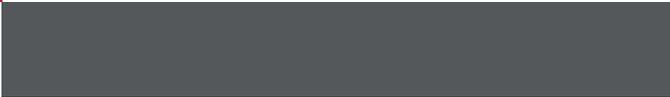




2018 Kerrville Long Range Water Supply Plan

Kerrville, Texas
January 24, 2020



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2018 Kerrville Long Range Water Supply Plan

Prepared for:

City of Kerrville, Texas

Prepared by:

HDR Engineering

Texas Firm P.E. Registration No. F-754

January 2020



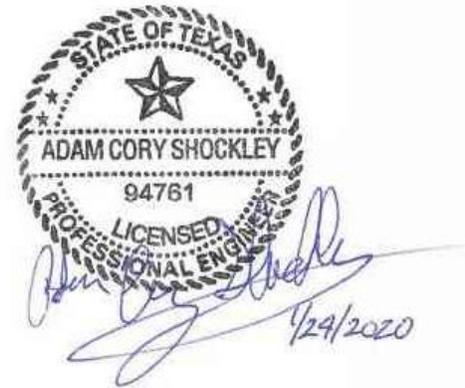
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Acknowledgements

HDR and the City of Kerrville acknowledge and appreciate the valuable contributions of the following stakeholder organizations and individuals in the development of the 2018 Kerrville Long Range Water Supply Plan:

Headwaters Groundwater Conservation District – Gene Williams

Upper Guadalupe River Authority – Ray Buck, Bob Waller

Kerr County Commissioners – Jonathan Letz, Tom Moser

Headwaters Kerr Basin Paleozoic Exploration Team



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Executive Summary

The City of Kerrville (City) continually strives to provide reliable, high quality water supplies to its citizens as part of its mission to create an environment that fosters prosperity and opportunity. In June 2018, the City presented its 30-year economic development goals as part of the Kerrville 2050 Comprehensive Plan¹. The 2018 Long Range Water Supply Plan (LRWSP) provides a plan for the City to meet the water supply needs associated with the economic development goals of the Comprehensive Plan. The LRWSP includes future demands, estimates of Kerrville's existing reliable supply, and compares them to obtain future needs for additional water supplies during the 2020 to 2120 planning horizon. Additionally, the LRWSP includes evaluations of twelve potential water supply strategies and recommends implementation of five of these strategies to meet future water supply needs of the City.

Water Demand Projections

Water demand projections are based on current customer account data provided by City staff and annual growth projections included in the Kerrville 2050 Comprehensive Plan. The projections assume that growth rates and average water use rates by account remain constant throughout the planning period. To sustain growth rates presented in the Comprehensive Plan, it is assumed that the City will annex adjacent property and expand its current distribution system to deliver supplies to these customers.

Figure ES-1 shows projected raw water demands by use type for the 2020-2050 period. It is anticipated that City growth will increase raw water demands to almost 6,700 acre-feet per year (acft/yr) by 2050. Should projected growth rates continue to 2120, raw water demands could increase to over 14,000 acft/yr. Texas Water Development Board (TWDB) water demand projections for Kerrville approved for use in the 2022 State Water Plan are shown in Figure ES-1 for reference. The TWDB demand projections suggest no significant population or economic growth over the next 50 years for the City.

¹ Kerrville 2050 Comprehensive Plan. Kimley-Horn and Associates, June 2018. www.kerrville2050.com

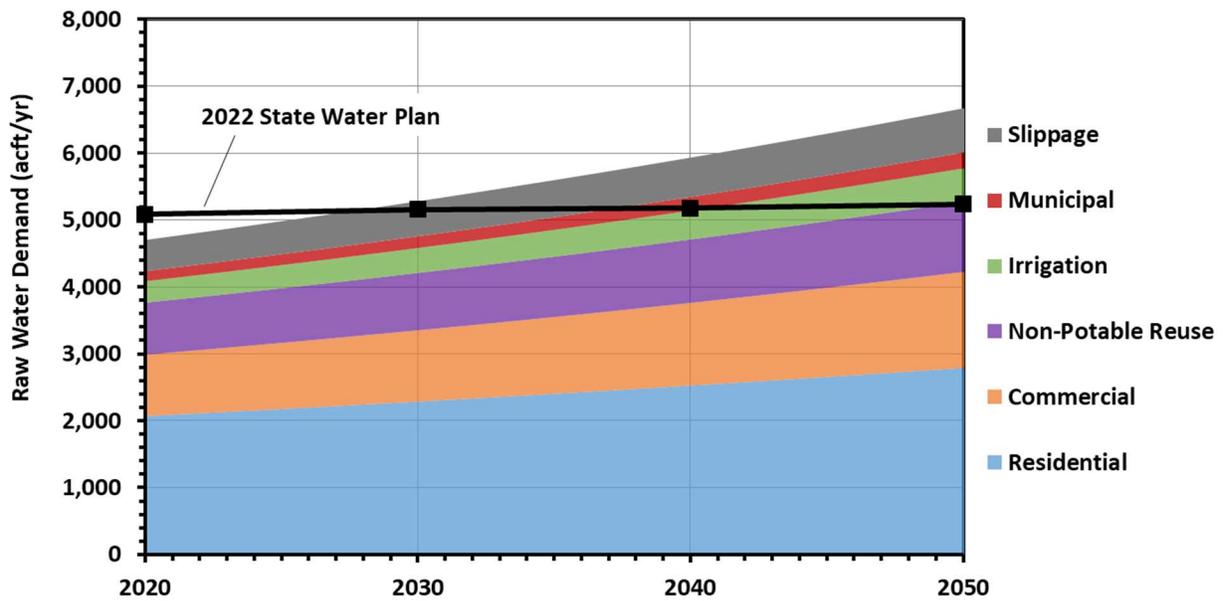


Figure ES-1. Projected Water Demand by Account Type for 2020-2050 Period

Existing Supplies

Currently, the City obtains its water supplies from surface and groundwater sources, reuse of treated wastewater, and the aquifer storage and recovery (ASR) of surface water. Figure ES-2 summarizes historical raw water production by source for the 2010-2017 period. The figure shows that the majority of water production during this period came from surface water sources in the form of diversions from the Guadalupe River or recovery of treated surface water from aquifer storage even though severe drought conditions were experienced in most of these years. The City was able to meet a substantial portion of customer demands from surface water supplies during these years because (1) the City has some flexibility to operate its diverse system in a manner to maximize use of available surface water supplies, and (2) the prior appropriation doctrine² and restrictions included in the City’s surface water permits were not strictly enforced.

² Texas surface water law is governed by the doctrine of prior appropriation which is commonly summarized as “first in time, first in right”. In other words, an older or senior water right may divert all of its water before a newer or junior water right may divert any water.

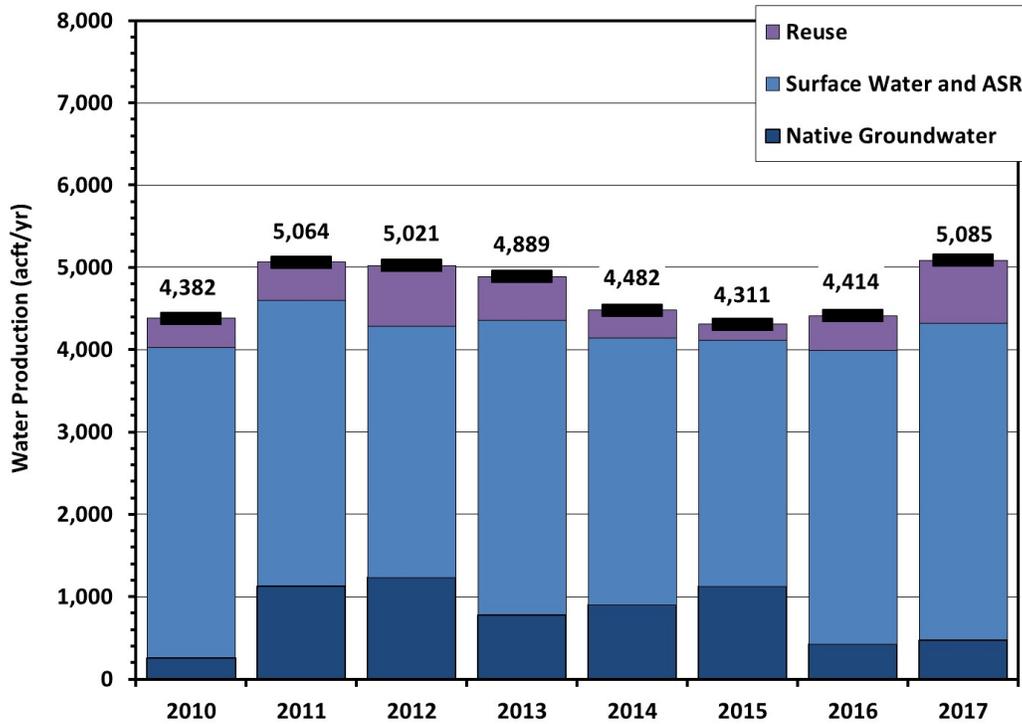


Figure ES-2. Kerrville Historical Water Production for 2010-2017 Period

For planning purposes, it is recommended that decisions regarding investment in the development of new supplies be made assuming appropriate mitigation of regulatory and hydrologic risks which could lead to supply shortages. As a result, reliable water supply or firm yield is considered to be the amount of water that can be supplied by the City on an annual basis assuming (1) strict enforcement of the prior appropriation doctrine and permit restrictions, and (2) a repeat of the most severe drought conditions in recorded history.

While many consider drought conditions experienced in the last decade to be the most severe in recorded history, from a surface water availability perspective, they were not as severe or prolonged as those experienced in the 1950s. If 1950s drought conditions were experienced beginning in 2010 and prior appropriation and permit restrictions were fully enforced, the City’s water production would have been limited to amounts less than actually produced as presented in Figure ES-3.

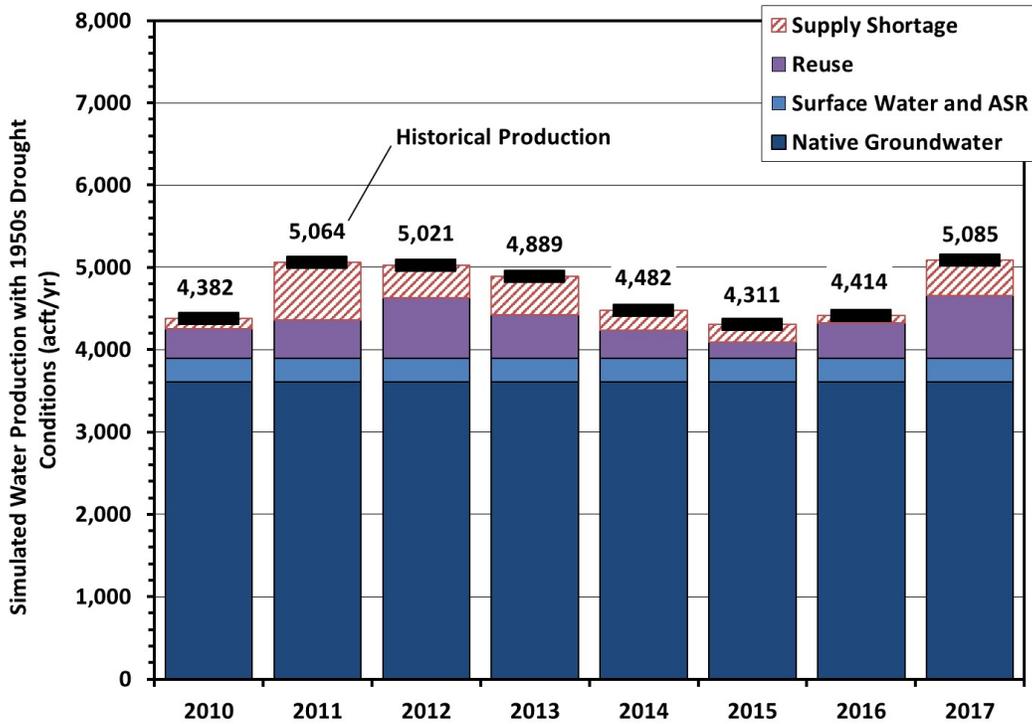


Figure ES-3. Kerrville Water Production for the 2010-2017 Period Assuming a Repeat of the Worst Drought on Record and Strict Enforcement of the Prior Appropriation Doctrine and Permit Restrictions

Under 1950s drought conditions and strict regulatory enforcement, the City would not have been able to divert any streamflow from the Guadalupe River and all surface water supplies would have come from the recovery of surface water stored in an aquifer. It is estimated that this supply would be less than 300 acft/yr assuming current storage levels. As a result, the City would have needed to pump the full amount of groundwater authorized under its permit (3,605 acft/yr) to help meet water demands. Even with the City fully utilizing its groundwater supply, supply shortage would have occurred in each year since 2010 with 1950s drought conditions and strict regulatory enforcement.

Table ES-1 provides the estimated firm supply for each source throughout the 100 year planning horizon included in the LRWSP. The City does not currently have the infrastructure to treat and distribute treated wastewater effluent to potable water customers; therefore, the firm non-potable reuse supply is limited by the non-potable reuse customer demands.

Table ES-1. Summary of Firm Supplies

Year	Firm Supply (acft/yr)			
	Groundwater	Surface Water and ASR ¹	Non-Potable Reuse	Total
2020	3,605	288	776	4,669
2030	3,605	288	857	4,750
2040	3,605	288	947	4,840
2050	3,605	288	1,046	4,939
2060	3,605	288	1,065	4,958
2070	3,605	288	1,065	4,958
2080	3,605	288	1,065	4,958
2090	3,605	288	1,065	4,958
2100	3,605	288	1,065	4,958
2110	3,605	288	1,065	4,958
2120	3,605	288	1,065	4,958

¹Assumes 10.4 year ASR pumping duration during repeat of the historical drought of record.

Projected Needs

Future water supply need is the difference between future demand and existing supply. When future demand is greater than the existing supply, the difference is commonly called a deficit, shortage, or need. Figure ES-4 compares the firm supplies, projected demands, and resulting needs for the 2020-2050 period. As shown in the figure, Kerrville’s current firm supplies are less than the current and future demands, indicating that a deficit exists and will continue to increase to 1,730 acft/yr in 2050 as demands increase from projected population growth and economic development. Should projected growth rates continue to 2120, the City’s need for additional water supplies would increase to 9,277 acft/yr. Kerrville will need to develop new supplies in order to reduce these deficits and the associated risks of not meeting customer demands during future droughts.

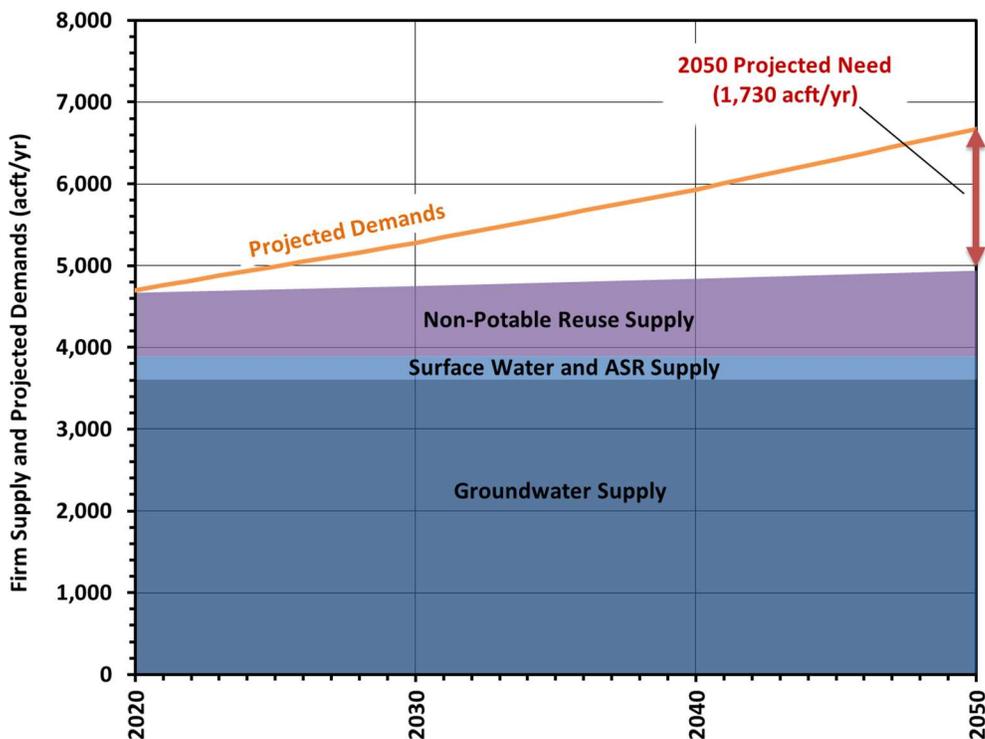


Figure ES-4. Comparison of Firm Supplies, Projected Demands, and Resulting Need for 2020-2050 Period

Water Supply Plan

One of the main goals of the LRWSP is to identify, evaluate, and select water supply strategies that could be implemented by Kerrville to meet future water supply needs. Twelve strategies were identified and evaluated to potentially meet these needs. These strategies were evaluated with respect to reliable supply, project cost, unit cost, permitting effort, and implementation effort. The goal of this process was to select strategies that provide the greatest benefits to Kerrville while minimizing costs and permitting and implementation obstacles.

The strategies selected as a result of this process are referred to as recommended strategies and are the strategies that Kerrville intends to implement to meet its future needs. The recommended water supply strategies are listed in Table ES-2 along with their estimated reliable supply, total project cost, and unit cost in 2018 dollars. These strategies include additional conservation to reduce demands, amendments to water rights currently owned by Kerrville and acquisition of new water rights to improve the reliability of surface water supplies, and development of a local Ellenburger Aquifer well and remote Ellenburger Aquifer well field in northeastern Kerr County.

Table ES-2. Recommended Water Supply Strategies

Recommended Strategies	Projected Supply (acft/yr)	Total Project Cost (\$)	Unit Cost (\$/acft)
Additional Conservation	270	\$2,180,000	\$439
Local Ellenburger Well	807	\$1,128,000	\$146
Remote Ellenburger Well Field ^a	1,730	\$12,995,000	\$713
Water Right Acquisitions ^b	146	---	---
Water Right Amendments	269	\$400,000	\$82

^a Remote Ellenburger well field is sized to provide a supply of 1,730 acft/yr to meet the projected 2050 need.

^b Costs for water right acquisitions would be determined on a case by case basis through negotiations between the City and water right holders.

The combined supply from these strategies is more than sufficient to meet Kerrville's projected need of 1,730 acft/yr in 2050. Should projected growth rates continue to 2120, the need for additional water supplies would require Kerrville to expand the remote Ellenburger well field, develop alternative strategies, and/or import water supplies from other sources outside of Kerr County.

Two alternative water supply strategies are included in the LRWSP. Alternative strategies are strategies that could be developed in the event one or more of the recommended strategies encountered an implementation obstacle that could not be overcome. The two alternative strategies are ASR expansion with additional treatment capacity and advanced treatment of treated wastewater to create a potable reuse supply. If the local Ellenburger well does not produce an adequate yield, conversion of the production well to an ASR well and addition of surface water treatment capacity to supply the ASR well during high flow, low demand periods is recommended. If the City is unable to acquire groundwater leases and develop the remote Ellenburger well field, development of the potable reuse supply is recommended.

Figure ES-5 provides a proposed timeline for implementation of each of the recommended strategies. If the local Ellenburger well does not produce the anticipated supply, implementation of the remote Ellenburger well field will need to be moved up to 2030 to avoid projected supply shortages. Note that strategies are not implemented to just meet the needs of Kerrville, zeroing out the deficit. The goal is to provide a supply buffer as shown in the figure to help ensure that supplies are sufficient if a project is delayed or new drought of record occurs.

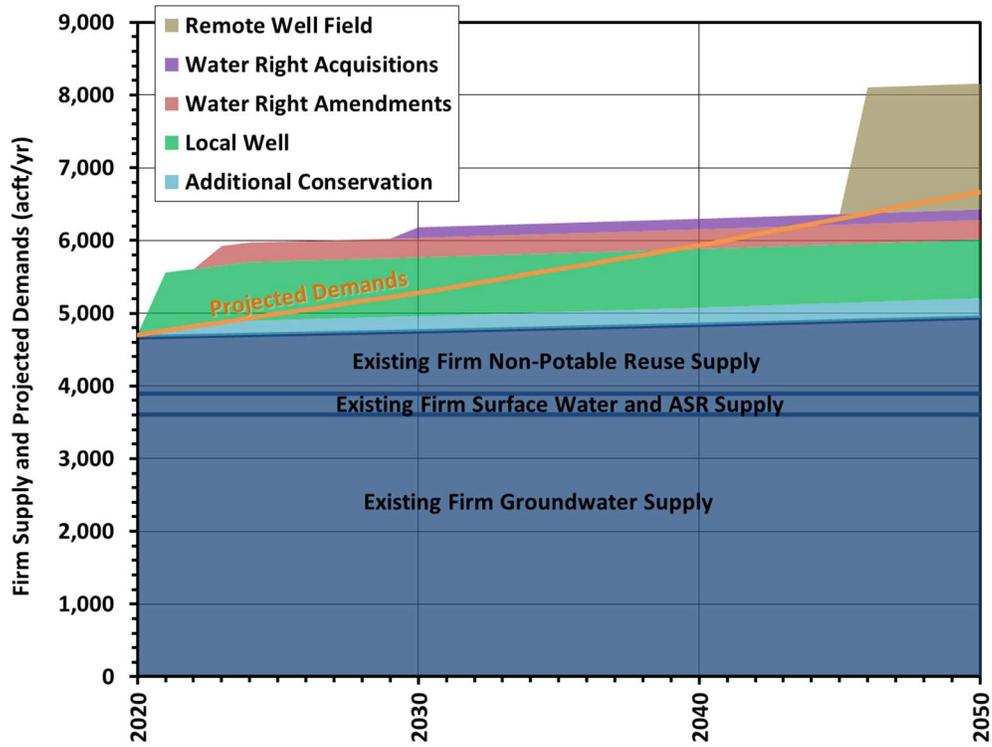


Figure ES-5. Recommended Strategy Timeline

1. Introduction

The City of Kerrville (City) continually strives to provide reliable, high quality water supplies to its citizens as part of its mission to create an environment that fosters prosperity and opportunity. The 2018 Long Range Water Supply Plan (LRWSP) provides projected demands, estimates of reliable existing supply, and compares them to obtain future needs for additional water supplies for the City of Kerrville for the 2020 to 2120 planning horizon. Additionally, the LRWSP evaluates twelve potential water supply strategies and recommends the implementation of five of these strategies to meet future water supply needs of the City.

The 100-year planning horizon provides Kerrville with a multi-generational plan to sustain long-term population growth and economic development while also providing a plan to meet the water supply needs associated with the economic development goals presented in the Kerrville 2050 Comprehensive Plan³. An extended 100-year planning horizon includes a high level of uncertainty in estimating demand and supply projections as the variables driving these factors are highly dynamic and difficult to predict with certainty far out into the future. For comparison, the Texas Water Development Board (TWDB) uses a 50 year planning horizon for the state water plan. The benefit of including a longer planning horizon is to provide the City options on the level of investment to make in the short-term that may have a long-term payoffs. Even with a 100-year planning horizon, HDR recommends the City consider regular updates to its long range water supply plan to compare previous projections of demand and supply with actual use data.

³ Kerrville 2050 Comprehensive Plan. Kimley-Horn and Associates, June 2018. www.kerrville2050.com

2. Water Demand Projections

Section 2 of the LRWSP outlines the basis for the water demand projections and associated calculation methodology. Water demand projections are based on current customer account data provided by City staff and annual growth projections included in the Kerrville 2050 Comprehensive Plan. The projections conservatively assume growth rates and average water use rates by account remain constant throughout the projection period. To sustain growth rates presented in the comprehensive plan, it is assumed that the City will have to annex adjacent property beyond 2050 and expand its current distribution system to deliver supplies to these customers. If additional conservation methods are implemented by the City, it is expected that per capita use rates will decline in the future. For this study, additional conservation is considered to be a supply strategy and is included in the strategy evaluations.

2.1. Current Water Uses

Table 1 provides the customer account categories based on use type and includes example customers associated with each category. Accounts are divided into five categories in accordance with the City's rate structure. Many commercial customers have separate meters for landscape irrigation to purchase water under the City's irrigation rates. Figure 1 provides the current number of accounts in 2018 for each of use type.

Table 1. Kerrville Account Use Categories and Associated Customers

Account Use Type	Associated Customers
Residential	Single Family, Duplex, Fourplex, Apartments, Mobile Homes
Commercial	Restaurants, Hotels, Retail, Business Facilities
Irrigation	Restaurants, Hotels, Retail, Business Facilities
Municipal	City owned facilities
Reuse	City Golf Course, Kerrville Sports Complex, Kerrville Soccer Fields, Schreiner University and Tivy High School

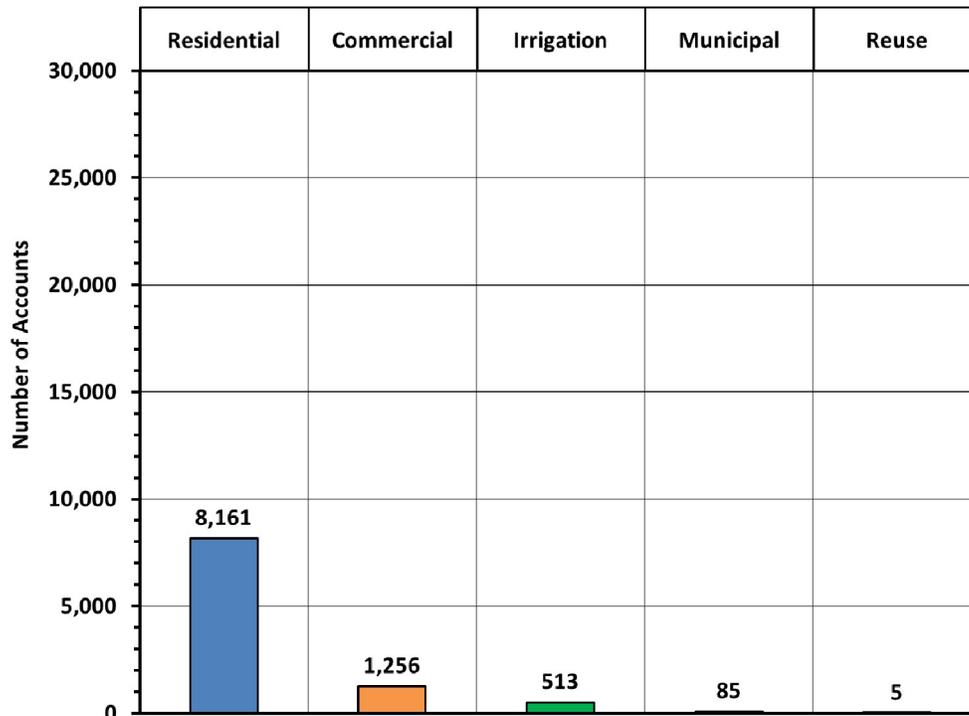


Figure 1. Number of Current Water Use Accounts by Category

Figure 2 shows the average annual use in gallons per account per day for the 2013-2017 period by use type with the exception of the non-potable reuse accounts. This five year average use is assumed representative of current (2018) use for the purposes of this study. The recent five year annual average is not representative of the current non-potable reuse because several accounts have been recently added, significantly increasing the amount of reuse water sold to customers. As a result, the 2017 volume of non-potable reuse delivered to customers is assumed to be the current (2018) non-potable reuse demand.

