



Brazos Valley  
GROUNDWATER CONSERVATION DISTRICT

# Hydrogeology Services Related to Groundwater Management

Brazos Valley Groundwater Conservation District

RFQ# 07-2022



## STATEMENT OF QUALIFICATIONS

August 12, 2022



**DBS&A**  
*Daniel B. Stephens & Associates, Inc.*  
a Geo-Logic Company

12303 Technology Boulevard, Suite 930D, Austin, Texas 78727



**DBS&A**  
*Daniel B. Stephens & Associates, Inc.*  
a Geo-Logic Company

August 9, 2022

Alan M. Day, General Manager  
Brazos Valley Groundwater Conservation District  
112 W. 3rd Street  
Hearne, Texas 77859

Re: RFQ No. 07-2022 Hydrogeology Services Related to Groundwater Management

Dear Mr. Day:

Daniel B. Stephens & Associates, Inc. (DBS&A) has the hydrogeologic expertise to assist the Brazos Valley Groundwater Conservation District (BVGCD) with the District's commitment to make sure that enough good quality groundwater stays in Brazos and Robertson Counties for future generations. DBS&A proposes a team of technical professionals, led by Mr. Andrew Donnelly, PG, that offers the following key benefits:

- ◆ **Thorough knowledge of local hydrogeology:** Our team has developed a comprehensive understanding of the local hydrogeology and aquifer conditions through the work we have performed for the Lost Pines and Fayette County GCDs and the Gonzales County Underground Water Conservation District (UWCD), and through our work with Groundwater Management Area (GMA) 12 for more than ten years. This existing knowledge gives us the ability to address groundwater management challenges and provide appropriate advice quickly and cost-effectively, without needing to get up-to-speed.
- ◆ **Dedicated team of experts:** DBS&A's technical professionals can support the District as an extension of your staff. Our team has decades of experience studying and evaluating groundwater resources, developing and implementing Management Plans under Chapter 36 of the Texas Water Code, and applying our expertise in groundwater availability modeling. We are familiar with the complexities associated with joint groundwater planning, and fully understand the dynamics associated with joint groundwater planning in Groundwater Management Area 12. We also offer three-dimensional (3D) modeling services to visualize aquifer systems, which can help the District to convey results and plans to stakeholders.

- ◆ **Responsiveness:** Our staff is committed to being highly responsive to the District. Our Project Manager, Mr. Andrew Donnelly, PG, will be supported by DBS&A's Austin, Texas, office, which is 83 miles from the District's office in Hearne. Several of our designated team members who have extensive experience supporting local groundwater conservation districts are located in Austin. Our team will be readily accessible and available to support the General Manager and District staff as needed.
  
- ◆ **Practical approach to resource management and planning:** Groundwater is DBS&A's core area of expertise. For 40 years, our professionals have assisted water providers and conservation districts across the Southwest in understanding groundwater. We have consistently proven to be a practical and reliable partner to numerous other GCDs that we consult for and have shown that we can provide technical expertise on a wide variety of groundwater issues. We are eager to provide our knowledge and expertise to help the District to address the hydrogeologic challenges that you face.

RFQ Requirements

Submitting firm:	Daniel B. Stephens & Associates, Inc.
All Principals of the Firm:	Chief Executive Officer: Nicole Sweetland, PhD, PG President: James A. Kelsey, PG Senior Vice President: Neil Blandford, PG Vice President, Texas Operations: Kevin Hopson, PG Vice President, New Mexico Operations: Gundar Peterson, PG
Person Authorized to Contractually Negotiate and Obligate the Firm:	Vice President, Texas Operations: Kevin Hopson, PG
Key Personnel Proposed to Provide Services:	Primary Point-of-Contact: Andrew Donnelly, PG: Project Manager, Senior Hydrogeologist, (512) 431-3784, adonnelly@geo-logic.com Secondary Point-of-Contact: Paul Kirby, PG: Assistant Project Manager, Geologist, (512) 651-6012, pkirby@geo-logic.com

Mr. Alan Day  
August 9, 2022  
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Key Personnel continued...	Principal-in-Charge: Kevin Hopson, PG: Vice President, Texas Operations, (512) 651-6002, khopson@geo-logic.com  Technical Advisor: Neil Blandford, PG: Senior Vice President, Principal Hydrologist, (505) 353-9105 nblandford@geo-logic.com
Person to Contact for Clarification:	Andrew Donnelly, PG: Project Manager, Senior Hydrogeologist, (512) 431-3784, adonnelly@geo-logic.com

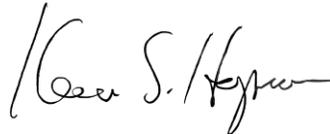
We look forward to working with the District to support your hydrogeological and groundwater management needs. Please contact Mr. Donnelly at (512) 431-3784 or [adonnelly@geo-logic.com](mailto:adonnelly@geo-logic.com) with any questions.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.



Andrew Donnelly, PG  
Project Manager, Senior Hydrogeologist



Kevin Hopson, PG  
Vice President, Texas Operations

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*“I would strongly recommend Daniel B. Stephens & Associates for your long-term consulting needs...[DBS&A] has provided nothing less than superior hydrogeologic services to the district on a myriad of projects and tasks, on time and on budget. Specifically, the staff have shown extensive technical knowledge in mapping, modeling, hydrology, planning, and project management.”*

-David A. Van Dresar, General Manager, Fayette County Groundwater Conservation District



### Andrew C. A. Donnelly, PG— Project Manager, Senior Scientist



Project Manager

Mr. Donnelly is a Project Manager with over 30 years of experience providing expert hydrogeologic consulting services to a variety of clients, including many GCDs such as Lost Pines GCD, Fayette County GCD, Gonzalez County UWCD, Colorado County GCD, Pecan Valley GCD, and others. Mr. Donnelly specializes in hydrogeologic analysis and groundwater resources research, groundwater modeling, water supply investigations, joint groundwater planning including the development of desired future conditions (DFCs), and groundwater flow modeling with groundwater availability models (GAMs) and other groundwater flow models. He has conducted several state-wide groundwater resource evaluations that have included the assessment of the geology, hydrogeology, and water quality of all of the state’s major and minor aquifers, including an evaluation of the brackish groundwater resources across Texas. Mr. Donnelly was also the Project

Manager for the development of a recent guidance manual on the design, installation, and testing of the ideal brackish groundwater testing well. Mr. Donnelly has worked with nearly all of the GAMs developed for the State’s major and minor aquifers. He has extensive experience with the Carrizo-Wilcox Aquifer, including over ten years of experience studying this aquifer as a technical consultant for the Lost Pines GCD, Fayette County GCD, and Gonzales County UWCD. He managed a multi-year project for the Gonzales County UWCD that involved the installation of monitoring wells in the outcrop of the Carrizo Aquifer as part of a network being installed to monitor the DFCs adopted by GMA 13 and the Gonzales County UWCD.

Mr. Donnelly will be the primary point of contact for the District, and will be responsible for meeting all project objectives, managing costs, overseeing the DBS&A project team, and developing and implementing technical project approach. He will coordinate the activities of the team members, facilitate and coordinate communication with the GCD and the team, and ensure that team members adhere to budgetary and schedule commitments. Although living out of state temporarily, Mr. Donnelly maintains his commitment to provide prompt service to all of his clients. In addition, our Austin office has multiple staff members (see below) who also have extensive experience supporting GCDs, should there be a need for in-person representation on short notice. Our team is committed to being readily accessible and available to support the General Manager and District staff as needed, including attending meetings with the General Manager and permittees, and hearings of the Board as requested.

*“[Andy is] ...our point guy and he’s excellent. He also produces very good documents. He’s able to write and use terms that the Board understands and that’s very good because we have new Board members and some of them are still learning the water business.”*

- Joe Cooper, (Formerly) Lost Pines Groundwater Conservation District

**Paul B. Kirby, PG—Assistant Project Manager, Geologist**



**Assistant Project Manager**

Mr. Kirby has 14 years in the water resource consulting industry. He specializes in providing support to GCDs on a range of geologic and hydrogeologic issues and will serve as the Assistant Project Manager and secondary point-of-contact and liaison between our project team and the District. Based in our Austin office, Mr. Kirby will be available for in-person meetings as needed. As Project Manager and primary technical lead for DBS&A for our Fayette County and Pecan Valley GCD clients, he attends Board of Directors meetings, answers question from Board members, District staff, and the public regarding groundwater quality conditions, aquifer DFCs and many other topics. He also managed multi-year groundwater quality studies for both the Fayette County GCD and Pecan Valley GCD, sampling hundreds of wells throughout each district. These were the most comprehensive groundwater studies conducted in these counties since the 1960s. Mr. Kirby has extensive experience collecting and analyzing data, preparing reports, and constructing GIS geodatabases.

**Kevin S. Hopson, PG—Principal-in-Charge, Vice President—Texas Operations, Senior Geologist**



**Principal-in-Charge**

Mr. Hopson has more than 32 years of professional experience in the environmental and geoscience industry and currently serves as DBS&A's Vice President for Texas operations. He provides managerial and technical support in water resources projects, environmental investigations, groundwater remediation, and public water supply concerns. Mr. Hopson has experience working with GCDs in Texas, such as Fayette County GCD and Gonzales County UWCD, in addition to having served as Principal-in-Charge for a comprehensive water audit, rate study, and conservation plan for three separate projects for the Cities of Marathon, Lyford, and Carrizo Springs, Texas.

Mr. Hopson will be responsible for overall client satisfaction, ensuring compliance with contract documents, and committing appropriate and effective resources to the project.

**T. Neil Blandford, PG—Senior Technical Advisor, Principal Hydrogeologist**



**Senior Technical Advisor**

Mr. Blandford has 35 years of experience specializing in water supply investigations and water rights analysis, numerical simulation of groundwater flow and contaminant transport, groundwater planning, computation of the effects of groundwater pumping on surface water, hydrogeologic evaluations, wellhead protection area delineation and source water determination, well field design, and expert testimony in water cases. He has served as Technical Advisor for DBS&A's on-call contract with the Lost Pines GCD providing technical oversight and review of hydrogeological and groundwater management issues. Mr. Blandford has worked extensively with the TWDB, including development of multiple GAMs. Mr. Blandford has provided technical expertise to other Texas Water Districts, including Hemphill County UWCD, Goliad County GCD, High Plains UWCD, and the Colorado River Municipal Water District. Mr. Blandford will provide senior review and serve as a technical advisory resource for the team.

*“The Goliad County Groundwater District Board of Directors thanks you for your hard work in the Contested Case Hearing. We are privileged to have worked with you in this gigantic undertaking. Neil, your knowledge and ability in this matter has been a tremendous asset to Goliad County and the District. You have understood the financial restraints on the District and have been willing to work through those matters with us. No matter the outcome of the case, we know we had the best possible advice and information we could have from you and your colleagues.”*

-Barbara Smith, Goliad County Groundwater Conservation District

### **Kenneth Calhoun, GISP—GIS Manager**



**GIS Manager**

Mr. Calhoun is the Manager of DBS&A's GIS services and has 25 years of experience. He specializes in coordination of enterprise-wide GIS for well, groundwater, land use, and water resources management, and implementation of various GIS software, global positioning system (GPS), and remote sensing technologies for GIS project management. Mr. Calhoun provides GIS support for litigation projects by utilizing historical maps and aerial photographs in support of client positions in water rights, environmental cleanup, and land trespass cases. Mr. Calhoun was Project Manager and GIS technical lead for the web-based water well management system for Lost Pines GCD. The system capabilities included online mapping, data collection, and links to online documentation and scanned documents. He also served as Project Manager for the development of a water well management system for University Lands, in Midland, Texas; Project Manager for the online water well registration database and online mapping application and geodatabase development for the Northern Trinity GCD; and technical lead for the GIS support of municipal water supply sources from the Southern Ogallala Aquifer in the City of Lubbock, Texas. Mr. Calhoun will provide GIS, mapping, and database support to the team.

### **Amy Ewing, PG—Senior Hydrogeologist**



**Technical Staff**

Ms. Ewing is a licensed Professional Geoscientist in Texas with more than 24 years of experience, specializing in hydrogeology; surface and groundwater quality studies; managed aquifer recharge; and water supply, conservation, and drought planning. As the Project Manager for the 2016 Region O Regional Water Plan in Texas, she has knowledge of the geology and hydrogeology of Texas, as well as a thorough understanding of the Regional Water Planning and State Water Planning process. She will provide technical support to the team.

**Russell S. Perry, PG—Senior Geologist**



Technical Staff

Mr. Perry has more than 34 years of experience in the environmental consulting profession. He has worked with the Gonzales County UWCD overseeing the installation of monitoring wells completed in the Carrizo Aquifer to quantify the effects of groundwater production relative to the DFCs adopted by GMA 13 and the Gonzales County UWCD. He led a Water Resources Study for Apex Clean Energy to develop a desktop study of groundwater availability and has experience performing groundwater resource investigations. He will provide local, technical support to the team.

**Elizabeth Bastien—Hydrogeologist**



Technical Staff

Ms. Bastien specializes in water resource investigations, water quality studies, water planning, permitting, and aquifer storage and recovery projects. She has extensive experience supporting the design, drilling, and installation of water supply wells. Ms. Bastien has conducted and analyzed numerous aquifer tests to evaluate aquifer properties such as transmissivity, storativity, and storage potential. She oversaw field work and reporting responsibilities for the National Ground Water Association award-winning water supply project in Amarillo, Texas. Ms. Bastien will provide technical support to the team.

**David N. Manoukian, PG— Staff Geologist**



Technical Staff

Mr. Manoukian has five years of professional experience providing water resources consulting services. He has collected thousands of water quality samples from private supply and groundwater monitoring wells, managed field crews, drilled and logged hundreds of soil borings, and collected, managed, and interpreted field data for approximately 100 projects. His experience has focused on collecting and interpreting field data, oversight of field investigations, data management and interpretation of geophysical well logs, and construction of hydrogeologic maps and cross sections. Mr. Manoukian will provide local, technical support to the team, including field services as needed.

### Daniel Ricardo Acevedo—Staff Geologist



Mr. Acevedo is a recent graduate educated in hydrology, hydrogeology, geology, and the environment. Mr. Acevedo has participated in estimating the impacts of groundwater pumping for hydraulic fracturing on fresh and brackish water aquifers in the Permian Basin of West Texas. He successfully developed water quality maps and assessed the impacts of pumping water on the aquifer hydraulic head, gross water volumes that entered and left storage, and volumetric fluxes within and between hydraulically connected aquifers. Additionally, Mr. Acevedo has experience in collecting, organizing, and interpreting data. He is skilled in geologic mapping and rock identification, and has experience with ArcGIS, Groundwater Modeling Systems, MODFLOW, and the Python programming language. Mr. Acevedo will provide local, technical support to the team.

## B. FINANCIAL CAPABILITY AND FINANCIAL STABILITY

DBS&A has worked on many projects within short timeframes due to regulatory or operational constraints and is committed to timely project completion. We know from experience that prompt, consistent communication is critical to keeping projects on schedule and within budget. Over our 38-year history, we have an estimated 96% on-time record of meeting client deadlines for project deliverables.

Additionally, DBS&A has not defaulted, failed to complete a contract, or had a contract terminated by the other party. Our references, provided in Exhibit C, can also attest to the accuracy, timeliness, and reliability of DBS&A.

### Demonstration of Financial Capability

DBS&A uses Deltek Vision software for financial and project accounting and payroll processing. We have an excellent record of successfully managing the financial aspects of project execution. During all tasks under a contract, Mr. Donnelly will monitor our progress using Vision's real-time financial and accounting reporting functions, as well as other in-house project management tools. Use of this interactive software and internal quality assurance processes consistently helps DBS&A to avoid budget overruns through controlling costs.

### Demonstration of Financial Stability

DBS&A has the necessary financial stability to undertake water resources projects of substantial size. As a wholly owned subsidiary of GLA, DBS&A is backed by an employee-owned corporation that has demonstrated consistent growth and profitability since GLA was founded in 1991. *Engineering News-Record* ranked GLA among the Top 500 Design Firms in the U.S. with a total revenue of over \$66.96 million in 2021. We are financially stable and maintain the accounting and other operational infrastructure, including lines of credit, required to effectively and securely operate a business of our size. Evidence of our financial stability, including our accountants' report, recent balance sheet, and income statement is confidential, but can be provided upon request.

### C. QUALIFICATIONS FOR KEY INDIVIDUALS

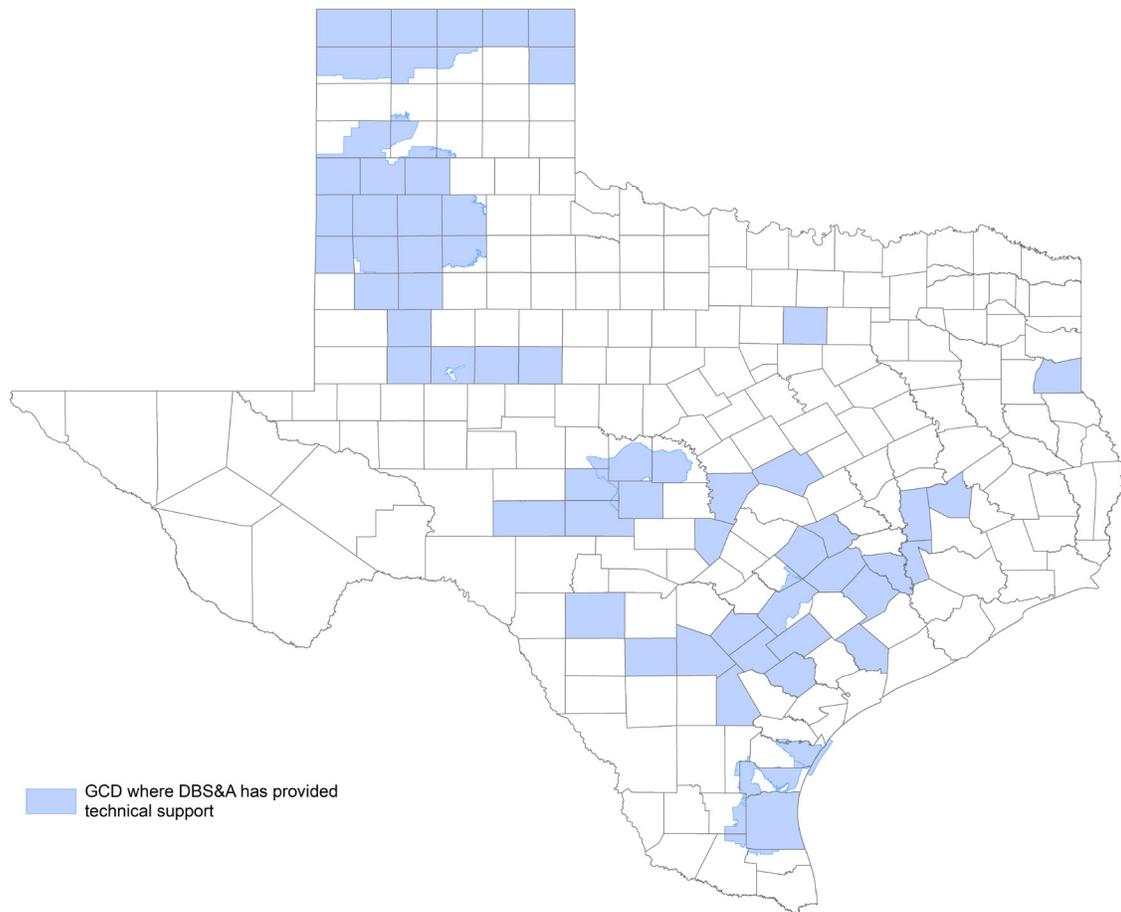
A summary of our proposed team’s qualifications are below. Please see detailed resumes in Appendix A for other qualifications for key individuals assigned to the District.

