



DESCRIPTION OF APPLICATION

Applicant: Needmore Water, LLC

Application Type: Regular Production Permit in the Middle Trinity Management Zone (Part II)

Request: Temporary Permit Conversion to a Regular Production Permit. Applicant requests approval of a Historical Middle Trinity Production Permit to withdraw 289,080,000 gallons/year for agricultural and general irrigation.

HOUSE BILL 3405

The Barton Springs/Edwards Aquifer Conservation District’s (District) territory was expanded on June 19, 2015 through the passage of H.B. 3405 (the Act). The Act requires all nonexempt, non-Edwards wells to be permitted and provides a three-month period to apply for a Temporary Permit, which expired on September 19, 2015. The Temporary Permits provide well owners with an interim authorization to operate a well, and for groundwater production not to exceed the well’s “maximum production capacity” as defined by the Act prior to conversion to a Regular Historical Production Permit. In accordance with Section 4(e) of the Act, the District is required to evaluate the proposed production prior to conversion to Regular Permits to determine if the amount authorized will cause:

1. A failure to achieve the applicable adopted desired future conditions for the aquifer; or
2. An unreasonable impact on existing wells.

The District has processed Part I and Part II of the application and conducted a best science evaluation of the Needmore Water, LLC permit request in accordance with the applicable District policies, the District Rules adopted July 16, 2015, and the District’s interpretation of the provisions of the Act.

PERMIT APPLICATION SUMMARY

Temporary Production Permit (Part I)

Needmore Water, LLC (Needmore) filed Part I of a two-part application with the District to provide an interim authorization under a Temporary Production Permit to continue operating the well for the existing use types prior to conversion to a Regular Historical Production Permit.

The application was signed, notarized, and timely filed on September 18, 2015 with supporting materials. Staff confirmed that the applicant met the eligibility requirements and issued the Temporary Permit on October 19, 2015 for approximately 180,000,000 gallons/year. This volume was interpreted by the General Manager (GM) as the maximum production capacity of the well based on the limited information submitted with the application, and best professional judgement. The Temporary Production Permit was approved with a special provision prohibiting operation of the damaged well until the Permittee demonstrated that the well was repaired and in good, non-deteriorated condition, and therefore, no longer abandoned in accordance with the applicable District rules and standards.

Regular Production Permit (Part II)

Needmore filed Part II of the two-part application for conversion to a Regular Historical Production Permit and requested authorization for maximum production capacity of a higher volume equivalent to 289,080,000 gallons/year (approximately 887 acre-feet/year; 550 gallons per minute) from the Middle Trinity Aquifer for continued operation to support Agricultural Use. The applicant addressed the damage in the well to the District's satisfaction and was able to successfully complete an aquifer test and submit a hydrogeological report as part of the Regular Permit application requirements. The maximum production capacity volume of the well (Well D) was confirmed by the District to be 289,080,000 gallons/year on the basis of the supporting aquifer test and analysis of the aquifer test data. All required information has been received by staff, therefore, the application is declared administratively complete.

APPLICATION REVIEW OF THE REGULAR PRODUCTION PERMIT

1. Timely Filing of a Temporary Application Form (District Rule 3-1.55.1 (A))

Staff confirmed that the applicant timely filed the signed and notarized application form and supporting materials on September 18, 2015.

2. Confirm Eligibility for a Temporary Permit/ Regular Production Permit (District Rule 3-1.55.1 (A))

Staff confirmed that the applicant meets the eligibility requirements because the applicant stated and documented that the existing nonexempt well was being operated on or before June 19, 2015. A Temporary Production Permit was issued on October 19, 2015 (Attachment A).

3. Verification of Ownership (District Rule 3-1.55.1 (E))

Staff confirmed through the Hays County Appraisal District that the 5,000 acre ranch ownership is listed in the owner name of Needmore Ranch. The Temporary Permit application was filed in the name of Needmore. The applicant provided supporting documentation to show the ownership interest between the differing entities. A special warranty deed was provided demonstrating property ownership in the name of Needmore Ranch. Additionally, a 2013 recorded groundwater rights warranty deed was provided demonstrating that Needmore holds ownership of all groundwater rights from the 5,000 acre property.

4. Verification of Complete Application Checklist Requirements (District Rule 3-1.55.2)

Staff reviewed the application materials to verify that all application checklist requirements for a regular production permit were adequately satisfied in accordance with District Rule 3-1.55.2. The application must address the following items in detail and it was determined that all items were satisfied.

A. Nature of Use and Verification of Beneficial Use Type

Through extensive review, District staff evaluated the use type of the well and concluded that the well is used for wildlife management purposes and to supplement a ponded water feature for recreation (swimming, fishing, and boating). Although the well is not used to support livestock other than buffalo and llamas on the Needmore Ranch, the definition of “Agricultural Use” under District Rule 2.1 includes “wildlife management.” District Rule 2.1 defines wildlife management to include “the watering and/or feeding of free-ranging, non-caged, wild animals under a management plan approved by TPWD, US Fish and Wildlife Service, or other governmental agency with authority to approve and regulate a wildlife management plan.” The District has confirmed the existence of an approved plan and has received a copy, therefore, the use type is confirmed to qualify as “Agricultural Use.”

B. Requested Volume and Maximum Production Capacity

To support the application request, the applicant completed an aquifer test on Well D to estimate the well’s maximum production capacity and to assess whether the production will cause impacts to the aquifer and existing wells pursuant to H.B. 3405. The aquifer test documented an average rate of 550 gpm over a five-day pumping duration.

The District initially issued a Temporary Production Permit of 179,965,440 gallons/year based on data from a limited aquifer test. The District also determined that the production capacity of the well should factor in practical operational limitations such as pumping duration and recovery. However, upon further research, staff was unable to find documentation in technical literature or industry standards to support the argument that maximum production capacity of a well should be limited or based on recommended practices for pumping duration and recovery. Although these may be practical considerations that operationally limit the pumping capacity of the well over the long-term, the GM has determined that it is appropriate to determine that the maximum production capacity of the well is 289,080,000 gallons/year based on an actual District-approved aquifer test. This volume is the amount requested by the applicant and is derived from the maximum pumping capacity of the well (550 gpm) and an assumption of continuous annual pumping. This volume has never been used and logistically may never be used.

C. Declarations to Comply with District Rules

Staff verified that the declaration statements listed on the application form were initialed or signed by the applicant. Those statements are as listed:

1. A declaration that the applicant will comply with the District Rules and Bylaws, all orders, and permits promulgated pursuant to the District Rules.
2. A declaration acknowledging that the Temporary Permit conveys no vested rights or privileges other than those set forth in this Section.
3. A declaration that the applicant assumes the risk that the District may grant or deny, wholly or partly, the permit application when the District takes final action after notice and hearing to issue a regular Production Permit pursuant to the application.

D. Copy of Applicable Contracts

Staff verified that this application requirement is not applicable to this application.

E. Well Location and Pumping Rate

Staff verified the coordinates of the well location (Attachment B). Staff also verified the applicant's statement that the average pumping rate documented through a District-approved aquifer test was 550 gpm.

F. Receiving Area Location

The applicant has described the intended receiving areas to include:

- The constructed pond water feature used to support wildlife management and recreation activities, and
- Future pasture areas that have not yet been equipped for receiving irrigation.

5. Well Condition (District Rules 3-5 and 3-1.11)

During the review of the Temporary Permit application, the District staff learned that the well was in a deteriorated condition (Attachment C). In discussions with representatives from the well drilling company, it was confirmed through downhole video footage that the lower part of the well casing had parted and fallen to the bottom of the borehole where the casing fragments were partially blocking the well. It was unclear when the damage occurred. The District issued the Temporary Permit contingent on the well being repaired in accordance with the District's well construction standards.

The applicant addressed the damage in the well and recompleted the well casing and annular seal in January 2016. Evidence of the damaged well and the District's findings were submitted to the Texas Department of Licensing and Regulation as evidence of well construction violations committed by the licensed drillers to hold the drillers accountable as the parties responsible for the well damage and repairs. A well recompletion design (Attachment D) was approved by the District and the well has been repaired and is now in operational condition.

6. Transport of Groundwater (District Rule 3-1.3.1)

The ponded water feature supplied by Well D is located outside the boundaries of the District. The District has reviewed District Rule 3-1.3.1 and determined that transport of water from Well D within the District to the ponded water feature located outside of the District is exempt from District transport rules and therefore exempt from transport permit requirements and transport fees.

USER CONSERVATION PLAN (UCP)/USER DROUGHT CONTINGENCY PLAN (UDCP)

Needmore submitted a UCP and UDCP which contain the required elements in accordance with applicable District Rule 3-6.3 and is consistent with District guidelines.

AQUIFER TEST AND HYDROGEOLOGICAL REPORT

An aquifer test was conducted and a Hydrogeologic Report was prepared and submitted by Wet Rock Groundwater Services, LLC (WRGS, 2016) to support the Needmore application. The report generally satisfies the goals of the District’s Aquifer Test and Hydrogeologic Report Guidelines (dated 2007) by providing data necessary to evaluate: 1) aquifer properties, 2) impacts to wells, and 3) changes in water quality. The aquifer test was done according to District guidelines and the District was consulted and involved in all aspects of the test.

In accordance with Section 4(e) of the Act, the District is required to evaluate the proposed production prior to conversion to Regular Permits to determine if the amount authorized will cause:

1. A failure to achieve the applicable adopted desired future conditions for the aquifer, or
2. An unreasonable impact on existing wells.

Technical Memo 2016-1115 (Attachment E) contains a detailed description of this evaluation which was conducted by applying the best available science using the available aquifer test data, the submitted report, and available analytical tools. The determination of whether the proposed production “will cause” one of the above conditions requires a projection of the future effects on the aquifer using the best available science. Regarding factor 2 above, the District has developed policies and protocols to guide the application process and review, and the requisite evaluation of any proposed groundwater production in order to provide a systematic and consistent means assessing impacts to existing wells. The term “unreasonable impacts” is not defined in statute, therefore, the District has to rely on its interpretation which includes a suite of factors. To facilitate this evaluation, the District interprets “unreasonable impacts on existing wells” to include:

1. Well interference related to one or more water wells ceasing to yield water at the ground surface;
2. Well interference related to a significant decrease in well yields that results in one or more water wells being unable to obtain either an authorized, historic, or usable volume or rate from a reasonably efficient water well;

3. Well interference related to the lowering of water levels below an economically feasible pumping lift or reasonable pump intake level; and
4. The degradation of groundwater quality such that the water is unusable or requires the installation of a treatment system.

After considering the findings of the evaluation of the Aquifer Science Team (see Technical Memo for further detail), the GM has determined that the modeled projections of drawdown attributed to pumping from Well D at maximum production capacity indicate that some wells will cease to yield water at the ground surface or will experience the lowering of water levels below a reasonable pump intake level. Therefore, the GM has determined that the proposed groundwater production, under modeled conditions, will cause unreasonable impacts to existing wells.

Given this determination, the GM has developed this preliminary decision recommending the necessary special provisions relating to permit compliance thresholds and aquifer monitoring to avoid unreasonable impacts. The recommendations are provided in further detail below.

CONSIDERATIONS FOR ACTION ON REGULAR PRODUCTION PERMITS

The GM has reviewed the application and makes the following determinations:

1. The application satisfies all the requirements and the required documentation and payment of fees have been satisfied in accordance with District Rules 3-1.4.A and 3-1.55 and therefore, is administratively complete.
2. The applicant has complied with the terms of the Temporary Permit in accordance with District Rule 3-1.55.4.B.3.
3. The requested permitted pumpage volume would not exceed the Modeled Available Groundwater estimate for the Middle Trinity Aquifer and therefore, will not likely cause a failure to achieve the applicable desired future condition in accordance with District Rule 3-1.55.4.B.4.a.
4. The modeled projections of drawdown attributed to pumping from Well D at maximum production capacity indicate that some wells will cease to yield water at the ground surface or will experience the lowering of water levels below a reasonable pump intake. Therefore, the proposed groundwater production, under modeled conditions, will cause unreasonable impacts to existing wells.
5. Conversion of the Temporary Permit into a Regular Permit authorizing the applicant's requested total annual production maximum equivalent to the maximum production capacity of Needmore Well D with special provisions for reductions when necessary to avoid unreasonable impacts to existing wells, uses the best science available to the District and appropriately balances between the conservation and development of

groundwater while protecting private property rights as specified in 36.0015(b) of the Texas Water Code.

PRELIMINARY DECISION

Pursuant to the Act and District Rules, applicants with an administratively complete application shall be issued a Regular Production Permit for the amount of groundwater production set forth in the Temporary Production Permit unless the District finds that authorizing that amount will cause unreasonable impacts to existing wells. Section 4 of the Act further authorizes that the District may issue an Order approving a Regular Production Permit for a reduced amount if the District finds that authorizing the groundwater production in the amount set forth in the Temporary Production Permit “will cause” unreasonable impacts.

The District has conducted the evaluation and developed a projection of impacts based on the application of the best available science and analytical tools and aquifer testing data provided with the application. On the basis of this evaluation, the GM has determined that the proposed groundwater production, under modeled conditions, will cause unreasonable impacts to existing wells. The District, however, does recognize that there is inherent uncertainty in the evaluation of future projected impacts. Further, the requested permit volume represents the maximum possible production capacity and continuous annual production at the maximum pumping rate. The level of production has not been and may have never been used or feasibly achieved. As such, the District has applied a reasonable and logical approach that would require such reductions authorized by the Act to be temporary and limited to times when there is demonstrable evidence in the form of measured water levels exceeding prescribed thresholds as indices of imminent impacts.

Given these considerations and findings, the GM recommends conversion of the Temporary Permit into a Regular Permit to authorize the total maximum annual withdrawal of 289,080,000 gallons/year with special provisions¹(Attachment G) for temporary reductions when necessary to avoid unreasonable impacts to existing wells and permanent reductions only after opportunity for notice and hearing if unreasonable impacts cannot be avoided through temporary reductions (Attachment F).

ATTACHMENTS

Attachment A – Temporary Production Permit

Attachment B – Well Location Map

Attachment C – Well Deteriorated Condition Photos

Attachment D – Approved Recompletion Well Design

Attachment E – Technical Memo 2016-1115: Evaluation for Unreasonable Impacts, Needmore Water, LLC Well D Permit Application

Attachment F – House of Representatives Journal Entry 5/31/15

Attachment G – Proposed Special Provisions

¹ House Journal entry from May 31, 2015 (p. 5835) for H.B. 3405 states a clear legislative intent that all other provisions of Texas Water Code, Ch. 36 (including 36.113 providing the authority to impose certain permit conditions) be applied to wells in the Shared Territory. The District fully intends to apply similar conditions to all other permits found to cause unreasonable impacts.

Attachment A – Temporary Production Permit



Barton Springs/Edwards Aquifer Conservation District

512-282-8441 ~ 1124 Regal Row Austin, TX 78748 ~ www.bseacd.org

Temporary Production Permit Permit No: T015-10-2015

Owner: Needmore Water LLC (Greg LaMantia)
System: Needmore Water LLC (Greg LaMantia)
Mailing Address: 3900 N. McColl Rd
McAllen, TX 78501
Physical Well Address: Fulton Ranch Rd
Wimberley, TX 78676
Management Zone: Upper/Middle Trinity Management Zone
Aquifer: Upper/Middle Trinity Aquifer
Number of Wells: 1

Terms: This permit is effective for the period of time between June 19, 2015 and the date that the District makes a final, appealable action on the issuance of a Regular Production Permit in accordance with District Rule 3-1.55.2.C.

This permit expires on August 31st of each year and, unless a Regular Production permit has been issued, is automatically renewed on September 1st of each year, granted that the permittee:

1. Operates the well consistent with the authorization in the permit application;
2. Timely pays all fees; and
3. Complies with all District rules, orders, permit conditions, permit requirements and terms of this permit.

Failure to pay fees, report pumpage, or abide by Rules, Bylaws, or Special Provisions of issuance, will subject this Permit to revocation. Permittee is subject to the enforcement mechanisms available to the District for any violation of applicable District Rules or Bylaws.

Permitted Groundwater Withdrawal: Only that amount of water which is required without being wasteful during the term of this Permit, but not to exceed: 179,965,440 gallons/year

Special Provisions: The permitted groundwater withdrawal volume is not authorized for production until 1) the Permittee has provided adequate documentation that the well has been repaired in accordance with applicable well construction standards, 2) the well is in good, non-deteriorated condition in accordance with Permit Condition #15 of this Permit, and 3) the well complies with the applicable requirements of 16 TAC 76.1004 and with District Rule 3-5.

