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## CHAPTER 10.0: PUBLIC INVOLVEMENT ACTIVITIES

### 10.1 OVERVIEW

The Lower Colorado Regional Water Planning Group (LCRWPG) made a commitment to conducting public outreach as a part of its duties as Planning Group members.

Major aspects of this effort included:

- **Holding 25 open regular meetings of the Planning Group** for presentation of material, discussion, deliberation, voting on specific measures, and public comment between February 2016 and October 2020. Members of the public attended all these meetings, which were posted on the Texas Secretary of State website and the Region K website in accordance with the Open Meetings Act. In accordance with the Texas Public Information Act, meeting minutes and other RWPG-related documents were posted on the Region K website for viewing and interested stakeholders that requested to be included in email notices received email communications regarding upcoming meetings. Every meeting included a scheduled time for public comment and questions. All the meetings were held in Austin in Travis County.
- **Holding a public meeting to receive input by the public** on the scope of work for the 2021 Region K Water Plan. This meeting was held on April 13, 2016. Resulting comments from the public are summarized in a table in *Appendix 10A*.
- **Holding a Water Planning 101 meeting** for new Region K members on March 9, 2016. This meeting had notice posted and was open to the public.
- **Serving as speakers at various civic and interest group meetings** representing a wide spectrum of interests and public opinion. These presentations took place throughout the planning period and in various counties of the region.
- **Conducting surveys** to obtain feedback on population and water demand projections and to obtain information regarding water supplies, water management strategies, and implementation of projects from the 2016 Plan.
- **Maintaining a web page** with documentation and notices of meetings and discussions, with links from the LCRA home page and the Texas Water Development Board (TWDB) website.
- **Using Committees** in order to assist in the review, consideration, and determination of the methodologies used to complete various parts of the 2021 Plan. Meetings were open to the public and many allowed for a more open dialogue between committee members and the public during the meeting.
- **Developing policy statements** through the Region K Legislative Committee regarding public involvement that have been adopted by Region K, and which are located in *Chapter 8* of this report.

Once the Region K Initially Prepared Regional Water Plan was approved by the Planning Group, the Group continued required public involvement by:

- **Holding a public hearing** to solicit public comments on the Initially Prepared Regional Water Plan. On March 16, 2020, Governor Greg Abbott granted a request by the Texas Attorney General to waive

certain requirements of the Texas Open Meetings Act, and the meeting was held virtually to limit face-to-face contact to slow the spread of the Coronavirus (COVID-19).

- **Making the Initially Prepared Regional Water Plan available** to the public by providing a copy of the Initially Prepared Region K Water Plan to at least one public library in each county in the region and either the county courthouse’s law library or the county clerk’s office for each county in the region and counties outside the region involved in Region K recommended water management strategies. The Initially Prepared Region K Water Plan was also posted on the Region K and TWDB websites.
- **Receiving and responding to a Public Information Request** from a stakeholder. A request for Region K-related emails was received on September 29, 2020. On October 6, 2020, the requested email documents were sent to the requestor. A comment from the requestor was then received on October 9, 2020, which was not timely for the public comment period. Information related to the request is included in *Appendix 10F*. Region K has no opinion on either of the conclusions determined in the Quarry Pit Opinion (included in *Appendix 10F*) and determined that no changes are needed to *Chapter 5*. Based on any future changes in water source determination, Region K would consider an amendment to the 2021 Region K Plan or an incorporation of the updated information into the 2026 Region K Plan.

The following sections detail the activities of the Regional Water Planning Group (RWPG) members.

**10.2 PLANNING GROUP MEETINGS THROUGHOUT THE REGION**

**Regular Planning Group Meetings**

Twenty-five (25) regular Planning Group meetings were held between February 2016 and October 2020 for presentation of material, discussion, deliberation, voting on specific measures, and public comment. These meetings were mainly held in Austin (in LCRA Dalchau Service Center). *Table 10.1* provides information on the feedback and comments received at the meetings.

**Table 10.1: LCRWPG Publicized Regular Planning Group Meetings**

Date	Meeting Location	# Public Attending	Public Comments
2/10/2016	LCRA Dalchau Service Center, Austin	15	None
4/13/2016	LCRA Dalchau Service Center, Austin	19	None
7/13/2016	LCRA Dalchau Service Center, Austin	10	None
10/12/2016	LCRA Dalchau Service Center, Austin	14	None
1/11/2017	LCRA Dalchau Service Center, Austin	14	Steven Cortez (Averitt and Associates) provided information on a statewide study to quantify water savings from planned water conservation efforts in the regional plans. David Lindsay provided comments on behalf of the Central Texas Water Coalition (CTWC) related to comments provided on water demand projections for irrigation. Mr. Lindsay indicated that CTWC submitted comments to TWDB on changing the basis for the

Date	Meeting Location	# Public Attending	Public Comments
			agricultural irrigation methodology aimed at building a stronger baseline for projections.
4/26/2017	LCRA Dalchau Service Center, Austin	11	Jordan Furnans (LRE Water) discussed the ongoing research funded by TWDB on subsidence risk statewide being performed by LRE Water and requested if any of the members were aware of any subsidence evidence or features to please let him know. The project is a year-long study.
7/12/2017	LCRA Dalchau Service Center, Austin	17	Jordan Furnans (LRE Water) spoke to the group about zebra mussels in the Highland Lakes, and how a Company called Environmental Quality and Operations (EQO) is working with the Texas Parks and Wildlife Department to help support efforts to limit the spread of zebra mussels. Dr. Furnans offered to speak to any organizations about how EQO can help in efforts combating zebra mussels.
10/11/2017	LCRA Dalchau Service Center, Austin	15	None
1/10/2018	LCRA Dalchau Service Center, Austin	20	Jordan Furnans (LRE Water) made a comment related to water modeling done by the RWPG. He stated that he has performed studies on modeling sedimentation and environmental flows, and both their effects on the firm water available in the WAM are minimal compared to modeling interruptible water. He encouraged the Group to keep in mind the impact of modeling interruptible water on the firm water available.
4/11/2018	LCRA Dalchau Service Center, Austin	15	Jordan Furnans (LRE Water) - take land subsidence into account when considering groundwater water management strategies related to groundwater pumping, as he recently provided TWDB with a report on the relationship of groundwater pumping and subsidence. Written comment provided by Jordan Furnans: To inform group of TWDB Subsidence Study Results and Availability of report/information.
7/11/2018	LCRA Dalchau Service Center, Austin	22	Troy Wenzel, Assistant Fire Chief at Pedernales Fire Department, Travis County, communicated his concern that their fire department relies on water from the Highland Lakes and that the lakes levels are falling. Low levels in the lakes mean their pumps cannot access water to fight fires. He would like the Region K group to take this into consideration in their decisions throughout the process.
8/29/2018	LCRA Dalchau Service Center, Austin	13	None

Date	Meeting Location	# Public Attending	Public Comments
10/24/2018	LCRA Dalchau Service Center, Austin	7	None
1/9/2019	LCRA Dalchau Service Center, Austin	9	None
4/24/2019	LCRA Dalchau Service Center, Austin	18	None
7/10/2019	LCRA Dalchau Service Center, Austin	21	None
10/9/2019	LCRA Dalchau Service Center, Austin	12	None
11/13/2019	LCRA Dalchau Service Center, Austin	14	None
1/15/2020	LCRA Dalchau Service Center, Austin	17	None
2/5/2020	LCRA Redbud Center, Austin	9	None
2/18/2020	LCRA Redbud Center, Austin	17	None
7/15/2020	Virtual	26	Cindy Smiley (Smiley Law Firm) spoke on behalf of the Central Texas Water Coalition. Smiley noted a new study, led by researchers at the University of Texas at Austin, was released in June 2020. This study states that Texas is facing unprecedented drought challenges and Texans need to prepare for a near future that is hotter, drier and fraught with more water extremes. Gary Newman, Region G, thanked the Region K RWPG for letting him attend.
8/12/2020	Virtual	13	None
9/15/2020	Virtual	25	Jordan Furnans (LRE Water) expressed appreciation to the LCRWPG for holding a consultant selection process for the sixth cycle of regional planning.
10/14/2020	Virtual	N/A	N/A

In addition to the regular planning group meetings, the LCRWPG has several sub-committees. These committees meet throughout each planning cycle to discuss certain parts of the plan in more detail. This planning cycle, recommendations from the committees were presented to the full planning group at regular planning group meetings. Committee meetings were open to the public. Meeting minutes from the relevant committees have been included as appendices in various chapters in the plan. *Table 10.2* lists each committee, the number of times the committee met, and whether members of the public attended any of the meetings.

**Table 10.2: LCRWPG Committees**

Committee	Number of Meetings	Public Attendance
Population and Water Demand	6	Yes
Water Modeling	5	Yes
Nominations	4	No
Water Management Strategies	10	Yes
Policy/Legislative	5	Yes
Unique Stream Segments	1	No

### 10.3 PRESENTATION TO CIVIC AND SPECIAL-INTEREST GROUPS

Using their own materials, Planning Group members gave presentations to civic and special-interest groups. *Table 10.3* provides a summary of this outreach effort with a listing of the LCRWPG presentations to civic and special interest groups.

These presentations were made to groups composed of individuals from all types of general and special interests that were identified by the TWDB in the establishment of the RWPGs.

**Table 10.3: LCRWPG Public Outreach: Presentations by RWPG Members to Other Groups**

Presenter	Date	County	Community Group	Topic/Subject
Jim Brasher	Regularly, throughout planning process	Colorado	Colorado County Groundwater Conservation District	Update on Region K planning
John Burke	2016	Bexar	Region L	Rainwater Harvesting
David Lindsay, Steve Box	April 2019	Travis	Region K Water Management Strategies Committee	Watershed Issues and the Suggested Strategy to Protect Inflows to the Colorado River

### 10.4 REGION K ACTIVITIES

#### 10.4.1 Advertising and Media

The LCRWPG advertised Region K regular and committee meetings through the Secretary of State website, the Region K website, and electronic mailouts to interested parties of meeting agendas and associated meeting materials.

#### 10.4.2 Surveys

The Planning Group conducted three surveys to obtain feedback on population and water demand projections, on water supplies and water management strategies for the 2021 planning cycle, and on

implementation of strategies recommended during the 2016 planning cycle. These letters and surveys are summarized below, and examples of the survey letters and types of responses are contained in *Appendix 10B*.

- The Regional Water Planning Population and Water Demand Projections survey was sent in February of 2017, to Water User Groups in the Region K area soliciting feedback on the draft population and water demand projections developed by TWDB. The TWDB required certain types of information be submitted as support for any proposed changes to their projections. Sixty-six (66) responses were received from the survey. The information received in the survey responses aided the Population and Water Demand Committee in developing its revision request to TWDB. See *Appendix 10B* for an example of the survey letter and accompanying materials. See *Appendix 2C* in *Chapter 2* for the documented population and water demand revision request submitted by the LCRWPG to TWDB.
- A survey to help identify the current water supplies and potentially feasible water management strategies was sent to Water User Groups in February of 2018. Sixty-four (64) responses were received. See *Appendix 10B* for an example of the correspondence and the survey. The information provided by the Water User Groups aided in the development of *Chapter 3* and *Chapter 5* of the 2021 Region K Water Plan.
- A survey requesting information related to implementation of water management strategies recommended in the 2016 Region K Water Plan was sent to Water User Groups (project sponsors) in November 2019. The survey itself was developed from questions in a spreadsheet template provided by TWDB. Seventeen (17) recipients responded, and most responders were project sponsors for more than one project. See *Appendix 10B* for an example of the correspondence and the survey. The results of the survey are included in *Appendix 11A* in *Chapter 11*.

#### 10.4.3 Public Meetings and Hearing

In addition to the meetings shown earlier in *Table 10.1*, an additional meeting was held for the primary purpose of gaining input and answering questions from the public on Region K's grant application for the 5<sup>th</sup> cycle of regional water planning. This meeting was held on April 13, 2016. The public input received was summarized in a table included in *Appendix 10A*.

One public hearing was scheduled and held on April 22, 2020 to receive public comments on the Initially Prepared 2021 Region K Water Plan. Proper notice was given prior to the public hearing, in accordance with the rules and guidelines. Due to the Coronavirus Disease 2019 (COVID-19) pandemic, the in-person portion of the public hearing was canceled, and the meeting was held via a publicly accessible telephone conference call. No oral public comments were received at the meeting. *Appendix 10C* contains the public hearing notice, the presentation posted online prior to the public hearing, and the meeting minutes.

Written comments from State agencies were received from both the TWDB and the Texas Parks & Wildlife Department. These comments, including the comment cover letter from TWDB that addresses what needs to be included in the final adopted plans, and their respective comment responses are provided in *Appendix 10D*. Written comments were received from the public until June 21, 2020. Comments and comment responses from Region K are included in *Appendix 10E*.

## **10.5 RELATED OUTREACH ACTIVITIES WITHIN THE REGION K AREA BEYOND THE LCRWPG**

There are several studies, workgroups, and legislative committees whose findings may affect the way water needs are met, what the requirements will be, and other factors. The following related studies are activities within the Region K area beyond the LCRWPG.

### **10.5.1 LCRA Water Management Plan**

During the majority of the current planning cycle, LCRA has operated the Lower Colorado River under provisions of the 2015 Water Management Plan (WMP). This plan was approved by Texas Commission on Environmental Quality (TCEQ) as a condition of the LCRA's water rights permits for lakes Buchanan and Travis, the two major water supply reservoirs in the Highland Lakes. An amendment to the plan was developed through a stakeholder process that began in 2018 and was approved by TCEQ in February 2020.

General information and a copy of the amendment can be found on the LCRA's website at [www.lcra.org](http://www.lcra.org).

### **10.5.2 Environmental Flows Advisory Group**

The 80<sup>th</sup> Texas Legislature established the Environmental Flows Advisory Group which is composed of nine members. This group is comprised of three Senate members, three House members and three public members. The public members are representatives of TCEQ, TWDB, and TPWD. This Advisory Group is tasked with balancing the demand placed on the State's water resources by the growing population and the requirements of the riverine, bay, and estuary systems. To assist them, the Advisory Group formed the Texas Environmental Flows Science Advisory Committee along with Basin and Bay Area Stakeholders Committees (BBASC). Additional committee information, updates and activities can be found at TCEQ's website at: [https://www.tceq.texas.gov/permitting/water\\_rights/wr\\_technical-resources/eflows/colorado-lavaca-bbasc](https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/eflows/colorado-lavaca-bbasc)

In September 2009, the Texas Environmental Flows Advisory Group appointed members of the Colorado and Lavaca Rivers and Matagorda and Lavaca Bays BBASC. The committee made recommendations to the TCEQ on the quantity of water needed to maintain the health of the named rivers and bays. TCEQ adopted new environmental flow standards from the input they received from the Committee that became effective in August 2012.

During this planning cycle, the BBASC has met three times, once in 2017 and twice in 2019, to receive presentations on various studies being performed on the local rivers and bays.

### **10.5.3 Irrigation District Advisory Panel**

There are advisory panels for each of the three irrigation divisions operated by LCRA: Garwood, Lakeside, and Gulf Coast. These groups are self-elected and are sponsored by LCRA. LCRA discusses with these groups anything related to LCRA's operations that is relevant to the customer groups. The discussions range from rate changes, changes in operations procedures, key projects impacting the irrigation districts, and other items that need to be communicated.



***APPENDIX 10A***

***SUMMARY OF PUBLIC INPUT FROM MEETING HELD APRIL 13, 2016***

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

**Region K responsibility (Y1 - Y27):**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
Y1	Overall Planning Process	RWPG should adopt and apply a set of guiding principles to serve as a blueprint for long-term water sustainability	Hill Country Alliance	2016- 2017	Core principles maintain clarity of mission and inform the process.	Region K	Yes, Hill Country Alliance will draft and submit to Reg K for consideration
Y2	Overall Planning Process	Recommendations for future planning in Chapter 8 will be presented and reviewed in each appropriate chapter; Would like confirmation that IPP Review comments will be considered in 2021 Region K planning and assume they will be presented and reviewed in each appropriate chapter; Recommend all comments in the IPP list and Chapter 8 be combined into one list and organized by Chapter and Time order to create a review checklist for the RWPG	Donna Klaeger	2016-2020		Region K (Not a TWDB requirement, though)	Yes
Y3	Regional Planning Description	Add discussion to Chapter 1 of the climate-related differences, drivers and impacts across the Colorado River Basin within Region K, particularly the Balcones Escarpment where the Gulf Coastal Plains transition into the Texas Hill Country	David Lindsay; Central Texas Water Coalition	By end of 2019	Provides important context for influences on future water supplies and availability	Region K	Yes
Y4	Regional Planning Description	Chapter 1 does not provide a basin wide economic review. Recommend replacing Chapter 1 with a complete review of the Colorado River Basin economic status	Donna Klaeger	By end of 2019	Refer to Region F complete economic review by county of its region.	Region K	Yes, Region K will consider modifying current Chapter 1 section to include data similar to Region F plan.
Y5	Population and Demand Projections	Review methodology and assumptions behind generating agricultural irrigation demands	Central Texas Water Coalition/ Kevin Klein	Fall 2016 / Spring 2017	Use of three different irrigation demand data sets (1992-2011, 2000-2011 and 2009) is inconsistent, irrigated acres and water use/acre not considered in demand calculations, historical use numbers may not reflect accurately reflect future use	Region K	Yes

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
Y6	Population and Demand Projections	Believe the Domestic and Livestock demands are understated.	No Colorado River Dam	Fall 2016 / Spring 2017	Been told that D&L demand is determined by various indirect methods. Why not identify the number of D&L users, apply a reasonable projection of demand, and list it as a separate WUG in the projections? Currently these estimates are buried somewhere in Livestock and/or County-Other. Why not be clear about these needs?	Region K	Yes
Y7	Population and Demand Projections and Water Availability	Incorporate consideration of climate change and thus climate uncertainty into both our supply and demand planning.	City of Austin - Austin Water	2016-2018	Including discussion of these items early in the process could strengthen our approach to drought planning and overall preparedness for a range of climate conditions.	Region K	Yes, City of Austin Water Utility will share data
Y8	Water Availability	Reassess firm yield calculations for Lakes Buchanan and Travis	Central Texas Water Coalition; Joe Don Dockery (Burnet County Commissioner)	By September 2018	LCRA will be operating under a new water management plan as of 2016, which will create the need to update firm supply as well as other aspects of the plan.	Region K	Yes
Y9	Water Availability	Incorporate as much as possible extended hydrology for WAM modeling into our planning (including naturalized hydrology data for 2014 and beyond).	City of Austin - Austin Water	2017-2018	Including discussion of these items early in the process could strengthen our approach to drought planning and overall preparedness for a range of climate conditions.	Region K (if data is available)	Yes, if available
Y10	Water Management Strategies	The total volume of yield from recommended WMS should be similar to or equal to the volume needed to meet water shortages	Sierra Club/ NWF/ Environment Texas/ Hill Country Alliance	Spring-Fall 2018	RWPs are reworked every 5 yrs, amendment process is straightforward, alternate water strategy category already exists	Region K	Yes
Y11	Water Management Strategies	Adopt policy change to make conservation goals more aggressive for WUGS with GPCD between 140 and 200.	Sierra Club/ NWF/ Environment Texas/ Hill Country Alliance	Spring-Fall 2018	2012 Region K Plan had this stronger water conservation recommendation, 140 gpcd is attainable (ex. Austin)	Region K	Yes
Y12	Water Management Strategies	Include wider breadth of discussion regarding the necessity of flood irrigation as the main irrigation method; Include additional WMS for agricultural irrigation as supported by research and application in other communities	Central Texas Water Coalition	By end of 2019	Alternatives to flood irrigation should be discussed as well as a wider breadth of management techniques to make flood irrigation more efficient. Innovative water management strategies for agricultural irrigation such as drip irrigation and use of brackish groundwater were not included in the 2016 Region K water plan	Region K	Yes
Y13	Water Management Strategies	Include more detailed discussion in Chapter 5 on feasibility/legality of enhanced recharge water management strategy	Central Texas Water Coalition	By end of 2019	This is a complicated concept and should be vetted further.	Region K	Yes

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
Y14	Water Management Strategies	Revisit quantification of savings for on-farm sprinkler irrigation water management strategy and assumptions behind savings	LCRA	Fall 2018- Fall 2019	Based on a survey conducted for LCRA through UT, only 25% of Lakeside farmers flush as a standard practice before holding a permanent flood. Including artificially high savings for this strategy makes it seem more cost effective than most other strategies with that may not be the case.	Region K	Yes
Y15	Water Management Strategies	Work with NRCS to modify potential irrigated acreage where on-farm strategies can be adopted to include groundwater areas, not just LCRA's service areas	LCRA- new comment	Spring- Fall 2019	Current adoption rates are only based on LCRA's service area and are therefore under- estimated	Region K	Yes
Y16	Water Management Strategies	Revisit City of Wharton water supply strategy to adopt as a recommended or alternative strategy	City of Wharton	Spring-Fall 2018	This strategy was included in the 2016 Region K Plan as a considered but not recommended or alternative strategy due to the late timing of submittal to the RWPG and the lack of feasibility studies.	Region K	Yes
Y17	Water Management Strategies	Prioritize and encourage water neutral decentralized systems that capture, use and reuse water in place.	Hill Country Alliance	Spring-Fall 2018	19th Century transmission pipeline infrastructure systems encourage waste and the de- watering of one region at the expense of another.	Region K	Yes
Y18	Water Management Strategies	Promote dredging of the Highland Lakes by LCRA to increase the capacity of the lakes.	Joe Don Dockery (Burnet County Commissioner), Donna Klaeger	Spring- Fall 2019	By TWDB's estimation, the Highland Lakes have lost 155,000 to 175,000 acre/feet of permitted storage to siltation since their construction. Keeping in mind this lost storage is already permitted. It simply needs to be reclaimed.	Region K	Yes, will consider as a strategy
Y19	Water Management Strategies	Region K should establish rules that make it clear that if a water user proposes a project, it is the RWPG's responsibility to include the project in the plan subject to any concerns or issues raised by opponents of the project. The rules should clarify that Region K is not a regulatory agency and should not "decide" whether a project should be approved, but rather should evaluate and analyze those strategies put forward.	City of Goldthwaite	Spring-Fall 2018	The City of Goldthwaite's in-channel dam project was removed from the 2016 Plan as a recommended strategy.	Region K	N/A; projects that provide no water supply during a drought of record do not meet TWDB guidelines for inclusion in regional water planning

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
Y20	Water Management Strategies	Concern regarding Hays County Pipeline project	Barbara Hopson, Wimberley resident	Spring- Fall 2019	According to the State Plan's own reckoning, the Wimberley area will not need additional water until 2040 at the earliest, although the Dripping Springs area needs additional water immediately because the City of Dripping Springs continues to approve plats for enormous subdivisions for which there is insufficient water available.	Region K	Yes
Y21	Water Management Strategies	Consider more rainwater harvesting as a strategy for the Region	TBD	Spring- Fall 2019		Region K	Yes
Y22	Water Management Strategies and Policy Recommendations	Policy recommendation for each WUG to consider alternative supplies such as reuse and rainwater in addition to water conservation before adopting large infrastructure projects to import water long distances	Hill Country Alliance	Spring-Fall 2018	Conservation and re- use are more economical than building large infrastructure at public expense so that a few user groups can consume large amounts of water on discretionary uses.	Region K	Yes, but not as a policy
Y23	Water Management Strategies (Environmental Impacts)	Evaluate cumulative impacts of new WMS on instream flows	Sierra Club/ NWF	Spring-Fall 2019	multiple new downstream surface storage, direct/indirect reuse and full use of water rights can have cumulative impacts on instream flows	Region K	Yes
Y24	Water Management Strategies (Ch 5) and Implementation (Ch 11)	Apply quantifiable targets and metrics for water conservation to all water user groups, not just municipal	Central Texas Water Coalition/ Kevin Klein; Donna Klaeger	Spring-Fall 2018	Consistency is needed across water user groups to quantify conservation goals and track progress toward goals	Region K	Yes, if data is available
Y25	Policy Recommendation	Request the RWPG discuss a request to study to understand the hydrology for low inflows and a study to provide a current firm yield from the Highland Lakes, so that we are dealing with verified yields in this plan	Donna Klaeger	2016-2017		Region K	Yes
Y26	Consultant Procurement	Recommends Region K use an RFQ process to select a consultant.	Jordan Furnans, LRE Water LLC	Fall 2020 - Spring 2021	n/a	Region K	N/A
Y27	Water Supply and Water Management Strategies	Describe process to determine environmental water needs and results/recommendations (SB3 process)	Sierra Club/ NWF	2019	Region K acknowledges that environmental water needs are important and should be included in the plan, but it is not in our purview to recommend strategies to meet those needs at this time.	Region K	Yes

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

**Not Region K responsibility, but Region K may consider (M1 - M13):**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
M1	Overall Planning Process	Strengthen collaborations with allies, state agencies, universities, and other planning groups	No Colorado River Dam	2016-2020	There are many ways that allies in the region, including state agencies and universities, as well as other planning groups, can come together to identify ways to improve the vitality of the river. Particular concern about the health of the river near The Biological Field Station at the Timberlake Ranch and Colorado Bend State Park.	Not Region K responsibility, but individual members can act if they so choose	Potentially, using no TWDB funds. Educational field trip may be an idea for Region K members
M2	Regional Planning Description and Water Management Strategies	Address distribution and conveyance system water loss for agricultural irrigation water users	Central Texas Water Coalition	Spring- Fall 2019	Water loss is addressed for municipal water user groups in Chapter and therefore should be addressed for agricultural water user groups as well.	TWDB	Region K will request data, if available
M3	Population and Demand Projections	Revision of population and water demand estimates should go through a formal public comment process	Hill Country Alliance	Fall 2016 / Spring 2017	This will make the revision process more transparent	TWDB (process already in place)	Yes
M4	Water Availability	Assumptions used in Water Availability models regarding demand seem unreasonable.	No Colorado River Dam	By September 2018	Under DOR conditions, it seems impossible that 100% of authorized demand would be available to all permit holders. Those who live on the Colorado River realize that the river can't deliver 100% of demand under what has become "new normal" conditions. Why not statistically validate the model using past projections with documented actuals? If we can get the assumptions and the models right, we'll be able to make wiser decisions.	TWDB / TCEQ	Region K will look at as part of modeling assumptions
M5	Water Management Strategies	Address how to include distribution- side extensions of reuse projects as viable recommended water management strategies that have associated project costs	LCRA -new comment	2016-2017	There are several municipalities around the highland lakes that have active reuse programs that do not have associated costs in the 2016 regional water plan due to lack of information or that they are extensions of existing reuse lines. This is an important strategy that needs to be included as a viable WMS in the water planning process	TWDB	Will look for guidance from TWDB; may be considered as a Chapter 8 recommendation
M6	Water Management Strategies/ Conservation and Policy Recommendations	Encourage WUGs within Region K to develop more uniform conservation oriented management plans	Hill Country Alliance	Spring-Fall 2019	Conservation and re- use are more economical than building large infrastructure at public expense so that a few user groups can consume large amounts of water on discretionary uses.	TCEQ	Hill Country Alliance can provide information for Region K to consider

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
M7	Drought Response (Chapter 7)	Include information pertaining to extended drought-related climatology cycles and historical extended drought cycles that have been more severe than the Drought of Record, should be incorporated in this planning cycle	David Lindsay	By March 2020	This information could provide valuable insights and context to consider regarding the question of whether our current water planning processes are sufficiently responsive and protective	N/A	If data is available
M8	Policy Recommendation	Authorize study on the relationship between groundwater level elevations and spring-flow rates in hill country rivers	Hill Country Alliance	2016-2017	The relationship between groundwater level elevations and spring-flow rates in most hill country rivers is poorly understood. Few monitoring wells exist that can provide continuous water level readings and this data has not been compared to spring flows	N/A	If data is available
M9	Policy Recommendation	Advocate to lift the discharge ban for the Highland Lakes	Joe Don Dockery (Burnet County Commissioner), Donna Klaeger	By March 2020	The currently available wastewater treatments can equal or surpass the water quality levels of naturally occurring water sources and should be included in returns to the water storage facilities.	Individual stakeholders; Region K (Chapter 8 policy recommendation only)	Yes, consider as part of Chapter 8
M10	Policy Recommendation	Request TCEQ to expand the permitted uses of "purple pipe" (treated effluent) water by municipalities to relieve the pressure on our existing raw water sources.	Joe Don Dockery (Burnet County Commissioner)	By March 2020	n/a	Individual stakeholders; Region K (Chapter 8 policy recommendation only)	Yes, consider as part of Chapter 8
M11	Policy Recommendation	Ask LCRA to reexamine the impacts of the Non-point Source Pollution Ordinance on inflows to the water storage system.	Joe Don Dockery (Burnet County Commissioner)	By March 2020	The Highland Lakes Watershed Ordinance is too aggressive in its capture of runoff from impervious cover construction, therefore withholding inflows. The requirements are also an impediment to new commercial growth in the Highland Lakes area from an added cost of construction aspect.	Individual stakeholders; Region K (Chapter 8 policy recommendation only)	Yes, consider as part of Chapter 8
M12	Unique Stream Segments	Region K recommend designation of the ten streams identified as warranting further study for consideration as unique stream segments be designated by the 2017 Legislature	Hill Country Alliance	2016 to be addressed in 2017 session	Increases visibility, ecological and economic value of particular stream segments	State Legislature	Include the same ten in Chapter 8 as previous plans
M13	Overall Planning Process	Focus on the health of the river	No Colorado River Dam	2016-2020	Because the Colorado River is the lifeblood of Region K, we suggest the RWPG start with an intensely fresh focus on the health of the river and the controllable conditions in the river basin that affect water quality and availability.	TCEQ / State Legislature	Region K considers environmental flow and water quality issues as part of the strategy evaluation process

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.