Staff	Role	Licenses/ Certifications	Memberships	Years of Experience
<b>Andrew Donnelly, PG</b>	Project Manager, Senior Scientist	Professional Geoscientist, TX #737	Texas Alliance of Groundwater Districts	34
<b>Paul B. Kirby, PG</b>	Assistant Project Manager, Geologist	Professional Geoscientist, TX #10841; Class C Groundwater Treatment Operator, TX #WG0017118		14
<b>T. Neil Blandford, PG</b>	Senior Technical Advisor, Principal Hydrogeologist	Professional Geoscientist, TX #1034	National Ground Water Association; International Association of Hydrogeologists	35
<b>Kevin Hopson, PG</b>	Principal-in-Charge, Vice President – Texas Operations, Principal Scientist	Professional Geologist, TX #1702	National Ground Water Association; Corrective Action Project Manager, Texas	32
<b>Amy Ewing, PG</b>	Hydrogeologist	Professional Geologist, TX #10413	American Water Resources Association; National Ground Water Association	24
<b>Russell S. Perry, PG</b>	Technical Staff Member	Professional Geologist, TX #735		34
<b>Kenneth Calhoun, GISP</b>	GIS Mapping and Database Specialist	Certified Geographic Information Systems Professional, GIS Certification Institute #43134	New Mexico Geographic Information Council	25
<b>Elizabeth M. Bastien</b>	Hydrogeologist		American Water Resources Association; National Ground Water Association	13
<b>David Manoukian, PG</b>	Technical Staff Member	Professional Geoscientist, TX #15105; Construction Quality Management Control for Contractors (U.S. Army Corps of Engineers)		7
<b>Daniel Acevedo</b>	Staff Geologist		Geological Society of America	2

## D. COMPANY’S EXPERIENCE AND QUALIFICATIONS

DBS&A and, specifically, our Austin office have provided water resources and environmental services to state, municipal, and private-sector clients since 1999. We assist water management agencies across Texas in the analysis of water resources and have provided technical support for GCDs for decades.

Areas of expertise of particular interest to the District include: hydrogeologic investigations; hydrogeologic mapping; groundwater flow modeling; assistance with permit application review; review, evaluation, and management of data collected by the GCD, including water level and water quality data; joint groundwater planning, including assistance with the development of DFCs and the evaluation of DFC compliance; and the application and assessment of GAMs. DBS&A also has experts in water well design that can assist the District with well design specifications or review, if requested.



Texas GCDs and UWCDs that DBS&A has worked for include: Blanco-Pedernales, Central Texas, Colorado County, Fayette County, Goliad County, Kenedy County, Lone Wolf, Lost Pines, North Plains, Northern Trinity, Pecan Valley, and Texana GCDs; and Evergreen, Gonzales County, Hemphill County, Hickory, Live Oak, Mesa, Permian Basin, South Plains, and Sutton County UWCDs.

Our experience in each of the areas of specialized expertise that the District seeks is demonstrated in the matrix below. Detailed descriptions of particularly relevant project examples are in Appendix B.

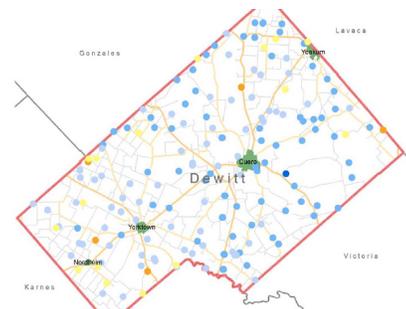
Water Conservation District	Hydrogeologic Mapping	Hydrogeologic Modeling/GAMs	Hydrogeological Investigations	Aquifer Research / General Knowledge	Management Plans / Rules	Well Spacing / Production Limits	Forecast, Planning Models / Tools	Presentations to GCDs, GMAs and Public	GAM for District Aquifers	Expert Services / Work with Legal Counsel	GIS Development
Bluebonnet GCD			●	●	●	●					
Central Texas GCD	●	●			●		●				●
Colorado County GCD			●	●					●		●
Evergreen UWCD			●		●				●		
Fayette County GCD	●	●	●	●	●	●	●	●	●		●
Goliad County GCD		●	●	●	●	●	●		●	●	●
Gonzales UWCD		●	●	●	●	●	●	●	●		●
Hemphill County UWCD	●	●	●	●	●	●	●	●	●	●	●
Hickory UWCD	●	●		●					●		
High Plains UWCD	●	●	●	●	●	●	●	●	●	●	●
Lost Pines GCD	●	●	●	●	●	●	●	●	●	●	●
Mesa UWCD	●	●		●						●	●
Pecan Valley GCD	●	●	●	●		●		●	●		●
Permian Basin UWCD		●		●	●		●				
Sutton County UWCD				●				●			●
Texana GCD			●		●			●	●		

Specific areas of our experience that will be advantageous to the Brazos Valley GCD include the following:

**Hydrogeologic Mapping**

We employ hydrogeologic mapping as a method of gathering and evaluating geological and groundwater information. This can be used to create a three-dimensional (3D) depiction of the subsurface geologic units in which groundwater occurs and can serve as the basis for the development of 3D groundwater flow models. Our GIS, graphics, and database capabilities include online mapping, data collection using online forms, and integration of online documentation and scanned documents, allowing us to efficiently and effectively store, retrieve, analyze, and present water resources data to technical audiences and the public. DBS&A has created 3D subsurface models for many projects, including Fayette County and other GCDs. The

Fayette County 3D hydrostratigraphic model assists the GCD with public education and was the basis of an online tool used to help estimate aquifer depths at locations throughout the district. DBS&A has also incorporated hydrogeologic mapping in multiple aquifer studies conducted for the TWDB. For example, DBS&A recently completed a conceptual model of the Cross Timbers Aquifer, a recently designated minor aquifer in north-central Texas, which incorporated hydrogeologic modeling to help delineate the hydrostratigraphic units of this very complex aquifer system. DBS&A is currently completing a similar conceptual model of the Marathon Aquifer in West Texas, which is also a very structurally complex aquifer system.



### Hydrogeologic Modeling (GAMs)

DBS&A in general and our proposed project staff in particular have extensive experience developing and using groundwater flow models for numerous clients on a wide range of projects. This experience includes the development and/or application of numerous TWDB GAMs. Our proposed Project Manager, Mr. Donnelly, worked for the TWDB in their GAM Section prior to working at DBS&A. While at the TWDB, he worked with all of the GAMs statewide and used many GAMs to conduct predictive simulations, and he evaluated each GAM for accuracy, corrected identified errors and inconsistencies, and converted multiple GAMs for use with the TWDB's preferred modeling software platform Groundwater Vistas. DBS&A also has extensive experience with the development and application of GAMs, having evaluated and used a majority of the GAMs and having developed GAMs of the Southern Ogallala Aquifer and the Edwards-Trinity (High Plains) Aquifers. DBS&A also developed conceptual models and/or structural models of the Llano Uplift Aquifers, the Blaine Aquifer, the Cross Timbers Aquifer, the Capitan Reef Aquifer, and the Marathon Aquifer.

Directly relevant to the Brazos Valley GCD, DBS&A has extensive experience with the central Queen City-Sparta GAM. We have used this model extensively to conduct technical analyses on behalf of the Lost Pines and Fayette County GCDs, both as part of the DFC development for GMA 12, and also as a standard part of the technical analysis of permit applications received by these districts. We were part of the team that developed the recent update to this GAM, providing in-kind services on behalf of the Lost Pines GCD during the model update effort. We have developed a wide array of processes to set up various modeling simulations and to efficiently post-process the results of simulations.

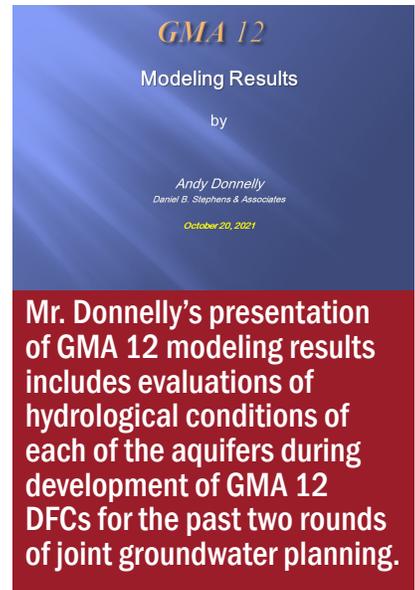
### Hydrogeologic Investigations

Hydrogeologic investigations are a core area of DBS&A expertise. Our expertise in hydrogeological site investigations includes the review and interpretation of existing information, field reconnaissance, hydrogeological mapping, borehole drilling (exploratory and production), well installation, water level surveys, groundwater sampling, geophysical surveys, pumping tests to determine sustainable well yield and aquifer properties, analysis of chemical analytical data, vulnerability, hazard and risk evaluations, data processing and reporting. DBS&A has conducted water quality investigations for both the Fayette County and Pecan Valley GCDs, both of which were multi-year investigations where hundreds of wells were sampled across each district, including the Carrizo-Wilcox, Queen City, and Sparta Aquifers. A comprehensive report was written at the conclusion of each study detailing the water quality and geochemical conditions observed for each aquifer across each district. For the Lost Pines GCD, we have conducted a wide variety of hydrogeologic investigation tasks, such as investigating the regional impacts of pumping that is occurring from the Vista Ridge project in Burleson County, evaluating long-term water level trends across the Lost Pines GCD, and evaluating localized hydrogeologic issues that the District requested assistance with, such as water quality issues with small, local springs.

### Research and General Knowledge of the District Aquifers

As the consultant for the Fayette County GCD and Gonzales County UWCD since 2009 and the Lost Pines GCD since 2011, DBS&A has extensive knowledge of all of the aquifers in the region, including the aquifers in Brazos Valley GCD (Simsboro, Calvert Bluff, Hooper, Carrizo, Sparta, Queen City, Yegua-Jackson, and Brazos River Alluvium aquifers). We have reviewed hundreds of well and geophysical logs, available reports, and discussed, analyzed and considered the character of each of the aquifers as part of our day-to-day work for those districts. This detailed knowledge enables us to make informed judgements that support those districts in making sound management decisions.

Mr. Donnelly has developed overview presentations on the nature of the aquifers managed by the Lost Pines GCD as part of workshops provided for both GCD directors and the public. Mr. Donnelly evaluated the aquifer uses and conditions and the hydrological conditions of the aquifers in the entire GMA 12 region, including Brazos and Robertson Counties, as part of the nine factors that must be evaluated by GMA 12 during the development of DFCs for the past two rounds of joint groundwater planning. This research included the evaluation of the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos River Alluvium Aquifers. These evaluations were presented to GMA 12, then incorporated into the final Explanatory Report, which Mr. Donnelly was the primary author of for the third round of joint groundwater planning that concluded in 2022.



### GCD Management Plans and Rules

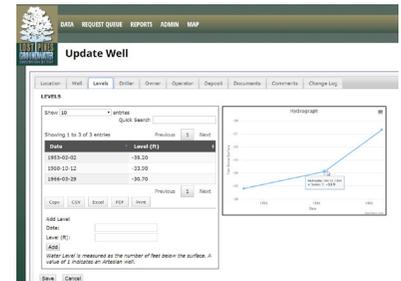
Our team is very familiar with the rules of many different GCDs. We have provided numerous recommendations to the Lost Pines GCD regarding changes that may be made to the existing rules as well as new rules that might be considered by that district. DBS&A is currently assisting the Lost Pines GCD establish a groundwater management zone in northern Lee County in response to water level declines observed there due to a large groundwater production project. DBS&A is also very familiar with the Management Plans of many different GCDs. We prepared preliminary drafts of a completely revised Management Plan and assisted with the past two Management Plan updates for the Lost Pines GCD, and have assisted other GCDs with their Management Plans. DBS&A is also very familiar with the rules and Management Plans of many other GCDs throughout the state. We have reviewed plans for all of the GCDs that are members of GMA 12, including BVGCD, and reviewed the rules and Management Plans for dozens of other GCDs as part of several regional water resources evaluations that we conducted for the General Land Office and University Lands. A good understanding of what other GCDs have incorporated into their rules and Management Plans is useful when evaluating rules and Management Plans, and modifications that might be recommended to help the GCD meet its goals and objectives.

### GCD Well Spacing and Production Limits

Both well spacing and production limit rules are often established during the initial development of a district's rules. DBS&A has worked extensively evaluating the rules of numerous GCDs with respect to both well spacing and production limits as part of large, regional evaluations conducted for the General Land Office and University Lands projects, and we routinely evaluate both well spacing regulations and production limit rules during our work on groundwater investigations throughout Texas. DBS&A has also worked with the Lost Pines GCD staff evaluating the current district well spacing rules and how these rules might be amended in future rules updates, and we have evaluated the potential for implementing production limits for the Lost Pines GCD and provided input on incorporating such limits into the GCD's rules.

### Creating Forecast, Planning Models and Tools

DBS&A has extensive experience using a variety of models to support different types of hydrogeologic investigations. For the Lost Pines GCD, we have run a large number of predictive simulations using the Central Queen City-Sparta GAM to help predict impacts of various pumping scenarios. These types of modeling scenarios are a standard part of our technical review of permits for this District. Predictive scenarios may evaluate drawdown within the District or over the broader region of GMA 12, where we have supported joint groundwater planning efforts by modeling multiple pumping scenarios across the 14-county GMA 12 area, including BVGCD. We have also run predictive model simulations to help develop impact assessments for large pumping projects that are pumping, or will produce, large quantities of groundwater in the region. DBS&A is also capable of evaluating well field operations, well field sustainability, identifying areas suitable for groundwater banking, groundwater resource planning, and identifying potentially feasible water management strategies using a variety of planning models and tools. Accurate and reliable prediction of changes in water levels is a critical component of effective groundwater management, and developing effective models that can reasonably predict groundwater levels is imperative. DBS&A's past experience with developing, evaluating and running models means we can use these tools quickly and cost-effectively to provide the BVGCD with the information required to make sound management decisions.



Results of water quality investigation mapped for Pecan Valley GCD

### Delivering Presentations to GCDs, GMAs, and the General Public

DBS&A's project managers and technical leads regularly present the results of findings to Boards of Directors, GMAs, and the general public at public meetings. Mr. Donnelly has developed and delivered several different presentations on basic hydrogeology, the aquifers managed by GCD, and joint groundwater planning at regular board meetings as well as at specific workshops for board members and the general public for Lost Pines GCD. Mr. Donnelly routinely gives presentations on other technical evaluations to GCD boards, and leads discussions at GMA 12 on different aspects of joint groundwater planning efforts being undertaken by the GMA. He has also given presentations at various conferences, such as at the Texas Alliance of Groundwater Districts (TAGD) annual Groundwater Summit. During these meetings and presentations, our team members present findings and help answer questions from the board members, district staff and the general public. Mr. Kirby also regularly presents the results of technical studies to GCDs and has presented the results of GCD studies at technical conferences such as the TAGD Groundwater Summit and the Gulf Coast Association of Geological Societies (GCAGS).

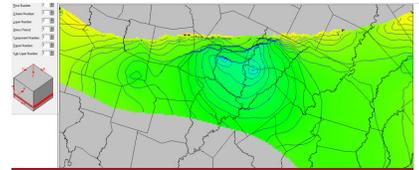


DBS&A provides a wide range of hydrogeologic support and assistance to GCD staff with technical issues.

### GAM Experience for District Aquifers

Our team has extensive experience in the development of regional-scale GAMs of many of Texas' major aquifers such as Pecos Valley, Gulf Coast, Carrizo-Wilcox, Ogallala, Edwards-Trinity (Plateau), and minor aquifers such as Marathon, Cross Timbers, and Edwards-Trinity (High Plains). These models have served as useful tools for evaluating water management strategies and planning and helping the districts in their decision-making processes. Our modeling efforts include data collection; analysis of aquifer water quality, recharge rates, interaction with surface water, and groundwater flow; GIS development; and data visualization, presentation, and reporting, including presenting findings to state, regional, and local water resource planners.

DBS&A also has extensive experience with the central Queen City-Sparta GAM, which is used to evaluate the regional impacts of pumping on many of the aquifers managed by the Brazos Valley GCD, including the Carrizo-Wilcox, Queen City, and Sparta aquifers. DBS&A was part of the team that helped develop the most recent updates to this GAM, providing in-kind services to the project team. This included evaluating the historic pumping occurring outside of the GMA 12 area and, importantly, conducting a thorough comparison of the modeled available groundwater (MAGs) developed using the previous version of the GAM to the revised version of the GAM, which uses a significantly different model structure than the original version. Mr. Donnelly routinely uses the central Queen City-Sparta GAM to evaluate different pumping scenarios and has developed a large number of specific programming routines to help efficiently construct model simulations and post-process model results, which allows for the quick turnaround of modeling and a consistent presentation of modeling results.