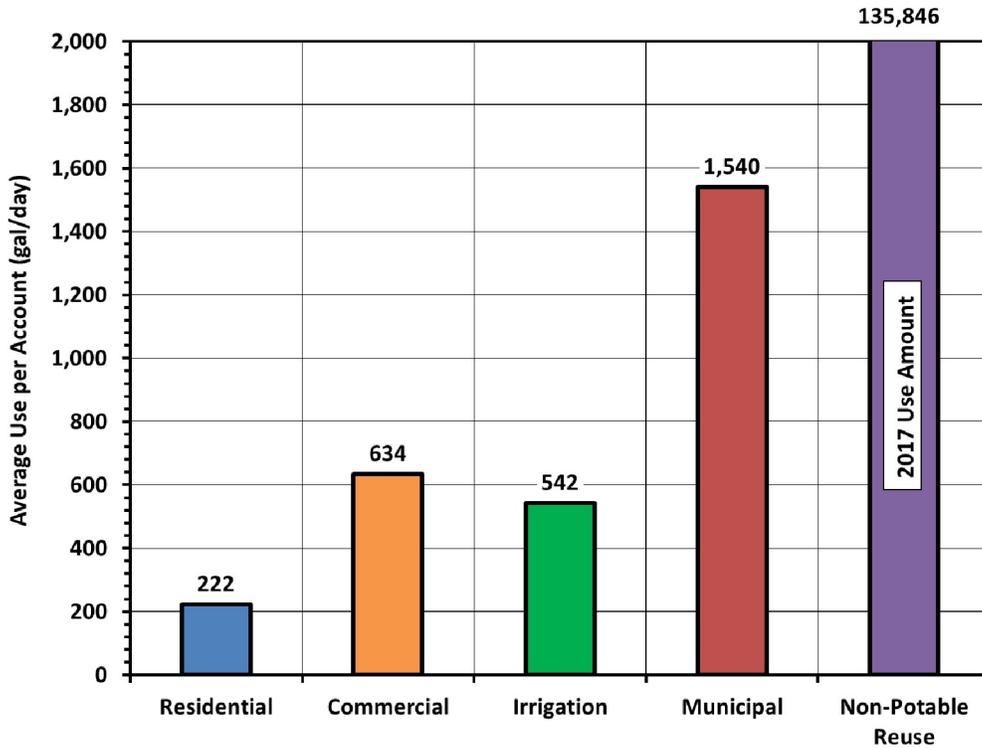


Figure 2. Average Use per Account Type for 2013-2017 Period

2.2. Future Water Demands

Future water use demands are projected using growth estimates included in the Kerrville 2050 Comprehensive Plan. Table 2 provides the projected annual growth in number of accounts for each use type. Staff anticipates that only two additional non-potable reuse accounts will be added due to limitations in the non-potable water distribution system. Additionally, staff estimates that an additional 11 percent of water used (i.e. sold) or delivered to municipal facilities is lost to system leaks and water treatment reject water before delivery to customers. This amount is referenced herein as slippage. Total raw water demands are projected throughout the planning horizon assuming continued slippage of 11 percent.

The projected number of future accounts for each use type are presented in Figure 3. Future account projections are shown for 2050 to coincide with the comprehensive plan and for the end of the 100-year planning horizon, 2120.

Table 2. Projected Annual Growth by Account Type and Estimated System Slippage

Account Use Type	Projected Annual Growth in Number of Accounts
Residential ¹	1.00%
Commercial ¹	1.50%
Irrigation ²	1.50%
Municipal ²	1.50%
Non-Potable Reuse	Conservative estimate of 2 additional non-potable reuse accounts
Slippage ³	11.0%

¹Projected annual growth included in Kerrville 2050 Comprehensive Plan.

²Irrigation and municipal growth assumed to be consistent with commercial growth projections included in Kerrville 2050 Comprehensive Plan.

³Conservative estimate based on historical production.

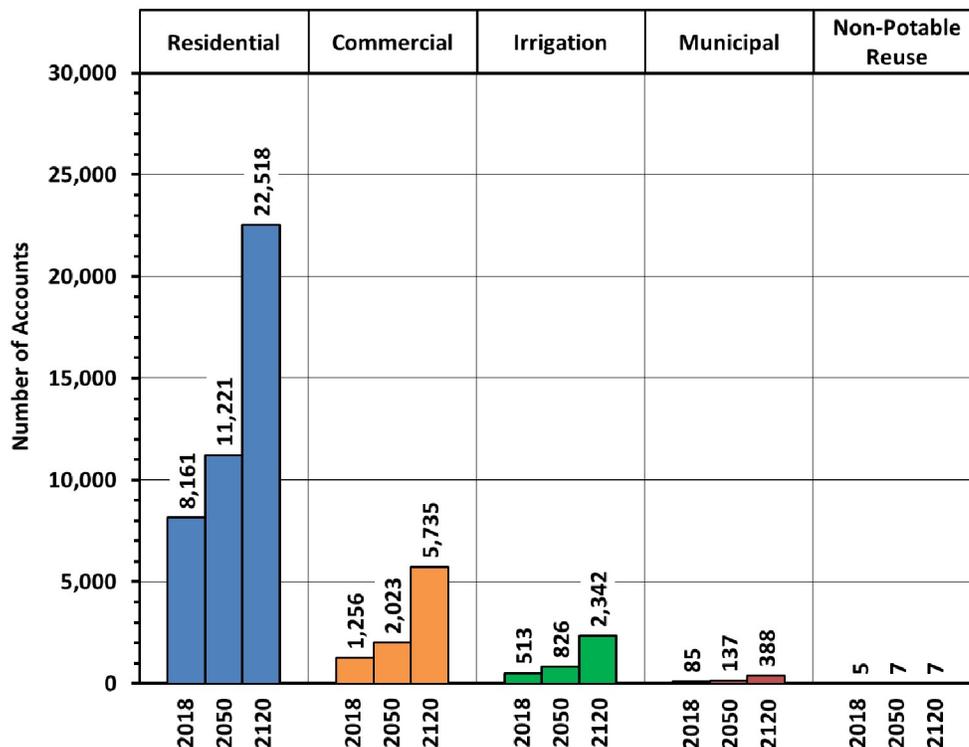


Figure 3. Number of Current and Projected Future Accounts by Type

Table 3 summarizes the projected water demands for the 2020-2120 period and Figure 4 and Figure 5 show the projected water demands by use type for the 2020-2050 and 2020-2120 periods, respectively. It is anticipated that City growth will increase raw water demands to 6,669 acft/yr by 2050. At this time, the Kerrville’s projected raw water demands will exceed the City’s authorized surface water use amount of 6,051 acft/yr. Texas Water Development (TWDB) water demand projections for Kerrville approved for use in the 2022 State Water Plan are shown in Figure 4 and Figure 5 for reference. Should projected growth rates continue to 2120, raw water demands would increase to over 14,000 acft/yr.

Table 3. Summary of Projected Water Demands for 2020-2120

Year	Water Demand by Use Type (acft/yr)					Slippage (acft/yr)	Total Raw Water Demand (acft/yr)
	Residential	Commercial	Irrigation	Municipal	Non-Potable Reuse		
2020	2,069	918	321	151	776	466	4,702
2030	2,286	1,066	372	175	857	523	5,280
2040	2,525	1,237	432	203	947	588	5,933
2050	2,789	1,435	502	236	1,046	661	6,669
2060	3,081	1,666	582	274	1,065	734	7,402
2070	3,404	1,933	676	318	1,065	814	8,209
2080	3,760	2,244	784	369	1,065	904	9,126
2090	4,153	2,604	910	428	1,065	1,008	10,168
2100	4,587	3,022	1,056	497	1,065	1,125	11,352
2110	5,067	3,507	1,225	577	1,065	1,259	12,700
2120	5,598	4,070	1,422	669	1,065	1,411	14,235

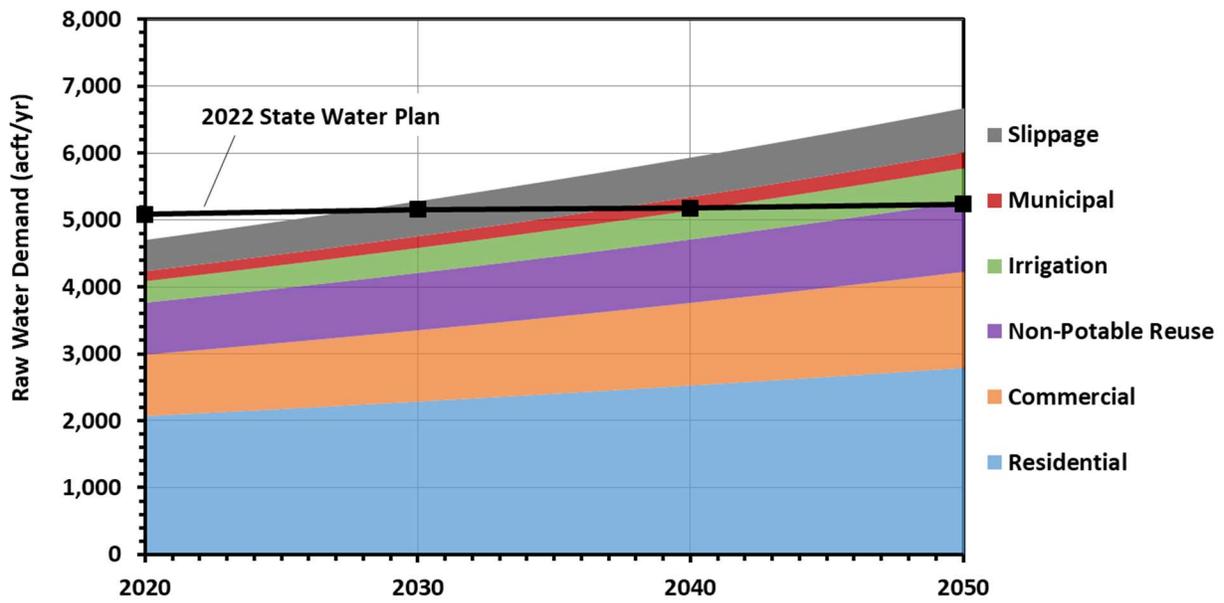


Figure 4. Projected Water Demand by Account Type for 2020-2050 Period

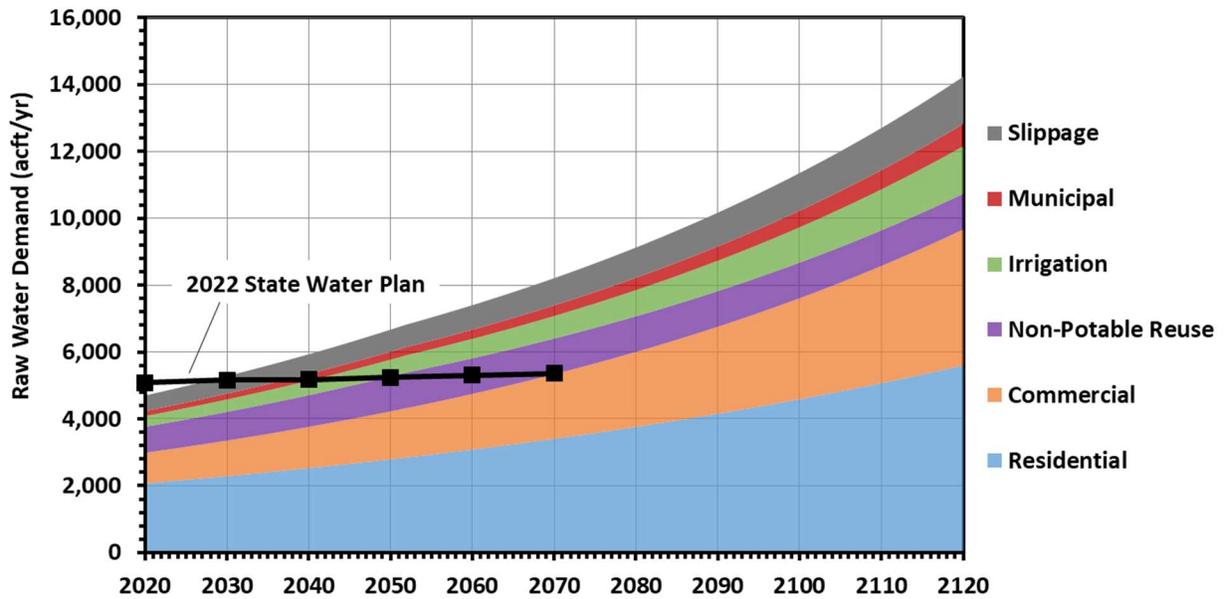


Figure 5. Projected Water Demand by Account Type for 2020-2120 Period

3. Existing Supplies

Section 3 presents information on Kerrville’s existing raw water supply infrastructure and water rights, and provides estimates of the reliability of existing supply sources. For this study, the reliable water supply or firm yield, is defined to be the amount of water that can be supplied on an annual basis without shortage throughout a repeat of the worst drought on record. Currently, the City obtains its water supplies from surface and groundwater sources, reuse, and aquifer storage and recovery (ASR). Figure 6 shows the locations of Kerrville’s water supply and treatment infrastructure including wells, surface water treatment facilities, and wastewater treatment facilities.

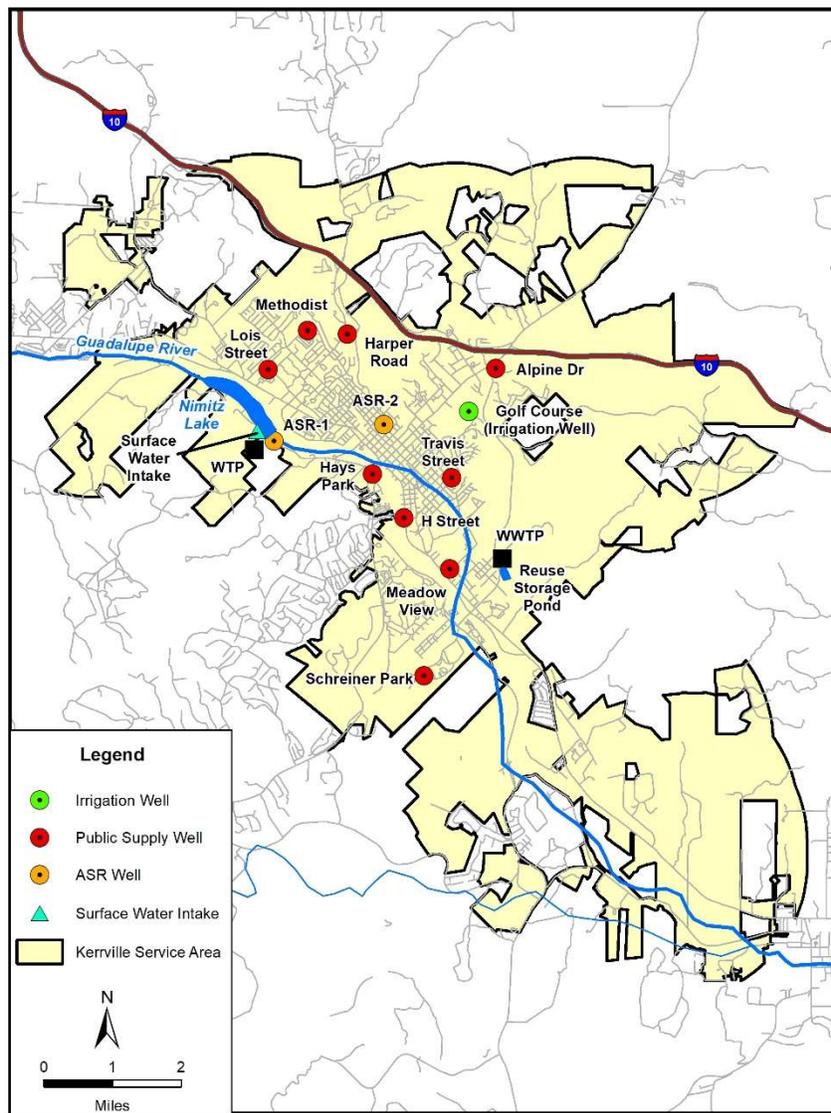


Figure 6. Kerrville Raw Water Supply Infrastructure

Historic Droughts

Kerrville and the Hill Country area frequently experience extreme weather conditions including flash floods and prolonged droughts. The two most prolonged droughts on record in the Hill County occurred in 1947-1957 and, more recently, in 2006-2014. A summary of recorded annual streamflow in the Guadalupe River at Comfort (USGS Gage 08167000) is provided in Figure 7 and shows these two drought periods are similar in length and severity. The historical streamflow data also indicate that 1956 is the most severe drought year on record from a streamflow perspective and 2011, often considered the most severe drought year in the recent drought period, is the fifth worst year in terms of recorded streamflow.

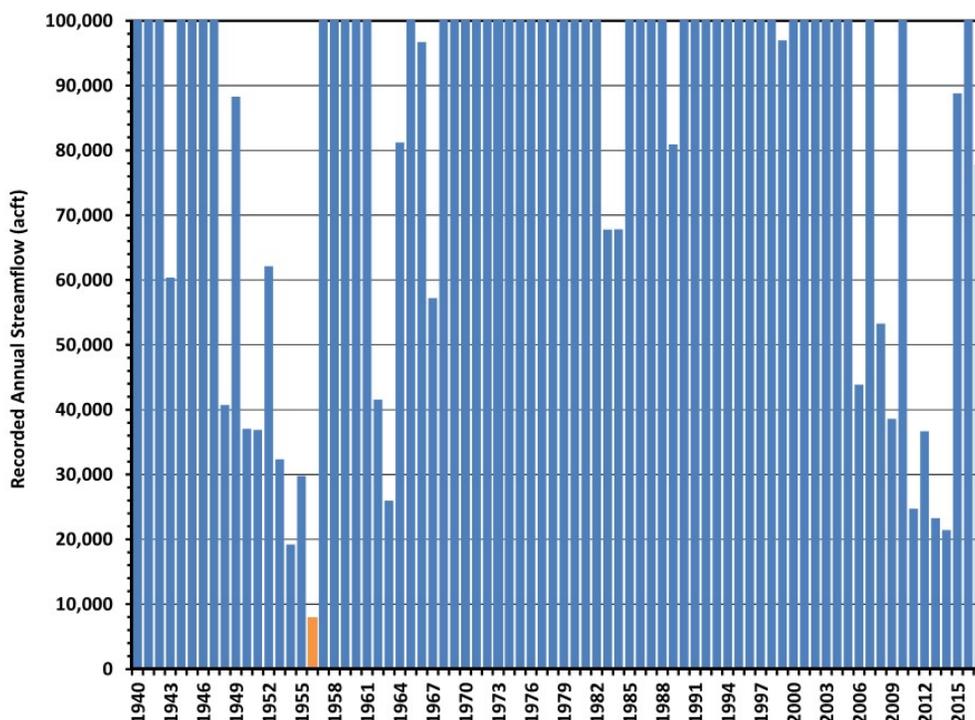


Figure 7. Annual Streamflow Recorded at Guadalupe River at Comfort (USGS Gage 08167000)

Figure 8 provides further comparison of the 1956 and 2011 years by illustrating the daily streamflow for each year. For five months of 1956, no streamflow was recorded at the Comfort gage with the exception of two small pulse events occurring in August and September. These streamflow records provide insight into the historical severity of droughts in the Hill Country; however, in order to determine the duration and severity of the critical drought of record, current water management authorizations must be simulated with historical streamflow as further described in Section 3.2.

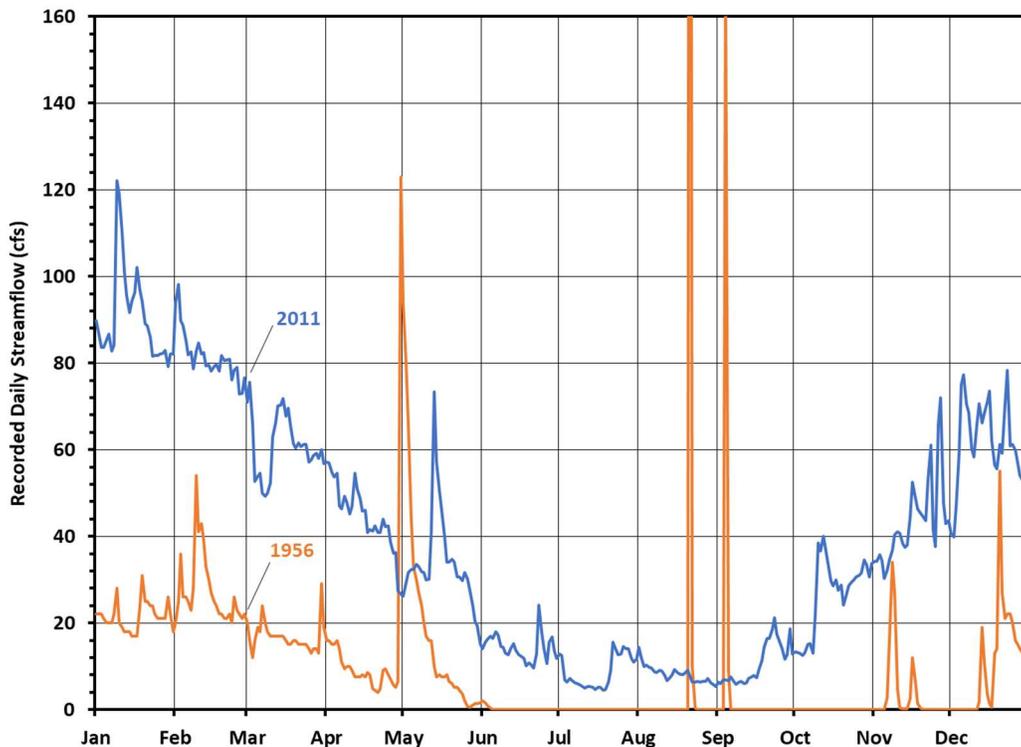


Figure 8. Daily Streamflow Recorded at Guadalupe River at Comfort (USGS Gage 08167000) for 1956 and 2011 Drought Years

3.1. Groundwater

Groundwater has historically been the primary source of water supply for Kerrville and the surrounding area. Eight water-bearing formations exist in Kerr County and are summarized in Table 4; however, the Lower Trinity Aquifer is the only formation that has historically produced significant quantities of fresh water for municipal use. Domestic and livestock wells in Kerr County typically draw supplies from the shallower Upper or Middle Trinity Aquifers and this separation moderates the effects of drawdown from deeper and higher capacity wells in the Lower Trinity.

Aquifers below the Lower Trinity (Marble Falls, Ellenburger/San Saba, and Hickory) have not been sufficiently explored to reliably document the potential well yield and water quality characteristics. Deep test wells in the Hickory Aquifer commonly produce water with high gross alpha particle activity and very warm to hot water. Water quality in the other deeper aquifers is expected to be similar.

As indicated in Table 4, the target aquifer for groundwater production by the City of Kerrville is the Lower Trinity. Lower Trinity wells are typically less than 700 ft deep and yield up to 1,400 gallons per minute (GPM) of high quality, fresh water. Typical groundwater levels of the lower Trinity in the Kerrville area are about 350 ft below the land surface and relatively stable.

Table 4. Kerr County Aquifers and their Water-Bearing Properties in Kerrville and the Surrounding Area

Aquifer	Stratigraphic Unit(s)	Typical Thickness (ft)	Approximate Elevation of Base (ft-msl)	Water-Bearing Properties	Additional Notes
Alluvium	Recent Sediments	40	40	Yields small to moderate quantities of water.	Limited to stream valleys
Edwards and Associated Limestone	Edwards Limestone	Does not exist below Kerrville		Yields small to moderate quantities of water.	Exists in uplands area west and north of Kerrville
	Comanche Peak Limestone	Does not exist below Kerrville			
Upper Trinity	Glen Rose Limestone (upper member)	250	1460	Yields very small to small quantities of highly mineralized water.	None
Middle Trinity	Glen Rose Limestone (lower member)	200	1260	Yields small to moderate quantities of fresh to slightly saline water.	None
	Hensell Sand	50	1210		
	Cow Creek Limestone	50	1160		
Lower Trinity	Sligo Limestone	125	1025	Yields small to large quantities of fresh water.	Target water-bearing formation for City of Kerrville wells
	Hosston Sand				
Marble Falls	Smithwick and Marble Falls	Roughly 800	250	Yields small to moderate quantities of fresh to slightly saline water.	No data in Kerrville area
Ellenburger/ San Saba	Honeycutt, Gorman, and Tanyard	Roughly 1,750	Roughly -1,500	Yields small to moderate quantities of fresh to slightly saline water. Yields are highly dependent on number and size fractures and cavities.	No data in Kerrville area
Hickory	Riley	Roughly 2,500	Roughly -4,000	Yields small to very large quantities of fresh to slightly saline water.	No data in Kerrville area

Table References:

Ashworth, J.B., 1983, Ground-Water Availability of the Lower Cretaceous Formations in the Hill County of South-Central Texas, Texas Department of Water Resources Report

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3.1.1. Trinity Aquifer Groundwater Availability

Groundwater management plans and rules for the regulation of groundwater resources are developed by local groundwater conservation districts under directives established by the Texas Legislature. These directives to the groundwater conservation districts are documented in Texas Water Code, Chapter 36⁴.

The process of developing the rules for the construction, operation and permitting of water wells begins with the development of a water management plan. After this plan has been reviewed and approved by the Texas Water Development Board (TWDB), the local groundwater district then writes rules that are consistent with the water management plan and directives in Chapter 36. The Headwaters Groundwater Conservation District (HGCD) has jurisdiction in Kerr County and has an approved groundwater management plan and adopted rules for permitting and regulating the production of groundwater in and near the City of Kerrville.

The adopted level of groundwater availability of the Trinity Aquifer in Groundwater Management Area 9 (GMA-9), which includes Kerr County, is based on adopted Desired Future Conditions (DFC). GMA-9 officials, which include a representative from each local groundwater conservation district in GMA-9, adopted an increase in allowable drawdown of 30 ft through 2060 in the Trinity Aquifer as the DFC. Based on this DFC, the TWDB has determined that the Modeled Available Groundwater (MAG) for the Trinity Aquifer gradually declines from 14,918 acft/year in 2020 to 14,223 acft/yr in 2060. The TWDB does not estimate a MAG for the Edwards Group of the Edwards-Trinity (Plateau), Ellenburger-San Saba, and Hickory Aquifers in Kerr County.

According to Chapter 36, Section 1132 of the Texas Water Code, a district is to issue permits up to the point that the total volume of exempt and permitted pumping will achieve an applicable DFC. Further, a district is to manage total groundwater production in consideration of: (1) the amount of groundwater authorized under permits previously issued by the district; (2) a reasonable estimate of the amount of groundwater that is actually produced under permits issued by the district; and (3) other considerations.

Currently, the HGCD has not made publically available a tabulation of the groundwater production permits. Thus, a definitive amount of potential groundwater production that is unpermitted under the MAG cap could not be determined. Additionally, there are a significant number of unregulated rural domestic and livestock wells in Kerr County, thus further making it difficult to determine an accurate estimate of available groundwater under the MAG cap. However, in personal communications with District officials, they indicated that about 2,500 acft/yr of water may still be available for permitting.

