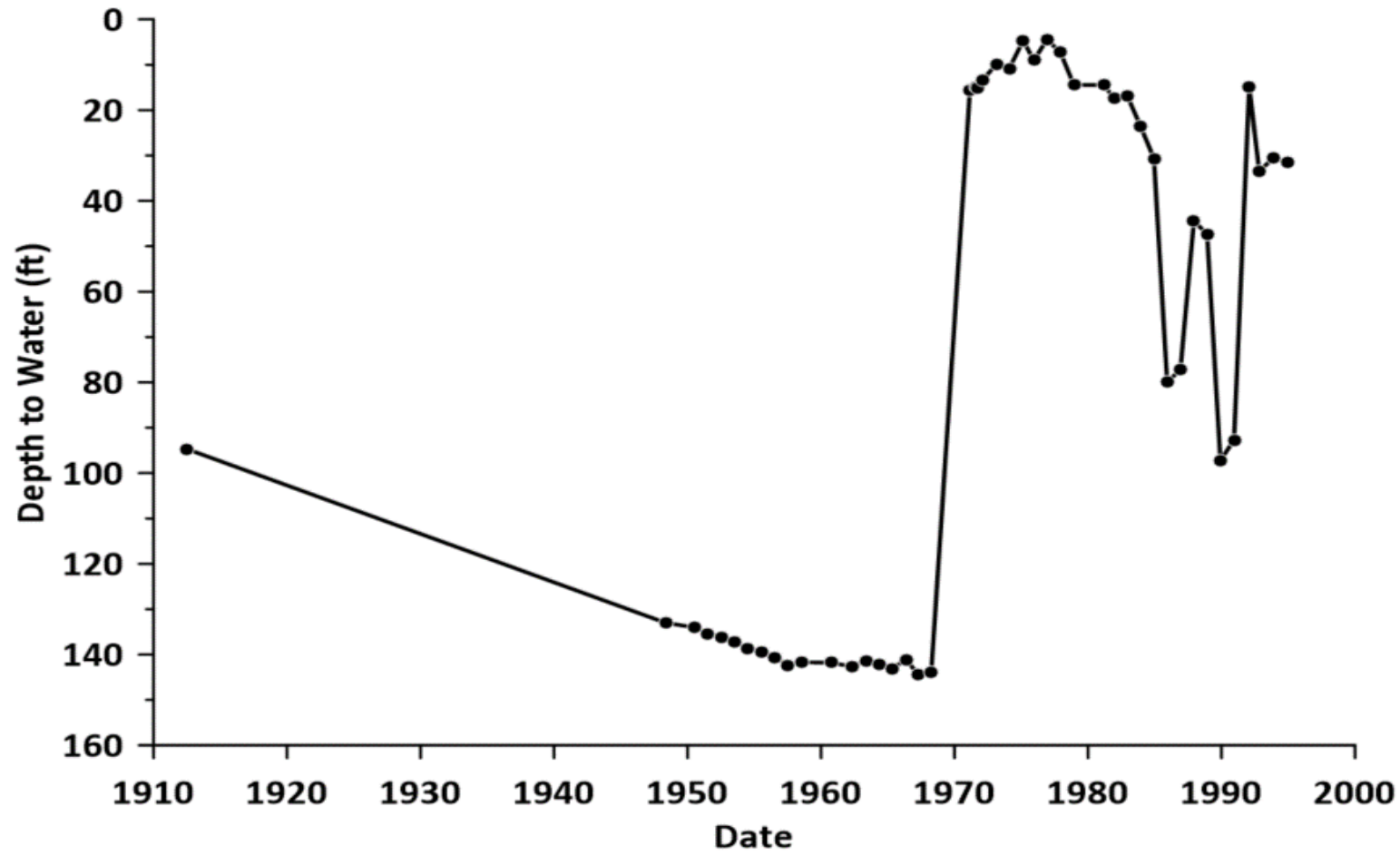
Lot	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	760	763	1,876	2,498	2,911	2,919	2,790	2,526	2,902	3,037	2,632	3,263	3,303	2,933
2	760	0	669	1,126	1,748	2,158	2,162	2,041	1,809	2,174	2,329	1,965	2,583	2,640	2,261
3	763	669	0	1,444	2,213	2,598	2,472	2,299	1,961	2,346	2,439	1,990	2,620	2,640	2,287
4	1,876	1,126	1,444	0	827	1,171	1,048	915	737	1,069	1,256	1,011	1,557	1,645	1,268
5	2,498	1,748	2,213	827	0	415	700	791	1,029	1,098	1,351	1,413	1,703	1,836	1,539
6	2,911	2,158	2,598	1,171	415	0	555	756	1,132	1,054	1,295	1,500	1,630	1,775	1,547
7	2,919	2,162	2,472	1,048	700	555	0	243	680	507	740	1,002	1,075	1,220	1,005
8	2,790	2,041	2,299	915	791	756	243	0	439	311	563	762	913	1,051	791
9	2,526	1,809	1,961	737	1,029	1,132	680	439	0	385	524	385	822	919	558
10	2,902	2,174	2,346	1,069	1,098	1,054	507	311	385	0	253	551	604	740	499
11	3,037	2,329	2,439	1,256	1,351	1,295	740	563	524	253	0	497	351	487	313
12	2,632	1,965	1,990	1,011	1,413	1,500	1,002	762	385	551	497	0	633	675	300
13	3,263	2,583	2,620	1,557	1,703	1,630	1,075	913	822	604	351	633	0	149	333
14	3,303	2,640	2,640	1,645	1,836	1,775	1,220	1,051	919	740	487	675	149	0	382
15	2,933	2,261	2,287	1,268	1,539	1,547	1,005	791	558	499	313	300	333	382	0