**DBS&A was part of the team that helped to update the central Queen City-Sparta GAM, providing in-kind services to the project team.**

### **Expert Witness in Contested Cases, Writing and Analyzing Testimony, and Working with Legal Counsel**

Mr. Donnelly and Mr. Blandford have significant direct experience in the areas of consultation, negotiation, settlement, mediation, and litigation. Mr. Donnelly and Mr. Blandford have testified in contested case and/or administrative hearings on behalf of GCDs, and Mr. Blandford has testified in numerous administrative hearings regarding water supply and water quality issues and has testified as an expert witness in multiple District and Superior Court cases regarding groundwater-related issues. Mr. Donnelly testified on behalf of both the Lost Pines GCD and Hemphill County UWCD at administrative hearings that were held to evaluate petitions filed against the reasonableness of the DFCs adopted by GMA 1 and 12 during the first round of joint groundwater planning. This effort required extensive coordination with legal counsel to defend the DFCs adopted by each GMA, and Mr. Donnelly routinely works with legal representatives for different GCDs. Mr. Blandford testified on behalf of the Goliad County GCD in a contested case involving the effects of proposed uranium mining on groundwater resources within the district. Mr. Blandford worked closely with the District manager and legal counsel on case strategy and expert testimony items.



**Mr. Donnelly testified on behalf of both the Lost Pines GCD and Hemphill County UWCD at administrative hearings.**

Other areas of expertise that may be of interest to the District include:

### **Joint Groundwater Planning**

DBS&A's team has extensive experience with joint groundwater planning. Our staff has worked with over half of the GMAs in the state. DBS&A assisted both GMA 1 and GMA 12 to defend the reasonableness of adopted DFCs in hearings after the first round of joint groundwater planning and has assisted several other GMAs with the development of DFCs and the production of explanatory reports. Mr. Donnelly worked with many of the GMAs, including GMA 12, when he worked at the TWDB, assisting the GMAs in navigating the complexities of joint groundwater planning and the development of DFCs during the initial round of the joint groundwater planning process.

Since moving from the TWDB to DBS&A in 2008, Mr. Donnelly has continued to stay very involved in the joint groundwater planning process with numerous GMAs, and on behalf of many GCDs and stakeholders with groundwater interests in different GMAs, giving him a strong resume of experience with this aspect of groundwater management in Texas. Mr. Donnelly has extensive experience with GMA 12. DBS&A's long-term experience working with GMA 12 will ensure efficient support for the Brazos Valley GCD within GMA 12, as we thoroughly understand all of the issues that will be facing both the Brazos Valley GCD and the GMA in the upcoming fourth round of joint groundwater planning.

### Water Level Evaluation and DFC Compliance

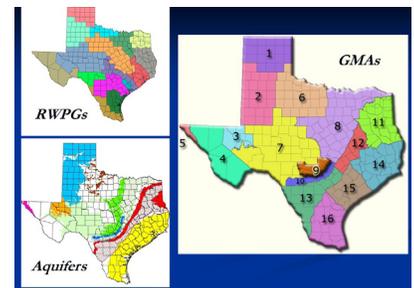
DBS&A has been working with our GCD clients collecting and evaluating water levels to help assess long-term water level trends and evaluate DFC compliance. The evaluation of DFC compliance is complex, and different approaches are being taken by different GCDs throughout the state. DBS&A has been assisting both Fayette County and Lost Pines GCDs with water level collection, organization, and evaluation for many years. We have been actively working with the staff of these GCDs on expanding the monitoring well network, including making recommendations on where additional wells should be added.

### Water Quality Studies

DBS&A has conducted numerous groundwater quality studies for a variety of clients. We conducted comprehensive water quality studies for both the Fayette County and Pecan Valley GCDs. Mr. Kirby was the Project Manager for both of these multi-year studies, each of which involved the sampling of hundreds of wells in all major and minor aquifers across each District. A follow-on multi-year water quality study is about to begin for the Pecan Valley GCD to provide additional background water quality data. These studies were done to help establish a baseline water quality dataset for each GCD that can be used to help assess future water quality declines should they occur. DBS&A would be in an excellent position to assist Brazos Valley GCD to implement such a study very cost effectively, if desired by the District.

### Permitting

DBS&A has been evaluating permits and we also routinely assist our GCD clients with the evaluation of permit applications received by these districts. Permit evaluations may include the complete evaluation of the technical components of the application, including evaluation of model runs as well as conducting independent simulations of the proposed pumping to evaluate the impacts on the groundwater and surface water resources of the GCD. These permit applications range from small applications for less than 100 acre-feet per year to permit applications for large export projects for tens of thousands of acre-feet per year.



DBS&A has played an integral role in the joint groundwater planning process for GMA 12.



DBS&A performs water quality studies to obtain data that can be used to help compare baseline to future water quality conditions.

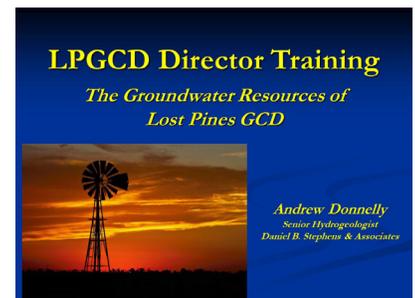
## E. PROJECTS FOR GROUNDWATER CONSERVATION DISTRICTS

DBS&A has successfully provided wide-ranging technical and administrative support to over 30 GCDs. Our most relevant project experience is detailed in the project descriptions provided in Appendix B. We have ongoing contracts with Lost Pines GCD, Fayette County GCD, Pecan Valley GCD, Colorado County GCD, and Gonzales County UWCD, to provide a wide range of hydrogeologic support and assist GCD staff with technical issues. Our duties for these GCDs include:

- Attending Board meetings and presenting the results of technical studies to the Board and the public
- Assisting the GCDs with the review of rules and the District's Management Plan
- Creating presentations on the basics of hydrogeology, the joint groundwater planning process, and the aquifers managed by a District as part of a GCDs' board member training process
- Reviewing operating permit applications
- Performing field investigations, including collecting water level measurements, groundwater quality sampling, and evaluating spring contamination
- Conducting technical studies, including two multi-year, District-wide groundwater quality studies conducted for Fayette County GCD and Pecan Valley GCD

An important role that DBS&A provides for many GCDs is assistance with the joint groundwater planning process. In this role we have provided extensive assistance to multiple GCDs regarding the development of DFCs, including:

- Assisting with the coordination between the GMAs and GCD boards
- Conducting GAM simulations to help understand the relationship between a DFC being considered and the resulting MAG
- Leading discussions with GMAs on the nine factors that must be considered during the development of DFCs
- Producing Explanatory Reports for GMAs



**Mr. Donnelly has provided training on various subjects to bolster the Director's understanding of the District's groundwater resources.**

*"The quality of the reports [DBS&A has] delivered... They're well done and don't need a lot of revision, and it's very much appreciated. That projects their professionalism."*

- Tim Andruss, Texana Groundwater Conservation District

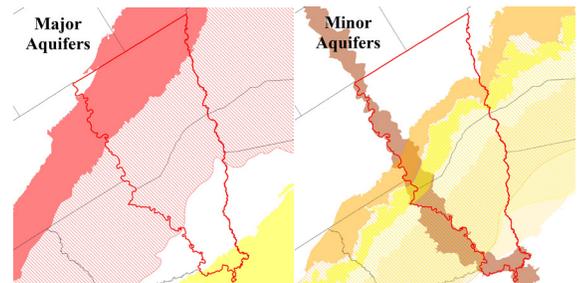
## F. LISTING OF CLIENTS WITH WATER WELLS PRODUCING GROUNDWATER IN THE DISTRICT

DBS&A is not aware of any current or previous clients who have produced groundwater in the District.

## G. EXPERIENCE INVOLVING THE MAJOR AND MINOR AQUIFERS IN THE DISTRICT

As the technical consultant for the Fayette County and Lost Pines GCDs for over ten years, DBS&A has extensive experience with all of the aquifers present in the Brazos Valley GCD. We have researched and evaluated the Brazos Valley Alluvium, Yegua-Jackson, Sparta, Queen City, and all four units within the Carrizo-Wilcox Aquifers for these districts and as part of our work for GMA 12. Our regular work involves significant research on all of these aquifers, and over the course of over ten years we have developed a strong understanding of the nature and extent of each of these aquifers. We have also been involved with the evaluation of the aquifers of the Brazos Valley GCD as part of the consultant team assisting GMA 12, including the evaluation of all of these aquifers across the entire GMA. DBS&A has evaluated hundreds of well and geophysical logs from these aquifers, as well as numerous pumping tests, water quality tests, and a large amount of data from various state databases. DBS&A is also very familiar with the variability of the structure of these aquifers in the region. Evaluating wells in order to assign aquifers to them can be difficult due to the extensive and variable faulting that occurs in some areas. DBS&A has years of experience determining appropriate aquifer assignments in the region.

DBS&A also has extensive experience with these aquifers outside of Brazos Valley GCD and GMA 12. DBS&A conducted a three-year project for the Gonzales County UWCD installing monitoring wells in the Carrizo Aquifer outcrop as part of that district's efforts to expand their monitoring well network to evaluate compliance with their adopted DFCs. We have evaluated many of BVGCD's aquifers as part of statewide studies completed by DBS&A, and Mr. Donnelly evaluated all of the major and minor aquifers of the state, including all of BVGCD's aquifers, when he evaluated the brackish groundwater resources of the state.



### Aquifers that DBS&A has experience working in:

- Brazos Valley Alluvium
- Yegua-Jackson Aquifer
- Sparta Aquifer
- Queen City Aquifer
- Carrizo-Wilcox Aquifer
- Carrizo
- Calvert Bluff
- Simsboro
- Hooper
- Alluvial aquifer(s)

**H. PROFESSIONAL LIABILITY INSURANCE**



**CERTIFICATE OF LIABILITY INSURANCE**

DATE(MM/DD/YYYY)  
12/22/2021

**THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.**

**IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).**

<b>PRODUCER</b> Aon Risk Insurance Services West, Inc. Los Angeles CA Office 707 Wilshire Boulevard Suite 2600 Los Angeles CA 90017-0460 USA	<b>CONTACT NAME:</b> PHONE (A/C. No. Ext): (213)630-3270		FAX (A/C. No.): (847)953-0574
	<b>E-MAIL ADDRESS:</b>		
<b>INSURED</b> Daniel B. Stephens & Associates, Inc. 6020 Academy NE, Ste. 100 Albuquerque, NM 87120	<b>INSURER(S) AFFORDING COVERAGE</b>		<b>NAIC #</b>
	INSURER A: Steadfast Insurance Company		26387
	INSURER B: Zurich American Insurance Company		16535
	INSURER C:		
	INSURER D:		
	INSURER E:		

**COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:			GPL0166069-05	12/31/2021	12/31/2022	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$1,000,000 MED EXP (Any one person) \$25,000 PERSONAL & ADV INJURY \$1,000,000 GENERAL AGGREGATE \$6,000,000 PRODUCTS - COMPI/OP AGG \$4,000,000
B	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS			BAP0166068-05	12/31/2021	12/31/2022	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY ( Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input type="checkbox"/> RETENTION			SXS0166076-05-Excess of General Liab., Auto Liab., Employer's Liab., Professional Liab & Pollution Liability	12/31/2021	12/31/2022	EACH OCCURRENCE \$5,000,000 AGGREGATE \$5,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	WC0166066-05	12/31/2021	12/31/2022	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE-EA EMPLOYEE \$1,000,000 E.L. DISEASE-POLICY LIMIT \$1,000,000
A	Professional Liability & Contractor's Pollution Liab.			GPL0166069-05	12/31/2021	12/31/2022	Each Claim \$2,000,000 Aggregate \$6,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

<b>CERTIFICATE HOLDER</b> Evidence of Insurance	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE <i>Aon Risk Insurance Services West, Inc.</i>

## **I. CONFLICTS OF INTEREST CERTIFICATION**

DBS&A is not aware of any existing conflicts of interest with the BVGCD or its Board of Directors, including the filing of any statements required under Chapter 176, Local Government Code.

### III. CERTIFICATE OF NON-DISCRIMINATION (Exhibit B)

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EXHIBIT B

CERTIFICATION OF NON-DISCRIMINATION

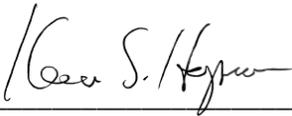
TO BE EXECUTED BY RESPONDENT AND SUBMITTED WITH STATEMENT OF QUALIFICATION

Respondent hereby certifies in performing work or providing services for the District, there shall be no unlawful discrimination in its hiring or employment practices, and Respondent shall comply with applicable federal and Texas anti-discrimination laws.

IN WITNESS WHEREOF, the undersigned has executed this Certificate of Non-Discrimination this 2th day of August 2022.

RESPONDENT:

Daniel B. Stephens and Associates, Inc.

BY: 

(Signature)

NAME: Kevin S. Hopson, PG

TITLE: Vice President, Texas Operations

ADDRESS: 12303 Technology Boulevard, Suite 930D

CITY: Austin

STATE: Texas

ZIP: 78727

## IV. REFERENCES (Exhibit C)

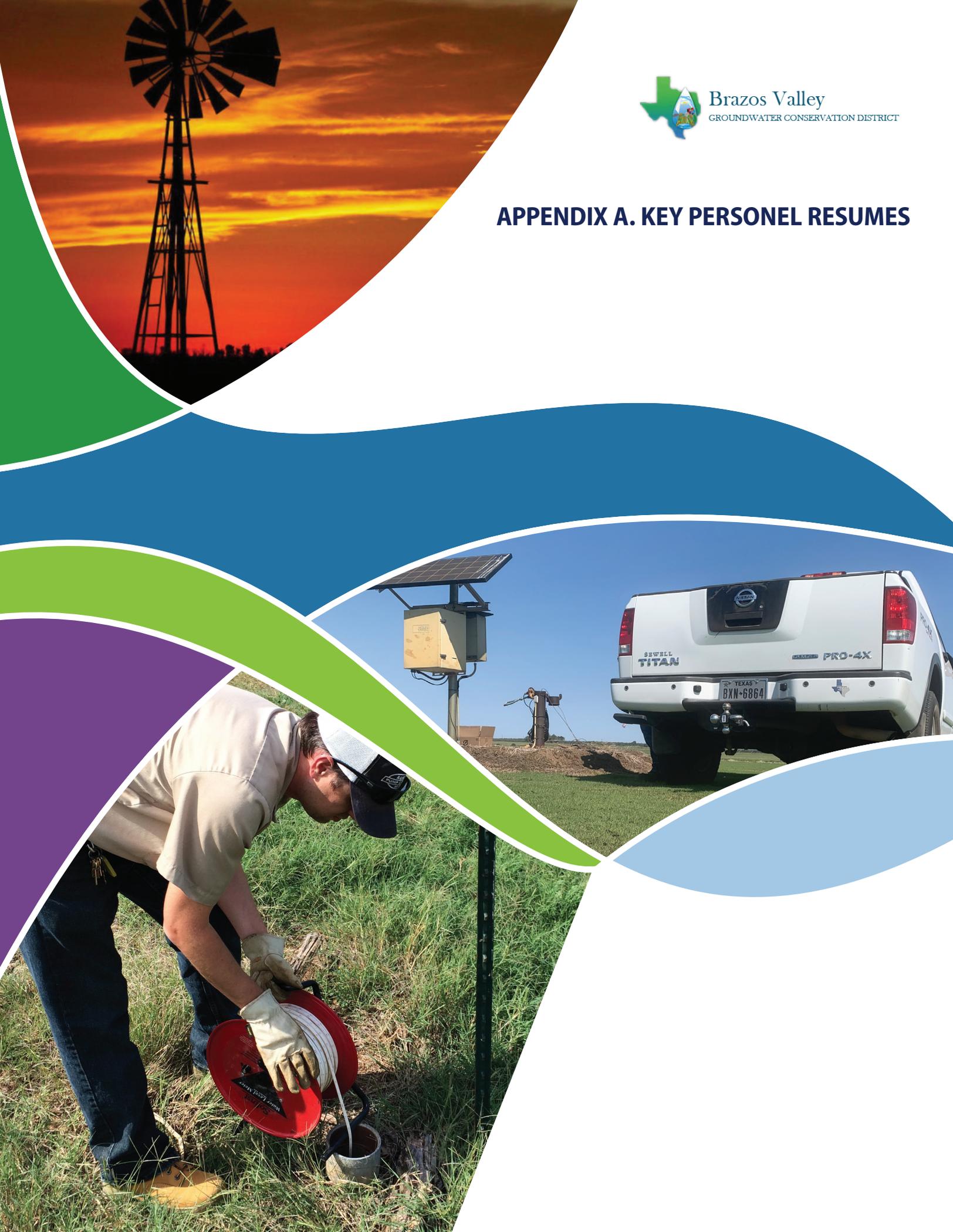
### EXHIBIT C REFERENCES

<b>REFERENCE 1</b>	
<b>NAME</b>	<b>Lost Pines Groundwater Conservation District</b>
ADDRESS	908 Loop 230
CITY, STATE ZIP CODE	Smithville, Texas 78957
TELEPHONE #	(512) 360-5088
CONTACT	Jim Totten, General Manager
DATES OF SERVICE	2011 - Present
DESCRIPTION OF SERVICES	On-Call Hydrogeological and Groundwater Management Services (Please see Appendix B for more detail.)
<b>REFERENCE 2</b>	
<b>NAME</b>	<b>Fayette County Groundwater Conservation District</b>
ADDRESS	255 Svoboda Lane, Room 115
CITY, STATE ZIP CODE	La Grange, Texas 78945
TELEPHONE #	(979) 968-3135
CONTACT	David Van Dresar, General Manager
DATES OF SERVICE	2009 - Present
DESCRIPTION OF SERVICES	On-Call Hydrogeological and Groundwater Management Services, including Multi-Year Groundwater Quality Study (Please see Appendix B for more detail.)
<b>REFERENCE 3</b>	
<b>NAME</b>	<b>Pecan Valley Groundwater Conservation District</b>
ADDRESS	1009 N. Esplanade Street
CITY, STATE ZIP CODE	Cuero, Texas 77954
TELEPHONE #	(361) 275-8188
CONTACT	Cindy Parma, General Manager
DATES OF SERVICE	2014 - Present
DESCRIPTION OF SERVICES	On-Call Hydrogeological and Groundwater Management Services, including Multi-Year Groundwater Quality Study (Please see Appendix B for more detail.)
<b>REFERENCE 4</b>	
<b>NAME</b>	<b>Gonzales County Underground Water Conservation District</b>
ADDRESS	522 Saint Matthew Street
CITY, STATE ZIP CODE	Gonzales, Texas 78629
TELEPHONE #	(830) 672-1047
CONTACT	Laura Martin, General Manager
DATES OF SERVICE	2009 - Present
DESCRIPTION OF SERVICES	Hydrogeologic Consulting, including the Installation of Carrizo Aquifer Outcrop Monitoring Wells (Please see Appendix B for more detail.)
<b>REFERENCE 5</b>	
<b>NAME</b>	<b>Evergreen Underground Water Conservation District</b>
ADDRESS	110 Wyoming Boulevard
CITY, STATE ZIP CODE	Pleasanton, Texas 78064
TELEPHONE #	(830) 569-4186
CONTACT	Russell Labus, General Manager
DATES OF SERVICE	2021 - Present
DESCRIPTION OF SERVICES	Monitor Well Installations (Please see Appendix B for more detail.)