**Region K Initial Consideration of Public Input on Planning Process for 5th Cycle**

**Not Region K responsibility, and Region K will not consider (N1 - N7):**

#	RWP Task	Topic	Organization	RWP Timeframe	Supporting arguments	Responsibility	Will Region K Consider for 2021 RWP Inclusion?
N1	Population and Demand Projections	Include environmental water needs as water user groups	Sierra Club/ NWF/ Environment Texas/ Central Texas Water Coalition	2016	Formalizing a process to include environmental water needs as a water user group will ensure that water needs for instream flows are accounted for just like any other water user category	State Legislature / TWDB	No, refer to Y27 for additional information related to environmental water needs
N2	Population and Demand Projections	Include the protection of recreational use as a formal category of use to be planned for	Central Texas Water Coalition	2016		State Legislature / TWDB	No, but the plan will continue to include discussion related to recreation and its importance to the Region
N3	Water Management Strategies	Include water pricing as a water management strategy for all water user groups	Central Texas Water Coalition / Frank Cooley; Donna Klaeger	Spring-Fall 2018	Tiered pricing is a proven, cost-effective water management strategy	Water wholesalers and retailers	No, however Region K could consider including a Chapter 8 recommendation regarding water pricing
N4	Water Management Strategies	Implore LCRA to increase the "full" lake level of Lake Buchanan from 1018 msl to 1020 msl.	Joe Don Dockery (Burnet County Commissioner), Donna Klaeger	Spring- Fall 2019	This additional storage capacity would equate to approximately 45,000 acre/feet of increased raw water, or 5,000 acre/feet more than the LCRA Lane City reservoir currently under construction. With the addition of lifts at each individual gate on Buchanan Dam and the installation of the Hydromet warning system, this can be a reality in the very near future.	LCRA	No
N5	Drought Response (Chapter 7)	Include a more comprehensive drought plan for LCRA's irrigation districts	Central Texas Water Coalition	By March 2020	Drought planning should be addressed equally across all water user groups	LCRA	Refer to LCRA
N6	Policy Recommendation	Clarify TCEQ Rule TAC 295.16 so that TCEQ would have a defensible basis to cease processing an application which was specifically omitted from the Water Plan.	No Colorado River Dam	2016	Region K did not include the Goldthwaite In-Channel Dam project as a recommended strategy in the 2016 RWP, but proponents continue to suggest the dam is justified and TCEQ spends public resources to process the permit application.	TCEQ	No
N7	Unique Stream Segments	Add additional unique stream segments to the Region K list for cycle 5	Hill Country Alliance	By March 2020	Increases visibility, ecological and economic value of particular stream segments	State Legislature	No

Region K responsibility (Y1 - Y27)

Not Region K responsibility, but Region K may consider (M1 - M13)

Not Region K responsibility and Region K will not consider (N1 - N7)

Consideration does not guarantee inclusion.



*APPENDIX 10B*

*1. REGION K POPULATION AND WATER DEMAND PROJECTIONS  
SURVEY*

*2. REGION K WATER SUPPLY AND STRATEGY SURVEY*

*3. REGION K IMPLEMENTATION SURVEY*

February 15, 2017



**Subject: Lower Colorado Regional Water Planning Area (Region K)  
Draft Projected Population and Water Demands for 2021 Regional Water Plan  
Please Review and Respond**

Dear Water User Group Representative:

The Texas Water Development Board (TWDB) has developed and released for review the **draft population and municipal water demand projections** intended for use in developing the 2021 Region K Water Plan. The Lower Colorado Regional Water Planning Group (Region K) is currently reviewing the draft projections for the region and is **seeking input from local utilities** to either verify the projections appear accurate or request that the TWDB consider revising the numbers.

As part of the 2021 Regional Water Plan, the consultant team is currently performing tasks related to the allocation of water supply and demand for Water User Groups (WUGs) in our region to determine projected future water shortages. A WUG consists of a demand center to which water resources can be allocated. Municipal WUGs are associated with populations within and outside of water utility service areas, and the projections of these populations are used to estimate future water demands. This utility-based planning method is slightly different from previous planning cycles, where city limits were also used to determine population areas. As a result, please note that the draft population and municipal demand projections provided by TWDB in the attached table should represent your entire water utility service area. For city water utilities, this may be less than or greater than the population within the city limits.

The draft population projections that have been provided by the TWDB for the 2021 Region K Water Plan use the 2010 Census data as a base, which the State Demographer and TWDB staff have projected out into the future. The associated municipal water demand projections rely on per capita water use as reported in the 2011 Water Use Survey to the TWDB, which have then been projected out to 2070. Additionally, the per capita water use values have been modified for anticipated plumbing code efficiency savings, which can explain why water demands might decrease over time.

The attached table lists all of the municipal WUGs located within Region K in alphabetical order. Rural areas that did not meet the criteria for being defined as an individual WUG are listed as "County-Other" in the table. If a WUG is located in more than one county and/or region, each of the county/region components and a summed total are shown to provide the entire picture.

We are asking that you review the population and demand projections for your WUG and respond with either:

- The numbers represent reasonable projections and require no revision, or

February 15, 2017

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- You would like to revise your projections and can provide information to support your request.

If **no revisions** are requested, a quick call or email to let us know you've reviewed the numbers and have no changes would be very appreciated. My contact information is at the end of this letter.

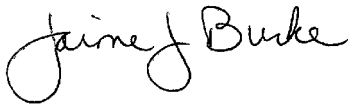
If you believe adjustments to the population and/or water demand projections may be warranted, please contact me so we can discuss your entity and what documentation might be needed by TWDB to back up a modification. Please contact me at your earliest convenience, preferably no later than **May 1, 2017**.

In addition, if after reviewing the water demand numbers, you have concerns regarding whether your current water supplies are able to meet your future water demands, Region K would be very glad to talk with you about what types of water management strategies would be appropriate to recommend for your WUG in the 2021 Region K Water Plan. Having a strategy or project recommended in a Region Water Plan can help in the process of applying for certain types of State funding.

You may contact me with any additional questions you have regarding the draft projections or regional water planning. I may be reached directly at (512) 457-7798 or at [jaime.burke@aecom.com](mailto:jaime.burke@aecom.com). For additional information, please also visit Region K's website at [www.regionk.org](http://www.regionk.org) and the TWDB's regional water planning webpage <http://www.twdb.texas.gov/waterplanning/rwp/index.asp>.

Thank you for taking the time to help support the regional water planning process in Texas.

Sincerely,



Jaime Burke, P.E.

Project Manager

AECOM

Consultant for the Lower Colorado Regional Water Planning Group (Region K)

Direct 512-457-7798

[jaime.burke@aecom.com](mailto:jaime.burke@aecom.com)

Enclosure – Table containing TWDB draft projections for all municipal WUGs in Region K

Copy: File

TWDB Draft Projections for 2022 State Water Plan																
RWP Utility ID	Region	County	Water User Group (WUG) Name	Population 2020	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070	Base GPCD	Municipal Demands 2020 (Ac-Ft/Yr)	Municipal Demands 2030 (Ac-Ft/Yr)	Municipal Demands 2040 (Ac-Ft/Yr)	Municipal Demands 2050 (Ac-Ft/Yr)	Municipal Demands 2060 (Ac-Ft/Yr)	Municipal Demands 2070 (Ac-Ft/Yr)
87	K	BASTROP	AQUA WSC	56,184	73,878	96,878	128,039	170,128	226,087	156	9,226	11,834	15,310	20,112	26,678	35,425
87	K	FAYETTE	AQUA WSC	24	27	30	31	33	34	156	4	4	5	5	5	5
87	K	TRAVIS	AQUA WSC	6,627	7,652	8,618	9,700	10,656	11,544	156	1,088	1,226	1,362	1,524	1,671	1,809
87	G	LEE	AQUA WSC	2,832	3,184	3,386	3,460	3,509	3,536	156	465	510	535	543	550	554
87	L	CALDWELL	AQUA WSC	1,730	2,118	2,501	2,879	3,261	3,633	156	284	339	395	452	511	569
			AQUA WSC TOTAL	67,397	86,859	111,413	144,109	187,587	244,834	156	11,067	13,913	17,607	22,636	29,415	38,362
115	K	HAYS	AUSTIN	74	796	1,560	3,957	9,535	17,255	157	13	133	260	660	1,591	2,880
115	K	TRAVIS	AUSTIN	960,709	1,125,478	1,285,243	1,402,811	1,496,994	1,607,291	157	162,496	187,844	214,509	234,131	249,850	268,259
115	K	WILLIAMSON	AUSTIN	47,680	59,897	74,334	89,882	107,514	126,860	157	8,065	9,997	12,406	15,001	17,944	21,173
			AUSTIN TOTAL	1,008,463	1,186,171	1,361,137	1,496,650	1,614,043	1,751,406	157	170,574	197,974	227,175	249,792	269,385	292,312
154	K	TRAVIS	BARTON CREEK WEST WSC	1,337	1,337	1,337	1,337	1,337	1,337	272	396	392	389	388	387	387
155	K	TRAVIS	BARTON CREEK WSC	702	832	956	1,047	1,121	1,206	649	504	594	681	745	798	858
158	K	BASTROP	BASTROP	11,069	15,008	20,129	27,068	36,439	48,898	191	2,244	2,978	3,951	5,288	7,111	9,536
161	K	BASTROP	BASTROP COUNTY WCID 2	5,007	7,450	10,626	14,930	20,741	28,469	94	479	690	971	1,357	1,882	2,580
165	K	MATAGORDA	BAY CITY	19,285	20,300	20,950	21,453	21,810	22,066	145	2,916	2,969	2,985	3,031	3,074	3,110
208	K	BURNET	BERTRAM	1,764	2,134	2,445	2,745	3,007	3,235	227	430	511	581	649	710	764
235	K	BLANCO	BLANCO	2,156	2,563	2,802	2,927	3,010	3,061	161	365	423	456	472	485	493
268	K	WHARTON	BOLING MWD	855	910	954	992	1,027	1,058	119	105	107	109	112	115	119
308	K	TRAVIS	BRIARCLIFF	2,009	2,320	2,613	2,942	3,231	3,500	141	300	340	380	425	466	504
320	K	MILLS	BROOKSMITH SUD	48	50	51	53	55	57	142	7	7	7	7	8	8
320	F	BROWN	BROOKSMITH SUD	8,047	8,240	8,241	8,240	8,240	8,241	142	1,199	1,195	1,170	1,156	1,153	1,153
320	F	COLEMAN	BROOKSMITH SUD	41	42	42	42	42	42	142	6	6	6	6	6	6
			BROOKSMITH SUD TOTAL	8,136	8,332	8,334	8,335	8,337	8,340	426	1,212	1,208	1,183	1,169	1,167	1,167
340	K	HAYS	BUDA	9,831	14,132	19,369	25,916	33,315	41,735	168	1,768	2,508	3,419	4,563	5,860	7,338
340	L	HAYS	BUDA	1,658	2,184	2,826	3,627	4,533	5,564	168	298	388	499	639	797	978
			BUDA TOTAL	11,489	16,316	22,195	29,543	37,848	47,299	168	2,066	2,896	3,918	5,202	6,657	8,316
354	K	BURNET	BURNET	7,424	8,983	10,298	11,555	12,660	13,619	231	1,844	2,197	2,497	2,790	3,054	3,284
392	K	MATAGORDA	CANEY CREEK MUD OF MATAGORDA COUNTY	2,088	2,198	2,270	2,324	2,362	2,390	118	252	255	255	258	261	264
398	K	BLANCO	CANYON LAKE WATER SERVICE	665	933	1,204	1,478	1,749	2,011	119	83	115	147	180	213	245
398	L	COMAL	CANYON LAKE WATER SERVICE	37,856	53,126	68,559	84,107	99,577	114,491	119	4,742	6,540	8,388	10,258	12,127	13,934
			CANYON LAKE WATER SERVICE TOTAL	38,521	54,059	69,763	85,585	101,326	116,502	119	4,825	6,655	8,535	10,438	12,340	14,179
436	K	TRAVIS	CEDAR PARK	10,913	11,641	12,521	12,521	12,521	12,521	193	2,251	2,387	2,554	2,550	2,547	2,546
436	G	WILLIAMSON	CEDAR PARK	81,716	90,641	90,641	90,641	90,641	90,641	193	16,857	18,582	18,490	18,457	18,441	18,434
			CEDAR PARK TOTAL	92,629	102,282	103,162	103,162	103,162	103,162	193	19,108	20,969	21,044	21,007	20,988	20,980
486	K	BURNET	CHISHOLM TRAIL SUD	379	460	527	591	647	696	174	70	84	96	107	117	126
486	G	BELL	CHISHOLM TRAIL SUD	2,967	3,488	4,027	4,562	5,086	5,602	174	551	640	734	829	923	1,016
486	G	WILLIAMSON	CHISHOLM TRAIL SUD	24,194	30,392	38,113	46,427	55,854	65,602	174	4,496	5,575	6,948	8,438	10,138	11,901
			CHISHOLM TRAIL SUD TOTAL	27,540	34,340	42,667	51,580	61,587	71,900	174	5,117	6,299	7,778	9,374	11,178	13,043
494	K	HAYS	CIMARRON PARK WATER	2,115	2,115	2,115	2,115	2,115	2,115	112	244	236	230	226	225	225
531	K	COLORADO	COLUMBUS	3,832	3,999	4,123	4,305	4,457	4,605	274	1,134	1,164	1,185	1,229	1,271	1,313

- List presented alphabetically by Water User Group (WUG) Name (4th column)
- Utilities in more than one county and/or region are shown so and have been totaled. All others occupy a single line.

TWDB Draft Projections for 2022 State Water Plan																
RWP Utility ID	Region	County	Water User Group (WUG) Name	Population 2020	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070	Base GPCD	Municipal Demands 2020 (Ac-Ft/Yr)	Municipal Demands 2030 (Ac-Ft/Yr)	Municipal Demands 2040 (Ac-Ft/Yr)	Municipal Demands 2050 (Ac-Ft/Yr)	Municipal Demands 2060 (Ac-Ft/Yr)	Municipal Demands 2070 (Ac-Ft/Yr)
570	K	BURNET	CORIX UTILITIES TEXAS INC	809	979	1,122	1,259	1,379	1,484	149	126	149	168	187	204	220
570	K	COLORADO	CORIX UTILITIES TEXAS INC	275	287	296	309	320	331	149	43	44	44	46	47	49
570	K	LLANO	CORIX UTILITIES TEXAS INC	1,199	1,211	1,223	1,235	1,248	1,260	149	187	184	183	184	185	187
570	K	MATAGORDA	CORIX UTILITIES TEXAS INC	43	46	47	48	49	50	149	7	7	7	7	7	7
570	K	MILLS	CORIX UTILITIES TEXAS INC	74	76	78	81	84	87	149	12	12	12	12	12	13
570	K	SAN SABA	CORIX UTILITIES TEXAS INC	94	99	100	98	100	103	149	15	15	15	15	15	15
570	G	LAMPASAS	CORIX UTILITIES TEXAS INC	2,226	2,280	2,417	2,562	2,664	2,770	149	348	347	362	381	395	411
570	G	WASHINGTON	CORIX UTILITIES TEXAS INC	3,690	3,926	4,087	4,247	4,372	4,473	149	577	598	612	631	648	663
			CORIX UTILITIES TEXAS INC TOTAL	8,410	8,904	9,370	9,839	10,216	10,558	149	1,315	1,356	1,403	1,463	1,513	1,565
579	K	TRAVIS	COTTONWOOD CREEK MUD 1	1,447	1,715	1,970	2,158	2,312	2,485	80	116	133	149	161	172	184
580	K	BURNET	COTTONWOOD SHORES	1,395	1,688	1,935	2,171	2,379	2,559	154	227	268	304	339	371	398
	K	BASTROP	COUNTY-OTHER, BASTROP	7,794	9,006	10,575	12,706	15,585	19,413	170	1,418	1,616	1,884	2,255	2,761	3,437
	K	BLANCO	COUNTY-OTHER, BLANCO	8,141	9,538	10,243	10,480	10,549	10,486	120	1,008	1,143	1,205	1,222	1,227	1,219
	K	BURNET	COUNTY-OTHER, BURNET	20,892	22,826	22,151	24,000	26,259	28,955	146	3,207	3,424	3,272	3,520	3,842	4,234
	K	COLORADO	COUNTY-OTHER, COLORADO	11,810	12,325	12,705	13,267	13,735	14,189	119	1,453	1,463	1,467	1,508	1,557	1,607
	K	FAYETTE	COUNTY-OTHER, FAYETTE	9,589	10,943	11,825	12,511	13,015	13,353	112	1,095	1,198	1,259	1,313	1,362	1,397
	K	GILLESPIE	COUNTY-OTHER, GILLESPIE	14,739	15,914	16,882	18,017	19,061	20,075	114	1,735	1,808	1,869	1,967	2,075	2,184
	K	HAYS	COUNTY-OTHER, HAYS	17,821	22,702	28,847	35,419	39,663	43,122	118	2,192	2,720	3,390	4,134	4,617	5,016
	L	HAYS	COUNTY-OTHER, HAYS	16,539	18,505	34,878	46,005	89,408	137,563	118	2,035	2,217	4,098	5,370	10,409	16,001
			COUNTY-OTHER, HAYS TOTAL	34,360	41,207	63,725	81,424	129,071	180,685	118	4,227	4,937	7,488	9,504	15,026	21,017
	K	LLANO	COUNTY-OTHER, LLANO	2,455	1,926	2,053	2,085	1,932	1,810	103	260	202	215	217	200	187
	K	MATAGORDA	COUNTY-OTHER, MATAGORDA	9,928	10,447	10,782	11,042	11,227	11,357	103	1,036	1,040	1,034	1,038	1,052	1,064
	K	MILLS	COUNTY-OTHER, MILLS	2,676	2,766	2,839	2,951	3,064	3,193	124	343	341	338	348	360	375
	K	SAN SABA	COUNTY-OTHER, SAN SABA	1,403	1,468	1,480	1,455	1,487	1,523	149	218	220	217	213	217	222
	K	TRAVIS	COUNTY-OTHER, TRAVIS	14,744	13,073	11,999	8,903	6,411	7,067	136	2,067	1,818	1,663	1,229	879	967
	K	WHARTON	COUNTY-OTHER, WHARTON	14,640	15,577	16,329	16,979	17,580	18,111	126	1,898	1,936	1,972	2,044	2,111	2,173
	P	WHARTON	COUNTY-OTHER, WHARTON	3,448	3,880	4,226	4,525	4,800	5,046	126	447	482	510	545	576	606
			COUNTY-OTHER, WHARTON TOTAL	18,088	19,457	20,555	21,504	22,380	23,157	126	2,345	2,418	2,482	2,589	2,687	2,779
	K	WILLIAMSON	COUNTY-OTHER, WILLIAMSON	14,483	20,375	19,717	19,007	18,203	17,320	148	2,248	3,089	2,958	2,838	2,712	2,579
	G	WILLIAMSON	COUNTY-OTHER, WILLIAMSON	28,684	37,315	52,198	44,899	69,190	91,040	148	4,452	5,657	7,831	6,705	10,310	13,555
			COUNTY-OTHER, WILLIAMSON TOTAL	43,167	57,690	71,915	63,906	87,393	108,360	148	6,700	8,746	10,789	9,543	13,022	16,134
605	K	BASTROP	CREEDMOOR-MAHA WSC	22	25	29	33	37	40	110	2	3	3	3	4	4
605	K	TRAVIS	CREEDMOOR-MAHA WSC	5,777	6,641	7,456	8,368	9,178	9,934	110	641	704	767	848	928	1,004
605	L	CALDWELL	CREEDMOOR-MAHA WSC	1,642	1,919	2,191	2,487	2,771	3,052	110	182	203	225	252	280	308
605	L	HAYS	CREEDMOOR-MAHA WSC	64	75	85	97	108	119	110	7	8	9	10	11	12
			CREEDMOOR-MAHA WSC TOTAL	7,505	8,660	9,761	10,985	12,094	13,145	110	832	918	1,004	1,113	1,223	1,328
650	K	TRAVIS	CYPRESS RANCH WCID 1	1,233	1,416	1,551	1,661	1,786	1,786	96	121	134	144	153	164	163
690	K	HAYS	DEER CREEK RANCH WATER	331	392	451	494	529	569	78	26	29	33	35	38	41
690	K	TRAVIS	DEER CREEK RANCH WATER	556	659	757	829	888	954	78	43	49	55	59	63	68
			DEER CREEK RANCH WATER TOTAL	887	1,051	1,208	1,323	1,417	1,523	78	69	78	88	94	101	109
752	K	HAYS	DRIPPING SPRINGS WSC	5,165	6,368	7,833	9,666	11,736	14,092	165	906	1,098	1,339	1,646	1,995	2,394
764	K	COLORADO	EAGLE LAKE	3,803	3,968	4,091	4,270	4,421	4,568	132	521	525	526	540	558	576

- List presented alphabetically by Water User Group (WUG) Name (4th column)
- Utilities in more than one county and/or region are shown so and have been totaled. All others occupy a single line.

