

TO: Kinney County Groundwater Conservation District

FROM: Vince Clause, PG, Freese and Nichols, Inc.

SUBJECT: November Hydrogeological Consulting Services Project Update

DATE: 11/18/2025

PROJECT: KGD25636 – FY26 Hydrogeological Consulting Services

This memorandum provides an update on current project initiatives and outlines key project milestones for the coming months.

Changes from prior month's update are provided in ***bold italics***.

Task 1: Recommendation for Rule Changes

Completed to date

- Conducted a general review and evaluation of KCGCD rules under On-Call agreement.

In progress & next steps

- Begin focused rule change evaluation in ***late*** November.
- Provide a draft report to the District in early to mid-December.
- Finalize report by December 31st.

Adjusted Timeline Recommendations

- ***Push delivery dates to January to avoid scheduling conflict with Task 2.***

Task 2: Support Desired Future Conditions Joint Planning

Completed to date

- Attended GMA 10 Meeting in San Antonio, TX on October 28th.
- ***Attended GMA 7 meeting in Sonora on November 6th.***
- Reviewed and synthesized data from multiple sources, including various GAM runs, Dr. Hutchison's tech memos, Kinney County Numerical Model Reports, GMA 7 Explanatory Reports, and the KCGCD Management Plan.
- Reviewed existing methods and data for DFC evaluation.
- Initiated recreation of DFC evaluation cross-plots.
- Began developing the technical memorandum of findings and recommendations.

In progress & next steps

- ***Meeting with TWDB to discuss technical approach on November 24th.***
- Schedule a meeting with Dr. Hutchison to verify his approach for DFC compliance.
- Continuing synthesis and review of GAM runs, tech memos, numerical and explanatory reports.
- Continued development of technical memorandum for findings and recommendations.
- ***Finalize report and recommendations in early January.***
- ***Board adopts its preferred approach to pumping related to GMA-7 DFC/MAG.***
- Present findings to GMA 7 at its ***February*** meeting.

Adjusted Timeline Recommendations

- ***Workshop findings to the District at its December meeting.***
- ***Deliver report to Board at January meeting.***

Task 3: Review and Finalize Groundwater Pumping and Source Aquifer Datasets

Completed to date

- Initiated processing of datasets received from the District, EcoKai, Dr. Hutchison, and the TWDB BRACS program.
- ***Developed draft pumping dataset with preliminary aquifer assignments.***

In progress & next steps

- Continue processing and quality-checking datasets.
- Maintain coordination (correspondence and workshops) to verify pumping and finalize water level datasets.

TO: Kinney County Groundwater Conservation District, Board of Directors

FROM: Vince Clause, PG, GISP, Freese and Nichols, Inc.

SUBJECT: Clarification on V-6 water-level trends and their relation to Las Moras Springs

DATE: 11/18/2025

PROJECT: KGD25511 – Project Management for On-Call Hydrogeological Consulting Services

Background

During the September 25 Board meeting, a public comment during Mr. Jim Burton's presentation asserted that pumping from the "V-6 index well" created a cone of depression that impacted Las Moras Springs due to the well's proximity to the spring. The comment was likely in reference to Garza's *Ground-Water Resources of the San Antonio Area, Texas: A Progress Report on Studies, 1960-64* (1966).

"The fluctuations in water levels in representative wells tapping the Edwards and associated limestone in the San Antonio area are shown in Figure 6. The trend in water levels during the period 1947-56 reflects a drought and the general increase in withdrawal from wells throughout the San Antonio area. Recharge from heavy rainfall during the period of 1957-61 caused the water level to rise approximately the same levels as they were before the drought. ...

The changes in water level in well V-6 in Kinney County (Figure 6) are closely related to those in the discharge of Las Moras Springs, which is west of the ground-water divide near Brackettville. ... Two main factors - - the increased irrigation development west and southwest of Brackettville, and a relatively dry season - brought about abnormally low water levels in the summer of 1964. The water level in well V-6 dropped more than 20 feet and Las Moras Springs ceased to flow during this period. After the pumping decreased in the fall and winter, the levels and spring flow recovered. This situation can be expected to recur, and if the irrigation development continues to increase, the springs may cease flowing for longer periods."

What Garza (1966) Documents

Garza presents long-term water-level trends in wells completed in the Edwards and associated limestones, including V-6 in Kinney County, and compares those trends to discharge at Las Moras Springs. Key points from Garza's discussion include:

- 1) Water levels in V-6 track closely with discharge at Las Moras Springs.
- 2) Two driving forces explain the abnormally low levels observed in summer 1964: (1) irrigation development west and southwest of Brackettville and (2) a relatively dry season.
- 3) After irrigation pumping decreased in the fall and winter, both water levels and spring flow recovered.
- 4) Garza cautions that similar conditions can recur and with continued irrigation development, the duration of no-flow at the springs may lengthen.

The historical record indicates that V-6 reflects changing hydraulic conditions within the Edwards and associated limestones. The combination of regional irrigation pumping and a dry season explain the observed conditions. Recovery occurred after seasonal reductions in pumping.