Brazos Valley  
GROUNDWATER CONSERVATION DISTRICT

## APPENDIX A. KEY PERSONEL RESUMES



# Andrew C. A. Donnelly, PG

Project Manager, Senior Scientist



Mr. Donnelly is a Project Manager with over 30 years of Texas groundwater experience. He has provided expert hydrogeologic consulting services to numerous groundwater conservation districts (GCDs). He specializes in hydrogeologic analysis and groundwater resources research, groundwater modeling, and water supply investigations. Mr. Donnelly has over 15 years of experience in joint groundwater planning, including the development of desired future conditions (DFCs) and evaluation and the use of groundwater availability models (GAMs) and other groundwater flow models in the joint groundwater planning process. Mr. Donnelly has conducted several state-wide groundwater resource evaluations that have included the assessment of the geology, hydrogeology, and water quality of all of the state's major and minor aquifers, including work on the brackish groundwater resources across Texas.

## EDUCATION

MA, Geology (emphasis in hydrogeology), University of Texas at Austin, 1988

BS, Geological Sciences, Pennsylvania State University, 1986

## PROFESSIONAL REGISTRATIONS

Professional Geoscientist, Texas, No.737

### **On-Call Services, Lost Pines Groundwater Conservation District, Bastrop and Lee Counties, Texas**

As Project Manager and primary technical lead, assist in a variety of hydrogeologic support roles for the District. This has included attending Board of Directors meetings to present findings and answer questions from the Board members, District staff, and the general public; developing training presentations for the Board of Directors; reviewing the District rules and Management Plan; developing technical documents; and numerous other duties at the request of the District staff and Board of Directors. Provide support on joint groundwater planning, including the development of DFCs as part of Groundwater Management Area (GMA) 12. Attend GMA meetings and assist the District with the evaluation of DFCs being proposed by the GMA. Coordinate with other GCDs and consultants to provide technical support to the GMA. Also assist the District with the technical evaluation of permit applications, including running groundwater flow models to evaluate the predicted impact of the applications. Conduct field work with District staff as needed. Evaluate District data and assisted with developing a customized online District database.

### **On-Call Services, Fayette County Groundwater Conservation District, Fayette County, Texas**

As Project Hydrogeologist, attend Fayette County Groundwater Conservation District Board of Directors meetings to help answer questions from the Board members, District staff, and the general public. Assist District staff with all issues related to joint groundwater planning in GMA 12 and GMA 15. Provided a comprehensive review of historic pumpage and permits issued by the District. Assist with review of their water level monitoring network. Assisted with the completion of a three-year water quality study, where 277 wells throughout all of Fayette County were sampled. The study related current data to historical data from a large study completed in the 1960s in addition to looking at the current locations of the "bad water lines" (total dissolved solids [TDS] > 1,000 ppm [parts per million]) to review any shifts in those lines over time.



## **Hydrogeologic Consulting and Installation of Outcrop Monitoring Wells, Gonzales County Underground Water Conservation District, Gonzales and Caldwell Counties, Texas**

As Project Manager, provide assistance with permit application and permit amendment reviews, including running the Southern Queen City-Sparta GAM with permit-specific pumpage included to help predict the potential impact of the proposed pumpage on the aquifer and DFCs. Managed the installation of monitoring wells in the Carrizo Aquifer in Caldwell, Gonzales, and Guadalupe Counties. This multi-year project involved the installation of wells in the Carrizo Aquifer outcrop area in order to assess the DFCs adopted by GMA 13 in both the Gonzales County Underground Water Conservation District and the Guadalupe County Groundwater Conservation District. This project included oversight of drilling, logging, and installation of wells that were drilled into the underlying Wilcox Aquifer and screened at the base of the Carrizo Aquifer.

## **Hydrogeologic Consulting, Pecan Valley Groundwater Conservation District, DeWitt County, Texas**

As Project Hydrogeologist, assist with ongoing tasks. Provided support to District staff related to joint groundwater planning in GMA 15. Assisted with the completion of a multi-year, county-wide groundwater quality investigation, where 164 wells throughout all of DeWitt County were sampled from the Gulf Coast Aquifer System. This study (1) assessed groundwater chemical composition and potential environmental impacts to aquifers, (2) provided the baseline water quality of the aquifers of DeWitt County, and (3) related current data to historical data from wells sampled previously by other entities to review any shifts in regional water quality. Assisted with other hydrogeology-related inquiries.

## **Hydrogeologic Consulting, Goliad County Groundwater Conservation District, Goliad County, Texas**

Project Manager for hydrogeologic consulting services provided to Goliad County Groundwater Conservation District. Tasks have included review of proposed and ongoing recharge evaluation projects, review of proposed test wells in adjacent Districts, providing comments on behalf of the District at the public hearing prior to issuance of the permit for the test well, assistance with organization of data on pumpage and permits in the District, and assistance related to joint groundwater planning in GMA 15.

## **Hydrogeologic Consulting, Texana Groundwater Conservation District, Jackson County, Texas**

Project Manager for hydrogeologic consulting services provided to the Texana Groundwater Conservation District. Provided assistance with the evaluation of water level data and the compliance with the DFCs that were adopted by GMA 15 and approved by the District Board of Directors.

## **Assistance with Development of Groundwater Management Strategies, Hemphill County Underground Water Conservation District, Canadian, Texas**

As Project Hydrogeologist, assisted the Hemphill County Underground Water Conservation District with evaluation of existing hydrogeologic data and groundwater management approaches. Provided recommendations regarding alternative approaches and application of the Northern Ogallala GAM. Assisted with defense of DFCs adopted by the District and GMA 1 that were intended to preserve surface water flows, which were protested as unreasonable by two protestants. Developed a groundwater flow model of the county. This model was a grid refinement of the Northern Ogallala GAM, incorporating detailed new information on red bed surfaces, aquifer characteristics based on stratigraphic modeling, and surface features including significant detail on existing and new streams included in the model.

## **Development of a Brackish Well Drilling Guidance Manual, Texas Water Development Board, Austin, Texas**

Project Manager for the development of a guidance manual on the drilling and logging of the ideal exploratory brackish groundwater well. This manual reviewed the types of exploratory wells that might be used in an investigation, available drilling methods, different completion options for wells, drilling and completion costs, and data that can be collected prior to drilling, during drilling, and after the well has been completed, including a



detailed discussion on geophysical logging, and miscellaneous issues that may arise during the planning and installation of exploratory wells.

### **Brackish Groundwater Investigation, Texas Water Development Board, Texas**

As Project Hydrogeologist, evaluated brackish water resources in all major and minor aquifers in Texas. Developed a comprehensive overview of the occurrence of brackish groundwater in the state that might be used for a variety of water supplies, including a characterization of each aquifer included in the study. Using geographic information systems (GIS), produced hydrogeologic and water quality maps to assess potential brackish water resources for planning purposes. Wrote a comprehensive report on the brackish groundwater resources of each of the aquifers in the state.

### **Groundwater Availability Models, Texas Water Development Board, Austin, Texas**

As a Texas Water Development (TWDB) Staff Hydrogeologist, imported all TWDB GAMs into Groundwater Vistas, checked all models for errors, and ensured all GAMs were fully functional in Groundwater Vistas, which was selected as the TWDB choice for running all these regional models. Initiated a process for correcting errors and creating detailed users' manuals (Quick References) on all GAMs. Performed a large number of simulations on many of these models, wrote numerous reports summarizing the results of model runs, and presented results at numerous public meetings.

### **Development of Cross Timbers Aquifer Conceptual Model, Texas Water Development Board, Texas**

Project Hydrogeologist who provided technical support throughout the project. Support included the gathering of relevant data on the geology and hydrogeology of the Cross Timbers Aquifer, assisting with aquifer characterization, and collecting and evaluating historic pumpage data across the aquifer. Co-author of the final report.

### **Hydrogeologic Analysis, City of Fort Stockton, Texas**

As Project Hydrogeologist, assisted with the evaluation of aquifers in the Fort Stockton area, primarily the Edwards-Trinity (Plateau) Aquifer, which included the evaluation of groundwater models constructed, the evaluation of well data from a variety of sources, and the production of the final report.

### **Groundwater Resource Evaluation, Online Water Well Management System, and Water Well Inventory, University Lands, Midland, Texas**

As Project Hydrogeologist, assisted with the evaluation of multiple brackish aquifers underlying University Lands in West Texas. Project included database development, construction of three-dimensional geologic models, and hydrogeologic analysis of multiple aquifers, including production zones, expected well yield, and water quality. Also assisted with the compilation and mapping of water levels, water quality, and water well production capacities.

### **Evaluation of Groundwater Resources, Texas General Land Office, Texas**

As Project Hydrogeologist, evaluated the groundwater resources associated with over 2,000 General Land Office properties throughout Texas. A GIS database was constructed that included aquifer type, groundwater volume, well yield, water quality, aquifer properties, and other attributes relevant to groundwater utilization potential. Properties were ranked according to groundwater development potential based on physical, administrative, and legal factors.

### **Trinity Aquifer Well Field Evaluation, Confidential Client, Texas**

As part of a due diligence evaluation for a loan, evaluated the potential for a Trinity Aquifer well field to produce a specified amount of water to sell to a local water provider. The ability of the well field to produce the requisite amount of water, and the groundwater district regulation's potential impact on the production and sale of this water, were critical factors in whether the financial transaction would be made.



Mr. Kirby has 14 years in the water resource consulting industry. He specializes in providing support to groundwater conservation districts (GCDs) on geologic and hydrogeologic issues, logging and field screening of soil borings, supervising monitor and recovery well installation, sampling soil and groundwater, conducting receptor and exposure pathway surveys, collecting and analyzing data, preparing reports, and constructing geographic information system (GIS) geodatabases.

#### EDUCATION

BA, Geological Sciences,  
University of Texas at Austin,  
2002

#### PROFESSIONAL REGISTRATIONS

Professional Geoscientist,  
Texas, No. 10841

Professional Geoscientist,  
Louisiana, No. 421

Leaking Petroleum Storage  
Tank Project Manager, Texas,  
No. PM0000351

Class C Groundwater  
Treatment Operator, Texas,  
No. WG0017118

#### **On-Call Services, Fayette County Groundwater Conservation District, Fayette County, Texas**

As Project Manager, attend Board of Directors meetings to present findings from ongoing projects. Answer questions from Board members, district staff, and the general public related to water quality, desired future conditions (DFCs) of aquifers, and other geology/hydrology-related inquiries. Provide ArcGIS training and support to district staff. Attend Groundwater Management Area 15 (GMA 15) meetings with district manager in support of DFC planning and reporting requirements. Assist District personnel in managing and updating their web-based well-mapping database.

#### **Countywide Groundwater Quality Study, Fayette County Groundwater Conservation District, Fayette County, Texas**

As Project Manager and Field Technician, completed a three-year study sampling 277 wells throughout all of Fayette County to collect samples from every freshwater aquifer that is utilized there. The study related current data to historical data from a large study completed in the 1960s in addition to looking at the current locations of the "bad water lines" (Total Dissolved Solids > 1,000 parts per million) to review any shifts in those lines over time. This is the most comprehensive groundwater study in the County since the 1960s and also serves as a template for a similar study completed in DeWitt County.

#### **Water Quality Investigation, Fayette County Groundwater Conservation District Fayette County, Texas**

As Project Geologist, compiled groundwater analytical data from the Texas Water Development Board (TWDB) and Fayette County Groundwater Conservation District (FCGCD) databases. Collected potential pollution source information from Texas Commission on Environmental Quality (TCEQ), the Capital Area Council of Governments, and the Railroad Commission of Texas. Conducted spatial analyses of the analytical data that exceeded Environmental Protection Agency maximum contaminant levels or health advisory limits with respect to any potential pollution source around or upgradient of that well. Reviewed the analytical data for wells with good historical data and analyzed those wells for trends that would indicate a degradation of water quality. Presented results to the Board of Directors, district staff, and the general public.



## **Groundwater Availability Study, Fayette County Groundwater Conservation District, Fayette County, Texas**

As Project Geologist, compiled geologic and hydrogeologic information from driller's reports and geophysical logs that were obtained from the FCGCD, the TCEQ, and the TWDB. Digitized well locations and created a GIS geodatabase. Developed three-dimensional (3-D) geologic and lithologic models of Fayette County based on driller's reports and geophysical logs for six aquifers. Created a recent composite water level. Performed volumetric calculations of net saturated sand for each of the six aquifers. Utilized ArcCatalog to create metadata for all shapefiles and raster files delivered to the client. Presented report and findings to the FCGCD Board of Directors, the district manager, and the general public.

## **On-Call Services, Pecan Valley Groundwater Conservation District, DeWitt County, Texas**

As Project Manager, attend Board of Directors meetings as requested to present findings from ongoing projects. Answer questions from Board members, district staff, and the public related to water quality, DFCs of aquifers, and other geology/hydrology-related inquiries. Provide technical training and support to district staff. Attend GMA 15 meeting with district manager in support of DFC planning and reporting requirements. Assist District personnel in managing and updating their web-based well-mapping database.

## **Countywide Groundwater Quality Study, Pecan Valley Groundwater Conservation District, DeWitt County, Texas**

Project Manager for a three-year study sampling 164 wells throughout all of DeWitt County to assess groundwater chemical composition and potential environmental impacts to aquifers, and to provide a baseline water quality of the aquifers of the County. The study also related current data to historical data from wells sampled previously by other entities to review any shifts in regional water quality.

## **Edwards Trinity (High Plains) Groundwater Availability Model, Texas Water Development Board, Austin, Texas**

As Project Geologist, analyzed lithology picks for subsurface units from hundreds of water well driller's logs in nine West Texas counties as part of the Edwards Trinity (High Plains) Aquifer project for DBS&A. Located wells from driller's report maps or land survey description. Using ArcGIS, digitized these wells as points in a shapefile and created attribute columns to capture relevant spatial and physical data.

## **Recharge Evaluation, Sutton County Underground Water Conservation District, Sutton County, Texas**

As Project Geologist, assisted in data collection for the County from various sources including County offices, the TCEQ, the TWDB, and the University of Texas Bureau of Economic Geology. Digitized well locations in ArcGIS. Created and maintained a database for the project. Reviewed driller's reports and scout tickets for geologic marker beds. Created a 3-D geologic model of Sutton County including cave locations and representation of cavities/caves in water wells.

## **Structure of the Llano Uplift Aquifers Project, Texas Water Development Board, Austin, Texas**

As Project Scientist, created and maintained a database for the project including performing database quality assurance/quality control checks. Digitized well locations in ArcGIS. Created and merged attribute tables in ArcGIS. Created maps showing specific wells and specific unit tops and bottoms using ArcGIS to assist the project team in structure correlation and modeling. Completed project reporting.

# T. Neil Blandford, PG

Principal Hydrogeologist/Senior Technical Advisor



## EDUCATION

MS, Hydrology,  
New Mexico Institute of  
Mining and Technology, 1987

BA, Environmental Science,  
University of Virginia, 1984

## PROFESSIONAL REGISTRATIONS

Professional Geoscientist,  
Texas, No. 1034

Mr. Blandford specializes in water supply investigations and water rights analysis, numerical simulation of groundwater flow and contaminant transport, groundwater planning, computation of the effects of groundwater pumping on surface water, hydrogeologic evaluations, wellhead protection area delineation and source water determination, well field design, and expert testimony.

### **On-Call Hydrogeological Services, Lost Pines Groundwater Conservation District, Bastrop and Lee Counties, Texas**

Senior Reviewer for DBS&A's on-call contract with the Lost Pines Groundwater Conservation District. Provided senior technical oversight and review for multiple memoranda and reports, primarily related to the predicted impact of permit applications.

### **Development of Groundwater Availability Model for Edwards-Trinity (High Plains) Aquifer, Texas Water Development Board, West Texas**

Principal Investigator for the development of a numerical groundwater flow model of the Edwards-Trinity (High Plains) Aquifer in Texas and New Mexico. Project involved extensive data collection and development of the geologic framework of four lower Cretaceous hydrogeologic units based on geophysical and geologic well logs and development of new conceptual models of groundwater flow. Employed information to develop a three-dimensional groundwater flow model for use by groundwater conservation districts and regional water planning groups to evaluate future groundwater availability.

### **Cross Timbers Aquifer Conceptual Model Development, Texas Water Development Board, North-Central Texas**

Project Manager for development of the aquifer conceptual model of the Cross Timbers Aquifer groundwater flow system (approximately 18,000 square miles) in north-central Texas. Project involved geologic and hydrogeologic mapping of nine hydro stratigraphic units, determination of aquifer extent and boundary conditions, detailed groundwater recharge modeling, assessment of groundwater-surface water interaction, determination of aquifer properties and groundwater quality, extensive project documentation, and interaction with stakeholders.

### **Assistance with Development of Groundwater Management Strategies, Hemphill County Underground Water Conservation District, Canadian, Texas**

Assisted the District with evaluation of hydrogeologic data and groundwater management approaches and provided recommendations regarding alternative approaches and application of the Northern Ogallala groundwater availability model. Assisted with defense of desired future conditions (DFCs) selected by Groundwater Management Area 1 to preserve surface water flows.