TWDB Draft Projections for 2022 State Water Plan																
RWP Utility ID	Region	County	Water User Group (WUG) Name	Population 2020	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070	Base GPCD	Municipal Demands 2020 (Ac-Ft/Yr)	Municipal Demands 2030 (Ac-Ft/Yr)	Municipal Demands 2040 (Ac-Ft/Yr)	Municipal Demands 2050 (Ac-Ft/Yr)	Municipal Demands 2060 (Ac-Ft/Yr)	Municipal Demands 2070 (Ac-Ft/Yr)
806	K	WHARTON	EL CAMPO	27	29	30	31	32	33	178	5	5	5	6	6	6
806	P	WHARTON	EL CAMPO	12,096	12,660	13,111	13,502	13,863	14,183	178	2,286	2,334	2,371	2,417	2,476	2,533
			EL CAMPO TOTAL	12,123	12,689	13,141	13,533	13,895	14,216	178	2,291	2,339	2,376	2,423	2,482	2,539
820	K	BASTROP	ELGIN	9,380	12,273	16,034	21,128	28,009	37,158	135	1,317	1,674	2,155	2,822	3,734	4,950
820	K	TRAVIS	ELGIN	1,814	2,615	3,371	4,217	4,963	5,658	135	255	357	453	563	662	754
			ELGIN TOTAL	11,194	14,888	19,405	25,345	32,972	42,816	135	1,572	2,031	2,608	3,385	4,396	5,704
876	K	FAYETTE	FAYETTE COUNTY WCID MONUMENT HILL	703	803	870	926	970	1,003	144	106	118	126	133	139	143
877	K	FAYETTE	FAYETTE WSC	5,142	5,869	6,363	6,770	7,089	7,336	119	636	705	750	791	826	854
894	K	FAYETTE	FLATONIA	1,658	1,893	2,052	2,183	2,287	2,365	197	346	386	412	435	455	470
975	K	GILLESPIE	FREDERICKSBURG	12,056	12,938	13,666	14,519	15,304	16,067	257	3,351	3,543	3,703	3,911	4,118	4,322
1015	K	TRAVIS	GARFIELD WSC	1,772	2,100	2,412	2,641	2,830	3,042	109	199	230	259	281	301	323
1043	K	HAYS	GOFORTH SUD	1,366	1,801	2,329	2,985	3,724	4,564	105	147	188	239	304	378	463
1043	K	TRAVIS	GOFORTH SUD	87	115	148	190	237	291	105	9	12	15	19	24	30
1043	L	CALDWELL	GOFORTH SUD	601	793	1,025	1,314	1,640	2,010	105	65	83	105	134	167	204
1043	L	HAYS	GOFORTH SUD	15,218	20,068	25,943	33,251	41,492	50,849	105	1,636	2,090	2,660	3,385	4,215	5,160
			GOFORTH SUD TOTAL	17,272	22,777	29,445	37,740	47,093	57,714	105	1,857	2,373	3,019	3,842	4,784	5,857
1048	K	MILLS	GOLDTHWAITE	2,075	2,144	2,203	2,289	2,377	2,475	181	400	403	406	418	433	451
1075	K	BURNET	GRANITE SHOALS	6,751	8,168	9,363	10,506	11,512	12,383	103	722	850	960	1,069	1,169	1,256
1211	K	HAYS	HAYS	1,222	1,606	2,038	2,429	3,036	3,727	143	183	235	294	348	435	533
1212	K	HAYS	HAYS COUNTY WCID 1	3,647	3,647	3,647	3,647	3,647	3,647	210	821	808	801	798	797	797
1213	K	HAYS	HAYS COUNTY WCID 2	1,224	1,608	2,041	2,433	3,041	3,732	217	285	369	464	551	688	844
1289	K	TRAVIS	HORNSBY BEND UTILITY	7,066	8,372	9,616	10,531	11,282	12,130	83	594	678	761	823	879	944
1497	K	BURNET	HORSESHOE BAY	1,192	1,683	2,097	2,493	2,841	3,142	569	747	1,048	1,302	1,545	1,759	1,945
1497	K	LLANO	HORSESHOE BAY	4,933	5,117	4,989	5,058	4,984	4,872	569	3,091	3,187	3,097	3,134	3,086	3,017
			HORSESHOE BAY TOTAL	6,125	6,800	7,086	7,551	7,825	8,014	569	3,838	4,235	4,399	4,679	4,845	4,962
1315	K	TRAVIS	HURST CREEK MUD	3,095	3,095	3,095	3,095	3,095	3,095	447	1,520	1,511	1,505	1,502	1,501	1,501
1371	K	BLANCO	JOHNSON CITY	2,053	2,441	2,668	2,787	2,867	2,914	163	353	411	443	460	473	480
1382	K	TRAVIS	JONESTOWN WSC	3,948	4,222	4,481	4,768	5,022	5,259	138	574	601	629	665	699	732
1407	K	TRAVIS	KELLY LANE WCID 1	1,693	1,693	1,693	1,693	1,693	1,693	178	322	317	313	312	311	311
1410	K	BURNET	KEMPNER WSC	759	852	937	1,019	1,097	1,171	164	132	146	158	171	184	196
1410	G	BELL	KEMPNER WSC	2,004	2,166	2,393	2,603	2,803	2,991	164	332	371	405	437	470	501
1410	G	CORYELL	KEMPNER WSC	3,542	3,978	4,371	4,755	5,120	5,463	164	618	681	739	799	858	916
1410	G	LAMPASAS	KEMPNER WSC	9,563	10,572	11,350	12,146	12,851	13,485	164	1,669	1,809	1,919	2,040	2,155	2,260
			KEMPNER WSC TOTAL	15,868	17,568	19,051	20,523	21,871	23,110	164	2,751	3,007	3,221	3,447	3,667	3,873
1440	K	BURNET	KINGSLAND WSC	425	515	590	662	726	781	106	46	55	62	69	75	81
1440	K	LLANO	KINGSLAND WSC	8,419	9,716	9,680	9,247	10,078	10,938	106	918	1,032	1,015	962	1,045	1,133
			KINGSLAND WSC TOTAL	8,844	10,231	10,270	9,909	10,804	11,719	106	964	1,087	1,077	1,031	1,120	1,214
1469	K	FAYETTE	LA GRANGE	5,478	6,253	6,778	7,212	7,552	7,816	154	883	979	1,041	1,097	1,147	1,187
1484	K	TRAVIS	LAGO VISTA	7,580	8,964	10,269	11,730	13,020	14,220	228	1,868	2,184	2,487	2,832	3,140	3,428
1528	K	TRAVIS	LAKEWAY MUD	13,904	18,295	18,295	18,295	18,295	18,295	301	4,561	5,943	5,909	5,893	5,888	5,886
1557	K	TRAVIS	LEANDER	9,491	24,827	43,093	46,640	48,403	50,610	114	1,133	2,907	5,020	5,422	5,623	5,877
1557	G	WILLIAMSON	LEANDER	41,071	69,551	115,635	188,502	238,648	293,630	114	4,904	8,144	13,470	21,913	27,724	34,098
			LEANDER TOTAL	50,562	94,378	158,728	235,142	287,051	344,240	114	6,037	11,051	18,490	27,335	33,347	39,975

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TWDB Draft Projections for 2022 State Water Plan																
RWP Utility ID	Region	County	Water User Group (WUG) Name	Population 2020	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070	Base GPCD	Municipal Demands 2020 (Ac-Ft/Yr)	Municipal Demands 2030 (Ac-Ft/Yr)	Municipal Demands 2040 (Ac-Ft/Yr)	Municipal Demands 2050 (Ac-Ft/Yr)	Municipal Demands 2060 (Ac-Ft/Yr)	Municipal Demands 2070 (Ac-Ft/Yr)
1561	K	BASTROP	LEE COUNTY WSC	998	1,311	1,719	2,273	3,021	4,015	122	127	161	208	272	361	479
1561	K	FAYETTE	LEE COUNTY WSC	1,435	1,638	1,775	1,889	1,979	2,047	122	182	202	215	226	236	244
1561	G	LEE	LEE COUNTY WSC	7,557	8,497	9,036	9,233	9,365	9,435	122	959	1,046	1,093	1,106	1,119	1,127
			LEE COUNTY WSC TOTAL	9,990	11,446	12,530	13,395	14,365	15,497	122	1,268	1,409	1,516	1,604	1,716	1,850
1606	K	LLANO	LLANO	3,565	3,759	3,754	3,689	3,814	3,943	226	862	891	877	855	883	913
1627	K	TRAVIS	LOOP 360 WSC	2,086	2,169	2,262	2,344	2,420	2,556	532	1,225	1,268	1,318	1,363	1,407	1,486
1675	K	TRAVIS	MANOR	8,650	12,017	15,193	18,750	21,889	24,808	122	1,110	1,517	1,907	2,346	2,736	3,099
1680	K	TRAVIS	MANVILLE WSC	22,045	27,156	31,976	37,373	42,136	46,566	148	3,434	4,148	4,835	5,623	6,329	6,991
1680	G	WILLIAMSON	MANVILLE WSC	10,728	13,476	16,900	20,586	24,767	29,089	148	1,671	2,058	2,555	3,097	3,720	4,367
			MANVILLE WSC TOTAL	32,773	40,632	48,876	57,959	66,903	75,655	148	5,105	6,206	7,390	8,720	10,049	11,358
1683	K	BURNET	MARBLE FALLS	8,784	12,906	18,684	21,713	23,732	24,741	250	2,354	3,400	4,884	5,661	6,184	6,446
1690	K	MATAGORDA	MARKHAM MUD	1,013	1,066	1,101	1,127	1,146	1,159	112	116	117	116	118	119	120
1711	K	MATAGORDA	MATAGORDA COUNTY WCID 6	1,099	1,158	1,194	1,223	1,244	1,258	101	113	113	112	113	115	116
1712	K	MATAGORDA	MATAGORDA WASTE DISPOSAL & WSC	691	728	751	769	781	792	173	127	130	131	133	135	137
1743	K	BURNET	MEADOWLAKES MUD	2,540	3,074	3,524	3,954	4,332	4,660	308	852	1,020	1,163	1,301	1,425	1,532
1946	K	TRAVIS	NORTH AUSTIN MUD 1	780	780	780	780	780	780	101	81	78	76	75	75	75
1946	K	WILLIAMSON	NORTH AUSTIN MUD 1	7,442	7,442	7,442	7,442	7,442	7,442	101	774	747	726	714	711	711
			NORTH AUSTIN MUD 1 TOTAL	8,222	8,222	8,222	8,222	8,222	8,222	101	855	825	802	789	786	786
1972	K	SAN SABA	NORTH SAN SABA WSC	647	678	681	671	686	702	264	185	191	190	187	191	195
1988	K	TRAVIS	NORTHTOWN MUD	10,834	12,509	14,091	15,859	17,421	18,874	60	728	841	947	1,066	1,171	1,268
2022	K	TRAVIS	OAK SHORES WATER SYSTEM	467	553	636	696	746	802	253	128	149	171	186	199	214
2074	K	MATAGORDA	PALACIOS	5,019	5,283	5,453	5,584	5,677	5,743	130	677	688	691	698	708	716
2137	K	TRAVIS	PFLUGERVILLE	62,745	85,016	106,017	129,532	150,287	169,592	155	10,403	13,928	17,298	21,087	24,438	27,564
2137	G	WILLIAMSON	PFLUGERVILLE	373	469	588	717	862	1,013	155	62	77	96	117	140	165
			PFLUGERVILLE TOTAL	63,118	85,485	106,605	130,249	151,149	170,605	155	10,465	14,005	17,394	21,204	24,578	27,729
2179	K	BASTROP	POLONIA WSC	236	300	385	498	653	858	120	29	36	45	58	76	100
2179	L	CALDWELL	POLONIA WSC	7,189	8,801	10,393	11,966	13,556	15,103	120	890	1,055	1,222	1,395	1,576	1,755
			POLONIA WSC TOTAL	7,425	9,101	10,778	12,464	14,209	15,961	120	919	1,091	1,267	1,453	1,652	1,855
2296	K	SAN SABA	RICHLAND SUD	956	1,002	1,007	991	1,015	1,038	135	136	139	137	133	136	139
2296	F	MCCULLOCH	RICHLAND SUD	999	1,041	1,045	1,056	1,058	1,060	135	142	144	142	142	142	142
			RICHLAND SUD TOTAL	1,955	2,043	2,052	2,047	2,073	2,098	135	278	283	279	275	278	281
2350	K	TRAVIS	ROLLINGWOOD	1,421	1,429	1,436	1,444	1,451	1,458	250	383	379	375	374	375	377
2368	K	TRAVIS	ROUND ROCK	1,732	2,003	2,258	2,544	2,796	3,030	152	278	315	352	395	434	470
2368	G	WILLIAMSON	ROUND ROCK	157,819	198,258	248,614	302,845	364,345	427,932	152	25,287	31,213	38,796	47,061	56,537	66,365
			ROUND ROCK TOTAL	159,551	200,261	250,872	305,389	367,141	430,962	152	25,565	31,528	39,148	47,456	56,971	66,835
2421	K	SAN SABA	SAN SABA	3,384	3,546	3,565	3,507	3,591	3,673	319	1,175	1,216	1,212	1,186	1,213	1,241
2438	K	FAYETTE	SCHULENBURG	3,147	3,592	3,894	4,143	4,339	4,490	209	701	783	838	885	926	958
2457	K	TRAVIS	SENNA HILLS MUD	1,219	1,445	1,660	1,818	1,947	2,093	316	420	493	564	616	659	708
2468	K	TRAVIS	SHADY HOLLOW MUD	4,366	4,366	4,366	4,366	4,366	4,366	151	695	677	661	653	651	651
2533	K	BASTROP	SMITHVILLE	4,797	6,308	8,273	10,933	14,527	19,306	164	821	1,048	1,351	1,774	2,353	3,125
2650	K	LLANO	SUNRISE BEACH VILLAGE	720	724	723	721	723	726	100	74	71	69	68	68	68
2655	K	TRAVIS	SUNSET VALLEY	1,179	1,414	1,725	2,074	2,383	2,669	312	400	476	578	694	797	892

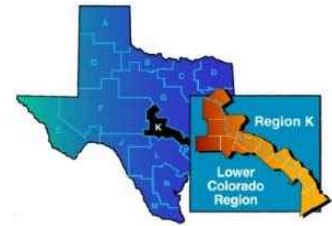
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2773	K	TRAVIS	TRAVIS COUNTY MUD 10	348	412	474	519	556	597	260	98	115	131	143	153	164
2775	K	TRAVIS	TRAVIS COUNTY MUD 14	2,015	2,388	2,742	3,003	3,218	3,459	84	172	196	220	238	254	273
2777	K	TRAVIS	TRAVIS COUNTY MUD 2	2,527	2,994	3,439	3,767	4,036	4,338	142	379	439	498	542	580	623
2778	K	TRAVIS	TRAVIS COUNTY MUD 4	2,446	2,825	3,182	3,581	3,934	4,263	755	2,051	2,365	2,662	2,994	3,288	3,563
2779	K	TRAVIS	TRAVIS COUNTY WCID 10	7,628	8,364	9,058	9,835	10,521	11,160	319	2,644	2,865	3,080	3,332	3,561	3,776
2780	K	TRAVIS	TRAVIS COUNTY WCID 17	33,117	39,741	43,715	44,473	45,671	47,125	236	8,450	10,053	11,016	11,186	11,479	11,841
2781	K	TRAVIS	TRAVIS COUNTY WCID 18	6,344	7,324	8,250	9,287	10,201	11,051	160	1,070	1,207	1,341	1,499	1,643	1,779
2782	K	TRAVIS	TRAVIS COUNTY WCID 19	682	682	682	682	682	682	628	474	472	470	469	469	469
2783	K	TRAVIS	TRAVIS COUNTY WCID 20	1,130	1,130	1,130	1,130	1,130	1,130	469	584	581	579	577	577	577
2784	K	TRAVIS	TRAVIS COUNTY WCID POINT VENTURE	723	1,215	1,568	1,900	2,273	2,601	283	222	370	474	573	685	783
2922	K	COLORADO	WEIMAR	2,164	2,257	2,329	2,431	2,516	2,600	229	532	545	554	574	593	613
2929	K	TRAVIS	WELLS BRANCH MUD	14,989	14,989	14,989	14,989	14,989	14,989	107	1,638	1,601	1,576	1,562	1,558	1,558
2929	K	WILLIAMSON	WELLS BRANCH MUD	1,073	1,073	1,073	1,073	1,073	1,073	107	117	115	113	112	112	112
			WELLS BRANCH MUD TOTAL	16,062	16,062	16,062	16,062	16,062	16,062	107	1,755	1,716	1,689	1,674	1,670	1,670
2940	K	FAYETTE	WEST END WSC	1,197	1,366	1,521	1,686	1,855	2,032	107	130	142	153	167	183	201
2940	G	WASHINGTON	WEST END WSC	487	555	618	686	753	826	107	53	58	62	68	74	82
2940	H	AUSTIN	WEST END WSC	1,835	2,092	2,330	2,582	2,843	3,114	107	199	218	235	256	281	308
			WEST END WSC TOTAL	3,519	4,013	4,469	4,954	5,451	5,972	107	382	418	450	491	538	591
2953	K	HAYS	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	12,788	18,076	24,517	32,568	41,666	52,021	391	5,501	7,739	10,476	13,901	17,775	22,188
2953	K	TRAVIS	WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY	7,394	8,537	9,615	10,824	11,890	12,880	391	3,181	3,655	4,109	4,620	5,072	5,494
			WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY TOTAL	20,182	26,613	34,132	43,392	53,556	64,901	391	8,682	11,394	14,585	18,521	22,847	27,682
2974	K	WHARTON	WHARTON	9,427	10,033	10,516	10,934	11,320	11,662	169	1,680	1,738	1,782	1,837	1,898	1,955
2976	K	WHARTON	WHARTON COUNTY WCID 2	2,235	2,379	2,493	2,593	2,684	2,765	192	456	474	488	503	520	535
3013	K	TRAVIS	WILLIAMSON COUNTY WSID 3	910	1,143	1,143	1,143	1,143	1,143	126	120	147	145	144	144	144
3013	G	WILLIAMSON	WILLIAMSON COUNTY WSID 3	2,323	2,917	3,626	4,389	5,255	6,154	126	307	376	461	554	662	775
			WILLIAMSON COUNTY WSID 3 TOTAL	3,233	4,060	4,769	5,532	6,398	7,297	126	427	523	606	698	806	919
3014	G	WILLIAMSON	WILLIAMSON TRAVIS COUNTIES MUD 1	4,596	4,596	4,596	4,596	4,596	4,596	126	598	584	576	572	571	570
3014	K	TRAVIS	WILLIAMSON TRAVIS COUNTIES MUD 1	1,113	1,113	1,113	1,113	1,113	1,113	126	145	141	139	139	138	138
			WILLIAMSON TRAVIS COUNTIES MUD 1 TOTAL	5,709	5,709	5,709	5,709	5,709	5,709	126	743	725	715	711	709	708
3026	K	TRAVIS	WINDERMERE UTILITY	17,866	17,866	17,866	17,866	17,866	17,866	154	2,920	2,864	2,831	2,815	2,810	2,809
3090	K	MILLS	ZEPHYR WSC	39	39	39	39	39	39	82	3	3	3	3	3	4
3090	F	BROWN	ZEPHYR WSC	4,173	4,173	4,173	4,173	4,173	4,173	82	343	339	330	325	324	324
			ZEPHYR WSC TOTAL	4,212	4,212	4,212	4,212	4,212	4,212	82	346	342	333	328	327	328

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February 26, 2018



**Subject: Lower Colorado Regional Water Planning Area (Region K)  
Water Supplies and Strategies for 2021 Regional Water Plan  
Please Review and Respond by March 30, 2018**

Dear Water Utility Representative:

Our Lower Colorado Regional Water Planning Group (Region K RWPG) is currently in the middle of the planning cycle for developing the 2021 Region K Water Plan, which becomes part of the Texas State Water Plan, and we need your assistance to ensure we're including accurate information for your water utility. Please review this letter, fill out the attached survey, and send it back to us by **March 30, 2018**.

It is a responsibility of the Region K RWPG, per the Texas Administrative Code (TAC), to identify and evaluate water **supplies** and **strategies** for each water user group within Region K. This is done to plan for potential water needs for a period from 2020 to 2070 and identify potential projects to meet those needs. This long-term water supply planning effort assists the State of Texas in determining what levels of funding for water supply projects may be needed over the next several decades. Projects applying for certain types of state funds must be recommended in the Regional Water Plan to be eligible.

**Supplies** [31 TAC 357.32(a)]:

*“Regional Water Planning Groups shall evaluate:*

- 1. Source water availability during Drought of Record conditions; and*
- 2. Existing water supplies that are legally and physically available to Water User Groups and wholesale water providers within a Regional Water Planning Area for use during the Drought of Record.”*

In accordance with the Texas Water Development Board (TWDB) guidelines, the five basic types of water supply that exist within Region K are: surface water supplies; groundwater supplies; supplies available through contractual arrangements; supplies available through the operation of a system of reservoirs or other supplies; and reclaimed water (reuse).

On the attached survey, we have listed the existing water supply sources that were identified for your water utility in the **2016** Region K Water Plan. We ask that you review the listed supplies, identify if they are correct, and then provide some additional associated details. There is also room to list additional sources that may be new or were perhaps missed during the last planning cycle.

**Strategies** [31 TAC 357.34(a)]:

*“Regional Water Planning Groups shall identify and evaluate potentially feasible Water Management Strategies and the Water Management Strategy Projects required to implement those strategies for all Water User Groups and wholesale water providers with identified Water Needs [shortages].”*

On the attached survey, we have also listed the water management strategies that were recommended for your water utility in the **2016** Region K Water Plan. We ask that you review the list and provide a

checkmark next to the ones that you think should be kept as recommended strategies for the **2021** Region K Water Plan. If you do not recognize the strategies selected for your utility, it may be because feedback was not provided during the previous cycle. As stated above, the TAC requires the Region K RWPG to recommend water management strategies to meet identified water needs, even if a water user group chooses not to provide input.

Additional potentially feasible water management strategies are listed in the attached document, as well. Please identify, using “Y” or “N”, which ones may be potentially feasible as strategies for your utility. If you answer “Y”, please provide any additional details you have at this time. Even if a water shortage during Drought of Record conditions is not predicted for your utility in the next 50 years, it is common to have plans for conservation and/or drought management.

**The Region K RWPG asks that you fill out and return the attached survey** regarding supplies and strategies by **March 30, 2018**. If you are unsure about strategies at this time, please fill out and return the ‘Supplies’ portion, and we will reach out to you regarding strategies in the next several months.

If you are aware of a water infrastructure project(s) your water utility is currently considering that would support the implementation of a strategy listed on the attached survey, please provide Region K with any details you have about the project(s) in the space provided, so that it may be considered for recommendation in the 2021 Region K Water Plan. The State Water Implementation Fund for Texas (SWIFT) is dedicated to financing water projects by providing low-interest loans. To be eligible for this funding, the water project *must* be recommended in the 2021 Regional Water Plan.

If we do not hear back from you, the Region K RWPG is still responsible for identifying water supplies and water management strategies for your utility through 2070, which ideally are based on your recommendations, so any input you can provide would be appreciated.

If you have any questions regarding the attached survey or the planning process in general, we’re happy to help answer them. I may be reached directly at (512) 457-7798 or at [jaime.burke@aecom.com](mailto:jaime.burke@aecom.com). For additional information, please also visit Region K’s website at [www.regionk.org](http://www.regionk.org).

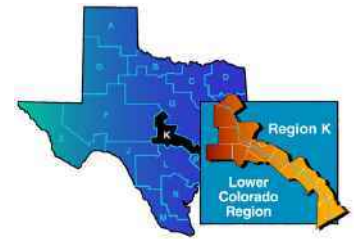
Thanks for your participation!

Sincerely,



Jaime Burke, P.E.  
Project Manager  
AECOM  
Consultant for the Region K RWPG

**Lower Colorado Regional Water Planning Area (Region K)  
AQUA WSC**



Please complete this form and return to Jaime Burke at [jaime.burke@aecom.com](mailto:jaime.burke@aecom.com) or AECOM, 9400 Amberglenn Blvd, Building E, Austin, TX 78729

**SUPPLIES**

Existing Water Supply Sources Identified in 2016 Regional Water Plan		Correct? (✓)	If correct, please identify the following volumes or rates:		
Source County	Supply Source		Current legal contracted or permitted amount	Pumping/Intake Capacity	Treatment Capacity
Bastrop	Carrizo-Wilcox Aquifer				
Caldwell	Carrizo-Wilcox Aquifer				

Additional sources not identified above:

Source County	Supply Source	Current legal contracted or permitted amount	Pumping/Intake Capacity	Treatment Capacity

**STRATEGIES**

Water Management Strategies Recommended in 2016 Regional Water Plan	(✓) Keep for 2021 Regional Water Plan?	
	Conservation	
	Drought Management	
	Expansion of Groundwater Supply (Bastrop County, Carrizo-Wilcox Aquifer)	
	New LCRA Contract w/ surface water infrastructure (Bastrop County, 2040)	

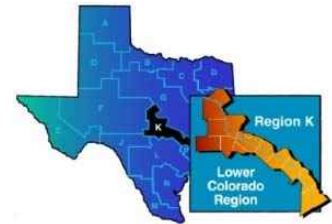
Potentially Feasible Strategies for 2021 Regional Water Plan	Y/N	If yes, please explain water sources and/or details:
*Expanded use of existing supplies		
**New supply development		
Conservation and drought management measures		
Reuse of wastewater (reclaimed water)		
Interbasin transfers of surface water		
Emergency transfers of surface water		

\* Expanded use of existing supplies including system optimization and conjunctive use of water resources, reallocation of reservoir storage to new uses, voluntary redistribution of water resources including contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements, subordination of existing water rights through voluntary agreements, enhancements of yields of existing sources, and improvement of water quality including control of naturally occurring chlorides.

\*\* New supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, seawater desalination, brackish groundwater desalination, water supply that could be made available by cancellation of water rights based on data provided by the Commission, rainwater harvesting, and aquifer storage and recovery.

**WATER UTILITY CONTACT** \_\_\_\_\_ **EMAIL** \_\_\_\_\_ **PHONE** \_\_\_\_\_

February 26, 2018



**Subject: Lower Colorado Regional Water Planning Area (Region K)  
Water Supplies and Strategies for 2021 Regional Water Plan  
Please Review and Respond by March 30, 2018**

Dear Water Utility Representative:

Our Lower Colorado Regional Water Planning Group (Region K RWPG) is currently in the middle of the planning cycle for developing the 2021 Region K Water Plan, which becomes part of the Texas State Water Plan, and we need your assistance to ensure we're including accurate information for your water utility. Please review this letter, fill out the attached survey, and send it back to us by **March 30, 2018**. If your utility is new to regional water planning this cycle and you have questions regarding this request, please call or email and we'll be glad to explain the process in further detail. Contact information is provided at the end of this letter.

It is a responsibility of the Region K RWPG, per the Texas Administrative Code (TAC), to identify and evaluate water **supplies** and **strategies** for each water user group within Region K. This is done to plan for potential water needs for a period from 2020 to 2070 and identify potential projects to meet those needs. This long-term water supply planning effort assists the State of Texas in determining what levels of funding for water supply projects may be needed over the next several decades. Projects applying for certain types of state funds must be recommended in the Regional Water Plan to be eligible.

**Supplies** [31 TAC 357.32(a)]:

*“Regional Water Planning Groups shall evaluate:*

- 1. Source water availability during Drought of Record conditions; and*
- 2. Existing water supplies that are legally and physically available to Water User Groups and wholesale water providers within a Regional Water Planning Area for use during the Drought of Record.”*

In accordance with the Texas Water Development Board (TWDB) guidelines, the five basic types of water supply that exist within Region K are: surface water supplies; groundwater supplies; supplies available through contractual arrangements; supplies available through the operation of a system of reservoirs or other supplies; and reclaimed water (reuse).

On the attached survey, we are asking you to list your utility's current source(s) of water supply. Please include the specific body of water or aquifer, and/or whether you purchase water through a contract with a provider. Including additional details regarding contract or permit volumes (e.g. acre-feet/year), pumping or intake capacity (e.g. well gpm), and treatment capacity (e.g. treatment plant MGD) for each source helps us determine the current legal and physical availability of the supply to your utility, as required under 31 TAC 357.32(a) above.

**Strategies** [31 TAC 357.34(a)]:

*“Regional Water Planning Groups shall identify and evaluate potentially feasible Water Management Strategies and the Water Management Strategy Projects required to implement those strategies for all Water User Groups and wholesale water providers with identified Water Needs [shortages].”*

On the attached survey, we are also asking you to let us know what kinds of water management strategies your utility might implement to meet any potential water shortages through 2070. Please identify, using “Y” or “N”, which ones may be potentially feasible as strategies for your utility. If you answer “Y”, please provide any additional details you have at this time. Even if a water shortage during Drought of Record conditions is not predicted for your utility in the next 50 years, it is common to have plans for conservation and/or drought management. As stated above, the TAC requires the Region K RWPG to recommend water management strategies to meet identified water needs, even if a water user group chooses not to provide input.

If you are aware of a water infrastructure project(s) your water utility is currently considering that would support the implementation of a strategy listed on the attached survey, please provide Region K with any details you have about the project(s) in the space provided, so that it may be considered for recommendation in the 2021 Region K Water Plan. The State Water Implementation Fund for Texas (SWIFT) is dedicated to financing water projects by providing low-interest loans. To be eligible for this funding, the water project *must* be recommended in the 2021 Regional Water Plan.

Example: Expanding the use of your existing groundwater source would be a water management strategy. Needing to install an additional well or transmission line in order to supply additional volume from the existing groundwater source would be a water infrastructure project associated with the strategy.

**The Region K RWPG asks that you fill out and return the attached survey** regarding supplies and strategies by **March 30, 2018**. If you are unsure about strategies at this time, please fill out and return the ‘Supplies’ portion, and we will reach out to you regarding strategies in the next several months.

If we do not hear back from you, the Region K RWPG is still responsible for identifying water supplies and water management strategies for your utility through 2070, which ideally are based on your recommendations, so any input you can provide would be appreciated.

If you have any questions regarding the attached survey or the planning process in general, we’re happy to help answer them. I may be reached directly at (512) 457-7798 or at [jaime.burke@aecom.com](mailto:jaime.burke@aecom.com). For additional information, please also visit Region K’s website at [www.regionk.org](http://www.regionk.org).

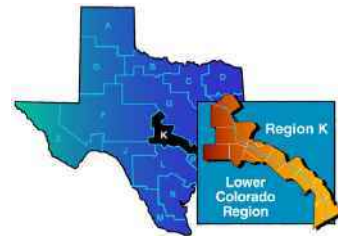
Thanks for your participation!