Mimumun 149
Average 1,385
Maximum 3,303

Quad 712 Annual Precipitation

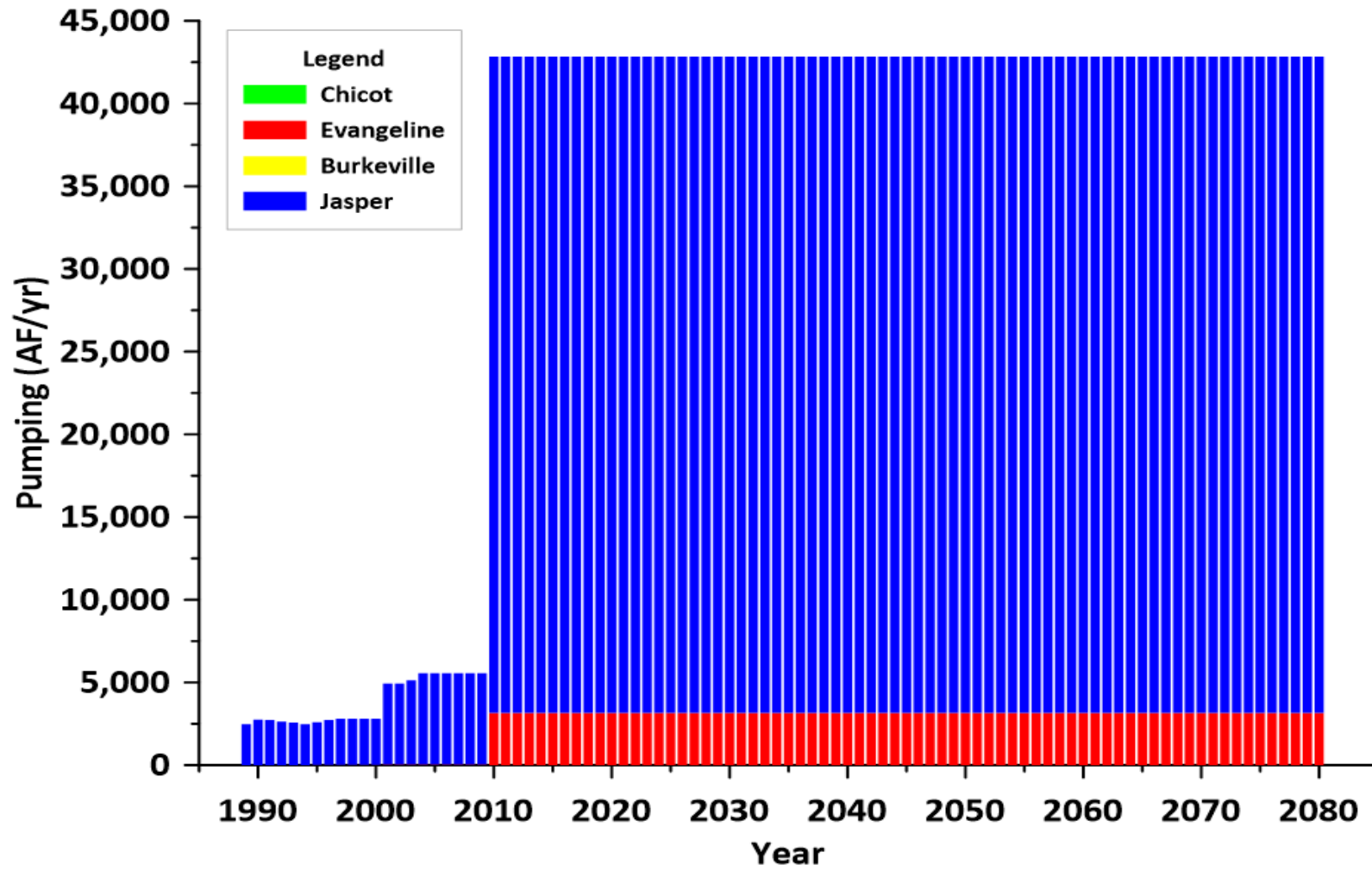


Well 60-29-403
Located 1.83 miles from Subdivision



State Well Number	Aquifer	AquiferCode	ObsCode	Well Depth	Latitude DD	Longitude DD	GAMx	GAMy	Dist to Witheth	Status Code	Date	Month	Day	Year	Plotting Date	Water Level	Change	Water Elevation	Meas Number	Measuring Agency	Method Of Measure ment	Remark ID	Remark
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	1912	0	0	1912	1912.5	94.7		283.3	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/10/1948	5	10	1948	1948.36	133	38.3	247	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/5/1950	7	5	1950	1950.51	134.01	1.01	245.99	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/10/1951	7	10	1951	1951.52	135.44	1.43	244.56	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/7/1952	7	7	1952	1952.51	136.19	0.75	243.81	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/7/1953	7	7	1953	1953.51	137.17	0.98	242.83	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/15/1954	7	15	1954	1954.53	138.63	1.46	241.37	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/5/1955	7	5	1955	1955.51	139.42	0.79	240.58	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/10/1956	7	10	1956	1956.52	140.83	1.21	239.37	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/15/1957	7	15	1957	1957.53	142.37	1.74	237.63	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	7/8/1958	7	8	1958	1958.52	141.69	-0.68	238.31	1	Other or Source of Measurement Unknown	Unknown	1	Accurately reflect water-level conditions
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	10/11/1960	10	11	1960	1960.77	141.79	0.1	238.21	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/7/1962	5	7	1962	1962.35	142.67	0.88	237.33	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/6/1963	5	6	1963	1963.35	141.35	-1.32	238.65	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/4/1964	5	4	1964	1964.34	142.1	0.75	237.9	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/5/1965	5	5	1965	1965.34	143.07	0.97	236.93	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	5/10/1966	5	10	1966	1966.36	141.06	-2.01	236.94	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	4/24/1967	4	24	1967	1967.31	144.5	3.44	235.5	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	4/3/1968	4	3	1968	1968.25	143.89	-0.61	236.11	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	X	4/18/1969	4	18	1969	1969.30				1	Texas Water Development Board	Steel Tape	30	Well site temporarily inaccessible due to impassable roads, locked gate, etc.
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	X	5/7/1970	5	7	1970	1970.35				1	Texas Water Development Board	Steel Tape	30	Well site temporarily inaccessible due to impassable roads, locked gate, etc.