## **Water Resources Support for Goliad County Groundwater Conservation District, Goliad, Texas**

Principal Investigator for assessment of the potential effects of in-situ leach uranium mining and evaluation of background water quality and surface water-groundwater interaction. Conducted hydrogeologic evaluation of site data, regional, and local groundwater flow and solute transport modeling for the Evangeline Aquifer, and provided expert testimony in a Texas Commission on Environmental Quality administrative hearing. Provided technical support regarding District's petition to U.S. Environmental Protection Agency regarding aquifer exemption and comments on rule making.

## **Hydrogeologic Evaluation for Feasibility and Permitting of Municipal Supply Wells, City of Stephenville, Texas**

Principal Investigator for evaluation of site hydrogeology for proposed municipal well field expansion. Project included data compilation and analysis, test hole drilling and oversight, and well permitting through the Middle Trinity Groundwater Conservation District. A preliminary analysis of the feasibility of conducting aquifer storage and recovery at the well field was also conducted.

## **Evaluation of Groundwater Resources, Texas General Land Office, Texas**

Principal Investigator for the evaluation of the groundwater resources associated with over 2,000 General Land Office properties throughout Texas. A geographic information system database was constructed that included aquifer type, groundwater volume, well yield, water quality, aquifer properties, and other attributes relevant to groundwater utilization potential. Properties were ranked according to key groundwater development factors.

## **Blaine Aquifer System Brackish Groundwater Analysis, Texas Water Development Board, North-Central Texas**

Project Manager for the assessment and evaluation of the fresh and brackish groundwater resources of the Blaine Aquifer system in north-central Texas. The aquifer system encompasses a region of approximately 10,000 square miles and is the sole source of supply for numerous communities, agriculture, and industry. Project involved geologic and hydrogeologic mapping of aquifer units and production intervals, determination of groundwater quality, evaluation of the effects of potential well fields, and interaction with stakeholders.

## **Municipal Well Field Development, Sustainability Analysis and Planning Support, Colorado River Municipal Water District, Ward County, Texas**

Principal Investigator for due diligence analysis for a large water right purchase in Ward County, Texas. The water right purchase was followed by a program of test hole drilling and construction, and testing of 21 high-capacity, raw water supply wells. The well field build-out was required to supplement existing groundwater and surface water supplies and was completed on a highly expedited schedule. Constructed a groundwater flow model to assist with well field operations, evaluation of well field sustainability and water quality, and groundwater resources planning. Led multiple efforts for groundwater analysis and planning, including assistance with the development or evaluation of DFCs for multiple aquifers under joint groundwater planning, and evaluation of alternative and additional sources of water supply.

## **Selected Publications and Presentations**

Blandford, N. 2021. Hydrogeology of the Cross Timbers Aquifer in North-Central Texas. American Ground Water Trust 2019 Annual Texas Groundwater Conference. Austin, Texas, June 30, 2021.

Blandford, N., 2019. Invited participant/speaker for Brackish Groundwater Panel at the Texas Alliance of Groundwater Districts, Texas Groundwater Summit. San Antonio, Texas, August 22, 2019.

Blandford, T.N. 2009. An Overview of Groundwater Management Approaches and Implications for MAG Permitting. Invited presentation to the Texas Alliance of Groundwater Districts. Arlington, Texas, September 29, 2009.

# Kevin S. Hopson, PG

Vice President/Senior Geologist



Mr. Hopson has 32 years of professional experience in the environmental and geoscience industry and currently serves as Vice President for Texas operations. He provides managerial and technical support in water resources projects, environmental investigations, groundwater remediation, and public water supply concerns.

### **Groundwater Availability Study, Fayette County Groundwater Conservation District, Fayette County, Texas**

Provided senior oversight for groundwater availability study for Fayette County Groundwater Conservation District.

### **Water Audits for the Cities of Marathon, Lyford, and Carrizo Springs, Texas, North American Development Bank, Texas**

Principal-in-Charge for comprehensive water audit, rate study, and conservation plan for three separate projects funded by the North American Development Bank.

### **Evaluation of Groundwater Resources, Texas General Land Office, Texas**

Provided administrative and financial management/support for DBS&A for the evaluation of the groundwater resources on General Land Office properties throughout Texas, including directing labor and material assets toward the successful completion of the project, and adhering to all contract requirements.

### **Gonzales County Underground Water Conservation District Monitoring Well Installation, Texas**

Provide senior oversight, management, and technical support for the monitor well installation program and hydrogeologic investigation to provide data in support of The Gonzales County Underground Water Conservation District Desired Future Conditions.

### **Well Field Development, City of Stephenville, Texas**

Provided administrative and technical support for the development of a public water supply well field. Directed labor and material assets for the drilling of test holes to assess the hydrogeological characteristics of a proposed water supply well field. Provided oversight of drilling and logging of test holes, evaluation of saturated sand thickness, and reporting.

### **Conceptual Model Development for the Cross Timbers Aquifer, Texas Water Development Board, North-Central Texas**

Provided administrative, financial, and contract management support for the development of a groundwater model of the Cross Timbers Aquifer. He directed labor and material assets toward the successful completion of the project.

## EDUCATION

BS, Geology, Texas Tech University, 1983

## PROFESSIONAL REGISTRATIONS

Professional Geoscientist, Texas, No. 1702

Corrective Action Project Manager, Texas, No. 1564

Registered Geologist, Kansas, No. 567

Professional Geoscientist, Louisiana, No. 315

Certified Professional Geologist, Pennsylvania, No. PG-003035-G

## PROFESSIONAL AFFILIATIONS

National Ground Water Association

American Association of Petroleum Geologists



## **Public Water Supply Compliance Monitoring, Private Client, Various Facilities, Texas**

Currently serve as Project Manager for the compliance monitoring and sampling program at various facilities that utilize water supply wells as potable water. Responsible for implementation and development of the program, which includes both weekly and monthly monitoring and reporting. Identified key personnel within DBS&A to become certified Texas Commission on Environmental Quality (TCEQ) Class D Water Operators.

## **Public Water Well Supply, Pioneer Natural Resources USA, Inc.**

Provided senior oversight for the installation, compliance permitting, and reporting for the installation of a public water supply well.

## **Assessment, Investigation, and Removal Services Contract, Texas Commission on Environmental Quality, Texas**

Program Manager for an eight-year, \$8 million contract. Responsibilities include contractual, financial, technical, and personnel management for a contract that addresses environmental impact from heavy metals, chlorinated solvents, and smelter wastes at projects throughout the State of Texas. Coordinate with the TCEQ, DBS&A Project Managers, and teaming partners in preparing and executing scopes of work for the TCEQ Superfund and Brownfields program.

## **Remediation Engineering/Site Activities, Texas Commission on Environmental Quality, Various Sites, Texas**

Program Manager for TCEQ Region 1 contract for leaking petroleum storage tank sites. Responsible for program development/implementation related to investigation, assessment, and remediation of petroleum hydrocarbon compounds at various locations in West Texas. Current remediation technologies employed are groundwater/soil vapor extraction and phase-separated hydrocarbon recovery.



Ms. Ewing specializes in water resources and hydrogeological investigations; surface and groundwater quality studies; water supply, conservation, and drought planning; managed aquifer recharge; and public involvement. She has worked on water resources planning, development, and management projects for more than 20 years.

#### EDUCATION

MWR, Water Resources (with distinction), University of New Mexico, 2003

BS, Earth Sciences, University of California, Santa Cruz, 1998

#### PROFESSIONAL REGISTRATIONS

Professional Geoscientist, No. 10413, State of Texas, 2008

NMED Drinking Water Bureau Water Sample Tech 2 #19435

#### PROFESSIONAL AFFILIATIONS

American Water Resources Association

National Ground Water Association

Groundwater Resources Association of California

American Council of Engineering Companies New Mexico, State Engineer/ Interstate Stream Commission Liaison; 2022 Outstanding Member Award

#### **Llano Estacado (Region O) Regional Water Plan, High Plains Underground Water Conservation District No. 1, Lubbock, Texas**

Project Manager for the 2016 Region O regional water planning project spanning a 21-county area in West Texas. The plan quantifies water supply and projects water demand through 2070, and includes evaluations of water supply strategies for meeting drought-of-record demands. Project tasks include contacting municipalities and water suppliers for information regarding their water supply and demand, current and planned infrastructure, and conservation and drought management plans; evaluating existing water supplies; and identifying potentially feasible water management strategies. The Plan was adopted by the Llano Estacado Regional Water Planning Group, and subsequently accepted by the Texas Water Development Board.

#### **Potter Well Field Development, City of Amarillo, Texas**

Assisted with well design and well completion reporting as a part of the development of a new municipal well field for the City of Amarillo.

#### **Rio Grande Basin Characterization, National Aeronautics and Space Administration Western Water Applications Office, Pasadena, California**

Conducted a survey that characterizes the overall water management, stakeholders, and water management challenges in the Rio Grande Basin in Colorado, New Mexico, and Texas, and facilitated a Rio Grande Basin needs assessment workshop to identify where National Aeronautics and Space Administration capabilities can be used to inform water management decisions and add value.

#### **Lower Bois d'Arc Reservoir Environmental Impact Statement, North Texas Municipal Water District, Texas**

Developed the water resources section of the Environmental Impact Statement for the proposed Lower Bois d'Arc Creek Reservoir that would supplement the North Texas Municipal Water District water supply.

#### **As-Needed Water Resources Services, Albuquerque Bernalillo County Water Utility Authority, Albuquerque, New Mexico**

Project Manager for our current on-call water resources contract with the Water Authority. Tasks have included recharge, non-potable, and San Juan-Chama Contractors Association project support.



### **Hydrological Services for Water Rights and Water Supply, Town of Taos, New Mexico**

Evaluated Town of Taos water rights for both its groundwater and surface water diversions. Analyzed water demand for the municipal system based on pumping and customer water-use records.

### **Recharge Demonstration, City of Hobbs, New Mexico**

Project Manager for the City of Hobbs' recharge demonstration project. The project scope calls for using treated wastewater and infiltration basins to recharge the Ogallala aquifer, allowing the City to recover the stored water during summer months, and reducing the irrigation demands for potable water.

### **Long-Range Water Supply Plan, Los Alamos County, New Mexico**

Project Manager for an update to the Los Alamos County long-range water supply plan, which provides an overview of the water system, water supply, water rights, current and projected demand and supply-demand gaps, risks due to climate change, water conservation, and actions the County may undertake to plan for a sustainable future water supply. The timeline for when the County may need to develop their San Juan-Chama Project (surface water) rights was also updated. Project tasks included facilitating a public meeting, and making presentations to the Board of Public Utilities and County Council.

### **Water Resources Management Plan Implementation Update, City of Rio Rancho, New Mexico**

Project Manager for the City's Water Resources Management Plan implementation updates in 2014 and 2020. Tasks included documenting the City's progress on implementing water resources policy initiatives, reprioritizing the existing and identifying new initiatives for the next five-year period, and public involvement. The strategies are divided into seven categories: conservation, education and outreach, water reuse, water supply and infrastructure, source water protection, economic development, and enforcement.

### **Silver City Comprehensive Water Conservation Plan, Town of Silver City, New Mexico**

Project Manager for the Town of Silver City's Comprehensive Water Conservation Plan, which outlines long-range water policies and water conservation goals, and identifies and prioritizes water conservation measures. The planning process included extensive public outreach and stakeholder involvement.

### **New Mexico Regional Water Planning, Northeast New Mexico, Southwest New Mexico, Taos County, Mora-San Miguel-Guadalupe, and Jemez y Sangre Planning Regions, and the New Mexico Interstate Stream Commission, New Mexico**

Developed water supply and demand assessments, compiled historical water uses and projected future water uses, summarized water quality data, worked with stakeholder groups to identify alternatives for meeting demands with available supplies, and public involvement, including meeting preparation, presentation of technical information at meetings, and meeting facilitation. Ms. Ewing worked on 5 of the original 16 regional water plans, and also supported the Northeast New Mexico planning region on their 2016 update.

### **Clovis Water Conservation Plan, City of Clovis, New Mexico**

Worked with the City of Clovis and the City of Clovis Water Policy Advisory Board to prepare a Water Conservation Plan to reduce the amount of groundwater pumping and slow the decline in water levels. This was in an effort to ensure that existing available water supplies will be sufficient to meet future demand.

# Russell S. Perry, PG

Senior Professional I



## EDUCATION

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MS, Geology, Texas A&M University, 1996

BS, Geology (minor in Mathematics), Texas A&I University, 1984

## PROFESSIONAL REGISTRATION

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Registered Professional Geologist, Texas, No. 735

Mr. Perry has more than 32 years of experience as a project manager in the groundwater development/conservation and environmental consulting industries combined. He is a professional geologist in Texas with expertise in drilling and subsurface geologic investigations, including the interpretation of geophysical logs, log correlation, and preparation of geologic cross sections and maps. He routinely prepares complex scientific reports and provides technical review of reports prepared by others.

### **Gonzales County Underground Water Conservation District, Texas**

As Project Geologist, prepared reports documenting multiple monitor well installations, geophysical well logging, well construction details, monitor well development, aquifer pump testing (to determine storativity and transmissivity), and water quality sampling for the Gonzales County Underground Water Conservation District (GCUWCD). The GCUWCD installed monitor wells into the Carrizo Aquifer to identify impacts of production as they relate to GCUWCD's Desired Future Conditions (DFCs). A secondary purpose of monitor well installations was to collect hydrogeologic data (aquifer thickness, transmissivity, permeability, and water quality), which was made available to the Texas Water Development Board (TWDB) for updates to the Groundwater Availability Model. Also prepared structural cross sections of the Carrizo Formation using geophysical logs. In areas where the structure of the Carrizo Formation was not well documented, structural contour maps of the underlying Midway Formation (a member of the Wilcox Formation) was used to project the upward structural features (faulting or stratigraphic thickening/thinning) to estimate the depth to the bottom of the Carrizo Formation.

### **Evergreen Underground Water Conservation District, Texas**

As Project Geologist, prepared an Invitation to Bid (ITB) document to solicit drilling companies for the installation of monitor wells within the Carrizo Aquifer on behalf of the Evergreen Underground Water Conservation District (EUWCD). The ITB included installation and engineered design specifications for monitor wells, and cost estimate spreadsheets for completion by the bidders. Currently, provide on-call consulting services to the EUWCD in support of drilling and well completion issues, routine borehole geophysical survey evaluation, selection of plug-back depths, screen intervals, and overall well completion suggestions.

### **Provenance Engineering, Stephenville Municipal Wellfield Design, Texas**

As Project Manager, provided engineering design of municipal wells to be installed within the Trinity Aquifer near Stephenville, Texas. The project included preparation of construction specifications for each of five



municipal wells, including screen diameter and lengths based on previous test hole data, well spacing, setback requirements, and permit considerations.

### **Guidance Document Preparation, Texas Water Development Board, Texas**

As co-author of the TWDB guidance document: “Drilling and Logging the Ideal Exploratory Brackish Groundwater Well” (DBS&A, 2021), was responsible for preparing sections of the report describing the types of exploratory boreholes, and wells, drilling methods, well completion, well development, drilling costs, data collected during drilling, and miscellaneous issues. He also contributed to the sections describing geophysical logging and data collection after well completion. Attended stakeholder meetings with TWDB staff during monthly meetings to discuss the document completion status. The guidance document was completed within schedule and budget.

### **Chickasaw Nation, Lone Grove, Oklahoma**

As a Project Geologist, reported the results of test wells installed in Lone Grove, Oklahoma, to evaluate the feasibility of potential municipal well installations. Guided staff during the installation of two test wells installed approximately 400 feet deep into the Oscar Formation, followed by hydraulic testing and subsequent aquifer analysis.

### **Corbin Ranch Test Well, Halff Associates, Inc., Connerville, Oklahoma**

As Project Geologist, developed the study to confirm anticipated favorable water production from the West Spring Creek Formation of the Lower Ordovician System Arbuckle Group using a one eight-inch diameter test well drilled to 700 feet below ground surface through dolomite rock. The test well was installed to evaluate the quality and availability of groundwater in support of the Choctaw and Chickasaw Nations Regional Water Plan. Oversaw drilling and installation of the Corbin Ranch test well, prepared lithologic description of drill cuttings, evaluated the borehole geophysical log, and performed an aquifer step test and a subsequent 8-hour constant rate (425 gallon per minute) aquifer test. While in the field, collected groundwater samples during the constant rate aquifer test for chemical analysis to determine groundwater quality relative to potential municipal water use.

### **City of Ada Municipal Water Wells #4 and #5, City of Ada, Oklahoma**

As Project Manager, ensured compliance with contract documents and oversaw installation of two 1,000-foot municipal water wells drilled into the West Spring Creek and Kindblade Formations of the Arbuckle Group. Ensured proper placement and cementing of surface casing, prepared lithologic descriptions of drill cuttings; performed aquifer step tests and constant rate tests of both water wells; collected water quality samples for chemical analysis; and prepared summary reporting. These wells increased the City of Ada’s capacity by 25 percent, with sustained pumping from each well calculated to be 3,500 and 2,000 gallons per minute.

### **536 Acre Tract Well Field, City of Stephenville, Texas**

As Project Manager, oversaw the test-hole installations, which utilized air and mud rotary drilling methods to a maximum depth of 590 feet of five test holes that were drilled for the City of Stephenville, Texas, to design a well field for supply of potable water and possibly installation of aquifer storage and recovery wells. The test holes were drilled to determine subsurface hydrogeologic conditions in the Trinity aquifer system. Prepared lithologic logs from drill cuttings and prepared structural cross sections depicting the Upper and Lower Trinity sand units. Prepared a summary report documenting the field work, with recommendations for screen slot sizing and production intervals based on review of the cross sections, lithologic logs, geophysical logs, and sieve analysis reports.

# Kenneth Calhoun, GISP

GIS Manager



Kenny Calhoun, GISP, is the Manager of DBS&A's Geographic Information Systems (GIS) services. He specializes in coordination of enterprise-wide GIS for well, groundwater, land use, and water resources management. He also implements various GIS software, global positioning system (GPS), and remote sensing technologies for GIS project management. Mr. Calhoun provides GIS support for litigation projects by utilizing historical maps and aerial photographs in support of client positions in environmental cleanup, water rights, and land trespass cases.

