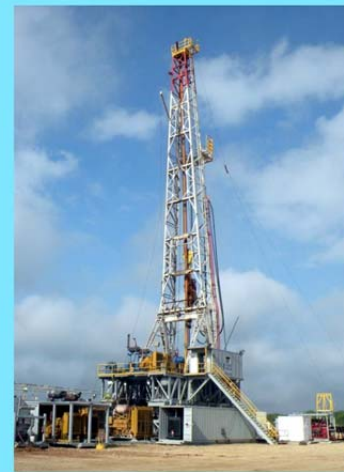


Groundwater Management Plan



**BALANCING HISTORICAL NEEDS DURING
A TRANSITION TO NEW DEMANDS**



January 2013 - Version 1.0

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Purpose And Intent

The Mission of University Lands is to manage and care for the Permanent University Fund (PUF) lands while maximizing the revenue generated for the benefit of Texas higher education. This Mission is accomplished through the application of intensive management, accounting, conservation, and environmental programs.

This Groundwater Management Plan (Plan) establishes policy in the areas of technical research, water conservation, public information, water well drilling, groundwater production, enforcement of rules, equity and discretion (as defined on p. 11) and cooperation and coordination. The Plan will establish guidance and rules to conserve, protect, and prevent the waste of the groundwater on University Lands.

The guidance, research initiatives and policies in the Plan compliment the obligations of Chapter 36 (Texas Water Code) Groundwater Conservation Districts that exist on or adjacent to University Lands. Currently, 13 Groundwater Conservation Districts, seven Groundwater Management Areas, and five Regional Water Planning Groups exist on University Lands. The interests and objectives of these entities are generally determined by Chapter 36 of the Texas Water Code, the locally elected board, and membership. University Lands' policies are intended to complement those of the Groundwater Districts and other planning entities; however, as the surface, groundwater, and mineral owner, University Lands believes that it is best positioned to manage groundwater resources on its property. Those who desire to access groundwater on University Lands must adhere to the policies contained herein.

Plan Adoption

The Plan was adopted by University Lands on January 01, 2013. Policies presented in this Plan were developed from data and reasonable methods of assessment available at the time of adoption. University Lands will periodically revise the Plan as new data and assessments warrant.

Plan Development

Plan development and revision are implemented with a four-step process of integrated assessment and research. With recognition of the immediate need to create reasonable guidance for water well construction and water use reporting, the four steps are summarized below and illustrated in Figure 1:

- Implement well construction criteria and usage reporting guidance
- Manage well construction and water usage data
- Assess the University's role in local and state water management and planning activity based upon review and analysis of collected hydrological data
- Develop and refine short-term and long-term research goals and groundwater management policy

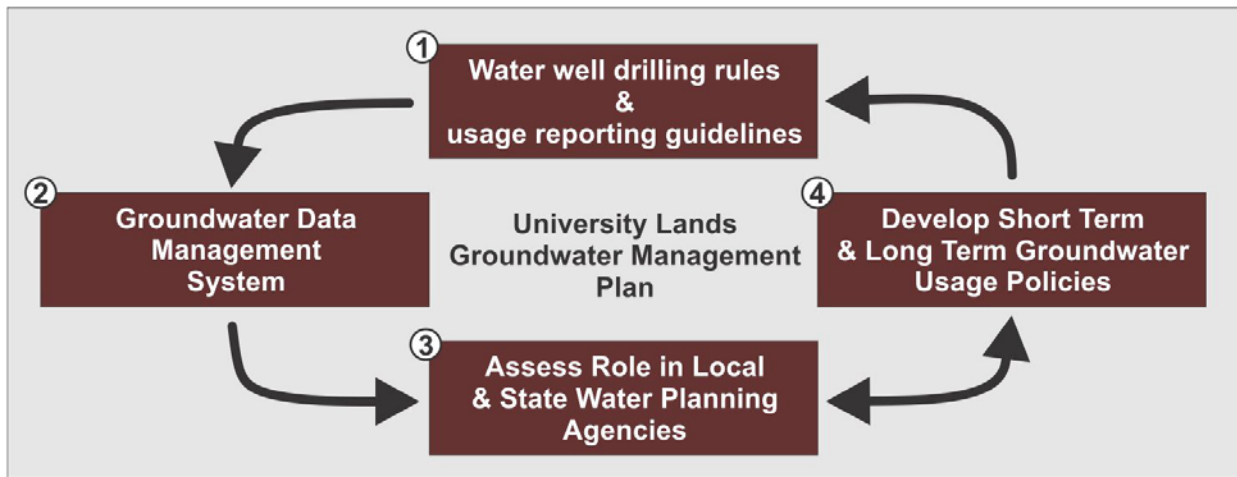


Figure 1. Process for University Lands Groundwater Management Plan Development

Background

In an address to the Third Congress of the Republic of Texas on December 20, 1838, President Mirabeau B. Lamar encouraged the establishment of a foundation to support higher education. On January 26, 1839, Congress allocated fifty leagues (approximately 220,000 acres) of land which were set aside for the endowment of a university (Table 1).

The State of Texas Constitution of 1876 called for the creation of the University of Texas and appropriated one million acres of land to establish the Permanent University Fund (PUF). An additional one million acres were added to the PUF land portfolio in 1883. These lands constitute the bulk of what is commonly referred to as University Lands or PUF lands. Now totaling approximately 2.1 million acres, most of this land is located in the 19 West Texas Counties of Andrews, Crane, Crockett, Culberson, Dawson, Ector, El Paso, Gaines, Hudspeth, Irion, Loving, Martin, Pecos, Reagan, Schleicher, Terrell, Upton, Ward, and Winkler counties.

Initially, in the late 1800's, surface uses of the University Lands were primarily ranchers who leased the land for livestock grazing. While livestock grazing continues as an integral component of surface activity, many additional activities have evolved, including easements, wind farms, telecommunication, vineyards, truck stops, churches, schools and business sites.

In 1923, oil was discovered on University Lands with the completion of the Santa Rita No. 1 in Reagan County. Mineral royalties, lease bonuses, and rentals have enabled the Permanent University Fund to exceed \$13 billion to date for the benefit of Texas higher education. Investment proceeds from the PUF, which is shared by the University of Texas System and Texas A&M University System, finances construction, renovation, library acquisitions, educational and research equipment, and academic excellence programs.

As of August 2012, more than 1.3 million acres of University Lands are leased for oil & gas production and exploration with more than 9,968 oil wells in 259 oil fields and over 853 gas wells in 119 gas fields.

Today, the combination of horizontal drilling and hydraulic fracturing has created new opportunity for the development of unconventional oil & gas from shale formations on a significant portion of University Lands. Increased water use associated with the development of hydraulic fracturing established the need for uniform water well design and construction, a groundwater use policy, and research of the groundwater resource on University Lands.