Technical Relevance

- V-6 is completed in the Edwards and associated limestones.
- V-6 is an index/observation well that records aquifer conditions in the Edwards and associated limestones. It is not presented by Garza (1966) as a production well whose pumping induced the documented drawdown. This point is also supported by Bennett and Sayre (1962), who document V-6 well use as “N” (or “none”).
- The observed correlation between V-6 water levels and Las Moras Springs discharge reflects hydraulic connectivity within the Edwards and associated limestones.

Source and Well Completion Notes

- Garza (1966) identifies V-6 among representative wells tapping the Edwards and associated limestones (p. 18).
- Additional details for V-6 are provided in Table 7 (p. 114) of Bulletin 6216, where it is classified as completed in the Edwards and associated limestones (Bennett and Sayre, 1962).

References:

Bennett, R.R., and Sayre, A.N. (1962). Geology and ground-water resources of Kinney County, Texas. Texas Water Commission.

Garza, S. (1966). Ground-water Resources of the San Antonio Area, Texas: A Progress Report on Studies, 1960-64 (Vol. 34). Texas Water Development Board.

TO: Kinney County Groundwater Conservation District, Board of Directors

FROM: Vince Clause, PG, GISP, Freese and Nichols, Inc.

SUBJECT: Board Follow-Up: Austin Chalk and Potential Effects on Other Aquifers (in Kinney County)

DATE: 11/18/2025

PROJECT: KGD25511 – Project Management and On-Call Hydrogeological Consulting Services

Background

During the October 28 Board meeting I was asked: “Is there any published science that says the Austin Chalk has no effect on the other Aquifers?” This memo summarizes relevant literature, clarifies my prior remarks, and recommends a focused study.

Consistent with My Prior Remarks

Published work does not categorically state “no effect.” However, the preponderance of evidence indicates that, in Kinney County, the Austin Chalk is hydraulically separated from the Edwards and Associated Limestones by several hundred feet of low-permeability units. Given limited fault displacements across this low permeability section, connectivity between the Austin Chalk and Edwards and associated limestones is expected to be negligible.

Clarification of My Prior Remarks

In responding to Director Palmer, I addressed Austin Chalk-to-Edwards interactions, not on Austin Chalk-to-Eagle Ford Shale or Austin Chalk-to-Buda Limestone connectivity. The literature supports that the Buda Limestone (semi-confining, jointed locally) and Eagle Ford Shale (mostly impermeable, jointed locally) may exhibit local connections. Hydraulically speaking, everything is connected; however some of those connections can be considered negligible due to the relatively insignificant movement of water through the pore spaces of confining units.

Relevant Kinney County Literature

Bennett and Sayre (1962)

“The Austin Chalk is the second most important aquifer in Kinney County... The water in the Austin appears to be contained in solution openings and fractures which vary in size and number from place to place.... The success of a water well drilled in the Austin Chalk is governed chiefly on the number and size of openings that are encountered in the drilling of the well.”

“The Grayson confines water in the underlying limestones... The Grayson shale is not known to yield water to wells in Kinney County, and because it is chiefly clay, attempts to obtain water from the Grayson are very likely to be unsuccessful. In a large part of the county the relatively impermeable clay confines the water in the underlying limestone.”

“The Buda Limestone, in general, is relatively impermeable, and it is not known to yield water to wells. In a few places and on and near the outcrop, however, joints may yield small amounts of water.”

“The Eagle Ford Shale is a source of water supply only in and near the outcrop area. The shale itself is nearly impermeable, but open joints in the shale store water and transmit it to the pumped wells.”

“In Kinney County the earth movements that caused the flexure were relatively slight; and although faults are numerous, they are of small extent and displacement”.

Green and Others (2019)

“Although there is faulting at Las Moras Springs, there is no indication that there is sufficient vertical structural offset to juxtapose the Edwards Aquifer with the Austin Chalk or any other permeable unit located closer to the surface”

“It is possible that the Buda Limestone and the Austin Chalk aquifers contribute to discharge at Las Moras Springs. Detailed water chemistry analysis of discharge from Las Moras Springs would help to resolve the sources of water for the springs.”

Summary of Literature Review

Stratigraphically, the Austin Chalk is separated from the Edwards by three low-permeability formations (youngest to oldest): Eagle Ford Shale, Buda Limestone, and Grayson Shale. Regional faults generally have small offsets, reducing the likelihood of cross formational flow between stratigraphic sections. Accordingly, a direct connection between the Austin Chalk and Edwards is unlikely. However, localized interactions with the Buda Limestone and Eagle Ford Shale are plausible.

Recommendation

In 2026, pursue the Texas Water Development Board (TWDB) newly created GCD grant funding for a focused program to evaluate vertical transmissivity through:

1. A series of targeted pumping tests (multi-day, large volume) in the Austin Chalk with observation wells in the Buda, Eagle Ford, and Edwards and associated limestones to detect cross formation flows.
2. A series of targeted pumping tests (multi-day, large volume) in the Edwards and associated limestones with observation wells in the Austin Chalk, Buda Limestone and Eagle Ford Shale.

This measured approach will directly address the Board’s question with site-specific evidence for Kinney County.

References

- Bennett, R.R., and Sayre, A.N. (1962). Geology and ground-water resources of Kinney County, Texas. Texas Water Commission.
- Green, R. T., Bertetti, F.P., and McGinnis, R.N. (2019). Kinney Pool: Defining the western boundary of the Edwards (Balcones Fault Zone) Aquifer, Texas.