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	2/26/1971	2	26	1971	1971.15	15.58		364.42	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	8/23/1971	8	23	1971	1971.64	14.95	-0.63	365.05	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	9/20/1971	9	20	1971	1971.71	15.2	0.25	364.8	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	2/15/1972	2	15	1972	1972.12	13.27	-1.93	366.73	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	2/21/1973	2	21	1973	1973.14	9.84	-3.43	370.16	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	2/7/1974	2	7	1974	1974.10	10.78	0.94	369.22	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	2/21/1975	2	21	1975	1975.14	4.67	-6.11	375.33	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/11/1975	12	11	1975	1975.93	8.98	4.31	371.02	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/9/1976	12	9	1976	1976.93	4.42	-4.56	375.58	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/5/1977	12	5	1977	1977.92	7.21	2.79	372.79	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/12/1978	12	12	1978	1978.94	14.42	7.21	365.58	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	3/11/1981	3	11	1981	1981.19	14.46	0.04	365.54	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/16/1981	12	16	1981	1981.95	17.43	2.97	362.57	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/15/1982	12	15	1982	1982.95	16.89	-0.54	363.11	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/14/1983	12	14	1983	1983.94	23.63	6.74	356.37	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/11/1984	12	11	1984	1984.93	30.65	7.02	349.35	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/9/1985	12	9	1985	1985.93	79.9	49.25	300.1	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/6/1986	12	6	1986	1986.92	77.21	-2.69	302.79	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/10/1987	12	10	1987	1987.93	44.45	-32.76	335.55	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/6/1988	12	6	1988	1988.92	47.3	2.85	332.7	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/4/1989	12	4	1989	1989.92	97.2	49.9	282.8	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/11/1990	12	11	1990	1990.93	92.7	-4.5	287.3	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	1/28/1992	1	28	1992	1992.08	14.65	-77.85	365.15	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	10/29/1992	10	29	1992	1992.92	33.4	18.55	346.6	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/2/1993	12	2	1993	1993.91	30.5	-2.9	349.5	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	P	12/5/1994	12	5	1994	1994.92	31.5	1	348.5	1	Texas Water Development Board	Steel Tape		
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	X	11/14/1995	11	14	1995	1995.86				1	Texas Water Development Board	Steel Tape	29	Unable to locate well
6029403	Gulf Coast	122JSPRU	H	425	30.56167	-95.47417	6342483.596	19463162.37	9688.57	X	11/12/1996	11	12	1996	1996.85				1	Texas Water Development Board	Steel Tape	29	Unable to locate well

