

Geophysical & Lithologic Testing

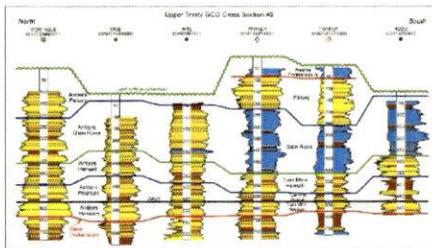
When a well is developed, the test well shall be pumped for several hours to determine the 1) specific capacity of the well, 2) the maximum anticipated drawdown of the water level in the well, 3) the volume of water produced at certain pump speeds. This all assists in determining if the test well is in a decent location to perform aquifer tests.

Prior to Testing: delay aquifer testing until water levels after a well's development phase have completely recovered from pre-pumping levels, or to at least 90% recovery.

Testing: the duration of aquifer tests depends heavily on local geology and lithology, however the goal is to produce a "straight-line trend" on a water level versus logarithmic time scale.

Testing: at a minimum, **24 hours is required for a uniform rate aquifer test. The time can be extended until either the straight-line or a consistent pumping level trend is observed.**

After the pump portion of the test has occurred, this is when recovery measurements are recorded, and these recovery tests will continue until water levels are at 90% or at pre-pumping levels.



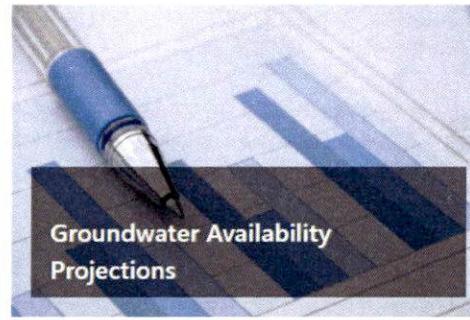
Groundwater Quality

Water quality analysis of the site required under 230.9 shall be compared to primary and secondary public drinking water standards listed below. Sampling should occur at the end of aquifer testing for those with proposed individual water wells on lots.

- Chloride (300 mg/L)
- Conductivity
- Fluoride (4.0 mg/L)
- Iron (0.3 mg/L)
- Nitrates (10 mg/L as nitrogen)
- Manganese (0.05 mg/L)
- pH (> 7.0)
- Sulfates (300 mg/L)
- Total hardness (mg/L)
- TDS - total dissolved solids (1,000 mg/L)
- presence/absence of total coliform bacteria (~5.0%)

Conductivity and pH may be measured in the field with hand-held equipment, but the other substances "shall" be tested in a TCEQ accredited laboratory. Below is a database of certified labs via UTGCD and TCEQ. *The tested values should be compared to primary and secondary public drinking water standards and the results documented.*

[UTGCD Water Lab Database](#)
[TCEQ - List of Labs \(at bottom of webpage\)](#)



Groundwater Availability Projections

Groundwater Availability shall be determined for:

- 10 years
- 30 years
- Any other timeframe required by municipal or county authority.

Time Drawdown Requirements

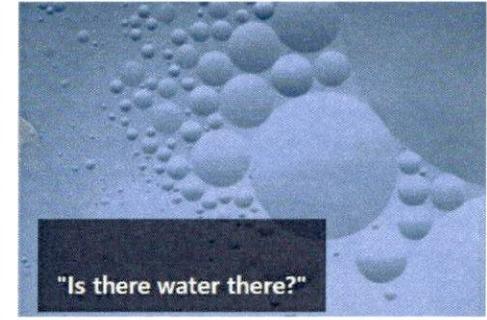
- Amount of drawdown at the pumped wells at 10 years
- Amount of drawdown at the pumped well locations at 30 years
- The amount of drawdown at the proposed subdivision boundaries at 10 years
- The amount of drawdown at the proposed subdivision boundaries at 30 years

Distance Drawdown Requirements

- Distance from the pumped well to the outer edges of the cone of depression for 10 years
- Distance from the pumped well to the outer edges of the cone of depression for 30 years

For multiple wells within a subdivision;

- How pumpage from multiple wells will affect drawdown in individual wells over 10 years
- How pumpage from multiple wells will affect drawdown in individual wells over 30 years



"Is there water there?"

While over 75% of Texas is underlain by a major or minor aquifer, these study parameters are designed to project future water demands for subdivisions and areas of high growth within the Lone Star State.

UTGCD and its review process aim to project three water futures within each review application including;

- Scenario 1, where outdoor watering occurs sparingly and alternative water technologies such as rainwater harvesting, and xeriscape are implemented
- Scenario 2, where high water use is anticipated via consistent and aggressive outdoor watering conditions, and then
- the plat applicant's projected demands wherever they fall on the spectrum of anticipated use

This will provide both homeowners and county/community leaders with additional information to aid in the decision making process. Contact UTGCD with any questions regarding our review process.



Certification & Submission

The certifications required by the state of Texas need to be prepared by either a licensed geoscientist or a licensed engineer. Below are links to the database of P.G.s and P.E.s in the State of Texas.

[Texas Board of Professional Engineers & Land Surveyors](#)

[Texas Board of Professional Geoscientists](#)

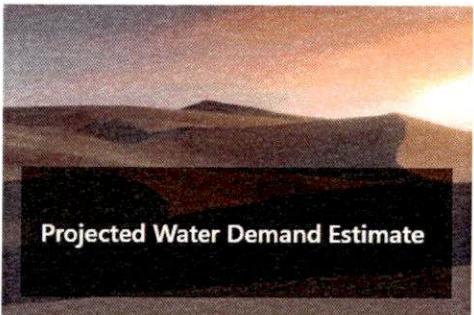


Upper Trinity Groundwater Conservation District

G.A.C. Guide

1859 W. Hwy 199
Springtown, TX 76082

Uppertrinitygcd.com



Projected Water Demand Estimate

Part of the study is estimating the projected water demand from a proposed subdivision or development, based on a variety of variables. Residential demand estimates shall at a minimum, be based on the current demand of any existing residential well, and (all of these at full build out):

- number of proposed housing units.
- average number of persons per housing unit.
- gallons of water required per person per day.
- water demand per housing unit per year (in acre-feet per year).
- total expected residential demand per year for the entire subdivision (also in acre-feet per year).
- total annual water demand estimate (this includes residential and non-residential estimates at full build out combined together).