Issued By: 
John Dupnik, P.G., BSEACD General Manager

This Permit is hereby issued on: 10/19/2015

PERMIT CONDITIONS AND REQUIREMENTS

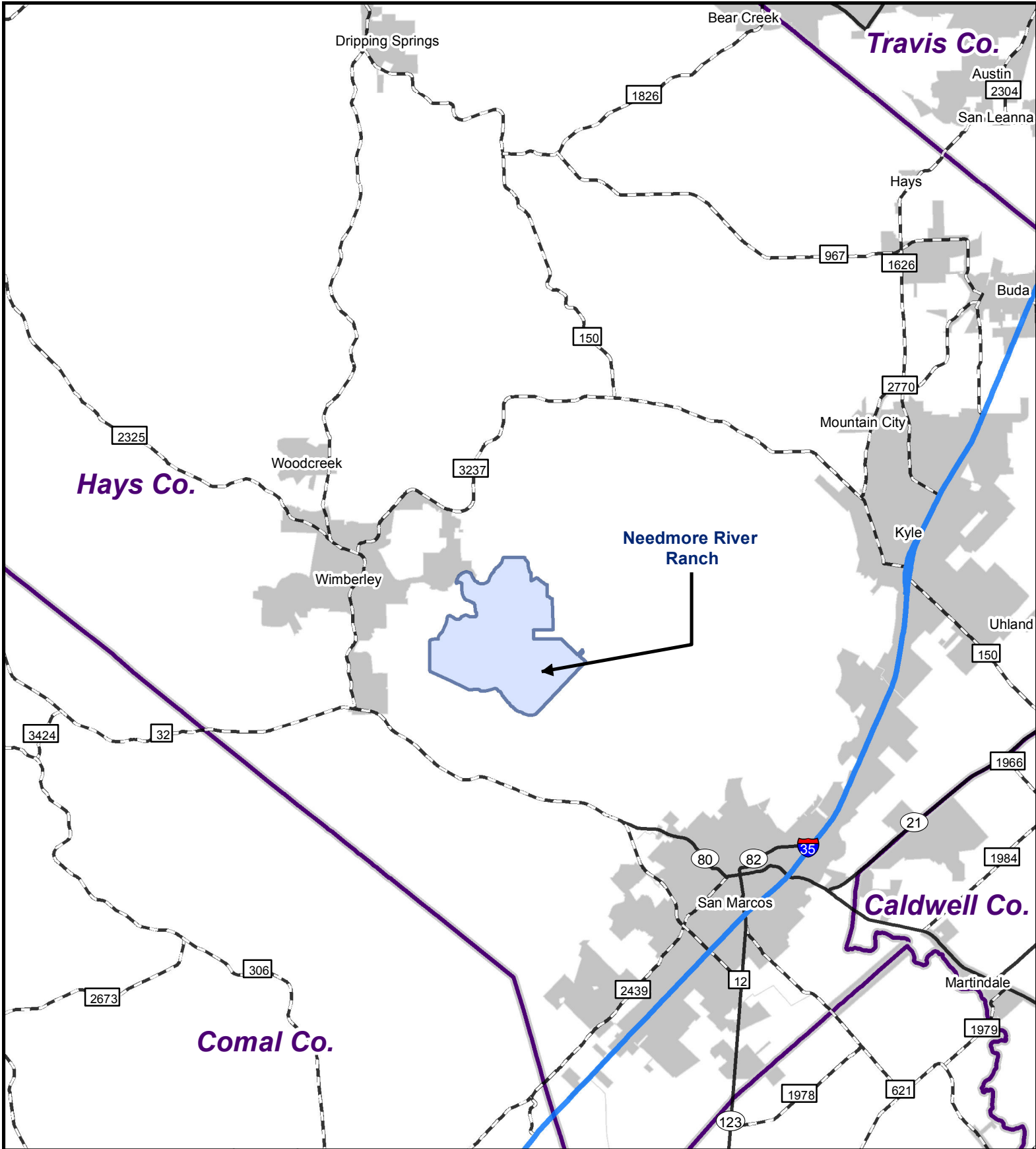
All permits are granted subject to the Rules, regulations, Orders, special provisions, and other requirements of the Board, and the laws of the State of Texas. In addition, each permit issued shall be subject to the following conditions and requirements:

1. The Temporary Production Permit is granted in accordance with the provisions of H.B. 3405 of the 84th Texas Legislature in conjunction with Chapter 36, Texas Water Code, and the Rules, regulations and Orders of the District and acceptance of the permit constitutes an acknowledgment and agreement that the permittee will comply with all the terms, provisions, conditions, requirements, limitations, and restrictions embodied in the permit and with the Rules, regulations, and Orders of the District applicable to permit holders.
2. The Temporary Permit does not confer any rights and privileges to the well owner or permittee other than those set forth in this Section.
3. Any person who relies on the Temporary Permit to drill, operate, or engage in other activities associated with a water well assumes the risk that the District may grant or deny, wholly or partly, the permit application when the District takes final action after notice and hearing to issue a Regular Production Permit pursuant to the application.
4. A functioning water meter must be installed within 30 days of the issuance of the Temporary Permit pursuant to Rule 3-2.
5. The permittee shall keep accurate records and meter readings, on a monthly basis, of the amount of groundwater withdrawn, the purpose of the withdrawal. Such records shall be submitted to the District office on a monthly basis, unless some other reporting period is specified in the permit, even if there is zero pumpage or transport for the time period and shall also be available for inspection at the permittee's principal place of business by District representatives. Immediate written notice shall be given to the District in the event a withdrawal of water exceeds the quantity authorized by the permit or rules.
6. Production shall not exceed the permitted volume authorized in the Temporary Production Permit.
7. The produced water shall be dedicated to beneficial use at all times.
8. The Temporary Production permittee is not required to comply with provisions of Rule 3-7 related to temporary drought curtailments.
9. The drilling and operation of the well for the authorized use shall be conducted in such a manner as to avoid waste, pollution, or harm to the aquifer.
10. The well site shall be accessible to District representatives for inspection during normal business hours and during emergencies. The permittee agrees to cooperate fully in any reasonable inspection of the well site related monitoring or sampling by District representatives. The well owner shall provide a 24-hour emergency contact to the District.
11. The application pursuant to which the permit has been issued is incorporated herein, and the permit is granted on the basis of and contingent upon the accuracy of the information

supplied in that application and in any amendments thereof. A finding that false information has been supplied shall be grounds for immediate revocation of the permit. In the event of conflict between the provisions of the permit and the contents of the application, the provisions of the permit shall prevail.

12. Violation of the permit's terms, conditions, and requirements, including pumping amounts in excess of authorized withdrawal, shall be punishable by civil penalties as provided by Special District Local Laws Code Chapter 8802 and the District Rules.
13. The Temporary Permit holder shall timely pay to the District all administrative fees and fees related to the amount of groundwater authorized to be produced pursuant to the Temporary Permit and District Rule 3-1.16 related to Fees and Payment of Fees.
14. Violation of the permit's terms, conditions, or requirements including pumping amounts in excess of authorized withdrawal shall be punishable by civil penalties as provided by Special District Local Laws Code Chapter 8802 and the District Rules.
15. The well authorized by this Permit must be maintained in good, non-deteriorated condition in compliance with District Rule 5 related to the District well construction standard.

Attachment B – Well Location Map



Scale: 1 inch = 3 miles

Drawn By: BB Date: 8-12

Quad Name and No:
Wimberley, Texas 29098-H-1
San Marcos North, Texas 29097-H-8

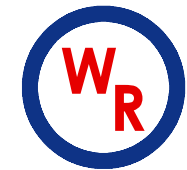
Projection:
UTM NAD 83 Zone 14



Needmore River Ranch: Road Map

Needmore River Ranch

Hays County, Texas



Wet Rock Groundwater Services, L.L.C.
Groundwater Specialists

TBPG Firm No: 50038
311 Ranch Road 620 South, Ste. 103
Austin, Texas 78734
Ph: 512.773.3226 Fax: 512.879.6809
www.wetrocks.com



Well D
 Lat: 29° 53' 12.99"N
 Long: 98° 2' 2.99"W
 Production Rate = 550 GPM

Needmore River Ranch

0 1,500 3,000 Feet

Drawn By: BB Date: 9-1-2015

Quad Name and No:
 Wimberley, Texas 29098-H-1
 San Marcos North, Texas 29097-H-8

Projection:
 UTM NAD 83 Zone 14



Well Location and Estimated Production Rate Map

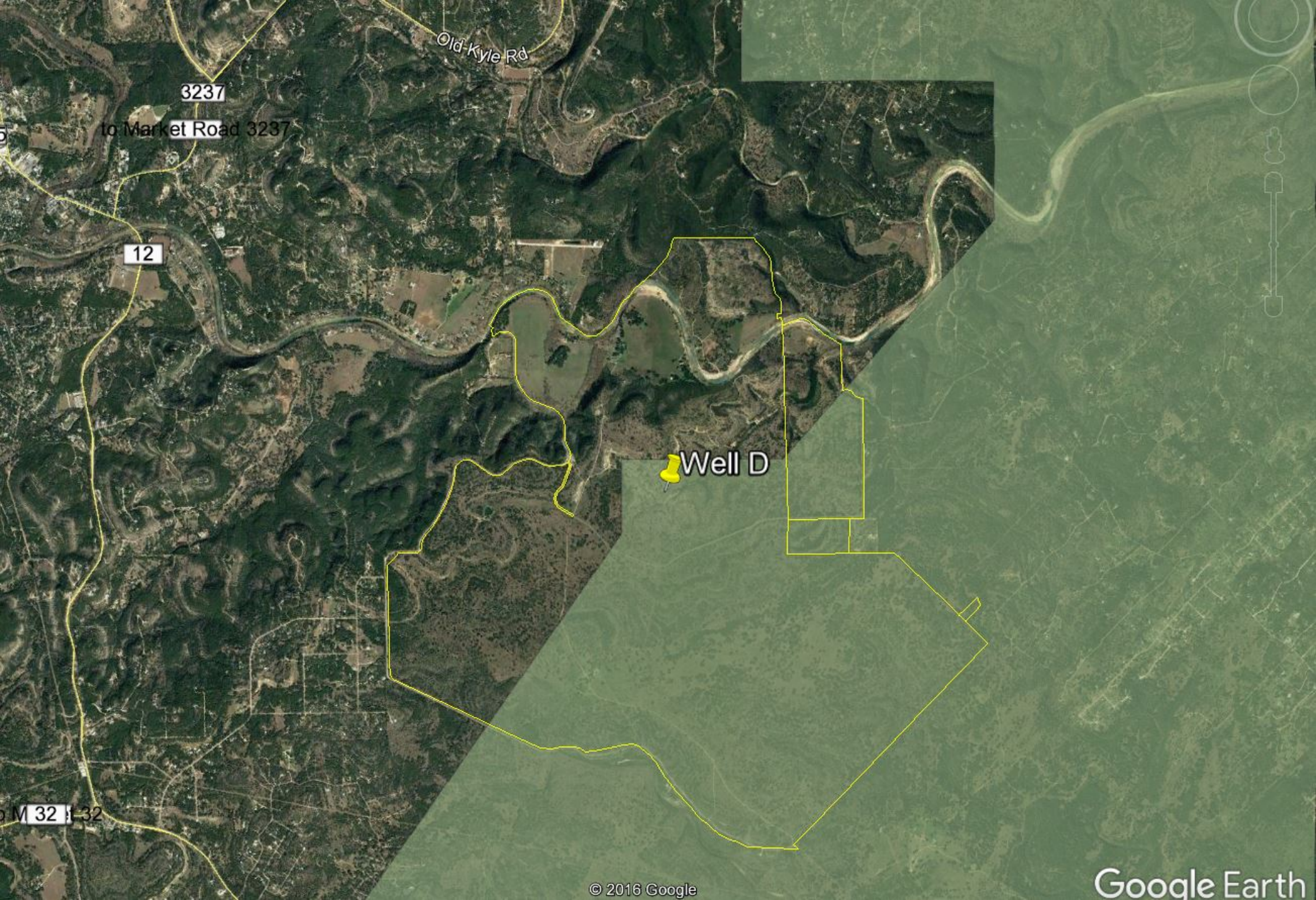
Needmore River Ranch

Hays County, Texas



Wet Rock Groundwater Services, L.L.C.
 Groundwater Specialists

TBPG Firm No: 50058
 317 Ranch Road 620 South, Ste. 203
 Austin, Texas 78734 Ph: 512.773.3226
 www.wetrockgs.com



Old Kyle Rd

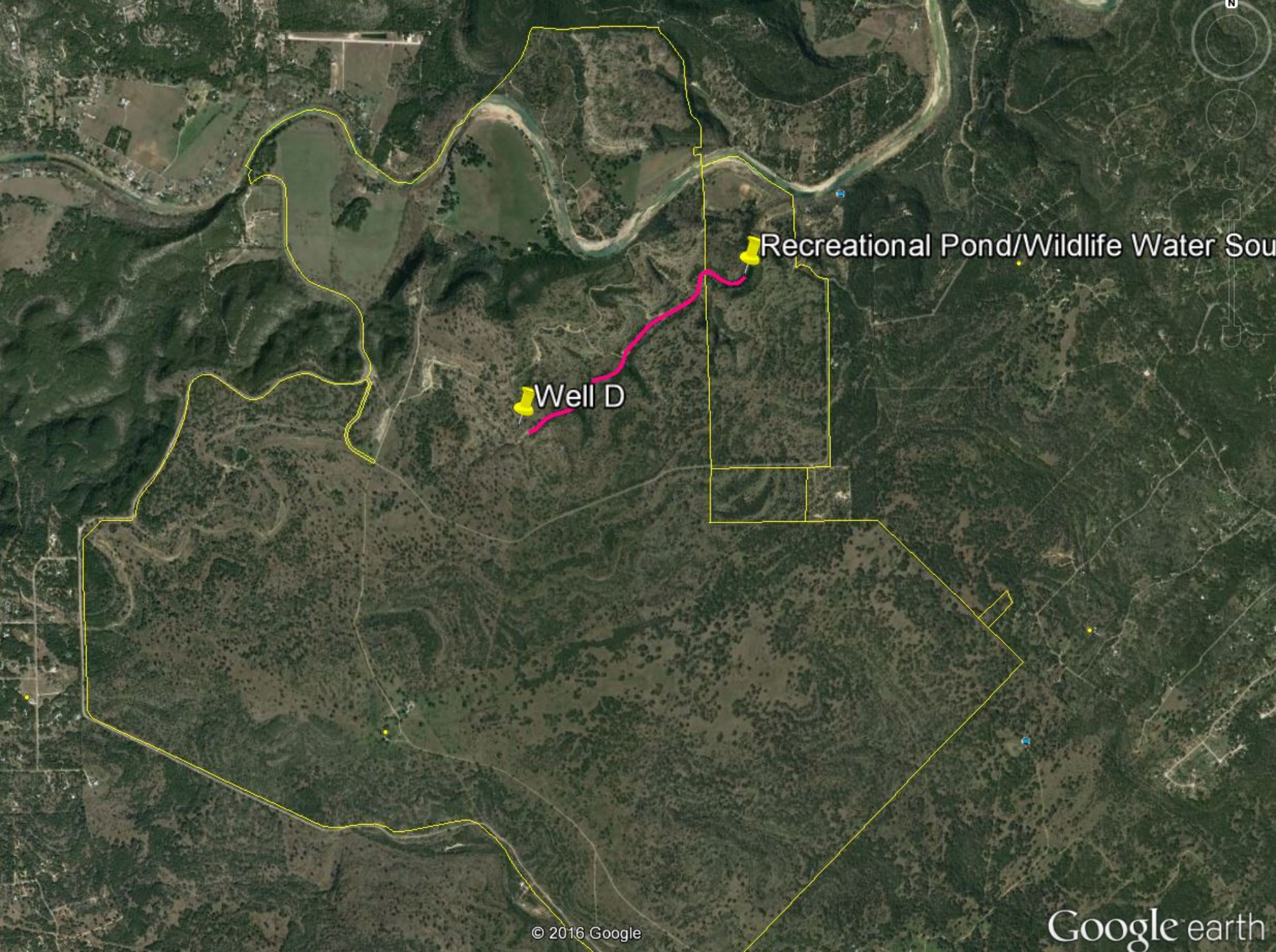
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to Market Road 3237

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Well D

M 32 32



Recreational Pond/Wildlife Water Source

Well D

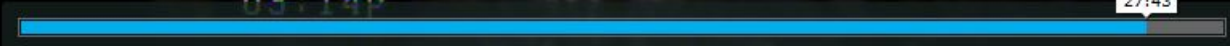
Attachment C – Well Deteriorated Condition Photos



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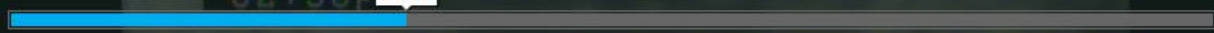
Needmore Ranch

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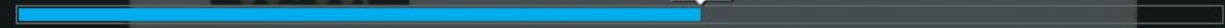
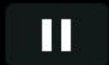


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Needmore Ranch

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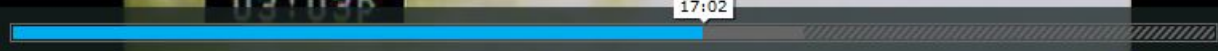
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Needmore Ranch

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Needmore Ranch

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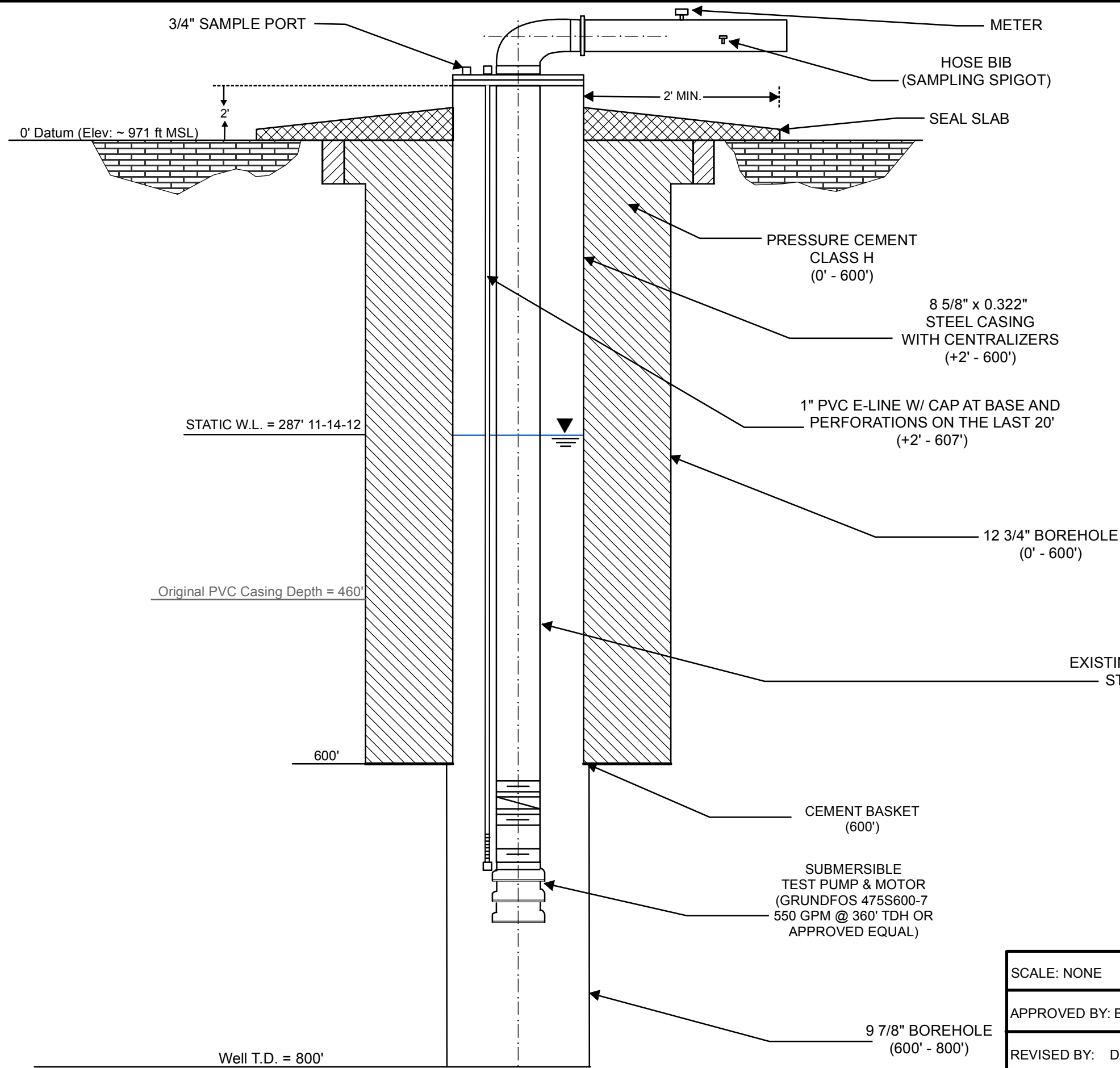
Needmore Ranch

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Downhole Video Footage:

<https://vimeo.com/142517941>


Attachment D – Approved Recompletion Well Design



Notes:

- Existing completion information was taken from State Well Report No. 317171.
- The well annulus volume was calculated to be 10.69 cu/yds; 150% of the calculated annulus volume is 16 cu/yds. The contractor shall have a minimum of 16 cu/yds available for pressure cementing.
- The production pump will be a Grundfos 475S600-6A or approved equal.

