



CONNECTING WATER TO LIFE

Technologies for Improved Planning and Design of Groundwater Wells

Jordan Furnans, PhD, PE, PG
Alex Schellhorn, PG

ROCKY MOUNTAIN | MIDWEST | SOUTHWEST | TEXAS

Agenda

An aerial photograph of a river with white water rapids, surrounded by a dense forest of green trees. The river is filled with large, dark rocks, and the water is a bright, foamy white. The forest is lush and green, with some trees showing signs of autumn. The overall scene is a natural, scenic landscape.

Visualization on a large scale in Williamson County, TX

- Petra capabilities
- Leapfrog visuals

Well Sight Selection – Webb County, TX

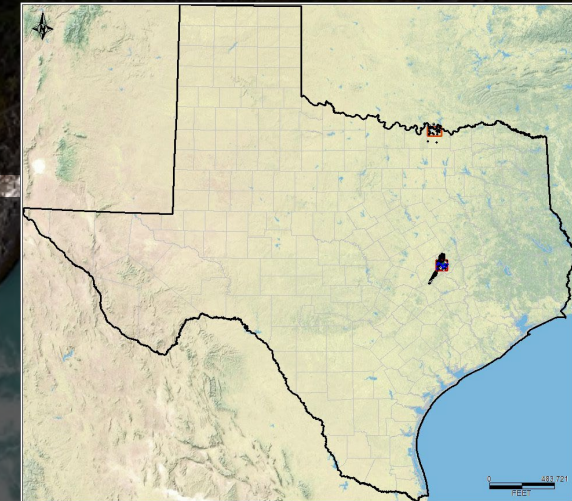
NMR Logging & Data Analysis – Smith County, TX

- Well Screening Locations

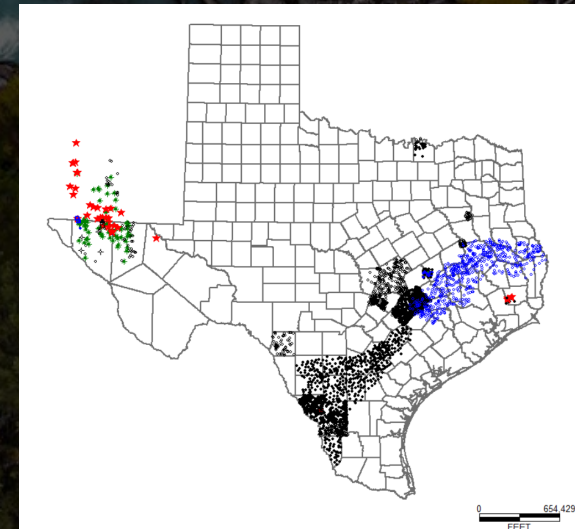
Petra Efforts at LRE Water

- Subsurface Mapping System
- Texas database has 4,000+ wells
- 10+ projects (both in progress and completed)
- Petra has the ability to consolidate large datasets associated with well planning and subsequent analyses into a single workspace
 - *Excel (ie. Well list)*
 - *ArcGIS (ie. Well locations infrastructure, surficial and bedrock geology)*
 - *Log data (ie. Lithology logs, wireline logs, raster logs – multiple wells)*
 - *Formation and aquifer tops*
 - *Core data*
 - *Water quality data*
 - *Well construction/completions details*
 - *Well testing data, etc.*

LRE-TX Petra Project (2022)