Sincerely,



Jaime Burke, P.E.  
Project Manager  
AECOM  
Consultant for the Region K RWPG

**Lower Colorado Regional Water Planning Area (Region K)  
BARTON CREEK WSC**



Please complete this form and return to Jaime Burke at [jaime.burke@aecom.com](mailto:jaime.burke@aecom.com) or AECOM, 9400 Amberglenn Blvd, Building E, Austin, TX 78729

**SUPPLIES**

Water Supply Sources to Identify for 2021 Regional Water Plan (include aquifer name, river/reservoir name, reuse, and/or contract provider)

Source County	Supply Source	Current legal contracted or permitted amount	Pumping/Intake Capacity	Treatment Capacity

**STRATEGIES**

Potentially Feasible Strategies for 2021 Regional Water Plan	Y/N	If yes, please explain water sources and/or details:
<i>*Expanded use of existing supplies</i>		
<i>**New supply development</i>		
<i>Conservation and drought management measures</i>		
<i>Reuse of wastewater (reclaimed water)</i>		
<i>Interbasin transfers of surface water</i>		
<i>Emergency transfers of surface water</i>		

\* Expanded use of existing supplies including system optimization and conjunctive use of water resources, reallocation of reservoir storage to new uses, voluntary redistribution of water resources including contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements, subordination of existing water rights through voluntary agreements, enhancements of yields of existing sources, and improvement of water quality including control of naturally occurring chlorides.

\*\* New supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, seawater desalination, brackish groundwater desalination, water supply that could be made available by cancellation of water rights based on data provided by the Commission, rainwater harvesting, and aquifer storage and recovery.

WATER UTILITY CONTACT \_\_\_\_\_ EMAIL \_\_\_\_\_ PHONE \_\_\_\_\_

---

**From:** Smiley, Alicia <[Alicia.Smiley@aecom.com](mailto:Alicia.Smiley@aecom.com)>

**Sent:** Monday, November 25, 2019 5:48 PM

**To:**

**Subject:** Region K Implementation Survey for 2021 Regional Water Plan - Please Respond by December 13, 2019



Dear Water Utility Representative:

Our Lower Colorado Regional Water Planning Group (Region K RWPG) is developing the 2021 Region K Water Plan, which becomes part of the 2022 Texas State Water Plan. Please review this letter, fill out the attached survey(s) in PDF form, and return by **December 13, 2019**.

It is a responsibility of the Region K RWPG, per the Texas Administrative Code (TAC), to collect information on implementation and reported impediments to implementation for water management strategies (WMS) and WMS projects in the 2016 Regional Water Plans/2017 State Water Plan.

**Implementation and Comparison to Previous Regional Water Plan [31 TAC 357.45(a)]:**

*“RWPGs shall describe the level of implementation of previously recommended WMSs and associated impediments to implementation in accordance with guidance provided by the board. Information on the progress of implementation of all WMSs that were recommended in the previous RWP, including conservation and Drought Management WMSs; and the implementation of WMSPs that have affected progress in meeting the state's future water needs.”*

The attached survey(s) include your utility's recommended water management strategies from the 2016 Region K Water Plan; some of these strategies were planned to be online by 2020.

When filling out the survey(s), we ask that you answer the questions in your PDF viewer and return electronically; many questions have dropdown option menus that are not available in print form. Alternatively, you may call us to help you with the process.

If you have any questions regarding the attached survey or the planning process in general, we're happy to help answer them. I may be reached directly at (512) 419-5073 or at [alicia.smiley@aecom.com](mailto:alicia.smiley@aecom.com).

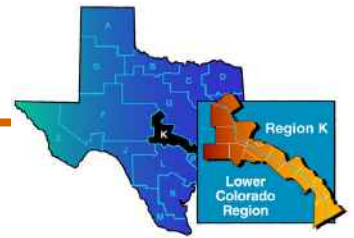
Thanks for your participation!

Sincerely,

Alicia Smiley, EIT  
Project Engineer  
AECOM  
Consultant for the Region K RWPG



**Lower Colorado Regional Water Planning Area (Region K)  
AQUA WSC**



Please complete this survey and return to Alicia Smiley at [alicia.smiley@aecom.com](mailto:alicia.smiley@aecom.com). Assistance can be provided in answering questions or filling out the survey at 512-419-5073.

**IMPLEMENTATION SURVEY**

Water Management Strategy Recommended in 2016 Regional Water Plan	<b><i>Drought Management</i></b>
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Drought management is the implementation of drought trigger responses due to drought conditions based on the utility's individual Drought Contingency Plan (DCP).

**Has Sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))**

If yes, in what year did this occur? \_\_\_\_\_

If yes, by what date is the action on schedule for implementation? \_\_\_\_\_

**At what level of implementation is the project currently?**

**If not implemented, why?**

If other, please describe \_\_\_\_\_

**What impediments are there to implementation?**

If other, please describe \_\_\_\_\_

**Year the project is online**

Current water supply project yield (ac-ft/yr) \_\_\_\_\_

Funds expended to date (\$) \_\_\_\_\_

Project Cost (\$) \_\_\_\_\_

**Is this a phased project?**

If yes, provide ultimate volume (ac-ft/yr) \_\_\_\_\_

If yes, provide ultimate project cost (\$) \_\_\_\_\_

**What is the project funding source(s)?**

Funding Mechanism if other? \_\_\_\_\_

**Year project reaches maximum capacity?**

**Does the project or WMS involve reallocation of flood control?**

**Does the project or WMS provide any measurable flood risk reduction?**

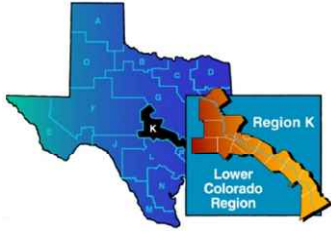
**Optional Comments**

\_\_\_\_\_  
\_\_\_\_\_



*APPENDIX 10C*

*REGION K IPP PUBLIC HEARING NOTICE, PUBLIC PRESENTATION,  
AND MEETING MINUTES*



**Lower Colorado Regional Water Planning Group (Region K)**  
P.O. Box 220, Austin, Texas 78767  
Phone: 512-473-3200

**Revised Public Notice issued April 9, 2020**

Revised Notice of Public Hearing to accept comments on the  
Initially Prepared 2021 Region K Water Plan for the  
Lower Colorado Regional Water Planning Group

At its Feb. 18, 2020 meeting, the Lower Colorado Regional Water Planning Group (Region K) approved its Initially Prepared 2021 Region K Water Plan (IPP). Region K also authorized its administrative agent, the Lower Colorado River Authority (LCRA), to submit the IPP on or before March 3, 2020. The IPP was submitted to the Texas Water Development Board on March 3, 2020.

Region K's IPP is available at [www.regionk.org](http://www.regionk.org) and at the County Clerk's office and a library in each county in Region K. A list of these locations follows this notice.

Notice of a public hearing to take comments on the IPP was published March 12, 2020. A 30-day pre-public hearing comment period is currently active until the date of the IPP Public Hearing.

**NOTICE IS HEREBY GIVEN THAT DUE TO THE COVID-19 PANDEMIC, THE IN-PERSON PORTION OF THE PUBLIC HEARING IS HEREBY CANCELLED, WITH THE HEARING TO BE HELD ONLY VIA A PUBLICLY ACCESSIBLE TELEPHONE CONFERENCE CALL.**

The public hearing is held pursuant to Texas Government Code, Section 551.125, as amended, and as modified by the temporary suspension of various provisions thereof effective March 16, 2020, by the Governor of Texas in accordance with the Texas Disaster Act of 1975, all as related to the Governor's proclamation on March 13, 2020, certifying that the COVID-19 pandemic poses an imminent threat of disaster and declaring a state of disaster for all counties in Texas.

**The public hearing telephone conference call will begin at 10:00 am, on April 22, 2020.** The agenda for the public hearing will consist of (1) a brief introduction of the meeting and recap of the posted notice, (2) introduction of the planning group members, and (3) opportunity for comments to be made by the public. No presentation of the IPP will be made at the public hearing. Comments will be recorded and a record of the hearing will be kept, and comments will be documented in the final 2021 Region K water plan. There is a narrated slide show overview of the IPP posted at [www.RegionK.org/2021-region-k-water-plan/](http://www.RegionK.org/2021-region-k-water-plan/)

The public hearing can be accessed and attended by phone call:

Toll free number: **877-820-7831**  
(Alternate number: 720-279-0026)

Meeting Passcode: **885538#**

Region K will accept **written comments until June 21, 2020. Submit comments to the Region K administrative agent: LCRA, Attn: David Wheelock, P.O. Box 220, Austin, TX 78767, or [administrative@regionk.org](mailto:administrative@regionk.org). If you have questions, contact David Wheelock at 512-730-6822 or [david.wheelock@lcra.org](mailto:david.wheelock@lcra.org).**

The IPP can viewed on-line at these locations:

<http://www.regionk.org/planning-documents/2021-region-k-water-plan/>

<http://www.twdb.texas.gov/waterplanning/rwp/plans/2021/index.asp>

Copies of the IPP are available for viewing at the following locations:

**Bastrop County**

County Clerk's Office  
803 Pine Street, Rm  
112  
Bastrop, TX 78602

Public Library  
1100 Church Street  
Bastrop, TX 78602

**Blanco County**

County Clerk's Office  
101 E. Cypress  
Johnson City, TX 78636

Public Library  
1118 Main Street  
Blanco, TX 78606

**Burnet County**

County Clerk's Office  
220 S. Pierce Street  
Burnet, TX 78611

Marble Falls Library  
101 Main Street  
Marble Falls, TX 78654

**Colorado County**

County Clerk's Office  
318 Spring Street, Rm 103  
Columbus, TX 78934

Nesbitt Memorial Library  
529 Washington Street  
Columbus, TX 78934

**Fayette County**

County Clerk's Office  
246 W. Colorado Street  
La Grange, TX 78945

Public Library  
855 S. Jefferson Street  
LaGrange TX 78945

**Gillespie County**

County Clerk's Office  
101 West Main St. Rm  
109  
Fredericksburg, TX  
78624

Gillespie County Library  
115 W. Main Street  
Fredericksburg, TX  
78624

**Hays County**

County Clerk's Office  
712 S. Stagecoach Trail  
San Marcos, TX 78666

San Marcos Library  
625 E Hopkins Street  
San Marcos TX 78666

**Llano County**

County Clerk's Office  
107 W. Sandstone  
Llano, TX 78643

Llano County Library  
102 E. Haynie  
Llano, TX 78643

**Matagorda County**

County Clerk's Office  
1700 7th Street Room  
202  
Bay City, TX 77414

Bay City Public Library  
1100 7th Street  
Bay City, TX 77414

**Mills County**

County Clerk's Office  
1011 Fourth Street  
Goldthwaite, TX 76844

Jenny Trent Dew  
Library  
1113 Fisher  
Goldthwaite, TX 76844

**San Saba County**

County Clerk's Office  
500 E. Wallace St Suite  
202  
San Saba, TX 76877

Rylander Memorial  
Library  
103 S Live Oak Street  
San Saba, TX 76877

**Travis County**

County Clerk's Office  
5501 Airport Blvd.  
Austin, TX 78751

Austin Public Library  
710 W Cesar Chavez  
St  
Austin, TX 78701

**Wharton County**

County Clerk's Office  
309 E. Milam St Suite 700  
Wharton, TX 77488

Wharton County Library  
El Campo Branch  
200 W. Church  
El Campo, TX 77437

**Williamson County**

County Clerk's Office  
405 Martin Luther King St.  
Georgetown, TX 78626

Georgetown Public Library  
402 W. 8th Street  
Georgetown, TX 78626

# Region K Public Hearing for the 2021 Initially Prepared Plan

Lower Colorado Regional Water Planning Group



April 22, 2020



1

## Presentation Outline

### ▼ Overview

- Regional Water Planning Process
- Elements of the 2021 Region K Water Plan
  - Population and water demand projections
  - Water availability/supply estimates
  - Water management strategies and their potential impacts
  - Drought response
  - Policy recommendations by the Regional Water Planning Group (RWPG)

### ▼ How to provide comments on the Initially Prepared Plan

Region K

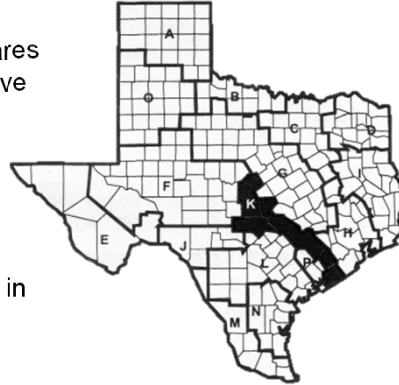
Page 2



2

## Regional Water Planning Overview

- ▼ SB1, 75th Legislature (1997)
- ▼ Each of the 16 planning regions prepares a 50-year water plan, updated every five years
- ▼ State Water Plan created from the 16 regional plans
- ▼ Regional Water Plans: First published in 2001
- ▼ State Water Plans: First (from RWPs) published in 2002

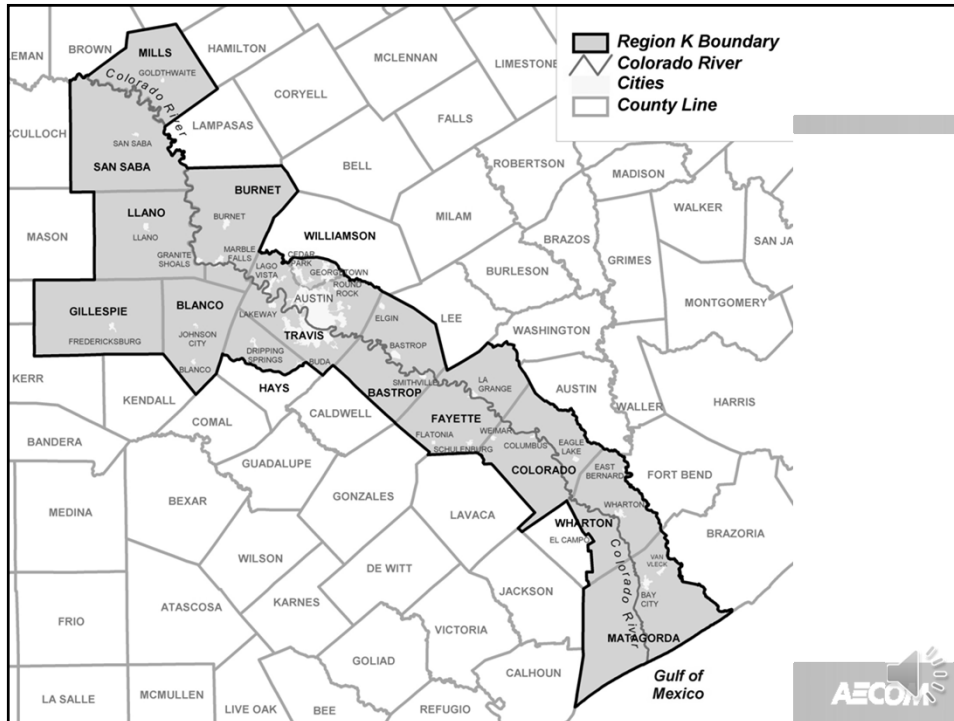


3

## Regional Water Planning Overview

- ▼ About the Planning Groups...
  - Volunteers with various levels of experience in the water industry
  - Diverse backgrounds:
    - Public
    - Small Business
    - Counties
    - Power Generation
    - Municipal Utilities
    - River Authorities
    - Industries
    - Water Districts
    - Agriculture
    - Water Utilities
    - Environment
    - Groundwater Management Area
  - Assisted by teams of consultants

4



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## About the Lower Colorado Regional Water Planning Area (Region K)

- ▼ Designation as a separate region helps protect local interests
  - Diverse agricultural and economic region
  - High population and municipal demand
  - High agricultural demand; major rice-producing region
- ▼ Administered by Lower Colorado River Authority (LCRA)
- ▼ Three (3) Major Water Providers
  - LCRA
  - Austin
  - West Travis County PUA

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## Regional Water Planning Overview

- ▼ Regional Planning does not replace the need for planning at the local level
- ▼ Regional Planning does build upon local planning efforts to provide long-term, regional direction
- ▼ Communication and feedback are essential to the process
- ▼ No requirement to implement strategies in the plans
- ▼ Consistency with the State Water Plan is required to:
  - Obtain TWDB funding for infrastructure
  - Obtain a water right permit
- ▼ The Initially Prepared Plan can be found online at [www.regionk.org](http://www.regionk.org)

7

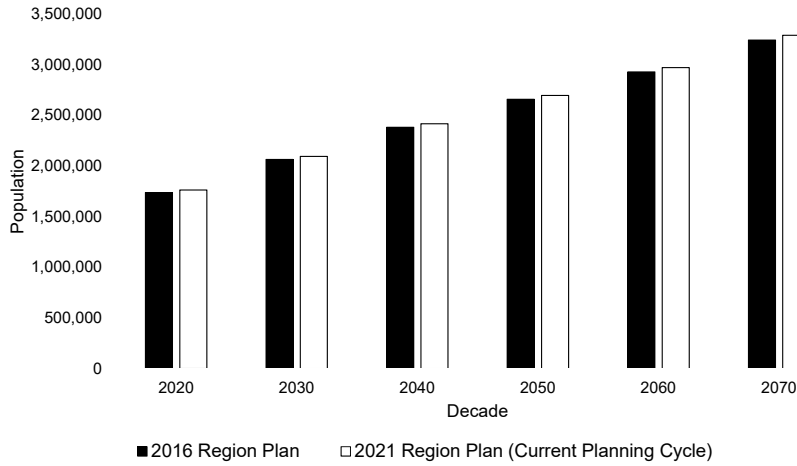
## Chapter 2

# POPULATION AND WATER DEMAND PROJECTIONS

8



## Region K Population Projections



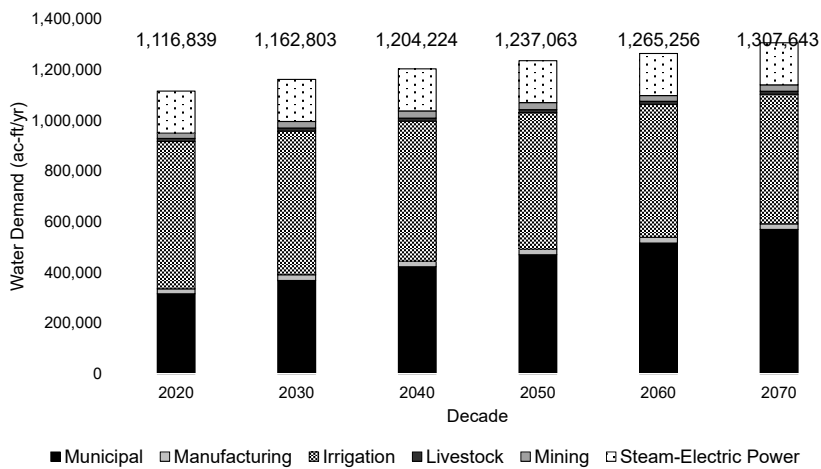
Region K

Page 9



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## 2021 Region K Projected Water Demands (acre-feet/year)



Region K

Page 10



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Chapter 3

# WATER AVAILABILITY/ SUPPLY ESTIMATES

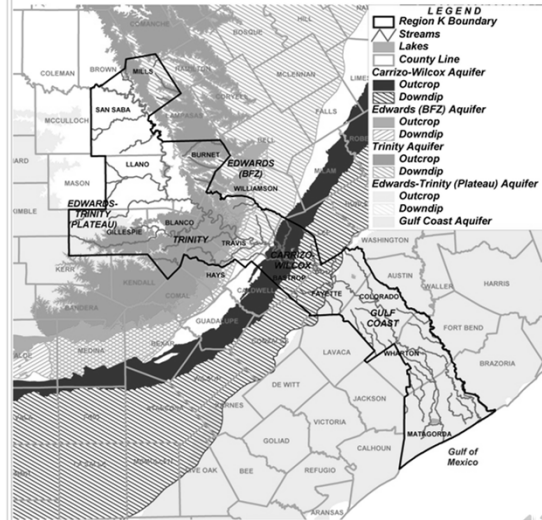
## Available Water



- ▼ Total available water  $\approx$  1.3 million acre-feet per year (ac-ft/yr)
  - 1 acre-foot = 325,851 gallons
- ▼ Over 900,000 ac-ft/yr is surface water
- ▼ Surface water availability modeling used to determine decadal amounts
- ▼ In general, it is the amount of water that is available yearly during a repeat of the conditions of the worst drought on record (2008-2015)
- ▼ Sources: Highland Lakes Reservoir System and Arbuckle Reservoir, small local reservoirs, STPNOC Reservoir, Run-of-River (Colorado, Guadalupe, Lavaca), Reclaimed Water

## Groundwater Availability

- ▼ Region K has five major aquifers and six minor aquifers.
- ▼ Major Aquifers:
  - Carrizo-Wilcox
  - Trinity
  - Edwards (BFZ)
  - Edwards-Trinity (Plateau)
  - Gulf Coast



Region K

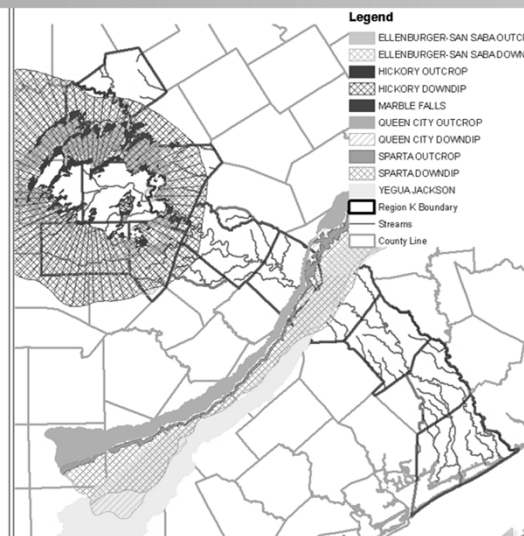
Page 13



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## Groundwater Availability

- ▼ Region K has five major aquifers and six minor aquifers.
- ▼ Minor aquifers:
  - Ellenburger-San Saba
  - Hickory
  - Marble Falls
  - Queen City
  - Sparta
  - Yegua-Jackson



Region K

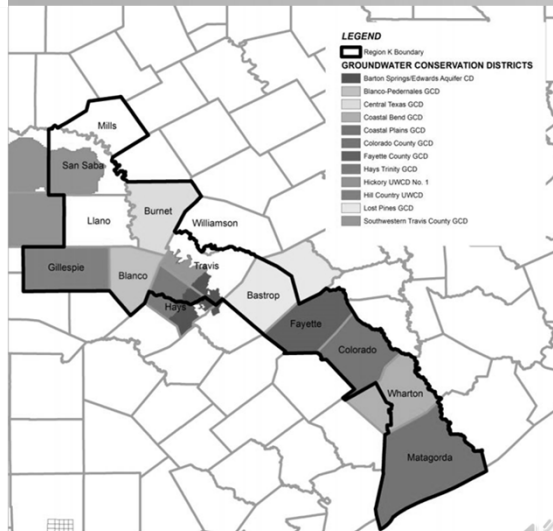
Page 14



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## Groundwater Availability

- ▼ The majority of aquifers are managed by Groundwater Conservation Districts (GCDs).



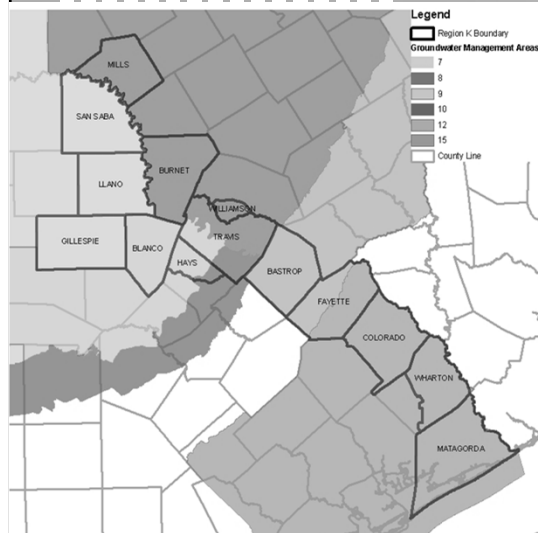
Region K

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## Groundwater Availability



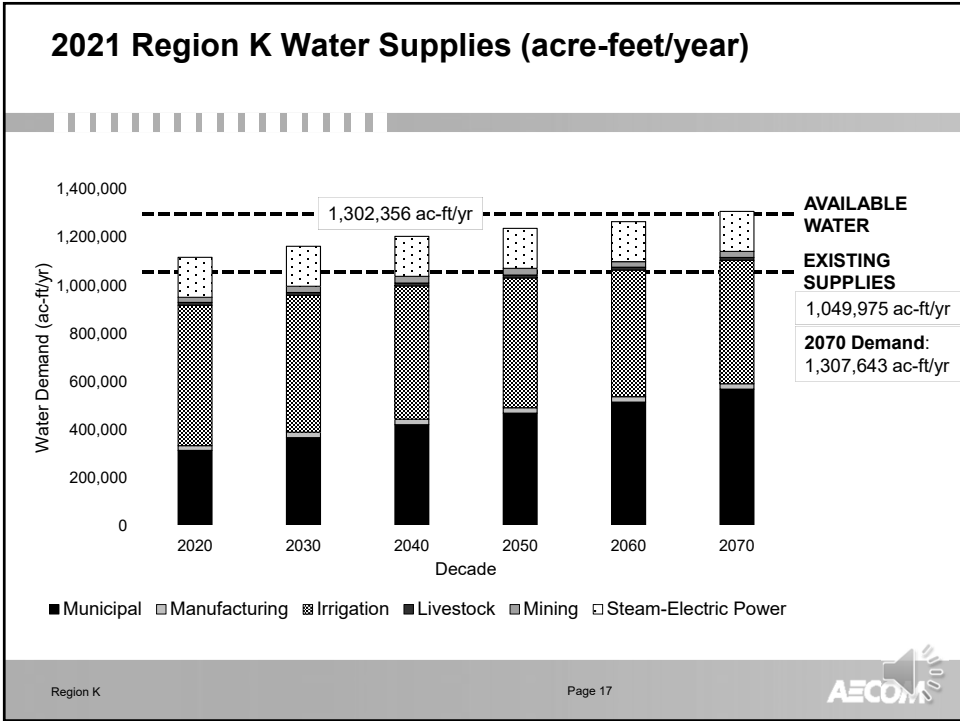
- ▼ GCDs group together to form Groundwater Management Areas (GMAs).
- ▼ The GMAs determine a Desired Future Condition (DFC) drawdown for the aquifers that are used to calculate the availability of the aquifer (Modeled Available Groundwater = MAG).
- ▼ If no MAG is established for an aquifer, the Region must use the best data available.