The TWDB conducts water-use surveys and estimates pumping throughout Texas. Beginning in 2000, the TWDB water-use data base was enhanced to report pumping data submitted by municipal, manufacturing, mining, steam-electric (power generation), irrigation, and livestock users and/or estimated by TWDB staff. The municipal use category is subdivided into relatively large public water supply systems and county other

⁴ <https://statutes.capitol.texas.gov/Docs/WA/htm/WA.36.htm>

that includes rural domestic use. This water-use data base further subdivides the withdrawals by aquifer.

TWDB annual estimates of pumping from the Trinity Aquifer in Kerr County for 2000-2016 are presented in Figure 9. The maximum pumping from the Trinity was almost 5,400 acft/yr, which occurred in 2014. For this period, the average pumping was slightly over 4,000 acft/yr. On average, municipal pumping is about two-thirds of the total pumping from the Trinity in Kerr County. In consideration of the MAG and Chapter 36 requiring the groundwater districts to consider the actual amount of groundwater production in managing their groundwater production, there appears to be about 10,000 acft/yr of additional groundwater availability above current production levels from the Trinity in Kerr County.

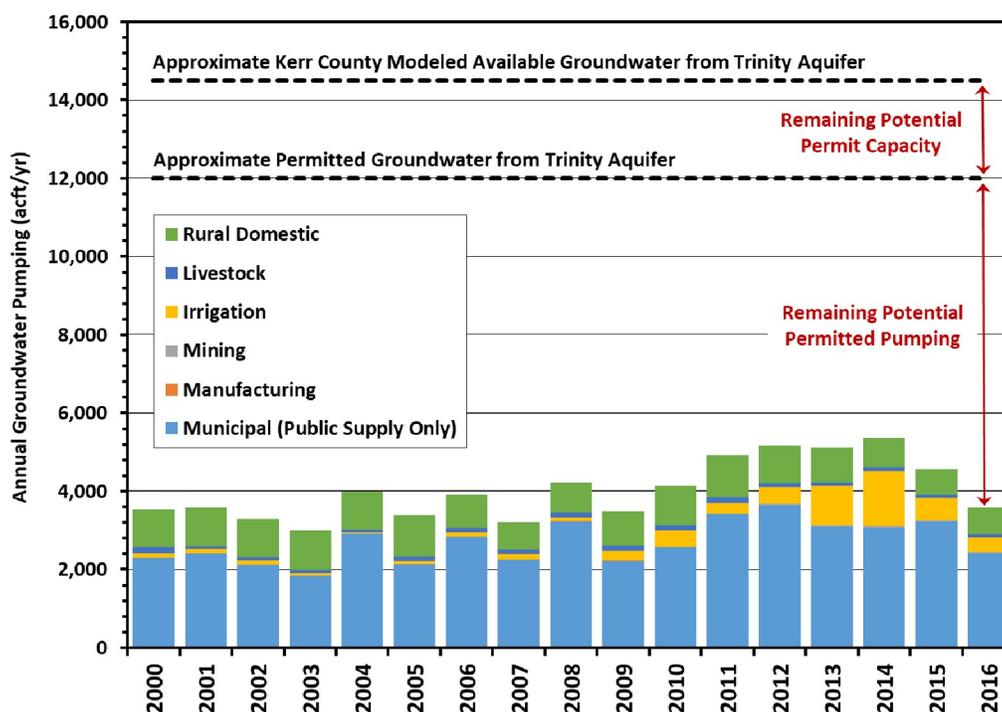


Figure 9. TWDB Estimates of Kerr County Groundwater Pumping from Trinity Aquifer

Figure 10 shows the TWDB estimated annual pumping by Kerrville (including recovery from aquifer storage) and other municipal water systems in Kerr County. Kerrville’s share of the municipal pumping ranges from about 7% in 2004 to 40% in 2012 and averages less than 24% of the total municipal pumping. The City’s highly variable pumping is a reflection of its efforts to conserve groundwater supplies when surface water supplies are available from the Guadalupe River.

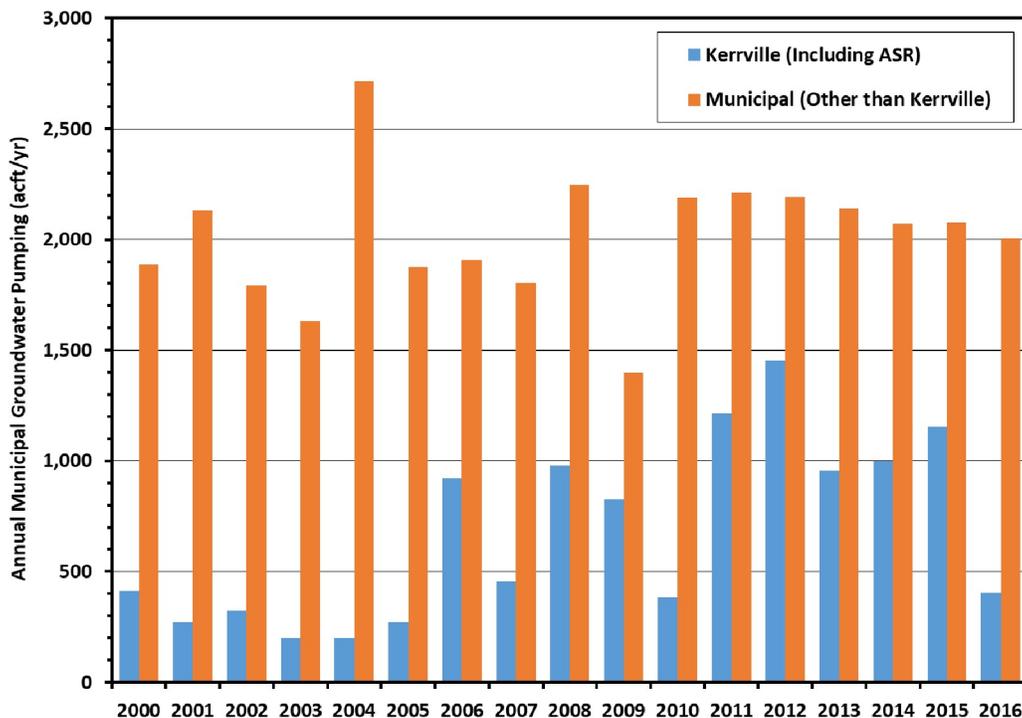


Figure 10. TWDB Estimates of Kerr County Municipal Groundwater Pumping from Trinity Aquifer for 2000-2016 Period

3.1.2. Groundwater Firm Yield

The City owns and operates nine Lower Trinity public supply wells and one irrigation well. The City also owns and operates two aquifer storage and recovery (ASR) wells. These ASR wells are dual-purpose wells in that they are designed to inject water for storage and to recover the stored water at a later date. Figure 6 provides the location of wells owned and operated by the City and permitted by the HGCD. The firm yield of the City’s groundwater supplies is estimated considering both permit limitations and the availability of groundwater for production using the City’s wells.

The City currently holds a production permit from the HGCD for 3,605 acft/yr (1,174,800 gallons per year). A copy of the permit is provided in the Appendix. Figure 11 shows the City’s annual groundwater production authorized under their HGCD permit. This production does not include recovery of surface water previously treated and injected into ASR. However, the City has the ability to use the ASR wells to produce native groundwater, but only if all injected surface water has been recovered. As a result of Kerrville’s efforts to conserve groundwater supplies when surface water supplies are available from the Guadalupe River, the City’s average groundwater production for the 2000-2016 period is about 675 acft/yr, thus historically underutilizing a substantial portion of their permit.

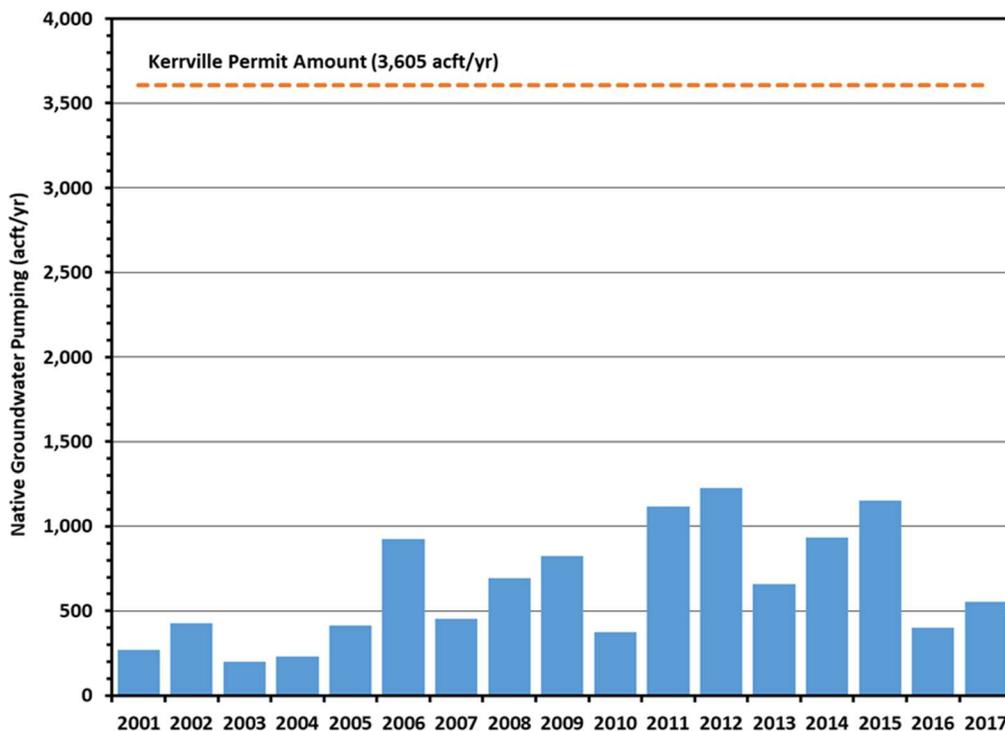


Figure 11. Kerrville Groundwater Pumping from Trinity Aquifer for 2000-2016 Period

The HGCD has a Drought Contingency Plan (DCP) to protect the aquifers in Kerr County during drought conditions. The objectives of the DCP are to: (1) conserve available water; (2) protect the quality of water, with particular regard to domestic water use; (3) protect and preserve public health and safety; and (4) minimize the adverse impacts of shortages.

The DCP has four drought stages. Each stage mandates an additional 10 percent reduction in the permitted level of pumping and triggers are based on the average groundwater level at four HGCD drought index wells. However, the HGCD recognizes the City’s efforts through its conjunctive use water policy and water conservation and drought management plans to conserve available water supplies during drought conditions. As a result, Kerrville is exempt from production cutbacks during drought conditions associated with the DCP.

A history of groundwater levels at a given well provides insights as to temporal trends and estimated groundwater availability for production by the City. These trends are useful to characterize long-term aquifer response to groundwater production, droughts, and above normal rainfall. For purposes of this assessment, water-level data collected at the Mac Holliman well is used to characterize these historical trends. This data set begins in 2001 and continues to June 2018.

Figure 12 shows Mac Holliman well levels with Kerrville’s groundwater production. These two data sets illustrate the strong response of groundwater level conditions to the rate of groundwater production. The figure shows that the City’s groundwater pumping has been

relatively low relative to its permit (averaging about 53 acft per month for 2001-2017 with a maximum of 231 acft per month in 2005). Important observations include: (1) the groundwater levels stabilized at about 1,350 ft-msl during the periods of relatively high pumping conditions, instead of showing continual, long-term declines; and (2) groundwater levels recovered relatively quickly when production was reduced. If future pumping were reduced to 2001-2005 levels (approximately 26 acft per month), groundwater levels could be expected to recover to near 2001-2005 levels.

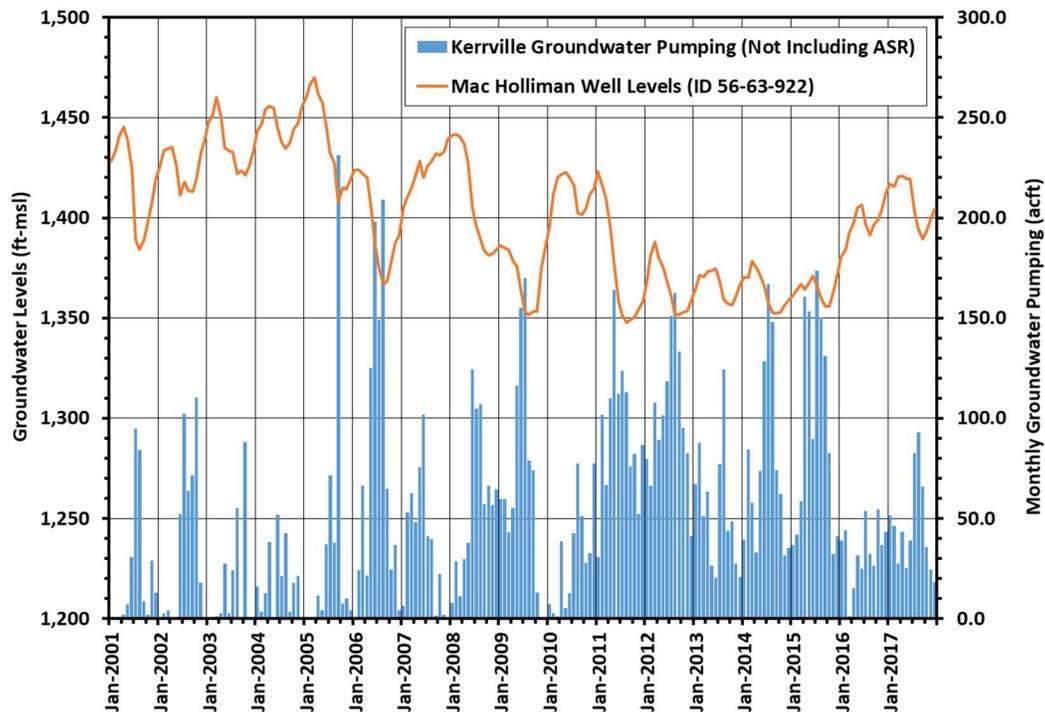


Figure 12. Comparison of Kerrville Groundwater Pumping and Resulting Groundwater Levels for 2001-2017 Period

A review of well construction data for Kerrville’s current active wells (2017) shows that the top of the water-bearing zone averages about 1,120 ft-msl. This elevation is about 230 ft lower than the groundwater levels during stress conditions. If one considers the general trend in regional groundwater levels and base of the Trinity Aquifer, this difference is expected to be relatively uniform across the immediate Kerrville area. This difference allows for significant additional drawdown at existing supply wells during pumping operations without drawing the water level (piezometric surface) down into the water-bearing section of the well.

As a result, it is expected that the City could reliably produce the full amount of groundwater authorized under the HGCD permit throughout a reoccurrence of the worst drought on record. Thus, the firm yield of the City’s groundwater supply is considered to be equal to their HGCD permit, which is 3,605 acft/yr.

3.2. Surface Water and Aquifer Storage and Recovery

In an effort to conserve groundwater supplies, Kerrville reduces groundwater pumping and diverts surface water during periods when sufficient streamflow is available in the Guadalupe River. However, because Kerrville is located in the upper portion of the Guadalupe River Basin and droughts frequently occur in the Hill County, the City's surface water supplies are often unreliable. The addition of off-channel storage in the form of aquifer storage and recovery (ASR) has increased the reliability of the City's supplies by storing treated surface water during high flow periods for use during drought periods. As shown in Figure 6, surface water diversions from the Guadalupe River are made at the City's water treatment plant (WTP) and treated for distribution or injection into one of two ASR wells.

3.2.1. Surface Water Rights

Kerrville owns four surface water rights in the upper Guadalupe River Basin authorizing diversions at the Kerrville WTP Intake of up to a combined 6,051 acft/yr. Additionally, the City has full or partial ownership in three other water rights (CA 18-2002, Permit 5208, and Permit 3635); however, these water rights do not authorize diversions at the WTP intake location and the City does not currently have the infrastructure to treat and distribute diversions under these water rights to meet potable water demands. Table 5 lists the water rights owned by Kerrville with certificate of adjudication (CA) or permit numbers, priority dates, annual authorized diversions amounts, authorized storage amounts, and restrictions. Copies of the City's water right permits are included in the Appendix. All diversions authorized at the WTP intake can be used for either municipal purposes or injection into the City's ASR system. Permit 5394A, owned by the Upper Guadalupe River Authority (UGRA) and included in Table 5, authorizes an additional 2,000 acft/yr of water to be diverted from Nimitz Lake. UGRA has not historically utilized this water right and as a result, it may be available for use by Kerrville upon an agreement with UGRA. However, Kerrville has not historically had a need for the additional authorization as the City does not currently have the treatment capacity to utilize the additional diversions during wet periods and the junior priority of the UGRA water right relative to Canyon Reservoir would not increase the reliability of diversions during drought conditions.

In addition, Table 5 includes the Guadalupe-Blanco River Authority's (GBRA) water right (CA 18-2074) authorizing the impoundment and diversion of water from Canyon Reservoir. This GBRA water right plays a significant role in determining water available for diversion under Kerrville and UGRA water rights as its priority date is senior to all but Kerrville's CA 18-1996. As a result, all water rights junior in priority to CA 18-2074 cannot legally impound or divert run-of-river streamflow unless Canyon Reservoir is full and spilling. Only the diversion of water already stored is authorized by water rights junior to CA 18-2074 if Canyon Reservoir is not full and spilling.

Table 5. Summary of Kerrville/UGRA Water Rights Authorizing Diversions at Kerrville Water Treatment Plant Intake

Water Right	Owner	Priority Date	Authorized Diversion Amount at Kerrville WTP Intake (acft/yr)	Authorized Storage Amount (acft)	Restrictions
CA 18-1996	Kerrville	Apr-1914	225	75 (Louise Hays Park Lake)	-Does not authorize impoundment of water in Nimitz Lake. -Cannot divert when Nimitz Lake level is below 1,608 ft-msl. -Can only divert available run-of-river streamflow and not stored water in Nimitz Lake. -Max diversion rate of 2.2 cfs.
CA 18-2074	GBRA	Mar-1956	---	386,200 (Canyon Reservoir)	---
CA 18-2026	Kerrville	Aug-1961	54	---	-Can only divert available run-of-river streamflow and not stored water in Nimitz Lake. -Instream flow restrictions at Guadalupe River at Center Point (USGS Gage No. 8166250). -Max diversion rate of 1.2 cfs.
Permit 3505	Kerrville	May-1977	3,603	840 (Nimitz Lake)	-Cannot divert when Nimitz Lake level is below 1,608 ft-msl. -Max diversion rate of 9.7 cfs.
Permit 5394B	Kerrville	Jan-1992	2,169	---	-Cannot divert when Nimitz Lake level is below 1,608 ft-msl.
Permit 5394A	UGRA	Jan-1992	2,000	---	-Instream flow requirements vary between 30-50 cfs. -Max combined diversion rate with Permit 3505 of 15.5 cfs.
Total Authorization under Kerrville Water Rights			6,051	915	---

3.2.2. Surface Water Availability

The reliability of water rights held by Kerrville and UGRA is affected by senior upstream and downstream water right diversions. Using a subset of the Texas Commission on Environmental Quality (TCEQ) Guadalupe-San Antonio River Basin Water Availability Model (GSA WAM) and additional modeling tools to support daily time step calculations, the daily availability of supplies under Kerrville and UGRA water rights was calculated. The subset of the GSA WAM developed for this analysis is referenced herein as the Mini-WAM. The Mini-WAM includes only the upper Guadalupe River Basin with Canyon Reservoir as the downstream boundary.

The current GSA WAM contains hydrologic data including natural streamflow and net evaporation for the 1934-1989 historical period. Natural flow is defined as the flow that would have occurred without the effects of water management activities such as diversions, return flows, and impoundment of water in reservoirs. Available flow for diversion is calculated in the GSA WAM by reducing natural flow by water right impoundments and diversions as they occur in priority order.

The development of the Mini-WAM allows for the extension of monthly naturalized flows in the upper Guadalupe River Basin for the 1990-2017 period without having to extend naturalized flows throughout the entire Guadalupe-San Antonio River Basin. Table 6 provides a list the primary control points in the Mini-WAM and the corresponding sources of data used in the simplified extension of naturalized flow and other hydrologic data. One control point in the Mini-WAM (CP03-Guadalupe River at Canyon Reservoir) required additional computations to obtain sufficiently accurate naturalized streamflows. A regression equation based on correlation of gaged streamflows at Spring Branch and Canyon Reservoir inflows computed by mass balance was used to estimate natural streamflows at Canyon Reservoir.

Table 6. Simplified Extension of Naturalized Flow for Primary Control Points in the Mini-WAM

Primary Control Point	Description	Method Used to Extend Naturalized Flow
CP01	Guadalupe River at Comfort	USGS Gage 0816700 streamgage data at Comfort adjusted for upstream diversions and return flows
CP02	Guadalupe River near Spring Branch	USGS Gage 08167500 streamgage data at Spring Branch adjusted for diversions and return flows upstream of Comfort
CP03	Canyon Reservoir	Simplified linear regression with naturalized Canyon inflow and USGS Gage 08167500 data at Spring Branch

Initial water availability calculations were performed using the Mini-WAM on a monthly time-step to estimate regulated streamflow and water available for diversion under existing water rights on a priority basis subject to technical assumptions regarding natural, anthropogenic, and legal factors. General technical assumptions used for applications of the Mini-WAM summarized herein include:

- Strict enforcement of the prior appropriation doctrine and restrictions included in Kerrville’s certificates of adjudication and permits.
- Surface water rights modeled at full consumptive amounts per certificates of adjudication and permits.
- Lower basin water rights senior to Canyon Reservoir (CA 18-2047) and not included in Mini-WAM are assumed to only make a senior call for water during drought conditions when Canyon Reservoir is likely not full and spilling. As such, water would already not be available for diversion under Kerrville or UGRA water rights included in Table 5 with the exception of CA 18-1996, thus lower basin senior water right calls would not significantly affect water availability estimates.
- No treated effluent discharges (aka. return flows) are included in the Mini-WAM. This assumption is consistent with TCEQ permitting and TWDB planning procedures. As return flows upstream of the Kerrville diversion location are minimal, exclusion does not significantly affect water availability estimates.

Available streamflow remaining after authorized senior priority upstream and downstream diversions was extracted from the Mini-WAM simulation at the Kerrville WTP intake diversion location. Monthly available streamflow values extracted from the Mini-WAM were disaggregated to daily values using historical daily streamflow patterns. These daily available streamflow values were then used, along with applicable seasonal diversion patterns associated with types of use and considering treatment capacity, to determine the reliability of diversions under Kerrville and UGRA water rights on a daily basis considering instream flow restrictions and minimum required Nimitz Lake water surface elevation for diversion.

Table 7 summarizes the daily reliability of diversions for each of the Kerrville and UGRA water rights in the model simulation. The daily reliability is defined herein as the percentage of days in the simulation period the full desired daily diversion target was obtained. Permit 3505 has the highest reliability among the water rights even though it is not the most senior in priority. This is a result of the two more senior water rights only having authorization to divert run-of-river streamflow while Permit 3505 authorizes diversion of run-of-river streamflow and water impounded in Nimitz Lake. For most of the simulation, including severe drought periods, streamflow is available for diversion under Kerrville’s most senior water right CA 18-1996. However, during these drought periods, Nimitz Lake levels are below 1608 ft-msl and diversions authorized under CA 18-1996 are restricted under the assumption that permit restrictions are strictly enforced during the simulation.

Table 7. Daily Reliability of Kerrville and UGRA Water Rights

Water Right	Owner	Priority Date	Authorized Diversion Amount at Kerrville WTP Intake (acft/yr)	Daily Reliability of Diversions
CA 18-1996	Kerrville	Apr-1914	225	49%
CA 18-2026	Kerrville	Aug-1961	54	40%
Permit 3505	Kerrville	May-1977	3,603	50%
Permit 5394B	Kerrville	Jan-1992	2,169	37%

Figure 13 shows the annual summation of computed daily diversions for the model simulation period. Simulation results indicate the drought of record from a water availability perspective is the drought that occurred in the 1950s. No streamflows would have been available for diversion from September 1947 to January 1958, a period of 10 years and 5 months. For comparison purposes, no streamflows would have been available for diversion during the recent drought from August 2009 to April 2016, a period of 6 years and 9 months. During these drought periods, Canyon Reservoir is not full and Nimitz Lake levels are below 1608 ft-msl resulting in no streamflow availability for Kerrville.

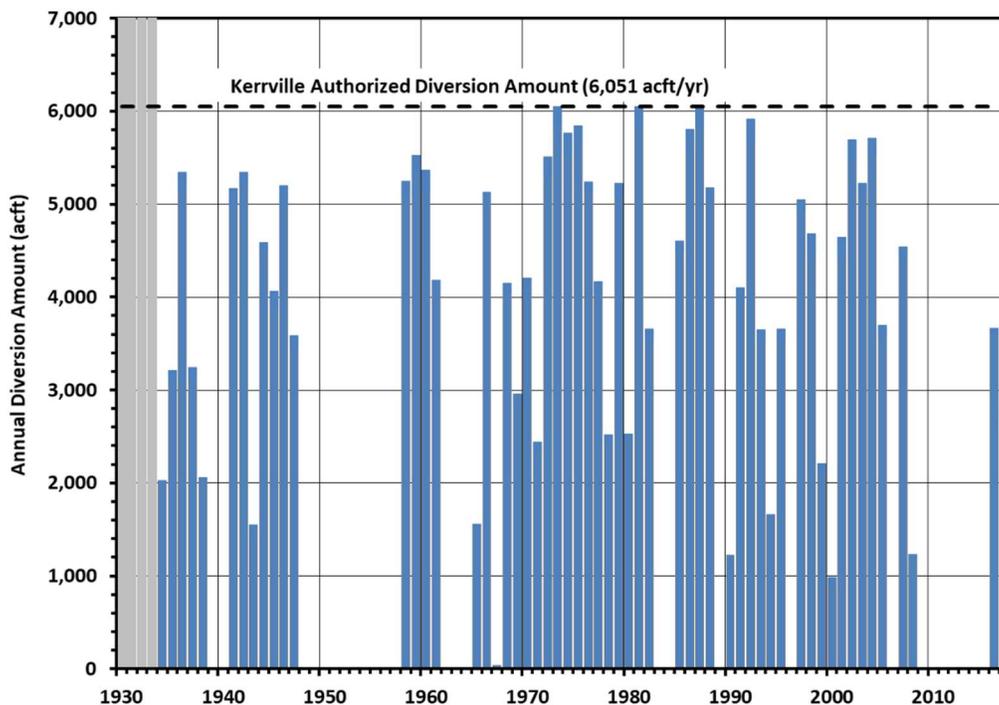


Figure 13. Simulated Annual Diversion Amounts under Kerrville Water Rights

Figure 14 shows the frequency of the annual diversion amounts presented in Figure 13. The median annual diversion amount is almost 3,000 acft/yr and, in over 30 percent of the years of the simulation, no water is available for diversion.