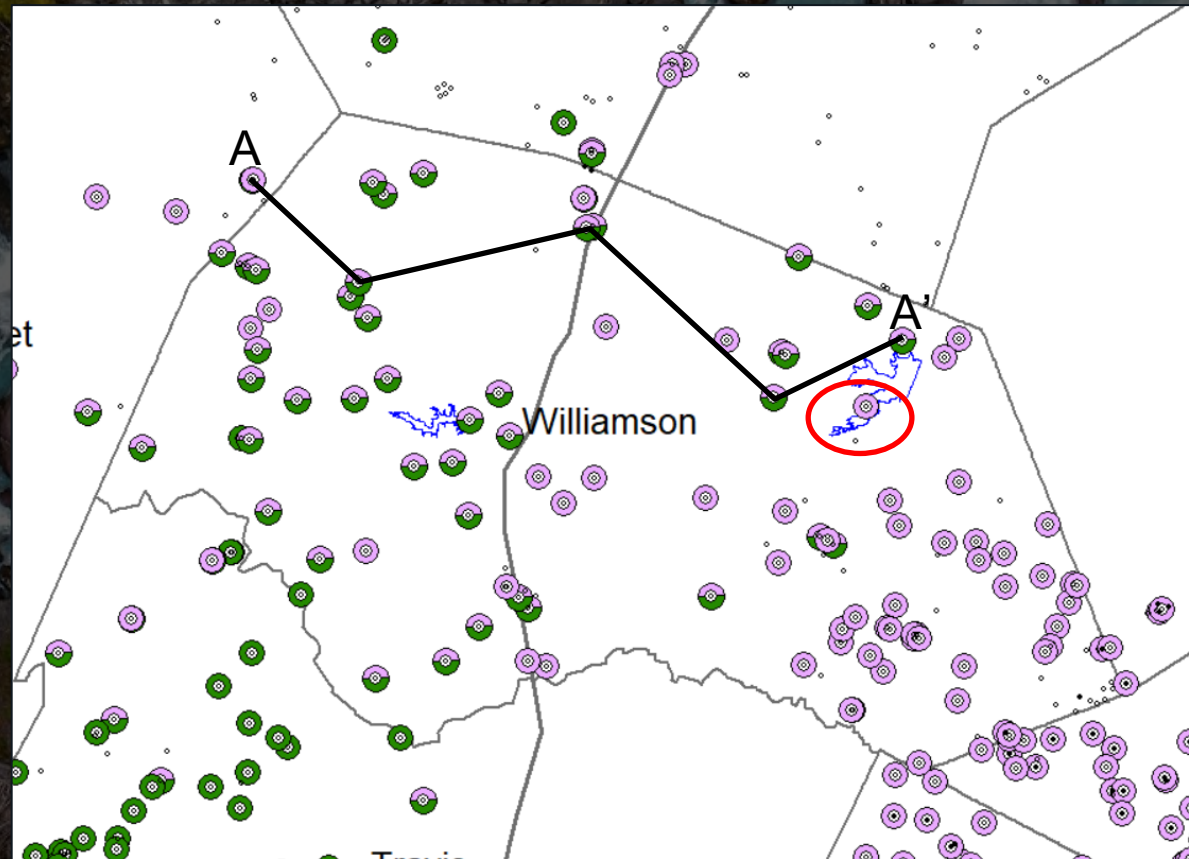


LRE-TX Petra Project (2024)