All data & calculations according to the TCEQ, shall be made available to a county authority or municipality if requested, and plat applicants shall provide any additional information required by any of our four counties as a part of their plat application.



Groundwater/Site Specific Resource Information

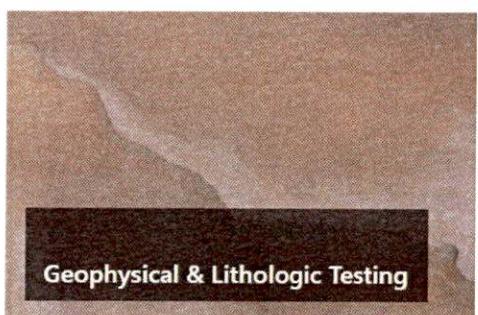
The next two chapters of TCEQ's certification involve information on the aquifer that is the intended source of the subdivision or development. The information below "shall be considered in planning and designing an aquifer test", and includes the following on the intended aquifer system: stratigraphy of the formations underlying the subdivision, lithology of the geologic strata geologic, structure aquifer characteristics, recharge & discharge rates from the aquifer(s), and ambient water quality in the aquifer formation.

When an aquifer test is being designed for a subdivision that will house individual lots and individual water wells, the following protocols details requirements about the study.

Test wells and observation wells: at least one of each is required within the proposed subdivision and must both be completed into the same formation of interest.

Location of observation & test wells - below are the minimum and maximum distances required for an observation well with regards to a test well within the

Observation Well Location	Minimum Distance	Maximum Distance
Confined Aquifer	$\geq 2b$ <i>b = aquifer thickness</i>	≤ 700 feet
Unconfined Aquifer	$\geq 2b$ <i>b = aquifer thickness</i>	≤ 300 feet



Geophysical & Lithologic Testing

A lithologic log is a long collection of data from the aquifer formation, showing the thickness and lithology of the unit, which includes size of particles, range of size of particles (also known as sorting), shape and smoothness of particles (also known as grading), the occurrence of water bearing strata or rock units, and special notes relevant to the drilling process.

A geophysical log on the other hand, uses characteristics of the rock formations to generate an image of the subsurface beneath the subdivision, essentially mapping the aquifer.

TCEQ requires at a minimum Ch. 230.8 "Obtaining Site-Specific Groundwater Data" defines a geophysical log as "an electrical log with shallow and deep investigative curves (e.g., 16 inch short normal/64-inch long-normal resistivity curves or induction log) with a spontaneous potential curve."

UTGCD owns and maintains geophysical logging equipment, and through interlocal agreements can lend our staff and equipment to assist in the geophysical logging of wells within the proposed subdivision. Call 817-523-5200 or visit uppertrinitygcd.com to schedule or request more information.

Dual Induction Tool - must be performed before well is cased OR if casing is constructed of PVC pipe.

Gamma Ray Tool - can be performed before or after well development.

Equipment sizing: 4 in. diameter or larger is necessary for downhole capability.



District staff complete study review – send to identified Platting authority representative, the applicant, and the TWDB.

The front page of the study's executive summary outlines the results of the three projections, and district recommendations regarding water availability.

District's executive summary & study should be filed with the county clerk in the county of origin, for future homeowners



Platting Authority determine how to proceed based on review



District maintains a database of ongoing and completed GAC studies for community access at uppertrinitygcd.com





230.9 includes necessary water testing parameters – 11 in total



District study review duration : 5-10 business days after determination of administrative completeness

Applicant's consultants generate drawdown & time scenarios via Ch. 230

Plat Applicant coordinates water quality testing via certified laboratory

Plat Applicant & their consultants produce final certification statement which includes completion of the TCEQ Form

Applicant submits certification statement for review by District staff
(staff may reach out for additional materials)

District must receive payment of GAC Review Fee prior to beginning review
(emailed invoice to the party responsible)

District staff verify certification is administratively complete prior to review

District staff review study & produce three water scenarios & recommendations based on testing data

Many labs may require their own staff to produce a sample, and samples may need to be refrigerated prior to transport.

ALL fees must be paid and ALL materials, calculations, and data used by applicant must be submitted to the district before the certification statement will be declared administratively complete.

District staff update county platting representatives on when a certification is under review and when a review is completed.



Platting authority directs applicants to contact UTGCD

TBPG & TBPELS maintain online licensure databases at pels.Texas.gov & tbpq.state.tx.us

Ch. 230 requires a minimum of ONE Observation Well and ONE Test well

Plat applicant reaches out to platting authority for submission

UTGCD coordinates pre-study meeting with applicant

Plat applicant secures P.E./P.G. for study, tests, & certification

P.E./P.G. confirms build-out/population data for study (230.5)
This data can be acquired from previous subdivisions & their build-out statistics

Plat Applicant notifies District of drilling & testing dates for observation

District staff monitor testing & well completions: observation & test wells

Applicants encouraged to meet with UTGCD staff to discuss requirements for completing groundwater studies in accordance with Chapter 230 of the Texas Administrative Code.

District staff require 48 hours notice prior to drilling & pump testing