## EDUCATION

MA, Geography (emphasis in GIS, Remote Sensing, and Water Resource Management), University of New Mexico, 1997

BA, Geography (emphasis in Physical Geography and GIS), University of New Mexico, 1993

## PROFESSIONAL REGISTRATIONS

Certified Geographic Information Systems Professional, GIS Certification Institute, No. 46134, September 2007

## PROFESSIONAL AFFILIATIONS

New Mexico Geographic Information Council, member 1999 to present. Board of Directors 2012-2013, President 2013

### **Web-Based Water Well Management System, Lost Pines Groundwater Conservation District, Smithville, Texas**

Project Manager and GIS Technical Lead responsible for development of a water well management system where residents can apply for water supply well applications. District staff can manage the application process work flow, documents, and drillers reports; perform data queries; and generate standard reports. System capabilities include online mapping, data collection using online forms, and links to online documentation and scanned documents. Administrative users can track the water well application process and approve or deny well applications. E-mail functionality was included to automatically notify applicants about the status changes of their application. Once logged in, a user is able to access and view information related to their well registration, drilling or production permitting, status of any current permitting process, or review of account balances.

### **Online Water Well Management System, Water Well Inventory, and Groundwater Resource Evaluation, University Lands, Midland, Texas**

Project Manager and GIS technical lead responsible for development of a water well management system where oil and gas operators and other University Lands leaseholders can apply for water supply well permits and upload completed water well information, such as well diagrams, geophysical logs, and water quality. Site developed with secured multi-tiered log-in functionality. Designed and implemented the system utilizing a Microsoft SQL Server back-end relational database, with a .Net (C#) front-end web application. GIS data is delivered from within ArcGIS Server 10. Included e-mail functionality to automatically notify applicants of status changes of their application. The system includes a unique feature that allows the user to view the depths to underlying aquifer formations based on the user-entered x-y coordinates. A publicly available water well search queue provides a customizable interface to search for existing wells from a variety of options, including well number, well owner, county, and spatial queries utilizing the GIS interface. The system is locally hosted through University Lands' servers. GIS development for the groundwater resource evaluation included compiling data related to several thousand oil and gas geophysical logs, water well logs, and cable-tool driller reports obtained from University Lands, Texas Railroad Commission, and the Bureau of Economic Geology well log libraries.



Mr. Calhoun also compiled and mapped water levels, water quality information, and water well production capacities.

## **Marathon Aquifer Conceptual Model, Texas Water Development Board, West Texas**

Technical lead for GIS development of the Marathon conceptual model. Tasks included compilation and analysis of data related to physiography and climate, geology and aquifer extent, hydrostratigraphy, hydrostratigraphic framework, water levels and regional groundwater flow, recharge, springs, hydraulic properties, discharge, and water quality in the study area. Aquifer properties were derived and correlated to the depositional environment of the aquifer based on thousands of well logs. The data was integrated from various sources including the Texas Natural Resources Information System (TNRIS), the Texas Water Development Water Board (TWDB), the United States Department of Agriculture (USDA), and the United States Geological Survey (USGS) into ArcGIS. Digital Elevation Model (DEM) data were mosaiced to develop land surface topography. Performed coordinate conversion to integrate well location and attribute data, DEM data, stratigraphy, Public Land Survey System (PLSS) data, and USGS raster topography data into a consistent coordinate system.

## **Groundwater Availability Modeling, Igneous and West Texas Bolsons Aquifers, Texas Water Development Board, Austin, Texas**

Technical lead for GIS development of the Igneous and West Texas Bolsons Aquifers Groundwater Availability Model. Calculated historical pumping allocations based on land use and groundwater pumping data integrated in GIS. Data integrated from various sources (including the TNRIS, the TWDB, the USDA, and the USGS) into ArcView GIS. Developed a Microsoft Access database that linked USGS, TWDB, and other various datasets to GIS. DEM data was mosaiced to develop land surface topography. Performed coordinate conversion to integrate well location and attribute data, DEM data, stratigraphy, surface geology, precipitation, PLSS data, and cultural features into consistent coordinate system. Coordinated digitizing of springs, surface water features, USGS streamflow gain-loss study results, lake evaporation, and water table contours for use in ArcView. Produced maps and graphics for final report.

## **Cross Timbers Conceptual Model, Texas Water Development Board, North Central Texas**

Technical lead for GIS development of the Cross Timbers conceptual model. Tasks included compilation and analysis of data related to physiography and climate, geology and aquifer extent, hydrostratigraphy, hydrostratigraphic framework, water levels and regional groundwater flow, recharge, rivers, streams, reservoirs, springs and other surface water features, hydraulic properties, discharge, and water quality in the study area. Aquifer properties were derived and correlated to the depositional environment of the aquifer based on thousands of well logs. The data was integrated from various sources including TNRIS, TWDB, USDA, and the USGS into ArcGIS. DEM data were mosaiced to develop land surface topography. Performed coordinate conversion to integrate well location and attribute data, DEM data, stratigraphy, PLSS data, and USGS raster topography data into a consistent coordinate system.

## **Geographic Information Systems Support for Analysis of Municipal Water Supply Sources from the Southern Ogallala Aquifer, City of Lubbock, Texas**

GIS technical lead for assessment of sustainability of the City's Bailey County well field and pumping groundwater from beneath the City to assist with meeting peak water demands. The project included the development of historical water level maps and other hydrogeologic analysis, along with development of detailed groundwater flow models. Integrated GIS data from various sources (including the TWDB and USGS) into ArcView GIS geodatabase files.

# Elizabeth M. Bastien

Hydrogeologist



With over 12 years of experience, Ms. Bastien specializes in water quality investigations; water resource management; surface water and groundwater sampling; water level monitoring instrumentation; well design, drilling, and well installation; aquifer pump tests and analysis; and aquifer storage and recovery. She has performed statewide water projects including sample and data collection of hydrologic data, evaluation of aquifer production and analysis of water quality in both surface water and groundwater, planning and oversight of drilling, sampling; and management of various construction projects including general construction, large scale municipal wells and domestic water supply wells.

## EDUCATION

MS, Hydrology, New Mexico Institute of Mining and Technology, 2009

BA, Chemistry, Albion College, 2004

## PROFESSIONAL REGISTRATIONS

NM Utility Water Sampler  
Tech 2 #19434

## PROFESSIONAL AFFILIATIONS

American Water Resources Association

National Ground Water Association

## TRAINING

MSHA, Part 46, Surface Mining, 2013 to Current

OSHA, 40 Hour HAZWOPER, 2009- Current

### **Potter County Wellfield Expansion, City of Amarillo, Texas**

Staff hydrogeologist for oversight for test holes in the Ogallala Aquifer. Determination of lithologic contacts, drilling documentation and direction, geophysical logging, sample collections of drill cuttings, and borehole plugging.

### **Water Development for Potter County Well Field, City of Amarillo, Texas**

National Ground Water Association award-winning water supply project involving three-dimensional hydrostratigraphic modeling to help characterize the complex hydrostratigraphy of the Ogallala Aquifer, guiding development of a new well field designed for maximum production capacity while limiting depletion impacts. Phase I of the project included testing aquifer properties and four prototype well designs and design of the well field. Phase II involved installation of 17 high-capacity production wells. A total of 21 production wells were installed with a tested capacity of more than 25 million gallons per day—exceeding the initial goals for the project. Hydrogeologist responsible for site preparation, observation and documentation of drilling-related activities, field sampling and logging of cuttings, well development, aquifer testing, water quality sampling, and documentation of well construction and all other data and activities at the site that were used to generate final well completion reports. Wells were drilled to depths of 800 feet within the Ogallala Aquifer using conventional mud rotary assisted drilling methods and downhole geophysical surveys were completed on each well. Assisted with Texas Commission on Environmental Quality (TCEQ) reports.

### **Ward County North Phase 2 Well Field Expansion, Colorado River Municipal Water District, Ward County, Texas**

Provided assistance with well design (using geophysics and water quality information to determine appropriate screen intervals), estimation of water quality utilizing resistivity geophysics, and minimal test boring samples. As the hydrogeologist on location for the duration of field activities, responsible for site preparation, observation and documentation of drilling-related activities, field sampling and logging of cuttings, well development, aquifer testing, water quality sampling, and documentation of well construction and all other data and activities. Wells were drilled to depths of 800 feet using



conventional mud rotary assisted drilling methods and downhole geophysical surveys were completed on each well. Also generated the 21 TCEQ reports required for each well, including aquifer test analysis with AQTESOLV and compiling water-quality sampling results.

### **Exploratory Test Well, Brown County Water Improvement District, Brown County, Texas**

Provided field oversight of drilling and construction of a 3,600-foot deep exploratory well to assess water quantity and quality in the Hickory Sand and Ellenburger Limestone Formations. Sampling of the Hickory Formation was performed using an inflatable packer assembly and multiple cement seals were emplaced to perform sampling and aquifer testing of the Ellenburger Formation. This work enabled the client to obtain water quantity and quality data needed to determine costs for brackish water treatment and assess the economic viability of a planned well field for municipal water supply.

### **Industrial Water Supply Development, Vista Sand, Tolar, Texas**

Provided exploratory drilling and oversight for the construction of 14 industrial water supply wells within budget and under an accelerated six-month schedule. The tested production capacity exceeded the project goal. This work provided the client with sufficient water supply to develop a planned frac sand mine.

### **Litigation Support, Evaluate Potential Impacts of Ground Water Production on Adjudicated Basin, Goleta Water District v. Slippery Rock Ranch, Goleta, California**

Support staff on a project to evaluate the potential connection between Slippery Rock Ranch wells and the Goleta Ground Water Basin. Tasks include supporting the field program, including physical measurements of precipitation, streams, and springs; and water quality sampling of springs, wells, and streams.

### **New Mexico Regional Water Plan Updates, New Mexico Interstate Stream Commission, Santa Fe, New Mexico**

Project scientist for technical update of New Mexico's 16 regional water plans. Ms. Bastien was responsible for technical data management for all 16 regional water plans including water quality data, water supply inventories, water budgets, groundwater and surface water hydrographs, and other information essential to the water plan format criteria.

### **Hopi Water System Improvements, Hopi Utilities Corporation, Hopi Reservation, Arizona**

Lead Field Hydrologist conducting aquifer testing and on-site guidance during well pump installation, plumbing and hydrant hookup as well as power connection to the three wells designed to improve water supply for residents on the Hopi Reservation. Two existing wells from the Hopi Arsenic Mitigation Project were outfitted with new pumping systems. Performed hydrogeologic and geochemical data analysis and reporting. Funding was from the Coronavirus Aid, Relief, and Economic Security Act.

### **Lower Rio Grande Water Quality Monitoring, New Mexico Interstate Stream Commission, Santa Fe, New Mexico**

Project Hydrogeologist for an investigation to develop a comprehensive understanding of salinity and the processes affecting changes in salinity and water quality in the Lower Río Grande in the reach between San Marcial, New Mexico, and El Paso, Texas. The project scope included collection of field data and water quality samples from more than 100 locations in the Lower Rio Grande basin, including surface water, groundwater, and wastewater sites. Analyzed all samples for total dissolved solids (TDS), specific conductance, alkalinity, major ions, bromide, selected trace elements, and nutrients. Constituents of concern included TDS, bromide, and sulfate. Provided field and office support for the following responsibilities: quarterly data collection (performed in cooperation with multiple local, state, and federal agencies), data management (field data, database of water quality, flow, and well information), and preparation of the annual, quarterly, and event reports.

# David N. Manoukian, PG

Staff Professional



## EDUCATION

MS, Geological Sciences,  
Texas Tech University, 2015

BS, Geological Sciences,  
California State University,  
Fullerton, 2012

## PROFESSIONAL REGISTRATIONS

Professional Geoscientist,  
Texas, No. 15105

EPA Certified Lead  
Inspector/Risk Assessor

Construction Quality  
Management Control for  
Contractors (USACE)

Mr. Manoukian has seven years of professional experience providing water resources consulting services. He has collected thousands of water quality samples from private supply and groundwater monitoring wells, managed field crews, drilled and logged hundreds of soil borings, and managed and interpreted field data for approximately 100 projects over the course of his career. His experience has focused on collecting and interpreting field data, oversight, data management and interpretation of geophysical well logs; groundwater sampling via bailers and peristaltic, bladder; lead risk assessments; drilling and installation of shallow and deep groundwater monitoring wells and soil vapor probes; installation of domestic supply, and test wells; logging soil borings; soil sampling; construction site safety awareness; remediation system operation and maintenance; and construction of maps and cross sections.

### **Water Audits, North American Development Bank, Cities of Lyford and Carrizo Springs, Texas**

Technical staff member who assisted with comprehensive water audits for two separate projects funded by the North American Development Bank (NADBank). The water audits included rate studies for water and sewer utilities as well as conservation plans. The goal of the water audits was to improve the Cities' operational and financial sustainability by estimating revenue versus non-revenue water and to distinguish real and apparent losses using the water accounting technique based on the American Water Works Association water balance model. The goal of the rate studies was to evaluate the ability of the current water and sewer rate structures to meet operating expenses for each department and develop proposed rates for the future. Coordinated all communication, data collection and interpretation, and training events for City staff and NADBank partners.

### **Test Well Installation, Chickasaw Nation, City of Lone Grove, Oklahoma**

Provided technical and geological services for the installation of two test wells for the City of Lone Grove, located in the Chickasaw Nation in southern Oklahoma. The City had a moratorium on building new homes due to insufficient water supply. The goal of the test well installations was to identify potential locations for additional domestic supply wells that would provide 100 gallons per minute of potable water between two wells. Provided oversight of drilling activities, well installation, and geophysical logging of the boreholes. Also logged the boreholes, interpreted geophysical logs, and performed aquifer testing at the two wells. Reasonable estimates for well yield between the two wells exceeded 150 gallons per minute.

### **Water Supply Improvements and Hopi Arsenic Mitigation Project, Hopi Tribe, Arizona**

Provided technical and geological services for the installation of two domestic water supply wells, and construction of a water distribution network consisting of a 40-mile pipeline, pumps, and storage tanks, funded by the



Coronavirus Aid, Relief, and Economic Security Act (CARES Act). The project provided a community within the Hopi Tribe with their first potable water source. Wells were completed within the Navajo Sandstone, at depths ranging from 650 to 2,600 feet below ground surface (bgs). Provided oversight of drilling activities, well installation, well development, and aquifer testing, as well as logged the boreholes, and interpreted geophysical logs.

### **Groundwater Remediation Project, Wyle Labs, Norco, California**

Provided technical and geological services for the drilling and installation of 35 injection wells and 20 resistivity monitoring wells via sonic drilling over the course of 7 months. Also provided oversight of the installation of a permeable reactive barrier composed of 1,000 tons of zero valent iron over the course of 9 months. Extensively involved in the installation and operation and maintenance of a groundwater extraction system, a phytoremediation system, thermal and chemical oxidation pilot studies, and sub-slab vapor extraction systems installed onsite. Participated in the various pilot studies and full-scale remediation systems onsite after various contaminants were identified in soil and groundwater under sampling direction from the Regional Water Quality Control Board.

### **Petroleum Release Investigation, Environmental Impact, Cedar Hill, Texas**

Technical staff member who provided technical and geological services related to the identification of the source of contamination from gasoline impacted groundwater seepage from a fresh embankment cut along a major highway and adjacent to a gas station. Performed a receptor survey, logged, and installed five soil borings, nine monitoring wells (four of which are dual nested), performed soil and groundwater sampling, managed analytical data and drafted a report, figures, and tables summarizing the results of the investigation.

### **Hazardous Waste Containment Unit Evaluation, Raytheon, El Segundo, California**

Provided technical and geological services for a project to evaluate the source of contamination at a hazardous waste management unit adjacent to a large infiltration basin and sites with previously identified contamination. Responsibilities included drilling 8 temporary groundwater wells to 100 feet below ground surface (bgs), converting 3 temporary wells to permanent groundwater monitoring wells, drilling and installing 4 new permanent groundwater monitoring wells to 100 feet bgs, and drilling and installing 3 semi-permanent multi-nested soil vapor probes to 75 feet bgs. Logged all soil borings with continuous sampling on hollow-stem auger, grab groundwater sampling, and documented vapor probe construction details; conducted well development and quarterly groundwater sampling after drilling activities were completed; documented all well development activities and performed groundwater sampling via low-flow purging techniques with a bladder pump; performed evaluation and decontamination of east and west yards in hazardous waste management unit in preparation for renovations; conducted concrete, soil, and wipe sampling of east and west yards; and developed wipe sampling protocols.

### **Joint Forces Training Base in Los Alamitos, Eco & Associates, Inc., Orange, California**

Technical staff member for project through Eco & Associates for U.S. Army Corps of Engineers to conduct semi-annual groundwater sampling and perform operation and maintenance on two pump-and-treat systems, and a post-closure landfill. Performed weekly, monthly, and annual inspections on two pump-and-treat systems. Diagnosed issues with the systems including failure of automatic shut off switches; took apart a carbon vessel, cleaned the inlet line, and replumbed the vessel with new two-inch polyvinyl chloride and braided vinyl lines; rebuilt a leaking transfer pump; rebuilt five pneumatic water pumps; and designed and installed a high-pressure purge valve to clear main water line of built-up sediments.

# Daniel Ricardo Acevedo

Staff Geologist



## EDUCATION

MSc, Water Management and Hydrological Sciences, Texas A&M University, 2021

BS, Geology, Texas A&M University, 2019

## PROFESSIONAL AFFILIATIONS

Geological Society of America

Daniel Acevedo is a recent graduate educated in hydrology, hydrogeology, geology, and the environment. He is experienced in collecting, organizing, and interpreting data and is skilled in geologic mapping and rock identification, and has experience with ArcGIS, Groundwater Modeling Systems (GMS), MODFLOW, and Python. He is bilingual in Spanish and English.