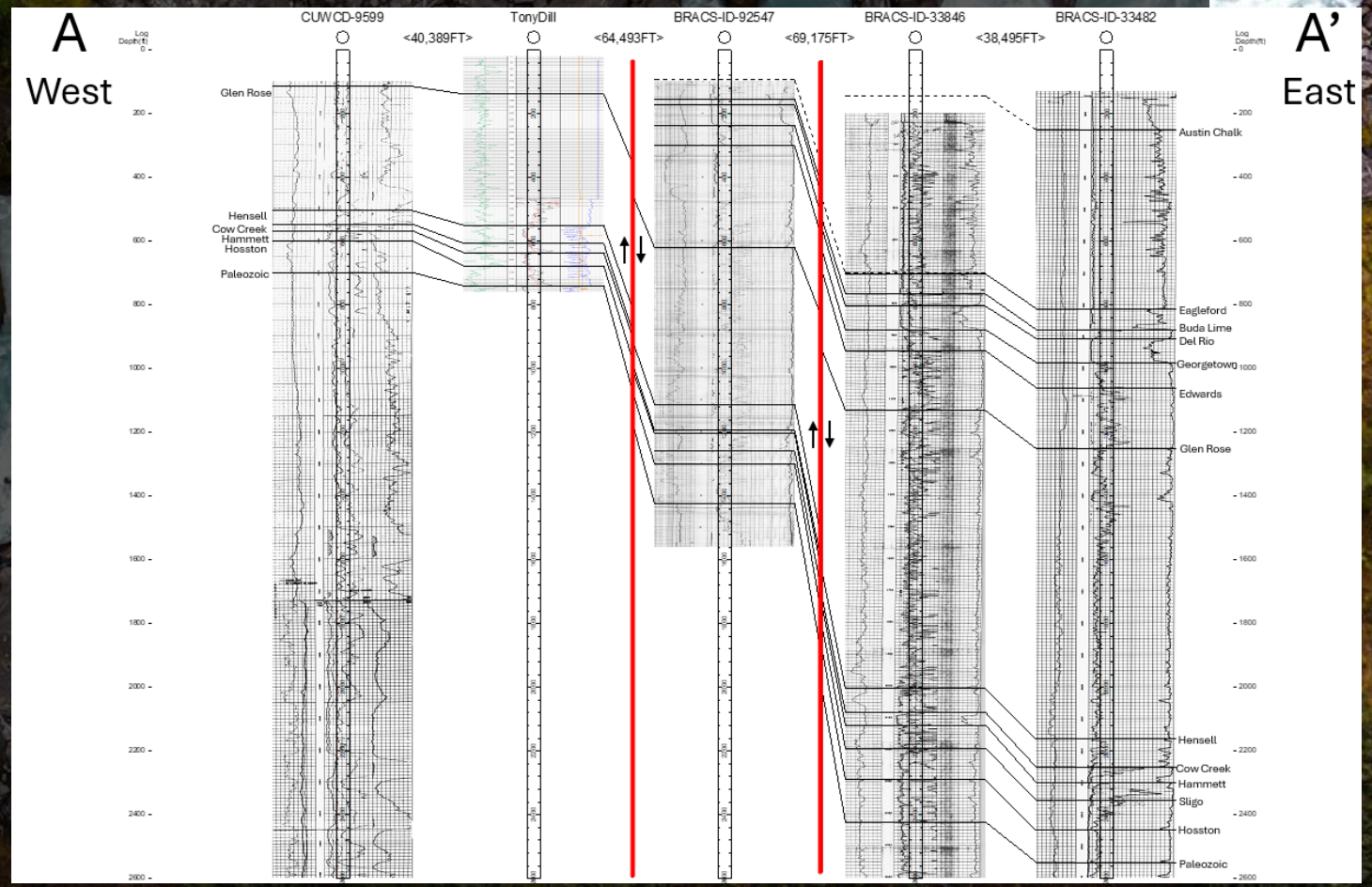
Williamson County – Central Texas

- Most logs are from O&G wells (limited by depth)
- **Pink** circles have rasters available and **Green** circles