Walker County Simulated Pumping



Bluebonnet Groundwater Conservation District

Guidelines for Submitting Data and Information and the Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use Of Groundwater

April 14, 2023

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1.0 Introduction

1.1 Summary of Rule 8.5(F)

Rule 8.5(F) of the Bluebonnet Groundwater Conservation District (BGCD) outlines the requirements of data, information and hydrogeologic reports required for Non-Exempt wells with inside casing diameter of eight inches or greater.

Rule 8.5(F)(2) lists data requirements that are expected to be submitted as part of the application:

- Well coordinates.
- Well construction diagram.
- A map showing the location of the proposed well, all existing wells, hydrologic features, and geologic features located within ½ mile of the proposed well site.
- Proposed production of the well or wells.
- Proposed production rate for the well or wells.

The reporting requirements are split into Phase I reports and a Phase II report. In general, the Phase I report is intended to be a preliminary report that relies on existing regional information. The Phase I report is intended to evaluate the impacts of pumping using existing data and the existing regional groundwater flow model of the area for the aquifer in which the well is to be completed. The Phase II report is intended to be a final report that relies on site specific data, information, test results and analyses.

The required data and information associated with Rule 8.5(F)(2) and the information on the permit application forms will be used by the BGCD to prepare a Phase I hydrogeologic report using existing regional data and information. Applicants have the option to submit a Phase I report that meets all the requirements of this guideline document. Phase II reports are to be prepared by the applicant as detailed below.

As described in Rule 8.5(F)(4), Phase I-a reports will be completed if the annual proposed production rate is equal to or less than 200 million gallons. Phase I-b reports will be completed if the proposed production rate is greater than 200 million gallons. The scope of Phase II reports are independent of proposed production rate.

As described in Rule 8.5(F)(6), hydrogeologic reports, whether completed by BGCD or submitted by the applicant, must meet the standards set forth in these guidelines and must be sealed by a Professional Geoscientist (P.G.) or Professional Engineer (P.E.) licensed to practice in the State of Texas.

1.2 Objective

This guideline document is intended to set standards and expectations for the investigations and reports. The planning and implementation of investigations should be coordinated with BGCD to insure acceptability. BGCD may exercise discretion in the application of the guidelines on an individual and site-specific basis in order to allow a practicable application of the guidelines while ensuring a result yielding the information needed by BGCD to process the permit application. The exercise of this discretion by BGCD shall not be construed as limiting the authority of BGCD in any other matter. BGCD should be notified at least 24 hours in advance of the anticipated conduct of any test-hole drilling, well construction, or pumping test conducted as part of the hydrogeologic investigation performed to meet the requirements of these guidelines.