Region K

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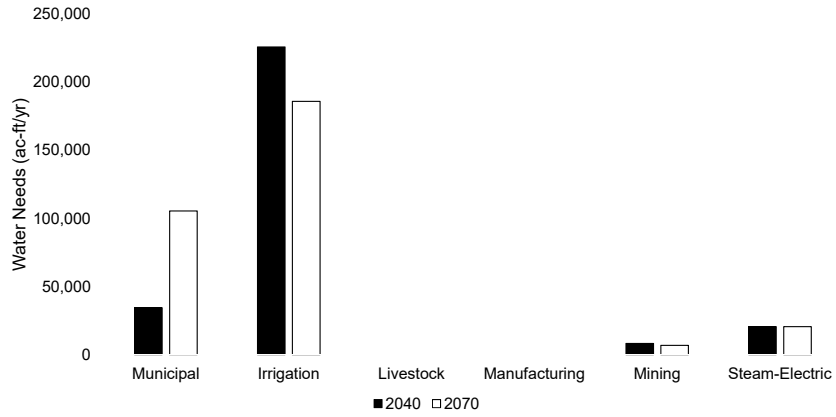
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## Chapter 4 WATER NEEDS

Region K Page 18 AECOM

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## Region K Water Shortages (Needs) by Category of Use



Shortage (Need) = Existing Supply - Demand

## Chapter 5

# WATER MANAGEMENT STRATEGIES

## How to Meet Water Needs?

- ▼ Drought Management (118)
- ▼ Municipal Conservation (68)
- ▼ Water Reuse and Reuse-sourced projects (13)
- ▼ Aquifer Storage and Recovery (ASR) (4)
- ▼ Expansion and Development of Groundwater
- ▼ Irrigation Conservation and Delivery Improvements
- ▼ New Reservoir Storage
- ▼ New Surface Water Infrastructure
- ▼ Water Purchase
- ▼ Rainwater Harvesting
- ▼ Groundwater Desalination
- ▼ Water Importation

## Water Management Strategies for LCRA (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Downstream Return Flows	3,985	4,969	6,072	7,164	8,267	8,267
Enhanced Municipal and Industrial Conservation	5,100	9,700	15,000	20,000	20,000	20,000
Amendment of ROR Water Rights, Including Garwood	N/A	N/A	N/A	N/A	N/A	N/A
Acquire New Water Rights	0	250	250	250	250	250
LCRA Contract Amendments	(12,600)	(5,700)	(6,100)	(9,800)	(13,150)	(13,320)
LCRA Contract Amendments with Infrastructure	0	(7,400)	(8,400)	(10,600)	(10,600)	(11,500)
New LCRA Contracts	0	0	(6,320)	(6,520)	(6,720)	(6,720)
New LCRA Contracts with Infrastructure	0	(3,200)	(7,900)	(12,400)	(20,400)	(31,600)
Expand Use of Groundwater – Carrizo-Wilcox Aquifer	0	30	30	30	30	30
Import Return Flows from Williamson County	0	5,460	10,920	16,380	21,840	25,000
Baylor Creek Reservoir	0	0	18,000	18,000	18,000	18,000
Aquifer Storage and Recovery	0	0	12,973	12,973	12,973	12,973
Enhanced Recharge	0	0	14,486	14,486	14,486	14,486
Mid-Basin Off-Channel Reservoir	0	20,000	20,000	20,000	20,000	20,000
Prairie Site Off-Channel Reservoir	0	19,500	9,500	0	0	0
Excess Flows Permit (5731) Off-Channel Reservoir	39,247	39,247	39,247	39,247	39,247	39,247
<b>Total</b>	<b>35,732</b>	<b>82,856</b>	<b>117,758</b>	<b>109,210</b>	<b>104,223</b>	<b>95,113</b>

## Water Management Strategies for Austin (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Municipal Conservation	8,266	9,708	11,281	12,423	13,389	14,666
Drought Management	4,910	14,890	24,870	30,120	35,370	40,620
Blackwater and Greywater Reuse	0	1,450	3,450	5,400	7,340	9,290
Aquifer Storage and Recovery	0	0	7,900	10,500	13,200	15,800
Off-Channel Reservoir and Evaporation Suppression	0	0	0	0	0	25,827
Onsite Rainwater and Stormwater Harvesting	0	790	1,880	2,890	3,890	4,900
Community-Scale Stormwater Harvesting	0	66	158	184	210	236
Brackish Groundwater Desalination	0	0	0	0	0	5,000
Centralized Direct Reuse	500	2,990	10,250	14,583	18,917	23,250
Decentralized Direct Non-Potable Reuse	0	1,400	4,160	8,330	12,510	16,680
Capture Local Inflows to Lady Bird Lake (LBL)	0	0	3,000	3,000	3,000	3,000
Longhorn Dam Operation Improvements	0	3,000	3,000	3,000	3,000	3,000
Indirect Potable Reuse through LBL	0	0	11,000	14,000	17,000	20,000
Lake Austin Operations	2,500	2,500	2,500	2,500	2,500	2,500
LCRA Contract Amendment	4,300	4,300	4,300	4,300	4,300	4,300
Centralized Direct Reuse (S-E)	0	1,750	1,750	1,750	1,750	1,750
<b>Total</b>	<b>20,476</b>	<b>42,844</b>	<b>89,499</b>	<b>112,980</b>	<b>136,376</b>	<b>190,819</b>

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## Water Management Strategies for West Travis County Public Utility Agency (ac-ft/yr)

Recommended Strategy	2020	2030	2040	2050	2060	2070
Municipal Conservation	1,008	2,279	3,644	5,460	7,360	9,370
Drought Management	2,038	2,133	2,111	2,215	2,238	2,228
LCRA Contract Amendments Requiring Infrastructure	0	2,400	2,400	4,600	4,600	5,500
Hays County Pipeline	0	3,000	3,000	3,000	3,000	3,000
Direct Potable Reuse	0	336	336	336	336	336
Direct Reuse (Non-Potable)	0	224	224	224	224	224
<b>Total</b>	<b>3,046</b>	<b>10,372</b>	<b>11,715</b>	<b>15,835</b>	<b>17,758</b>	<b>20,658</b>

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## Considered Impacts

- ▼ Water quality
- ▼ Existing water rights
- ▼ Instream flows
- ▼ Bay and estuary freshwater inflows
- ▼ Aquifer yield
- ▼ Agricultural water resources
- ▼ Threatened and endangered species
- ▼ Wildlife habitat
- ▼ Public lands
- ▼ Recreation

Chapters 6-8

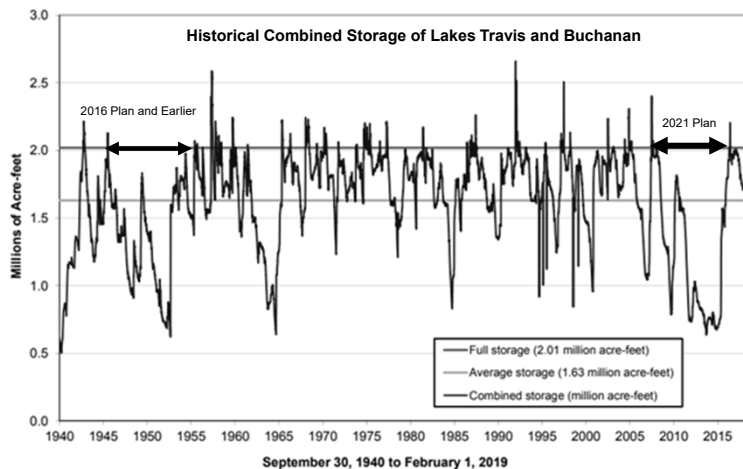
## ADDITIONAL PARTS OF THE PLAN

## Cumulative Impacts of the Regional Water Plan (Chapter 6)

- ▼ Cumulative impacts of the regional water plan, for example on groundwater levels, spring discharges, bay and estuary inflows, and instream flows.
  - Modeling performed to compare instream flows and bay/estuary inflows both with and without water management strategies.
- ▼ Description of the impacts of the RWP regarding:
  - Other Water Resources of the State;
  - Threats to Agricultural and Natural Resources;
  - Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas;
  - Major impacts of recommended Water Management Strategies on key parameters of water quality, and;
  - Effects on Navigation.

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## Drought Response (Chapter 7)



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## Drought Response (Chapter 7)

- ▼ Current Drought Preparations and Response
  - Drought Triggers
- ▼ Emergency Interconnects
- ▼ Emergency Responses to Drought or Loss of Supply
- ▼ Drought Management Strategies

## Legislative Policy Recommendations (Chapter 8)

- ▼ 14 policy recommendations from the RWPG
  - Management of Surface Water Resources: Inter-Basin Transfers and Model Linking
  - Environmental – Instream Flows and Freshwater Inflows to Bays and Estuaries
  - Environmental – Sustainable Growth, Including Impacts of Growth
  - Groundwater
  - Potential Impacts to Agricultural and Rural Water Supplies
  - Agricultural Water Conservation
  - Municipal/Industrial Conservation
  - Reuse
  - Brush Management
  - Inflows to Highland Lakes
  - Coordination of Planning Cycles for Determination of Desired Future Conditions by GCDs and Generation of the Regional Water Plan by RWPGs
  - Recommended Improvements to the Regional Planning Process (SB 1 - 75th Legislature)
  - Radionuclides in the Hickory and Marble Falls Aquifers
  - Planning for Droughts Worse than the Drought of Record

## PUBLIC COMMENTS ON THE INITIALLY PREPARED PLAN

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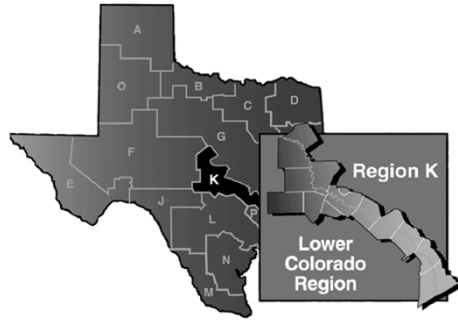
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### Public Comment on the IPP

<ul style="list-style-type: none"> <li>▼ Initially Prepared Plan Available:           <ul style="list-style-type: none"> <li>– <a href="http://www.regionk.org">www.regionk.org</a></li> <li>– <a href="http://www.twdb.texas.gov">www.twdb.texas.gov</a></li> <li>– County Clerk’s Offices</li> <li>– One library in each county</li> </ul> </li> <li>▼ Accepting written comments through June 21, 2020</li> <li>▼ Upcoming <u>Virtual</u> Public Hearing on April 22, 2020 at 10:00 a.m. to receive verbal public comments.</li> </ul>	<ul style="list-style-type: none"> <li>▼ Please submit written comments to:           <p style="margin-left: 20px;">David Wheelock Administrative Agent for Region K LCRA P.O. Box 220 Austin, TX 78767 <a href="mailto:administrative@regionk.org">administrative@regionk.org</a></p> </li> <li>▼ Go to <a href="http://www.regionk.org">www.regionk.org</a> for details on the Upcoming Meetings page</li> </ul>
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# PUBLIC COMMENTS

WE THANK YOU FOR YOUR INPUT



## Notes for Region K Public Hearing

Lower Colorado Regional Water Planning Group  
Public Hearing April 22, 2020  
By Conference Call  
10:00 a.m.

**Attendance:** 27 phone lines called into the conference call. Chairman John Burke, Vice Chair David Wheelock, and Ms. Jaime Burke, AECOM, were all on one phone line.

1. **Call to Order** – Chairman John Burke called the meeting to order at 10:00 a.m.
2. **Welcome and Introductions** – Chairman Burke welcomed all to the public hearing, briefly introducing the planning group members and explaining that this public hearing is to receive comments on the 2021 Region K Water Initially Prepared Plan (IPP) for the Lower Colorado Regional Planning Group. Information on the IPP can be found on the Region K website, at <https://www.regionk.org/planning-documents/2021-region-k-water-plan/>.

Chairman Burke also explained that the IPP was approved by the Lower Colorado Regional Water Planning Group (LCRWPG) in February 2020 and required notice was sent on March 12, 2020. Due to COVID-19 concerns, on March 16 Governor Abbott temporarily suspended parts of the Open Meetings Act, which allowed the LCRWPG to conduct this hearing over the internet and phones. The revised notice that cancelled the in-person component of the public hearing and created this virtual meeting was posted on the Secretary of State website, the Region K website, and where possible was emailed to entities that were previously noticed.

3. **Public Comments** – Limit 3 minutes per person. No comments were made during the conference call. Region K will accept written comments until June 21, 2020. Written comments may be mailed to LCRA, Attn: David Wheelock, P.O. Box 220, Austin, TX 78767, or emailed to [administrative@regionk.org](mailto:administrative@regionk.org).
4. **Adjourn** – Chairman John Burke adjourned the meeting at 10:07 a.m.

*APPENDIX 10D*

*STATE AGENCY COMMENTS ON INITIALLY PREPARED PLAN WITH  
REGION K COMMENT RESPONSES*

Mr. John Burke, Chair  
John Burke & Associates  
17310 Hill Lakes Court  
Cypress, Texas 77429

Ms. Monica Masters  
Lower Colorado River Authority  
P.O. Box 220, MC H107  
Austin, Texas 78767

Re: Texas Water Development Board Comments for the Lower Colorado (Region K)  
Regional Water Planning Group Initially Prepared Plan, Contract No. 1548301839

Dear Mr. Burke and Ms. Masters:

Texas Water Development Board (TWDB) staff have completed their review of the Initially Prepared Plan (IPP) submitted by March 3, 2020 on behalf of the Lower Colorado Regional Water Planning Group (RWPG). The attached comments follow this format:

- **Level 1:** Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and,
- **Level 2:** Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

Please note that rule references are based on recent revisions to 31 Texas Administrative Code (TAC) Chapter 357, adopted by the TWDB Board on June 4, 2020. 31 TAC § 357.50(f) requires the RWPG to consider timely agency and public comment. Section 357.50(g) requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan (*Contract Exhibit C, Section 13.1.2*).

Standard to all planning groups is the need to include certain content in the final regional water plans that was not yet available at the time that IPPs were prepared and submitted. In your final regional water plan, please be sure to also incorporate the following:

- a) Completed results from the RWPG's infrastructure financing survey for sponsors of recommended projects with capital costs, including an electronic version of the survey spreadsheet [*31 TAC § 357.44*];

**Our Mission**     **Board Members**

To provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas

Peter M. Lake, Chairman | Kathleen Jackson, Board Member | Brooke T. Paup, Board Member  
Jeff Walker, Executive Administrator



- b) Completed results from the implementation survey, including an electronic version of the survey spreadsheet [31 TAC § 357.45(a)];
- c) Documentation that comments received on the IPP were considered in the development of the final plan [31 TAC § 357.50(f)]; and
- d) Evidence, such as a certification in the form of a cover letter, that the final, adopted regional water plan is complete and adopted by the RWPG [31 TAC § 357.50(h)(1)].

Please ensure that the final plan includes updated State Water Planning Database (DB22) reports, and that the numerical values presented in the tables throughout the final, adopted regional water plan are consistent with the data provided in DB22. For the purpose of development of the 2022 State Water Plan, water management strategy and other data entered by the RWPG in DB22 shall take precedence over any conflicting data presented in the final regional water plan [Contract Exhibit C, Sections 13.1.3 and 13.2.2].

Additionally, subsequent review of DB22 data is being performed. If issues arise during our ongoing data review, they will be communicated promptly to the planning group to resolve. Please anticipate the need to respond to additional comments regarding data integrity, including any source overallocations, prior to the adoption of the final regional water plans.

The provision of certain content in an electronic-only form is permissible as follows: Internet links are permissible as a method for including model conservation and drought contingency plans within the final regional water plan; hydrologic modeling files may be submitted as electronic appendices, however all other regional water plan appendices should also be incorporated in hard copy format within each plan [31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 13.1.2 and 13.2.1].

The following items must accompany, the submission of the final, adopted regional water plan:

1. The prioritized list of all recommended projects in the regional water plan, including an electronic version of the prioritization spreadsheet [31 TAC § 357.46]; and,
2. All hydrologic modeling files and GIS files, including any remaining files that may not have been provided at the time of the submission of the IPP but that were used in developing the final plan [31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 13.1.2, and 13.2.1].

The following general requirements that apply to recommended water management strategies must be adhered to in all final regional water plans including:

1. Regional water plans must not include any recommended strategies or project costs that are associated with simply maintaining existing water supplies or replacing existing infrastructure. Plans may include only infrastructure costs that are associated with volumetric increases of treated water supplies delivered to water user groups or that result in more efficient use of existing supplies [31 TAC § 357.10(39), § 357.34(e)(3)(A), Contract Exhibit C, Sections 5.5.2 and 5.5.3]; and,

2. Regional water plans must not include the costs of any retail distribution lines or other infrastructure costs that are not directly associated with the development of additional supply volumes (e.g., via treatment) other than those line replacement costs related to projects that are for the primary purpose of achieving conservation savings via water loss reduction [*§ 357.34(e)(3)(A), Contract Exhibit C, Section 5.5.3*].

**Please be advised that, within the attached document, your region has received a comment specifically requesting that the RWPG provide the basis for how the RWPG considers it feasible that certain water management strategies will actually be implemented by January 5, 2023 (see Level 1, Comment 1), especially for projects with long lead times. This comment is aimed at making sure RWPGs do not present projects in their plans to provide water during the 2020 decade that cannot reasonably be expected to be online, *and provide water supply*, by January 5, 2023. For project types whose drought yields rely on *previously stored water*, the 2020 supply volume should take into consideration reasonably expected accumulated storage that would already be available in the event of drought. The RWPG must adequately address this Level 1 comment in the final, adopted regional water plan, which might require making changes to your regional plan.**

**It is preferable that RWPGs adopt a realistic plan that acknowledges the likelihood of unmet needs in a near-term drought, rather than to present a plan that overlooks reasonably foreseeable, near-term shortages due to the inclusion of unrealistic project timelines. If a '2020' decade project cannot reasonably be expected to come online by January 2023, for example if a reservoir has not started the permitting process, it should be moved to the 2030 decade. Any potential supply gaps (unmet needs) created by moving out projects to the 2030 decade may be shown as simply 'unmet' in the 2020 decade or be shown as met by a 'demand management' strategy. Doing so will appropriately reflect the fact that some entities would likely face an actual shortage if a drought of record were to occur in the very near future despite projects (that may be included in the plan but associated with a later decade) that will eventually address those same potential shortages in future years.**

**It is imperative that you provide the TWDB with information on how you intend to address this comment and all other comments well in advance of your adoption the regional water plan to ensure that the response is adequate for the Executive Administrator to recommend the plan to the TWDB Board for consideration in a timely and efficient manner. Your TWDB project manager will review and provide feedback to ensure all IPP comments and associated plan revisions have been addressed adequately. Failure to adequately address this comment (or any Level 1 comment) may result in the delay of the TWDB Board approval of your final regional water plan.**

As a reminder, the deadline to submit the final, adopted regional water plan and associated material to the TWDB is **October 14, 2020**. Any remaining data revisions to DB22 must be

Mr. John Burke  
Ms. Monica Masters  
Page 4

communicated to Sabrina Anderson at [Sabrina.Anderson@twdb.texas.gov](mailto:Sabrina.Anderson@twdb.texas.gov) by **September 14, 2020**.

If you have any questions regarding these comments or would like to discuss your approach to addressing any of these comments, please do not hesitate to contact Lann Bookout at (512) 936-9439 or [Lann.Bookout@twdb.texas.gov](mailto:Lann.Bookout@twdb.texas.gov). TWDB staff will be available to assist you in any way possible to ensure successful completion of your final regional water plan.

Sincerely,

Date: 6/18/2020

Jessica Zuba  
Deputy Executive Administrator  
Water Supply and Infrastructure

Attachment

c w/att.: Mr. David Wheelock, Lower Colorado River Authority  
Ms. Jaime Burke, AECOM

## TWDB Comments on the Initially Prepared 2021 Lower Colorado (Region K) Regional Water Plan.

**Level 1: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.**

1. Chapter 5 and the State Water Planning Database (DB22). The plan includes the following recommended water management strategies (WMS) by WMS type, providing supply in 2020 (not including demand management): one *aquifer storage & recovery*, five *groundwater wells & other*, one *direct potable reuse*, one *indirect reuse*, three *other direct reuse*, and five *other surface water*. **Strategy supply with an online decade of 2020 must be constructed and delivering water by January 5, 2023.**
  - a) Please confirm that all strategies shown as providing supply in 2020 are expected to be providing water supply by January 5, 2023. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]
  - b) Please provide the specific basis on which the planning group anticipates that it is feasible that the *aquifer storage and recovery*, and five *other surface water* WMSs will all actually be online and providing water supply by January 5, 2023. For example, provide information on actions taken by sponsors and anticipated future project milestones that demonstrate sufficient progress toward implementation. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]
  - c) In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly, and also indicate whether ‘demand management’ will be the WMS used in the event of drought to address such water supply shortfalls or if the plan will show these as simply ‘unmet’. If municipal shortages are left ‘unmet’ and without a ‘demand management’ strategy to meet the shortage, please also ensure that adequate justification is included in accordance with 31 TAC § 357.50(j). [TWC § 16.051(a); 31 § TAC 357.50(j); 31 TAC § 357.34(i)(2); Contract Exhibit C, Section 5.2]
  - d) **Please be advised that, in accordance with Senate Bill 1511, 85th Texas Legislature, the planning group will be expected to rely on its next planning cycle budget to amend its 2021 Regional Water Plan during development of the 2026 Regional Water Plan, if recommended WMSs or projects become infeasible, for example, due to timing of projects coming online.** Infeasible WMSs include those WMSs where proposed sponsors have not taken an affirmative vote or other action to make expenditures necessary to construct or file applications for permits required in connection with implementation of the WMS on a schedule in order for the WMS to be completed by the time the WMS is needed to address drought in the plan. [TWC § 16.053(h)(10); 31 TAC § 357.12(b)]

2. Page 3-14, Table 3-4. Please confirm whether the local surface water supplies listed in Table 3-4 are firm supplies under drought conditions and document this information in the final, adopted regional water plan. *[31 TAC § 357.32(a); Contract Exhibit C, Section 3.2]*
3. Section 3.2.2, Tables 3.12, 3.18, and 3.19. Please include all MAG values (even if zero) for the following aquifer/county/basins: Carrizo-Wilcox/Fayette/Lavaca, Queen City/Fayette/Lavaca, and Sparta/Fayette/Lavaca. *[31 TAC § 357.32(d)]*
4. Section 4.3.1. The plan does not appear to include identified water need volumes for major water providers (MWP) reported by category of use including municipal, mining, manufacturing, irrigation, steam electric, mining, and livestock. Please report the results of the needs analysis for MWPs by categories of use as applicable in the region in the final, adopted regional water plan. *[31 TAC § 357.33(b)]*
5. Chapter 4. While the results of the secondary needs analysis is presented in Appendix ES.G for water user groups (WUG), please include a discussion of this needs analysis to Chapter 4 or reference the current location in the final, adopted regional water plan. *[31 TAC § 357.33(e)]*
6. Chapter 4. The plan does not appear to include a secondary needs analysis for MWPs Please present the results of the secondary needs analysis by decade for MWPs in the final, adopted regional water plan. *[31 TAC § 357.33(e)]*
7. Chapter 5, page 5-76. Please clarify how the firm yield for the proposed Austin Off-Channel Reservoir was estimated and whether the yield was estimated in accordance with the Region's approved hydrologic variance, e.g., use of the cutoff model, in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.2.1]*
8. Chapter 5. It is not clear from the plan what methodology was used to estimate the amount of future direct reuse water available from such sources. Please describe the methodology in the final, adopted regional water plan. *[Contract Exhibit C, Section 3.4]*
9. Chapter 5. Please clarify whether all potentially feasible water management strategies (WMS) were evaluated under drought of record conditions and document this information in the final, adopted regional water plan. *[31 TAC § 357.35(a)]*
10. Chapter 5 and DB22. The plan includes WMS projects that appear to come online after the related WMS is initially online providing supply. For example, the Direct Potable Reuse – Buda WMS is reported to provide supply in 2020, however the related WMS project in DB22 does not come online until 2030. For WMS projects that are the basis for a strategy to deliver water, please ensure that the project is associated with the initial decade, or earlier decade, that the strategy is delivering supply. In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly. *[31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]*

11. DB22 Report 'WUG Recommended Conservation WMS Associated with Recommended IBT WMS' appears to include the WUG Bastrop County WCID 2 that receives WMS supply from a proposed interbasin transfer WMS yet do not have any recommended conservation WMS supply. Please include a water conservation WMS for each WUG or WWP that is to obtain water from a proposed interbasin transfer to which TWC § 11.085 applies, in the final, adopted regional water plan. *[31 TAC § 357.34(i)(2)(C)]*
12. Demand reduction WMS supply data in DB22 indicates that there are approximately 40 WUGs within Region K where supply from demand reduction WMSs will reduce projected demands by 40 percent or greater in at least one planning decade. Please confirm the feasibility of obtaining this magnitude of the demand reduction volumes in the final, adopted regional water plan. *[31 TAC § 357.34(i)(2)(B)]*
13. Appendix 5D. The cost of acquiring the acreage for the conservation pool appears to be missing from the Cost Summary for the Austin Off-Channel Reservoir. Please provide this information in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5]*
14. Chapter 5. Please provide documentation that all costs associated with the Austin Water Forward Plan were indexed to 2018 dollars and that the required capital cost components were evaluated for each strategy. For example, capital costs must include the following, when applicable: construction costs, engineering and feasibility studies, legal assistance, financing, bond counsel and contingencies, permitting and mitigation, land purchase not associated with mitigation, easement costs, and purchases of water rights. *[Contract Exhibit C, Section 5.5]*
15. Section 5.2.3.2.2, page 5-72. The strategy evaluation for Blackwater and Greywater Reuse does not appear to document the methodology for the WMS yield calculations. Please provide additional information on how the yield was determined and show how the quantified yield estimates for this WMS will be available throughout the full period of drought of record conditions. Additionally, the evaluation indicates that significant annual costs (\$47M) were excluded from the plan. All capital and annual, and unit costs associated with developing water supply yield, even within the distributed locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. *[31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]*
16. Section 5.2.3.2.5, page 5-77. The strategy evaluation for Onsite Rainwater and Stormwater Harvesting and Community-Scale Stormwater Harvesting WMSs states that implementation of either as a WMS is dependent upon the “catchment area, storage capacity, rainfall frequency, and water demand of the end user.” Please clearly document whether the quantified yield for this WMS will be available at each distributed location throughout the full period of drought of record conditions and, if so, include the necessary storage capacity calculations, land requirements, and other implementation requirements to achieve this sustained, drought of record yield in the final, adopted regional water plan. If the supply from onsite rainwater

and stormwater cannot be shown to be available throughout drought of record conditions, in every distributed location, remove the WMS from the plan as a recommended strategy. Additionally, capital and annual costs associated with developing this proposed water supply yield, even within the distributed locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]

17. Section 5.2.4.6, page 5-131. The strategy evaluation for Rainwater Harvesting states that the implementation is dependent upon the “catchment area, storage capacity, rainfall frequency, and water demand of the end user.” Please clearly document whether the quantified yield for this WMS will be available at each location and also throughout the full period of drought of record conditions and, if so, include the necessary storage capacity calculations, land requirements, and other implementation requirements to achieve the sustained, drought of record yield in the final, adopted regional water plan. If the supply from rainwater cannot be shown to be available throughout drought of record conditions, remove the WMS from the plan as a recommended strategy. Additionally, capital and annual costs associated with developing this proposed water supply yield, including the distributed investments in multiple locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]
18. Section 5.2.3.2.8, page 5-86. The strategy evaluation for the Decentralized Direct Non-Potable Reuse WMS appears to be developing new water supply within the WUG system. The plan states that pipeline and pump station costs are not included in the costing for the WMS. All capital and annual costs associated with developing water supply, even within the distribution system, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5]
19. Section 5.2.3.2.9, page 5-87. The strategy evaluation for the Capture Local Inflows to Lady Bird Lake indicates that the WMS will be intermittent and seasonal. Please remove the strategy from the plan as presented since it clearly does not meet the requirement in 31 § TAC 357.34(b) and would not provide reliable water supply during severe drought conditions with associated reliable yield unit costs. [Contract Exhibit C, Section 5.5.3]
20. Section 5.2.3.11, page 5-90. The strategy evaluation for the Longhorn Dam Operations Improvements notes components, including security upgrades, electrical updates, gate improvements, and data acquisition and monitoring that do not appear to increase water supply volumes. Please remove the WMS from the plan or demonstrate how these items would directly increase the water supply volumes above what is currently available. Please provide a breakout of all project components with capital costs. Do not include any costs for maintenance of, or upgrades to, or rehabilitation to existing equipment that do not directly increase the volumetric water supply, above and beyond the supply volume that could have been

provided had the facilities been properly maintained, in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5.3]*