SCALE: NONE
APPROVED BY: BB DATE: 11-15
REVISED BY: DATE:
DRAWING NO: W-1
SHEET: 1 OF 1

Well Profile: Well D	
Needmore River Ranch Hays County, Texas	
	Wet Rock Groundwater Services, LLC
	Groundwater Specialists
	TBPG Firm No: 50038 317 Ranch Road 620 South, Suite 203 Austin, Texas 78734
	Ph: 512.773.3226 www.wetrockgs.com

Attachment E –
Technical Memo 2016-1115: Evaluation for Unreasonable Impacts,
Needmore Water LLC Well D Permit Application



*Technical Memo 2016-1115
November 2016*

Evaluation for Unreasonable Impacts: Needmore Water, LLC, Well D Permit Application

Brian B. Hunt, P.G., and Brian A. Smith, Ph.D., P.G.

Introduction

The Barton Springs/Edwards Aquifer Conservation District's (District) territory was expanded on June 19, 2015 through the passage of H.B. 3405 (the Act). The Act requires all nonexempt, non-Edwards wells to be permitted and provides a three-month period to apply for a Temporary Permit, which expired on September 19, 2015. The Temporary Permits provide well owners with an interim authorization to operate a well prior to conversion to a Regular Historical Production Permit. In accordance with Section 4(e) of the Act, the District is also required to evaluate the proposed production prior to permit conversion to Regular Permits to determine if the amount authorized will cause:

1. A failure to achieve the applicable adopted desired future conditions for the aquifer; or
2. An unreasonable impact on existing wells.

The determination of whether the proposed production "will cause" one of the above conditions requires a projection of the future effects on the aquifer using the best available science. Regarding factor 2 above, the District has developed policies and protocols to guide the application process and review, and the requisite evaluation of any proposed groundwater production in order to provide a systematic and consistent means assessing impacts to existing wells. The term "unreasonable impacts" is not defined in statute, therefore, the District has to rely on its interpretation which includes a suite of factors. To facilitate this evaluation, the District interprets "unreasonable impacts on existing wells" to include:

1. well interference related to one or more water wells ceasing to yield water at the ground surface;
2. well interference related to a significant decrease in well yields that results in one or more water wells being unable to obtain either an authorized, historic, or usable volume or rate from a reasonably efficient water well;
3. well interference related to the lowering of water levels below an economically feasible pumping lift or reasonable pump intake level; and
4. the degradation of groundwater quality such that the water is unusable or requires the installation of a treatment system.

Section 4 of the Act further describes the District's authority to reduce permits if the District finds that the production "will cause" unreasonable impacts. This forward looking evaluation requires a projected forecast based on the application of the best available analytical tools and aquifer testing data provided with the application. Given the inherent uncertainty in the evaluation of future projected impacts, the District has applied a reasonable and logical approach that is consistent with District's objective to

manage total groundwater production on a long-term basis while avoiding the occurrence of unreasonable impacts.

This preferred approach involves a scientific evaluation using the best available science to anticipate such impacts, monitoring and data collection to measure the actual impacts on the aquifer(s) over time once pumping commences, and prescribed response measures to be triggered by defined aquifer conditions and implemented to avoid unreasonable impacts.

Accordingly, the District has conducted an evaluation of the Needmore Water, LLC permit request. As part of the evaluation, the Aquifer Science (AS) staff has reviewed the hydrogeologic report (WRGS, 2016) submitted by the applicant, the aquifer test data, and other relevant data and factors. This technical memo presents a summary of the evaluation of the aquifer test and the findings of projected unreasonable impacts. In addition, this document established compliance levels (water levels) within an index well that will prescribe response measures to be triggered if and when aquifer conditions exceed those levels. Prescribed measures and the staff recommended special provisions are further described in the General Manager's Preliminary Decision.

Needmore Water, LLC Permit Application

Needmore Water, LLC applied for, and was issued, a Temporary Permit for approximately 180,000,000 gallons/year. Under Part II of the permit application, Needmore has requested authorization for maximum production capacity of a higher volume equivalent to 289,080,000 gallons/year (approximately 887 acre-feet/year; 550 gallons per minute). An evaluation of the aquifer test and the projected impacts was performed on the basis of the requested maximum production capacity volume.

Needmore Hydrogeologic Report

The report prepared by Wet Rock Groundwater Services, LLC (WRGS, 2016) generally satisfies the goals of the District's Aquifer Test and Hydrogeologic Report Guidelines (dated 2007) by providing data necessary to evaluate: 1) aquifer properties, 2) impacts to wells, and 3) changes in water quality. The aquifer test conducted by WRGS was done according to District guidelines, and the District was consulted and involved in all aspects of the test. The data collected for the test was of good quality and allows a relatively straight-forward parameter estimation. Appendix A contains detailed technical notes by AS staff on aquifer parameters derived from the 2016 aquifer test. However, AS staff does not agree with all aspects of the report including some technical opinions, interpretations, and assumptions. The most significant differences in opinion include:

- 1. Analytical solutions (Theis).** The WRGS (2016) report generally dismisses the use of analytical solutions such as the Theis (1963) equation for making estimates of well interference. The Theis equation is a long-established tool within hydrogeology and is the best tool available for making projections of drawdown over time (Driscoll, 1986). The WRGS (2016) report states:

“The heterogeneous (sic) character of the karst aquifer, in addition to potential disconnects between the Cow Creek Member and other formations, causes traditional methods of estimating drawdown, such as the Modified non-equilibrium equation (Theis equation), to overestimate drawdown.”

A more accurate description of analytical solution results is not that they overestimate drawdown, but that there is inherent uncertainty in the results. An evaluation of drawdown can result in either an overestimate, or underestimate, of actual conditions. For example, the WRGS (2016) report underestimates drawdown at the observation wells for the test duration. While we understand that WRGS was trying to match drawdown at the pumping well, the goal of the aquifer test was to assess whether the projected drawdown would indicate any risk of causing unreasonable impacts including interference with existing wells (see item #2 below).

Repeated criticisms in the report about the use of Theis appears to be focused on the effects of recharge on the Middle Trinity, which the Theis equation does not consider. While this is true, AS staff considers the results from Theis as a scenario similar to a repeat of severe drought when little recharge occurs and the ability to capture is constrained. In addition, the Theis equation considers the aquifer infinite; therefore there is an infinite reservoir of water to draw from. Aquifers are in fact not infinite but have boundaries. Therefore, during drought periods that result in limited recharge and capture constraints, the ‘infinite extent’ assumption moderates the ‘no recharge’ assumption in our opinion. Therefore, AS staff considers the source of water as being dominated by changes in storage (depletion) for these types of relatively short-term forecasts, and not dominated by capture. The WRGS (2016) report states at some future point in time the drawdown resulting from the Needmore pumping well will effectively stabilize as a result of capture (inducing recharge, or reducing springflows). This is a true statement—indeed the source of water will change from dominated by storage to dominated by capture at some future time. However, the time period for this to occur is uncertain. AS staff believes that it is likely on the scale of years given the aquifer parameters, distance to such features it would capture (e.g. area streams and Middle Trinity springs), and the age of the water in the area. Indeed, during severe drought conditions, most of the streams and springs would be “capture constrained” since they are generally dry or very low flow (Konikow and Leake, 2014). A detailed numerical model is needed to fully address this issue.

In summary, many of the assumptions listed and discussed in the report are in fact not as limiting as stated. Driscoll’s (1986) discussion on such assumptions of theoretical models (Theim) states, “These assumptions appear to limit severely the use of the equations. In reality however, they do not.” AS staff views the use of analytical models (Theis) comparable to the use of numerical models in the Trinity (e.g. Mace et al., 2000; Jones et al., 2011). Results from such tools in the correct context and for certain stated purposes are useful and should be utilized in forecasting.

- 2. Estimation of representative aquifer parameters for the study area and lack of evaluation of interference.** While the WRGS (2016) report determined aquifer parameters that appear suitable estimates for an evaluation of drawdown in the immediate vicinity of the pumping well, its estimates result in drawdown that do not match data at observation wells. Accordingly, the parameters are not useful for estimating drawdown at a distance where impacts could occur, and the WRGS (2016) report does not explicitly attempt to estimate projected impacts to distant wells.
- 3. Regional Middle Trinity water-level trends.** The stability and quick recovery of water levels in the Middle Trinity, including the Cow Creek, as described in the WRGS (2016) report, ignores studies that indicate the contrary. Although no long-term data are available for the immediate vicinity of the Needmore area, numerous studies to the west of Needmore (and where the Trinity is

recharged) indicate the Middle Trinity is under stress as a whole. Long-term data indicate the aquifer does not fully recover during wet periods (Hunt and Smith, 2016; Hunt, 2014; Wierman et al., 2010). Indeed, long-term cones of depression are observable on water-level maps for the Middle Trinity (Hunt and Smith, 2016; Hunt and Smith, 2010) and are precisely the unreasonable impacts groundwater conservation districts and groundwater management areas are trying to avoid.

Unreasonable Impacts Analysis

The primary goal of this evaluation is to forecast drawdown attributed to the proposed production and associated unreasonable impacts related to well interference for existing wells in accordance with the Act as interpreted by the District. The impacts from pumping on the Desired Future Conditions (DFC) are not addressed in this evaluation, nor are the impacts to area streams and springs. Numerical models would be the best tool for such an evaluation, but are not available at this time.

The WRGS (2016) report suggests minimal drawdown over time based on the applicant's analysis of the Needmore Well D pumping data. AS staff estimated aquifer parameters from the data (**Table 1; Appendix A**) and present a range of drawdown from the pumping of Needmore Well D on nearby domestic wells. The focus of this evaluation is on the potential drawdown to a domestic well and a Hays Trinity Groundwater Conservation District monitor well known as the Amos Well. The well is located the Saddle Ridge subdivision located about two miles southwest of Needmore Well D (see map **Appendix A**). The Amos Well had a measureable response with recorded drawdown of about 12 ft during the aquifer test. AS staff reasonably assumes that the water level response to pumping in the Amos Well is representative of wells in the northern area of the Saddle Ridge subdivision.

Using the aquifer parameters derived from the aquifer test (**Table 1; Appendix A**), the AS staff estimates the additional drawdown from the Needmore pumping over time in **Figure 1**. For the evaluation, AS staff chose drawdown from pumping over a seven-year period. This period was chosen to be representative of a severe drought when little recharge occurs and capture is constrained. The results of the estimated drawdown at the Amos Well due to Needmore pumping is about 75 ft after seven years (**Figure 1**).

In order to estimate the risk of unreasonable impacts from the proposed production from Needmore Well D, the full range of water-level variability in the area of influence must be considered and accounted for in the evaluation (**Table 2**). This includes an accounting of projected drawdown attributed to factors independent of the proposed production including drought variability and existing and future local pumping (**Table 2**). Combined with this existing water-level variability of 50 ft (**Table 2**), 15 ft of drawdown from normal operation of Well D, and 75 ft of modeled drawdown, the total projected drawdown is about 140 ft. The additional modeled drawdown from the proposed Needmore pumping could lower the water level below the top of the Middle Trinity Aquifer in the Saddle Ridge area, and puts the water level within 20 feet of the pump in the Amos well.

Table 1. Parameter Estimates Used in Drawdown Scenarios

Parameter	Value	Comment
Transmissivity	814 ft ² /d	average for Amos
Storativity	2.6e-5	average for Amos
Thickness	350 ft	Cow Creek and Lower Glen Rose
Distance	10,300 ft	From pumping well to Amos Well
Pumping	540 gpm	Assumes 24/7

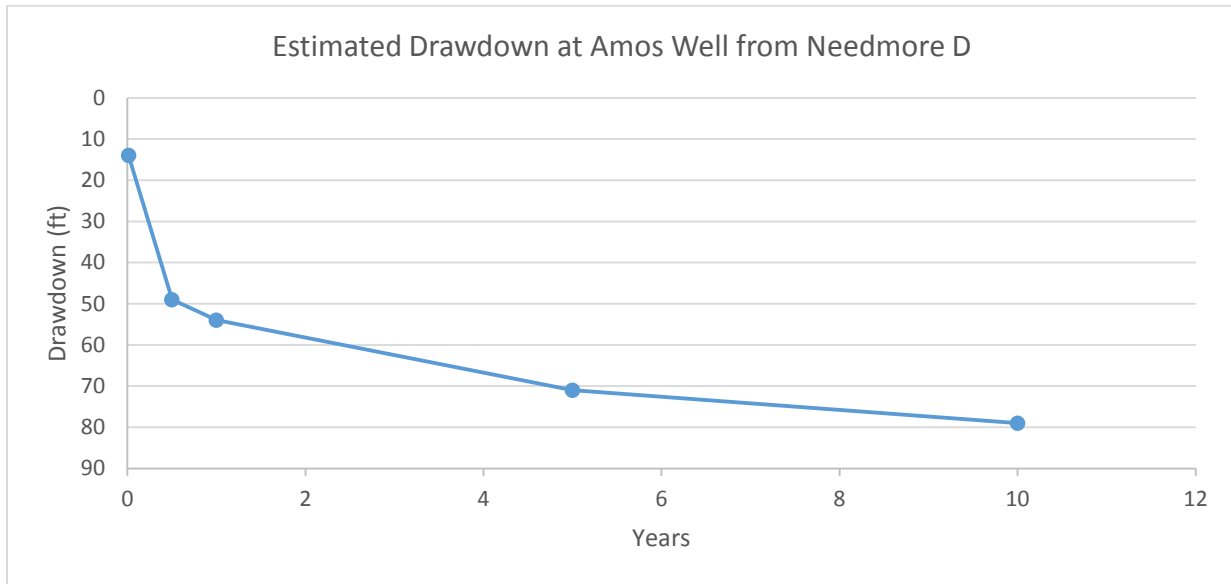


Figure 1. Graphical presentation of drawdown versus time from the Needmore pumping alone at the Amos observation well (assuming Table 1 parameters). Note most of the drawdown occurs within the first year.

Table 2. Existing Drawdown or Water-level Variability Estimates in the Vicinity of the Amos Well Prior to Needmore Pumping

Source	Value (ft)	Comment
Drought	42	Derived from the Ruby Ranch Westbay Well (Cow Creek Zone) (June 2010-Feb 2012)
Present local interference	4	Nearby domestic wells and the Amos well
Future local interference	2	Domestic wells
Uncertainty	2	Buffer for estimates above
Total:	50	

Unreasonable Impacts Findings

In conducting this evaluation, the AS staff has applied the best available science using the available aquifer test data and analytical tools as described above. After factoring in the hydrogeology of the aquifer and existing water-level variability under severe drought conditions (Table 2), the modeled projections of drawdown attributed to pumping from the Needmore Well D at maximum production capacity indicate that some wells will cease to yield water at the ground surface or will experience the lowering of water levels below a reasonable pump intake level. However, as with any tool used to forecast, there are inherent uncertainties. Even though the analytical models show that the proposed production will cause unreasonable impacts to existing wells under severe drought conditions, the AS staff recommends to approve the permit in full, and apply compliance levels and permit provisions tied to actual aquifer monitoring data (outlined below) to avoid any occurrence unreasonable impacts.

Proposed Compliance Levels and Potential Permit Provisions

Although the tools used by AS staff result in the proposed production causing unreasonable impacts in the long term, there is always uncertainty with any forecasting or modeling. AS staff fully recognizes uncertainties in using analytical models for forecasting, so our approach is to constrain model results with data moving forward. Pursuant to District policy, AS staff recommends special provisions to the permit requiring 1) ongoing monitoring and data collection to measure the actual impacts to the aquifer over time once pumping commences and, 2) prescribed response measures indexed to defined compliance levels and a dedicated index well.

Table 3 presents a summary of the specific compliance levels derived for the Amos Well. **Figure 2** is a graphical representation of the Amos Index Well and the corresponding compliance levels. Compliance levels were set after considering natural water-level variability (Table 2; 50 ft) and also the observed short-term operational effects of pumping from the Needmore Well (~15 ft). Thus, this allows for up to about 65 ft of variability below the average water level before crossing the first compliance level threshold. **Figure 3** is a conceptual diagram showing how each compliance level is distributed over depth and time.

Recommended special provisions to the permit will reference the compliance levels established in this document and are only briefly presented in Table 3.