2.0 Phase I Reports

The Phase I report is intended to evaluate the impacts of pumping using existing data and the existing regional groundwater flow model of the area for the aquifer in which the well is to be completed. Phase I-a reports will be completed if proposed annual production is equal to or less than 200 million gallons. Phase I-b reports will be completed if proposed annual production is greater than 200 million gallons.

2.1 Phase I-a Report

As documented in Hutchison (2023), since this guideline document was updated in 2014, permit applications with “relatively low” proposed production rates yielded drawdown and subsidence results from HAGM simulations that were not considered significant.

The Phase I-a report uses the information provided by the applicant, the data the Excel spreadsheet *BGCD Parameters.xlsx* (Hutchison, 2023), and calculations of drawdown using the Theis equation (Hutchison, 2023) to estimate potential impacts of the proposed pumping. No HAGM simulation is required as part of a Phase I-a report.

The Phase I-a report consists of five required elements in the form of tables as documented in Hutchison (2023):

- Grid parameters
- HAGM parameters
- HAGM results
- Theis parameters
- Theis results

This report will be prepared by the District within 30 days of submission of a completed application with all the required elements from Rule 8.5(F)(2). The Phase I-a report is part of an administratively complete permit application.

2.2 Phase I-b Report

The Phase I-b report (required for proposed annual production greater than 200 million gallons) will include the five tables required for the Phase I-a report plus a HAGM simulation. The report shall include the results of a simulation using the Groundwater Availability Model for the area that adds the proposed well to the then most recent model run that was used to establish the desired future condition.

Results of the simulation must include:

- A drawdown hydrograph of the cell or cells in which pumping is proposed, including a comparison with the desired future condition drawdown of the subject cell or cells.
- A time series graph that compares maximum subsidence under the DFC condition and the maximum subsidence with the additional proposed pumping in the immediate area of the pumping.
- Tables of drawdown and subsidence at the locations of existing registered and permitted wells contained in the BGCD database.
- A county-aquifer level groundwater budget that includes a comparison of the HAGM simulation with the proposed well and the groundwater water budget of the desired future condition simulation.

The water budget requirement must use net flow values and separately identify net lateral flows to neighboring counties. A summary table of the groundwater budgets should be organized

substantially similar to the example presented below:

	DFC Run (2010 to 2080)	QV Sunterra Run (2010 to 2080)	Difference (AF/yr)	Difference (% of Pumping Increase)
Inflow				
Recharge and Net Surface Water Inflow (GHB Boundary)	41,382	41,757	374	12.2
Interbed Storage	2,956	3,089	133	4.3
From Austin County	6,232	6,304	71	2.3
From Grimes County	1,816	1,816	1	0.0
From Washington County	1,243	1,243	0	0.0
Total Inflow	53,629	54,209		
Outflow				
Pumping	55,495	58,564	3,070	100.0
To Fort Bend County	10,422	10,014	-408	13.3
To Harris County	4,157	2,644	-1,513	49.3
To Montgomery County	5,922	5,922	1	0.0
Total Outflow	75,996	77,145		
Inflow - Outflow	-22,367	-22,937		
Model Calculated Storage Change	-22,366	-22,936	-570	18.6
Model Error	-1	-1		

A discussion of the results of the simulations is required and should focus on recommendations regarding the design of a drilling and testing program that would be completed as part of the Phase II report.

This report will be prepared by the District within 30 days of submission of a completed application with all the required elements from Rule 8.5(F)(2) and the completed HAGM simulation. The Phase I-b report is part of an administratively complete permit application.

2.3 Option for Applicant Submittal of Phase I Reports

An applicant has the option to submit a Phase I-a or Phase I-b report (depending on the proposed annual production rate) with the permit application. The submitted report must meet all requirements of these guidelines and Rule 8.5(F). BGCD review of a submitted Phase I-a or Phase I-b report will be completed within 30 days of submittal.

3.0 Phase II Report

Phase II reports are to be completed after an approved program of drilling and aquifer testing have been completed. The data obtained from the drilling and aquifer testing shall be used in the analyses of the Phase II report. The Phase II report shall be submitted to BGCD in accordance with Rule 8.5(F)(8). As provided in Rule 8.5(F)(9), the information in the Phase II report can be used as a basis for modifying the permitted production rate or result in special conditions on the permit.