December 20, 1838	Republic of Texas President Lamar makes address to 3rd Congress of the Republic of Texas, urging the Congress to establish the foundation of a vast system of education
January 26, 1839 (Grant #1)	Republic of Texas set aside fifty leagues (220,000 acres) of land for the establishment and endowment of a University.
1876 (Grant #2)	The State of Texas Constitution called for creation of the University of Texas. Appropriation of 1 million acres of land for the establishment of a Permanent University Fund (PUF).
1883 (Grant #3)	The State of Texas added an additional 1 million acres to the PUF Lands
1923	Oil discovered with the first completed well, the Santa Rita #1 in Reagan County.
1929	The Board for Lease of University Lands was created by the Texas Legislature, transferring oil & gas management authority to the Board from the Texas General Land Office.
1949	The management authority for all minerals other than oil & gas was transferred from the Texas General Land Office to the University of Texas System Board of Regents

Table 1. Historical timeline of University Lands.

Some notable milestones of development and use of University Lands include:

- In 1974, University Lands established an experimental vineyard for wine grape research in Pecos County. The experimental research paved the way for the establishment of a commercial vineyard of approximately 1,000 acres and a multi-million dollar commercial winery, both situated on University Lands east of Fort Stockton.
- In 2001, portions of two wind farms with approximately 100 wind turbines generating a total capacity of 65.3 megawatts were constructed on University Lands in Pecos County. Additional wind power projects on PUF lands are expected in the future as the demand for wind power increases.

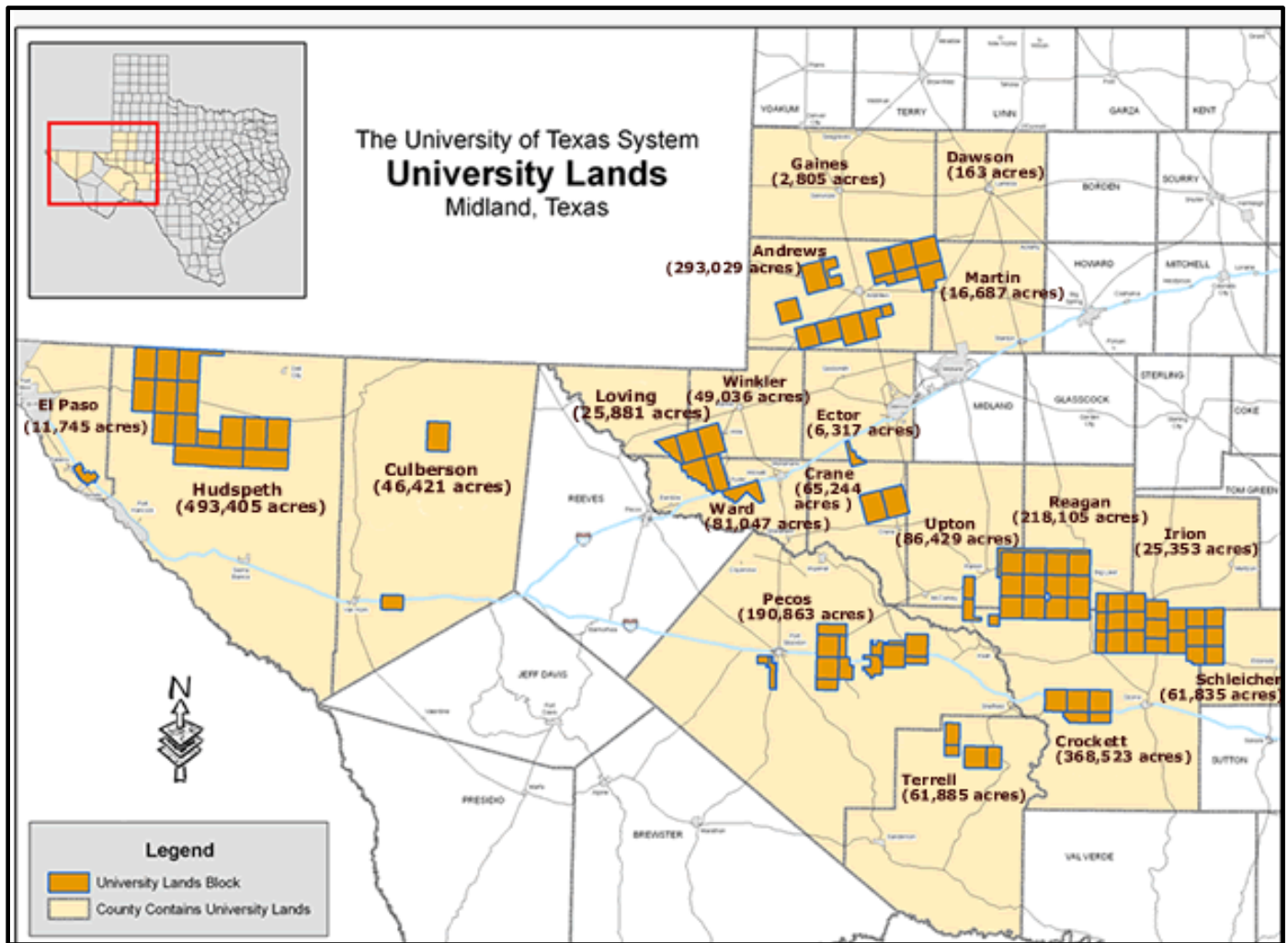


Figure 2. Map of University Lands.

Surface Interests Division of University Lands

PUF lands is an entity of the University of Texas System and is administered in Midland, Texas by University Lands Executive Director James L. Benson and a departmental staff for Mineral Interests, Surface Interests, Accounting, and Information Technology groups (Figure 2).

The Surface Interests department provides management oversight for all surface uses, some of which include:

- Grazing lease activity
- Oil and gas surface infrastructure development and monitoring
- Roads, pipeline, power line and utility easements
- Business site leases

- Vineyard / Winery lease
- Leases for various oil field operations
- Wind farm leases, etc...

To support these activities, the Surface Interests' team is tasked with the following responsibilities:

- Monitoring daily activity on approximately:
 - 4000 active oil and gas leases
 - 7,500 miles of pipeline, distribution, transmission power line, and communication line easements
 - 112 grazing leases
 - 450 commercial surface leases
- Development of rate and surface damage schedules used in conjunction with surface leases for business sites, issuing pipeline easements, material used for construction of oil well locations and roads
- Waste management oversight and remediation activity
- Oversight of remediation activity
- Preservation of archeological artifacts
- Administration of potable water contracts for municipal and industrial (commercial) use
- Administration of water used for oil & gas development (drilling and fracing)

University Lands allows ranching operations to access groundwater resources for livestock watering via windmill wells and small diameter wells equipped with submersible pumps. University Lands has implemented a groundwater policy to ensure that historical water use remains available and unaffected by newer, non-traditional groundwater use, and to enable data collection of water utilization from PUF lands.

Policy

University Lands promotes water conservation, groundwater studies, dissemination of groundwater information to the public, and cooperation and coordination of all groundwater users on University Lands. These policies will minimize the mining of groundwater resources on University Lands and add collectively to the groundwater knowledge base of all entities that operate on University Lands.