Table 3: Summary of Specific Compliance Levels in the Amos Monitor Well

Compliance Level	Description	depth to water (ft)	Note	Permit Action
1	Evaluation	525	Approximate top of Middle Trinity Aquifer as determined from geophysical logs.	District will conduct an evaluation of data to assess the actual impacts of pumping.
2	<u>Avoidance Measures</u>	550	This level is the mid-point between level 1 and 3 and is a sentinel level to begin curtailment measures in order to delay or abate further drawdown.	Temporary curtailment of 20% off the baseline curtailment rate (BCR).
3	<u>Maximum Drawdown Allowable</u>	575	This level accounts for the drawdown from the Needmore Well D pumping for 1 year (~50 ft), after accounting for 65 feet of variability.	Temporary curtailment of 40% off the baseline curtailment rate (BCR).
4	<u>Unreasonable Impact to Existing Wells</u>	580	This level is deemed a reasonable pump intake level and below this level an unreasonable impact occurs to the Amos Well, and likely surrounding wells.	Temporary curtailment of 100% off the baseline curtailment rate (BCR). Staff initiates permit amendment.

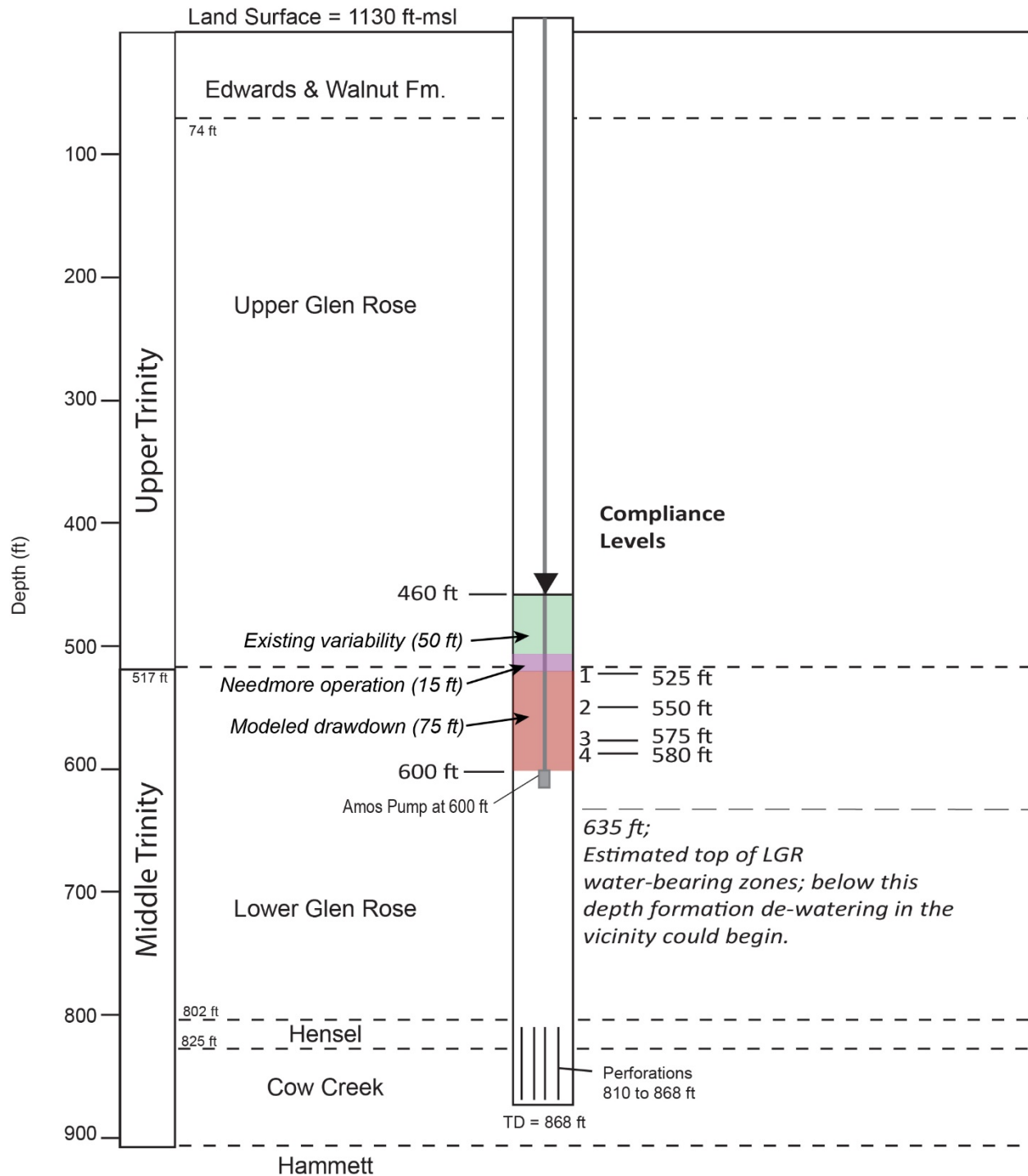


Figure 2. Potential Index Well Diagram and Compliance Levels

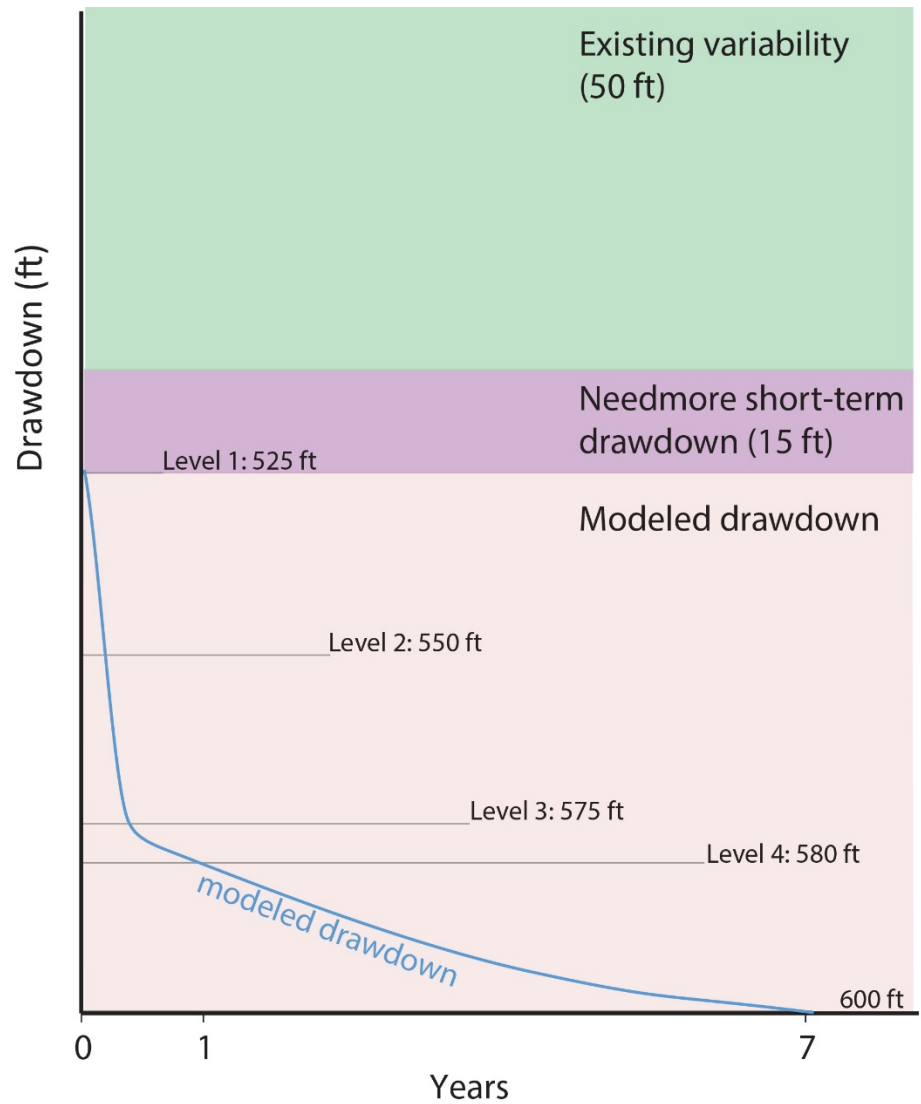


Figure 3. Drawdown vs Time Indicating Compliance Levels

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Appendix A

Summary Notes of January 2016 Aquifer Test and Parameter Estimation, Needmore Water, LLC, Well D, Hays County

Aquifer Science Staff
2/23/16

Summary of Aquifer Test

WRGS conducted an aquifer test for the Needmore Ranch “Well D” in January 2015 according to District rules and guidelines (BSEACD, 2007). Under H.B. 3405, Needmore Water, LLC requested authorization to produce 289,080,000 gallons/year (887 ac-ft/year) for agricultural use. The purpose of this document is to summarize the aquifer test and the estimation of aquifer parameters.

Table A-1 summarizes the wells in the study completed in the Middle Trinity (including the Cow Creek). Another shallow Upper Glen Rose well (Caboose observation well) was monitored and showed no response to the pumping, and is not included herein.

Table A-1. Aquifer Test Summary

Well Name	Type	Pump depth	Date Aquifer Test	Static WL used in Eval (DTW-ft)	Duration	Yield (gpm)	Max. drawdown (ft)*
Needmore D_PW	Pumping		1/25/16 10:20 AM	272.91	Pumping: 5.03 days (120.7 hrs) Recovery:	544	35.3
Catfish Pond_OW	Needmore Observation			407.13			15.8
Amos_OW	HTGCD Observation	600		459.70			14.4
Top of Hill_OW	Needmore Observation			319.78			6.1

*Per WRGS

Table A-2. Well Information

Well Name	Tracking No.	Ddlat	Ddlong	Distance (mi) from PW	Radial Distance (ft)	Date drilled	MP	LSD (ft-msl)	Borehole dia (in)	Depth _total ft	Casing dia (in)	Depth casing (ft)	completion
Needmore D_PW		29.970225	-98.034223	0	0	01-Jan-16	2.5	936	9.875	800	8.63	600	open
Catfish Pond_OW		29.970017	-98.052244	1.1	5808		1.8	1070			6.25	475	open
Amos_OW		29.961129	-98.065213	1.95	10296			1132			5		
Top of Hill_OW	148941	29.990911	-98.033147	1.43	7550	02-Dec-05	2.0	995	8	1100	5	700	open

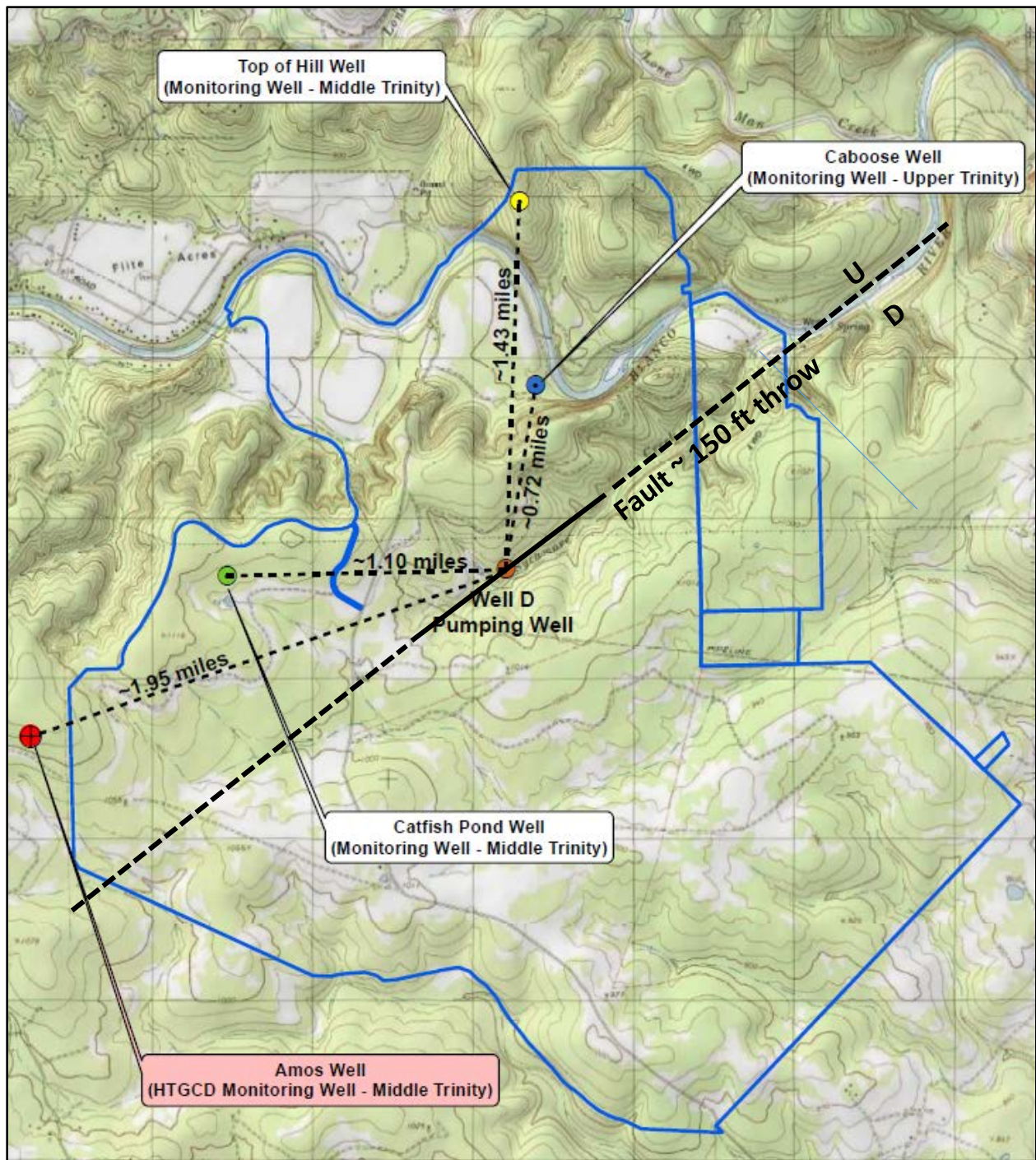


Figure A-1. Location map of the Needmore Ranch and wells in the study (basemap modified from WRGS). Note the fault that is mapped and confirmed in the field by BSEACD staff. The well is located on the fault, however the production zone is on the up-thrown side of the fault.

Needmore Middle Trinity Hydrographs

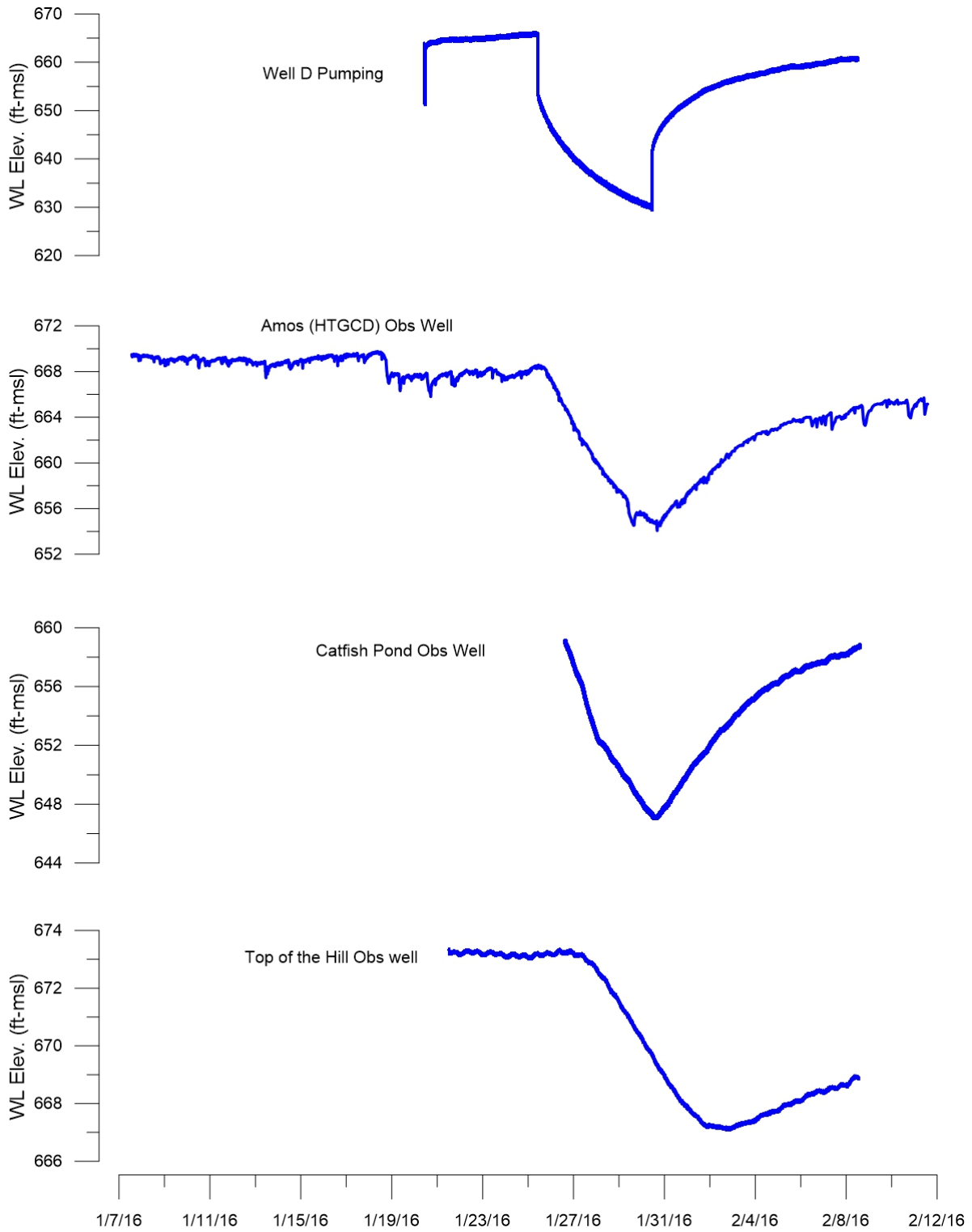


Figure A-2. Hydrograph from transducer data for all Middle Trinity wells.