3.1 Completed Well Construction Diagram

A diagram of the as-built completion details of all production and monitoring wells must be included that shows, at a minimum, well depths, borehole and casing diameters, depth interval of well screens, and gravel pack design. The State of Texas Water Well Report (Drillers Log) shall

also be included but should not be used as a substitute for the more detailed requirements listed above.

3.2 Results of Borehole Drilling and Well Construction

The following data and analyses must be included in the report:

- Geologist logs of all boreholes
- Geophysical logs of all boreholes
- Estimates of clay thickness and clay percentage for each borehole calculated based on model layer intervals for comparison to regional data.

3.3 Results of Aquifer Tests

In general, the aquifer tests shall consist of a pre-test phase where the static water levels of the test and monitor wells are measured on a regular basis for 24 hours prior to the test, a constant pumping phase of not less than 24 hours and a recovery phase of a period sufficient for a 90% recovery of beginning water levels the test and monitor well locations or at least a 24-hour period, unless an alternative procedure is found acceptable by BGCD. Existing private wells within ½ mile of the test location or otherwise acceptable to BGCD may be used as monitor wells for the pumping test.

The following data and analyses must be included in this report:

- A map giving the location and elevation above mean sea level (NGVD 1929 or NAVD 1988) of the test well, any existing or newly constructed monitor wells and all surrounding wells that exist within a ½ mile radius of the test well. The map shall include streets, roads and the bounds of land tracts sufficient to determine the location of the test well within the tract of land on which it is located. The map shall also include recharge features, geologic features, other water system features (e.g. storage tanks, existing wells), and potential sources of contamination.
- Narrative describing the aquifer test (dates and times run, pumping rate, wells monitored during test, method of data collection, etc.).
- A discussion of the conduct of the test giving details of the significant events of the test, any equipment failures and any contingency measures that may have been employed.
- Analyses of the test results, including the method(s) of analysis, the calculated aquifer parameters should include the transmissivity, hydraulic conductivity and storage coefficient (storativity) values.
- A table giving the water-level drawdown and recovery data from the test and monitor wells, and figures giving the water level recovery curves from which the aquifer parameters were calculated.
- A discussion of the conclusions drawn from the analytical results of the calculation of the aquifer parameters at the test location including and the effects of any boundary conditions identified during the test.
- A discussion comparing the parameters calculated from the analyses of the test to HAGM data from the Phase I report.

In addition, electronic versions of all test data shall be submitted to BGCD as part of the report.

3.4 Water Quality

The report shall include:

- A table of specific conductance, temperature, and pH measurements taken at regular intervals during the aquifer test giving the measured value and time of the measurement.
- Laboratory analysis of a water sample taken at the end of the pumping phase of the aquifer test.
- A discussion of the water quality analysis stating whether the sample was of a quality to meet Texas Commission on Environmental Quality Primary Drinking Water Standards.
- A discussion of expected changes in water quality that may be anticipated from future pumping either at the proposed well or any existing registered or permitted well within 1 mile of the proposed well.

3.5 Updated Simulation of Pumping

The objective of the updated simulations of the proposed pumping is to update the Phase I analytical calculation of drawdown with the local scale information developed from the drilling and testing program. Depending on the results of the aquifer test analyses, this updated simulation may be run using analytical methods or numerical methods. The scope and time frame of the analysis should be the same as the time frame of the simulation completed in Phase I to discuss and analyze a comparison of the results.

The report shall include the results of a simulation using a local scale analytical or numerical model, and the results compared to the results from the Phase I analytical results. This section of the Phase II report must include:

- A discussion of the specific method used, and the associated assumptions associated with the method.
- A drawdown hydrograph at the location of the pumping well(s) and any monitoring wells used during the test.
- Comparison of the results with the Phase I analytical results.
- Tables of updated drawdown and subsidence at the locations of existing registered and permitted wells contained in the BGCD database.

4.0 References

Hutchison, W.R., 2023. Documentation Associated with Updated Guidelines for Preparation of Hydrogeologic Reports in Support of Applications for the Permitted Use of Groundwater. Report prepared for Zach Holland, General Manager of the Bluebonnet Groundwater Conservation District. April 14, 2023, final.