have Cow Creek tops picked
- Database
- **3,300 GPM** well by Granger Lake



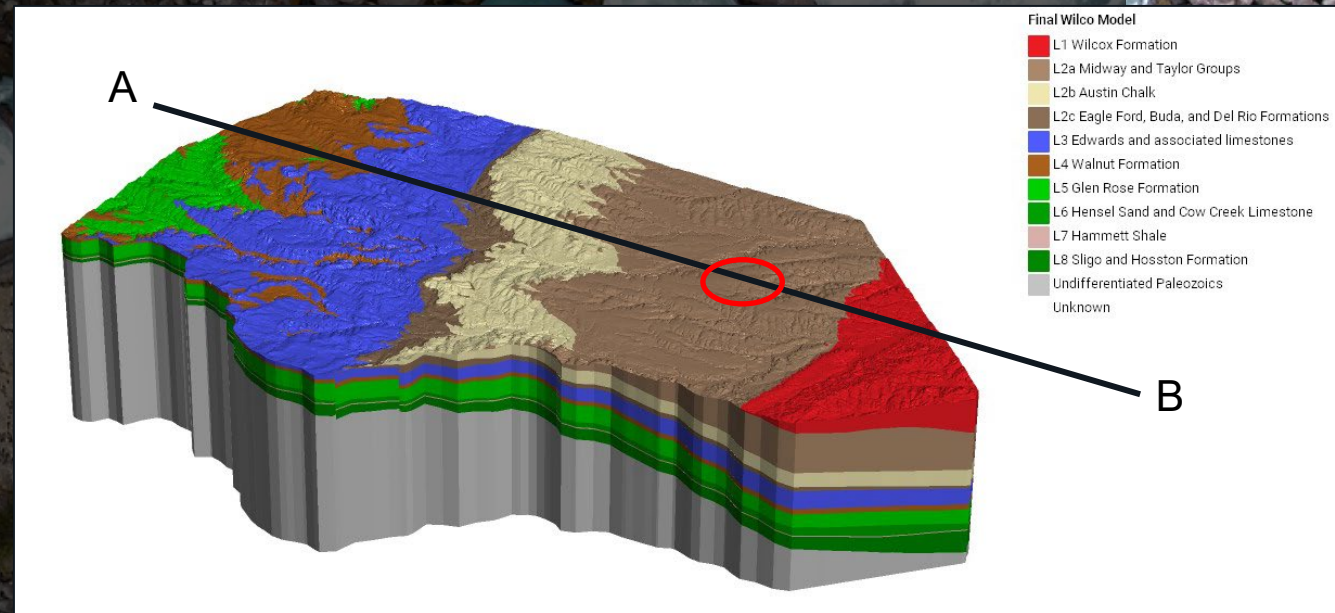
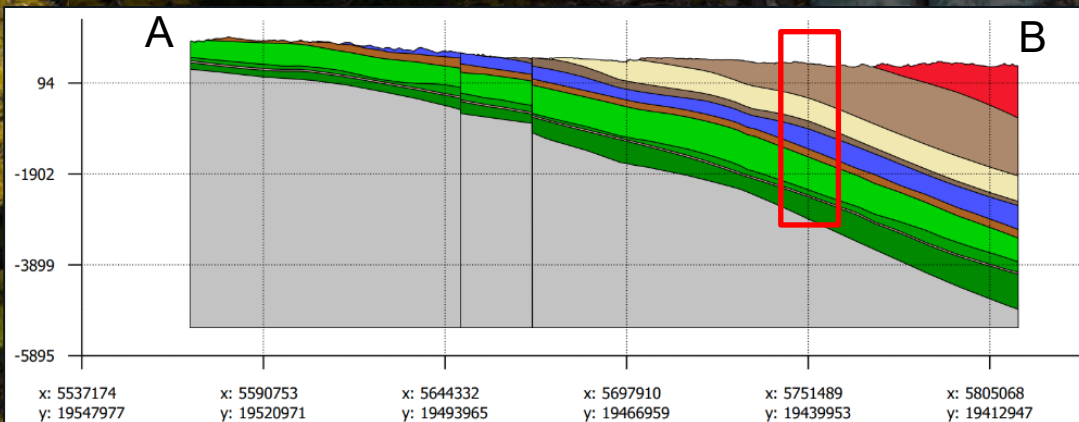
Petra Cross Sections