Conformance to this Plan does not necessarily exempt or otherwise relieve a groundwater user from responsibility to notify and/or adhere to the policies of groundwater conservation districts. This Plan does not usurp or supplant any groundwater conservation district policy. Entities using groundwater on University Lands must demonstrate compliance with this Plan.

Technical Research And Studies

Sound technical information is critical to effective management of groundwater resources. As such, University Lands will perform groundwater research through its staff of geologists, specialists, and engineers, as well as through outside consultants. This research may incorporate the periodic recording of groundwater elevation, production, and quality in selected wells. Potential research topics include, but are not limited to the following:

- Water Conservation Practices
- Water Recycling
- Aquifer Geology and Hydrology
- Groundwater Data Monitoring & Collection
- Water Well Design
- GIS and Remote Sensing
- Best Practices
- Evaporation Studies

Water Conservation

Fresh (potable) groundwater is a vital resource that can be extended through appropriate preservation methods. In some instances, University Lands may require a conservation plan for certain groundwater uses to ensure beneficial use, and to promote the elimination or minimization of wasted water. University Lands will cooperate with, and expects the cooperation of, each water user to promote the most efficient use of water.

Public Information

University Lands will share information with the public and will cooperate with the media and other interested parties. Public dissemination of information creates awareness and support to minimize mining of the groundwater. Voluntary conservation measures can significantly extend the groundwater resource and reduce conflict among competing interests.

Management Authority

Recognizing that groundwater is fundamental to utilization of University Lands' resources, this Plan seeks to manage groundwater withdrawal in a manner that assures continued future water availability while maximizing PUF revenue. The economic cost of uncontrolled groundwater use is not necessarily apparent and University Lands must insure that the rate of groundwater mining is not "excessive" in an effort to guarantee future availability of this resource and the subsequent economic benefits, which water supports.

Fee simple title of PUF lands has never left the sovereign; and as such, University Lands manages, and controls access to the surface and the subsurface of the land. It can contract with the groundwater user to control the nature, quantity, duration of pumping, and payment, if required, for use of the groundwater on its lands or exportation of groundwater off of its

lands. University Lands does not assume this position lightly, rather it considers this authority a great responsibility that requires stewardship of the groundwater resource and recognition that entities beyond its boundaries rely on the same aquifers underlying PUF lands.

Groundwater withdrawal can be minimized by four key methods:

- Mandatory conservation
- Implementation of best practices
- Limitation on groundwater production
- Restrict access to specific aquifers

In managing groundwater withdrawals, University Lands shall take into account several factors, including:

- Economic impact of conservation measures
- The degree and effect of groundwater mining
- Hydrological characteristics of the aquifers within the lands

Management Of Groundwater Supplies

University Lands will manage groundwater to conserve the resource while seeking to enhance the economic viability of all entities using the water. With consideration of the economic and cultural activity that depends on a reliable source of groundwater, University Lands will identify and promote best management practices of all groundwater resources.

Working with groundwater users, University Lands will establish and maintain an observation well network to monitor aquifer conditions. University Lands will perform regular internal assessments of water availability, and as appropriate, cooperate with others to assess the groundwater resources.

University Lands' policy and guidance for water well construction and management of groundwater withdrawal is administered with an application to drill and with a subsequent approval to produce groundwater. These applications and guidance are provided in Appendix A. University Lands may deny an application to install a water well, or deny or limit groundwater production if the applications are incomplete or nonconforming.

Before installing a water well, an application shall be submitted to University Lands that describes the proposed well location, intended use of well, O&G lease information, as appropriate, and well construction criteria including the targeted aquifer and screen interval. The well must be drilled within 90 days of application approval. Within 30 days of well completion, the applicant must submit an approval packet to produce the groundwater. This packet will include pump test results, laboratory water quality analyses, Well Reports, and 3rd-party confirmation that cement circulated to the ground surface.

Equity And Discretion

All groundwater users must employ sound groundwater management and conservation practices. Although one entity's groundwater withdrawal may cause no obvious consequence, cumulative water withdrawal can affect competing economic and cultural interests, therefore, every entity is subject to this Plan.

To ensure the Plan's objectives are achieved, University Lands retains discretion in allowing groundwater withdrawal. Temporary exceptions may be granted to alleviate potential economic hardship due to hydrological or geographic characteristics or potential adverse consequences to adjacent landowners, or other users of groundwater.

This Plan does not prescribe a specific production ratio of groundwater withdrawal based upon the number of acres of land leased or otherwise utilized by an entity. Nothing in this Plan, should be interpreted to mean that an entity is entitled to use groundwater in any amount merely because the Plan does not prescribe a ratio for production.

State of Texas Water Regulatory & Water Planning Agencies

In the State of Texas, the management of groundwater use and planning is provided by the following three regulatory and planning entities:

- Groundwater Conservation Districts (GCD)
 - Groundwater Management Areas (GMA)
 - Regional Water Planning Groups (RWPG)
- (Figure 6)

Groundwater Conservation Districts

In Title 2 (Water Administration), Subtitle E (Groundwater Management), Chapter 36 (Groundwater Conservation Districts) of the Texas Water Code, the State of Texas identifies Groundwater Conservation Districts as its preferred method of groundwater management through rules developed, adopted, and promulgated by a district in accordance with the provisions of Chapter 36. GCD's consist of locally elected board members responsible for promulgating and administering rules for groundwater use in the District's boundaries.

Approximately half (52%) of PUF lands are within the boundary of thirteen GCDs. The location of these GCDs is illustrated in Figure 3, and the percent by county of University Lands within a GCD is shown in Table 2. The eleven GCD's administer unique rules and regulations. In areas where no GCD's exist, no rules or regulations, aside from those promoted by University Lands, regulate water well spacing or groundwater withdrawal.