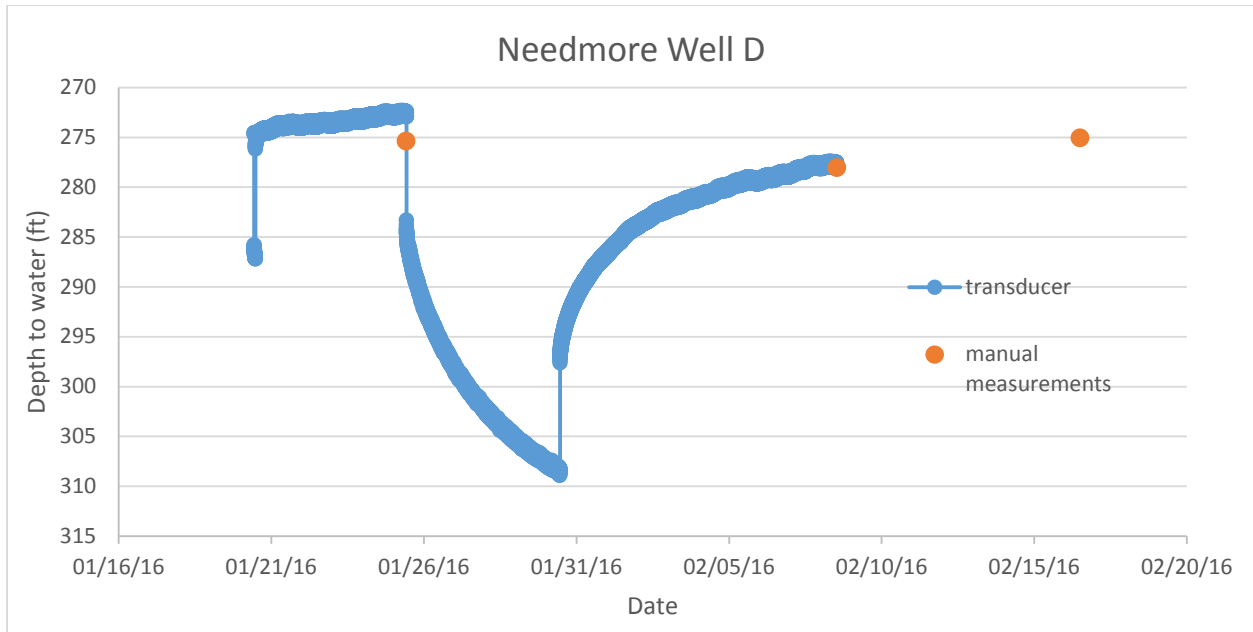


Figure A-3. Hydrograph of the Needmore D pumping well transducer and manual data. Water levels were rising from pre-test of pump on 1/20/16 when the test started on 1/25/16. Note that a “pumping level” or psuedo-steady state was not reached before the end of the pumping phase. Maximum drawdown was 35 feet at the end of the test. Water levels reached 86% recovery after 14 days when the transducer was taken out, and 94% after 22 days of recovery. The last measurement was on 2/16/16.

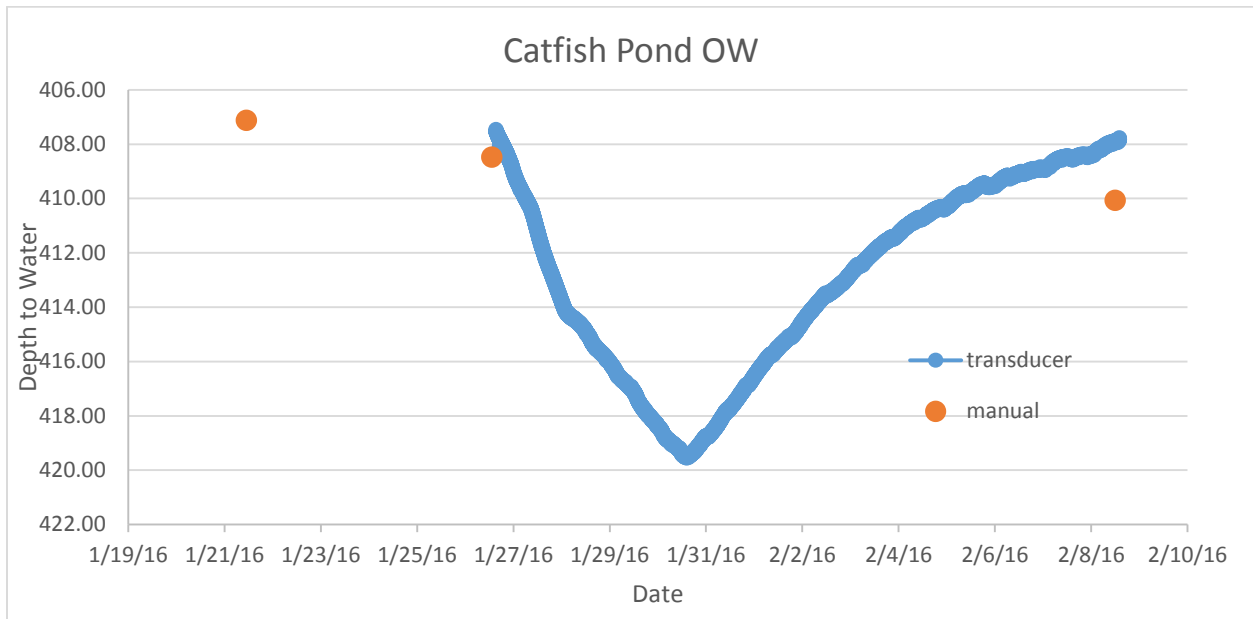


Figure A-4. Hydrograph of the Catfish Observation Well transducer and manual data. An error in the placement of the transducer resulted in missing early-time data. Note that there is 0.7 ft discrepancy in the manual measurements and the transducer data on 1/26/16. There is about a 2.0 ft discrepancy in the manual measurements and transducer data on 2/8/16. Source of the error is unknown, but it could

be double subtractions of a measurement point. Maximum drawdown during the test was 16 feet. Water levels reached 90% recovery after 13 days. The last measurement was on 2/8/16.

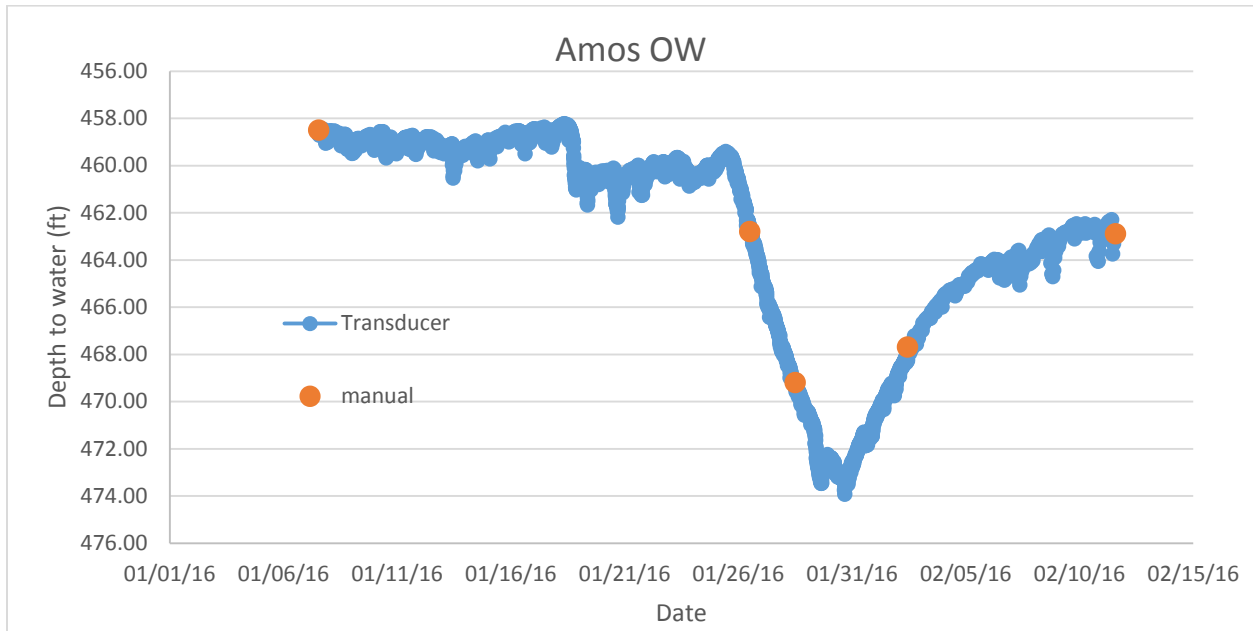


Figure A-5. Hydrograph of the HTGCD Amos Observation well transducer and manual data. Some local well interference creates the small variations of up to about 2 ft. Pre-test water level trends are relatively flat. Maximum drawdown was about 13 feet. Water levels reached 77% recovery after 13 days with last measurement on 2/11/16.

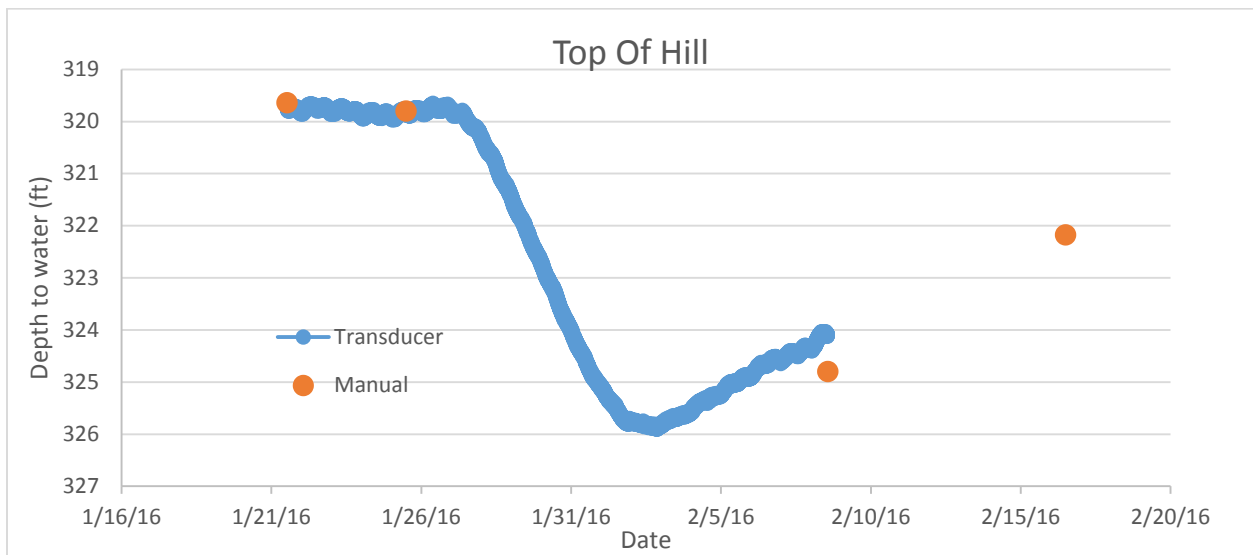


Figure A-6. Hydrograph of the Top of the Hill Observation Well transducer and manual data. Note there is 0.7 ft discrepancy in the manual measurement and the transducer data on 2/8/16. Source could

be instrument drift or manual measurement error. Pre-test water level trends are relatively flat. Maximum drawdown was about 6 feet. Water levels reached 60% recovery after 22 days. The last measurement was on 2/16/16.

Parameter Estimates

Table A-3 summarizes two estimates of transmissivity from specific capacity data, including empirical (Mace, 2001) and analytical (Theis et. al, 1963; Cooper-Jacob). **Figure 7** shows the Cooper-Jacob analytical solution using the change in head over one log cycle of time. **Tables 4-7** summarizes the parameters from various analytical solutions using Aqtesolv software (except where indicated).

Table A-3. Empirical and Analytical Estimates of Transmissivity from Specific Capacity (15.4 gpm/ft) of the Pumping Well Needmore D.

Method--Transmissivity	Value (ft ² /d)	units
Empirical (Mace, 2001)	2,068	Developed for fractured Glen Rose and Cow Creek
Analytical (Theis 1963)	5,751	Interactive spreadsheet described in Mace, 2001.
Analytical (Driscoll, 1986)	4,120	
Analytical (Cooper-Jacob)	976	
<i>average</i>	3,229	

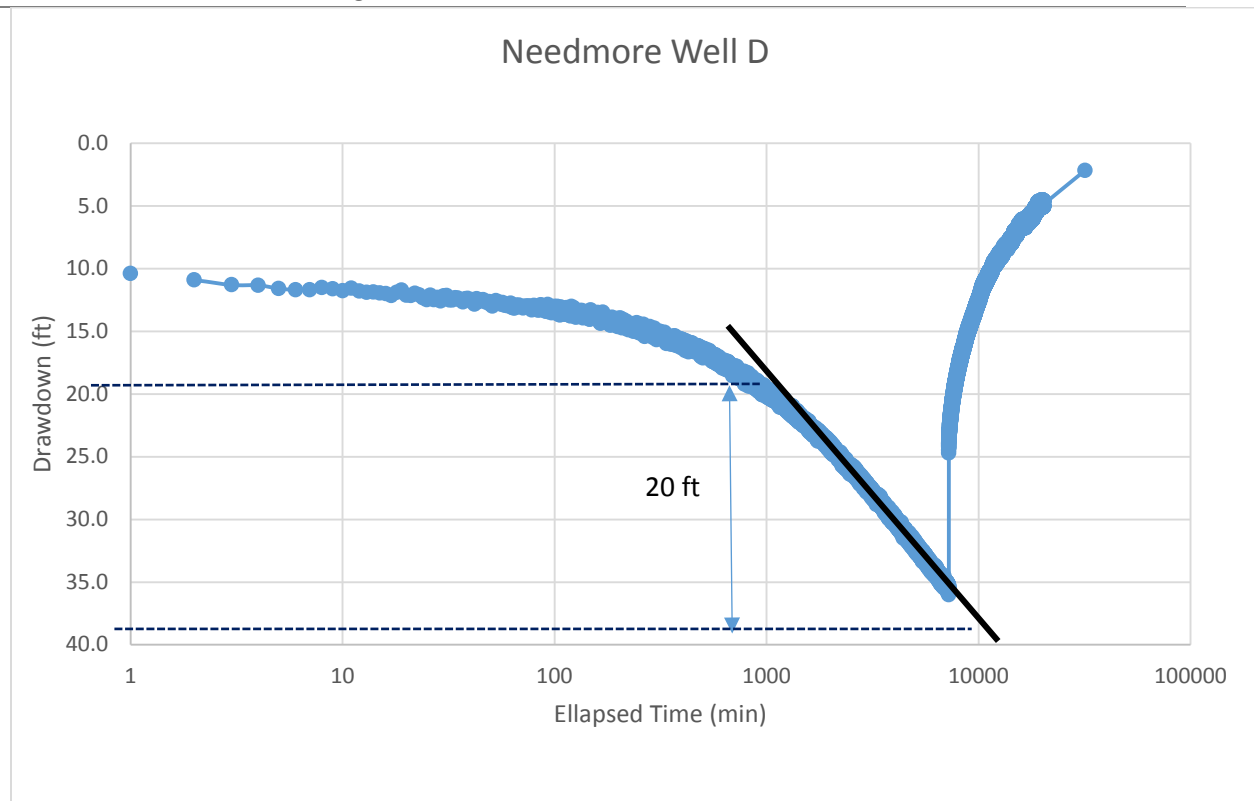


Figure A-7. Cooper-Jacob analytical method to estimate transmissivity.

Table A-4. Needmore Pumping Well D Parameter Estimation from Analytical Solutions

Method	Result (T, ft ² /d)	Storativity	Comment
Theis	774	n/a	partial penetration
Theis Recovery	617	n/a	
Cooper-Jacob	855	n/a	
Papadopoulos-Cooper	737	n/a	Wellbore storage
Dougherty-Babu	737	n/a	Wellbore storage, partial penetration
average	744		

1 gpd/ft = 0.13 ft²/d

1 ft²/d = 7.48 gpd/ft

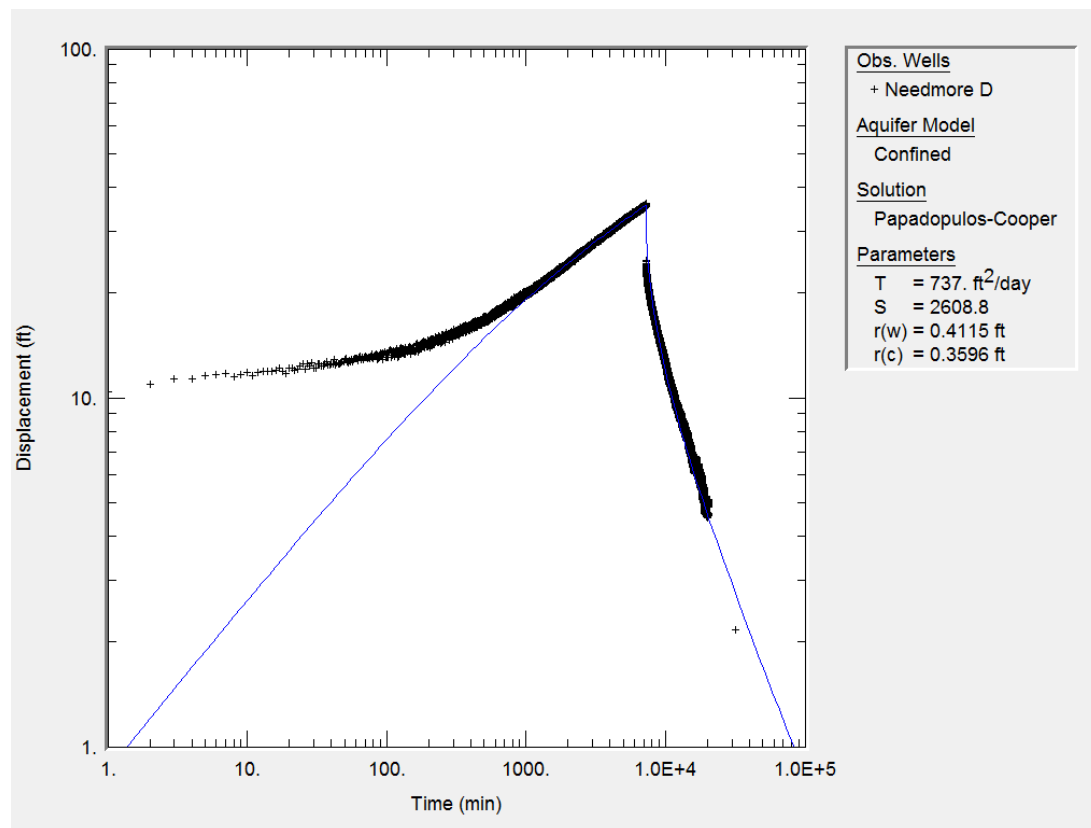


Figure A-8. Selected Aqtesolv solution and curve match for Needmore D pumping well. Note the early time suggests well bore storage effects.