### **Graduate Assistant Researcher, Texas A&M Berg-Hughes Center for Petroleum & Sedimentary Systems, College Station, Texas**

Estimating the impacts of groundwater pumping for hydraulic fracturing on fresh and brackish water aquifers in the Permian Basin of West Texas. To achieve this work, he downloaded and edited a groundwater availability model from the Texas Water Development Board website, and merged multiple databases together to come up with an approximate pumping schedule for the past, present, and the following 30 years into the future under different pumping scenarios. The databases that were merged include water supply well information, as well as FracFocus' reported gallons of water used by hydraulic fracturing wells. Most of this work was achieved using ArcGIS, MODFLOW, GMS, and Microsoft Office software. He successfully delivered water quality maps, as well as assessed the impacts of pumping water on: 1) the aquifer hydraulic head, 2) gross water volumes that entered and left storage, and 3) volumetric fluxes within and between hydraulically connected aquifers.

### **Teaching Assistant, Texas A&M Department of Physics and Astronomy, College Station, Texas**

Lab instructor for Experimental Physics and Engineering Lab III - Electricity and Magnetism. Procedures often used Python to perform experiments and record observations.

### **Geophysical Processing Intern, TEEC GmbH, Isernhagen, Germany**

Trained in geophysical processing software and writing technical reports.

### **Student Technician, Texas A&M Department of Geology and Geophysics, College Station, Texas**

Skilled at following procedures to prepare samples for mass spectrometry research in a dry-lab environment for Dr. Marcantonio. Trained in making thin sections of rocks for Dr. Kronenberg's research on structure analysis of deformed rocks from the Main Himalayan Thrust fault.

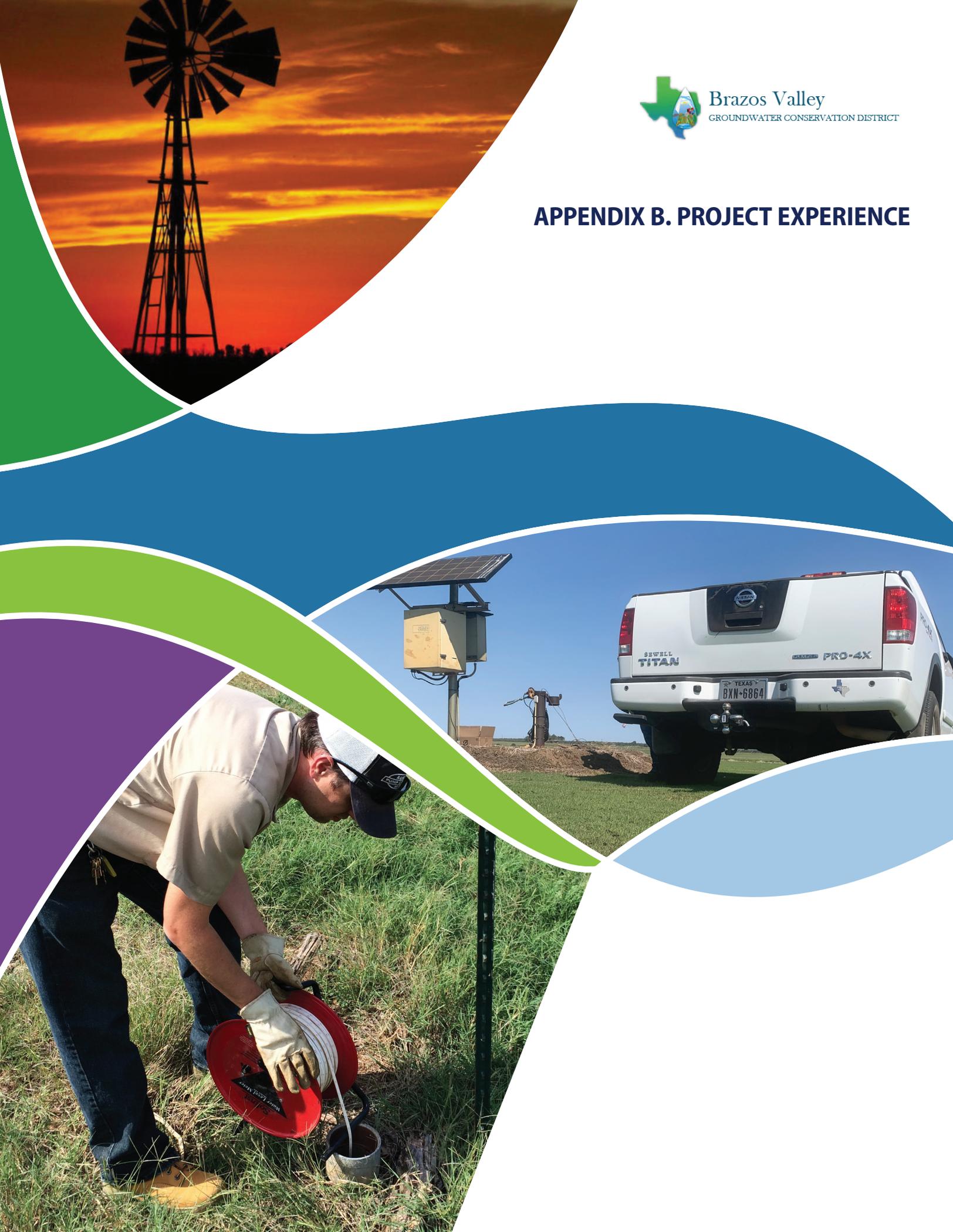
## **Publications and Presentations**

Acevedo, D. 2021. Estimating the Impacts of Groundwater Pumping for Hydraulic Fracturing on Fresh and Brackish Water Aquifers in the Permian Basin of West Texas, Master of Science in Water Management & Hydrological Sciences (thesis and technical report). Funded by Texas A&M Berg-Hughes Center for Petroleum & Sedimentary Systems and University Lands.



Brazos Valley  
GROUNDWATER CONSERVATION DISTRICT

## APPENDIX B. PROJECT EXPERIENCE



## On-Call Hydrogeologic, Database, and Modeling Services

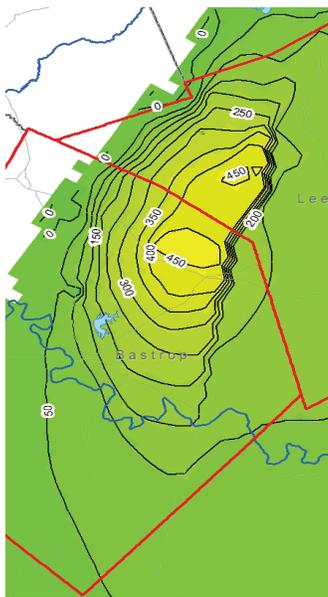
Bastrop and Lee Counties, Texas

### Client

**Lost Pines Groundwater Conservation District**

### Highlights

- ◆ Assisted with joint groundwater planning and development of DFCs
- ◆ Successfully defended DFCs against two petitions
- ◆ Performed well and aquifer evaluations
- ◆ Reviewed all significant permit applications
- ◆ Assisted with water level monitoring network



Evaluation of drawdown for permit application submitted to Lost Pines GCD

DBS&A was contracted by the Lost Pines Groundwater Conservation District (LPGCD) to provide technical support for hydrogeologic services. DBS&A's responsibilities have included:

- ◆ Review of rules and development of the District Management Plan
- ◆ Evaluation of operating permit applications
- ◆ Evaluation of well and aquifer behavior
- ◆ Collection and evaluation of water level data, including the evaluation of impacts from pumping occurring outside of the District
- ◆ Collection and review of water quality data
- ◆ Organization and evaluation of other types of data, including pumpage data, exempt and non-exempt well data, and data from various state agencies
- ◆ Coordination with the Texas Water Development Board on a variety of topics
- ◆ Groundwater availability modeling, both specific to the District and regional evaluations as part of Groundwater Management Area (GMA) 12
- ◆ Assistance with the coordination with permit holders and adjacent GCDs and their consultants
- ◆ Development of director training and other technical presentations
- ◆ Review and update of the District well database
- ◆ Joint groundwater planning support
- ◆ Support for any other hydrogeology-related tasks at the request of District staff

DBS&A provides the technical review of all permit applications received by the District, including evaluating the impacts of the proposed pumpage using the regional Groundwater Availability Model. DBS&A played an integral role in assisting the District with the development of Desired Future Conditions (DFCs) for the first three rounds of joint groundwater planning through GMA 12, including successfully assisting the District defend the adopted DFCs against two petitions.

DBS&A developed an online database for the District for use in well registrations and permitting, and is assisting the District in evaluating and expanding the data included in the database for all exempt and non-exempt wells and permits in the District. DBS&A assists the District with water level measurements and the evaluation and expansion of the water-level monitoring network, including assistance with the evaluation of the impacts in northern Lee County from the Vista Ridge project.

DBS&A regularly assists District staff with a wide variety of hydrogeology-related issues that come up for the District, such as assistance for permit holders with issues with wells, review of data received by the District, assistance with stakeholder concerns, strategic planning for District technical tasks, among other things. DBS&A has also recently developed a draft of an annual Water Level Report for the District.

## On-Call Hydrogeologic, Environmental, Database, and Modeling Services

### Fayette County, Texas

#### Client

**Fayette County  
Groundwater  
Conservation District**

#### Highlights

- ◆ Regularly attend Board of Directors meetings
- ◆ Performed a three-year water quality study
- ◆ Developed a 3D hydrostratigraphic model

DBS&A has provided the Fayette County Groundwater Conservation District (FCGCD) with ongoing hydrogeologic, environmental, database, and modeling services since 2011. DBS&A regularly attends FCGCD Board meetings, and assists with technical issues, including:

- ◆ Assistance with joint groundwater planning with both Groundwater Management Area (GMA) 12 and GMA 15
- ◆ Assistance with the District on-line water well database
- ◆ Evaluation of historic pumpage
- ◆ Development of a water level monitoring network, water level collection, and installation of automated water level collection devices
- ◆ Providing District staff with geographic information system (GIS) training and support

#### Groundwater Water Quality Sampling Program

DBS&A also conducted a three-year groundwater water quality sampling program in Fayette County. We collected groundwater samples from 277 selected wells throughout the County to assess groundwater chemical composition, potential environmental impacts to the aquifers, and groundwater quality by comparing these new data to data previously collected by Texas Water Development Board and estimate the location of the “bad water lines.” DBS&A worked with FCGCD personnel to identify candidate wells and create notification letters to gain access from the selected well owners. The results of the study provided an updated baseline of water quality conditions in seven different aquifer units located within the County, and indicated that groundwater quality is similar to that found historically in Fayette County.

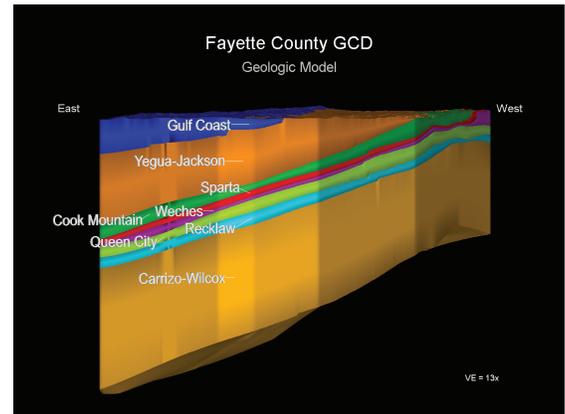
#### Three-Dimensional Hydrogeologic Model

DBS&A also managed the development of a three-dimensional (3D) hydrogeologic model of Fayette County. This project included the identification and analysis of hydrogeologic and stratigraphic data within the County, and the construction of an ArcGIS geodatabase to store and manage the applicable data. Geophysical



Duncan Windmill: Windmill pumps from a 600-foot deep well into a large concrete cistern that was dug by hand.

logs were collected and interpreted to determine the top and bottom surfaces (where feasible) of the seven freshwater aquifers utilized in the County, as well as the brackish aquifers within the Calvert Bluff and Simsboro Formations of the Wilcox Group. The geophysical logs were also utilized to determine net sand thickness for each aquifer investigated. Drillers reports and well logs were then collected and classified by aquifer to further delineate the net sand content for each aquifer. Finally, estimates of groundwater in storage were made based on the net sand evaluations, aquifer extent, and assumptions regarding effective porosity. The project data were integrated into a 3D software package to create a 3D hydrostratigraphic model of the County that could be used to conduct volume calculations and estimate the spatial variability of water availability. The 3D model was used to assist with the development of desired future conditions (DFCs) of regional aquifers, including the Carrizo-Wilcox.



The 3D hydrostratigraphic model was used to conduct volume calculations and estimate the spatial variability of water availability.

### Environmental Services

DBS&A performed evaluation of a variety of potential environmental concerns within Fayette County, two of which include evaluating the potential impacts of in situ uranium mining and investigation of contaminants from the coal-fired Fayette Power Plant (FPP) Project. The uranium mining project included designing and implementing a water quality sampling program to establish baseline water quality parameters proximal to a uranium lease in central Fayette County. Three quarterly sampling events of eight privately-owned wells were conducted and the laboratory analytical data was reviewed and compared to historical levels. The FPP investigation included a review of numerous environmental reports obtained from Texas Commission on Environmental Quality regarding the groundwater monitoring program in place for the Lower Colorado River Authority's FPP. To investigate the possibility that contaminants existing on the FPP property traveled off-site and/or contaminated a deeper sand unit, a sampling program was designed to sample existing private wells that were screened in the appropriate sand units. The analytical results were compared to on-site results and historical results in the area, and presented in a written report to the FCGCD Board of Directors, District staff, and the general public.

## Groundwater Modeling, Three-Dimensional Modeling, and Desired Future Conditions Support

Hemphill County, Texas

### Client

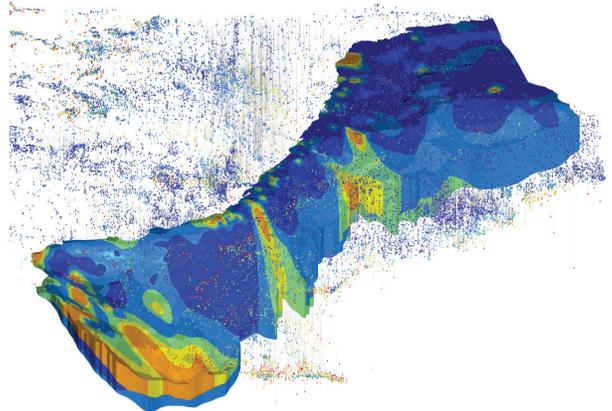
**Hemphill County  
Groundwater  
Conservation District**

### Highlights

- ◆ Creation of County-specific groundwater flow model
- ◆ Expert witness testimony for DFC petitions

DBS&A provided hydrogeologic consulting to the Hemphill County Water Conservation District (UWCD), including:

- ◆ Development of a three-dimensional (3D) model of the Ogallala Aquifer
- ◆ Development of a Hemphill County-specific groundwater flow model
- ◆ Support and testimony in a petition against desired future conditions (DFCs) proposed by Groundwater Management Area (GMA) 1
- ◆ Development of a net effective saturated thickness study on the Ogallala Aquifer within Hemphill County



Hemphill hydrostatigraphic model

DBS&A performed a detailed evaluation of the Ogallala Aquifer, which included a study on the net effective saturated thickness of the unconfined Ogallala Aquifer within the County. More than 2,500 well reports or well records were screened to help define the top of the Permian red beds, of which more than 850 were selected to help redefine the top of the Permian red bed, saturated lithology, and net effective saturated thicknesses. This data was then used to create a 3D model to assist the District in groundwater availability visualization and analysis.

DBS&A created a County-specific groundwater flow model for the District, which was a grid refinement of the Northern Ogallala groundwater availability model (GAM). Work included a refinement of the base of the Ogallala Aquifer and the hydraulic characteristics of the aquifer, both based on a 3D modeling effort, and incorporation of detailed surface water features to the model to better simulate the interaction of the Ogallala Aquifer and the numerous streams and rivers present in the County.

DBS&A supported the District in the development of DFCs in the groundwater joint planning process and presented testimony in support of the District in a GMA 1 DFC petition hearing related to two petitions filed against the DFCs adopted for Hemphill County. The DFCs proposed by Hemphill County UWCD and GMA 1 were ultimately ruled to be reasonable and the petitions were rejected.

## On-Call Hydrogeologic, Environmental, Database, and Modeling Services

DeWitt County, Texas

### Client

**Pecan Valley  
Groundwater  
Conservation District**

### Highlights

- ◆ Assisted with GMA15 joint groundwater planning
- ◆ Assistance with online water well database
- ◆ Providing GIS training and support
- ◆ Analyzed potential hydraulic fracturing and uranium mining impacts

DBS&A has provided the Pecan Valley Groundwater Conservation District (PVGCD) with ongoing hydrogeologic, environmental, database, and modeling services since 2011. DBS&A attends PVGCD Board meetings as requested, and assists with technical issues, including:

- ◆ Assistance with joint groundwater planning in Groundwater Management Area (GMA) 15
- ◆ Assistance with the District online water well database
- ◆ Evaluation of historic pumpage
- ◆ Providing district staff with geographic information system (GIS) training and support

DBS&A also conducted a three-year groundwater water quality sampling program in DeWitt County. This program focused on the collection and analysis of scientific data regarding the aquifer systems and physical phenomena that affect the aquifers managed by PVGCD, which had not been conducted previously in DeWitt County. A total of 164 wells were sampled between 2015 and 2017 to assess the groundwater chemical composition and potential environmental impacts on aquifers throughout the County. DBS&A worked with PVGCD personnel to identify candidate wells and create notification letters to gain access from the selected well owners. The results

of the study indicated that overall current groundwater quality is similar to the historic groundwater quality data that was available.

A small number of wells contained analytes with concentrations above primary drinking water standards, including arsenic, uranium, and nitrate. A number of analytes were also detected above the applicable secondary drinking water standard. However, these are not health-based standards, but are generally related to aesthetic issues such as color, odor and taste, and it is relatively common for one or more of these standards to be exceeded in some wells.

There did not appear to be any discernible trends in basic groundwater quality across DeWitt County. Most of the groundwater was fresh, with only 21 wells exceeding a total dissolved solids of 1,000 milligrams per liter. Likewise, no discernible trends were evident in any of the other general water quality parameters. There were no conclusive indications of impacts to groundwater quality from the presence of hydraulic fracturing activities occurring in the northern part of the County. The uranium constituent suite analyzed for in the southern part of the County indicated the occurrence of several of the parameters included in this suite. Most of these constituents are naturally occurring and the results were within or close to the historic range for these parameters.