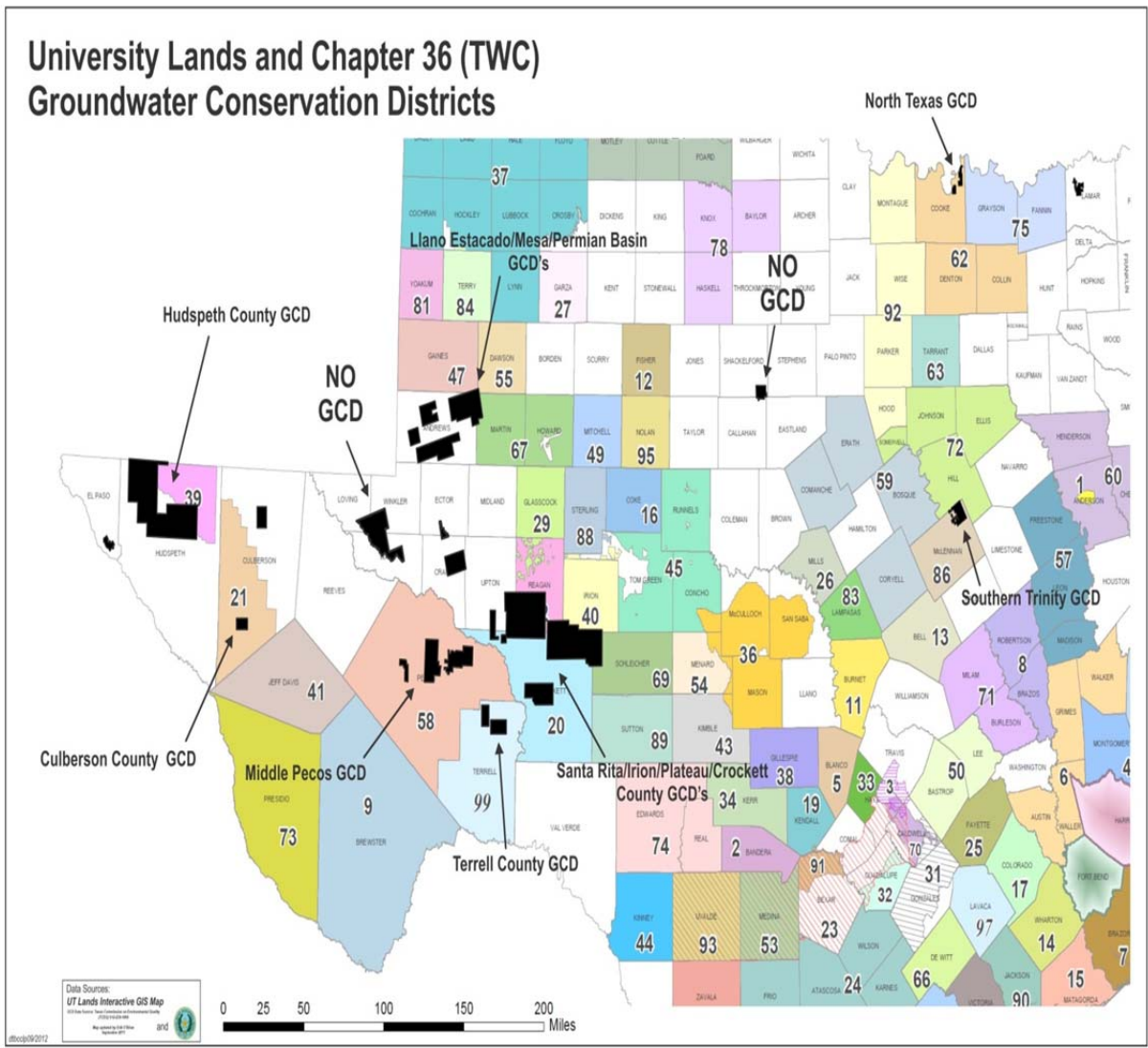


Figure 3. Map of University Lands (black) and Groundwater Conservation Districts (shown in color) overlain with University Lands.

Note: Area shown in white does not have a Groundwater Conservation District.

UL County	Total Acreage	GCD	% in GCD*	Acreage In GCD	Acreage Out of GCD
Andrews	293,029	None	0%	-	293,029
Culberson	46,421	Culberson County	40%	18,568	27,853
El Paso	11,745	None	0%	-	11,745
Irion	25,353	Irion County	100%	25,353	-
Pecos	190,863	Middle Pecos	100%	190,863	-
Terrell	61,885	Terrell County	100%	61,885	-
Ward	81,047	None	0%	-	81,047
Crane	65,244	None	0%	-	65,244
Dawson	163	Mesa	100%	163	-
Gaines	2,805	Llano Estacado	100%	2,805	-
Loving	25,881	None	0%	-	25,881
Reagan	218,105	Santa Rita	100%	218,105	-
Upton	86,429	None	0%	-	86,429
Crockett	368,523	Crockett County	100%	368,523	-
Ector	6,317	None	0%	-	6,317
Hudspeth	493,405	Hudspeth County	25%	123,351	370,054
Martin	16,687	Permian Basin	100%	16,687	-
Schleicher	61,835	Plateau	100%	61,835	-
Winkler	49,036	None	0%	-	49,036
	2,104,773			1,088,139	1,016,634
				52%	48%
				% in GCD	% Out of GCD

* Estimated

Table 2. University Lands Property Inside and Outside GCD Boundaries

Groundwater Management Areas

Groundwater Management Areas (GMA) facilitate regional groundwater planning. University Lands is located within seven GMA's (Figure 4). All GCD's within each GMA, are required to coordinate management of groundwater resources; specifically, they determine the desired future condition (DFC) for each aquifer recognized by the Texas Water Development Board (TWDB) to exist within the GMA.