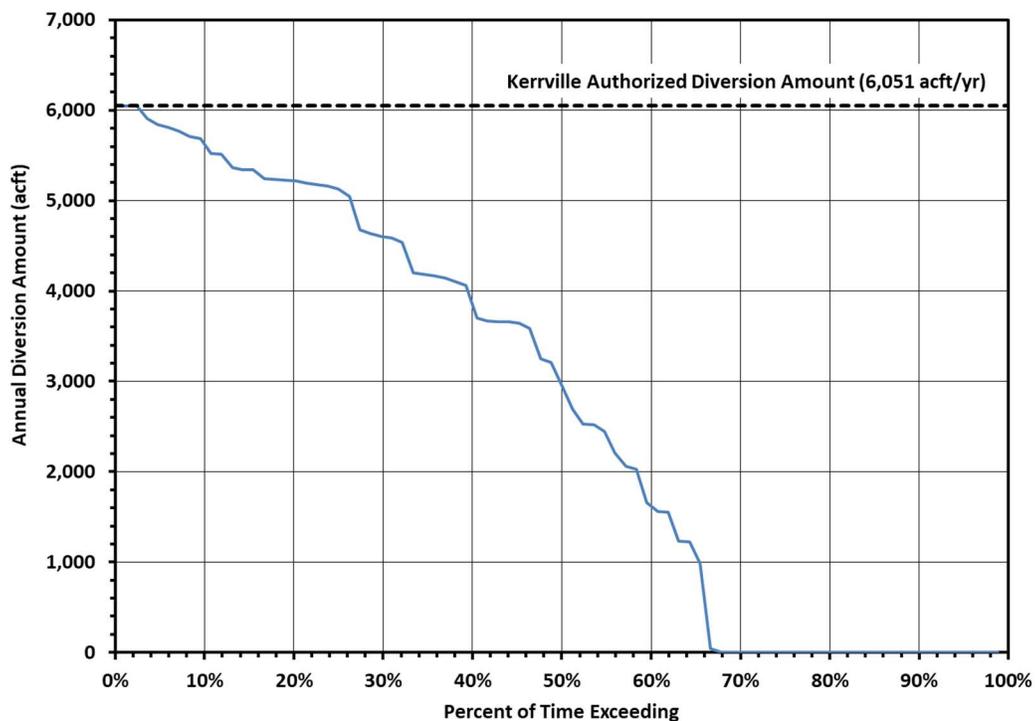


Figure 14. Frequency of Simulated Annual Diversion Amounts under Kerrville Water Rights

3.2.3. Aquifer Storage and Recovery (ASR)

Kerrville operates two ASR wells to store excess available surface water in the Hosston formation of the Lower Trinity aquifer for recovery and use during drought conditions and to meet higher seasonal demands during the summer. As shown in Figure 6, ASR-1 is located next to the WTP and excess treated water is sent directly to the well for injection. ASR-2 is located in the central part of the city and excess treated water in the distribution system is used for injection. Once injected, the water becomes comingled with native Trinity groundwater. Kerrville’s ASR permit allows for 100 percent recovery of the volume of injected water and does not discount the recovery amount for any losses associated with drift that may occur.

Figure 15 illustrates historical ASR operations (injection and recovery) since 2001 and the resulting cumulative storage in the ASR system. Injection is common during the non-summer months and may occur throughout the entire year during extended wet periods such as those experienced in 2010 and 2017. During a severe drought, such as most of 2008, 2009, and 2011, no injection operations occurred. Conversely, recovery operations occurred during each of these years and were greatest during 2009, 2011, and 2014. From January 2001 through July 2018, the City has increased the amount of water stored in ASR from about 113 million gallons (347 acft) to 944 million gallons (2,897

acft). As shown in Figure 15, most of the storage was accumulated from 2001 through 2007 and after 2015. From 2008 through 2015, the injection and recovery was nearly balanced as drought conditions affected the Kerrville area.

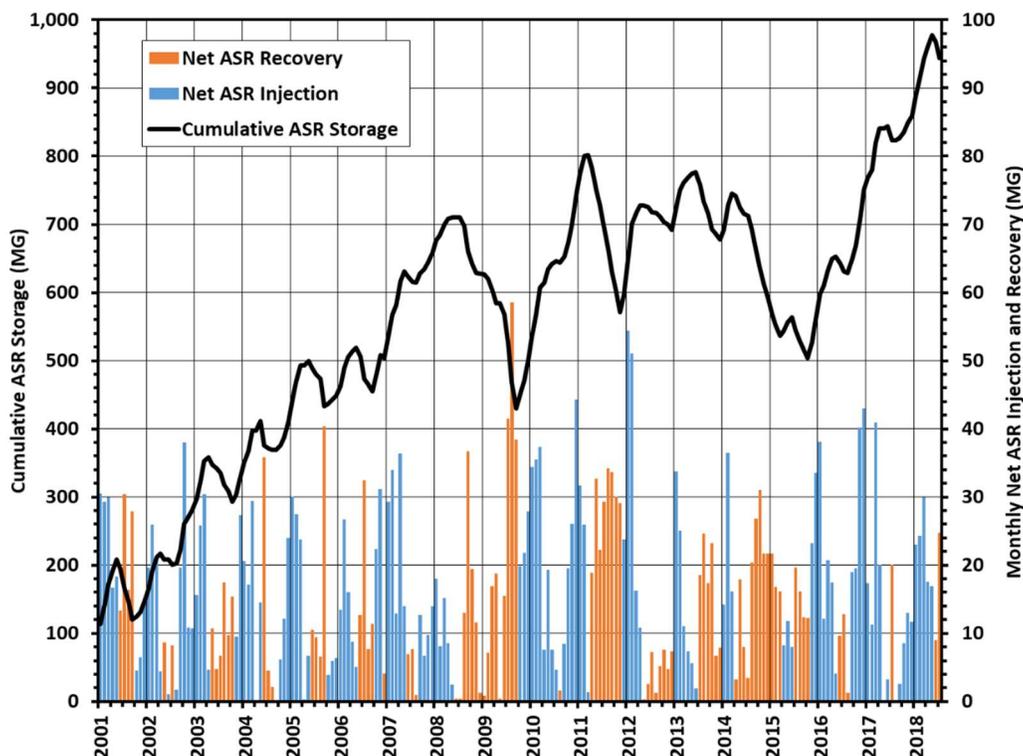


Figure 15. Historical ASR Operations and Cumulative Storage

As shown in Figure 11, City demands on native groundwater from the Trinity Aquifer have been at relatively high levels since 2006 compared to the 2001-2005 period. For the 17-year period, native groundwater provided a little more than two times the amount of water recovered from ASR. One factor in the balancing of the ASR facilities and the native Trinity water wells is in 2017 there were two ASR wells and seven major Trinity wells. Thus, during high summer demands, the portion of the water coming from ASR is restricted by the number of ASR wells.

The response of groundwater levels to injection and recovery operations in the Trinity Aquifer is the primary indicator of the ability to reliably recover injected water. This response is presented in Figure 16 for 2001 for ASR-1 and the R-1 monitor well located next to ASR-1. During this year, injection generally occurred from January through May and from early October to the end of the year, and recovery extended from early June through early October. In June, as the operations shifted from injection to recovery, the water levels in R-1 declined from about 1,500 ft-msl to about 1,250 ft-msl where it stabilized throughout the recovery period. Later, when the operations shifted from recovery to injection, the groundwater levels quickly recovered to 1,500 ft-msl. This groundwater level response is also clearly evidenced by an approximate 250 ft change in mid-November when the injection cycle was interrupted with a short period of recovery.

This groundwater level response to ASR operations is consistent throughout the 2001-2017 period and suggests that essentially all of the cumulative storage in the ASR can be reliably recovered.

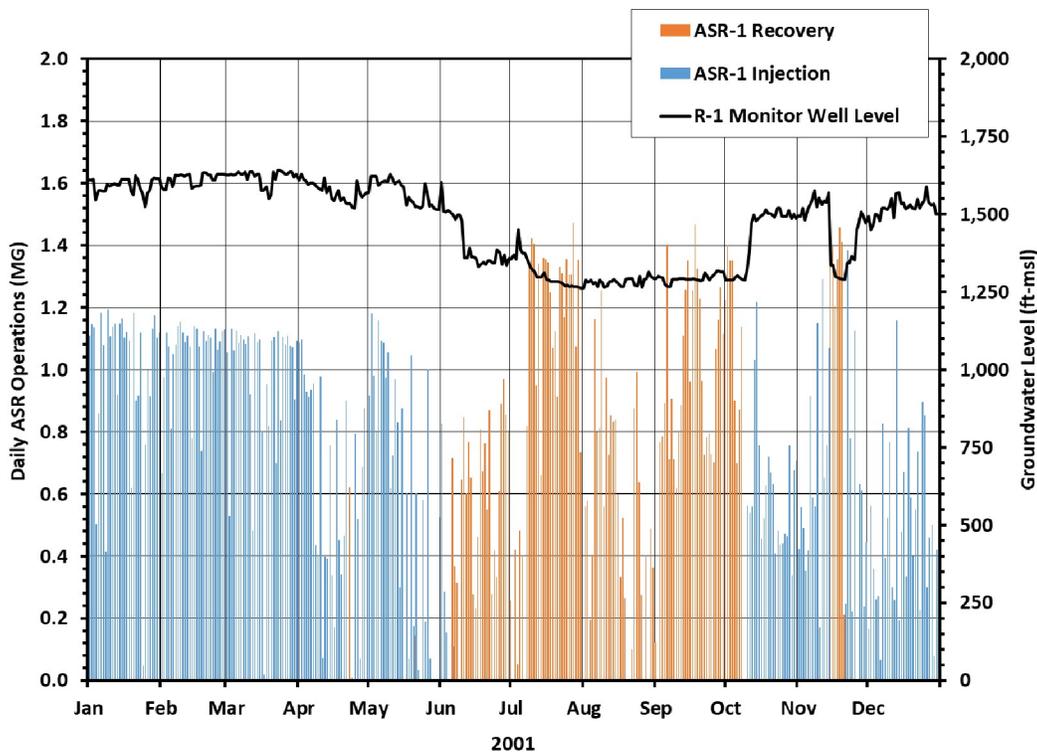


Figure 16. 2001 Daily ASR Operations and Resulting Groundwater Levels

3.2.4. Surface Water and ASR Firm Yield

As described in the surface water availability section (3.2.2), during the critical drought of record, no streamflows were available for diversion for 10 years and 5 months. Therefore, during a repeat of the critical drought of record, all reliable surface water supplies must come from the recovery of stored water in the ASR system. As a result, the surface water firm yield is determined by the current ASR storage amount. Figure 17 shows the relationship between firm yield and ASR storage assuming a drought duration of 10 years and 5 months (10.4 years). This relationship is illustrated in the figure by the red line. The firm yield will increase with storage up to the maximum ASR recovery rate of 2,661 acft/yr (2.376 MGD) as determined by historical recovery operations. For example, if ASR storage increased to 10,000 acft, the City could recover the storage uniformly at a rate of 962 acft/yr over 10.4 years without completely depleting the storage (10,000 acft / 10.4 years = 962 acft/yr). As of January 2019, the City’s ASR storage has accumulated to 2,996 acft resulting in a firm yield of 288 acft/yr (2,996 acft / 10.4 years = 288 acft/yr).

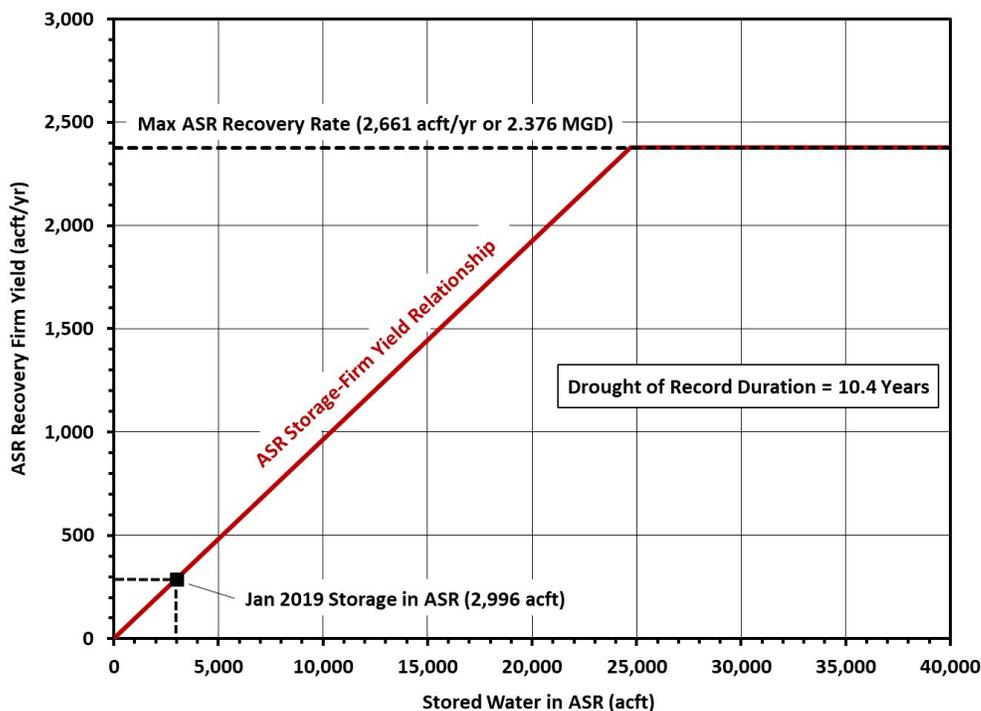


Figure 17. ASR Storage and Firm Yield Relationship assuming 10.4 Year Pumping Scenario throughout Drought of Record

3.3. Reuse

The City currently provides non-potable reuse water (i.e. treated wastewater) to the City Golf Course, Kerrville Sports Complex, Kerrville Soccer Fields, Schreiner University, Tivy High School, Comanche Trace Golf Course, and River Hills Golf Course. Additionally, the City has reserved approximately 0.5 MGD of treated effluent above its current reuse contract obligations for future potable or non-potable reuse.

Average treated effluent is about 2.3 MGD⁵; however, City staff advised that treated effluent decreased to about 1.5 MGD (1,680 acft/yr) during recent drought conditions when water use was reduced. This treated effluent amount is considered to be the current treated effluent amount during drought conditions and is assumed to increase proportionally with projected increases in residential, commercial, and municipal water use.

In an effort to further reduce potable water demand and dependency on groundwater and surface water supplies, the City has recently expanded its non-potable reuse delivery capacity by constructing a 95 million gallon (292 acft) off-channel storage pond adjacent to the wastewater treatment plant as shown in Figure 6. The pond provides the operational flexibility to meet peak reuse demands during the summer for irrigation, thus reducing demand on potable water supplies.

⁵ 2012 Kerrville Wastewater Master Plan

The City does not currently have the infrastructure to treat and distribute treated wastewater effluent to potable water customers; therefore, the firm non-potable reuse supply is limited by the non-potable reuse customer demands. Table 8 and Figure 18 summarize and illustrate the projected treated wastewater effluent, non-potable reuse demands, non-potable firm supply, and the additional firm reuse supply potentially available.

Table 8. Projected Firm Non-Potable Reuse Supply

Year	Projected Treated Effluent during Drought Conditions (acft/yr)	Projected Non-Potable Reuse Demands (acft/yr)	Firm Non-Potable Reuse Supply (acft/yr)	Potential Additional Firm Reuse Supply (acft/yr)
2020	1,680	776	776	904
2030	1,888	857	857	823
2040	2,122	947	947	733
2050	2,388	1,046	1,046	634
2060	2,687	1,065	1,065	615
2070	3,027	1,065	1,065	615
2080	3,411	1,065	1,065	615
2090	3,846	1,065	1,065	615
2100	4,339	1,065	1,065	615
2110	4,898	1,065	1,065	615
2120	5,533	1,065	1,065	615

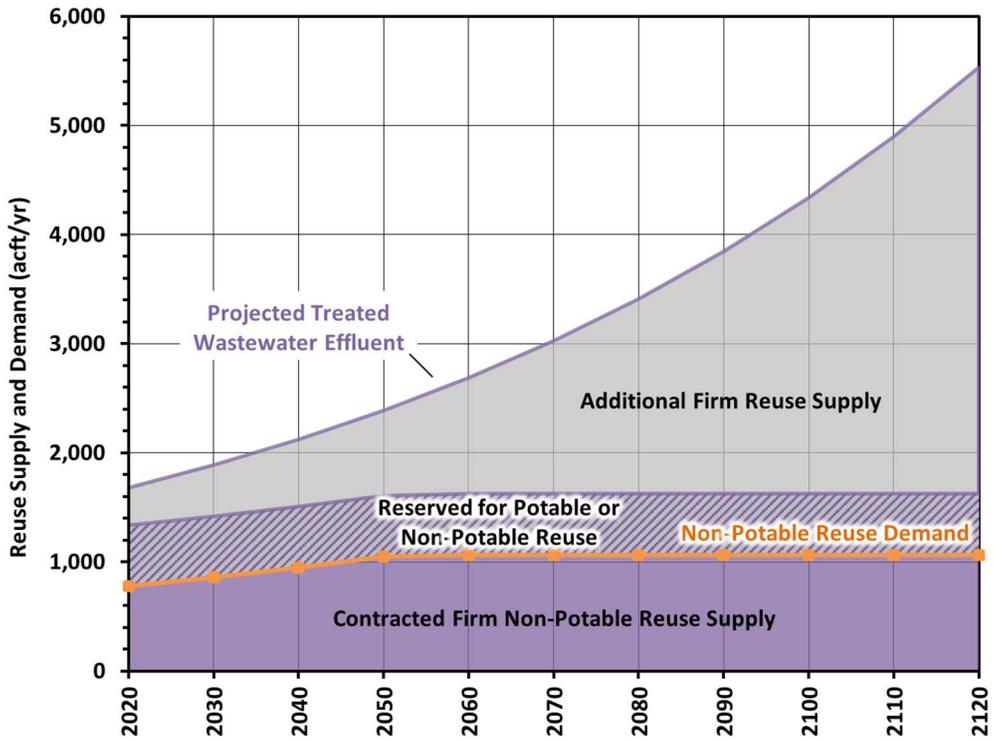


Figure 18. Projected Firm Non-Potable Reuse Supply

4. Water Supply Needs

Future water supply need is the difference between future demand and existing supply. When future demand is greater than the existing supply, the difference is commonly called a deficit, shortage, or need. When supply is greater than demand, the difference is commonly referred to as a buffer, surplus, or management supply. Water supply needs presented in this plan are based on a repeat of the historical drought of record and strict enforcement of the prior appropriation doctrine and permit restrictions. It is understood that during severe drought conditions the City has some flexibility to operate its diverse system to mitigate some of the impacts of a drought, such as reducing demand through water use restrictions to extend supplies for a longer period than presented in this worst case scenario. However, for planning purposes it is recommended that decisions regarding investment in the development of new supplies be made assuming conservative assumptions to mitigate risks associated with supply shortages.

Table 9 summarizes Kerrville's projected demands, firm supplies, and anticipated deficits for the next 100 years and Figure 19 and Figure 20 compare the firm supplies and projected demands for the 2020-2050 and 2020-2120 periods, respectively. As shown in Table 9, Kerrville's current firm supplies are less than the current and future demands, indicating that a deficit exists and will continue to increase as demands increase from projected population growth and economic development. Kerrville will need to develop new supplies in order to reduce these deficits and the associated risks of not meeting customer demands during future droughts.

Table 9. Summary of Demands, Firm Supplies and Needs for Kerrville

Year	Firm Supply (acft/yr)				Projected Demands (acft/yr)	Supply Buffer/Deficit (acft/yr)
	Groundwater	Surface Water and ASR	Non-Potable Reuse	Total		
2020	3,605	288	776	4,669	4,702	(33)
2030	3,605	288	857	4,750	5,280	(530)
2040	3,605	288	947	4,840	5,933	(1,093)
2050	3,605	288	1,046	4,939	6,669	(1,730)
2060	3,605	288	1,065	4,958	7,402	(2,444)
2070	3,605	288	1,065	4,958	8,209	(3,251)
2080	3,605	288	1,065	4,958	9,126	(4,168)
2090	3,605	288	1,065	4,958	10,168	(5,210)
2100	3,605	288	1,065	4,958	11,352	(6,394)
2110	3,605	288	1,065	4,958	12,700	(7,742)
2120	3,605	288	1,065	4,958	14,235	(9,277)

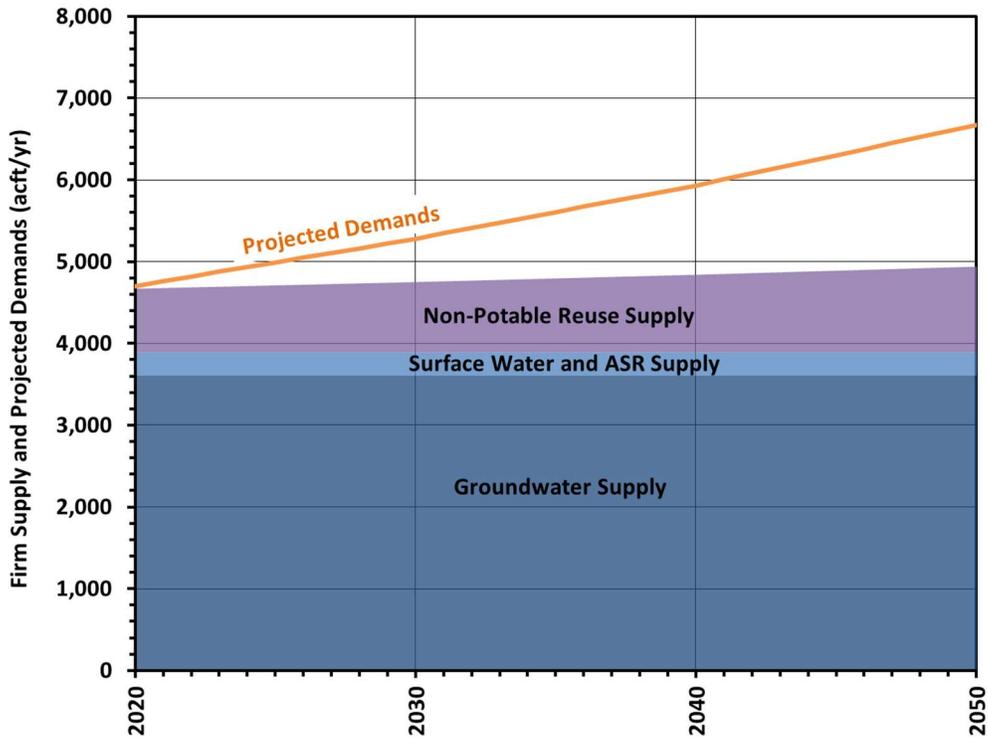


Figure 19. Comparison of Firm Supplies and Projected Demands for 2020-2050 Period

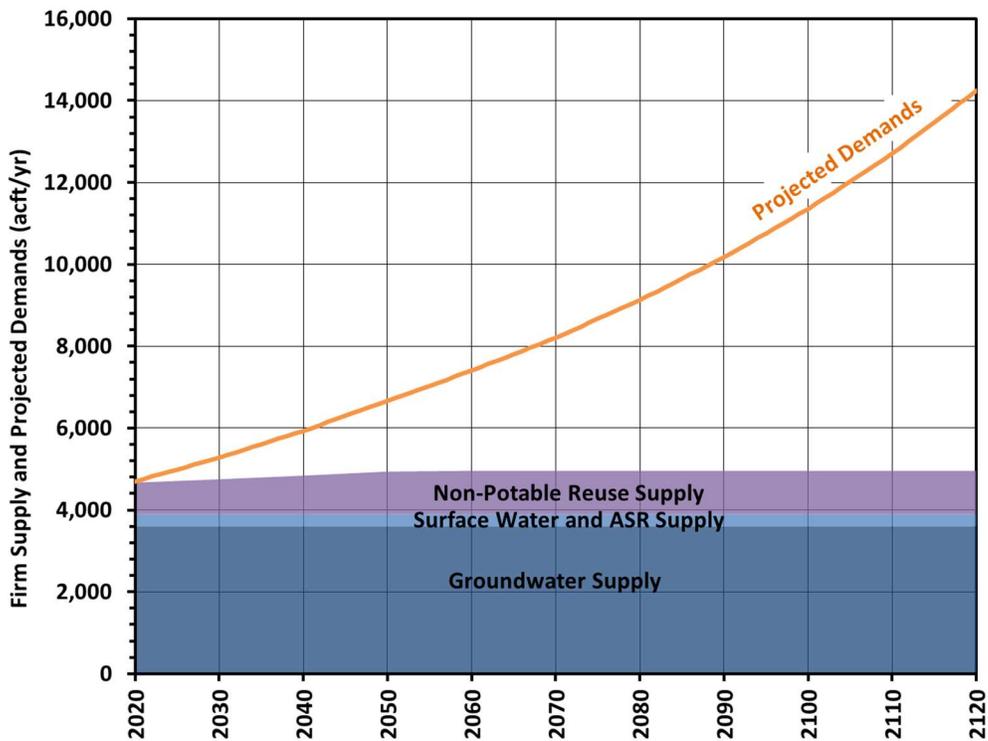


Figure 20. Comparison of Firm Supplies and Projected Demands for 2020-2120 Period

5. Water Supply Plan

Key goals of the LRWSP are identifying, evaluating, and selecting water supply strategies that could be implemented by Kerrville to meet future water supply needs. As shown in Table 9, Kerrville needs 1,730 acft/yr of additional supply by 2050 and 9,277 acft/yr by 2120 to overcome the projected supply deficits from population and economic growth. Twelve strategies were identified and evaluated to potentially meet these needs. These strategies are evaluated with respect to project cost, unit cost, supply quantity, permitting challenges, and implementation challenges. Summaries of the strategy evaluations are presented in Section 6. The goal of the process was to select strategies that provide the greatest benefits to Kerrville while minimizing costs and permitting and implementation obstacles.

The strategies selected as a result of this process are referred to as recommended strategies and are the strategies that Kerrville intends to implement to meet its needs. The alternative strategies are identified to replace the recommended strategies in the event one or more of the recommended strategies becomes infeasible.

5.1. Recommended Strategies

Recommended strategies are strategies that Kerrville will actively pursue and implement to meet the projected needs. The recommended water supply strategies are listed in Table 10 along with their reliable supply, total project cost, and unit cost in 2018 dollars. These strategies include additional conservation to reduce demands, amendments to water rights currently owned by Kerrville, acquisition of new water rights to improve the reliability of surface water supplies, and development of a local Ellenburger Aquifer well and remote Ellenburger Aquifer well field in northeastern Kerr County.

Table 10. Recommended Strategies

Recommended Strategies	Reliable Supply (acft/yr)	Total Project Cost (\$)	Unit Cost (\$/acft)
Additional Conservation	270	\$2,180,000	\$439
Local Ellenburger Well	807	\$928,000	\$130
Remote Ellenburger Well Field ^a	1,730	\$12,710,000	\$703
Water Right Acquisitions ^b	146	---	---
Water Right Amendments	269	\$400,000	\$41

^a Remote Ellenburger well field is sized to provide a supply of 1,730 acft/yr to meet the projected 2050 need.

^b Water right acquisitions costs would be determined on a case by case basis through negotiations between the City and water right holders.

The combined supply from these strategies is sufficient to meet Kerrville’s projected need of 1,730 acft/yr in 2050. Should projected growth rates continue to 2120, the need for additional water supplies would require Kerrville to expand the remote Ellenburger well field, develop the alternative strategies, and/or import water supplies from other sources outside of Kerr County.

5.2. Alternative Strategies

The LRWSP includes two alternative strategies. Alternative strategies are strategies that could be developed in the event one or more of the recommended strategies encounters an implementation obstacle that cannot be overcome. It is recommended that Kerrville continue to evaluate these strategies, along with the implementation of the recommended strategies, to be in a position to move an alternative strategy to a recommended strategy if the need arises.