Table A-5. Catfish Pond Observation Well Parameter Estimation

Method	Result (T, ft ² /d)	Storativity	Comment
Theis	921	9.8e-5	
Theis/Agarwal	557	8.0e-5	recovery
Theis Recovery	850	n/a	
Cooper-Jacob	837	8.1e-5	
Papadopulos-Cooper	895	9.8e-5	
Dougherty-Babu	896	1.0e-4	
average	826	9.14e-5	

1 gpd/ft = 0.13 ft²/d
1 ft²/d = 7.48 gpd/ft

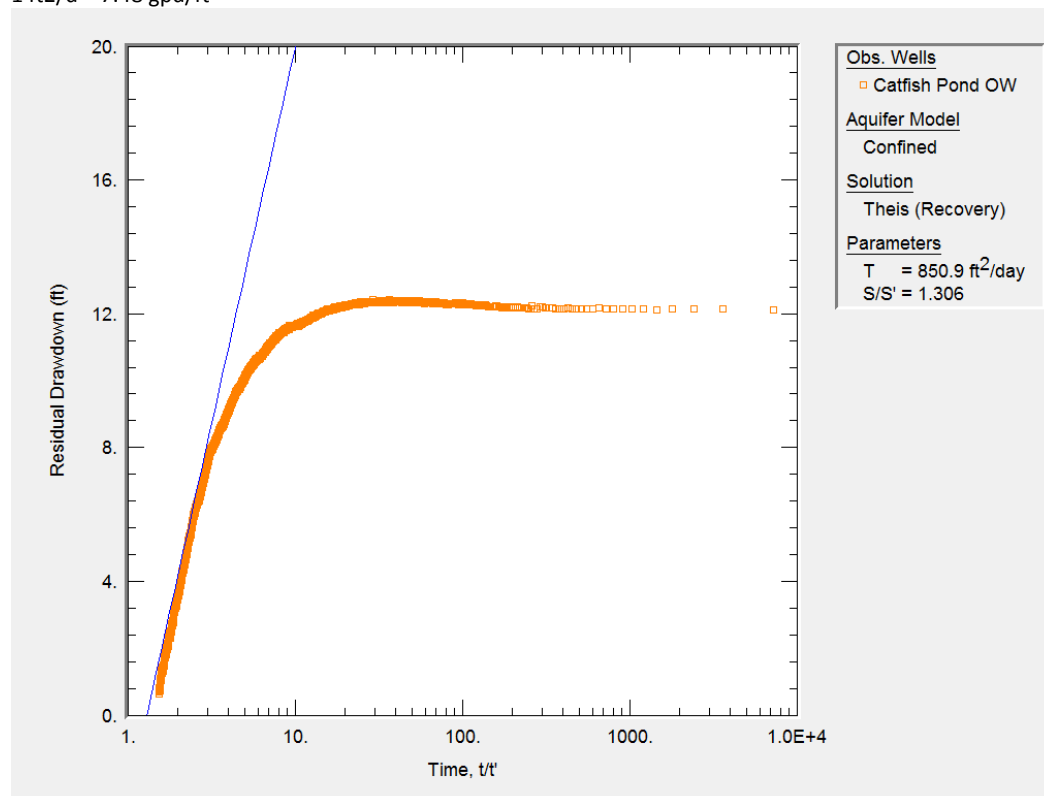


Figure A-9. Selected Aqtesolv solution and curve match for Catfish Pond observation well.

Table A-6. Amos HTGCD Observation Well Parameter Estimation

Method	Result (T, ft ² /d)	Storativity	Comment
Theis	834	2.7e-5	
Theis/Agarwal	585	3.1e-5	
Theis Recovery	945	n/a	
Cooper-Jacob	1,186	2.0e-5	
Papadopulos-Cooper	813	2.7e-5	
Dougherty-Babu	824	2.4e-5	
MLU-single layer	823	2.3e-5	MLU software
MLU-multi layer	500	2.7e-5	MLU software

average | 814 | 2.6e-5

1 gpd/ft = 0.13 ft²/d
 1 ft²/d = 7.48 gpd/ft

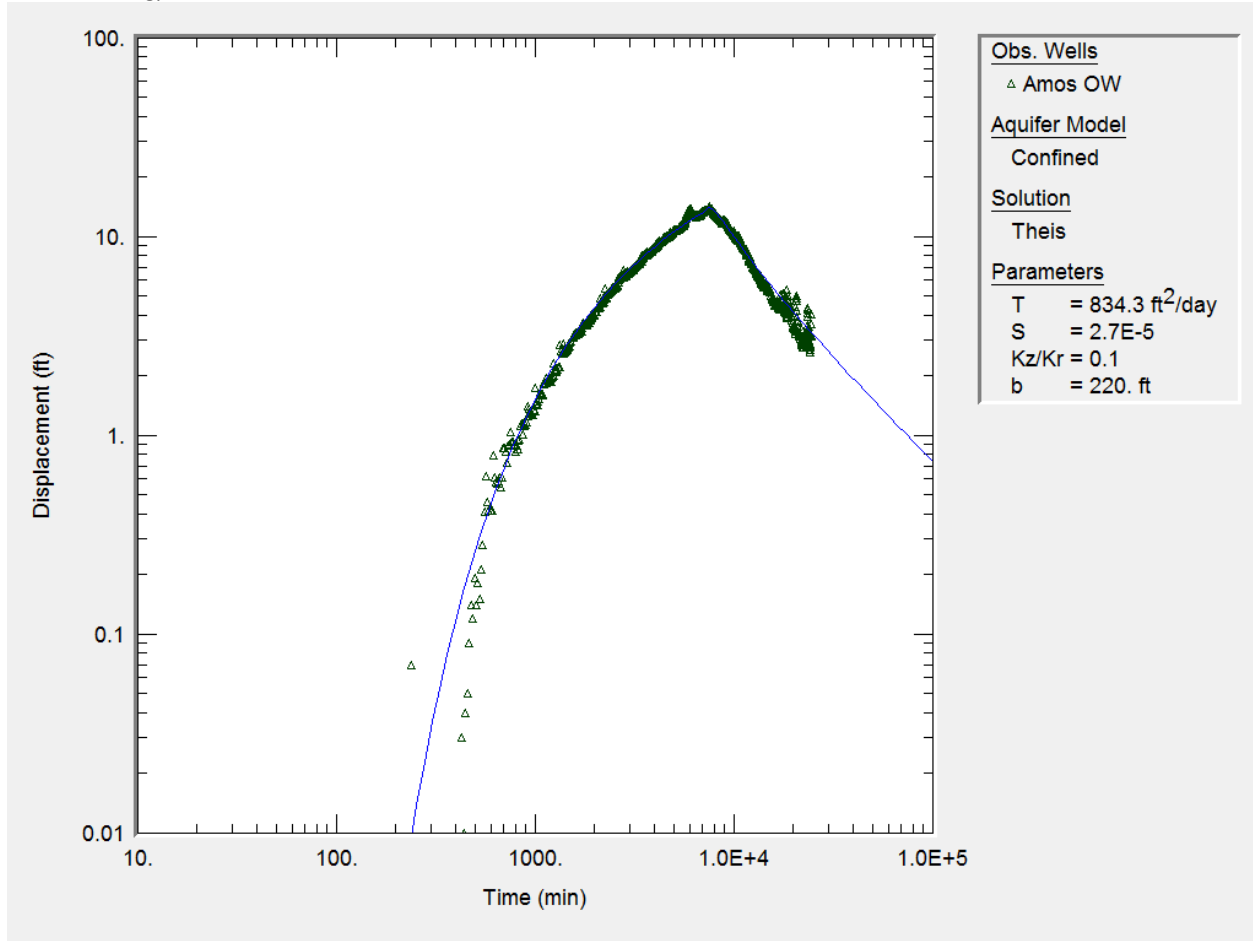


Figure A-10. Selected Aqtesolv solution and curve match for Amos observation well.

Table A-7. Top of the Hill Observation Well Parameter Estimation

Method	Result (T, ft ² /d)	Storativity	Comment
Theis	504	1.8e-4	
Theis Recovery	1838	n/a	
Cooper-Jacob	1366	1.5e-4	
Papadopulos-Cooper	438	1.7e-4	
Dougherty-Babu	494	1.4e-4	
MLU-single layer	509	1.8e-4	MLU software
MLU-multi layer	358	1.4e-4	MLU software
average	786	1.6e-4	

1 gpd/ft = 0.13 ft²/d
 1 ft²/d = 7.48 gpd/ft

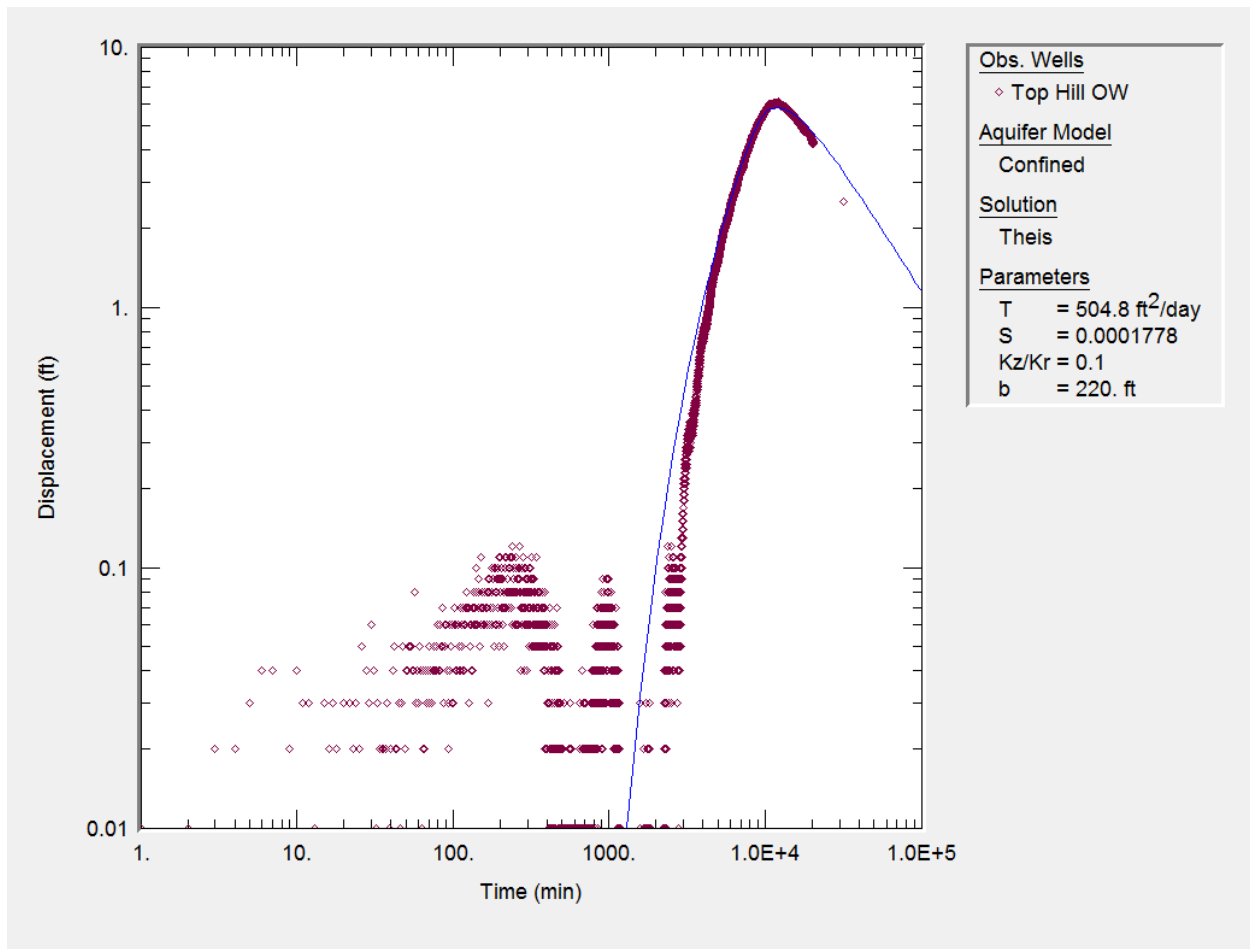


Figure A-11. Selected Aqtesolv solution and curve match for Top of Hill observation well.

MLU Software

MLU (Multi-Layer Unsteady state; <http://www.microfem.com/products/mlu.html>) software is another analytical solution to estimate aquifer parameters, but in layered aquifer systems. The benefit to MLU is that the layered stratigraphy and aquifer parameters can be used to test conceptual models and potentially provide a better fit to data than other analytical solutions that do not consider layered hydrostratigraphy.

For this evaluation, a two aquifer system with two aquitards (limits of the freeware) were created for testing. MLU was calibrated to the Amos Well and the Hill Top Well, independently (**Figures 12-15**). Similar to Aqtesolv, the model would not calibrate with multiple observation wells together, owing to the anisotropy and heterogeneity of the aquifer.

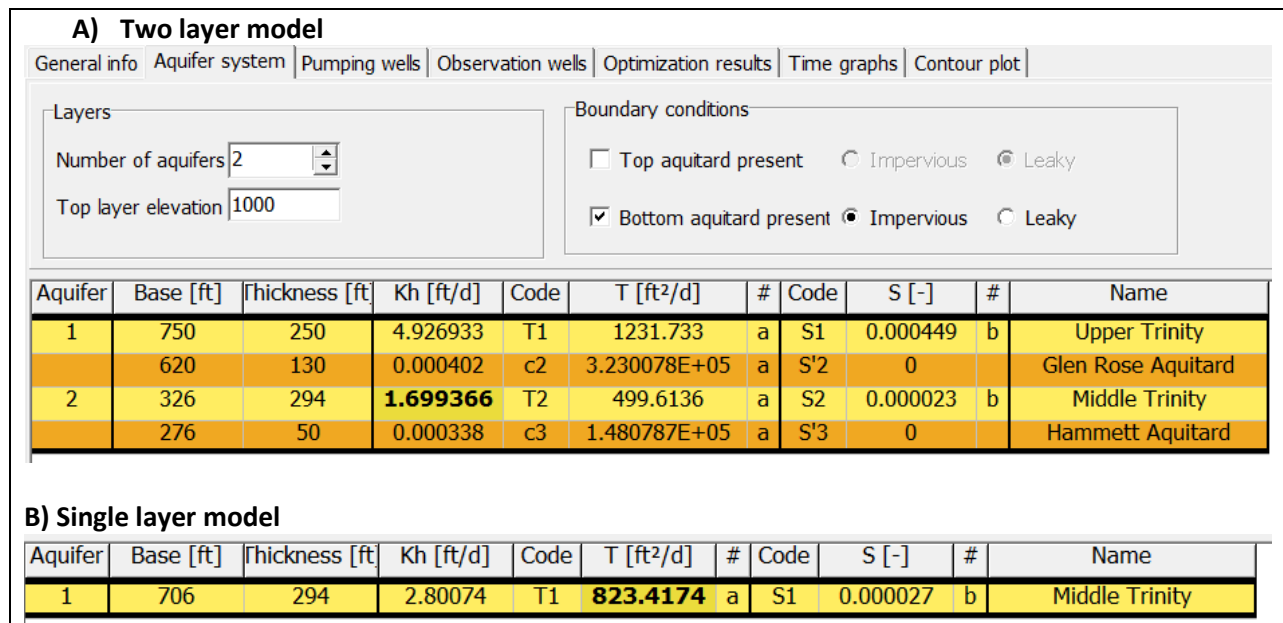
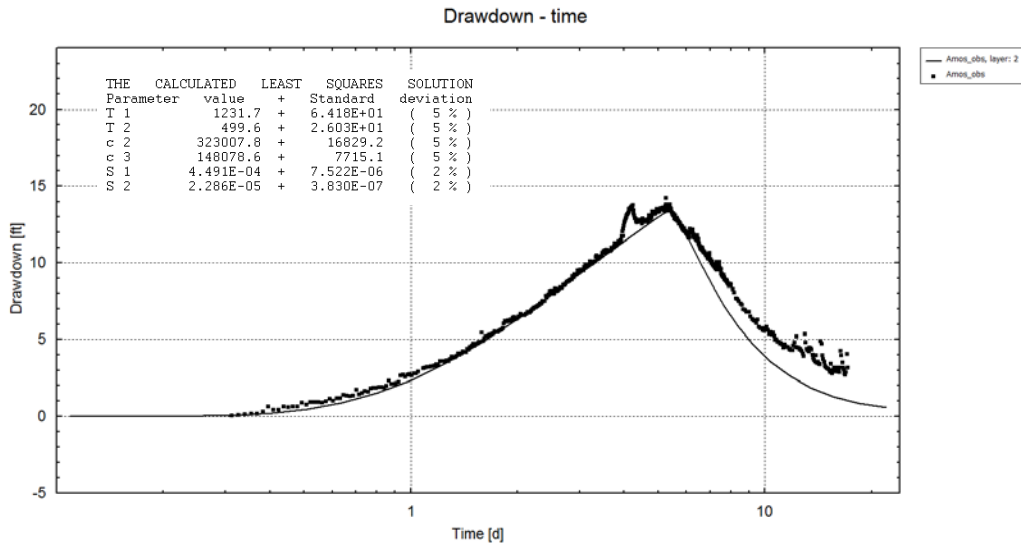


Figure A-12. MLU conceptual models that returned the best-fit of the data to the Amos Well considering two aquifers and two aquitards (upper) and only one aquifer (lower). Note that the value under T (ft²/d) in the aquitard is actually a conductance value. A) Contains a conceptual model with two aquifers that has a good fit. B) Contains a conceptual model with only one layer that has the best fit of the data.