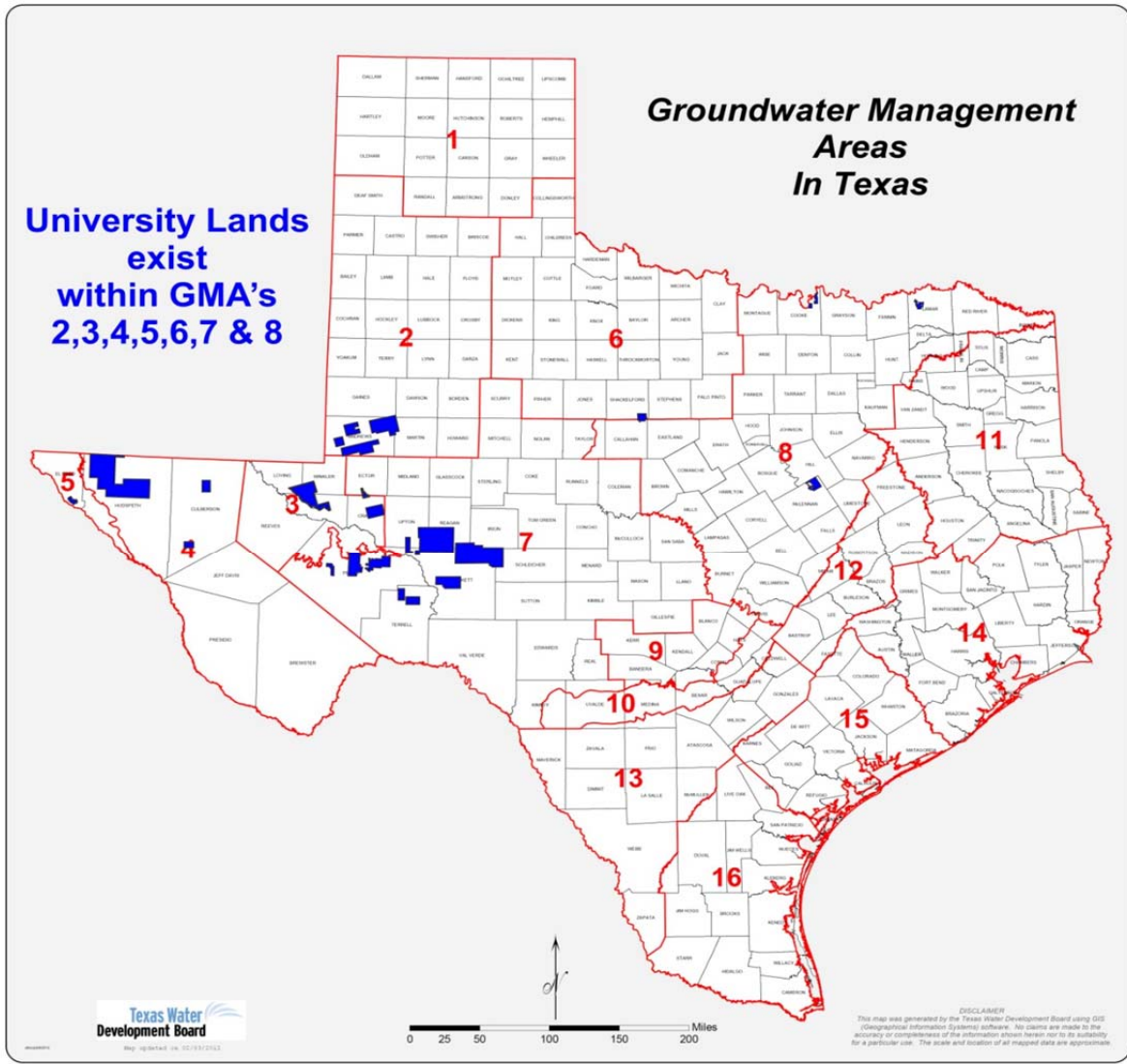


Figure 4. Map of University Lands (blue) location within Groundwater Management Area's

The DFC is described in the Texas Administrative Code as:

“The desired, quantified condition of groundwater resources (such as water levels, water quality, spring flows, or volumes) at a specified time or times in the future or in perpetuity, as defined by participating groundwater conservation districts within a groundwater management area as part of the joint planning process.” Desired future conditions have to be physically possible, individually and collectively, if different desired future conditions are stated for different geographic areas overlying an aquifer or subdivision of an aquifer.” [TAC§356.2(8)]

To determine a DFC, the conservation districts within the GMA are required to consider present and future groundwater use and the availability of groundwater, i.e. the hydrological characteristics of an aquifer. The DFC's can be established for each aquifer, subdivision of an aquifer or geologic strata, or each geographic area overlying an aquifer. The State of Texas mandated a September 2010 deadline for GMA's to establish DFC's. The TWDB will generate a Groundwater Availability Model (GAM) based on the DFCs to develop Managed Available Groundwater (MAG) quantities. The MAG is an estimate of the maximum volume of groundwater that can be extracted annually to maintain the DFC.

The DFCs for groundwater on University Lands have only recently been developed. The GCD's use of the Managed Available Groundwater in their permitting and planning is not entirely clear, and is not necessarily consistent across the GMA's. Statewide, some GCD's use the MAG to determine the maximum allowable permitted pumping volumes within the GMA to achieve the DFC. The Groundwater Availability Models require establishment of a groundwater "budget" that summarizes the amount of water entering and leaving the aquifer. The groundwater budget considers factors such as precipitation recharge, surface water outflow to springs and rivers, lateral flow into and out of the aquifers and flow between aquifers (leakage). Additionally, historical and projected future groundwater pumping rates are critical factors in establishing Desired Future Conditions and Managed Available Groundwater.

Regional Water Planning Groups

In 1997, the Texas legislature established 16 Regional Water Planning Groups (RWPGs). Figure 5 provides a map that illustrates the geographical extent of the RWPG's with University Lands overlaid. University Lands are within five RWPG's.

The RWPG's contain approximately 20 members representing the interests of the groundwater users within each group. The RWPG's submit a Regional Water Plan to the TWDB on a five-year schedule. The TWDB condenses the 16 Regional Water Plans into one State Water Plan.

Regional Water Planning Areas

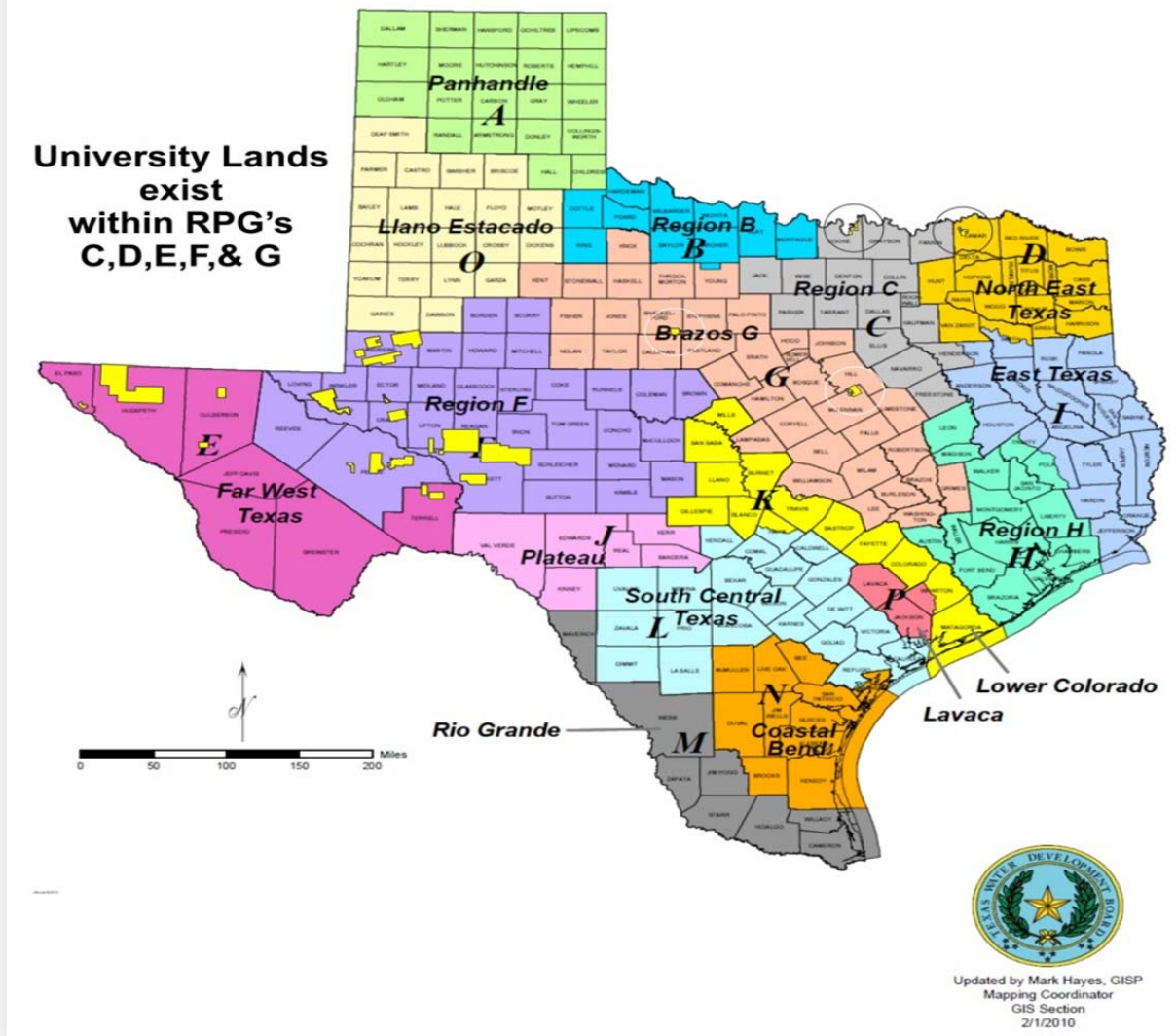


Figure 5. University Lands location (yellow) shown relative to the geographical boundaries of Regional Water Planning Groups (shown in color)

In 2011, the State mandated that the RWPG's use the MAG model, developed by the TWDB from the DFC's provided by the GMA's. The State Water Plan is now directly linked to decisions (DFC's) made by local GCD board members.