- Database and correlation tool
- Provides the ability to connect well logs quickly across large areas

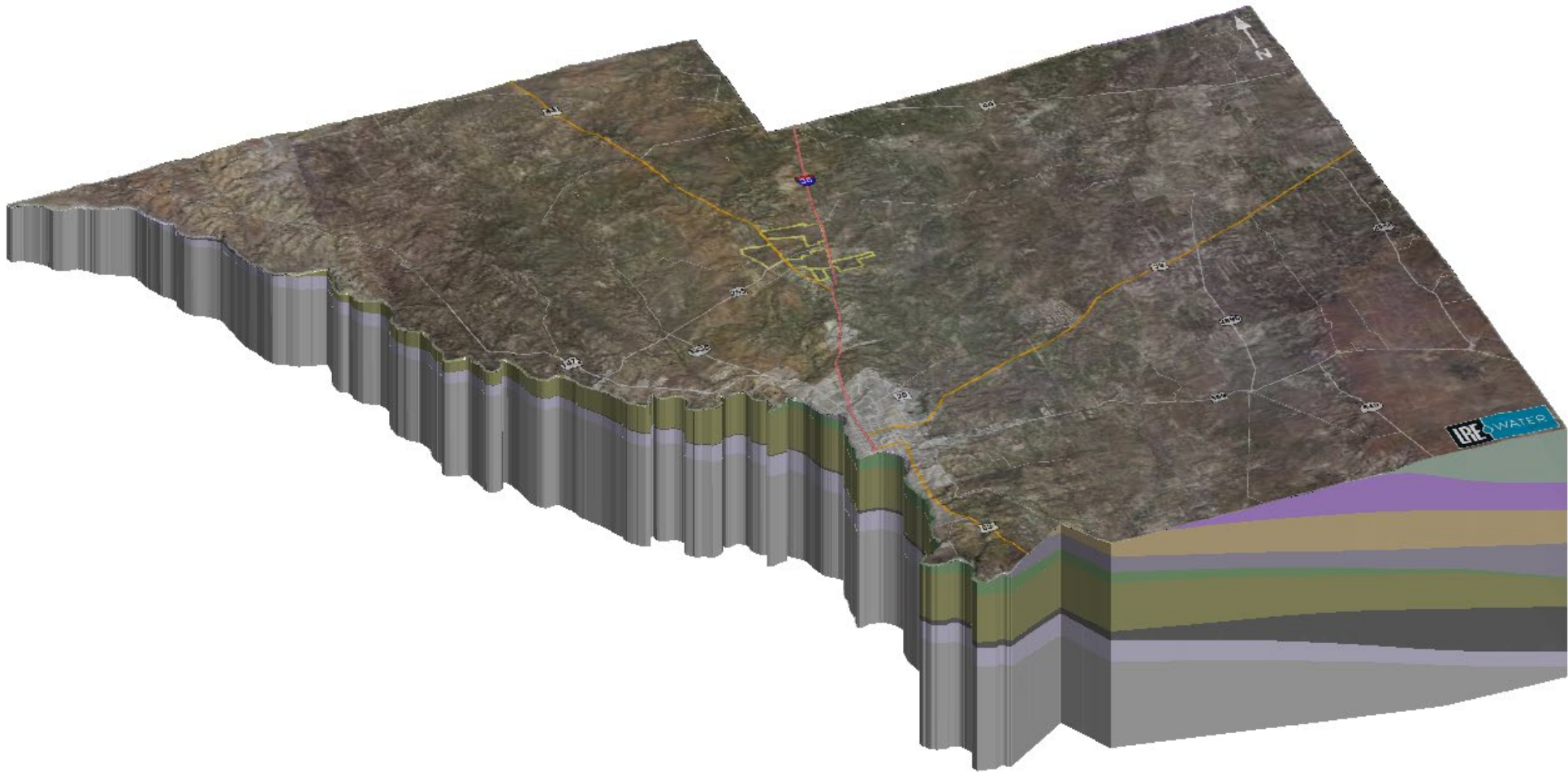


Leapfrog

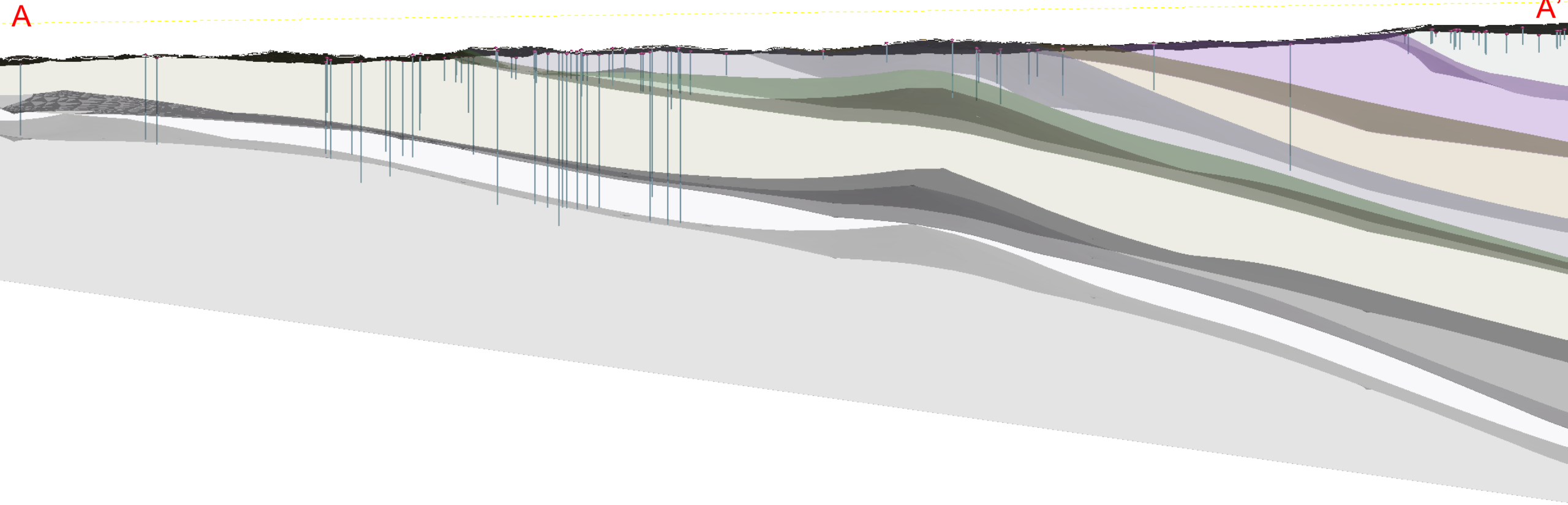
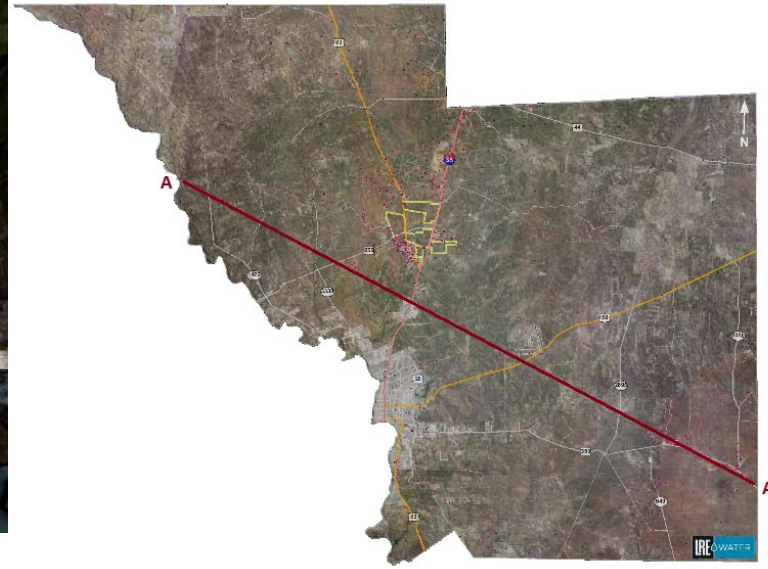
- Formation tops can be imported in from Petra
- Optimal visualization tool for spotting trends and anomalies