A) Two aquifer model



B) Single-layer model

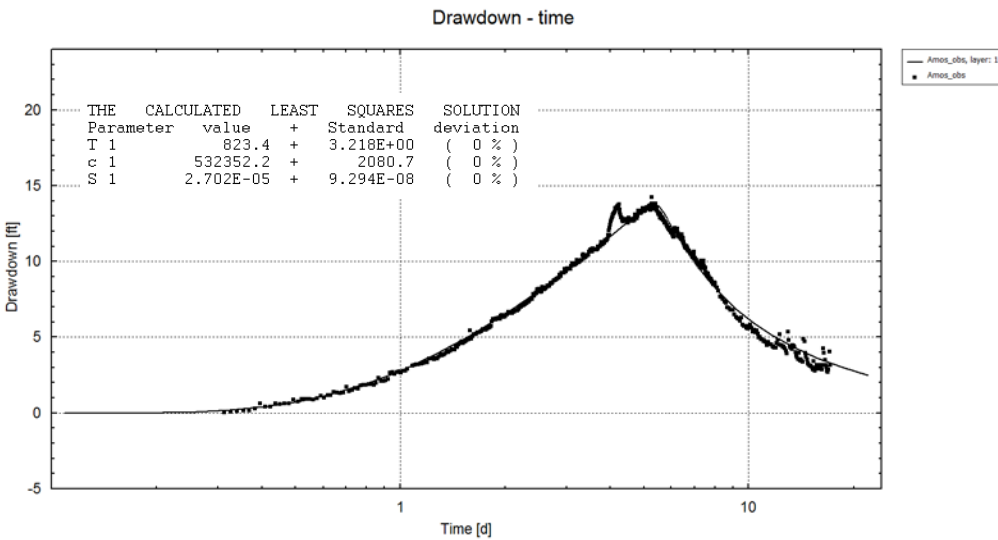


Figure A-13. MLU time-drawdown graph for the Amos OW showing data and model output. A) Results from with two aquifers, B) Results with just one aquifer and has a better fit.

A) Two aquifer model										
Aquifer	Base [ft]	Thickness [ft]	Kh [ft/d]	Code	T [ft ² /d]	#	Code	S [-]	#	Name
1	750	250	3.533548	T1	883.3869	a	S1	0.002882	b	Upper Trinity
	620	130	0.000561	c2	2.31658E+05	a	S'2	0		Glen Rose Aquitard
2	326	294	1.218768	T2	358.3179	a	S2	0.000147	b	Middle Trinity
	276	50	0.000471	c3	1.062005E+05	a	S'3	0		Hammett Aquitard

B) One aquifer model										
Aquifer	Base [ft]	Thickness [ft]	Kh [ft/d]	Code	T [ft ² /d]	#	Code	S [-]	#	Name
1	706	294	1.729687	T1	508.5281	a	S1	0.000179	b	Middle Trinity

Figure A-14. MLU conceptual models that returned the best-fit of the data to the Hill Top Well considering, A) two aquifers and two aquitards, and B) one aquifer. Note that the value under T (ft²/d) in the aquitard is actually a conductance value. The upper figure with two aquifers had a good fit. However, the second conceptual model had the same good fit.

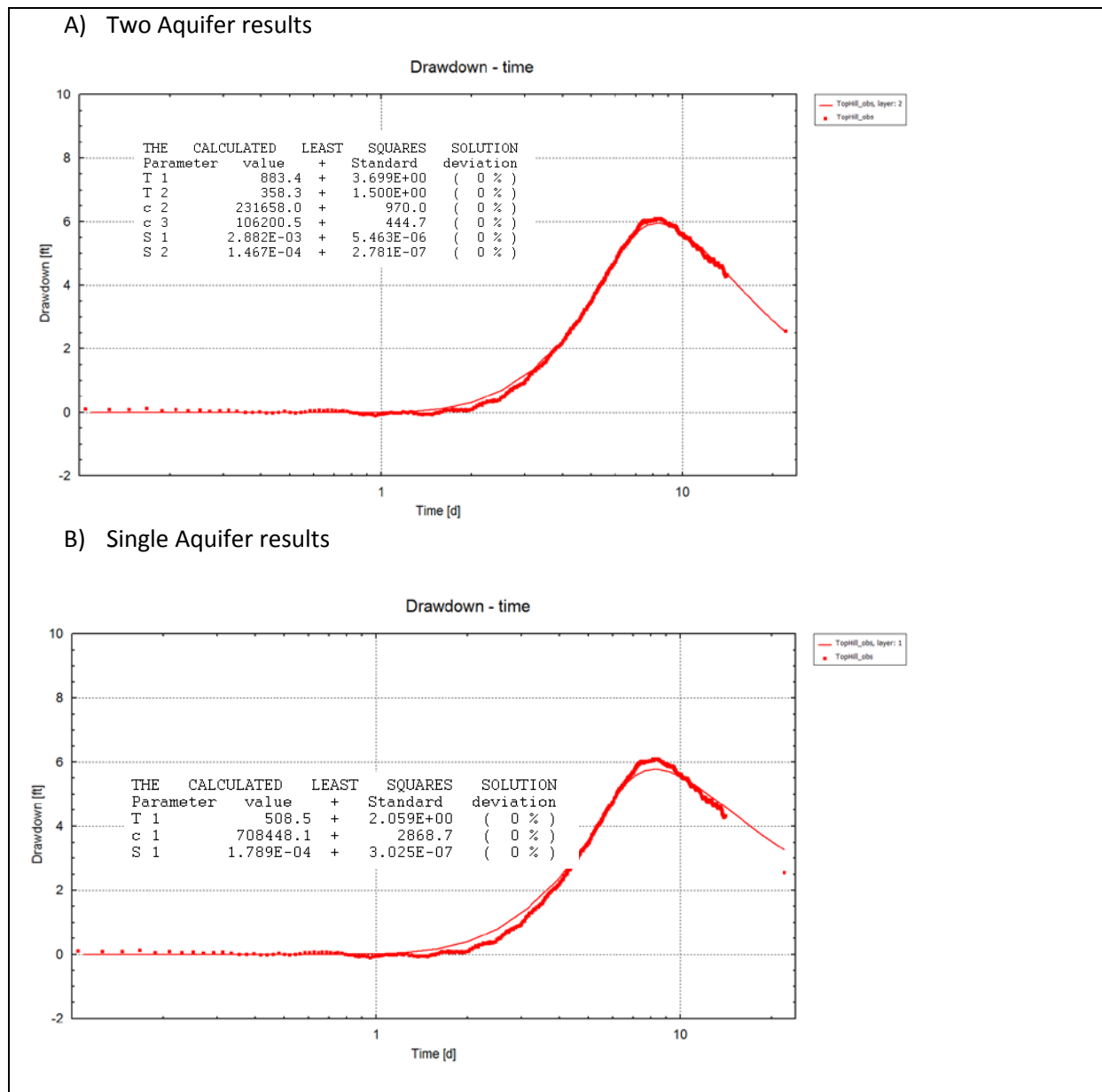


Figure A-15. MLU time-drawdown graphs for the Hill Top OW showing data and model output. The upper figure is with two aquifers, the lower is with just one aquifer. They both had equal statistical fit of the data. However, the multi-layer figure (A) visually matches the late-time better than the single layer.

Discussion and Conclusions

Analytical estimates of transmissivity using various analytical solutions in Aqtesolv and MLU were consistent among the pumping well and all three observation wells. However, estimates of transmissivity from specific capacity were elevated when compared to analytical solutions in Aqtesolv and MLU.

Along strike of the Needmore Well D, and parallel to the fault zone, the observation wells responded quicker and with a larger magnitude to pumping than the Hill Top Well updip and normal to the fault zone. Wells along strike appear to have higher transmissivity and lower storativity values compared to the updip Hill Top observation well.

The MLU program provided similar results as the analytical solutions of Aqtesolv. However, MLU demonstrated that to fit the data, leaky or layered aquifer systems are not needed for a test of this duration. In other words, for this test, the Middle Trinity Aquifer does not appear to derive significant amounts of water from the overlying Upper Trinity Aquifer. Supporting this was the fact that the Caboose observation well (Upper Trinity) monitored for this test did not register any response to the pumping.

Only the discrepancy between manual measurements and transducer data (noted above), and the lack of early-time data in the Catfish observation well were problems with the data from this test. However, those issues do not appear to significantly affect these evaluations and parameter estimations.

Two aspects of the well response to pumping deserve further investigation as to understanding the response in terms of long-term implications, if any:

1. The lack of pseudo-steady state or pumping level reached by the Needmore D Well and therefore the observation wells.
2. Very slow to incomplete recovery of the pumping and observation wells.

The aquifer test conducted by WRGS was done according to BSEACD guidelines and the District was consulted and involved in all aspects of the test. The data collected for the test was of good quality and allows a relatively straight-forward parameter estimation. **Table A-8** contains a summary of the average values of parameter for each well, and the overall average value.

Table A-8. Summary of average aquifer parameters

<i>Well</i>	<i>Average Transmissivity (ft²/d)</i>	<i>Storativity</i>
<i>Needmore D_PW</i>	744	n/a
<i>Catfish OW</i>	826	9.14e-5
<i>Amos OW</i>	814	2.6e-5
<i>Hill Top OW</i>	786	1.6e-4
<i>Average</i>	793	9.25e-5

References

Mace, R., 2001, Estimating Transmissivity Using Specific-Capacity Data: Geological Circular 01-2, Bureau of Economic Geology, University of Texas at Austin, 44 p.

Theis, C.V., Brown, R.H., and Myers, R.R., 1963, Estimating the Transmissibility of Aquifers from the Specific Capacity of Wells: Methods of Determining Permeability, Transmissivity, and Drawdown: in U.S. Geological Survey Water-Supply Paper, No. 1464, 693 p.

Attachment F – House of Representatives Journal Entry 5/31/15

(1) a failure to achieve applicable adopted desired future conditions for the aquifer; or

(2) an unreasonable impact on existing wells as found in the district's order.

(i) A person who relies on the temporary permit granted by this section to drill, operate, or engage in other activities associated with a water well assumes the risk that the district may grant or deny, wholly or partly, the permit application when the district takes final action after notice and hearing to issue a regular permit pursuant to the application.

SECTION 5. If the addition of territory under Section 8802.0035, Special District Local Laws Code, as added by this Act, causes the annual water use fee in Section 8802.105 to exceed \$1 million, the district shall not require an assessment of greater than \$1 million annually as adjusted to reflect the percentage change during the preceding year in the Consumer Price Index.

SECTION 6. (a) The legislature validates and confirms all acts and proceedings of the board of directors of the Barton Springs-Edwards Aquifer Conservation District that were taken before the effective date of this Act.

(b) Subsection (a) of this section does not apply to any matter that on the effective date of this Act:

(1) is involved in litigation if the litigation ultimately results in the matter being held invalid by a final judgment of a court; or

(2) has been held invalid by a final judgment of a court.

SECTION 7. (a) The legal notice of the intention to introduce this Act, setting forth the general substance of this Act, has been published as provided by law, and the notice and a copy of this Act have been furnished to all persons, agencies, officials, or entities to which they are required to be furnished under Section 59, Article XVI, Texas Constitution, and Chapter 313, Government Code.

(b) The governor, one of the required recipients, has submitted the notice and Act to the Texas Commission on Environmental Quality.

(c) The Texas Commission on Environmental Quality has filed its recommendations relating to this Act with the governor, the lieutenant governor, and the speaker of the house of representatives within the required time.

(d) All requirements of the constitution and laws of this state and the rules and procedures of the legislature with respect to the notice, introduction, and passage of this Act are fulfilled and accomplished.

SECTION 8. It is the intent of the legislature that this Act apply only to the territory described by Section 8802.0035, Special District Local Laws Code, as added by this Act, and not have statewide implications.

SECTION 9. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2015.

HB 3405 - STATEMENT OF LEGISLATIVE INTENT

Representative Isaac submitted the following statement for inclusion in the journal:

REPRESENTATIVE E. RODRIGUEZ: Representative Isaac, at the outset, let me say that I am supportive of your bill. The Hays County and Travis County delegations have put a lot of work into this bill this session, and I wanted to commend you on getting this bill through the process. I just want to ask you, as the author of **HB 3405**, a few questions about the bill and the senate amendments to establish the legislative intent of this measure. One of the things that was in the senate committee substitute was the inclusion of a piece of territory in my legislative district and Representative Howard's district that is critical for the management of the groundwater resources in Travis County, but I understand that was not included in the final bill because of a problem with the notice. Is that correct?

REPRESENTATIVE ISAAC: Yes, that is correct.

E. RODRIGUEZ: And I understand that you have agreed to work with me and Representative Howard next session on a bill that would include that territory in the Barton Springs district. Is that correct?

ISAAC: Yes, that is correct.

E. RODRIGUEZ: Also, Representative Isaac, there was a provision in the senate committee substitute that would have escalated the permit fee for well owners in Hays County by 10 cents per year until they were on par with the fees paid by new well owners in Travis County, but that was not included in the final senate amendments. And I understand that you are amenable to helping Representative Howard and I restore that fee escalator next session so that your constituents and our constituents will eventually all be on a level playing field on the amount of fees that are paid to the district. Is that correct?

ISAAC: Should we return, I am happy to discuss that next session.

E. RODRIGUEZ: Now, let's talk about the procedures for issuance of a temporary permit and a regular permit that ended up in the final language. As I understand it, a person in the territory added by this bill has three months from the effective date of this Act to file an administratively complete permit application with the Barton Springs district. And then the district will issue a temporary permit to the applicant that will provide the applicant with authority to drill or operate a well, consistent with permit application, during the period of time between the effective date of the Act and the date the district's board of directors takes final action to grant or deny the regular permit. Is that correct?

ISAAC: Yes, that is correct.

E. RODRIGUEZ: And if during that period of time before issuance of the regular permit the district wants to reduce the amount of water that can be pumped under the temporary permit, the district can only do so if the district's board of directors finds that permit holder is unable to demonstrate by a preponderance of the evidence that their groundwater production will not cause either: (1) a failure to achieve applicable desired future conditions for the aquifer; or (2) unreasonable impacts on existing wells. And the permit holder bears the burden of proof on those demonstrations. Is that all correct?

ISAAC: Yes, that is correct.

E. RODRIGUEZ: So those demonstrations in Subsection (h) of Section 3 of your bill only apply to the temporary permit, correct?

ISAAC: Yes, that is correct.

E. RODRIGUEZ: Now, let's discuss the regular permit. As I understand it, the district board, after notice and hearing, is required to issue the regular permit in the same amount of authorized groundwater production as the temporary permit unless the district finds that doing so will cause: (1) a failure to achieve the applicable adopted desired future conditions for the aquifer; or (2) an unreasonable impact on existing wells. Representative Isaac, Chapter 36 of the Texas Water Code, at Section 36.113, also requires groundwater districts to consider certain other factors in deciding whether to grant or deny a permit, authorizes them to require certain information in permit applications, and authorizes them to impose certain permit conditions, terms, and provisions. For example, the water has to be put to a beneficial use, and the applicant has to agree to avoid waste. Is it your intent that the provisions of Section 36.113 would apply to issuance of a regular permit in the territory added by **HB 3405** in addition to the provisions included in your bill?

ISAAC: Yes, it is my intent that all of the other provisions of Chapter 36 of the Water Code and the district's enabling legislation would apply to these wells in the new territory.

E. RODRIGUEZ: Representative Isaac, it is my understanding that the Barton Springs district also has special provisions in its regulatory system that may require permit holders to reduce pumping in certain drought conditions. **HB 3405** just deals with issuance of the permit holders underlying temporary permit and regular permit. It is not your intent to give any of those permit holders in the added territory any special exemption from the pumping reductions that may be required by the district during special drought conditions, is it?

ISAAC: No, it is not my intent to exempt anyone from the district's rules that apply to permit holders during times of severe drought.

E. RODRIGUEZ: Thank you. And, finally, Representative Isaac, I understand there was a discrepancy between two of the senate floor amendments. Senate Floor Amendment No. 1 required permit holders to pay fees based upon the amount authorized in the permit, which is how I understand the district's regulatory and financing system is structured, and Senate Floor Amendment No. 2 inadvertently said that fees would be based upon the amount of water produced. I understand that we will have a technical correction resolution introduced to clarify the language in Floor Amendment No. 2 to make sure everyone understands that your intent is not to have a different fee payment system in the added territory, but to have those permit holders pay fees based on the amount authorized in the permit, just as all other permit holders in the district currently pay fees. Is that correct?

ISAAC: Yes, that is my intent.

Representative Isaac moved to adopt the conference committee report on **HB 3405**.

The motion to adopt the conference committee report on **HB 3405** prevailed by (Record 1794): 143 Yeas, 1 Nays, 1 Present, not voting.

Yeas — Allen; Alonzo; Alvarado; Anchia; Anderson, C.; Anderson, R.; Ashby; Aycock; Bell; Bernal; Blanco; Bohac; Bonnen, G.; Burkett; Burns; Burrows; Button; Canales; Capriglione; Clardy; Coleman; Collier; Cook; Craddick; Crownover; Cyrier; Dale; Darby; Davis, S.; Davis, Y.; Deshotel; Dutton; Elkins; Faircloth; Fallon; Farias; Farney; Farrar; Fletcher; Flynn; Frank; Frullo; Galindo; Geren; Giddings; Goldman; Gonzales; González; Guerra; Guillen; Gutierrez; Harless; Hernandez; Herrero; Howard; Huberty; Hughes; Hunter; Isaac; Israel; Johnson; Kacal; Keffer; Keough; King, K.; King, P.; King, S.; King, T.; Klick; Koop; Krause; Kuempel; Landgraf; Laubenberg; Leach; Lozano; Márquez; Martinez; Martinez Fischer; McClendon; Metcalf; Meyer; Miles; Miller, D.; Miller, R.; Moody; Morrison; Muñoz; Murphy; Murr; Naishtat; Nevárez; Oliveira; Otto; Paddie; Parker; Paul; Peña; Phelan; Phillips; Pickett; Price; Raney; Raymond; Reynolds; Riddle; Rinaldi; Rodriguez, E.; Rodriguez, J.; Romero; Rose; Sanford; Schaefer; Schofield; Schubert; Shaheen; Sheets; Sheffield; Simmons; Simpson; Smith; Smithee; Spitzer; Springer; Stephenson; Stickland; Thompson, E.; Thompson, S.; Tinderholt; Turner, C.; Turner, E.S.; Turner, S.; VanDeaver; Villalba; Vo; Walle; White, J.; White, M.; Workman; Wray; Wu; Zedler; Zerwas.