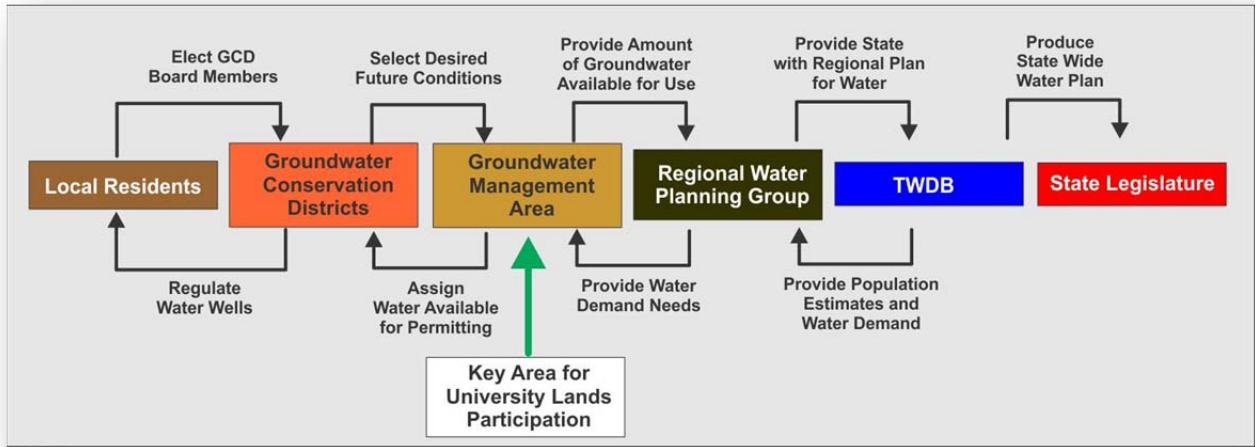


Figure 6. Water planning process and University Lands participation.

KEY AQUIFERS

University Lands overlies three major aquifers and five minor aquifers, as defined by the TWDB. The major and minor aquifers are illustrated in Figures 7 and 8, respectively. The major aquifers include the Pecos Valley, Edwards-Trinity Plateau, and Ogallala.

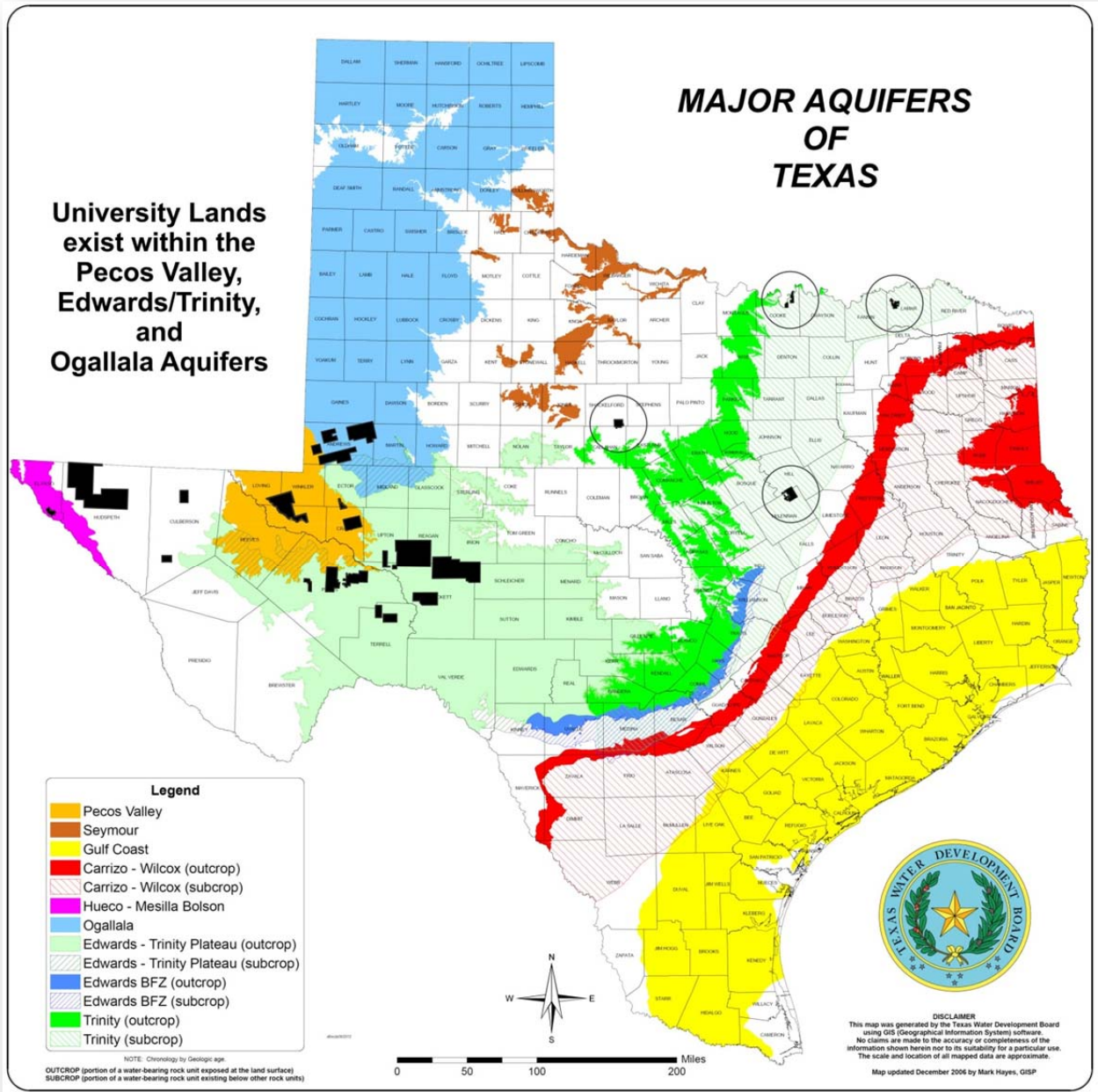


Figure 7. Major aquifers underlying University Lands (black).