21. Section 5.2.3.12, page 5-91. The strategy evaluation for the Lake Austin Operations indicates that the supply will not be available throughout a repeat of a drought of record since the “*potential stored water benefits would only be available when rainfall and lake level conditions allow.*” Please either remove the strategy from the plan as presented since it clearly does not meet the requirement in 31 § TAC 357.34(b), or modify the strategy in a manner that would provide reliable water supply during drought conditions and present the reliable yield, along with the calculations on which it is based, and the associated unit cost along with calculations showing the basis for the reliable yield calculation in the final, adopted regional water plan. *[31 § TAC 357.34(b), Contract Exhibit C, Section 5.5.3]*
22. Section 5.2.4.8, page 5-135. The strategy includes language about the concept and potential of brush control but does not present discrete proposed brush control projects and approximate locations. Please show proposed locations and sizes of brush control areas (acreage for each county) and the associated water supply yield based on those locations or remove the WMS from the plan. Please confirm whether, and demonstrate how, the quantified supply estimates for the Brush Management WMS will be available as additional water supply in a sustained manner throughout drought of record conditions in the final, adopted regional water plan. *[31 TAC § 357.34(b); 31 TAC §357.34(e)(3)(A); Contract Exhibit C, Section 5.6]*
23. Section 5.2.5.4 and 5.2.5.5. Please ensure that the direct reuse (potable and non-potable) WMSs and associated project costs do not include distribution lines directly to residences or commercial businesses. Major transmission lines associated with delivering reuse supplies, for example to the general location of a major industrial park, may be acceptable in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5.3]*
24. Section 5.2.4.3.2, page 5-119. Recommended strategy supplies for the Alliance Regional Water Authority Pipeline WMS appear to be inconsistently reported for Buda in Table 5.101 and DB22. Please revise this information as appropriate in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*
25. Chapter 5. The WMS evaluations do not appear to include quantified impacts on all of the required environmental factors (environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico). Please include a quantitative reporting of each environmental factor for each WMS evaluated in the final, adopted regional water plan. *[31 TAC § 357.34(e)(3)(B)]*
26. Chapter 5. The plan does not appear to include quantitative impact information for agricultural resources in each of the WMS descriptions, for example the Brackish Groundwater Desalination WMS (page 5-82) includes a statement such as there are “no direct impacts” but do not quantify the information. Please include a



quantitative impacts analysis for agricultural resources for each WMS evaluated in the final, adopted regional water plan. *[31 TAC § 357.34(e)(3)(C)]*

27. Units costs reported in DB22 appear notably high for the New Water Purchase – Llano WMSs. For example, unit costs are reported as \$45,619 in 2020. Please confirm that the calculated unit costs are correct in DB22 and that costs were considered in WMS recommendations in the final, adopted regional water plan. *[31 TAC § 357.34(e)(2)]*
28. Appendix 5D. The plan, in multiple instances, does not appear to include MGD, pipe diameters, or pipe length information in some strategy evaluations costing report tables for example, West Travis County PUA-LCRA Contract Amendment with Infrastructure. Please provide this information, if known, or remove the zeros from the costing outputs in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.6]*
29. Chapter 6. Please include the TWDB Socioeconomic Impacts of Projected Water Shortages Report as an appendix to Chapter 6 rather than Chapter 4 in the final, adopted regional water plan. *[31 TAC § 357.40(a)]*
30. Section 7.3. The plan states that emergency interconnect information was submitted confidentially from the 2021 Plan, however at a minimum, the final, adopted regional water plan must include the number of existing and potential interconnects including who is connected to whom. Please include this information in the final, adopted regional water plan. *[31 TAC § 357.42(d), Exhibit C, Section 7.3]*
31. Section 7.4. Please confirm whether the entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply. *[Contract Exhibit C, Section 7.4]*
32. Chapter 10. The plan notes that all meetings were held in accordance with the Texas Open Meetings Act but does not discuss compliance with the Texas Public Information Act. Please address how the planning group complied with the Texas Public Information Act in the final, adopted regional water plan. *[31 TAC §357.21; 31 TAC §357.50(f)]*
33. Chapter 11. Please provide a brief summary of how the 2016 Plan differs from the 2021 Plan with regards to recommended and alternative WMS *projects* in the final, adopted regional water plan. *[31 TAC § 357.45(c)(4)]*

<p><b>Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.</b></p>
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1. Section 2.4.3 and 2.4.4. Please make the following correction: Environmental flow standards are located in 30 TAC, 298 Subchapter D - not 30 TAC, 398 Subchapter D.

2. Please consider including an identification number (either Section Number [e.g. 5.2.3.1.11] similar to what is done in Table 5.1 or Identification Number [e.g. K16] similar to what is done in the Recommended Water Management Strategy Summary Table in Appendix 5B) on pages 6-6 and 6-7 to clearly identify WMSs that were considered in cumulative impacts analysis on environmental flows.
3. Section 3.2.2. Please consider adding information on the Cross Timbers Aquifer, which is present in Mills and San Saba counties.
4. Pages 3-36, 3-43, 3-46. Please consider clarifying that the DFC-compatible groundwater availabilities for non-relevant aquifers were provided by the TWDB as part of TWDB's informal comments on the Region K Technical Memorandum.
5. Chapter 3. Please consider separating reuse from the surface water section, as reuse is considered as a distinct water supply for the purposes of regional water planning.
6. Section 5.2.2, page 5-7. Please consider adding that entities with 3,300 or more connections, as well as those having a financial obligation greater than \$500,000 with TWDB are also required to submit water conservation plans.
7. The GIS files submitted for WMS projects do not include the minimum required metadata. Please include at a minimum, metadata about the data's projection, with the final GIS data submitted. *[Contract Exhibit D, Section 2.4.1]*
8. The GIS files submitted for WMS projects do not adhere to the contractually required naming convention. Please rename the GIS files following the naming convention outlined in Exhibit D, Section 2.4.5 in the final GIS data submitted. *[Contract Exhibit D, Section 2.4.5]*
9. The GIS files submitted for WMS projects do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.4.5. Please include the following attribute fields in all submitted WMS project GIS data with the final GIS files submitted: Datum. *[Contract Exhibit D, Section 2.4.5]*

## TWDB Comments on the Initially Prepared 2021 Lower Colorado (Region K) Regional Water Plan.

**Level 1: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.**

1. Chapter 5 and the State Water Planning Database (DB22). The plan includes the following recommended water management strategies (WMS) by WMS type, providing supply in 2020 (not including demand management): one aquifer storage & recovery, five groundwater wells & other, one direct potable reuse, one indirect reuse, three other direct reuse, and five other surface water. **Strategy supply with an online decade of 2020 must be constructed and delivering water by January 5, 2023.**

- a) Please confirm that all strategies shown as providing supply in 2020 are expected to be providing water supply by January 5, 2023. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]

*Response: Three of the strategies showing supply in 2020 were incorrectly entered in DB22. These are the LCRA Excess Flows Reservoir strategy, the Buda Direct Potable Reuse strategy, and the Buda Direct Reuse (Non-Potable) strategy. These three strategies should show supplies beginning in 2030, and DB22 will be corrected for these strategies. All other strategies shown as providing supply in 2020 are expected to provide water supply by January 5, 2023, although some strategies will only be implemented as needed (under severe drought conditions, for example). For those strategies, there are no project components that need to be constructed in order to implement the strategy.*

- b) Please provide the specific basis on which the planning group anticipates that it is feasible that the aquifer storage and recovery, and five other surface water WMSs will all actually be online and providing water supply by January 5, 2023. For example, provide information on actions taken by sponsors and anticipated future project milestones that demonstrate sufficient progress toward implementation. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]

*Response: As stated in Section 5.2.4.4.1 of the Initially Prepared Plan regarding the BS/EACD – Edwards/Middle Trinity ASR strategy, “At this time, one WUG has indicated interest and/or progress toward implementing this strategy. As of June 2019, Buda has completed a feasibility study for this strategy and allocated funds for a pilot test to begin in the fall of 2019, with facilities expected to be online in 2020. Strategy yield is expected to be 150 ac-ft/yr by 2020, with a full capacity of 600 ac-ft/yr reached by 2030.”*

*The five “other surface water WMSs” include Austin – Lake Austin Operations; Blend Brackish Surface Water in STPNOC Reservoir; LCRA – Interruptible Water*

*for Agriculture (LCRA WMP Amendments); New Water Purchase – Llano; and Water Purchase Amendment – Barton Creek WSC.*

*For the Austin – Lake Austin Operations strategy, a simple modification to the operation of Lake Austin would be involved should a severe drought occur and it need to be implemented. As it is in the Austin Water Forward Plan approved by City Council, action has taken place by the project sponsor to implement the strategy if needed, and no capital costs are needed to implement the strategy.*

*For the Blend Brackish Surface Water in STPNOC Reservoir strategy, implantation would only be needed under extreme drought conditions if the reservoir fell below a certain level. Infrastructure is already in place for this strategy if it is needed.*

*For the LCRA – Interruptible Water for Agriculture (LCRA WMP Amendments), this strategy is already implemented, and is included as a strategy because it is not able to be included in the supply modeling for the firm yield analysis.*

*For the New Water Purchase – Llano strategy, the utility discussed the potential need for this strategy during the last severe drought. Purchasing trucked in water is an option that will be implemented only if needed during extreme drought situations.*

*For the Water Purchase Amendment – Barton Creek WSC strategy, this is a simple contract amendment that would be able to be implemented quickly if projected water demands and/or drought situation cause their current water contract to not be sufficient. No capital costs would be needed.*

- c) In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly, and also indicate whether ‘demand management’ will be the WMS used in the event of drought to address such water supply shortfalls or if the plan will show these as simply ‘unmet’. If municipal shortages are left ‘unmet’ and without a ‘demand management’ strategy to meet the shortage, please also ensure that adequate justification is included in accordance with 31 TAC § 357.50(j). [TWC § 16.051(a); 31 § TAC 357.50(j); [31 TAC § 357.34(i)(2); Contract Exhibit C, Section 5.2]

*Response: Making the proper corrections to DB22 did not result in any increases in near-term unmet water needs.*

- d) **Please be advised that, in accordance with Senate Bill 1511, 85th Texas Legislature, the planning group will be expected to rely on its next planning cycle budget to amend its 2021 Regional Water Plan during development of the 2026 Regional Water Plan, if recommended WMSs or projects become infeasible, for example, due to timing of projects coming online.** Infeasible WMSs include those WMSs where proposed

sponsors have not taken an affirmative vote or other action to make expenditures necessary to construct or file applications for permits required in connection with implementation of the WMS on a schedule in order for the WMS to be completed by the time the WMS is needed to address drought in the plan. [TWC § 16.053(h)(10); 31 TAC § 357.12(b)]

2. Page 3-14, Table 3-4. Please confirm whether the local surface water supplies listed in Table 3-4 are firm supplies under drought conditions in the final, adopted regional water plan. [31 TAC § 357.32(a); Contract Exhibit C, Section 3.2]

*Response: Additional language has been added to confirm that local surface water supplies were developed for drought of record conditions.*

3. Section 3.2.2, Tables 3.12, 3.18, and 3.19. Please include all MAG values (even if zero) for the following aquifer/county/basins: Carrizo-Wilcox/Fayette/Lavaca, Queen City/Fayette/Lavaca, and Sparta/Fayette/Lavaca. [31 TAC § 357.32(d)]

*Response: Tables for the Carrizo-Wilcox Aquifer, Queen City Aquifer, and Sparta Aquifer were edited to include the zero volume MAG values for the Lavaca Basin within Fayette County, as reflected in the GMA-12 report for GAM Run 17-030. Note that table numbers have changed since the IPP due to responses to other TWDB comments.*

4. Section 4.3.1. The plan does not appear to include identified water need volumes for major water providers (MWP) reported by category of use including municipal, mining, manufacturing, irrigation, steam electric, and livestock. Please report the results of the needs analysis for MWPs by categories of use as applicable in the region in the final, adopted regional water plan. [31 TAC § 357.33(b)]

*Response: Tables have been added to Section 4.3, Major Water Provider Needs, identifying needs by category of use for each MWP.*

5. Chapter 4. While the results of the secondary needs analysis is presented in Appendix ES.G for water user groups (WUG), please include a discussion of this needs analysis to Chapter 4 or reference the current location in the final, adopted regional water plan. [31 TAC § 357.33(e)]

*Response: Section 4.4, Second-Tier Water Needs, is a new section added to Chapter 4. Section 4.4.1 includes a discussion of secondary water needs for Water User Groups.*

6. Chapter 4. The plan does not appear to include a secondary needs analysis for MWPs. Please present the results of the secondary needs analysis by decade for MWPs in the final, adopted regional water plan. [31 TAC § 357.33(e)]

*Response: Section 4.4, Second-Tier Water Needs, is a new section added to Chapter 4. Section 4.4.2 includes a discussion of secondary water needs for Major Water Providers.*

7. Chapter 5, page 5-76. Please clarify how the firm yield for the proposed Austin Off-Channel Reservoir was estimated and whether the yield was estimated in

accordance with the Region's approved hydrologic variance, e.g., use of the cutoff model, in the final, adopted regional water plan. [Contract Exhibit C, Section 5.2.1]

*Response: Strategy has been expanded to clarify that the models used for Austin's Water Forward Plan were not used to develop the firm yield for the 2021 Region K Plan. The Austin Off-Channel Reservoir water management strategy was added into the approved Region K Cutoff Model, and the OCR firm yield was calculated for the Region K Drought of Record period, October 2007 through December 2016, in accordance with Region K's approved hydrologic variance. Modeling results indicate that the firm yield of municipal supply from the OCR is projected to be about 25,000 acre-feet per year.*

8. Chapter 5. It is not clear from the plan what methodology was used to estimate the amount of future direct reuse water available from such sources. Please describe the methodology in the final, adopted regional water plan. [Contract Exhibit C, Section 3.4]

*Response: Section 5.2.5.5 (Direct Reuse (Non-Potable)) was updated to clarify that direct reuse yield information was obtained directly from Water User Groups.*

9. Chapter 5. Please clarify whether all potentially feasible water management strategies (WMS) were evaluated under drought of record conditions and document this information in the final, adopted regional water plan. [31 TAC § 357.35(a)]

*Response: Section 5.1 (Potential Water Management Strategies) was expanded to clarify that all potentially feasible water management strategies were evaluated under Drought of Record conditions.*

10. Chapter 5 and DB22. The plan includes WMS projects that appear to come online after the related WMS is initially online providing supply. For example, the Direct Potable Reuse – Buda WMS is reported to provide supply in 2020, however the related WMS project in DB22 does not come online until 2030. For WMS projects that are the basis for a strategy to deliver water, please ensure that the project is associated with the initial decade, or earlier decade, that the strategy is delivering supply. In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly. [31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]

*Response: Three strategies showing supply in 2020 were incorrectly entered in DB22. These are the LCRA Excess Flows Reservoir strategy, the Buda Direct Potable Reuse strategy, and the Buda Direct Reuse (Non-Potable) strategy. These three strategies should show supplies beginning in 2030, and DB22 will be corrected for these strategies.*

11. DB22 Report 'WUG Recommended Conservation WMS Associated with Recommended IBT WMS' appears to include the WUG Bastrop County WCID 2 that receives WMS supply from a proposed interbasin transfer WMS yet does not have

any recommended conservation WMS supply. Please confirm that this WUG is not subject to Texas Water Code § 11.1271 and § 13.146. If they are subject to those provisions, please ensure that water conservation practices are recommended. [31 TAC § 357.34(g)(2)(A)]

*Response: Section 5.2.2.3 (Municipal Conservation) was updated to include a recommended conservation strategy for Bastrop County WCID 2. The strategy recommends a 5% reduction in 2060, resulting in a demand reduction of 4 GPCD. Due to the small reduction, there are no capital costs associated with this strategy. DB22 has been updated to include strategy.*

12. Demand reduction WMS supply data in DB22 indicates that there are approximately 40 WUGs within Region K where supply from demand reduction WMSs will reduce projected demands by 40 percent or greater in at least one planning decade. Please confirm the feasibility of obtaining this magnitude of the demand reduction volumes in the final, adopted regional water plan. [31 TAC § 357.34(g)(2)(B)]

*Response: Two WUGs, Georgetown and Cedar Park, were found to be double-counting municipal conservation between Region K and Region G. The municipal conservation strategy for Region G has been removed; the Region G plan and DB22 have been updated accordingly.*

*Demand reduction consists of conservation and drought management water management strategies. The Water Conservation Implementation Task Force (WCITF) recommended a 1 percent per year reduction in per capita water demand in order to reach the target demand of 140 GPCD. Over the planning period (50 years), if a WUG has a GPCD greater than 140, a WUG would reduce their projected demands by up to 40%. The Region K conservation strategy requested by the Lower Colorado Regional Planning Group reduces the GPCD by 10% each decade until it reaches 140; if a WUG has a high GPCD in 2020 and doesn't reach 140 by 2070, the overall reduction is about 45%. The Region K drought management either reduces post-conservation GPCD by 20% each decade if the GPCD is greater than 100 or defers to a WUG's DCP "Severe" trigger response goal when possible. As some WUG's "Severe" trigger response goals aim for 25% or 30% reduction, the aims increase demand reduction. A WUG with a high GPCD that does not reach 140 by 2070 and a 20-25% drought management reduction has an overall demand reduction of 56-59%. As water conservation follows the WCITF recommendations and drought management follows the WUGs' trigger response goals, the reductions should be feasible during Drought of Record conditions. Section 5.2.4.9.1 (Drought Management – Municipal Utilities) has been updated acknowledging the feasibility.*

13. Appendix 5D. The cost of acquiring the acreage for the conservation pool appears to be missing from the Cost Summary for the Austin Off-Channel Reservoir. Please provide this information in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5]

*Response: Costs for Land Acquisition and Surveying are included in Appendix 5D. Strategy was also updated to note that the cost for land is assumed to be a percentage of facility costs.*

14. Chapter 5. Please provide documentation that all costs associated with the Austin Water Forward Plan were indexed to 2018 dollars and that the required capital cost components were evaluated for each strategy. For example, capital costs must include the following, when applicable: construction costs, engineering and feasibility studies, legal assistance, financing, bond counsel and contingencies, permitting and mitigation, land purchase not associated with mitigation, easement costs, and purchases of water rights. [Contract Exhibit C, Section 5.5]

*Response: All costs provided by the Austin Water Forward Plan were parsed out and input into the TWDB Unified Costing Model in 2018 dollars. The following language was added to Austin strategies: "In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2018 dollars." After coordination with TWDB staff, required capital cost components were updated for several strategies.*

15. Section 5.2.3.2.2, page 5-72. The strategy evaluation for Blackwater and Greywater Reuse does not appear to document the methodology for the WMS yield calculations. Please provide additional information on how the yield was determined and show how the quantified yield estimates for this WMS will be available throughout the full period of drought of record conditions. Additionally, the evaluation indicates that significant annual costs (\$47M) were excluded from the plan. All capital and annual, and unit costs associated with developing water supply yield, even within the distributed locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]

*Response: Strategy evaluation has been updated with a more detailed yield estimate methodology and costing. The yield provided is available throughout the full period of drought of record conditions.*

16. Section 5.2.3.2.5, page 5-77. The strategy evaluation for Onsite Rainwater and Stormwater Harvesting and Community-Scale Stormwater Harvesting WMSs states that implementation of either as a WMS is dependent upon the "catchment area, storage capacity, rainfall frequency, and water demand of the end user." Please clearly document whether the quantified yield for this WMS will be available at each distributed location throughout the full period of drought of record conditions and, if so, include the necessary storage capacity calculations, land requirements, and other implementation requirements to achieve this sustained, drought of record yield in the final, adopted regional water plan. If the supply from onsite rainwater and stormwater cannot be shown to be available throughout drought of record conditions, in every distributed location, remove the WMS from the plan as a recommended strategy. Additionally, capital and annual costs associated with



developing this proposed water supply yield, even within the distributed locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]

*Response: Yields and unit costs have been re-evaluated, and Modeling has shown that yields from the Onsite Rainwater and Stormwater Harvesting and the Community-Scale Stormwater Harvesting strategies are available every year during the drought of record. The strategy evaluation has been clarified to state that water availability beyond the expected yields is largely dependent on variable factors. Additionally, the yields shown are a total for the Austin WUG, based on multiple locations. The estimated number of locations that the total yield is based on has been added to the strategy description. Costing has been updated.*

17. Section 5.2.4.6, page 5-131. The strategy evaluation for Rainwater Harvesting states that the implementation is dependent upon the “catchment area, storage capacity, rainfall frequency, and water demand of the end user.” Please clearly document whether the quantified yield for this WMS will be available at each location and also throughout the full period of drought of record conditions and, if so, include the necessary storage capacity calculations, land requirements, and other implementation requirements to achieve the sustained, drought of record yield in the final, adopted regional water plan. If the supply from rainwater cannot be shown to be available throughout drought of record conditions, remove the WMS from the plan as a recommended strategy. Additionally, capital and annual costs associated with developing this proposed water supply yield, including the distributed investments in multiple locations, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [31 § TAC 357.34(b); Contract Exhibit C, Section 5.5]

*Response: Strategy has been updated with additional information confirming drought of record yield and storage capacity. A project with capital and annual costs has been added to the strategy and will be added to DB22.*

18. Section 5.2.3.2.8, page 5-86. The strategy evaluation for the Decentralized Direct Non-Potable Reuse WMS appears to be developing new water supply within the WUG system. The plan states that pipeline and pump station costs are not included in the costing for the WMS. All capital and annual costs associated with developing water supply, even within the distribution system, must be included in the plan and DB22. Please reconcile this information and data in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5]

*Response: Collection pipeline and pump station costs have been included in the costing for the Decentralized Direct Non-Potable Reuse strategy. DB22 has been updated.*

19. Section 5.2.3.2.9, page 5-87. The strategy evaluation for the Capture Local Inflows to Lady Bird Lake indicates that the WMS will be intermittent and seasonal. Please remove the strategy from the plan as presented since it clearly does not meet the

requirement in 31 § TAC 357.34(b) and would not provide reliable water supply during severe drought conditions with associated reliable yield unit costs. *[Contract Exhibit C, Section 5.5.3]*

*Response: Strategy language was updated to clarify that while the strategy may not intend to produce a yield year-round, the average annual yield is modeled for drought conditions. For example, most of the 3,000 ac-ft may be provided during the winter months, but it is still an overall annual yield of 3,000 ac-ft under drought conditions.*

20. Section 5.2.3.11, page 5-90. The strategy evaluation for the Longhorn Dam Operations Improvements notes components, including security upgrades, electrical updates, gate improvements, and data acquisition and monitoring that do not appear to increase water supply volumes. Please remove the WMS from the plan or demonstrate how these items would directly increase the water supply volumes above what is currently available. Please provide a breakout of all project components with capital costs. Do not include any costs for maintenance of, or upgrades to, or rehabilitation to existing equipment that do not directly increase the volumetric water supply, above and beyond the supply volume that could have been provided had the facilities been properly maintained, in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5.3]*

*Response: Strategy and associated costs have been amended to only include the addition of new bascule gate controls to increase the efficiency of gate operations and reduce water loss downstream; this helps to reduce water lost from Lady Bird Lake due to normal dam operations.*

21. Section 5.2.3.12, page 5-91. The strategy evaluation for the Lake Austin Operations indicates that the supply will not be available throughout a repeat of a drought of record since the “*potential stored water benefits would only be available when rainfall and lake level conditions allow.*” Please either remove the strategy from the plan as presented since it clearly does not meet the requirement in 31 § TAC 357.34(b), or modify the strategy in a manner that would provide reliable water supply during drought conditions and present the reliable yield, along with the calculations on which it is based, and the associated unit cost along with calculations showing the basis for the reliable yield calculation in the final, adopted regional water plan. *[31 § TAC 357.34(b), Contract Exhibit C, Section 5.5.3]*

*Response: Strategy has been expanded to clarify that it provides supplemental water during the drought of record. In cases when Lake Austin Operations are not available as a supplemental water supply, Austin, as a major water provider, will continue to use water from its Colorado River rights and LCRA back-up contract, in addition to other water management strategies. Austin Water has an overall plan to use firm and supplemental water supplies as a system to provide water through a drought of record. Yield and unit cost have been re-evaluated, and modeling done for this strategy shows that the supply included in Region K is available during the drought of record. This is similar to how the supply volumes are calculated in Chapter 3 for the Highland Lakes and LCRA Backup.*

22. Section 5.2.4.8, page 5-135. The strategy includes language about the concept and potential of brush control but does not present discrete proposed brush control projects and approximate locations. Please show proposed locations and sizes of brush control areas (acreage for each county) and the associated water supply yield based on those locations or remove the WMS from the plan. Please confirm whether, and demonstrate how, the quantified supply estimates for the Brush Management WMS will be available in a sustained manner throughout drought of record conditions in the final, adopted regional water plan. [31 TAC § 357.34(b); 31 TAC §357.34(e)(3)(A)]

*Response: Strategy has been updated with assumed acreage for each county and associated water supply yield. Language has been added explaining that the quantified supply estimate will be available in a sustained manner throughout drought of record conditions as the increased permeability in the soil allows for additional deep drainage; these estimates assume the minimum rainfall and do not account for any surface water inflows.*

23. Section 5.2.5.4 and 5.2.5.5. Please ensure that the direct reuse (potable and non-potable) WMSs and associated project costs do not include distribution lines directly to residences or commercial businesses. Major transmission lines associated with delivering reuse supplies, for example to the general location of a major industrial park, may be acceptable in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5.3]

*Response: It has been confirmed that all direct reuse water management strategies and associated projects do not include distribution lines.*

24. Section 5.2.4.3.2, page 5-119. Recommended strategy supplies for the Alliance Regional Water Authority Pipeline WMS appear to be inconsistently reported for Buda in Table 5.101 and DB22. Please revise this information as appropriate in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

*Response: Table 5.101 has been corrected to be consistent with DB22. Region L confirmed with ARWA and GBRA that the project would be providing water supplies by the January 5, 2023 deadline.*

25. Chapter 5. The WMS evaluations do not appear to include quantified impacts on all of the required environmental factors (environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico). Please include a quantitative reporting of each environmental factor for each WMS evaluated in the final, adopted regional water plan. [31 TAC § 357.34(e)(3)(B)]

*Response: The water management strategy descriptions in the main text of Chapter 5 have been updated to include a quantitative reporting of all environmental factors for each strategy.*