Nays — Bonnen, D.(C).

Present, not voting — Mr. Speaker.

Absent, Excused — Longoria; Lucio; Minjarez.

Absent — Dukes; Larson.

STATEMENTS OF VOTE

When Record No. 1794 was taken, I was shown voting yes. I intended to vote no.

Harless

When Record No. 1794 was taken, I was in the house but away from my desk. I would have voted yes.

Larson

SB 313 - CONFERENCE COMMITTEE REPORT ADOPTED

Representative Aycock submitted the conference committee report on **SB 313**.

SB 313 - REMARKS

REPRESENTATIVE AYCOCK: This was sent back to conference committee to strip one nongermane amendment. We retained the Keough amendment which addressed some of the concerns you had the other day about realigning the TEKS that have already been reworked. And I believe I have questions probably.

**CONFERENCE COMMITTEE REPORT ON
HOUSE BILL 3405 ADOPTED**

Senator Campbell called from the President's table the Conference Committee Report on **HB 3405**. The Conference Committee Report was filed with the Senate on Friday, May 29, 2015.

On motion of Senator Campbell, the Conference Committee Report was adopted by the following vote: Yeas 27, Nays 4.

Yeas: Bettencourt, Birdwell, Campbell, Creighton, Ellis, Eltife, Garcia, Hall, Hancock, Hinojosa, Huffines, Huffman, Kolkhorst, Lucio, Menéndez, Nelson, Nichols, Perry, Rodríguez, Schwertner, Seliger, L. Taylor, Uresti, Watson, West, Whitmire, Zaffirini.

Nays: Burton, Estes, Fraser, V. Taylor.

**SENATE RULE 12.09(a) SUSPENDED
(Printing and Notice of Conference Committee Reports)**

Senator L. Taylor moved to suspend Senate Rule 12.09(a) as it relates to the Conference Committee Report on **HB 2804**.

The motion prevailed by the following vote: Yeas 30, Nays 1.

Nays: West.

**CONFERENCE COMMITTEE REPORT ON
HOUSE BILL 2804 ADOPTED**

Senator L. Taylor called from the President's table the Conference Committee Report on **HB 2804**. The Conference Committee Report was filed with the Senate on Friday, May 29, 2015.

On motion of Senator L. Taylor, the Conference Committee Report was adopted by the following vote: Yeas 30, Nays 1.

Nays: West.

**CONFERENCE COMMITTEE ON
SENATE BILL 1735 DISCHARGED**

On motion of Senator Birdwell and by unanimous consent, the Senate conferees on **SB 1735** were discharged.

REMARKS ORDERED PRINTED

On motion of Senator Campbell and by unanimous consent, all remarks regarding **SB 1735** were ordered reduced to writing and printed in the *Senate Journal* as follows:

Senator Birdwell: First and foremost, Members, I want to thank you for your hard work and dedication in working on the Hazlewood program. I also want to thank my colleague and House counterpart on this legislation, Representative John Zerwas. His courtesy and coordination on this legislation has been greatly appreciated. Furthermore, I want to note the courage he displayed by taking on this difficult issue, particularly as a non-veteran. Indeed, the effort to save the program for the men and

Attachment G – Proposed Special Provisions
Needmore Water LLC, Well D Permit Application

SPECIAL PROVISIONS

SECTION 1. DEFINITION OF TERMS

“Baseline Curtailment Rate (BCR)” - is a calculated annual volume based on the actual metered and reported monthly pumping volumes of the previous 12 months. The previous 12-month total is used to establish an annual volume rate referred to as the Baseline Curtailment Rate (BCR). All required temporary curtailments specified in these special provisions are applied to the BCR on a monthly basis until the drawdown in the index well recovers to the specified water level threshold. The BCR is further described in Section 4 of these provisions.

“Index Well(s)” – is a designated observation or monitoring well that is used to measure the water level and/or quality of water within the aquifer. For the purpose of these provisions, “Amos Index Well” and “Catfish Index Well” are designated as compliance index wells; “Amos Index Well” is the primary index well and “Catfish Index Well” is the secondary index well. Details describing these index wells are found in Section 3 of these provisions.

“Response Action(s)” – is a mandatory measure that the Permittee must comply with and implement per the terms and conditions of this permit and its special provisions. Specific response actions are described in Section 4 of these provisions.

“Trigger” – is a designated water level that prompts a response action once the measured water level is reached. For compliance purposes, the measured water level shall be calculated as a 30-day rolling average of the minimum daily water level (measured depth to water, in feet, from land surface) measurements. Once a Trigger has been reached, the Permittee must implement the appropriate response action. Specific Triggers are described in Section 4 of these provisions.

“Mitigation” – for the purpose of these provisions, this term means any proactive or reactive measures taken by a designated party to prevent, reduce, or remedy actual unreasonable impacts on an operational and adequate well that are unanticipated and unavoidable through reasonable avoidance measures.

“Unreasonable Impacts” – The District interprets unreasonable impacts to mean significant drawdown of the water table or reduction of artesian pressure as a result of pumping from a well or well field, which contributes to, causes, or will cause:

1. well interference related to one or more water wells ceasing to yield water at the ground surface;
2. well interference related to a significant decrease in well yields that results in one or more water wells being unable to obtain either an authorized, historic, or usable volume or rate from a reasonably efficient water well;
3. well interference related to the lowering of water levels below an economically feasible pumping lift or reasonable pump intake level; or
4. the Desired Future Condition (DFC) to not be achieved.

SECTION 2. GENERAL

1. In response to the District's review of the submitted Hydrogeological Report and the subsequent preliminary finding identifying unreasonable impacts resulting from permitted pumping (289,080,000 gallons/yr) of Needmore Well D, the District requires permit-specific Response Actions to be implemented in order to avoid unreasonable impacts. These actions are identified in Section 4 of these provisions. The Permittee must comply with the Response Actions associated with Permit Compliance Level (defined in Section 4 below).
2. These provisions designate the use of a primary index well for which Permit Compliance Levels, Triggers and mandatory Response Actions will be established and monitored for compliance. Section 3 of these provisions further describes the details of each index well. In the event that the primary index well is no longer an adequate well for compliance purposes, the permit may be amended to designate the secondary index well (Catfish Well) to serve as the primary index well.
3. As drawdown in the primary index well approaches each Permit Compliance Level, the District will coordinate an evaluation of the data to assess the actual impacts as compared to the modeled impacts of pumping. The District will coordinate with the permittee to schedule a meeting and to review the data. This meeting will also serve to communicate details about the relevant Response Actions in place, as well as to communicate the need for the Permittee to prepare for the upcoming Response Actions that will be required if subsequent Compliance Levels are reached.
4. When the water level in the primary index well reaches a designated Trigger, the District will notify the Permittee via certified mail within ten business days ("Mailed Notification Letter"). This notification will include a revised pumping chart that reflects the BCR and the mandatory temporary curtailments applied to that volume. Upon receipt of the notification and the revised pumping chart, the Permittee must comply with the curtailed monthly pumping allocation to begin on the first day of the month following notification.
5. The Permittee may submit an amendment application to request revisions or modifications to the permit volume or the permit special provisions. The Board will consider such requests as major amendments and will be processed in accordance with District Rule 3-1.4 B(1) and Rule 3-1.4 C(2) related to notification, Board action, and public hearings.
6. If the District determines through its own coordinated evaluation and investigation that production from the permitted well is causing actual unreasonable impacts (as defined in Section 1 of these Special Provisions) to either the index wells or any other operational well that is adequately equipped, maintained, and completed, then the District may require temporary cessation of pumping until the Board, after notice and opportunity of a hearing, approves a staff-initiated amendment to partially reduce the full permit volume to a rate that will reasonably avoid recurrence of unreasonable impacts.
7. In lieu of permit reductions required by provision No. 6, the District may consider voluntary Mitigation measures pursuant to any agreement in effect between the District and the Permittee related to Mitigation to remedy the unreasonable impacts. Such Mitigation measures shall be reserved only after all reasonable preemptive avoidance measures have been exhausted, and shall serve as a contingency for the occurrence of unreasonable impacts that were unanticipated and unavoidable through reasonable measures.

8. If the District determines that new pumping centers or large-scale groundwater production within the area of influence are significantly affecting drawdown relative to the permit Compliance Levels, then the District may consider revision of these permit provisions and permit Compliance Levels. Any permit revisions must be approved by the Board through a permit amendment.
9. Data collected from the index wells that have been determined by the District to be inaccurate shall not be used to determine compliance with these permit provisions.

SECTION 3. INDEX WELLS

The District has designated a primary index well (Amos Well) and secondary index well (Catfish Well) for the purpose of monitoring aquifer conditions in the Middle Trinity Aquifer. These provisions further define the Permit Compliance Levels, Response Actions, and Triggers specific to the primary index well. The secondary index well will be monitored to establish correlated data with the primary index well. In the event that the primary index well is no longer an adequate or accessible well for compliance purposes, the permit may be amended to designate the Catfish Well to serve as the primary index well. The District is responsible for compiling, collecting, and archiving data from the monitor wells. Table 1 describes the two index wells.

The Amos Index Well is part of the Hays Trinity Groundwater Conservation District (HTGCD) well monitoring network. It is a domestic well that is operational and in use as an exempt well. The well is completed as a Middle Trinity well located in Hays County approximately two miles from the permitted Well D. An agreement has been secured between the District and the well owner of the Amos Index well granting access and authority to utilize the well as a monitoring and index well. The Catfish Index Well is located in the HTGCD on the Permittee’s property referred to as Needmore Ranch. The well is operational and in use as an exempt livestock well. The well is completed to produce from the Middle Trinity Aquifer and is located in Hays County approximately one mile from the permitted Well D.

Table 1. List of index wells for the Needmore Well D production permit.

Index Well	Well Name & Well Number	Coordinates	Physical Address	Well Owner Contact
Primary Index Well	Amos Well	29.961399, -98.064977	600 Mission Trail Wimberley, TX 78676	Stephen & Sharon Amos
Secondary Index Well	Catfish Well	29.970093, -98.052253	Needmore Ranch	Needmore Water, LLC

Amos Index Well Provisions

1. Within 90 days of the effective date of the permit, the District, in coordination with the Permittee and well owner, shall be responsible for purchasing and ensuring the proper installation of monitoring equipment necessary to collect and transmit water level data to a website accessible to the Permittee

and the District for the purpose of evaluating compliance with the Section 4 of these Special Provisions.

2. The District shall be responsible for operating, maintaining, repairing, and replacing all monitoring equipment such as pressure transducers, related telemetry equipment, and cell/web hosting fees. All materials and equipment shall be new, free from defects, and fit for the intended purpose. Any expenses for the above described work will be incurred by the District at no cost to the Permittee.
3. The well owner is solely responsible for normal wear and tear, well maintenance, pump servicing or other repairs resulting from the well owner's normal use of the well.
4. The District may consider cost sharing or incurring cost associated with repairs or replacement of any part of the index well that is reasonably necessary or convenient for the continuous and adequate performance of the well for monitoring purposes.

Catfish Index Well Provisions

1. Within 90 days of the effective date of the permit, Permittee shall convey a binding access agreement acceptable to the District for Catfish Index Well that allows the District access for equipment maintenance and repair, and data collection, if warranted.
2. Within 90 days of the effective date of the permit, Permittee shall install, at its own expense, a one-inch conductor pipe to enable the measurement of water level in the Catfish Index Well. In addition, a pressure transducer capable of storing water level data will be installed and data downloaded and provided to the District quarterly. Alternatively, Permittee may assume the expense for the installation of telemetry equipment hosted by the TWDB (assuming TWDB is interested and available). If telemetry equipment is installed and hosted by the TWDB, prior to the telemetry installation, manually collected monthly water level data shall be provided to the District by the fifth of each month along with the required meter reading.
3. The Permittee bears all responsibility and expenses associated with installation, routine maintenance, replacement, repair, or inspection of the pressure transducers or any related telemetry equipment and cell/web hosting fees not covered by the TWDB. All associated work shall be completed by a contractor or contractors selected by Permittee and approved by the District. All materials and equipment shall be new, free from defects, and fit for the intended purpose.
4. The Permittee shall provide notice to the District at least five days in advance of any installation, routine maintenance, replacement or repair of equipment; and shall maintain and submit, upon request by the District, copies of any or all calibration or repair logs. This notice requirement is for both the pumping well and the Catfish Index Well.
5. The Permittee shall be responsible for repairing and replacing any part of the Catfish Index Well. If repairs or replacement of any part of the index well are reasonably necessary or convenient for the continuous and adequate performance of the well, the District shall provide notice and the Permittee shall make repairs and replacements as soon as practicable.

SECTION 4. PERMIT COMPLIANCE ACTIONS

The following Permit Compliance Levels, Response Actions, and Triggers apply to the Amos Index Well as the designated primary index well.

Permit Compliance Level 1 – Evaluation

Trigger 1 - A 30-day rolling average water level equal to or greater than **525 ft** below land surface (bls).

Response Action – When drawdown in the Amos Index Well reaches a sustained average water level that is equal to or greater than **525 ft** bls, the District will conduct an evaluation of the data to assess the actual impacts of pumping. The evaluation will utilize best available science and methods to consider factors and data including, but not limited to:

- a. Manual confirmation of water level data;
- b. Calibration and drift of pressure transducer;
- c. Actual pumping rate and associated drawdown;
- d. Drought conditions;
- e. New local interference from pumping both inside and outside of District;
- f. Water level trends in monitor wells; and,
- g. Revised aquifer parameters (e.g. transmissivity, storativity).

Permit Compliance Level 2 – Avoidance Measures

Trigger 2 - A 30-day rolling average water level equal to or greater than **550 ft** bls.

Response Action A - Establish a Baseline Curtailment Rate (BCR)

When drawdown in the Amos Index Well reaches a sustained average water level that is equal to or greater than **550 ft** bls, the District will establish a BCR. The BCR is a calculated annual volume based on the actual monthly pumping volumes of the previous 12 months. The previous 12-month total is used to establish an annual volume rate referred to as the BCR. All mandatory temporary curtailments specified in these special provisions are applied to the BCR on a monthly basis.

Response Action B – When drawdown in the Amos Index Well reaches a water level that is equal to or greater than **550 ft** bls, the Permittee shall comply with a mandatory temporary monthly curtailment of **20%** off the BCR. When the drawdown in the Amos Index Well recovers to a 30-day rolling average water level that is less than 550 ft bls, the mandatory monthly curtailment of 20% shall be completely relaxed. Upon that recovery, authorization for the full permit volume will be restored provided that drought-triggered curtailments do not apply.

Permit Compliance Level 3 – Maximum Drawdown Allowable

Trigger 3 - A 30-day rolling average water level equal to or greater than **575 ft** bls.

Response Action – When drawdown in the Amos Index Well reaches a sustained average water level that is equal to or greater than **575 ft** bls, the Permittee shall comply with a temporary monthly curtailment of **40%** of the BCR. When the drawdown in the Amos Index Well recovers to a 30-day rolling average water level that is greater than 550 ft bls and less than 575 ft bls, the mandatory temporary monthly curtailment of 40% shall be relaxed to 20%.

Permit Compliance Level 4 – Unreasonable Impacts to Existing Wells

Trigger 4 - A 30-day rolling average water level equal to or greater than **580 ft bls**.

Response Action – Continued drawdown of water levels that are equal to or greater than **580 ft bls** will be considered by the District as evidence of unreasonable impacts to the Amos Well. When drawdown in the Amos Index Well reaches a sustained average water level that is equal to or greater than **580 ft bls**, **the Permittee shall comply with a temporary cessation of pumping**. When the drawdown in the Amos Index Well recovers to a 30-day rolling average water level that is greater than 575 ft bls and less than 580 ft bls, the mandatory temporary cessation of pumping shall be relaxed to temporary monthly curtailment of 40%.

If the District determines through its own coordinated evaluation and investigation that production from the permitted well is causing actual unreasonable impacts (as defined in Section 1 of these Special Provisions) to either the index wells or any other operational well that is adequately equipped, maintained, or completed, then the District may require temporary cessation of pumping until the Board, after notice and opportunity of a hearing, approves a staff-initiated amendment to partially reduce the full permit volume to a rate that will reasonably avoid recurrence of unreasonable impacts.

SECTION 5. DROUGHT CHART & BCR PUMPING CHART

When drawdown in the primary index well reaches the Compliance Level 2 Trigger (**550 ft bls**), the District will establish a BCR reflected as an annual volume. The Permittee will be issued a revised pumping chart that reflects an annual volume referred to as the BCR. Once the Compliance Level 2 Trigger is reached, this revised pumping chart shall replace all other previous pumping charts or drought target charts in place. Upon receipt of the Mailed Notification Letter and the pumping chart, the Permittee must comply with the curtailed monthly pumping allocation to begin on the first day of the month following notification.

As the drawdown in the primary index well recovers to a water level less than **550 ft bls**, the Permittee will no longer be required to comply with the revised pumping chart and may return to following the initially issued drought curtailment chart.

If at any point during the term of the permit, the water level reaches the Compliance Level 2 Trigger (550 ft bls) again after having previously recovered to less than **550 ft bls**, the District will recalculate a new BCR and the Permittee will be issued a new revised pumping chart that reflects an annual volume based on a new BCR. For each occurrence of receding water levels reaching the Compliance Level 2 Trigger, a revised pumping chart reflecting a revised BCR shall replace all other previous pumping charts or drought target charts in place. Upon receipt of the Mailed Notification Letter and the pumping chart, the Permittee must comply with the curtailed monthly pumping allocation to begin on the first day of the month following notification.