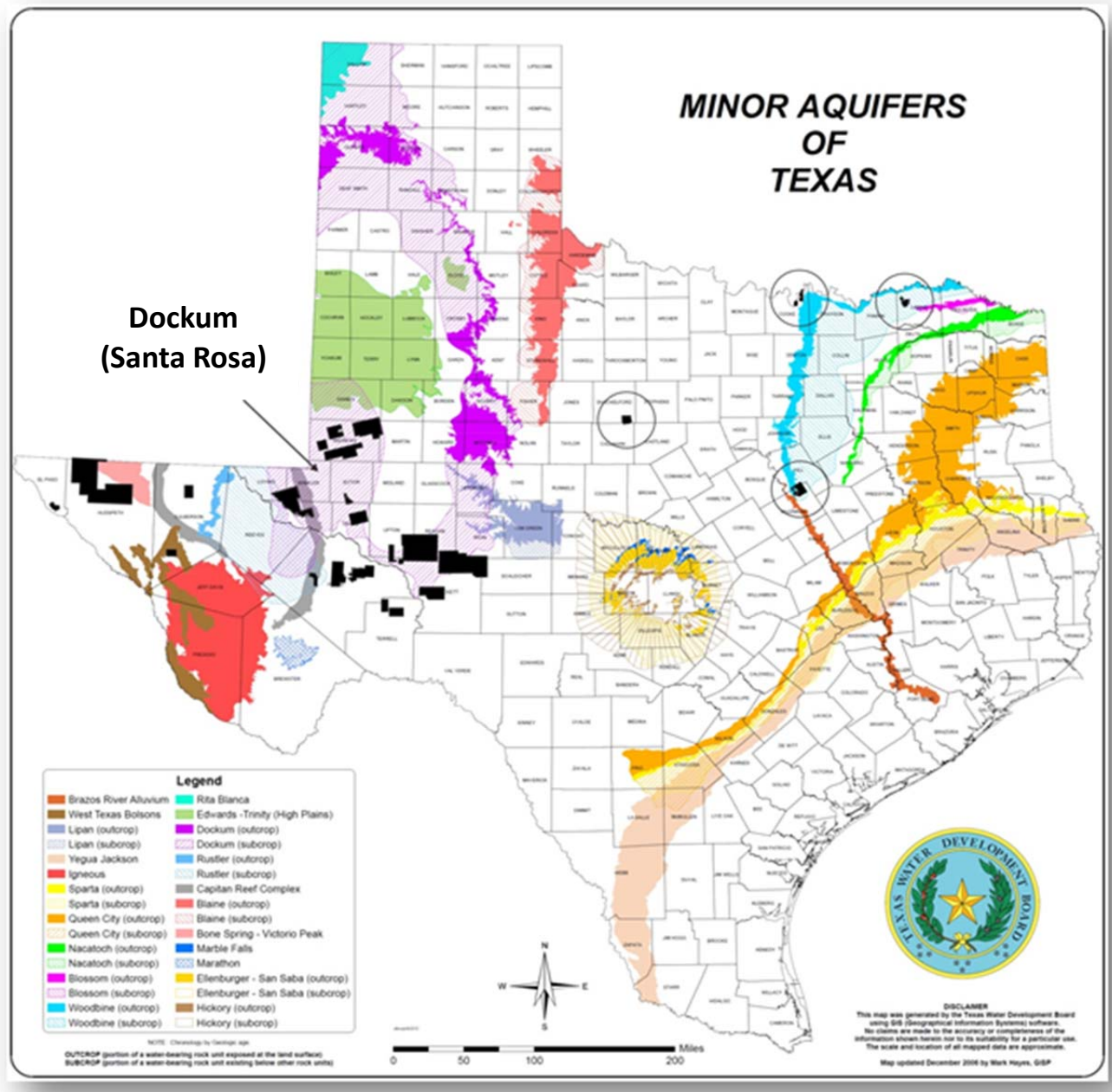


Figure 8. Minor aquifers underlying University Lands (black).

One minor aquifer, the Dockum, is a significant source of groundwater on portions of University Lands. In some locales and literature, the Dockum is referred to as the Santa Rosa. The Dockum provides an alternate groundwater source in areas where the overlying Trinity-Edwards aquifer is experiencing stress.

Management Goals

- Goal 1.0** Determine water use, supply, and demand
- Goal 2.0** Develop best practices for efficient use and waste minimization of groundwater
- Goal 3.0** Develop a monitor well network and water well inventory
- Goal 4.0** Continue development of the Dockum (Santa Rosa) aquifer
- Goal 5.0** Continue development and refinement of water well drilling and production
- Goal 6.0** Evaluate opportunities to provide information for water planning
- Goal 7.0** Create web-based groundwater database to allow users to access and upload water well and groundwater use data
- Goal 8.0** Perform hydrological studies to define the groundwater resources on University Lands

Appendix A

University Lands

704 W. Dengar Ave, Midland, Texas 79705-5319
P.O. Box 553, Midland, Texas 79702-0553
Phone (432) 684-4404 Fax (432) 682-7456
www.utlands.utsystem.edu

APPLICATION FOR CONSTRUCTION OF A WATER WELL

- Attach Submittal Packet for Water Well Construction
- A separate Approval to Pump form must be submitted within 30 days of pump installation.

Remit to ULWater@utsystem.edu

Questions: Jim Buice jbuice@utsystem.edu
432-684-4404 (Office) 432-634-6869 (Cell)

Well Identification/name: _____

Use of Well: _____
(list each intended use of well, i.e. frac, rig supply, location/road construction, hydrotest, etc.)

Targeted Aquifer: _____
(no frac or rig supply wells will be approved for completion in the Edwards-Trinity aquifer)

Application Date: _____

Part I – Well Owner and Driller Information:

Well Owner: _____

Phone: _____

Contact : _____

E-Mail: _____

Mailing address: _____

City, State, ZIP: _____

Registrant (if other than well owner): _____

Phone: _____

Contact : _____

E-Mail: _____

Mailing address: _____

City, State, ZIP: _____

Drilling Company: _____

Phone: _____ E-Mail: _____
Driller: _____ License #: _____
Expiration Date: _____

Mailing address: _____
City, State, ZIP: _____

Part II – Well Location:

Section, Block, County _____

Latitude/Longitude: _____
(6 decimal places.)

Part III – Required Documents:

Check to verify each document is included in the application (reference “Submittal Packet for Water Well Construction”):

- Aerial Photograph
- U.S. Geological Survey 7.5-minute Topographic Quadrangle Map
- Groundwater Conservation District Notification
- Plans and Specifications Stamped by a Professional Engineer or a Professional Geologist
Licensed in Texas

Part IV – Summary:

The proposed well location is approximately _____ feet from the nearest water well

Screened interval of nearest existing water well identified in the water well search: _____

Estimated depth of well (ft below ground surface): _____

Borehole diameter (in): _____

Casing diameter (in): _____

Anticipated depth of casing (ft below ground surface): _____

Anticipated screen interval (ft below ground surface): _____

Part V – Certification:

I hereby certify the following:

- To the best of my knowledge and belief the information given herewith is true and accurate;
- For Dockum (Santa Rosa) water wells, the proposed well location is a minimum of 1,200 feet from the nearest known Dockum (Santa Rosa) water well,
- To the best of my knowledge and belief the proposed well will have no impact on existing Trinity-Edwards water wells.