The two alternative strategies are ASR expansion with additional treatment capacity and advanced treatment of treated wastewater effluent to create a potable reuse supply. If the local Ellenburger well does not produce an adequate yield, conversion of the production well to an ASR well and addition of surface water treatment capacity to supply the ASR well during high flow, low demand periods is recommended. If the City is unable to acquire groundwater leases and develop the remote Ellenburger well field, development of the potable reuse supply is recommended. Table 11 provides the projected supply in 2050, total project cost, and unit cost for the two alternative strategies.

Table 11. Alternative Strategies

Alternative Strategy	2050 Supply (acft/yr)	Total Project Cost (Million Dollars)	Unit Cost (\$/acft)
ASR Expansion with Additional Treatment Capacity	284	\$10,197,000	\$4,327
Potable Reuse	560	\$7,349,000	\$1,777

5.3. Implementation Timeline

Table 12 shows the recommended year of implementation for each strategy. Note that strategies are not selected to just meet the needs of Kerrville, thereby zeroing out the deficit. The goal is to provide a supply buffer as shown in the table to help ensure that supplies are sufficient if a project is delayed or a new drought of record occurs. If the local Ellenburger well does not produce the anticipated supply, implementation of the remote Ellenburger well field will need to be moved up to 2030 to avoid projected supply shortages. This information is presented graphically in Figure 21 and Figure 22.

Table 12. Implementation Schedule

Recommended Strategies	Implementation Year
Additional Conservation	Ongoing
Additional Kerr County Groundwater (Local Ellenburger Well)	2020
Water Right Amendments	2023
Water Right Acquisitions	2030
Additional Kerr County Groundwater (Remote Ellenburger Well Field)	2045 ^a

^a Implementation year for Remote Ellenburger well field would need to be moved up to 2030 if local Ellenburger well does not produce anticipated yield.

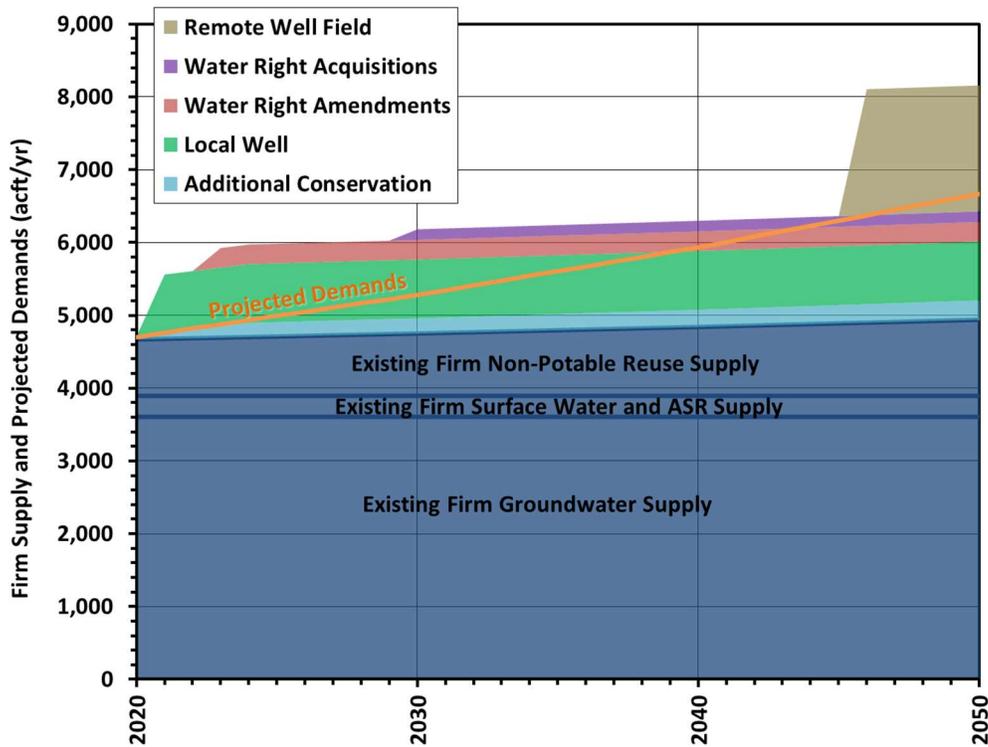


Figure 21. Recommended Strategy Timeline

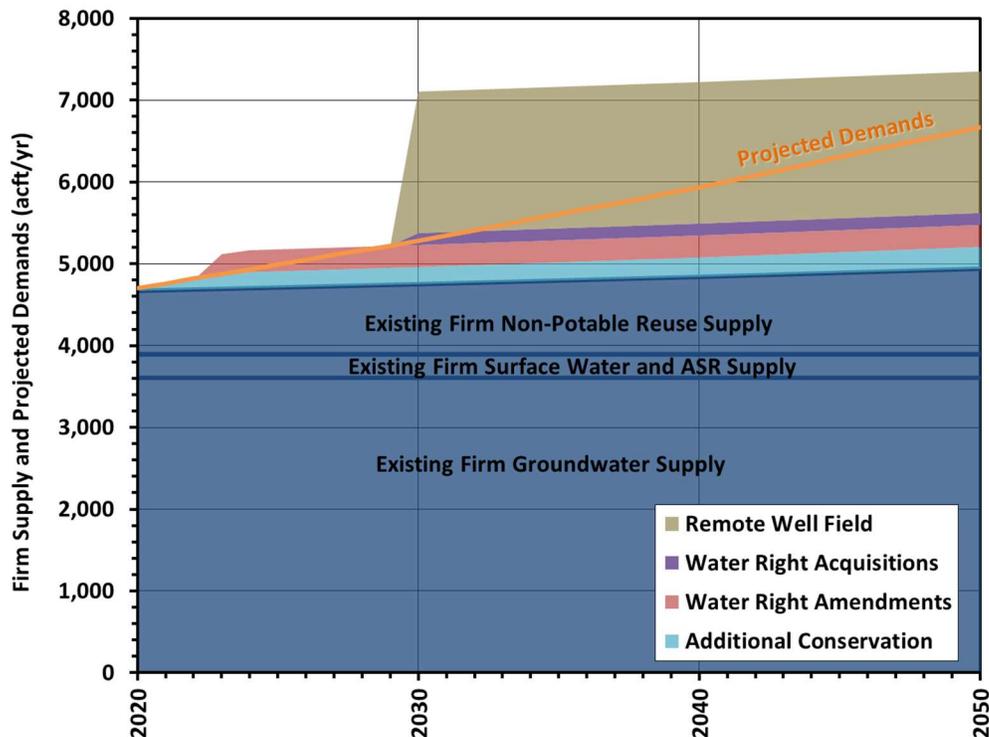


Figure 22. Recommended Timeline Assuming Local Ellenburger Well does not Produce Anticipated Yield

5.4. Next Steps

There are many potential obstacles that can be encountered along the path of project development and implementation. The regulatory and permitting environment today is the most challenging in history and project implementation requires steadfast dedication and solid planning to overcome these challenges. For the LRWSP, a list of implementation steps have been identified for each recommended strategy to help Kerrville move forward with securing these supplies.

Additional Conservation Implementation Steps

- Continue implementing water conservation strategies included in the 2014 Kerrville Water Conservation Plan.
- Update the water conservation plan in 2023 to identify, fund, and implement appropriate new strategies to enhance water savings and achieve new conservation goals.

Additional Kerr County Groundwater (Local Ellenburger well)

- Select final location for Ellenburger well site within Kerrville service area.
- Complete Ellenburger well and connect to potable water supply system.

Additional Kerr County Groundwater (Remote Ellenburger well field)

- Complete feasibility study to identify potential well field sites and refine Ellenburger well yield estimates.

Water Rights Acquisitions

- Contact potential water right holders to determine potential for acquisition of water rights.

Water Rights Amendments

- Conduct pre-application meetings with TCEQ to discuss water right amendments.
- Submit water right amendment applications to TCEQ.

6. Water Supply Strategies

Strategy Selection Process

Twelve water supply strategies were selected for evaluation based on input from local stakeholders including the Kerr County Commissioners Court, UGRA, HGCD, and City staff. The twelve strategies selected for evaluation in the LRWSP are listed in Table 13.

Table 13. Strategies Selected for Evaluation

Additional Conservation	Imported Groundwater (from outside Kerr County)
Additional Groundwater within Kerr County	GBRA Upstream Contract
Water Right Acquisitions	Brackish Groundwater
Water Right Amendments	Connection to Regional Wholesale Water Provider
ASR Expansion	Off-Channel Storage
Potable Reuse	Repurposing of Gravel Pits

Strategy Cost Estimates

The twelve water management strategies are evaluated on a consistent cost basis and subject to similar technical assumptions. Unless otherwise noted, capital and annual operations & maintenance cost estimates were prepared using the Unified Costing Model (UCM) developed by HDR Engineering, Inc. for the Texas Water Development Board (TWDB) to promote consistency in the 2021 regional water planning process. Current cost estimates are based on September 2018 price indices. Table 14 summarizes other specific assumptions adopted for parameters used in the UCM.

Table 14. General Unified Cost Model (UCM) Assumptions

Parameter	Assumed Value
Interest During Construction	3.00%
Rate of Return on Investments During Construction	0.50%
Engineering, Legal, & Contingencies (Pipelines)	30% of Capital Costs
Engineering, Legal, & Contingencies (All Other Facilities)	35% of Capital Costs
Debt Service Period	30 years
Annual Interest Rate	3.50%
Operations & Maintenance (Pipelines)	1.00% of Capital Costs
Operations & Maintenance (Pump Stations)	2.50% of Capital Costs
Power Costs	\$0.08/kilowatt-hour
Right of Way Land Acquisition Width	50 ft
Hazen Williams C factor	120

Table 15 summarizes the reliable supply and estimated costs for the selected strategies. Estimated costs are provided in terms of total project cost, annual cost, and unit cost. These cost terms are defined as follows.

- **Total Project Cost** - The costs for all project components including materials, labor, equipment, engineering, legal, land acquisition and surveying, permitting, contingencies, and interest during construction. In other words, the total cost to construct the project.
- **Annual Cost** – The cost to deliver supplies on an annual basis including debt service payments for construction costs, operation and maintenance, energy costs, and payments for leases or water contracts.
- **Unit Cost** - The cost per acre-foot to deliver supplies determined by dividing the total annual cost during the debt service period by the annual reliable supply volume.

Table 15. Summary of Cost Estimates for Selected Strategies

Strategy	Reliable Supply (acft/yr)	Total Project Cost	Annual Cost	Unit Cost (\$/acft/yr)
Additional Conservation	270	\$2,180,000	\$118,530	\$439
Additional Kerr County Groundwater (Local Ellenburger Well)	807	\$1,128,000	\$118,000	\$146
Additional Kerr County Groundwater (Remote Ellenburger Well Field) ^b	1,730	\$12,995,000	\$1,234,000	\$713
Water Right Acquisition ^a	146	---	---	---
Water Right Amendments	269	\$400,000	\$22,000	\$82
ASR Expansion	284	\$10,197,000	\$1,229,000	\$4,327
Potable Reuse	560	\$7,349,000	\$995,000	\$1,777
Imported Groundwater ^b	1,730	\$17,147,000	\$1,484,000	\$858
GBRA Upstream Contract	0	\$400,000	\$96,000	---
Brackish Groundwater ^b	1,730	\$26,839,000	\$3,429,000	\$1,982
Regional WWP Connection ^b	1,730	\$79,885,000	\$6,296,000	\$3,639
Off-Channel Storage	350	\$51,281,000	\$3,604,000	\$10,297
Repurposing of Gravel Pits	Fatal Flaw			

^a Costs for water right acquisitions would be determined on a case by case basis through negotiations between the City and water right holders.

^b Strategy infrastructure is sized to meet 2050 projected need of 1,730 acft/yr.

Strategy Evaluations

A fatal flaw analysis was performed to eliminate strategies that are not considered feasible, practicable, or capable of providing a reliable supply. Only one of the twelve strategies evaluated, the repurposing of gravel pits, was eliminated from consideration due to the inability of the strategy to provide a reliable supply.

The remaining eleven strategies were evaluated based on the criteria presented in Table 16. Supply is assumed to be the 100 percent reliable annual supply available to Kerrville in 2050. For surface water strategies, firm yield or rather the amount of water that can be supplied on an annual basis without shortage throughout a repeat of the worst drought on record is assumed to be the reliable supply in 2050. For groundwater and regional strategies, facilities are sized to meet the 2050 projected need of 1,730 acft/yr.

Table 16. Summary of Evaluation Criteria

Category	Description	Criteria
Reliable Supply	The reliable annual supply or firm yield available to Kerrville from the project.	Low: No Firm Yield Medium: Less than 1,000 acft/yr High: Greater than 1,000 acft/yr
Total Project Cost	The costs for all project components including construction, contingencies, and ancillary costs.	Low: \$0 - \$5 Million Medium: \$5 - \$25 Million High: Greater than \$25 Million
Unit Cost	The cost per acre-foot of supply determined by dividing the total annual cost during the debt service period by the annual supply volume.	Low: \$0 - \$1000/acft/yr Medium: \$1000 - \$2000/acft/yr High: Greater than \$2000/acft/yr
Permitting Effort	The level of effort required to obtain the necessary permits for the project including environmental permits, water rights, and/or water supply contracts from a wholesale water provider.	Ranking based on engineering judgment
Implementation Effort	The level of effort required for implementing the project including integration into the existing water system, political support, and public support.	Ranking based on engineering judgment

Table 17 summarizes the results for each of the five evaluation criteria for each of the twelve strategies selected for evaluation. Results in the table are highlighted green, yellow, or red to signify low, medium, or high level of cost, permitting effort, or implementation effort, respectively. Reliable supply values in Table 16 are highlighted green, yellow, or red to signify high, medium, or low quantity, respectively. The strategies are ranked based on a composite score. The table also summarizes the composite scores for the strategies. Composite scores are based on the following values: green (1), yellow (2), and red (3) with lower composite scores preferred over higher composite scores. The recommended strategies have the lowest composite scores ranging from 7 to 8 with the alternative and other strategies having composite scores ranging from 9 to 14.

Table 17. Summary of Water Supply Strategy Evaluations

Strategy	Reliable Supply (acft/yr)	Project Cost	Unit Cost (\$/acft/yr)	Permitting Effort	Implementation Effort	Composite Score
Recommended Strategies						
Additional Conservation	270	\$ 2,180,000	\$ 439	Low	Medium	7
Additional Kerr County Groundwater (Local Ellenburger Well)	807	\$ 1,128,000	\$ 146	Low	Medium	7
Additional Kerr County Groundwater (Remote Ellenburger Well Field) ^b	1,730	\$ 12,995,000	\$ 713	Medium	Medium	8
Water Right Acquisition ^a	146	---	---	Medium	Medium	8
Water Right Amendments	269	\$ 400,000	\$ 82	Medium	High	9
Alternative Strategies						
ASR Expansion	284	\$ 10,197,000	\$ 4,327	Low	Low	9
Potable Reuse	560	\$ 7,349,000	\$ 1,777	Medium	High	11
Other Evaluated Strategies						
Imported Groundwater ^b	1,730	\$ 17,147,000	\$ 858	High	High	10
GBRA Upstream Contract	0	\$ 400,000	---	High	Medium	12
Brackish Groundwater ^b	1,730	\$ 26,839,000	\$ 1,982	High	High	12
Regional WWP Connection ^b	1,730	\$ 79,885,000	3,639	High	High	13
Off-Channel Storage	350	\$ 51,281,000	\$ 10,297	High	High	14
Repurposing of Gravel Pits	Fatal Flaw					---
^a Costs for water right acquisitions would be determined on a case by case basis through negotiations between the City and water right holders.						
^b Strategy infrastructure is sized to meet 2050 projected need of 1,730 acft/yr.						



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Appendix A – Groundwater Permit

HGCD Conjunctive Use Production Permit

125 Lehmann Dr. Ste. 202

Kerrville, Texas, 78028

Phone: 830/896/4110

Permit No:	P0020	Date Issued:	Sep-18	Expiration Date:	Sep-23
Owner/System Name:		City of Kerrville			
Mailing Address:			701 Main Street, Kerrville, TX, 78028		
			Aquifer: Middle & Lower Trinity		
Situs Address:		Various sites (see file), Kerrville			
Usage:	PWS	TCEQ:	1330001 & 1330021	CCN:	12928
				Acreage:	14,685.00
Well Number(s)	GPS: Latitude		GPS: Longitude		Ref. Number(s)
02-536 (Golf Course)	30 deg. 03 min. 27.00 sec.		99 deg. 07 min. 14.00 sec.		42912
02-537 (Alpine Dr)	30 deg. 03 min. 59.90 sec.		99 deg. 06 min. 50.40 sec.		30351
02-538 (H Street)	30 deg. 02 min. 05.80 sec.		99 deg. 08 min. 10.90 sec.		N/A
02-539 (Harper Rd)	30 deg. 04 min. 25.80 sec.		99 deg. 09 min. 00.50 sec.		62488
02-540 (Hayes Park)	30 deg. 02 min. 39.20 sec.		99 deg. 08 min. 38.40 sec.		65921
02-541 (Meadowview)	30 deg. 01 min. 26.70 sec.		99 deg. 07 min. 30.50 sec.		31986
02-542 (Lois Street)	30 deg. 03 min. 58.80 sec.		99 deg. 10 min. 10.10 sec.		16276
02-543 (Travis Street)	30 deg. 02 min. 36.30 sec.		99 deg. 07 min. 28.90 sec.		38773
1992 (Methodist)	30 deg. 04 min. 28.60 sec.		99 deg. 09 min. 35.60 sec.		70457
1512 (Schreiner Park)	30 deg. 00 min. 05.30 sec.		99 deg. 07 min. 53.10 sec.		69159
ASR R-1	30 deg. 03 min. 07.10 sec.		99 deg. 09 min. 58.10 sec.		17636
ASR R-2	30 deg. 03 min. 16.90 sec.		99 deg. 08 min. 28.50 sec.		14696

Conditions (listed below):
 See attached Special Provisions document dated June 2018. Well & Acreage for Kerrville Schreiner Park (P0148) were combined with the Permit for City of Kerrville (P0020) in September 2018. The individual Permit for Kerrville Schreiner Park (P0148) & the Permit Renewal, dated June 2018, for City of Kerrville (P0020) are now suspended.

Total Production Allowed for this Permit: 1,174,800,000 gallons per year

Permit Acknowledgment:

1. This permit is granted in accordance with the provisions of the District Act, Water Code, and the rules and orders of the District, and acceptance of this permit constitutes an acknowledgment and agreement that the permittee will comply with the Texas Water Code, the District Act, the District rules, orders of the Board, and all the terms, provisions, conditions, requirements and restrictions embodied in this permit.
2. This permit confers no vested rights in the holder, and it may be revoked or suspended, or its terms may be modified or amended pursuant to provisions of the District Act.
3. The operation of the well for the authorized withdrawal must be conducted in a non-wasteful manner. In the event that groundwater is to be transported a distance greater than one-half (1/2) mile from the well, it must be transported by a pipeline to prevent waste caused by evaporation and percolation.
4. The permittee must keep records of the amount of groundwater produced and the purpose of the production and such records shall be available for inspection by District representatives. Immediate written notice must be given to the District in the event production exceeds the quantity authorized by this permit, or the well is either polluted or causing pollution of the aquifer.
5. The site must be accessible to the District representative for inspection, and the permittee agrees to cooperate fully in any reasonable inspection of the well and well site by District representatives.
6. The application pursuant to which this permit has been issued is incorporated in this permit, and this permit is granted on the basis of and contingent upon the accuracy of the information supplied in that application and in any amendments to the application. A finding that false information has been supplied is grounds for immediate revocation of the permit. In the event of conflict between the provisions of this permit and contents of the application, the provisions of this permit shall control.
7. A violation of this permit's terms, conditions, requirements, or special provisions, is punishable by civil penalties as provided by the District Rules.
8. Wherever special provisions are inconsistent with other provisions or District rules, the special provisions prevail.
9. Permittee understands that this permit is granted for a period up to five (5) years and is subject to renewal at the end of the time specified on the permit. Application for renewal will be subject to Pumping Limits applicable at that time.
10. Permittee understands this Permit is valid until modification of any information submitted for this Application and Permit, or expiration of this Permit.

SWORN AND SUBSCRIBED Before me this

STUART BARRON
 Owner/Agent Print Name

Stuart Barron
 Owner/Agent Signature

6th day of September, 2018

Gene Williams
 Notary Public



COPY

HEADWATERS GROUNDWATER CONSERVATION DISTRICT
125 LEHMANN DR STE 202, KERRVILLE, TEXAS 78028

AFFIDAVIT FOR PERMIT ACREAGE
Permitted Well

PERMIT NO. P0020

THE COUNTY OF KERR §
STATE OF TEXAS §

Before me, the undersigned authority, on this day personally appeared

Stuart Barron, Director Public Work for:

P0020-City of Kerrville

KCAD Property ID No. Boundaries of Kerrville City Limits + additional connected service areas + Kerrville Schreiner Park, per the City of Kerrville Director of Public Works as of August 28, 2018

Total Acreage: 14,685

The undersigned after being by me duly sworn, upon oath states the total acreage estimate of the property described above is accurate to the best of their knowledge and available information. The undersigned further agrees to submit all updated corrections to the submitted acreage information as it becomes available.

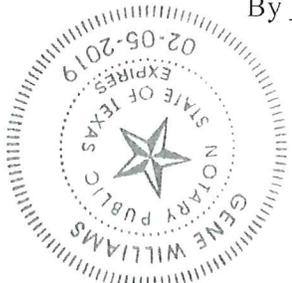
The undersigned further states their understanding that acreage is considered when assigning the total production allowed for this permit. Changes in acreage must be reported to the District and may affect the total production allowed.

Stuart Barron
Printed name of Owner/Designated Agent

[Signature]
Signature of Owner/Designated Agent

Sworn to and subscribed before me on this 6th day of September, 2018

By [Signature]
Signature of Notary





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Appendix B – Surface Water Certificates of Adjudication and Permits

7-19-81

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 18-1996

OWNER: City of Kerrville
600 Main Street
Kerrville, TX 78028

COUNTY: Kerr

PRIORITY DATE: April 4, 1914

WATERCOURSE: Guadalupe River

BASIN: Guadalupe River

WHEREAS, by final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, a right was recognized under Certified Filing 62A authorizing City of Kerrville to appropriate waters of the State of Texas as set forth below;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Guadalupe River Basin is issued to City of Kerrville, subject to the following terms and conditions:

1. INPOUNDMENT

Owner is authorized to maintain a dam and reservoir on the Guadalupe River and impound therein not to exceed 75 acre-feet of water. Point on the dam at the center of the stream is S 53°50'E, 350 feet from the east corner of the James H. Coker Survey 144, Abstract 95, Kerr County, Texas.

2. USE

A. Owner is authorized to divert and use not to exceed 75 acre-feet of water per annum from the Guadalupe River to irrigate a maximum of 44 acres of land out of a tract located in the James H. Coker Survey 144, Abstract 95, and the T. L. Waddel Survey 145, Abstract 354, Kerr County, Texas, said tract being described as follows:

(1) BEGINNING at a point in the Northwest line of the Southeast one-half of Survey No. 144, said point being also in the Northeast right-of-way line of State Highway Spur 98;

(2) THENCE N 45°E, 612 feet to a point on the Guadalupe River;

(3) THENCE down the said river with the meanders as follows:

S 62°10'E, 125.1 feet; S 69°58'E, 416.8 feet; S 47°45'E, 262.2 feet; S 42°12'E, 622.3 feet; S 38°18'E, 261.3 feet; S 24°18'E, 56.4 feet; S 45°27'E, 109.0 feet; S 49°24'E, 161.1 feet; S 38°52'E, 171.4 feet; S 35°09'E, 270.2 feet; S 34°46'E, 609.8 feet;

(4) THENCE S 44°24'W, 614.0 feet;

(5) THENCE N 24°50'W, 185.7 feet;

(6) THENCE N 39°03'W, 428.0 feet;

(7) THENCE S 44°24'W, 140.4 feet;

(8) THENCE N 36°08'W, 1191.1 feet to a point in the Southeast right-of-way line of Texas Highway 16;

(9) THENCE N 45°27'E, 25.0 feet;

(10) THENCE N 47°10'W, 186.7 feet;

(11) THENCE N 40°34'W, 112.8 feet;

(12) THENCE Northwest with the Northeast right-of-way line of State Highway Spur 98, to the place of beginning, containing 45.55 acres of land, more or less.

FILMED

MAR 15 1982

SYSTEM 200

B. Owner is authorized to divert and use not to exceed 150 acre-feet of water per annum from the Guadalupe River for municipal purposes.

3. DIVERSION

A. Location:

(1) At a point on the west bank of the reservoir which is N 49°06'W, 900 feet from the east corner of the James H. Cocke Survey 144, Abstract 95, Kerr County, Texas.

(2) At a point on the east bank of the reservoir which is N 29°15'W, 930 feet from the aforesaid reservoir.

(3) At a point on the west bank of the reservoir at the aforesaid survey corner.

B. Maximum Combined Rate: 2.2 cfs (1000 gpm).

4. PRIORITY

The time priority of owner's right is April 4, 1914.

5. SPECIAL CONDITION

Owner shall maintain a suitable outlet in the dam authorized herein to allow the free passage of water that owner is not entitled to divert or impound.

The locations of pertinent features related to this certificate are shown on Page 4 of the Guadalupe River Certificates of Adjudication Maps, copies of which are located in the offices of the Texas Department of Water Resources and the office of the County Clerk.

This certificate of adjudication is issued subject to all terms, conditions and provisions in the final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, and supersedes all rights of the owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Guadalupe River Basin.

This certificate of adjudication is issued subject to the Rules of the Texas Department of Water Resources and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

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Certificate of Adjudication 18-1996, Page 3 of 3 pages

This water right is appurtenant to the above-described land within which irrigation is authorized, unless and until severed from the land. A transfer of any portion of the above-described land includes, unless otherwise specified, that portion of the water right which is appurtenant to the transferred land at the time of the transaction.

TEXAS WATER COMMISSION

/s/ Felix McDonald

Felix McDonald, Chairman

DATE ISSUED:

JUL 17 1981

ATTEST:

/s/ Mary Ann Hefner

Mary Ann Hefner, Chief Clerk

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MAR 15 1982
SYSTEM 200

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 18-1996A TYPE: AMENDMENT
Name: City of Kerrville Address: 600 MAIN
KERRVILLE TX 78028
Filed: February 8, 1991 Granted: February 27, 1991
Purpose: Municipal County: Kerr
Watercourse: Guadalupe River Watershed: Guadalupe River Basin

WHEREAS, Certificate No. 18-1996 was issued to City of Kerrville on July 17, 1981 and authorizes the owner to maintain a dam and reservoir on the Guadalupe River and impound therein not to exceed 75 acre-feet of water. Certificate owner is also authorized to divert and use not to exceed 75 acre-feet of water per annum for irrigation purposes and use not to exceed 150 acre-feet of water per annum from the reservoir for municipal purposes; and

WHEREAS, applicant has requested an amendment to Certificate No. 18-1996 by adding an upstream diversion point with no change in the authorized diversion rate and this diversion point being the same diversion point owned by the Upper Guadalupe River Authority (UGRA) and authorized by Permit No. 3505 (A-3769); and

WHEREAS, by resolution the Board of Directors of the Upper Guadalupe River Authority agrees to divert up to 150 acre-feet of water per annum for municipal purposes for the City of Kerrville; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate No. 18-1996 is issued to City of Kerrville, subject to the following terms and conditions:

3. DIVERSION

A. Location:

Certificate owner is authorized to use Diversion Point No. 4, owned by Upper Guadalupe River Authority and authorized by Permit No. 3505, on the left, or west, bank of a reservoir on the Guadalupe River S 27° E, 2450 feet from the southwest corner of the Walter Fosgate Survey No. 120, Abstract No. 138, Kerr County, Texas.