Webb County – Laredo, TX

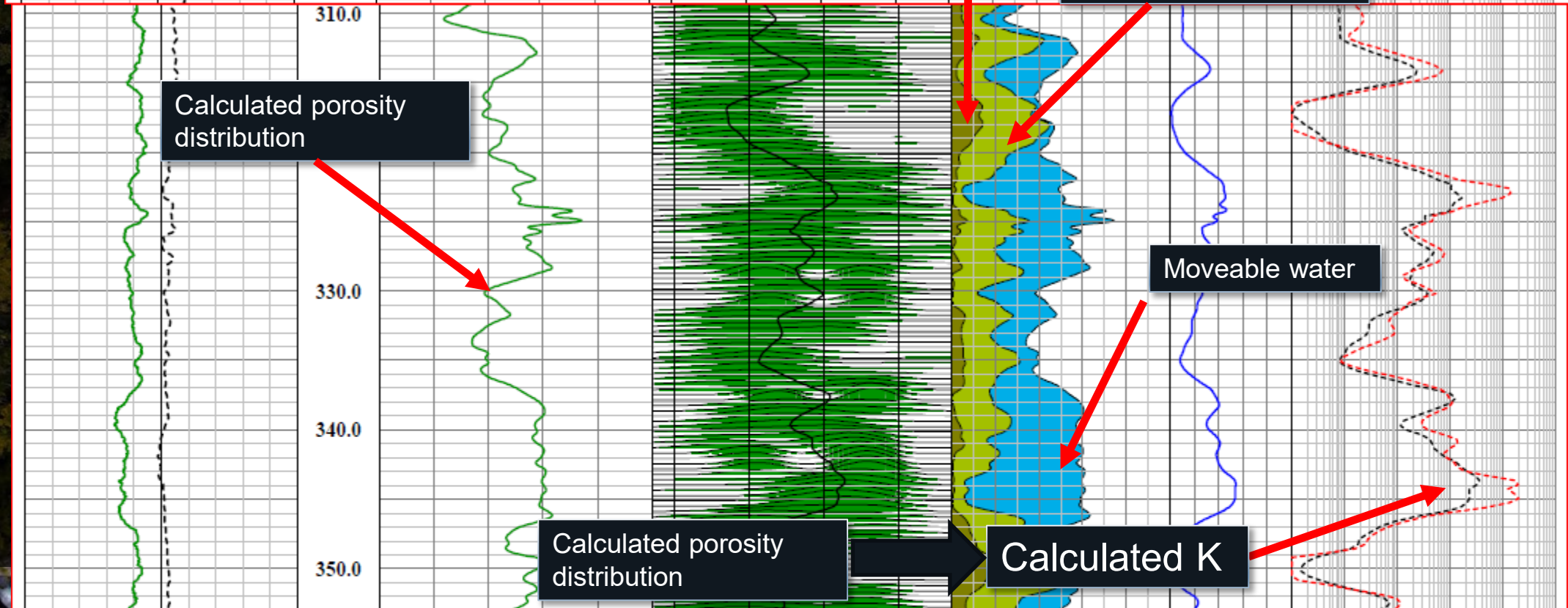


Webb County – Laredo, TX



Pilot Hole Analysis - NMR

Nat. Gamma		Depth 1in:10ft	Total Porosity		T2DIST		WATER VOLUME			Sy	Hyd. Cond. (KSDR)				
0	API		200			0		0.03			0.01	ft/day	1000		
3-Arm Caliper		BAD HOLE		VV	0.5	T2LM		Clay Bound ...	Capillary Bou...	Moveable W...	0	VV	0.5	Hyd. Cond. (KTIM)	
0	Inches		20			0.5	ms	5000							ft/day