26. Chapter 5. The plan does not appear to include quantitative impact information for agricultural resources in each of the WMS descriptions, for example the Brackish Groundwater Desalination WMS (page 5-82) includes a statement such as there are “no direct impacts” but do not quantify the information. Please include a quantitative impacts analysis for agricultural resources for each WMS evaluated in the final, adopted regional water plan. [31 TAC § 357.34(e)(3)(C)]

*Response: The water management strategy descriptions in the main text of Chapter 5 has been updated to include a quantitative reporting of impacts to agricultural resources for each strategy.*

27. Unit costs reported in DB22 appear notably high for the New Water Purchase – Llano WMSs. For example, unit costs are reported as \$45,619 in 2020. Please confirm that the calculated unit costs are correct in DB22 and that costs were considered in WMS recommendations in the final, adopted regional water plan. [31 TAC § 357.34(e)(2)]

*Response: Costs for Llano’s New Water Purchase strategy were considered at the November 13, 2019 Region K RWPG meeting. It was recognized that this strategy has a very high unit cost of water. Mike Reagor (Region K member representing municipalities and former mayor of Llano) explained that this strategy would not be feasible for long-term implementation, but it would be feasible during a period of drought; that is also recognized in Section 5.4.2.7. This Llano strategy for emergency water shortage conditions would be implemented by purchasing raw water from Burnet to be delivered by truck to the water treatment plant. As such, cost would depend on rates for hauling raw water and volumes to be transported. Llano provided a cost estimate consisting of an approximate 250,000 gallons per day, or 48 truckloads, supplied at \$35,000/day. As such, the 2020 unit cost of \$45,619/ac-ft is reported correctly.*

28. Appendix 5D. The plan, in multiple instances, does not appear to include MGD, pipe diameters, or pipe length information in some strategy evaluations costing report tables for example, West Travis County PUA-LCRA Contract Amendment with Infrastructure. Please provide this information, if known, or remove the zeros from the costing outputs in the final, adopted regional water plan. [Contract Exhibit C, Section 5.6]

*Response: Region K utilized “Simplified Hydraulics” rather than “Advanced Hydraulics” in the Unified Costing Model (UCM). Using “Simplified Hydraulics” generates and displays a cost for pipe, but the MGD, diameter, and length do not display due to a coding error in the UCM. Zeros have been removed from the costing outputs.*

29. Chapter 6. Please include the TWDB Socioeconomic Impacts of Projected Water Shortages Report as an appendix to Chapter 6 rather than Chapter 4 in the final, adopted regional water plan. [31 TAC § 357.40(a)]

*Response: Appendix 4B has been moved to Appendix 6B.*

30. Section 7.3. The plan states that emergency interconnect information was submitted confidentially from the 2021 Plan, however at a minimum, the final, adopted regional water plan must include the number of existing and potential interconnects including who is connected to whom. Please include this information in the final, adopted regional water plan. [31 TAC § 357.42(d), Exhibit C, Section 7.3]

*Response: Included a table showing emergency interconnects for 19 WUGs within Region K and a statement noting that although the submitted information included 38 existing and potential interconnects, some of the sellers or recipients were private or non-WUGs and are not included in the table.*

31. Section 7.4. Please confirm whether the entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply. [Contract Exhibit C, Section 7.4]

*Response: A statement was added confirming that emergency response was evaluated for 180 days or less of remaining supply.*

32. Chapter 10. The plan notes that all meetings were held in accordance with the Texas Open Meetings Act but does not discuss compliance with the Texas Public Information Act. Please address how the planning group complied with the Texas Public Information Act in the final, adopted regional water plan. [31 TAC §357.21; 31 TAC §357.50(f)]

*Response: Language was added to Section 10.1, noting that in accordance with the Texas Public Information Act, meeting minutes and other RWPG-related documents were posted on the Region K website for viewing.*

33. Chapter 11. Please provide a brief summary of how the 2016 Plan differs from the 2021 Plan with regards to recommended and alternative WMS projects in the final, adopted regional water plan. [31 TAC § 357.45(b)(4)]

*Response: New Sections 11.2.8 and 11.2.9 has provided a comparison of Recommended and Alternative Water Management Projects in the 2016 and 2021 Plans.*

<p><b>Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.</b></p>
--

1. Section 2.4.3 and 2.4.4. Please make the following correction: Environmental flow standards are located in 30 TAC, 298 Subchapter D - not 30 TAC, 398 Subchapter D.

*Response: The language has been revised to read 30 TAC, 298 Subchapter D.*

2. Please consider including an identification number (either Section Number [e.g. 5.2.3.1.11] similar to what is done in Table 5.1 or Identification Number [e.g. K16] similar to what is done in the Recommended Water Management Strategy Summary

Table in Appendix 5B) on pages 6-6 and 6-7 to clearly identify WMSs that were considered in cumulative impacts analysis on environmental flows.

*Response: Section numbers have been added to the lists on pages 6-6 and 6-7.*

3. Section 3.2.2. Please consider adding information on the Cross Timbers Aquifer, which is present in Mills and San Saba counties.

*Response: In July 2018, the TWDB reached out to Region K to see if the Region would like to submit requests to add non-MAG Cross Timber Aquifers to the DB22 database. The region consulted Mitchell Sodek, General Manager of the Central Texas GCD, who responded that it should be left out of the plan for the 2021 cycle. At the time, there was no readily available information for the aquifer in Mills County, and GMA 8 had no figures for this newly designated aquifer. It is classified as "other aquifer" in the 2021 Region K Plan. No changes have been made.*

4. Pages 3-36, 3-43, 3-46. Please consider clarifying that the DFC-compatible groundwater availabilities for non-relevant aquifers were provided by the TWDB as part of TWDB's informal comments on the Region K Technical Memorandum.

*Response: The sentence reading "The TWDB staff conducted a modeling analysis related to the Llano Uplift aquifers and provided DFC-compatible "non-relevant" groundwater availability values..." was amended to read, "As part of TWDB's informal comments on the Region K Technical Memorandum, the TWDB staff conducted a modeling analysis related to the Llano Uplift aquifers and provided DFC-compatible "non-relevant" groundwater availability values..." in each section.*

5. Chapter 3. Please consider separating reuse from the surface water section, as reuse is considered as a distinct water supply for the purposes of regional water planning.

*Response: Section 3.2.1.1.2.5 (Current Available Reclaimed Water) has been moved to a new water supply section 3.2.3.*

6. Section 5.2.2, page 5-7. Please consider adding that entities with 3,300 or more connections, as well as those having a financial obligation greater than \$500,000 with TWDB are also required to submit water conservation plans.

*Response: Section 5.2.2 has been updated to include the information that entities with 3,300 or more connections, as well as those having a financial obligation greater than \$500,000 with TWDB are also required to submit water conservation plans.*

7. The GIS files submitted for WMS projects do not include the minimum required metadata. Please include at a minimum, metadata about the data's projection, with the final GIS data submitted. [Contract Exhibit D, Section 2.4.1]

*Response: RWPG will submit GIS files with project metadata.*

8. The GIS files submitted for WMS projects do not adhere to the contractually required naming convention. Please rename the GIS files following the naming

convention outlined in Exhibit D, Section 2.4.5 in the final GIS data submitted.  
*[Contract Exhibit D, Section 2.4.5]*

*Response: RWPG will submit GIS files with a fixed naming convention.*

9. The GIS files submitted for WMS projects do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.4.5. Please include the following attribute fields in all submitted WMS project GIS data with the final GIS files submitted: Datum. *[Contract Exhibit D, Section 2.4.5]*

*Response: RWPG will submit GIS files with attribute fields.*



June 17, 2020

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Carter P. Smith  
Executive Director

Mr. David Wheelock  
Region K Regional Water Planning Group  
c/o Lower Colorado River Authority  
P.O. Box 220  
Austin, TX 78767

Re: 2021 Region K Initially Prepared Regional Water Plan

Dear Mr. Wheelock:

The Texas Parks and Wildlife Department (TPWD) has reviewed the 2021 Initially Prepared Regional Water Plan for Region K (IPP) and appreciates the opportunity to provide comments. Water impacts every aspect of TPWD's mission to manage and conserve the natural and cultural resources of Texas. Although TPWD has limited regulatory authority over the use of state waters, we are the agency charged with primary responsibility for protecting the state's fish and wildlife resources. To that end, TPWD offers these comments intended to help avoid or minimize impacts to state fish and wildlife resources.

TPWD understands that regional water planning groups are guided by 31 TAC §357 when preparing regional water plans. These water planning rules spell out requirements related to natural resource and environmental protection. Accordingly, as in previous planning cycles, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy?
- Does the IPP include Drought Contingency Plans?
- Does the IPP recommend any stream segments for nomination as ecologically unique?
- If the IPP includes strategies identified in the 2016 regional water plan, does it address concerns raised by TPWD in connection with the 2016 Water Plan?

The population of the Region K Lower Colorado River Water Planning Area (LCRWPA) is projected to nearly double to over 3.2 million by 2070. During the



same period, as identified in the IPP, water demands are expected to increase by 17 percent. The approximately 1.3 million acre-feet demand in 2070, a decrease of 154,000 a-ft from the demand projection in the 2016 Region K Water Plan, will be met by a mix of water supply strategies including new off-channel reservoirs, conservation, drought management, surface water reuse, amendments to existing water rights and contracts, aquifer storage and recovery, and expanded groundwater use. The identified strategies will have varying degrees of effect on fish and wildlife resources, environmental flows, and spring systems.

The IPP briefly describes natural resources in the Lower Colorado Region including vegetational areas, lists of species of special concern, groundwater resources, and information on environmental flow requirements for the lower Colorado River as identified in the LCRA's Water Management Plan (WMP) and the state's environmental flow standards (30 TAC, 298(D)). The IPP provides information on potential water quality and quantity concerns related to surface and groundwater and includes limited information on characteristic fish and wildlife species, spring systems, and groundwater/surface water interactions in the region. Such information could be useful in understanding the impacts of select water supply strategies on fish and wildlife species, water quality, and water-based recreation in the region.

The Region K IPP addresses quantitative reporting of environmental factors as required by 31 TAC §357.7(a)(8)(A) by analyzing potential impacts to instream flows and freshwater inflows to Matagorda Bay from recommended water supply strategies to flow levels identified in the LCRA Water Management Plan and/or the environmental flow standards. In places, the plan would benefit from a more thorough explanation and quantification where appropriate to better explain potential environmental flow impacts from proposed strategies. For example, several groundwater strategy evaluations state the potential for insignificant local environmental impacts depending on site characteristics. From the description, it is not clear that impacts will be insignificant without more details and information. In addition, proximity of groundwater withdrawal projects to springs, seeps, and wetlands could affect surface water habitats and associated species.

As pointed out in the IPP, many of the recommended water management strategies that could impact the Colorado River system and Matagorda Bay utilize water under existing water rights or reuse water that was already assumed to be 100 percent consumed under the required surface water availability modeling (WAM) guidelines. Even with individual and cumulative impact analyses, the 100 percent use assumption makes it difficult to determine quantifiable impacts of those water supply strategies on environmental flows. However, this difficulty should not be interpreted as meaning that there will be no impacts. By using a WAM Run 3 modeled baseline condition versus current conditions, the environmental flow analyses may underestimate the environmental effects of strategies. Changing use patterns, increased and full use of existing water rights, and dependence on return

flows as strategies will invariably alter hydrologic flow regimes, instream flows, and freshwater inflows into Matagorda Bay.

Of the recommended water supply strategies, reuse and off-channel reservoirs could have the largest impact on instream flows and bay and estuary inflows. Though TPWD generally supports reuse as a water supply strategy, it is important to note the importance of return flows in often providing a consistent flow in the river, even when a portion is reused, that helps sustain aquatic habitats and biotic communities. While return flows may provide a positive impact to instream flows as they travel downstream to a diversion point, environmental impacts downstream of the diversion point may be more than minimal. Without additional information, TPWD believes that the potential exists for negative environmental effects to Matagorda Bay from diminished flows in the river due to the exercise of individual and cumulative strategies.

As noted in the IPP, the recommendation by the Lower Colorado Regional Water Planning Group (LCRWPG) of strategies such as conservation, reuse, and drought management will reduce demands which will help to maintain spring and stream flows in the region, especially during times of drought. In addition, recommended strategies such as off-channel reservoirs and aquifer storage and recovery may aid in balancing peak demands for surface water and groundwater, which could also help maintain spring flows in the region. More environmentally benign strategies, such as conservation and drought management, may help maintain environmental flows while minimally impacting the environment and delay or eliminate the need for more environmentally damaging strategies. TPWD supports the use of aggressive water conservation strategies and goals as identified in the plan for municipal, industrial, and agricultural users. In general, these strategies are preferred alternatives to large-scale water development projects.

TPWD agrees with many of the policy recommendations included in the IPP. The recommendations consistently recognize the complexity of water issues in Texas and the importance of instream flows and freshwater inflows. The policies are not only explicitly related to environmental flows and the importance of recognizing environmental demands for water as a use category, but also to groundwater/surface water interaction and modeling, sustainable groundwater use, interbasin transfers, reuse, and ecologically unique stream segments. TPWD was honored to participate in the Unique Stream Segments (USS) Committee meetings during the planning cycle and supports the recommendations made by the committee and ultimately adopted by the LCRWPG. Although the IPP does not recommend nomination of any stream segments as ecologically unique, it does recommend actions for future Lower Colorado Regional Water Plans. TPWD looks forward to assisting the group as they investigate and pursue designation of ecologically unique stream segments and is willing to assist with the preparation of a recommendation packet as identified in TAC §357.8.

Mr. David Wheelock  
Page 4 of 4  
June 15, 2020

In closing, TPWD commends the LCRWPG for producing such a detailed and comprehensive IPP. TPWD also greatly appreciates the group providing the TPWD representative opportunities to participate and engage the group at planning group and subcommittee meetings. TPWD looks forward to continuing to work with the planning group to develop water supply strategies that not only meet the future water supply needs of the region but also preserve the ecological health of the region's aquatic resources. Please contact me at (512) 389-8715 or [Cindy.Loeffler@TPWD.Texas.gov](mailto:Cindy.Loeffler@TPWD.Texas.gov) if you have any questions or comments.

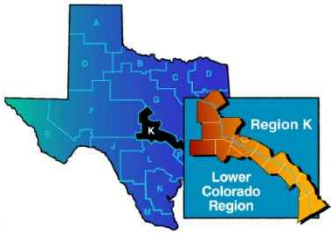
Sincerely,

*Cindy Loeffler*

Cindy Loeffler, Chief  
Water Resources Branch

CL:lc

Cc: David Bradsby, Coastal Fisheries Division, TPWD



**Lower Colorado River Authority**, Administrative Agent  
P.O. Box 220, Austin, Texas 78767  
(512) 473-3200, Fax (512) 473-3551

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David Wheelock, Vice-Chair  
Teresa Lutes, Secretary  
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Jim Brasher  
David Caldwell  
Ronald G. Fieseler  
Lauri Gillam  
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Jim Luther  
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Ann McElroy  
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Mike Reagor  
Rob Ruggiero  
Paul Sliva  
Mitchell Sodek  
James Sultemeier  
Byron Theodosis  
Jim Totten  
Paul Tybor  
David Van Dresar  
Jennifer Walker

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Bastrop  
Blanco  
Burnet  
Colorado  
Fayette  
Gillespie  
Hays (partial)  
Llano  
Matagorda  
Mills  
San Saba  
Travis  
Wharton (partial)  
Williamson (partial)

October 14, 2020

Ms. Cindy Loeffler  
Texas Parks and Wildlife Department  
4200 Smith School Road  
Austin, TX 78744  
[cindy.loeffler@tpwd.texas.gov](mailto:cindy.loeffler@tpwd.texas.gov)

**Subject: Response to your submitted comment on the Region K  
Initially Prepared Plan**

Dear Ms. Loeffler:

Thank you for your comments on the 2021 Region K Initially Prepared Water Plan (IPP). The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future.

We look forward to working with you in future rounds of regional planning to re-evaluate the potential for unique stream segments in the Lower Colorado Regional Water Planning Area and appreciate any assistance you may be able to provide.

Sincerely,

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group

***APPENDIX 10E***

***PUBLIC COMMENTS ON INITIALLY PREPARED PLAN WITH REGION  
K COMMENT RESPONSES***

**From:** [Gerlach, Helen](#)  
**Subject:** [EXTERNAL] FW: Region K / Atmospheric Water Generation Inclusion: TX 2022 Water Plan  
**Date:** Tuesday, June 09, 2020 5:15:26 PM  
**Attachments:** [Atmospheric Water Generation J Saggese.pdf](#)  
[TWDB 2017 St Water Plan AWG Notes.docx](#)  
[Atmospheric Water Generator Intro\\_M West..docx](#)

---

Region K Members and Friends,

Please see the following email and attachments regarding atmospheric water generation.

Thank you,

Helen Gerlach  
**Graduate Engineer B**  
City of Austin | Austin Water  
Office: 512-972-0423 | Cell: 321-482-4064  
[Helen.Gerlach@austintexas.gov](mailto:Helen.Gerlach@austintexas.gov)

----- Forwarded message -----

From: **Andrew Sowder** <[asowder@sbcglobal.net](mailto:asowder@sbcglobal.net)>  
Date: Tue, Jun 9, 2020 at 12:02 PM  
Subject: Region K / Atmospheric Water Generation Inclusion: TX 2022 Water Plan  
To: [johnburke41@gmail.com](mailto:johnburke41@gmail.com) <[johnburke41@gmail.com](mailto:johnburke41@gmail.com)>

Hello Mr. Burke,

As a Regional Water Planning Group Chairperson of Region K, you are knowledgeable of how the Water Cycle produces rain. Atmospheric Water Generation technology *produces* water using the same Water Cycle process, which you will hopefully agree makes it an *innovative technology* it worthy of including in Texas' 2022 Water Plan.

	Water Cycle	Atmospheric Water Generation
Tech'		
	<ul style="list-style-type: none"><li>· In the Water Cycle, warm humid air rises into the atmosphere.</li><li>· Atmospheric temperature cools at higher altitudes, so as the rising warm humid air ascends it</li></ul>	<ul style="list-style-type: none"><li>· An Atmospheric Water Generation machine draws warm humid air into a chamber.</li><li>· The chamber is temperature controlled, which enables cooling of the warm humid air to a temperature</li></ul>

into the cooler temperature zones it begins to condensate forming clouds

· When the atmospheric temperature around the cloud cools to the Dewpoint temperature rain occurs.

that begins condensation.

· When the temperature in the chamber is cooled to the Dewpoint temperature droplets form which fall into a collection pan, then flow out through a valve.

You may have seen examples of Atmospheric Water Generation technology on a hot-humid Texas day when you turned on your car's AC. Your AC cooled the air blowing out of your car's defrost vent. The cold air blowing from the defrost vent cooled your windshield to the Dewpoint temperature. Warm humid air contacting the cooled party of your windshield began to condensate turning into water drops.

One small cloud makes a little rain, and many small clouds make enough rain to fill aquifers, lakes, and rivers, the same is true of a distributive Atmospheric Water Generation network. Advancements in Atmospheric Water Generation now make it an economically scalable technology, capable of onsite residential/commercial water production from hundreds of gallons to acre feet of water for municipal, aquifer and reservoir supply. The aggregate potential of a distributive Atmospheric Water Generation network would substantially mitigate drought induced water supply shortages.

The following information and attached files contain documentation and contacts for your review: Economic energy / gallons produced ratio, Validation of economic operability, and Military sales that will hopefully prompt your inclusion of Atmospheric Water Generation in Texas' 2022 Water Plan as an innovative technology for *producing* water.

This information has also been sent to TWDB's Planning Group Regional Managers Innovative Water Technology staff, and others in hopes of AWG implementation.

Thank for your consideration, Andrew Sowder

512-299-4290 (Cell) / [asowder@sbcglobal.net](mailto:asowder@sbcglobal.net)

**Introduction:** Mr. Moses West, [AWG Contracting](#), has developed an economic, environmentally viable Atmospheric Water Generator (AWG) that fulfills many of the stated goals in Texas' 2017 Water Plan.

**2017 Water Plan:** AWG *creates* water, all other technologies referenced in the report draw upon existing water supplies. AWG is capable of both supplementing water systems and reservoirs during non-drought periods and *supplying* water during droughts.

Notations highlighting AWG's ability to meet Texas 2017 Water Plan's goals and requirements are in attachment: TWDB\_ 2017 St Water Plan AWG Notes.

**Economy of AWG Production:** [Dr. Les Shephard](#), 2015 Trinity University Test Data.

"Bottom line is that to produce 1-acre foot ~ 365000 gallons would take nominally 340,000 kWh - a rough number at 50% RH (estimated 0.93 kWh/g) - based on [real data and real operational environment measurements for Texas](#)."

"I think the estimate seems reasonable given the data we collected 5 years ago (2015) - given the appropriate number of new machines I sense we could do better, but this is a good estimate. The data indicates that to produce an acre-foot per day will require about 450 machines (~10' by 20' by 8' per container - that is a large number and may be a little conservative based on 50% RH). It will also place a localized load on the electric distribution system. I don't know anything about the cost of these machines and a common question we get is what are the local environmental impacts. Depending on machine spacing, the impacts should be minimal - however we have not made actual T/RH measurements of the air around the machine while it is operational. Two major advantages of these units, as you know, is that they can be moved to minimize the need for infrastructure buildout and the water can be treated to tailored specifications if necessary, on location."

**Validation:** Vieques, Puerto Rico, September 2015. Engineer and Project Manager John Saggese's independent paper, [Atmospheric Water Generation, An Opportunity in Disaster Relief](#) documents production by Mr. West's AWG of over 400,000 gallons of water between June 4<sup>th</sup> – August 6<sup>th</sup> of 2015.

Mr.Saggese's paper is attachment: Atmospheric Water Generation\_J Saggese.pdf.

Mr. West has increased his AWG's efficiency since 2015; it is arguably the most economically efficient technology currently available, hence the United States Marines have recently purchased two(2) AWGs, and Texas National Guard four (4) AWGs to date.

AWG Contracting's Chief of Contracting Officer, Dexter Moon, can supply information regarding the current generation of AWGs.

**Implementation:** AWG is a scalable technology that can be implemented in either a distributive manner with onsite AWGs tying into existing residential and commercial water systems, or centralized supplying reservoirs, aquifers, treatment plant, pump station, etc.

A distributive AWG system with on-site solar, wind, and geothermal electrical generation, would be a win-win for both Texas' electric and water utilities. AWG's with on-site electrical generation when not producing water would supply electricity to the grid.

**Emergency Relief:** A distributive AWG/Electric Generation system would greatly mitigate the impact severe weather events by reducing the size of outage areas. Independent/onsite systems would be closer to areas in need minimizing distribution logistics.

**Outreach/Education:** Mr. West is assisting with the development curriculum about atmospheric water as a viable base of a water supply and hopes to see future vocational programs for high school and beyond.

**Business Information:** AWG Contracting LLC. <https://awgcontractingus.com/#>

Mr. West Interview : Univ. of TX: 2020 Earth Day TRACS talk by Moses West entitled

["Out of Thin Air"](#) / <https://www.youtube.com/watch?v=vEoFztNuFOI> / "Phillips, Kristin E" <[kristin.phillips@austin.utexas.edu](mailto:kristin.phillips@austin.utexas.edu)> or [sustainability@austin.utexas.edu](mailto:sustainability@austin.utexas.edu)

**Contact information:**

Moses West: 512-922-5102 (cell), [moses@awgcontractingus.com](mailto:moses@awgcontractingus.com)

Dr. Les Shephard: [shephardles@gmail.com](mailto:shephardles@gmail.com), [LinkedIn](#)



Dexter Moon, CCO AWG Contracting LLC, Tele: 678.776.6096,  
[dexterm@awgcontractingus.com](mailto:dexterm@awgcontractingus.com)

[Magnum Engineering](#) in Schertz, TX is AWG Contracting's manufacturing facility.

**Conclusion:** Thank you for your time and consideration.

I'd appreciate any future opportunity that might be available assist the TWDB in its efforts to insure Texas with an economic and environmentally sustainable water supply.

Andrew Sowder

Email: [asowder@sbcglobal.net](mailto:asowder@sbcglobal.net), Cell: 512-299-4290

**CAUTION:** This email was received at the City of Austin, from an EXTERNAL source. Please use caution when clicking links or opening attachments. If you believe this to be a malicious and/or phishing email, please forward this email to [CSIRT@austintexas.gov](mailto:CSIRT@austintexas.gov).

# Atmospheric Water Generation

## An Opportunity in Disaster Relief

Access to clean water is vital, both for disaster relief and more generally, for underdeveloped or underserved communities. Atmospheric Water Generation (AWG) provides clean water quickly, reliably, and in a cost effective, environmentally conscious way. This technology utilizes mechanical dehumidification and water purification to produce clean water from humidity in the air.

The island of Vieques, Puerto Rico is an excellent case in point. Hurricane Maria devastated Vieques, as well as the main island of Puerto Rico, in September 2017. On Vieques the water system was compromised.

In February of 2018, and at their own expense, Paladin Water Technology deployed an AWG unit to Vieques, locating it in an area adjacent to a destroyed hospital. From this location Mr. Moses A. West, CEO of Paladin, has generated and distributed, TOTALLY FREE OF CHARGE, in excess of 40,000 gallons of drinking water to residents in critical need of clean water. He has operated continuously to this day, and has demonstrated the performance and viability of his equipment in difficult, real-world conditions.

The delivery of bottled water for disaster response is a costly proposition. In addition to the cost of the water, transportation costs are significant, as are the costs associated with collection and disposal of the plastic bottles, which is often incomplete. Additional water must be brought in as long as the disaster continues.

The delivery of an AWG, on the other hand, is a one-time proposition. The unit is self-contained and powered by a 30 kW diesel generator with an on-board fuel tank. It is well packaged, rugged, and capable of rapid deployment. It requires little set-up, operator input, or maintenance. As long as diesel fuel is available, the unit will produce water. The unit can also be powered directly from a utility source, or by a solar array and battery bank.

An earlier (and less efficient) version of Paladin's AWG was extensively tested at The University of Texas-San Antonio (UTSA) by Dr. Wes Shephard, professor of engineering. Test results are summarized on Chart #1, following. Note that this earlier, less-efficient unit produced well in excess of 15 gallons of water per gallon of fuel consumed! Additionally, tests done under the supervision of a Registered Engineer indicated that the water produced exceeded water quality standards set by the State of Texas Commission on Environmental Quality and the Texas Administrative Code.

Photos of Mr. West and the AWG unit can be seen in Plates #1 - 4. Plates #5 – 14 document the distribution of water. The pictures speak for themselves. Mr. West has personally demonstrated the viability of this technology, and his equipment deserves strong consideration by those involved in disaster relief.

Contact information for Mr. West follows:

Mr. Moses A. West  
CEO, Paladin Technology, LLC  
512-922-5102  
moses@awgtechnology.us

A more detailed technical report will follow.