4. SPECIAL CONDITIONS

- a. Certificate owner is authorized the use of Diversion Point No. 4 only when the water level in the reservoir authorized by Permit No. 3505 is above elevation 1608 feet mean sea level.
- b. The diversion of the 150 acre-feet of water for municipal purposes at Diversion Point No. 4 is subject to the Upper Guadalupe River Authority resolution to divert the 150 acre-feet of water per annum for the City of Kerrville. If the aforementioned resolution is terminated, this amendment shall become null and void.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 18-1996, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

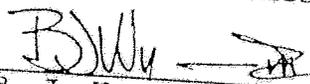
Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

Certificate owner shall use those practices, techniques and technologies that will reduce the loss or waste of water and improve the efficiency and use of water so that only so much water as can be beneficially used will be diverted.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

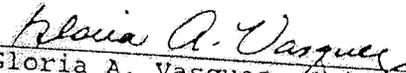
TEXAS WATER COMMISSION



B. J. Wynne, III, Chairman

DATE ISSUED: MAR 19 1991

ATTEST:


Gloria A. Vasquez, Chief Clerk

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



ADG/18-1996B/CO

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

RECEIVED

DEC 19 2006

TCEQ
CENTRAL FILE ROOM

CERTIFICATE NO. 18-1996B	TYPE:	11.122
Name: City of Kerrville	Address:	800 Junction Hwy Kerrville, Texas 78028-5069
Filed: April 3, 1998	Granted:	APR 10 1998
Purpose: Municipal	County:	Kerr
Watercourse: Guadalupe River	Watershed:	Guadalupe River Basin

WHEREAS, Certificate No. 18-1996 was issued to City of Kerrville on July 17, 1981 and authorizes the owner to maintain a dam and reservoir on the Guadalupe River and impound therein not to exceed 75 acre-feet of water. Certificate owner is also authorized to divert and use not to exceed 75 acre-feet of water per annum for irrigation purposes and use not to exceed 150 acre-feet of water per annum from the reservoir for municipal purposes; and

WHEREAS, applicant obtained an amendment to Certificate No. 18-1996 by adding an upstream diversion point with no change in the authorized diversion rate and this diversion point being the same diversion point owned by the Upper Guadalupe River Authority (UGRA) and authorized by Permit No. 3505 (A-3769); and

WHEREAS, pursuant to that certain "Termination, Asset Transfer & Acquisition, & Settlement Agreement" (the "Agreement") by and between the applicant and UGRA, dated November 20, 1997, upon "Closing" of said Agreement UGRA conveys ownership of the diversion works authorized in Permit No. 3505 and Permit No. 3505 to applicant; and

WHEREAS, upon Closing of the Agreement the Special Condition in paragraph 4.b. of amendment A to this Certificate becomes surplusage; and

WHEREAS, the Texas Natural Resource Conservation Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Natural Resource Conservation Commission in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate No. 18-1996 is issued to City of Kerrville, subject to the following terms and conditions:

3. DIVERSION

A. Location

Certificate owner is authorized to use Diversion Point No. 4, authorized by Permit No. 3505, on the left, or west, bank of a reservoir on the Guadalupe River S 27° E, 2450 feet from the southwest corner of the Walter Fosgate Survey No. 120, Abstract No. 138, Kerr County, Texas.

4. SPECIAL CONDITIONS

- A. Certificate owner is authorized the use of Diversion Point No. 4 only when the water level in the reservoir authorized by Permit No. 3505 is above elevation 1608 feet mean sea level.

5. WATER CONSERVATION

Within one (1) year from issuance of this permit amendment, owner shall submit to the Executive Director of the Texas Natural Resource Conservation Commission a water conservation plan as described in Texas Administrative Code Section 288.2, which shall provide for the utilizing of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future use or alternative uses. Such plan shall include a requirement in every wholesale water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, that each successive wholesale customer develop and implement water conservation measures. If the customers intend to resell the water, then the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 18-1996, as amended, except as specifically amended herein.

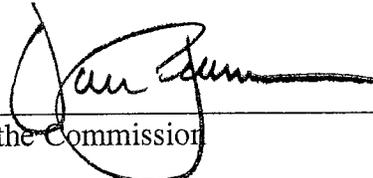
This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission.

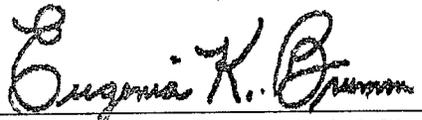
TEXAS NATURAL RESOURCE CONSERVATION
COMMISSION



For the Commission

DATE ISSUED: APR 10 1998

ATTEST:



Dr. Eugenia K. Brumm, Chief Clerk

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AMENDMENT TO A
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 18-1996C

TYPE: 11.122

Owner:	City of Kerrville	Address:	800 Junction Highway Kerrville, Texas, 78028
Filed:	July 14, 2010	Granted:	SEP 11 2010
Purpose:	Agricultural & Municipal	County:	Kerr
Watercourse:	Guadalupe River	Watershed:	Guadalupe River Basin

WHEREAS, The City of Kerrville (City, Applicant, or Owner) owns Certificate of Adjudication No. 18-1996 which authorizes the City to maintain a dam and reservoir on the Guadalupe River, Guadalupe River Basin, and impound therein not to exceed 75 acre-feet of water; and

WHEREAS, The City is also authorized to divert and use 75 acre-feet of water per year from three diversion points on the reservoir for agricultural purposes to irrigate 44 acres of land in Kerr County. The City is further authorized to divert and use an additional 150 acre-feet of water from an upstream diversion point on the Guadalupe River for municipal purposes. The City is authorized a combined maximum diversion rate of 2.2 cfs (1,000 gpm) from all four diversion points; and

WHEREAS, Applicant seeks to amend Certificate of Adjudication No. 18-1996 to add municipal use to the 75-acre-foot portion of water, enabling the applicant to divert and use the 75-acre-foot portion of water for multiple purposes (agricultural and municipal); and

WHEREAS, Applicant also seeks to change the place of use for their entire 225 acre-feet of water to the City of Kerrville's authorized service area ; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, this amendment, if granted, is subject to requirements and orders of the South Texas Watermaster; and

WHEREAS, no requests for a contested case hearing were received for this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this water use amendment;

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 18-1996, designated Certificate of Adjudication No. 18-1996C, is issued to the City of Kerrville, subject to the following terms and conditions:

1. USE

In lieu of the previous authorizations, Owner is now authorized to divert not to exceed 75 acre-feet of water per for municipal and agricultural purposes and is also authorized to divert 150 acre-feet of water per year for municipal purposes for a total combined amount of 225 acre-feet of water per year for use within the City of Kerrville's authorized service area.

2. CONSERVATION

Owner shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss of waste or maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future use or alternative uses. Such plans shall include a requirement that in every wholesale water contract entered into, on or after the effective date of this amendment, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures. If the customer intends to resell the water, then the contract for resale of the water must have water conservation requirements so that each successive wholesale customer in the resale of the water be required to implement water conservation measures.

3. SPECIAL CONDITIONS

- A. Owner shall contact the South Texas Watermaster prior to diversion of water authorized by this amendment.
- B. Within 90 days prior to the diversion of water for agricultural purposes, the applicant or contract customer must submit to the TCEQ a water conservation plan to comply with the Title 30 Texas Administrative Code Chapter 288.4.

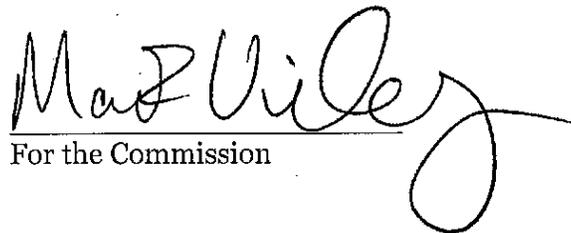
This amendment is issued subject to all terms, conditions, and provisions contained in Certificate No. 18-1996, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State resources exercised by the Commission.


For the Commission

Date Issued: **SEP 11 2010**

7-17-81

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 18-2026

OWNER: William A. Moore
Box 319
Dilley, TX 78017

COUNTY: Kerr

PRIORITY DATE: 1961

WATERCOURSE: Guadalupe River

BASIN: Guadalupe River

WHEREAS, by final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, a right was recognized under Claim 1294 authorizing William A. Moore to appropriate waters of the State of Texas as set forth below;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Guadalupe River Basin is issued to William A. Moore, subject to the following terms and conditions:

1. USE

Owner is authorized to divert and use not to exceed 125 acre-feet of water per annum from the Guadalupe River to irrigate a maximum of 80 acres of land out of a tract located in the Robert Brown Survey 36, Abstract 28, Kerr County, Texas, said tract being described as follows:

- (1) BEGINNING at a point for the Southeast corner of Survey 36, on the bank of the Guadalupe River;
- (2) THENCE North at 754 varas a point in South line of the right-of-way Highway 27 at 2172 varas the Northeast corner Survey 36;
- (3) THENCE West, 529 varas;
- (4) THENCE South, 500 varas;
- (5) THENCE West, 405-1/2 varas;
- (6) THENCE South, 936 varas to the North bank of the Guadalupe River;
- (7) THENCE down said river with its meanders as follows:

N 84°E, 357 varas; S 21-1/2°E, 240 varas; S 40°E, 135 varas; South, 258 varas; S 59°E, 240 varas; S 71°E, 200 varas to the place of beginning, containing 234.44 acres of land, more or less.

2. DIVERSION

A. Location:

(1) At a point on the north bank of the Guadalupe River which is S 06°E, 17690 feet from the northwest corner of the Robert Brown Survey 36, Abstract 28, Kerr County, Texas.

(2) At a point on the north bank of the Guadalupe River which is S 08°E, 17960 feet from the northwest corner of the aforesaid survey.

B. Maximum Rate: 1.2 cfs (525 gpm).

3. PRIORITY

The time priority of owner's right is 1961.

The locations of pertinent features related to this certificate are shown on Page 5 of the Guadalupe River Certificates of Adjudication Maps, copies of which are located in the offices of the Texas Department of Water Resources and the office of the County Clerk.

MAR 23 1982

SYSTEM 200

FEB 5 1982

This certificate of adjudication is issued subject to all terms, conditions and provisions in the final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, and supersedes all rights of the owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Guadalupe River Basin.

This certificate of adjudication is issued subject to the Rules of the Texas Department of Water Resources and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

This water right is appurtenant to the above-described land within which irrigation is authorized, unless and until severed from the land. A transfer of any portion of the above-described land includes, unless otherwise specified, that portion of the water right which is appurtenant to the transferred land at the time of the transaction.

TEXAS WATER COMMISSION

/s/ Felix McDonald

Felix McDonald, Chairman

DATE ISSUED:

JUL 17 1981

ATTEST:

/s/ Mary Ann Hefner

Mary Ann Hefner, Chief Clerk

FILMED
MAR 23 1982
SYSTEM 200

*Attach
2-17-81*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 18-2026A

TYPE: AMENDMENT

Name: Kenneth W. Whitewood
and E. Marjane Whitewood

Address: 204 Cully Drive
Kerrville, Texas 78028

Filed: August 1, 1996

Granted: NOV 22 1996

Purpose: Irrigation

County: Kerr

Watercourse: Guadalupe River

Watershed: Guadalupe River Basin

WHEREAS, Certificate of Adjudication No. 18-2026 was issued to William A. Moore on July 17, 1981 and authorized the owner the right to divert and use, not to exceed 125 acre-feet of water per annum from two points on the Guadalupe River at a maximum rate of 1.2 cubic feet per second (525 gallons per minute) to irrigate a maximum of 80 acres of land out of a 234.44 acre-tract located in the Robert Brown Survey 36, Abstract 28, Kerr County, Texas; and

WHEREAS, Commission records indicate that Kenneth W. and E. Marjane Whitewood own a portion of the water right which allows them to divert and use not to exceed 49.916 acre-feet of water per annum from the river to irrigate 31.952 acres out of 53.56 acres of land authorized under Certificate No. 18-2026; and

WHEREAS, the certificate includes a time priority of 1961; and

WHEREAS, the applicants have requested an amendment to Certificate No. 18-2026 to add an additional 100 acre-feet of water per annum and to increase the amount of land to be irrigated per annum to 44.72 acres out of their 53.56 acre-tract of land; and

WHEREAS, the applicants are also requesting authorization to divert at a maximum rate of 0.7 cfs (300 gallons per minute) from the river; and

WHEREAS, Commission records indicate that the three other owners of this certificate have provided letters of consent to this application; and

WHEREAS, Kenneth W. and E. Marjane Whitewood entered into a Subordination Agreement with the Guadalupe-Blanco River Authority for the use of 100 acre-feet of water per annum from the Guadalupe River; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Natural Resource Conservation Commission in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 18-2026 is issued to Kenneth W. and E. Marjane Whitewood as follows:

1. DIVERSION & USE

- a. In lieu of previous authorizations, owners are authorized to divert and use not to exceed 149.916 acre-feet of water per annum to irrigate a maximum of 44.72 acres out of their 53.56 acre-tract of land at a maximum rate of 0.7 cfs (300 gallons per minute) from the Guadalupe River.
- b. The maximum combined diversion rate for all of the owners of the certificate is 1.2 cfs (525 gallons per minute).

2. PRIORITY

The time priority of the diversion of the additional 100 acre-feet of water per annum is August 1, 1996.

3. SPECIAL CONDITIONS

- a. In order to protect instream water use in the Guadalupe River during the months of March through June, owners are authorized to divert the additional water authorized by this amendment only when the flow of the river equals or exceeds 57 cfs at U.S.G.S. Gaging Station No. 08167000 at Comfort, Texas.
- b. In order to protect instream water use in the Guadalupe River during the months of July through February of the following year, owners are authorized to divert the additional water authorized by this amendment only when the flow of the river equals or exceed 44 cfs at the aforesaid U.S.G.S. gage.
- c. In addition to the flow restrictions contained in Paragraph b. SPECIAL CONDITIONS, in order to protect recreational use in the Guadalupe River during the months of July through February of the following year, when the flow of the river at the aforesaid gage is 50 cfs or greater, owners must restrict diversions of the water authorized by this amendment to allow a flow of at least 50 cfs at the gage.

- d. This additional 100 acre-feet of water authorized by this amendment is subject to the maintenance of the March 1, 1996 "Subordination Agreement", or extensions thereof, between certificate owners and the Guadalupe-Blanco River Authority.

4. CONSERVATION

Owners shall implement a water conservation plan that provides for the utilization of those practices, techniques and technologies that reduce the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.

This amendment is issued subject to all superior and senior rights in the Guadalupe River Basin.

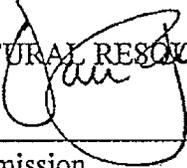
Owners agree to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

Prior to diversion of water authorized herein, owners shall contact the South Texas Watermaster at 1-800-733-2733.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



For the Commission

DATE ISSUED: NOV 22 1996

ATTEST:


Mamie M. Black, Acting Chief Clerk

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
THE STATE OF TEXAS
COUNTY OF TRAVIS



I hereby certify that this is a true and correct copy of a Texas Commission on Environmental Quality document, which is filed in the permanent records of the Commission. Given under my hand and the seal of office on

AMENDMENT TO A Bridget C. Bohac JUN 16 2014
CERTIFICATE OF ADJUDICATION
Bridget C. Bohac, Chief Clerk
Texas Commission on Environmental Quality

CERTIFICATE NO. 18-2026B

TYPE §§11.122, 11.154

Owner: City of Kerrville Address: 701 Main Street
Kerrville, Texas 78028

Filed: February 14, 2013 Granted: June 11, 2014

Purpose: Agricultural, Municipal, County: Kerr
Industrial

Watercourse: Guadalupe River Watershed: Guadalupe River Basin

WHEREAS, Certificate of Adjudication No. 18-2026 (Certificate) originally authorized the owner to divert and use not to exceed 125 acre-feet of water per year from a point on the Guadalupe River, Guadalupe River Basin, at a maximum diversion rate of 1.2 cfs (525 gpm) for agricultural purposes to irrigate a maximum of 80 acres of land in Kerr County; and

WHEREAS, The City of Kerrville (City) acquired a portion of the Certificate which authorizes the diversion and use of not to exceed 53.945 acre-feet of water per year from two points on the north bank of the Guadalupe River, Guadalupe River Basin, Kerr County, at a maximum combined diversion rate of 1.2 cfs (525 gpm), for agricultural purposes. The City acquired the water but not the land to which it was appurtenant. The priority date for the City's portion of the Certificate is 1961; and

WHEREAS, The City seeks to amend its portion of the Certificate to add municipal and industrial use; add a place of use for the agricultural, municipal, and industrial use being the City of Kerrville's service area within the Guadalupe River Basin; add a diversion point; and authorize the use of this water in its aquifer storage and recovery (ASR) system, authorized by Water Use Permit No. 5394, for storage and subsequent retrieval for multiple purposes; and

WHEREAS, the proposed diversion point is located on the Guadalupe River, bearing S 22° E, 2,335 feet from the southwest corner of the Walter Fosgate Original Survey No. 120, Abstract No. 138, also being Latitude 30.052971° N, Longitude 99.166252° W, in Kerr County; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, this amendment, if granted, is subject to requirements and orders of the South Texas Watermaster; and

WHEREAS, the Executive Director recommends special conditions be included; and

WHEREAS, two requests for a contested case hearing were received for this application and subsequently withdrawn; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 18-2026 designated Certificate of Adjudication No. 18-2026B, is issued to the City of Kerrville, subject to the following conditions:

1. USE

- A. In lieu of the previous authorizations, Owner is now authorized to divert and use the 53.945 acre-feet of water per year for agricultural, municipal, and industrial purposes in its service area within the Guadalupe River Basin.
- B. Owner is also authorized to use the 53.945 acre-feet of water per year in its aquifer storage and recovery system, authorized by Water Use Permit No. 5394, for subsequent diversion for agricultural, municipal, and industrial purposes.

2. DIVERSION

- A. In addition to previous authorizations, Owner is also authorized to divert from a point located on the Guadalupe River, bearing S 22° E, 2,335 feet from the southwest corner of the Walter Fosgate Original Survey No. 120, Abstract No. 138, also being Latitude 30.052971° N, Longitude 99.166252° W, in Kerr County.
- B. Combined maximum diversion rate of 1.2 cfs (525 gpm).

3. PRIORITY DATE

The time priority of this right is 1961.

4. CONSERVATION

Owner shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water so that a water supply is made available for future or alternative uses. Such plans shall include a requirement that in every water supply contract entered into, on or after the effective date of this amendment, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures. If the customer intends to resell the water, then the contract for resale of the water shall have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

5. SPECIAL CONDITIONS

Diversion of water under this amendment shall be authorized subject to the following:

- A. Diversion of water under this Certificate shall be authorized when streamflows exceed the following values at USGS Gage No. 8166250 - Guadalupe River near Center Point, TX, subject to the requirements of special conditions B-D below:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Season	Winter			Spring			Summer			Fall		
Subsistence Flow (cfs)	20	20	20	12	12	12	1	1	1	16	16	16
Base Flow (cfs)	73	73	73	66	66	66	49	49	49	73	73	73

- B. Owner shall not divert water authorized by this amendment if streamflow at USGS Gage No. 8166250 is below the applicable subsistence flow.
- C. If streamflow at USGS Gage No. 8166250 is greater than the applicable subsistence flow but less than the applicable base flow, Owner shall allow the applicable subsistence flow, plus 50% of the difference between measured streamflow at the gage and the applicable subsistence flow, to pass the gage and any remaining flow may be diverted and used by the Owner as provided herein.

- D. If streamflow at USGS Gage No. 8166250 is greater than the applicable base flow, Owner may divert water authorized under this Certificate unless streamflows fall below the applicable base flow standards, in which case special conditions B and C apply to the diversions.
- E. Owner shall allow representatives of the TCEQ reasonable access to the property to inspect the measuring device and records.
- F. Owner shall install and maintain a measuring device which accounts for, within 5% accuracy, the quantity of water diverted from the point authorized above in Paragraph 2.A. DIVERSION and maintain measurement records.
- G. Owner shall contact the South Texas Watermaster prior to diversion of water authorized by this amendment.

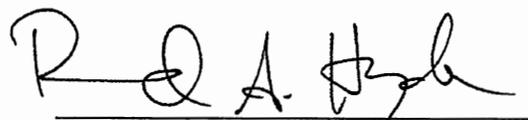
This amendment is issued subject to all terms, conditions and provisions contained in Certificate of Adjudication No. 18-2026, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.



For the Commission

Date issued: **June 11, 2014**

Samuel Wallace Survey No. 112, Abstract No. 360;
Samuel Wallace Survey No. 111, Abstract No. 359;
T. N. Minter Survey No. 110, Abstract No. 248;
William Watt Survey No. 68, Abstract No. 366;
J. W. Porter Survey No. 701, Abstract No. 450;
HE&WT RR Co. Survey No. 1425, Abstract No. 687; and
J. A. Rotge Survey No. 1426, Abstract No. 1450.

3. DIVERSION

- (a) Point of Diversion: At a point on the west bank of the reservoir, S 27° E, 2450 feet from the SW corner of the aforesaid Fosgate Survey.
- (b) Maximum Diversion Rate: 9.7 cfs (4375 gpm).

4. TIME LIMITATIONS

Construction or installation of all works herein authorized or required shall be in accordance with plans approved by the Commission and shall be commenced within two years and completed within three years from date of issuance of this permit.

5. SPECIAL CONDITIONS

- (a) Failure to commence and complete any construction authorized or required by this permit within the period stated in Time Limitations shall cause this permit to expire and become of no further force and effect.
- (b) Permittee is authorized to make diversions hereunder only when the water level in the reservoir is above elevation 1608 feet msl.

This permit is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Permittee agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this permit.

All other matters requested in the application which are not specifically granted by this permit are denied.

This permit is issued subject to the Rules of the Texas Department of Water Resources and to the right of continual supervision of State water resources exercised by the Department.

TEXAS WATER COMMISSION

Date Issued:

October 14, 1977

Filed 26 Day of Oct. A.D., 1977
EMMAE M. MUENKER 4:55 PM
Clerk County Court, Kerr County, Texas
By Absent Deputy
Attest:

Mary Ann Hefner
Mary Ann Hefner, Chief Clerk

Joe D. Carter
Joe D. Carter, Chairman

Joe R. Carroll
Joe R. Carroll, Commissioner

Dorsey B. Hardeman
Dorsey B. Hardeman, Commissioner

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
INTEROFFICE MEMORANDUM

TO : Records Management

DATE: April 6, 1998

Application No. 3769/Permit No. 3505
Kerr County
Guadalupe River Basin

FROM : Water Uses & Availability Section
Water Quantity Division

SUBJECT : Change of Ownership

DELETE : Upper Guadalupe River Authority as owner

ADD : City of Kerrville, Texas, as owner

Ownership of Record with Addresses and Remarks:

City of Kerrville, Texas
800 Junction Highway
Kerrville, Texas 78028-5069

This change is based on a copy of the "Termination, Asset Transfer & Acquisition & Settlement Agreement" dated November 20, 1997.

This permit authorizes (1) impoundment of 840 acre-feet of water in a reservoir on the Guadalupe River, (2) use of 3603 acre-feet of water per annum from said reservoir for municipal purposes and (3) secondary use of 2450 acre-feet per annum of waste water, produced from its sewage disposal System from the surface water diverted, for irrigation of 192 acres out of its adjacent tracts containing 533 acres.

Mohan Reddy

Data Entry Made: _____

WU & A Section: _____

Change Noted: _____

Central Records/Date: _____

2. DIVERSION

Permittee is authorized to divert water from the point on the reservoir authorized in Permit No. 3505 at a maximum rate, in combination with the rate included in Permit No. 3505, of not to exceed 15.5 cfs. Prior to the diversion of the water authorized hereunder, Permittee shall have installed a metering device in accordance with Commission Rules.

3. POINT OF RETURN

Water diverted for use by the City of Kerrville but not consumed shall be returned to the City of Kerrville's wastewater treatment plant discharge outfall.

4. WATER CONSERVATION

Permittee shall implement the aforesaid "Kerr County Water Conservation Plan and Drought Contingency Plan" dated May 12, 1992. Any subsequent plan used by permittee shall provide for the utilizing of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future use or alternative uses. Such plan shall include a requirement in every wholesale water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, that each successive wholesale customer develop and implement water conservation measures. If the customer intends to resell the water, then the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

5. SPECIAL CONDITIONS

- A. Permittee is authorized to divert water hereunder only when the water level in the referenced existing reservoir is above 1,608 feet mean sea level.
- B. During the months of October through May, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 40 cfs at a reference device to be installed by the Permittee immediately downstream of the dam for the referenced reservoir at a location to be approved by the Executive Director. During the months of

WHEREAS, the Commission finds that UGRA does not have existing contracts for all of the water requested for diversion under Application No. 5394; and

WHEREAS, the Commission finds that water sought to be diverted under Application No. 5394 for which UGRA does not have existing water supply contracts should be limited to a term of years if such contracts are not hereafter entered into, submitted to Commission staff and approved in accordance with Commission Rules; and

WHEREAS, the Commission considered the "Kerr County Water Conservation Plan and Drought Contingency Plan (May 12, 1992)" submitted by the Upper Guadalupe River Authority in support of this Application and such plan evidences that permittee shall use reasonable diligence to achieve water conservation; and

WHEREAS, the water requested in this application is included in a Subordination Agreement between the applicant and the Guadalupe-Blanco River Authority; and

WHEREAS, the Commission finds that jurisdiction over the application is established; and

WHEREAS, a public hearing was held on the granting of this application after the publication of all notice requirements; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Commission in issuing this permit.

NOW, THEREFORE, this permit to appropriate and use State water is issued to the Upper Guadalupe River Authority, subject to the following terms and conditions:

1. USE

Permittee is authorized to divert not to exceed 4,169 acre-feet of water per annum from the reservoir on the Guadalupe River included in Water Use Permit No. 3505. Of this total amount, 2,761 acre-feet per annum is available on a firm yield basis, with the remaining 1,408 acre-feet per annum available on a "run-of-river" basis. Such total amount of water shall be used for municipal use and/or injected into the Hosston-Sligo Aquifer of the Lower Trinity formation for subsequent retrieval for municipal use.

June through September, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 30 cfs at the aforesaid reference device.

- C. In addition to the variable flow restrictions contained in Paragraph 5. SPECIAL CONDITIONS B., if inflows into the referenced reservoir are 50 cfs or greater, Permittee must restrict the diversions hereunder authorized to allow a flow of at least 50 cfs to pass the reference device described in that paragraph. The inflows are to be measured at a separate reference device or devices installed by Permittee upstream of the reservoir at a specific location to be approved by the Executive Director.
- D. Of the 4,169 acre-feet of water authorized for diversion per annum in Paragraph 1. USE, such water shall be used as follows:
- i. Not to exceed 1,100 acre-feet of water per annum may be contracted for municipal use by the City of Kerrville (either water diverted directly from the river or surface water injected into the aforesaid aquifer and subsequently retrieved);
 - ii. Not to exceed 1,661 acre-feet of water per annum may be contracted for municipal use by Kerr County entities other than the City of Kerrville (either water diverted directly from the river or surface water injected into the said aquifer and subsequently retrieved); and
 - iii. The remaining 1,408 acre-feet of water per annum shall be used for injection into the said aquifer for storage to maintain the firm yield of the system.
- E. Authorization to divert and use any portion of the 1,661 acre-feet of water per annum referenced in Paragraph 5. SPECIAL CONDITIONS, D. ii. which UGRA has not committed to a binding take-or-pay contract and submitted to the Commission by midnight, December 31, 2010, will be subject to cancellation and by January 17, 2011, UGRA shall submit to the Commission a document requesting voluntary cancellation of that portion of the 1,661 acre-feet of water not included in a contract.
- F. The authorizations hereunder are subject to the maintenance of the June 8, 1987 "Subordination

Agreement" or extensions thereof, between permittee and the Guadalupe-Blanco River Authority. The Commission shall be notified immediately by the permittee upon amendment or expiration of such agreement and provided with copies of appropriate documents effecting such changes.