DBS&A conducted a three-year groundwater water quality sampling program.

## Hydrogeologic Consulting and Monitor Well Installation Services

Gonzales County, Texas

### Client

**Gonzales County  
Underground Water  
Conservation District**

### Highlights

- ◆ Performed permit application model run reviews
- ◆ Assisted with DFC compliance
- ◆ Managed the installation of a groundwater monitor well network

DBS&A has been the hydrogeologic consultant for the Gonzales County Underground Water Conservation District (GCUWCD) for over ten years. Assistance to the GCUWCD has included:

- ◆ Review of permit applications, in particular, model simulations submitted as part of permit applications.
- ◆ Review of water levels and assessment of the GCUWCD's compliance with approved desired future conditions (DFCs).
- ◆ Development of groundwater model runs to assess multiple permit applications. Model runs associated with permit applications typically use the groundwater availability model (GAM) for the southern portion of the Queen City-Sparta Aquifer (which includes the Carrizo-Wilcox) to evaluate the impact of the proposed permit pumpage on water levels throughout the GCUWCD. Permit applications in the GCUWCD are typically in the Carrizo Aquifer, which is the most prolific aquifer in the area.
- ◆ Conducted modified pumpage model runs at the GCUWCD 's request.

DBS&A oversaw the installation of Carrizo Aquifer outcrop monitoring wells for the GCUWCD. Monitor wells were installed in the Carrizo Aquifer outcrop in Guadalupe, Gonzales, and Caldwell Counties, Texas. These wells will be used to identify impacts of groundwater production as they relate to the GCUWCD's DFCs developed during joint groundwater planning as part of Groundwater Management Area 13.



Outcrop monitoring wells were installed to identify impacts of groundwater production as they relate to DFCs developed during the joint groundwater planning process.

A secondary purpose of monitor well installations was to collect hydrogeologic data (i.e., aquifer thickness, transmissivity, permeability, and water quality), which will be made available to the Texas Water Development Board for updates to the GAM.

DBS&A provided oversight of drilling associated with monitor well installations, including preparation of lithologic logs from drill cuttings, evaluation of geophysical logs, selection of screen intervals, preparation of a regional strike-oriented cross section, and reports documenting the monitor well installations, well construction details, monitor well development, aquifer pump testing, and water quality sampling.

After completion, the wells were developed using air lift methods for approximately four hours, with estimated production rates ranging from 5 to 100 gallons per minute. After allowing the groundwater elevations to stabilize, 24-hour aquifer tests were conducted, with production rates ranging from 25 to 95 gallons per minute.

## Monitor Well Installations

Pleasanton, Texas

### Client

Evergreen Underground Water Conservation District

### Highlights

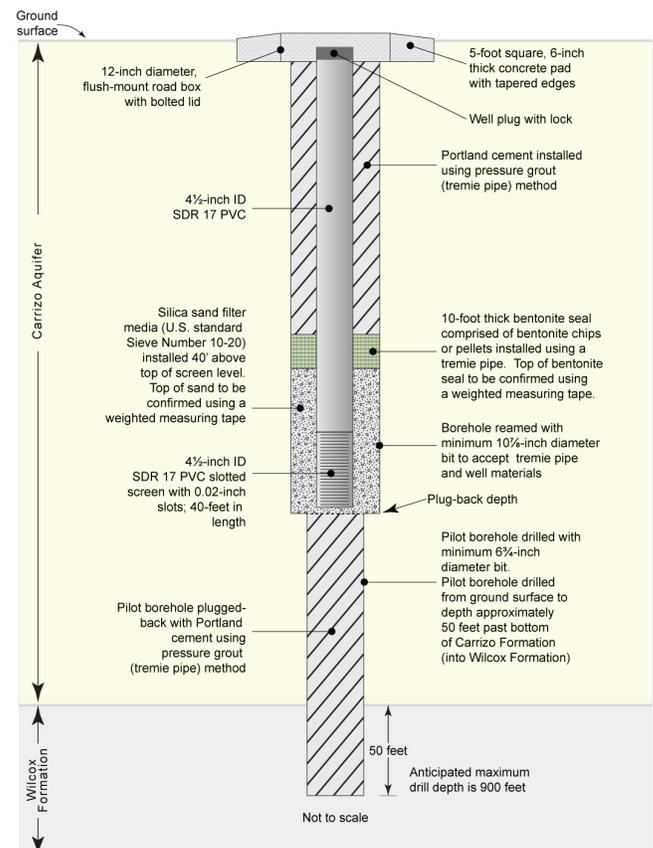
- ◆ Assessed impacts relating to DFCs
- ◆ Collected hydrogeologic data from Carrizo Aquifer
- ◆ Prepared ITB
- ◆ Ongoing support of drilling and well completion

DBS&A currently provides on-call consulting services to the Evergreen Underground Water Conservation District (EUWCD) to support the installation of five groundwater monitor wells into the Carrizo Aquifer. Within EUWCD's jurisdiction, the Carrizo Aquifer extends from the northeastern portion of Wilson County, through the northern end of Atascosa County, and into southern Medina County and far northern Frio County.

The main purpose of the groundwater monitor well installation project is to quantify impacts of production from the Carrizo Aquifer as they relate to the EUWCD's Desired Future Conditions (DFCs), particularly the percent saturated thickness of the Carrizo

Aquifer. A secondary purpose of the monitor well installation project is to collect hydrogeologic data (including aquifer thickness, transmissivity, permeability, specific yield, and water quality) from the Carrizo Aquifer.

DBS&A prepared an Invitation to Bid (ITB) document to solicit drilling companies for the installation of monitor wells within the Carrizo Aquifer on behalf of the EUWCD. The ITB included installation and engineered design specifications for monitor wells, and cost estimate spreadsheets for completion by the bidders. DBS&A provides ongoing consulting services to the EUWCD in support of drilling and well completion issues, borehole geophysical survey evaluation, selection of plug-back depths, screen intervals, and overall well completion suggestions.



Conceptual monitor well construction diagram

## Ward County Water Supply

Ward County, Texas

### Client

Colorado River  
Municipal Water District

### Highlights

- ◆ Developed innovative methodology to characterize complex subsurface hydrogeologic conditions and evaluate water quality
- ◆ Performed well design, installation oversight, and testing for 21 high capacity raw water supply wells
- ◆ Exceeded target groundwater production

The Colorado River Municipal Water District (CRMWD) in west Texas serves member communities with a growing economy. Existing water supplies are stressed as surface water supplies from CRMWD's three major reservoirs have declined due to long-term drought conditions. To provide an emergency water supply source in times of drought, CRMWD acquired an existing well field in Ward County with an initial production capacity of approximately 15 million gallons per day. Worsening drought conditions in 2011 resulted in severe rates of reservoir depletion and CRMWD decided to expand the well field with the goal of doubling its production capacity. By mid-2011 projections of water use suggested that CRMWD's surface water sources could be extremely limited by early 2013. This situation required an aggressively accelerated construction schedule to bring the new groundwater supply online before December 2012.

DBS&A planned and executed a Phase 1 test drilling investigation to characterize subsurface hydrogeologic conditions and evaluate water quality. This investigation was followed by Phase 2 design work, contracting, and construction oversight of 21 new supply wells in the Ward County North well field. DBS&A developed an innovative well design methodology to meet targeted water quality and employed a science-based approach to develop multi-screen designs matching complex and variable subsurface lithology within the Pecos Valley Aquifer. Understanding of detailed well field stratigraphy was required, and detailed interpretations of reworked Dockum Group sediments that compose portions of the Pecos Alluvium versus proper Dockum Group geologic contacts were necessary. DBS&A also designed, assisted with procurement, and oversaw installation or construction of submersible pumps and wellhead completions and controls.

DBS&A worked with CRMWD to coordinate planning and contracting in a timely manner and oversaw a fast-track construction schedule that enabled the client to meet the project deadline. The wells were completed on-time and within budget to provide additional operational capacity that exceeds project goals for groundwater production and water quality.



Monitoring a pumping test of a completed production well



## Potter County Well Field Development

West Texas

### Client

City of Amarillo

### Highlights

- ◆ 2011 National Ground Water Association Award for Outstanding Ground Water Supply Project
- ◆ Multi-year, multi-phase phase project

DBS&A was retained by the City of Amarillo, Texas, to develop new water supplies from its Potter County water rights holdings to meet anticipated future growth needs and address near-term supply shortfalls due to drought impacts on surface water supplies. The City's goal is to produce an additional 20 to 40 million gallons per day (mgd) of municipal water supply from approximately 45,000 acres of water rights holdings within the Ogallala Aquifer. The project included:

- ◆ Hydrogeologic assessments
- ◆ Drilling contract procurement and administration
- ◆ Municipal well permitting
- ◆ Exploratory borehole drilling
- ◆ Supply well engineering design, construction and oversight
- ◆ Aquifer testing and well performance assessment
- ◆ Regulatory reporting
- ◆ Well field optimization modeling



Optimal sites for the initial prototype well installations were based on a 3D hydrostratigraphic model.

Phase 1 activities of the multi-year project were successfully completed in 2008. Initial hydrogeologic assessments included evaluation of geophysical logs and driller's logs from previous test drilling and well installations throughout the area of interest. Subsurface lithology and stratigraphy data were incorporated into a three-dimensional (3D) hydrostratigraphic model, which was used to select optimal sites for initial prototype well installations based on the thickness of permeable sand and gravel layers and the geometry of the underlying red beds (i.e., distribution of paleochannels).

Additional hydrogeologic assessments included groundwater modeling of future production scenarios to assess aquifer sustainability. The modeling study demonstrated that the initial plans for producing 20 mgd from a limited portion of the City's water rights holdings would result in rapid aquifer depletion. As a result, the well field area was expanded to obtain the desired production capacity while maintaining favorable aquifer conditions.





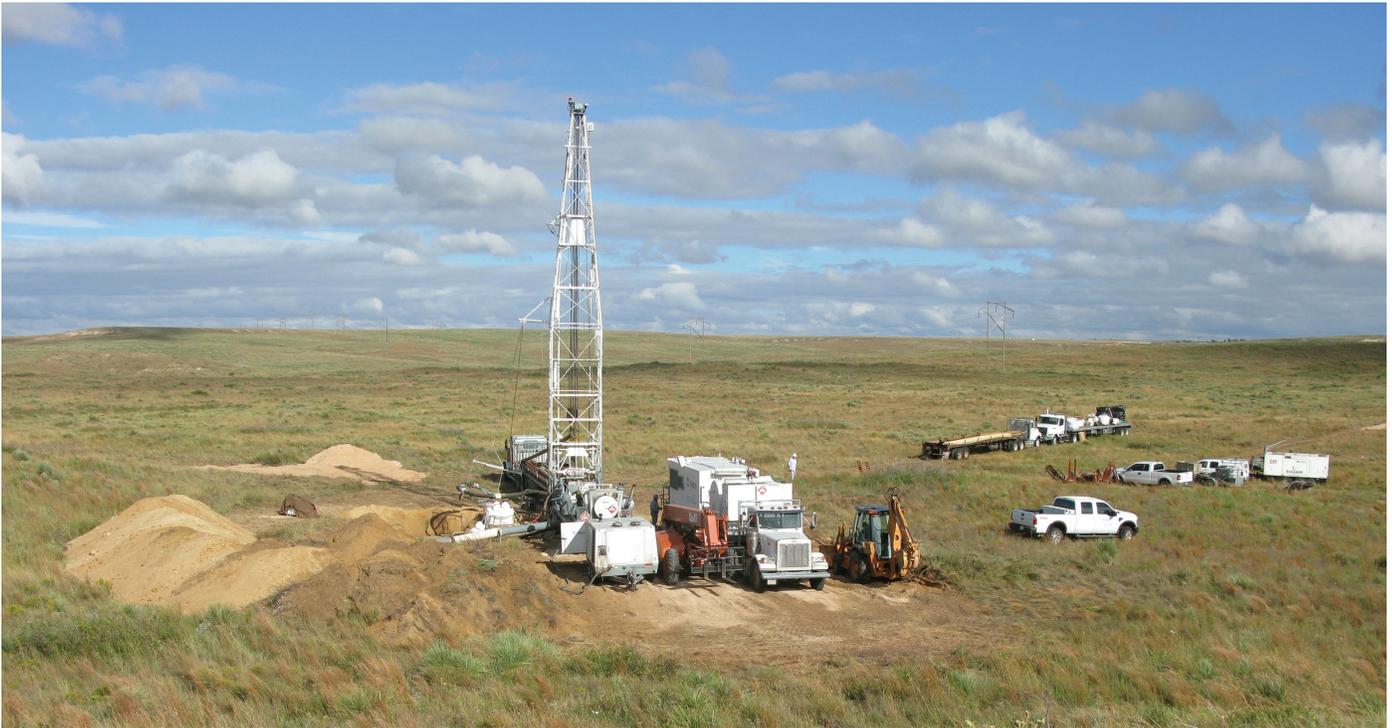
Prototype supply wells demonstrated production capacities ranging from 850 to 1,140 gallons per minute.

During the summer of 2008, DBS&A planned, designed, and oversaw installation of four prototype supply wells ranging from 490 to 900 feet in depth, and conducted pump testing that demonstrated production capacities of 850 to 1,140 gallons per minute. The field program also included the installation of 5 observation wells used to monitor water level drawdown during pumping tests, and drilling 10 exploratory test borings at depths up to 960 feet.

During the winter of 2008-2009, DBS&A updated the groundwater model based on the Phase 1 field investigation and performed additional simulations to develop the final well field design, which consisted of 21 supply wells within a well field footprint encompassing about 18 square miles. The initial estimated production capacity of the completed well field was 20.6 mgd.

DBS&A planned and oversaw the drilling of 11 additional exploratory test borings in the spring of 2009 to verify aquifer conditions and provide site-specific data for well design. DBS&A prepared and submitted a Multiple Water Well Drilling Permit application to the Panhandle Groundwater Conservation District (PGCD) in the spring of 2009. Additional modeling scenarios were run at the request of the PGCD demonstrating predicted aquifer impacts from balancing future production demand between the new Potter County well field and the City's existing Carson County well field under most-likely and worst-case pumping scenarios. Our work with the PGCD resulted in the approval of a new permit to drill 17 new wells and a permitted production ceiling of 24,900 acre-feet per year (22 mgd) from a contiguous tract of nearly 41,000 acres.

DBS&A prepared detailed designs for 17 new supply wells with 16-inch diameter casing and screens ranging in depth from 457 to 704 feet. We also prepared plans and specifications for well drilling and construction along with an activity schedule to complete the well installations using multiple drilling rigs, development rigs, and pumping crews operating simultaneously. Phase 2 construction activities began in July 2010 and the installation and testing of 16 supply wells and six monitor wells was completed by October 2010, under budget and two months ahead of schedule. Recommended maximum operating capacities of the completed wells range from 420 to 1,890 gpm, exceeding the target well field production capacity.



Multiple drilling rigs, development rigs, and pumping crews worked simultaneously.

Phase 2 construction activities began on July 19, 2010 and the installation and testing of 16 supply wells and six monitor wells was completed by October 10, 2010, under budget and two months ahead of schedule. Recommended maximum operating capacities of the completed wells range from 420 to 1,890 gpm. Total well field production capacity established by pump testing exceeds 25.5 million gallons per day.

## Region O 2016 Regional Water Plan

### West Texas

#### Client

#### High Plains Underground Water Conservation District No. 1

#### Highlights

- ◆ Developed a 50-year water supply plan to meet drought-of-record demands
- ◆ Evaluated existing water supplies and projected future demands
- ◆ Identified and evaluated strategies to meet unmet demands
- ◆ Facilitated stakeholder forums and committee work to complete the plan and obtain formal plan adoption

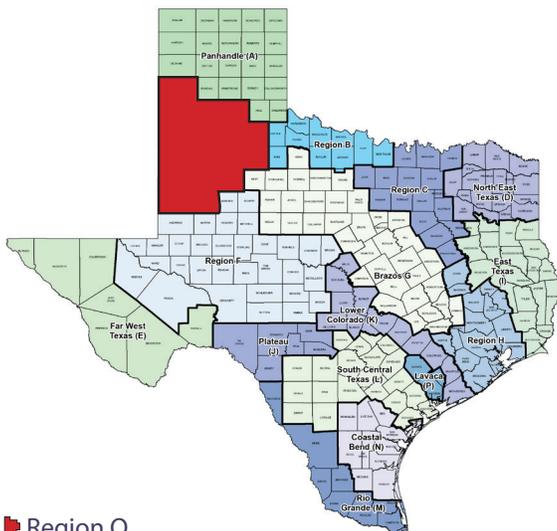
DBS&A served as lead contractor for the Llano Estacado Regional Water Planning Group and the High Plains Underground Water Conservation District to develop the 2016 Region O Regional Water Plan. Region O consists of 21 counties, encompassing the southern extent of the Texas panhandle, and includes approximately 200 water user groups. The region's 10-year average water use (2003 through 2012) is 3,787,711 acre-feet per year, of which 98.6 percent is from groundwater sources. The goal of the project was to develop a 50-year water supply plan to meet drought-of-record demands, including a recommendation of water supply strategies.

DBS&A led all tasks associated with Regional Water Plan development, including:

- ◆ Collection of information from wholesale water providers and water user groups regarding historical water use to confirm the projected water demands and recommended strategies
- ◆ Non-population-related water demand projections (new projections)
- ◆ Population and population-related water demand projections (new projections)
- ◆ Evaluation of existing water supply, including groundwater and surface water
- ◆ Identification of potentially feasible water management strategies
- ◆ Development of technical memorandums, as well as the complete Regional Water Plan
- ◆ Evaluation and selection of water management strategies
- ◆ Adoption of plan through a regional stakeholder process

Stakeholders include groundwater conservation districts, groundwater management areas, river authorities, power providers, counties, municipalities, small business owners, oil and gas industry, regional councils of government, landowners, agricultural interests, livestock operators, environmental groups, and the public.

The 2016 Region O Regional Water Plan was adopted by the Llano Estacado Regional Water Planning Group in November 2015, and the plan was accepted by the Texas Water Development Board in December 2015. The Texas Water Development Board will compile information from all 16 regional water plans into the 2017 State Water Plan.



Region O