Professional Engineer or Professional Geologist

Print Name

Date

State of Texas Seal:

University Lands

Submittal Packet for Water Well Construction

A submittal packet containing the information described herein must be submitted concurrently with the "APPLICATION FOR CONSTRUCTION OF A WATER WELL."

This packet must be sealed by a Professional Engineer or Professional Geologist licensed in the State of Texas.

Remit to ULWater@ustsystem.edu

Questions: Jim Buice jbuice@ustsystem.edu
432-684-4404 (Office) 432-634-6869 (Cell)

1. Perform a one-mile radius database water well search and a walking/visual 0.25 mile radius water well search. Using drillers logs or best estimate, i.e "shallow windmill," determine screened interval of water wells located within the search radii.
2. Plot proposed water well location and identified water wells within the search radii on an aerial photograph. Annotate the photograph with circles representing the search radii, the screen intervals of existing water wells, and the proposed water well NAD83 Lat/Long coordinates. **If the proposed location is moved more than 100 feet, submit a revised photograph that illustrates the new location and coordinates.**
3. Location plotted on a map overlain with the applicant's contiguous University O&G lease that the well will serve.
4. Proposed well location is a minimum 1,200 feet from existing Dockum (Santa Rosa) water wells.
5. Include the groundwater conservation district water well permit. **If proposed well is exempt from permitting, include the district's notification form and evidence that the notification was submitted to the district, i.e. a fax record.** Permit or notification must be in applicant's name. Attach a copy of any other submittals required by the district.
6. Estimated total depth of proposed well (feet below ground surface)
7. Borehole diameter
 - Diameter must be at least 3 inches wider than flush joint casing OD or coupling OD if threaded and coupled casing is used (AWWA Sec. 4.3.5.2.2).
8. Statement that following practices will be implemented to minimize contamination during drilling operations:
 - **Water used for drilling operations shall contain a maximum TDS concentration of 3,000 ppm TDS and shall be of sanitary quality.**
 - Premises, materials, tools, and drilling equipment shall be maintained to comply with the Safe Drinking Water Act (AWWA Sec. 4.3).
 - Mud pits must be constructed and maintained to minimize contamination of the drilling mud (Section 290.41(c)(2)(B) of the TCEQ rules).
 - Temporary toilet facilities location at least 150' from well (Section 290.41(c)(2)(C) of the TCEQ rules).
9. Casing material

10. Casing length
 - **Casing on Dockum (Santa Rosa) wells must extend to the top of the producing interval within the Dockum formation.**
 - Must extend a minimum of 24 inches above final ground elevation or above the 100 year flood level record, whichever is higher (AWWA Section 4.7.10.3).
 - Anticipated depth of casing (feet below ground level).
11. Cementing depth and method
 - All zones containing water of undesirable quality or zones to be protected but excluded from final well completion shall be cemented from a point of at least 5 feet above the zone to a point at least 5 feet below the zone per AWWA Section 4.7.8.5
 - Cementing shall be performed under pressure from the bottom upward in a continuous operation to ensure a complete seal of the annular space between the casing and the borehole (AWWA Section 4.7.8.7).
 - Conform to AWWA Standard A-100, Appendix C, excluding the dump bailer and tremie methods.
12. Gravel pack depth and method
 - Must be disinfected (Section 290.41(c)(3)(D) of the TCEQ rules).
13. Pump setting (feet below ground level)
14. Pump size
15. Anticipated production rate (gallons per minute)
16. Well disinfected per TCEQ rules.
17. Well head and sealing slab
 - Slab edge 3 feet from the well casing in all directions sloping away from the casing (Section 290.41(c)(3)(J) of the TCEQ rules) or conductor casing cemented in place at least 2 feet above and 2 feet below ground level.
 - Well head sealed with a gasket or sealing compound (Section 290.41(c)(3)(K) of the TCEQ rules).
 - Water level measuring device (airline with Schrader valve and psi gauge or pressure transducer)
18. Cross-section well construction diagram

University Lands

Submittal Packet for Approval to Pump a Water Well

Approval to pump a water well on University Lands is contingent upon submittal of the information contained herein. This submittal packet must be sealed by a Professional Engineer and a Professional Geologist licensed in the State of Texas. Pumping can begin immediately following well completion.

- **Approval to pump will be suspended if all items in this packet are not submitted within 30 days after pump installation.**
- **Pumping must cease immediately upon University Lands' request.**
- **Pumping will not resume until additional testing, documentation, or corrective action is approved by University Lands.**

Remit to ULWater@ustystem.edu

Questions: Jim Buice jbuice@ustystem.edu
432-684-4404 (Office) 432-634-6869 (Cell)

Final Location Maps

The aerial photograph locality map included in the "Application for Construction" must be resubmitted with the final well location and coordinates illustrated on the map.

Water Well Cross-Sectional As-Builts

- Total depth
- Borehole diameter
- Casing diameter
- Casing material
- Casing length
- Length of casing above ground level
- Concrete seal slab or conductor casing
- Cementing depth and method
- Filter pack depth and method of placement (if applicable)
- Filter pack type, size, and volume (if applicable)
- Screen type and intervals (if applicable)
- Top of pump (feet below ground surface)
- Airline setting (feet below ground surface)
- Motor HP
- Production rate (gpm)
- Well head surface completion

Required Documents

1. State of Texas Well Report (Driller's log)
2. Third-party onsite monitor's summary (field notes) of the drilling and well completion operations
3. Signed verification by a third-party witness to the cementing process that cement returned to the surface
4. **For Dockum (Santa Rosa) water wells:**
 - gamma ray
 - spontaneous potential
 - shallow and deep resistivity
 - caliper
 - Base of the Trinity-Edwards formation, bottom of casing, and the screen interval(s) marked on the logs
5. 12-hour pump test or until water level stabilizes for 2 hours at a constant pumping rate. The pump rate must be no less than 70% of the final pumping rate. Static water level measurements shall be made at no more than 10 minute intervals for a minimum of 30 minutes prior to pumping. Water levels and pumping rates shall be recorded every 5 minutes for the first hour, 10 minutes for the second hour, and hourly for the remainder of the test. Water levels are to be recorded in feet below ground surface. Recovery data shall be recorded at 10 minute intervals for 2 hours or until the water level returns to static, whichever occurs first.
6. Water analysis report from a reputable lab to include the following analytes:
 - pH
 - Conductivity
 - Total Hardness as CaCO₃
 - Sodium
 - Calcium
 - Magnesium
 - Potassium
 - Bicarbonate
 - Carbonate
 - Sulfate
 - Chloride
 - Iron
 - Total Dissolved Solids
 - Nitrate
7. Verification that a permanent sign with the well name and operator/well owner identification is posted at the well site.