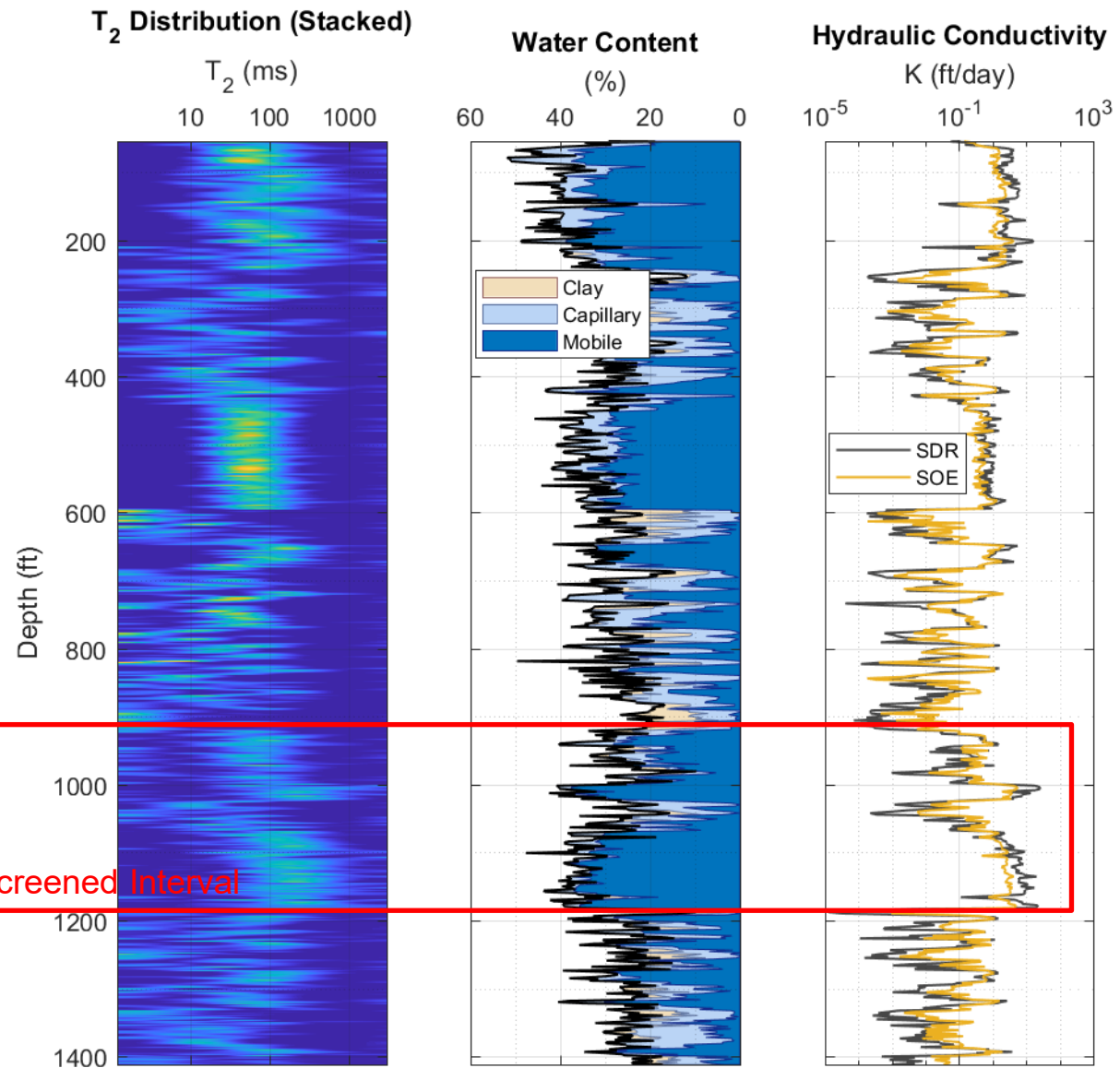


Pine Trail Shores Smith County, TX

- Public Water Supply Well
- Designed: 310 gpm
 - Based on nearby well data



**Texas
Water Utilities**

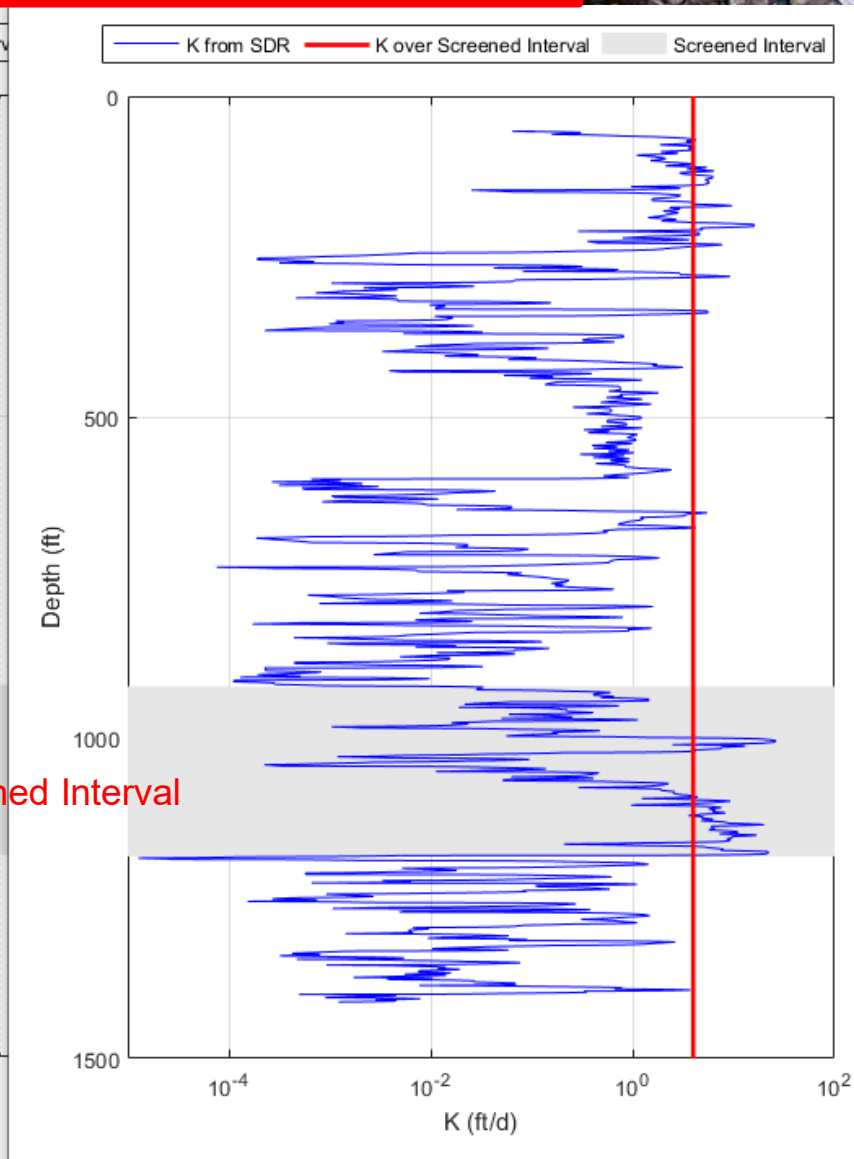
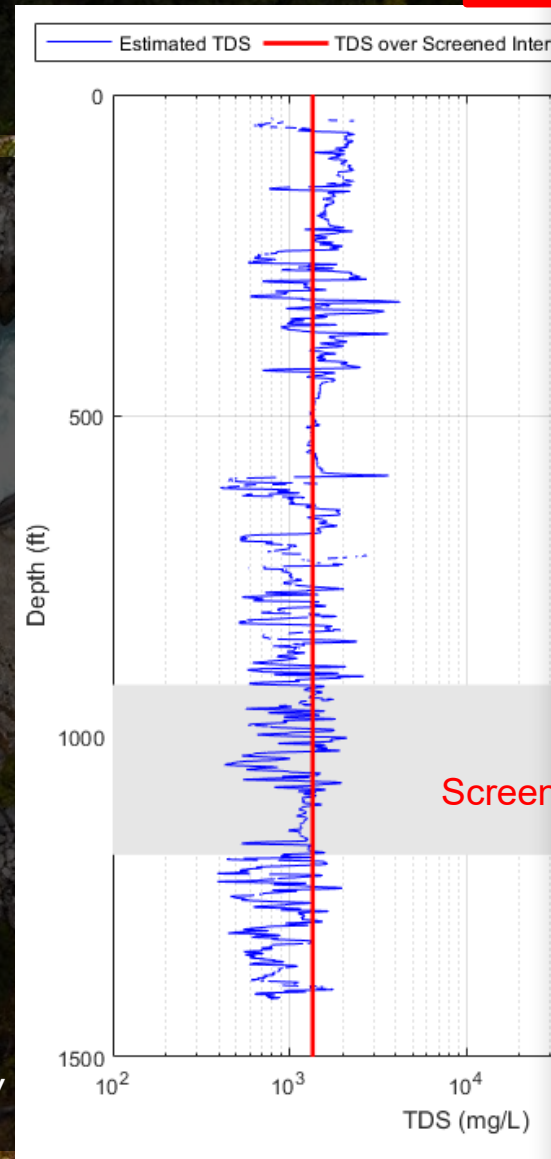


Pine Trail Shores Smith County, TX

- TDS Calculations
 - Archie's Law
 - Porosity & Resistivity Logs
- Yield & TDS over Screened Interval
- Expected:
 - 1,304 mg/L TDS
 - 7,876 gpd/ft Transmissivity
- Obtained:
 - 294 mg/L TDS
 - 11,707 gpd/ft Transmissivity

Expected: 310 gpm
Obtained: 525 gpm

**2 Different Slot Sizes & Filter Packs





CONNECTING WATER TO LIFE

Jordan Furnans, PhD, PE, PG
Alex Schellhorn, PG

Jordan.Furnans@lrewater.com
Alex.Schellhorn@lrewater.com

512-736-6485
512-300-0435