- G. Water diverted under this permit for storage in the aquifer shall be treated to drinking water standards as per Texas Water Commission Rules.
- H. The annual total of the diversions authorized under Permit No. 3505 and under this permit shall be allocated to each day based on historic patterns of usage, as reflected in Exhibit A attached to this permit. If, on any given day, the daily allocation is not needed or not available under either permit, then such allocations shall not be made up on future days, except that allocations under this permit (No. 5394) may be made up on future days provided that flows at the downstream reference device described in Paragraph 5. SPECIAL CONDITIONS, B. are at least 60 cfs on those future days.

This permit is issued subject to all superior and senior water rights in the Guadalupe River Basin.

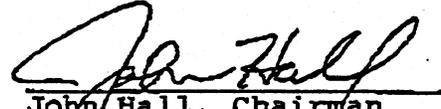
Permittee agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this permit.

All other matters requested in the application which are not specifically granted by this permit are denied.

This permit is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

DATE ISSUED: OCT 12 1993

TEXAS WATER COMMISSION

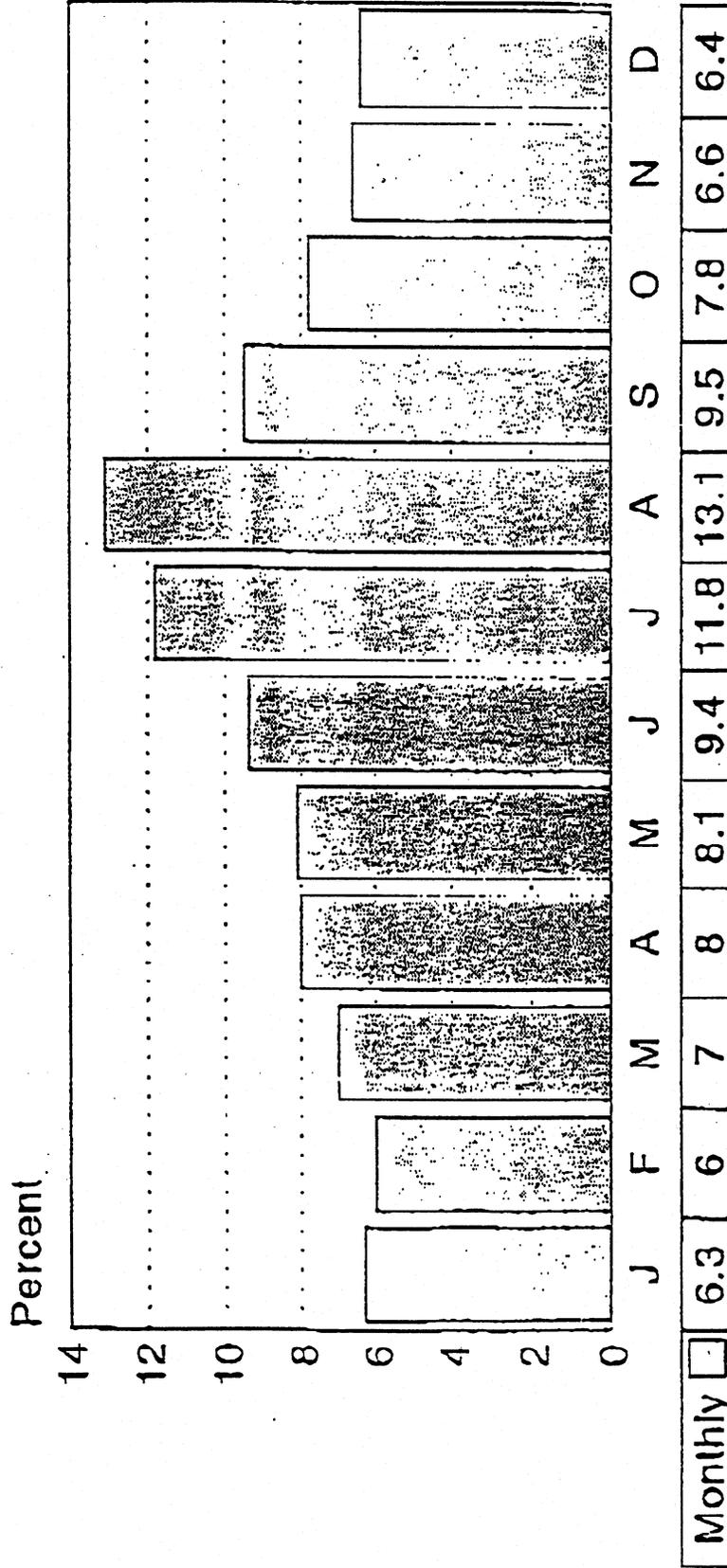

John Hall, Chairman

ATTEST:

for Mamie M. Black
Gloria A. Vasquez, Chief Clerk

UGRA Demand Distribution

(Used in Modeling)



Based on historical use for City of Kerrville

WK/5394A/CO

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



AMENDMENT TO PERMIT TO APPROPRIATE AND USE STATE WATER

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TCEQ CENTRAL FILE ROOM

APPLICATION NO. 5394A PERMIT NO. 5394A TYPE: 11.122

Permittee: Upper Guadalupe River Authority Address: 215 Water Street
Kerrville, Texas 78028

Filed: April 3, 1998 Granted: APR 10 1998

Purposes: Municipal and Recharge County: Kerr

Watercourse: Guadalupe River Watershed: Guadalupe River Basin

WHEREAS, the Upper Guadalupe River Authority (UGRA) holds Permit No. 5394 authorizing the diversion of up to 4169 acre-feet of water per annum from an existing 840 acre-foot capacity reservoir (included in UGRA's Water Use Permit No. 3505) in Kerr County, approximately 1.5 miles west-northwest of the Kerr County Courthouse on the Guadalupe River, for municipal purposes and/or injection via wells into an underground aquifer reservoir known as the Hosston-Sligo Sands of the Lower Trinity formation for subsequent retrieval and use for municipal purposes in Kerr County; and

WHEREAS, UGRA has the right under Permit No. 5394 to appropriate up to 2169 acre-feet of water per annum for the City of Kerrville, Texas; and

WHEREAS, UGRA desires to amend its Permit to reflect the transfer of the rights associated with the 2169 acre-feet of water under Permit No. 5394 to Kerrville and to obtain a modified permit in its own name, without any change in the purpose or place of use, at the same rate of diversion for the 2000 acre-feet of water per annum retained by UGRA; and

WHEREAS, the water requested in this application is included in a Subordination Agreement between the Upper Guadalupe River Authority and the Guadalupe-Blanco River Authority; and

WHEREAS, the Commission finds that jurisdiction over the application is established; and

WHEREAS, no person has protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Commission in issuing this permit amendment.

NOW, THEREFORE, this permit amendment to appropriate and use State water is issued to the Upper Guadalupe River Authority (UGRA), subject to the following terms and conditions:

1. USE

Permittee is authorized to divert not to exceed 2,000 acre-feet of water per annum on a firm yield basis from the Guadalupe River at the point of diversion included in Water Use Permit No. 3505. Such total amount of water shall be used for municipal use and/or injected into the Hosston-Sligo Aquifer of the Lower Trinity formation for subsequent retrieval for municipal use.

2. DIVERSION

Permittee is authorized to divert water from the point on the reservoir authorized in Permit No. 3505 at a maximum rate, in combination with the rate included in Permit No. 3505 and Permit No. 5394B, of not to exceed 15.5 cfs. Prior to the diversion of the water authorized hereunder, Permittee shall have installed a metering device in accordance with Commission rules.

3. POINT OF RETURN

Water diverted for use but not consumed shall be returned to the water course or stream of origin if it can be returned by gravity flow and it is reasonably practicable to do so.

4. WATER CONSERVATION

Within one (1) year from issuance of this permit amendment, owner shall submit to the Executive Director of the Texas Natural Resource Conservation Commission a water conservation plan as described in Texas Administrative Code Section 288.2, which shall provide for the utilizing of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future use or alternative uses. Such plan shall include a requirement in every wholesale water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, that each successive wholesale customer develop and implement water conservation measures. If the customers intend to resell the water, then the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

5. SPECIAL CONDITIONS

- A. Permittee is authorized to divert water hereunder only when the water level in the referenced reservoir authorized by Permit 3505 is above 1,608 feet mean sea level.

- B. During the months of October through May, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 40 cfs at a referenced device to be installed immediately downstream of the dam for the referenced reservoir at a location to be approved by the Executive Director. During the months of June through September, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 30 cfs at the aforesaid reference device.
- C. In addition to the variable flow restrictions contained in Paragraph 5. SPECIAL CONDITIONS B., if inflows into the referenced reservoir are 50 cfs or greater, Permittee must restrict the diversions hereunder authorized to allow a flow of at least 50 cfs to pass the reference device described in that paragraph. The inflows are to be measured at a separate reference device or devices installed by Permittee upstream of the reservoir at a specific location to be approved by the Executive Director.
- D. Of the 2,000 acre-feet of water authorized for diversion per annum in Paragraph 1. USE, such water shall be used as follows:
- i. Not to exceed 1,661 acre-feet of water per annum may be contracted for municipal use by Kerr County entities other than the City of Kerrville (either water diverted directly from the river or surface water injected into the aforesaid aquifer and subsequently retrieved); and
 - ii. The remaining 339 acre-feet of water per annum shall be used for injection into the said aquifer for storage to maintain the firm yield of the system.
- E. Authorization to divert and use any portion of the 1,661 acre-feet of water per annum referenced in Paragraph 5. SPECIAL CONDITIONS, D. I. which UGRA has not committed to a binding take-or-pay contract and submitted to the Commission by midnight, December 31, 2010, will be subject to cancellation and by January 17, 2011, UGRA shall submit to the Commission a document requesting voluntary cancellation of that portion of the 1,661 acre-feet of water not included in a contract.
- F. The authorizations hereunder are subject to the maintenance of the June 8, 1987 "Subordination Agreement" or amendments and extensions thereof, between the permittee and/or the Upper Guadalupe River Authority and the Guadalupe-Blanco River Authority. The Commission shall be notified immediately by the permittee upon amendment or expiration of such agreement and provided with copies of appropriate documents affecting such changes.
- G. Water diverted under this permit for storage in the aquifer shall be treated to drinking water standards as per Texas Natural Resources Conservation

Commission Rules.

- H. The annual total of the diversions authorized under Permit No. 3505 and under this permit shall be allocated to each day based on historic patterns of usage, as reflected in Exhibit A attached to Permit 5394. If, on any given day, the daily allocation is not needed or not available under either permit, then such allocations shall not be made up on future days, except that allocations under this Permit No. 5394A may be made up on future days provided that flows at the downstream reference device described in Paragraph 5. SPECIAL CONDITIONS, B. are at least 60 cfs on those future days.

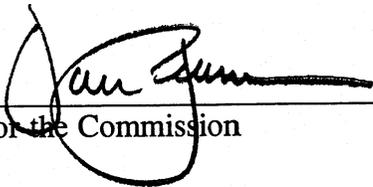
This permit amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Permittee agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this permit are denied.

This permit is issued subject to the Rules of the Texas Natural Resources Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

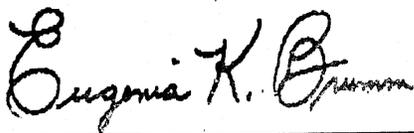
TEXAS NATURAL RESOURCE CONSERVATION
COMMISSION



For the Commission

DATE ISSUED: APR 10 1998

ATTEST:



Dr. Eugenia K. Brumm, Chief Clerk

WK15394B/C0

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



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AMENDMENT TO PERMIT TO
APPROPRIATE AND USE STATE WATER

APPLICATION NO.5394B	PERMIT NO. 5394B	TYPE: 11.122
Permittee: City of Kerrville Texas	Address:	800 Junction Highway Kerrville, Texas 78029-5069
Filed: April 3, 1998	Granted:	APR 10 1998
Purposes: Municipal and Recharge	County:	Kerr
Watercourse: Guadalupe River	Watershed:	Guadalupe River Basin

WHEREAS, the Upper Guadalupe River Authority (UGRA) holds Permit No. 5394 authorizing the diversion of up to 4169 acre-feet of water per annum from an existing 840 acre-foot capacity reservoir (included in UGRA's Water Use Permit No. 3505) in Kerr County, approximately 1.5 miles west-northwest of the Kerr County Courthouse on the Guadalupe River, for municipal purposes and/or injection via wells into an underground aquifer reservoir known as the Hosston-Sligo Sands of the Lower Trinity formation for subsequent retrieval and use for municipal purposes in Kerr County; and

WHEREAS, UGRA has conveyed Permit No. 3505 and the right under Permit No. 5394 to appropriate up to 2169 acre-feet of water per annum to the City of Kerrville, Texas; and

WHEREAS, Kerrville desires to have a water right transferring the rights associated with the 2169 acre-feet of water under Permit No. 5394 issued in its own name, without any change in the purpose or place of use, at the same rate of diversion; and

WHEREAS, the water requested in this application is included in a Subordination Agreement between the Upper Guadalupe River Authority and the Guadalupe-Blanco River Authority; and

WHEREAS, the Commission finds that jurisdiction over the application is established; and

WHEREAS, no public hearing was requested or held on the granting of this application after the publication of all notice requirements; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Commission in issuing this permit amendment.

NOW, THEREFORE, this permit amendment to appropriate and use State water is issued to the City of Kerrville, Texas, subject to the following terms and conditions:

1. USE

Permittee is authorized to divert not to exceed 2,169 acre-feet of water per annum from the reservoir on the Guadalupe River included in Water Use Permit No. 3505 and Permit No. 5394A. Of this total amount, 761 acre-feet per annum is available on a firm yield basis, with the remaining 1,408 acre-feet per annum available on a "run-of-river" basis. Such total amount of water shall be used for municipal use and/or injected into the Hosston-Sligo Aquifer of the Lower Trinity formation for subsequent retrieval for municipal use.

2. DIVERSION

Permittee is authorized to divert water from the point on the reservoir authorized in Permit No. 3505 at a maximum rate, in combination with the rate included in Permit No. 3505 and Permit No. 5394A, of not to exceed 15.5 cfs. Prior to the diversion of the water authorized hereunder, Permittee shall have installed a metering device in accordance with Commission rules.

3. POINT OF RETURN

Water diverted for use by the City of Kerrville but not consumed shall be returned to the City of Kerrville's wastewater treatment plant discharge outfall.

4. WATER CONSERVATION

Within one (1) year from issuance of this permit amendment, owner shall submit to the Executive Director of the Texas Natural Resource Conservation Commission a water conservation plan as described in Texas Administrative Code Section 288.2, which shall provide for the utilizing of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future use or alternative uses. Such plan shall include a requirement in every wholesale water supply contract entered into, on or after the effective date of this permit, including any contract extension or renewal, that each successive wholesale customer develop and implement water conservation measures. If the customers intend to resell the water, then the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

5. SPECIAL CONDITIONS

- A. Permittee is authorized to divert water hereunder only when the water level in the referenced existing reservoir is above 1,608 feet mean sea level.

- B. During the months of October through May, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 40 cfs at a referenced device to be installed by the Permittee immediately downstream of the dam for the referenced reservoir at a location to be approved by the Executive Director. During the months of June through September, Permittee is authorized to divert water hereunder only when the flow of the Guadalupe River exceeds 30 cfs at the aforesaid reference device.
- C. In addition to the variable flow restrictions contained in Paragraph 5. SPECIAL CONDITIONS B., if inflows into the referenced reservoir are 50 cfs or greater, Permittee must restrict the diversions hereunder authorized to allow a flow of at least 50 cfs to pass the reference device described in that paragraph. The inflows are to be measured at a separate reference device or devices installed by Permittee upstream of the reservoir at a specific location to be approved by the Executive Director.
- D. Of the 2,169 acre-feet of water authorized for diversion per annum in Paragraph 1. USE, such water shall be used as follows:
- i. Not to exceed 1,100 acre-feet of water per annum for municipal use by the City of Kerrville (either water diverted directly from the river or surface water injected into the aforesaid aquifer and subsequently retrieved); and
 - ii. The remaining 1,069 acre-feet of water per annum shall be used for injection into the said aquifer for storage to maintain the firm yield of the system.
- E. The authorizations hereunder are subject to the maintenance of the June 8, 1987 "Subordination Agreement" or amendments and extensions thereof, between the permittee and/or the Upper Guadalupe River Authority and the Guadalupe-Blanco River Authority. The Commission shall be notified immediately by the permittee upon amendment or expiration of such agreement and provided with copies of appropriate documents affecting such changes.
- F. Water diverted under this permit for storage in the aquifer shall be treated to drinking water standards as per Texas Natural Resources Conservation Commission Rules.
- G. The annual total of the diversions authorized under Permit No. 3505 and under this permit shall be allocated to each day based on historic patterns of usage, as reflected in Exhibit A attached to Permit 5394. If, on any given day, the daily allocation is not needed or not available under either permit, then such allocations shall not be made up on future days, except that allocations under this Permit No. 5394B may be made up on future days provided that flows at the downstream reference device described in Paragraph 5. SPECIAL CONDITIONS, B. are at least 60 cfs on those future days.

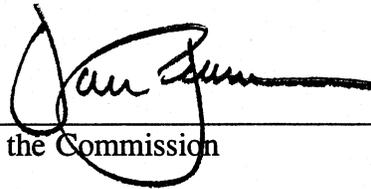
This permit amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Permittee agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this permit.

All other matters requested in the application which are not specifically granted by this permit are denied.

This permit is issued subject to the Rules of the Texas Natural Resources Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS NATURAL RESOURCE CONSERVATION
COMMISSION



For the Commission

DATE ISSUED: APR 10 1998,

ATTEST:


Dr. Eugenia K. Brumm, Chief Clerk

WR/5394C/CB

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



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AMENDMENT TO A
WATER USE PERMIT

APPLICATION NO. 5394C

PERMIT NO. 5394C

TYPE: §11.122

Permittee: Upper Guadalupe River Authority

Address: 125 Lehmann, Suite 100
Kerrville, Texas 78028

Filed: June 8, 2000

Granted: **AUG 20 2002**

Purposes: Municipal, Recharge, Agriculture

County: Kerr and Kendall

Watercourse: Guadalupe River

Basin: Guadalupe River
Basin

WHEREAS, Water Use Permit No. 5394A, as amended, issued to the Upper Guadalupe River Authority (UGRA), authorizes the permittee to divert and use not to exceed 2,000 acre-feet of water per annum, on a firm yield basis, from an existing 840 acre-foot capacity reservoir on the Guadalupe River, Guadalupe River Basin, in the Walter Fosgate Survey, Abstract 138, in Kerr County for municipal use and/or injection into the Hosston-Sligo Aquifer of the Lower Trinity Formation for subsequent retrieval for municipal purposes; and

WHEREAS, a point on the center line of the aforesaid reservoir is located S 40°E, 2,470 feet from the southwest corner of the aforesaid survey, and is authorized by the UGRA's Water Use Permit No. 3505 (Application No. 3769); and

WHEREAS, water authorized for use by Water Use Permit No. 5394A is included in a Subordination Agreement between the Guadalupe-Blanco River Authority and the UGRA, and may be diverted at a maximum rate of 15.5 cfs (6,956 gpm) in combination with Water Use Permit No. 3505 (Application No. 3769) and the City of Kerrville's Water Use Permit No. 5394B; and

WHEREAS, the Upper Guadalupe River Authority has entered into a Water Supply Agreement with Buckhorn Golf II Ltd., a Texas Limited Partnership, dated April 10, 2000, to provide not to exceed 160 acre-feet of agricultural water per annum for a ten year period to irrigate 110 acres of land out of three tracts totaling 187.276 acres in Kendall County; and

WHEREAS, the UGRA seeks to amend Water Use Permit No. 5394A by adding agricultural use to irrigate 160 acre-feet of water per annum currently authorized for municipal use, by adding

an additional point of diversion on the left bank of the Guadalupe River, Guadalupe River Basin one mile east of Comfort, Texas, and by changing the place of use of the agricultural water to the acreage owned or leased by Buckhorn Golf II Ltd. in Kendall County; and

WHEREAS, the Commission finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director finds that at least 75% of the requested 160 acre-feet of water per annum would be available in only 14.3% of the years, and the monthly demand would be available in only 33.9 % of the months; and

WHEREAS, the existing authorization contains certain stream flow restrictions to prevent negative impact on existing instream uses which will remain in effect under this amendment; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and the Rules of the Texas Natural Resource Conservation Commission in issuing this amendment;

NOW THEREFORE, this amendment to Water Use Permit No. 5394A, designated Water Use Permit No. 5394C, is issued to the Upper Guadalupe River Authority, subject to the following terms and conditions:

1. USE

In lieu of the prior authorization contained in Water Use Permit No. 5394A, permittee is authorized to divert:

- A. Not to exceed 2,000 acre-feet of water per annum on a firm yield basis from the Guadalupe River at the point of diversion included in Water Use Permit No. 3505. Such total amount of water shall be used for municipal use and/or injected into the Hosston-Sligo Aquifer of the Lower Trinity Formation for subsequent retrieval for municipal purposes.
- B. Not to exceed 160 acre-feet of water per annum of the authorized 2000 acre-feet of water per annum, for a ten year period, for agricultural purposes, the irrigation of land owned by Buckhorn Golf II Ltd. described as 110 acres out of a 187.532 acre tract of land contained in six tracts located in the Justa Esqueda Survey No. 25, abstract 157, approximately one mile east of the town of Comfort in Kendall County, Texas.

2. DIVERSION

- A. Point: In addition to the diversion points currently authorized by Water Use Permit No. 5394A Permittee is also authorized to divert the water authorized herein at a point bearing S 41.245° E, 8,218 feet from the USGS published

benchmark/triangular station known as "Comfort 2" on the left, or north, bank of the Guadalupe River approximately 200 yards downstream of the IH-10 bridge, one mile east of Comfort, Texas, also described as 29.970°N Latitude and 98.883°W Longitude .

- B. Rate: The maximum diversion rate for the water authorized herein is not to exceed 1.1 cfs (500 gpm), and the combined maximum diversion rate for all water diverted pursuant to Water Use Permit No. 5394A, as amended, shall not exceed 15.5 cfs (6,956.4 gpm) in combination with Water Use Permit No. 3505 and Water Use Permit No. 5394B.

3. TIME PRIORITY

The time priority of this amendment for use of the 160 acre-feet of water per annum for agricultural uses is January 6, 1992, except it shall be junior in priority to all water rights owners of record, as they appear on the date this amendment is granted, with diversion points on the Guadalupe River between the existing and proposed diversion points.

4. CONSERVATION

Owners shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future or alternative uses.

5. SPECIAL CONDITIONS

In addition to Paragraph 5, SPECIAL CONDITIONS A through H of Water Use Permit No. 5394A, the following additional special conditions shall also apply:

- I. This amendment is subject to the maintenance, or extension, of the Water Supply Agreement, between Permittee and Buckhorn Golf II, Ltd. dated April 10, 2000.
- J. Upon expiration of the aforesaid Water Supply Agreement, this amendment shall expire and become null and void without further Commission consideration, and the 160 acre-feet of water per annum authorized hereby for agriculture use (irrigation) shall revert back to municipal use with no further Commission action..
- K. Permittee is required to contact the South Texas Watermaster prior to the diversion of any water authorized by this amendment.

- L. Prior to diversion of the water authorized herein, Permittee shall install and maintain a measuring device at the described diversion point, capable of measuring within plus or minus 5% accuracy, to record the amount of water diverted from the stream for industrial purposes. Representatives of the TNRCC shall, upon demand, be provided physical access to the diversion (pump) sites for inspection and verification purposes.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

All other matters requested in the application which are not specifically granted by this amendment are denied.

Permittee agrees to be bound by the terms, conditions and provisions contained herein, and such agreement is a condition precedent to the granting of this amendment.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION



For the Commission

Date Issued: **AUG 20 2002**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AMENDMENT TO A WATER USE PERMIT

PERMIT NO. 5394D

TYPE: 11.122

Permittee:	Upper Guadalupe River Authority	Address:	125 Lehmann Drive, Suite 100 Kerrville, Texas 78028
Filed:	November 20, 2012	Granted:	February 7, 2013
Purpose:	Municipal	County:	Kerr
Watercourse:	Guadalupe River	Watershed:	Guadalupe River Basin

WHEREAS, the Upper Guadalupe River Authority (UGRA) owns a portion of Water Use Permit No. 5394 which authorizes the diversion and use of not to exceed 2,000 acre-feet of water per year, on a firm yield basis, from a point on an existing 840 acre-foot reservoir (authorized by City of Kerrville's Water Use Permit No. 3505) on the Guadalupe River, Guadalupe River Basin for municipal use and/or injection into the Hosston-Sligo Aquifer of the Lower Trinity Formation for subsequent retrieval for municipal use in Kerr County. The time priority of this right is January 6, 1992; and

WHEREAS, multiple Special Conditions apply including Special Condition 5.D. which states:

Of the 2,000 acre-feet of water authorized for diversion in Paragraph 1. USE, such water shall be used as follows: (i) not to exceed 1,661 acre-feet of water per year may be contracted for municipal use by Kerr County entities other than the City of Kerrville (either water diverted directly from the river or surface water injected into the aforesaid aquifer and subsequently retrieved) and (ii) the remaining 339 acre-feet of water per year shall be used for injection into the said aquifer for storage to maintain the firm yield of the system; and

WHEREAS, UGRA seeks to amend its portion of Water Use Permit No. 5394 to remove "other than the City of Kerrville" from Special Condition 5.D.i. in order to authorize UGRA to contract for municipal use of the water by any Kerr County entity, including the City of Kerrville; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, this amendment, if granted, is subject to requirements and orders of the South Texas Watermaster; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Water Use Permit No. 5394, designated Water Use Permit No. 5394D, is issued to the Upper Guadalupe River Authority, subject to the following terms and conditions:

SPECIAL CONDITION

In lieu of SPECIAL CONDITION 5.D.i. of Water Use Permit No. 5394A, the following Special Condition applies:

Not to exceed 1,661 acre-feet of water per year may be contracted for municipal use by Kerr County entities (either water diverted directly from the river or surface water injected into the aforesaid aquifer and subsequently retrieved).

This amendment is issued subject to all terms, conditions, and provisions contained in Water Use Permit No. 5394, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Permittee agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.


For the Commission

Date issued: **February 7, 2013**

WR 'adj / 2002 / CO

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 18-2002

OWNER: Shelton Ranch Corporation,
a Texas Corporation
P. O. Box 1107
Kerrville, TX 78028

COUNTY: Kerr

PRIORITY DATE: 1924

WATERCOURSE: Guadalupe River

BASIN: Guadalupe River

WHEREAS, by final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, a right was recognized under Claim 1519 authorizing Carl D. Meek to appropriate waters of the State of Texas as set forth below;

WHEREAS, by Agreement dated April 1, 1980, recorded in Vol. 233, page 320, Deed Records of Kerr County, Shelton Ranch Corporation acquired, along with a portion of the land described in Claim 1519, a specified portion of the seller's water rights;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Guadalupe River Basin is issued to Shelton Ranch Corporation, subject to the following terms and conditions:

1. USE

Owner is authorized to divert and use not to exceed 136 acre-feet of water per annum from the Guadalupe River to irrigate a maximum of 99 acres of land out of a tract located in the William Watt Survey 65, Abstract 364 and the William Watt Survey 66, Abstract 365, Kerr County, Texas, said tract being described as follows:

- (1) BEGINNING at a point on the right-of-way line of F.M. Highway 689 out of the William Watt Survey 66, 6785 feet N 55°E of its Northwest corner;
- (2) THENCE S 44°35'W, 2180 feet;
- (3) THENCE N 45°41'W, 1428 feet;
- (4) THENCE S 47°24'W, 4016 feet;
- (5) THENCE S 43°E, 3570 feet;
- (6) THENCE N 47°E, 5445 feet to a point on the right-of-way line of F.M. Highway No. 689;
- (7) THENCE up said highway with the meanders to the place of beginning.

2. DIVERSION

A. Location:

At a point on the southwest bank of the Guadalupe River which is N 81°E, 8355 feet from the northwest corner of the D. Schauchard Survey 67, Abstract 299, Kerr County, Texas.

B. Maximum Rate: 2.4 cfs (1080 gpm).

3. PRIORITY

The time priority of owner's right is 1924.

The locations of pertinent features related to this certificate are shown on Page 4 of the Guadalupe River Certificates of Adjudication Maps, copies of which are located in the offices of the Texas Department of Water Resources and the office of the County Clerk.

FILMED

RECEIVED

MAR 15 1982

FEB 4 1982

600

WR, adj / 2002 / CO

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 18-2002

OWNER: Shelton Ranch Corporation,
a Texas Corporation
P. O. Box 1107
Kerrville, TX 78028

COUNTY: Kerr

PRIORITY DATE: 1924

WATERCOURSE: Guadalupe River

BASIN: Guadalupe River

WHEREAS, by final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, a right was recognized under Claim 1519 authorizing Carl D. Meek to appropriate waters of the State of Texas as set forth below;

WHEREAS, by Agreement dated April 1, 1980, recorded in Vol. 233, page 320, Deed Records of Kerr County, Shelton Ranch Corporation acquired, along with a portion of the land described in Claim 1519, a specified portion of the seller's water rights;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Guadalupe River Basin is issued to Shelton Ranch Corporation, subject to the following terms and conditions:

1. USE

Owner is authorized to divert and use not to exceed 136 acre-feet of water per annum from the Guadalupe River to irrigate a maximum of 99 acres of land out of a tract located in the William Watt Survey 65, Abstract 364 and the William Watt Survey 66, Abstract 365, Kerr County, Texas, said tract being described as follows:

- (1) BEGINNING at a point on the right-of-way line of F.M. Highway 689 out of the William Watt Survey 66, 6785 feet N 55°E of its Northwest corner;
- (2) THENCE S 44°35'W, 2180 feet;
- (3) THENCE N 45°41'W, 1428 feet;
- (4) THENCE S 47°24'W, 4016 feet;
- (5) THENCE S 43°E, 3570 feet;
- (6) THENCE N 47°E, 5445 feet to a point on the right-of-way line of F.M. Highway No. 689;
- (7) THENCE up said highway with the meanders to the place of beginning.

2. DIVERSION

A. Location:

At a point on the southwest bank of the Guadalupe River which is N 81°E, 8355 feet from the northwest corner of the D. Schauchard Survey 67, Abstract 299, Kerr County, Texas.

B. Maximum Rate: 2.4 cfs (1080 gpm).

3. PRIORITY

The time priority of owner's right is 1924.

The locations of pertinent features related to this certificate are shown on Page 4 of the Guadalupe River Certificates of Adjudication Maps, copies of which are located in the offices of the Texas Department of Water Resources and the office of the County Clerk.

FILMED

RECEIVED MAR 15 1982

FEB 4 1982

This certificate of adjudication is issued subject to all terms, conditions and provisions in the final decree of the 37th Judicial District Court of Bexar County, in Cause No. 77-CI-13052, In Re: The Adjudication of Water Rights in the Upper Guadalupe River Segment of the Guadalupe River Basin, dated November 12, 1979, and supersedes all rights of the owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Guadalupe River Basin.

This certificate of adjudication is issued subject to the Rule of the Texas Department of Water Resources and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

This water right is appurtenant to the above-described land within which irrigation is authorized, unless and until severed from the land. A transfer of any portion of the above-described land includes, unless otherwise specified, that portion of the water right which is appurtenant to the transferred land at the time of the transaction.

TEXAS WATER COMMISSION

/s/ Felix McDonald

Felix McDonald, Chairman

DATE ISSUED:

JUL 17 1981

ATTEST:

/s/ Mary Ann Hefner

Mary Ann Hefner, Chief Clerk

FILMED
MAR 15 1982
SYSTEM 200

*Attach
7-17-81*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



ADJ/18-2002A/10

RECEIVED

DEC 19 2006

TCEQ
CENTRAL FILE ROOM

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

Certificate of Adjudication No. 18-2002A

Type: §11.122

Owner: Comanche Trace Ranch &
Golf Club, L. L. L. P.

Address: 3074 Bandera Highway
Kerrville, Texas 78028

Filed: March 9, 2000

Granted: **JUN 08 2000**

Use: Irrigation

County: Kerr

Watercourse: Guadalupe River

Basin: Guadalupe River Basin

WHEREAS, Certificate No. 18-2002 authorizes the owner, with a time priority of 1924, to divert and use not to exceed 136 acre-feet of water per annum from the Guadalupe River at a maximum rate of 2.4 cfs (1080 gpm) for irrigation of 99 acres of land in the William Watt Survey 65, Abstract No. 364, and the William Watt Survey 65, Abstract No. 365, Kerr County; and

WHEREAS, Comanche Trace Ranch and Golf Club, L. L. L. P. seeks to amend the certificate by adding off-channel storage and increasing the area to be irrigated; and

WHEREAS, the Texas Natural Resource Conservation Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Natural Resource Conservation Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 18-2002 is issued to Comanche Trace Ranch and Golf Club, L. L. L. P., subject to the following terms and conditions:

1. USE

In lieu of the previous authorization, certificate owner is authorized to divert not to exceed 136 acre-feet of water per annum from the Guadalupe River to two off-channel reservoirs authorized under this amendment for subsequent irrigation of 471.4 acres out of 1131.78 acres of land in the following surveys in Kerr County: William T. Crook Survey No. 63, Abstract 116, William Watt Survey No. 64, Abstract No. 363, William Watt Survey No. 65, Abstract No. 364, William Watt Survey No. 66, Abstract No. 365 and the Thomas Jackson Survey No. 394, Abstract No. 212. This 1131.78 acres is owned by certificate owner as evidenced by a Warranty Deed recorded in Volume 971, Pages 698-706 in the Official Records of Kerr County.

2. IMPOUNDMENT

Certificate Owner is authorized to maintain an existing off-channel reservoir and to construct and maintain an off-channel reservoir and impound therein water diverted from the Guadalupe River under this certificate, as amended. The reservoirs are described as follows:

Reservoir A: an existing off-channel reservoir located 4.5 miles south of Kerrville impounding 24.3 acre-feet of water with a surface area of 2.21 acres. The reservoir is N42°E, 3817 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.984°N Latitude and 99.117°W Longitude.

Reservoir I: a proposed off-channel reservoir to be located 4.1 miles south of Kerrville impounding 65 acre-feet of water with a surface area of 8.71 acres. The reservoir will be N 43°E, 8428 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.989°N Latitude and 99.109°W Longitude.

3. SPECIAL CONDITIONS

Owner shall contact the South Texas Watermaster prior to diversion of water authorized under the certificate, as amended.

4. TIME LIMITATIONS

- A. Construction and modification of the lakes herein authorized shall be in accordance with plans approved by the Executive Director and shall be commenced within one year and completed within two years from the date of issuance of this permit.
- B. Failure to commence and complete construction and modification of the lakes (Reservoir A and Reservoir I) within the period stated above, shall

cause this authorization, with respect to the lakes not modified/constructed, to expire and become null and void without further Commission consideration, unless permittee applies for an extension of time to commence and/or complete construction prior to the respective deadlines for commencement and completion, and the application is subsequently granted.

This amendment is issued subject to all superior and senior rights in the Guadalupe River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

**TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION**



For the Commission

Date Issued: **JUN 08 2000**

Bo
C

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
INTEROFFICE MEMORANDUM

TO : Records Management

DATE: May 17, 2000

Certificate of Adjudication No. 18-2002
Kerr County
Guadalupe River Basin

FROM : Water Rights Permitting & Availability Section
Water Permits & Resource Management Division

SUBJECT : Change of Ownership

ADD : City of Kerrville as joint owner

Water Rights Conveyance dated February 14, 2000, has been checked and found to cover part of the water right.

Ownership of Record with Addresses and Remarks:

Comanche Trace Ranch And Golf Club, LLLP, a Colorado limited partnership, et al
(et al consists of: City of Kerrville)
3033 East First Avenue, Suite 810
Denver, Colorado 80206

The ownership of the water rights under this certificate of adjudication (136 acre-feet of water per annum from the Guadalupe River for irrigation of 99 acres out of 260.23 acre-portion of 1131.78 acre-tract) is established as follows:

1. Club 260.23 acre-tract, and
undivided 1/2 interest in 136 acre-feet
2. City undivided 1/2 interest in 136 acre-feet

~~2002/41~~ 2002/400 68AF
~~2002/410~~ 68AF

Data Entry Made: _____

Mohant Reddy
WRP & A Section: _____

Change Noted: _____

Central Records/Date: _____

WHEREAS, the Texas Natural Resource Conservation Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Natural Resource Conservation Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 18-2002, as amended, is issued to Comanche Trace Ranch and Golf Club, L. L. P., subject to the following terms and conditions:

1. IMPOUNDMENTS

Certificate Owner is authorized to construct and maintain 4 off-channel reservoirs and to construct and maintain 5 on-channel reservoirs and impound therein water diverted from the Guadalupe River under this certificate, as amended. The reservoirs are described as follows:

Reservoir B, an off-channel reservoir will be located 4.4 miles south of Kerrville and will impound 6.0 acre-feet of water with a surface area of 0.9 acres. The reservoir will be N 41.73° E, 5129 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.985°N Latitude and 99.119°W Longitude.

Reservoir C, an off-channel reservoir will be located 4.2 miles south of Kerrville and will impound 4.4 acre-feet of water with a surface area of 0.97 acres. The reservoir will be N 37.53°E, 5997 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.987°N Latitude and 99.119°W Longitude.

Reservoir D, an on-channel reservoir will be located on Dry Hollow, tributary of the Guadalupe River 4.4 miles south of Kerrville and will impound 9.5 acre-feet of water with a surface area of 1.60 acres. The reservoir will be N 47.8°E, 8559 feet from the west corner of the William Watt Survey No. 65, Abstract No. 364, also being 29.985°N Latitude and 99.1099°W Longitude.

Reservoir E, an off-channel reservoir will be located 4.7 miles south of Kerrville and will impound 1.2 acre-feet of water with a surface area of 0.29 acres. The reservoir will be N 30.17°E, 1596 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.975°N Latitude and 99.125°W Longitude.

Reservoir F, an on-channel reservoir will be located on an unnamed tributary of Dry Hollow 4.3 miles south of Kerrville and will impound 0.4 acre-feet of water with a surface area of 0.09 acres. The reservoir will be N 1.76°W, 3777 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.985°N Latitude and 99.133°W Longitude.

Reservoir G, an on-channel reservoir will be located on an unnamed tributary of Dry Hollow 4.2 miles south of Kerrville and will impound 1.7 acre-feet of water with a surface area of .34 acres. The reservoir will be N 13.18°E, 4583 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.987°N Latitude and 99.125°W Longitude.

Reservoir H, an on-channel reservoir will be located on an unnamed tributary of Dry Hollow 4 miles south of Kerrville and will impound 22.3 acre-feet of water with a surface area of 2.10 acres. The reservoir will be N 17.88°E, 5485 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.988°N Latitude and 99.123°W Longitude.

Reservoir I, an off-channel reservoir will be located 4.1 miles south of Kerrville and will impound 65 acre-feet of water with a surface area of 8.71 acres. The reservoir will be N 43°E, 8428 feet from the south corner of the William Watt Survey No. 66, Abstract No. 365, also being 29.989°N Latitude and 99.109°W Longitude.

Reservoir J, an off-channel reservoir will be located 4.2 miles south of Kerrville and will impound 1.5 acre-feet of water with a surface area of .34 acres. The reservoir will be N 46.92°E, 10926 feet from the west corner of the William Watt Survey No. 65, Abstract No. 364, also being 29.991°N Latitude and 99.107°W Latitude.

Reservoir K, an on-channel reservoir will be located on Dry Hollow 4.1 miles south of Kerrville and will impound 0.3 acre-feet of water with a surface area of .09 acres. The reservoir will be N 41.68°E, 7094 feet from the south corner of the William Watt Survey No. 66, Abstract 365, Kerr County, also being 29.988°N Latitude and 99.118°W Longitude.

2. DIVERSION AND USE

- A. Owner is authorized to convey the 136 acre-feet of water per annum currently authorized for diversion by this certificate from the Guadalupe River to the aforesaid reservoirs for subsequent diversion and irrigation of land currently included in the certificate.
- B. Owner is authorized to use the bed and banks of the unnamed tributary of Dry Hollow to convey water authorized for diversion from the Guadalupe River under this certificate, as amended, between Reservoirs F, G, and H for aesthetic purposes and to re-circulate the water between the reservoirs.

3. TIME LIMITATIONS

- A. Construction of the lakes herein authorized shall be in accordance with standard engineering practices and shall be commenced within one year and completed within two years from the date of issuance of this amendment.

- B. Failure to commence and complete construction of Reservoirs B, C, D, E, F, G, H, J, and K within the period stated above, shall cause this authorization, with respect to the lakes not modified/constructed, to expire and become null and void without further Commission consideration, unless permittee applies for an extension of time to commence and/or complete construction prior to the respective deadlines for commencement and completion, and the application is subsequently granted.

This amendment is issued subject to all superior and senior rights in the Guadalupe River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

**TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION**



For the Commission

Date Issued: **SEP 12 2000**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AMENDMENT TO A CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 18-2002C

TYPE: 11.122, 11.042

Owner: Comanche Trace Ranch &
Golf Club, L.L.L.P.

Address: 3074 Bandera Highway
Kerrville, Texas 78028

Filed: May 14, 2009

Granted: **MAY 14 2010**

Purpose: Irrigation, Recreation

County: Kerr

Watercourse: Unnamed tributary of Dry Hollow
and Dry Hollow, Unnamed tributary
of Stone Creek and Stone Creek,
Guadalupe River

Watershed: Guadalupe River Basin

WHEREAS, Comanche Trace Ranch & Golf Club, L.L.L.P. owns Certificate of Adjudication No. 18-2002 which authorizes the Owner to maintain six off-channel reservoirs (A, B, C, E, I, J) and five on-channel reservoirs (D, F, G, H, K) on Dry Hollow, and an unnamed tributary of Dry Hollow, tributary of the Guadalupe River, and impound water diverted from the Guadalupe River, Guadalupe River Basin. The Certificate also authorizes the Owner to divert and use not to exceed 136 acre-feet of water per year from the Guadalupe River at a maximum diversion rate of 2.4 cfs (1,080 gpm) for storage, recreation, and subsequent diversion for agricultural purposes to irrigate 471.4 acres out of a 1,131.78-acre tract in Kerr County. The Certificate further authorizes the owner to use the bed and banks of an unnamed tributary of Dry Hollow to convey water to reservoirs F, G, and H for re-circulation and aesthetic purposes; and

WHEREAS, Comanche Trace Ranch & Golf Club, L.L.L.P. seeks to amend Certificate of Adjudication No. 18-2002 to authorize maintenance of six additional on-channel reservoirs (L, M, N, O, P, Q) and one off-channel reservoir (R) with a combined maximum capacity of 46.3 acre-feet of water; and

WHEREAS, Comanche Trace Ranch & Golf Club, L.L.L.P. also seeks to use the bed and banks of an unnamed tributary of Stone Creek and Stone Creek to transport water that will be provided under a Contract for Water Lease related to authorizations under Certificate of Adjudication 18-2001 for 104 acre-feet of additional water to be used for re-circulation and recreation (aesthetic) purposes, Kerr County, Texas; and

WHEREAS, the re-circulation is described as follows: The water for the first feature will be discharged into Reservoir L, thence to Reservoir M, thence to Reservoir N. Water will be diverted from Reservoir N for recirculation back into Reservoir L. Water for the second feature will be discharged into

Stone Creek upstream of Reservoir P and allowed to flow downstream into Reservoir P where it will be diverted for recirculation. Water for the third feature will be discharged into Stone Creek upstream of Reservoir Q and allowed to flow downstream into Reservoir Q where it will be diverted for recirculation. The reach for these features is upstream of and including Reservoir Q. Reservoir O is a separate on-channel reservoir with no pumping feature. Reservoir R is an existing off-channel reservoir and will be used for additional impoundment of run off water from the already permitted irrigation system; and

WHEREAS, ownership of the land inundated by reservoirs L, M, N, O, P, Q, and R and the land to be irrigated is evidenced by Special Warranty Deed, Volume 0971, Page 698, in the Official Records of Kerr County; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, this amendment, if granted, is subject to requirements and orders of the South Texas Watermaster; and

WHEREAS, no requests for a contested case hearing were received for this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 18-2002, designated Certificate of Adjudication No. 18-2002C, is issued to Comanche Trace Ranch & Golf Club, L.L.P., subject to the following terms and conditions:

1. IMPOUNDMENT

In addition to the previous authorization to construct and maintain six off-channel reservoirs and to construct and maintain five on-channel reservoirs and impound therein water diverted from the Guadalupe River, Certificate Owner is also authorized to maintain an additional six on-channel reservoirs and one additional off-channel reservoir under this certificate, as amended. The reservoirs are described as follows:

Reservoir L is an existing on-channel reservoir located on an unnamed tributary of Stone Creek, tributary of Turtle Creek, tributary of the Guadalupe River, Guadalupe River Basin, 4.7 miles east of Kerrville, impounding 1.4 acre-feet of water with a surface area of 0.18 acre. Station +0 on the centerline of the dam is N 34.68333° E, 1,419 feet from the south corner of the William Watt Original Survey No. 66, Abstract No. 365, also being 29.979167° N Latitude and 99.130278° W Longitude.

Reservoir M is an existing on-channel reservoir located on an unnamed tributary of Stone Creek, 5 miles east of Kerrville, impounding 5.1 acre-feet of water with a surface area of 0.51 acre. Station +0 on the centerline of the dam is N 76.616667° E, 604 feet from the south corner of the Watt Survey, also being 29.975556° N Latitude and 99.131111° W Longitude.

Reservoir N is an existing on-channel reservoir located on an unnamed tributary of Stone Creek, 5.3 miles east of Kerrville, impounding 9.0 acre-feet of water with a surface area of 0.90 acre. Station +0 on the centerline of the dam is S 14.85° E, 1,785 feet from the south corner of the Watt Survey, also being 29.971389° N Latitude and 99.131667° W Longitude.

Reservoir O is an existing on-channel reservoir located on an unnamed tributary of Stone Creek, 5.4 miles east of Kerrville, impounding 1.1 acre-feet of water with a surface area of 0.14 acre. Station +0 on the centerline of the dam is S 8.166667° E, 2,664 feet from the south corner of the Watt Survey, also being 29.968889° N Latitude and 99.131667° W Longitude.

Reservoir P is an existing on-channel reservoir located on Stone Creek, tributary of Turtle Creek, tributary of the Guadalupe River, Guadalupe River Basin, 5.6 miles east of Kerrville, impounding 1.0 acre-feet of water with a surface area of 0.03 acre. Station 0+ on the centerline of the dam is S 2.95° E, 3,488 feet from the south corner of the Watt Survey, also being 29.968889° N Latitude and 99.131667° W Longitude.

Reservoir Q is an existing on-channel reservoir located on Stone Creek, 5.7 miles east of Kerrville, impounding 1.2 acre-feet of water with a surface area of 0.13 acre. The reservoir is S 9.90° E, 3,991 feet from the south corner of the Watt Survey, also being 29.968889° N Latitude and 99.130833° W Longitude.

Reservoir R is an existing off-channel reservoir located 5.7 miles east of Kerrville impounding 27.5 acre-feet of water with a surface area of 2.76 acres. Station 0+ on the centerline of the dam is S 47.15° E, 2,419 feet from the south corner of the Watt Survey, also being 29.971389° N Latitude and 99.127222° W Longitude.

2. USE

- A. In addition to the previous authorization to convey 136 acre-feet of water per year and use of 150 acre-feet of a 254 acre-feet per year contract for water lease from the Guadalupe River for diversion to reservoirs B, C, D, E, F, G, H, I, J and K for subsequent diversion and irrigation, Owner is also authorized to convey the remaining 104 acre-feet of leased water per year from the Guadalupe River for diversion to reservoirs L, M, N, O, P, Q and R for re-circulation, recreation (aesthetic), and agricultural purposes.
- B. In addition to the previous authorization to use the bed and banks of an unnamed tributary of Dry Hollow to convey water between Reservoirs F, G and H, Owner is also authorized to use the bed and banks of an unnamed tributary of Stone Creek to convey water between Reservoirs L, M and N, and to use the bed and banks of Stone Creek to convey water between Reservoirs P and Q.

3. DISCHARGE

Owner is authorized to discharge the water authorized by this amendment as follows:

Discharge Point 1 is located approximately 300 feet upstream of Reservoir P, on Stone Creek, 5.6 miles southeast of the City of Kerrville, bearing S 6.033333° E, 3,195 feet from the south corner of the William Watt Original Survey No. 66, Abstract No. 365, also being Latitude 29.967222° N, Longitude 99.131944° W. Water will be discharged at a maximum rate of 0.2 cfs (100 gpm).

Discharge Point 2 is located approximately 550 feet upstream of Reservoir Q, on Stone Creek, 5.6 miles southeast of the City of Kerrville, bearing S 5.80° E, 3,640 feet from the south corner of the Watt Survey, also being Latitude 29.966389° N, Longitude 99.131667° W. Water will be discharged at a maximum rate of 0.2 cfs (100 gpm).

Discharge Point 3 is located on the dam of Reservoir L, an unnamed tributary of Stone Creek, 4.7 miles southeast of the City of Kerrville, bearing N 34.683333° E, 1,419 feet from the southwest corner of the Watt Survey, also being Latitude 29.979167° N, Longitude 99.130278° W. Water will be discharged at a maximum rate of 1.1 cfs (500 gpm).

4. DIVERSION

In addition to the diversion point authorized under Certificate of Adjudication No. 18-2001, Owner is also authorized to divert water authorized by this amendment as follows:

Diversion Point 2 is located on the perimeter of Reservoir P, on Stone Creek, 5.6 miles southeast of Kerrville, bearing S 2.95° E, 3,488 feet from the south corner of the William Watt Original Survey No. 66, Abstract No. 365, also being at Latitude 29.966667° N, Longitude 99.1325° W. Water will be diverted at a maximum diversion rate of 0.2 cfs (100 gpm).

Diversion Point 3 is located on the perimeter of Reservoir Q, on Stone Creek, 5.7 miles southeast of Kerrville, bearing S 9.90° E, 3,991 feet from the south corner of the Watt Survey, also being at Latitude 29.965278° N, Longitude 99.130833° W. Water will be diverted at a maximum diversion rate of 0.2 cfs (100 gpm).

Diversion Point 4 is located on the perimeter of Reservoir N, on an unnamed tributary of Stone Creek, 5.3 miles southeast of Kerrville, bearing S 14.85° E, 1,785 feet from the south corner of the Watt Survey, also being at Latitude 29.971389° N, Longitude 99.131667° W. Water will be diverted at a maximum diversion rate of 1.1 cfs (500 gpm).

5. CONSERVATION

Owner shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water, so that a water supply is made available for future or alternative uses.

6. SPECIAL CONDITION

- A. In order to provide water quality benefits to the reservoirs and water bodies downstream, the permittee shall maintain a buffer zone of permanent vegetation around the perimeter of each reservoir consisting of native vegetation such as buffalo grass, bluestem, blue gramma, and muhly grass with the exception of reasonable access areas. The buffer zone shall be graded to have a slope no greater than 15%.
- B. This permit does not allow Owner to impound State water. Owner shall provide and maintain suitable outlets in good working condition in the reservoirs to pass all inflows of State water downstream and maintain the reservoirs full. Upon termination of this permit, Owner shall activate the outlets such that no State water is impounded in the reservoir.
- C. Owner shall maintain and operate an alternate source of water with sufficient production to ensure no State water is used. Owner has entered into a *Contract for Water Lease* with the owners of Certificate of Adjudication No. 18-2001 for an additional 104 acre-feet of water pursuant to an Upstream Diversion Contract based on the Guadalupe Blanco River Authority's (GBRA) Certificate of Adjudication No. 18-2074 for Canyon Reservoir as the alternate source of water for this project. Owner shall maintain records of the amount of water diverted and utilized. Owner shall provide documentation of same for review during normal business hours upon requests by either the Executive Director or members of the general public.
- D. This permit is issued contingent upon the Owner's maintenance of the alternate source of water identified in Paragraph (2) above. In the event the *Contract for Water Lease* will not be used as the alternate source, Owner shall immediately cease impoundment of water under this permit and either apply to amend this permit with documentation of the new alternate source of water, or voluntarily forfeit the permit. If Owner does not amend or forfeit the permit, the Commission shall be notified immediately by the Owner that the *Contract for Water Lease* will not be used as the alternate source of water for this permit.
- E. Diversion of water shall not occur at rates or in amounts higher than the actual daily amount of water discharged into Stone Creek and/or the unnamed tributary of Stone Creek after accounting for the calculated losses and travel time from the discharge point(s) to the diversion points.

- F. Prior to the diversion of water authorized herein, Owner shall contact the South Texas Watermaster.
- G. Prior to diversion of the water authorized herein, Owner shall install and maintain measuring devices, at the discharge point of the water and at any authorized diversion point, capable of measuring within plus or minus 5% accuracy, to record the amount of water discharged into Stone Creek and/or an unnamed tributary of Stone Creek and subsequently diverted on a daily basis.

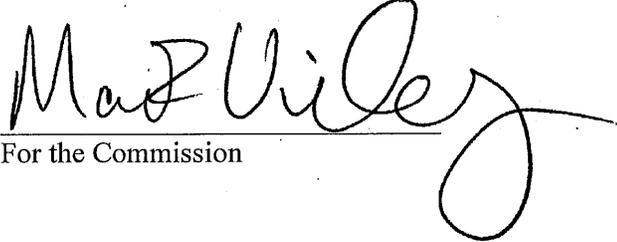
This amendment is issued subject to all terms, conditions and provisions contained in Certificate of Adjudication No. 18-2002, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Guadalupe River Basin.

Certificate Owner agrees to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.


For the Commission

Date Issued: **MAY 14 2010**