## Summary of Testing Results

### Estimates of Diesel Fuel Consumption Per Gallon of Water

#### June 4 to June 30, 2015

- Total Water Production - 1031.6 Gallons/ Day (43 Gallons/Hour)
- Diesel Fuel Consumption – 1 Gallon/23.2 Gallons of Water/Hour
- Energy Consumption – 626.8 kWh/ Day
- Energy Consumption/Gallon – 0.611 kWh/Gallon
- Average Daily Relative Humidity- 72.3%
- Average Daily Temperature – 27.5 °C

#### July 1 to July 31, 2015

- Total Water Production – 868.8 Gallons/ Day (36.2 Gallons Hour)
- Diesel Fuel Consumption – 1 Gallon/19.6 Gallons of Water/Hour
- Energy Consumption – 638.1 kWh/ Day
- Energy Consumption/Gallon – 0.743 kWh/Gallon
- Average Daily Relative Humidity - 68.7%
- Average Daily Temperature – 29.5 °C

#### August 1 to August 6, 2015

- Total Water Production – 745 Gallons/ Day (31 Gallons/Hour)
- Diesel Fuel Consumption – 1 Gallon/16.7 Gallons of Water/Hour
- Energy Consumption – 653.8 kWh/ Day
- Energy Consumption/Gallon – 0.887 kWh/Gallon
- Average Daily Relative Humidity- 58.9%
- Average Daily Temperature – 31.1 °C
- 

#### Diesel Fuel Consumption Based on Relative Humidity

#### Water (Mean Values) Produced per Gallon of Diesel

RH (%)	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 -90	90 - 100
Water/Diesel (Gallons)	12.4	14.6	17.3	20.5	21.1	23.8	24.3

#### CHART #1



**PLATE #1**

The complete AWG Unit. Note the right half of the unit is a shipping container.  
The actual size of the unit is only half what it appears to be in the photo.



PLATE #2

The diesel engine/generator and fuel module.

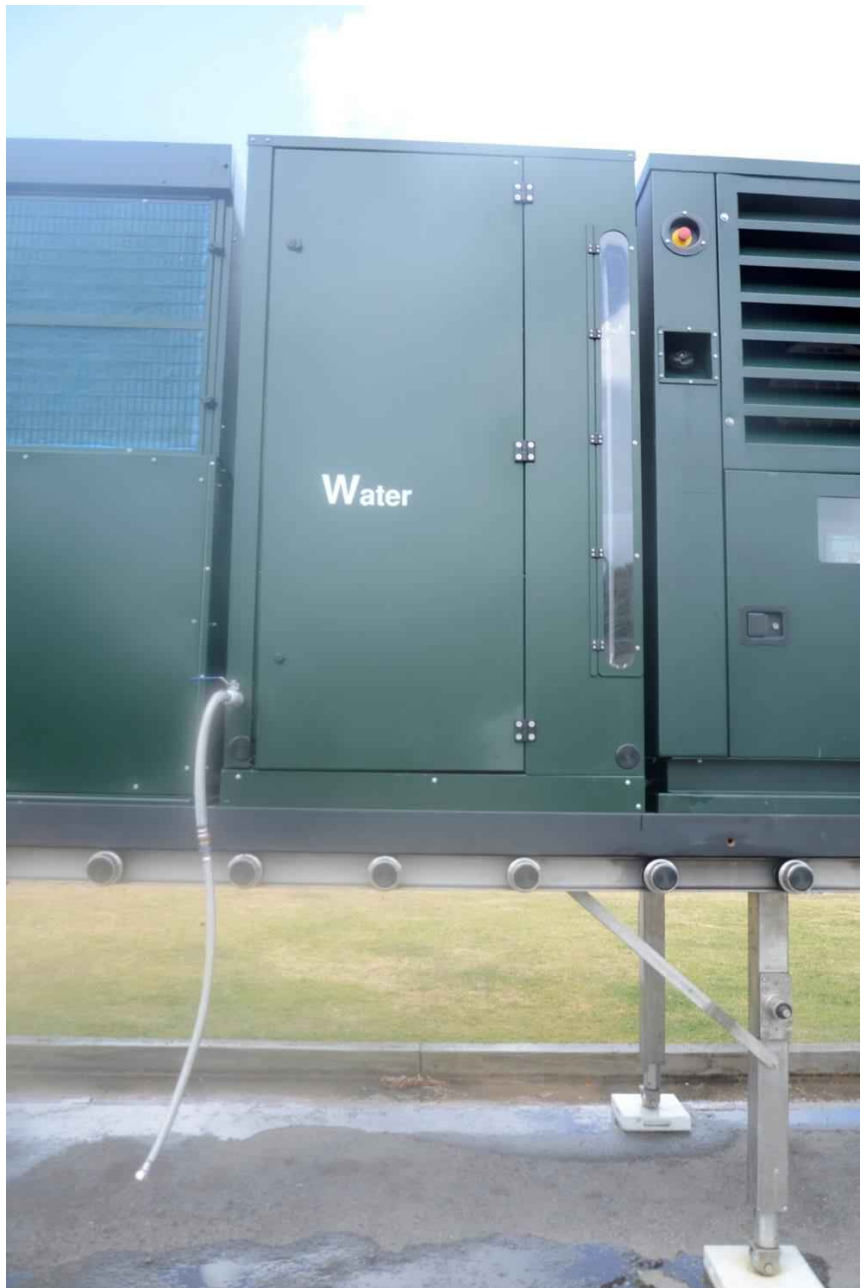
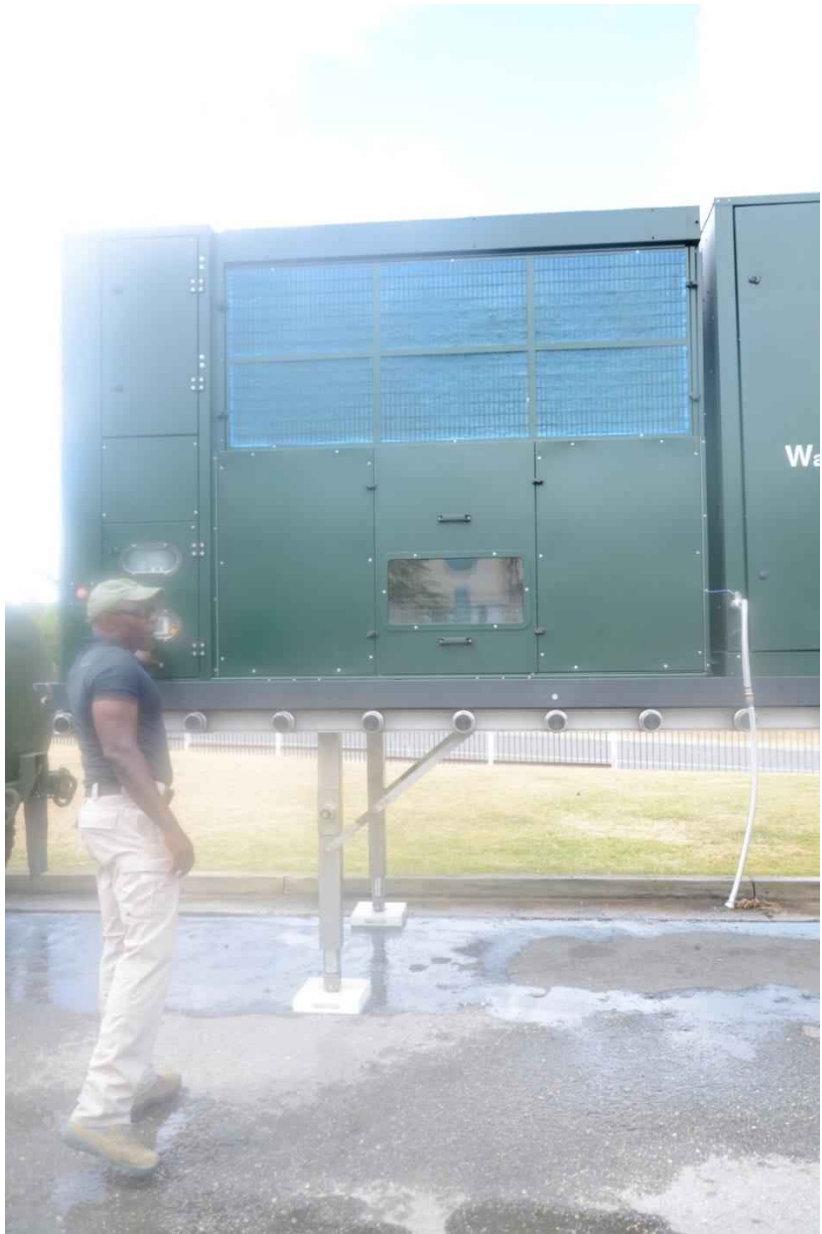


PLATE #3

Purified water storage tank.



**PLATE #4**

The dehumidification module.



**Lower Colorado River Authority**, Administrative Agent  
P.O. Box 220, Austin, Texas 78767  
(512) 473-3200, Fax (512) 473-3551

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Mitchell Sodek  
James Sultemeier  
Byron Theodosis  
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Paul Tybor  
David Van Dresar  
Jennifer Walker

## COUNTIES

Bastrop  
Blanco  
Burnet  
Colorado  
Fayette  
Gillespie  
Hays (partial)  
Llano  
Matagorda  
Mills  
San Saba  
Travis  
Wharton (partial)  
Williamson (partial)

October 14, 2020

Mr. Andrew Sowder  
asowder@sbcglobal.net

### **Subject: Response to your submitted comment on the Region K Initially Prepared Plan**

Dear Mr. Sowder:

Thank you so much for your interest in Region K and regional water planning. Thank you for taking the time to submit your comment to us regarding Atmospheric Water Generation (AWG) technology. We appreciate the information you provided.

Your comments were presented to the Lower Colorado Regional Water Planning Group (LCRWPG) at the July 15, 2020 Region K meeting. Due to the regional water planning timeline, the LCRWPG will not be able to incorporate AWG as a strategy in the 2021 Region K Water Plan. The LCRWPG may consider the AWG technology as a strategy during the next round of planning and determine if a project sponsor can be identified in order to be included in the 2026 Region K Water Plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Burke".

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group





# City of Austin

Austin Water P.O. Box 1088 Austin, Texas 78767 (512) 972-0101

June 21, 2020

John Burke, Chairman  
Lower Colorado Regional Water Planning Group (Region K)  
P.O. Box 220  
Austin, TX 78767

Re: Lower Colorado Regional Water Planning Group Initially Prepared Plan Comments

Dear Chairman Burke:

The City of Austin appreciates this opportunity to comment on the Lower Colorado Regional Water Planning Group (Region K) Initially Prepared Plan (IPP) as part of the ongoing plan development effort. Austin Water (AW) is continuing to review the IPP and, at this opportunity, offers the following high-level comments regarding strategy costing.

The TWDB's current Unified Costing Model (UCM) is generally structured to cost out traditional water management strategies. We have seen an opportunity for potential updates to be considered for the UCM for costing out "non-traditional" water management strategies. Such UCM updates could expand the process of developing cost estimates for small decentralized systems that would provide supply across a Water User Group (WUG), such as rainwater harvesting, stormwater harvesting, AC condensate reuse, and blackwater and graywater reuse. Such updates could potentially consider inclusion of costs typically incurred by developers to reflect a fuller picture of community costs for these types of strategies, which include onsite developer/program participant-owned strategies with potential cost offsets through utility incentives.

Similarly, we suggest that the guidelines for determining which components of a WUG-owned strategy can be included in the cost estimate could be reviewed to determine if additional strategy elements should be considered for inclusion, for example, additional distribution system-level infrastructure. Additionally, we suggest that there may be opportunity for improvement in the UCM methodology used for cost estimation and development of unit costs for intermittent or emergency strategies that may not produce a consistent annual yield. We recognize that such process improvements would take time to be considered and addressed and would not likely be able to be implemented until future planning rounds.

As part of Austin's Water Forward Plan, the City has developed strategy cost estimates that include more comprehensive elements required to complete and implement the strategies. Therefore, the Region K IPP includes costs for some City of Austin strategies that are lower than the cost estimates in Water Forward generally related to the UCM points outlined above. While some elements are not currently included in the cost estimates and unit costs, for this planning round, the relevant strategy write-ups in Chapter 5 do include supporting information, in narrative form, related to the additional strategy costs.

We appreciate this opportunity to provide these comments and anticipate providing additional input and comments as we work together as a planning group to finalize and adopt the Region K Plan later this year.

Please let us know if you have any questions at [teresa.lutes@austintexas.gov](mailto:teresa.lutes@austintexas.gov) or (512)972-0179.

Sincerely,

Teresa Lutes, P.E.  
Austin Water





**Lower Colorado River Authority**, Administrative Agent  
P.O. Box 220, Austin, Texas 78767  
(512) 473-3200, Fax (512) 473-3551

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Travis  
Wharton (partial)  
Williamson (partial)

October 14, 2020

Ms. Teresa Lutes  
Austin Water  
PO Box 1088  
Austin, TX 78767  
[Teresa.Lutes@austintexas.gov](mailto:Teresa.Lutes@austintexas.gov)

**Subject: Response to your submitted comment on the Region K Initially Prepared Plan**

Dear Ms. Lutes:

Thank you for your comments on the 2021 Region K Initially Prepared Water Plan (IPP). The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future.

Your comments were presented to the Lower Colorado Regional Water Planning Group (LCRWPG) at the July 15, 2020 Region K meeting. The LCRWPG supports potential changes to the Texas Water Development Board's (TWDB) Unified Costing Model tool and costing guidelines that may allow for improved cost estimates of all water management strategies. Your comments will be passed along to the TWDB.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Burke".

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group



June 18, 2020

[VIA E-MAIL TO ADMINISTRATIVE@REGIONK.ORG](mailto:ADMINISTRATIVE@REGIONK.ORG)

Lower Colorado Regional Water Planning Group  
c/o Mr. David Wheelock  
Lower Colorado River Authority  
P.O. Box 220  
Austin, Texas 78767

Re: Comments of the Central Texas Water Coalition on the Region K Initially Prepared Plan Submitted to the Texas Water Development Board on March 3, 2020

Dear Mr. Wheelock:

The Central Texas Water Coalition (CTWC) appreciates the opportunity to submit the following comments on the Initially Prepared Plan (IPP) developed by the Lower Colorado Regional Water Planning Group (Region K) and submitted to the Texas Water Development Board (TWDB) on March 3, 2020. In addition, we wish to thank the representatives of Region K and the TWDB for their time and effort toward the preparation of the 2021 Region K Plan. For many reasons, this work is vitally important to the future of this region, as well as the State.

Chapter 1: INTRODUCTION AND DESCRIPTION OF THE LOWER COLORADO REGIONAL WATER PLANNING AREA. We appreciate the Planning Group's efforts to update the Planning Area information on topics such as flooding, drought cycles, water supplies, and the economic importance of the Highland Lakes. We encourage Region K to keep this information as current as possible in upcoming planning cycles.

Chapter 3: IDENTIFICATION OF CURRENTLY AVAILABLE WATER SUPPLIES. The CTWC encourages Region K to utilize a Safe Yield approach for the storage reservoirs included in its 2021 Region K Plan, rather than continuing to rely on traditional water availability modeling and water volumes calculated as the Firm Yield of a reservoir. A Safe Yield approach is justified in view of this Region's reliance on surface water reservoirs to provide water for a significant and continuously growing Central Texas population. Relying solely on the Firm Yield of Lakes Buchanan and Travis in today's water planning evaluations and planning carries risks associated with rapid drawdown of the lakes in times of drought. Utilizing a Safe Yield approach would add a safety margin to protect against dangerously low lake levels in times of prolonged drought. We understand that other Regions are incorporating a Safe Yield approach, and such an approach would certainly be justified for Region K.

Chapter 5: IDENTIFICATION, EVALUATION, AND SELECTION OF WATER MANAGEMENT STRATEGIES BASED ON NEED. The CTWC wholeheartedly supports conservation efforts as an essential strategy for sustaining the water supplies for this region and all of its water user groups. We support the conservation strategies presented for agricultural irrigation but are concerned that the conservation strategies may not be implemented without incentives such as higher water rates and funding. Water rates should be used as an incentive for water conservation and for funding efficiency projects.

In addition to describing the benefits of conservation and the various conservation-based strategies, CTWC requests that Region K collect data that allows an accounting of the results of the conservation strategies implemented by the Water User Groups. Collecting data and verifying the savings associated with a conservation method or practice would assist Region K in making better decisions in future Plans. With additional data on water savings, Water User Groups could identify their successes or deficiencies with respect to different conservation practices.

Chapter 8: ADDITIONAL RECOMMENDATIONS (INCLUDING UNIQUE ECOLOGICAL STREAM SEGMENTS AND RESERVOIR SITES, LEGISLATIVE ISSUES, AND REGIONAL POLICY ISSUES). CTWC supports the Policy Recommendations emphasizing the need for additional study and quantification of low inflow issues from the watershed; the need for new brush management funding; and the development of modeling for surface-water and ground-water interaction, followed by the incorporation of the modeling results and studies into the Region K Plan.

Other Comments on IPP. Recently, although it was not a part of Region K's IPP, we understand that the Region K Chairman received an email dated June 9, 2020 suggesting that an "Atmospheric Water Generation" technology should be included as an innovative technology in Texas' 2022 Water Plan. The email, distributed to Region K members and stakeholders, described this Atmospheric Water Generation (AWG) technology as a method for producing water, and it appeared to encourage Region K to include it in its 2021 Plan. The proposed technology estimates an efficiency of 0.93 kWh per gallon. While CTWC supports new ideas for increasing and sustaining water supplies, we have serious concerns about the feasibility and cost-effectiveness of the technology described by the AWG proponents, for the reasons described below.

The atmospheric water condensation scheme proposed in Region K / Atmospheric Water Generation Inclusion, TX 2022 Water Plan, dated June 9, 2020, estimates an efficiency of 0.93 kWh/gal.

Most electricity in Texas is generated by thermo-electric steam turbine plants (using some variation of the Rankine-cycle), which evaporate enormous amounts of water in their cooling reservoirs by both natural evaporation (wind, sun, etc.) and forced evaporation to cool their condensers. This water comes from our rivers, streams and aquifers, and is lost to the atmosphere. One source cites: "Evaporation losses from reservoirs are estimated to be greater than the combined consumption from industrial and domestic water uses."

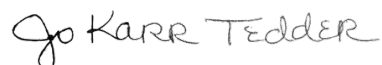
On average in the US, per the USGS, a withdrawal volume of 15 gallons (gal) of water was used to produce 1 kilowatt-hour (kWh) of electricity in 2015. (Other sources estimate from 20 to 50 gallons.) Some of the withdrawn water returns to the environment as liquid water, except for that which is evaporated.

Thus, a scheme producing 1 gallon of water per 0.93 kWh (1.075 gal/kWh) by condensation from the atmosphere, at best consumes electricity at a rate that requires about 15 gallons of withdrawn water per kWh generated by thermo-electric power plants. In other words, 15 gallons withdrawn from lakes, streams and aquifers would only condense 1.075 gallons from the air.

While we encourage thinking out of the box for new water supplies, proposals must be carefully evaluated for efficiency and feasibility.

Again, thank you for the opportunity to submit these comments. We are happy to answer any questions that you may have. Please feel free to contact me at 512.755.4805.

Sincerely,



Jo Karr Tedder, President  
Central Texas Water Coalition

cc: Mr. David Wheelock, LCRA (via email to [david.wheelock@lcra.org](mailto:david.wheelock@lcra.org))

CENTRAL TEXAS WATER COALITION  
P O BOX 328, SPICEWOOD, TX 78669  
[www.CentralTexasWaterCoalition.org](http://www.CentralTexasWaterCoalition.org)

Central Texas Water Coalition is a 501(c)(4) non-profit, non-tax deductible organization.



**Lower Colorado River Authority**, Administrative Agent  
P.O. Box 220, Austin, Texas 78767  
(512) 473-3200, Fax (512) 473-3551

**VOTING MEMBERS**

John Burke, Chair  
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Wharton (partial)  
Williamson (partial)

October 14, 2020

Ms. Jo Karr Tedder  
Central Texas Water Coalition  
PO Box 328  
Spicewood, TX 78669

**Subject: Response to your submitted comment on the Region K Initially Prepared Plan**

Dear Ms. Tedder:

Thank you for your comments on the 2021 Region K Initially Prepared Water Plan (IPP). The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future.

Your comments were presented to the Lower Colorado Regional Water Planning Group (LCRWPG) at the July 15, 2020 Region K meeting. Due to the regional water planning timeline, the LCRWPG will be glad to consider your comments as part of our planning efforts during the next planning cycle.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Burke".

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group



June 19, 2020

Mr. John Burke, Chairman  
Lower Colorado Regional Planning Group  
Region K  
P.O. Box 220  
Austin, TX 78767

Re: Comments on the Region K 2021 Initially Prepared Plan

Dear Mr. Burke:

The Lower Colorado River Authority (LCRA) has reviewed the Lower Colorado Regional Planning Group 2021 Initially Prepared Plan and offer the following comments:

**Chapter 5 – Identification, Evaluation, and Selection of Water Management Strategies Based on Need**

*Section 5.2.6 Irrigation Water Management Strategies, page 5-168:*

This sections discusses how HB1437 can be used as a funding mechanism for irrigation conservation. The cost sharing requirements for HB1437 funding are inaccurately described. The sentence: “Through the HB 1437 process, farmers within LCRA’s irrigation divisions will receive funding of about 80 percent of the total costs, with farmers bearing 20 percent of the cost for implementing conservation” should be replaced with: “Historically, farmers received about 80 percent of the total costs from a combination of funding through NRCS’ EQIP funds and HB1437 funds, with farmers bearing 20 percent of the cost of implementing conservation.”

*Section 5.2.2.5.4 Real-Time Use Metering and Monitoring, page 5-40 (paragraph 2, first sentence):*

Replace word “volumetric” with “velocity” in the following sentence: “Currently, within LCRA irrigation divisions, surface water use is measured once daily using a volumetric probe, and total use is calculated for each field. LCRA staff controls adjustments to the water flow into each field turnout.”

Sincerely,

A handwritten signature in black ink that reads "David Wheelock". The signature is written in a cursive style.

David Wheelock, PE  
Director, Water Supply Planning



**Lower Colorado River Authority**, Administrative Agent  
P.O. Box 220, Austin, Texas 78767  
(512) 473-3200, Fax (512) 473-3551

**VOTING MEMBERS**

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Byron Theodosis  
Jim Totten  
Paul Tybor  
David Van Dresar  
Jennifer Walker

October 14, 2020

Mr. David Wheelock  
LCRA  
PO Box 220  
Austin, TX 78767  
[david.wheelock@lcra.org](mailto:david.wheelock@lcra.org)

**Subject: Response to your submitted comment on the Region K  
Initially Prepared Plan**

Dear Mr. Wheelock:

Thank you for your comments on the 2021 Region K Initially Prepared Water Plan (IPP). The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future.

We will incorporate the edits you have provided into the final adopted 2021 Region K Water Plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Burke".

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group

**COUNTIES**

Bastrop  
Blanco  
Burnet  
Colorado  
Fayette  
Gillespie  
Hays (partial)  
Llano  
Matagorda  
Mills  
San Saba  
Travis  
Wharton (partial)  
Williamson (partial)



Barry Mahler, Chairman  
Marty H. Graham, Vice Chairman  
Scott Buckles, Member  
José O. Dodier, Jr., Member



David Basinger, Member  
Tina Y. Buford, Member  
Carl Ray Polk, Jr., Member  
Rex Isom, Executive Director

**TEXAS STATE SOIL AND WATER CONSERVATION BOARD**  
*Protecting and Enhancing Natural Resources for Tomorrow*

June 18, 2020

Mr. David Wheelock  
Region K Administrator

Dear Mr. Wheelock;

For the past 2 years the Texas State Soil and Water Conservation Board (TSSWCB) has been participating in the Texas Water Development Board's (TWDB) Regional Water Planning meetings as directed by Senate Bill 1511, passed in the 2017 legislative session. We appreciate being included in the process and offer these constructive comments to the regional water plans and ultimately the State water plan. Attached you will find some specific comments to the Region K water plan as they pertain to the TSSWCB.

As you may know 82% of Texas' land area is privately-owned and are working lands, involved in agricultural, timber, and wildlife operations. These lands are important as they provide substantial economic, environmental, and recreational resources that benefit both the landowners and public. They also provide ecosystem services that we all rely on for everyday necessities, such as air and water quality, carbon sequestration, and wildlife habitat.

With that said, these working lands are where the vast majority of our rain falls and ultimately supply the water for all of our needs, such as municipal, industrial, wildlife, and agricultural to name a few. Texas' private working lands are a valuable resource for all Texans.

Over the years, the private landowners of these working lands have been good stewards of their property. In an indirect way they have been assisting the 16 TWDB's Regional Water Planning Groups in achieving their goals through voluntary incentive-based land conservation practices.

It has been proven over time if a raindrop is controlled where it hits the ground there can be a benefit to both water quality and water quantity. Private landowners have been providing benefits to our water resources by implementing Best Management Practices (BMP) that slow water runoff and provide for soil stabilization, which also slows the sedimentation of our reservoirs and allows for more water infiltration into our aquifers.

1497 Country View Lane • Temple, TX 76504-8806  
Phone: 254-773-2250 • Fax: 254-773-3311  
<http://www.tsswcb.texas.gov>

Some common BMPs include brush management, prescribed grazing, fencing, grade stabilization, irrigation land leveling, terrace, contour farming, cover crop, residue and tillage management, and riparian herbaceous cover.

The TSSWCB has been active with agricultural producers since 1939 as the lead agency for planning, implementing, and managing coordinated natural resource conservation programs for preventing and abating agricultural and sivicultural nonpoint sources of water pollution.

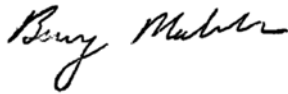
The TSSWCB also works to ensure that the State's network of over 2,000 flood control dams are protecting lives and property by providing operation, maintenance, and structural repair grants to local government sponsors.

The TSSWCB successfully delivers technical and financial assistance to private landowners of Texas through Texas' 216 local Soil and Water Conservation Districts (SWCD) which are led by 1,080 locally elected district directors who are active in agriculture. Through the TSSWCB Water Quality Management Plan Program (WQMP), farmers, ranchers, and silviculturalists receive technical and financial assistance to voluntarily conserve and protect our natural resources. Participants receive assistance with conservation practices, BMPs, that address water quality, water quantity, and soil erosion while promoting the productivity of agricultural lands. This efficient locally led conservation delivery system ensures that those most affected by conservation programs can make decisions on how and what programs will be implemented voluntarily on their private lands.

Over time, lands change ownership and many larger tracts are broken up into smaller parcels. Most new landowners did not grow up on working lands and therefore may not have a knowledge of land management techniques. The TSSWCB is writing new WQMPs for these new landowners who are implementing BMPs on their land. Education and implementation of proper land management and BMPs continues to be essential. Voluntary incentive-based programs are essential to continue to address soil and water conservation in Texas.

These BMPs implemented for soil and water conservation provide benefits not only to the landowner but ultimately to all Texans and our water supply.

Respectfully,



Barry Mahler  
Chairman



Rex Isom  
Executive Director

Attachment

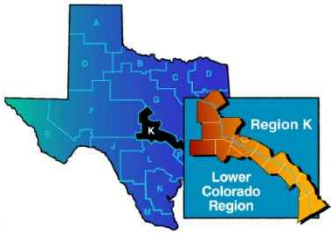
Region K (Lower Colorado)

- Page 8-13, 8.1.6.1 Background Information

Insert the following:

- *“The Texas State Soil and Water Conservation Board (TSSWCB) works in conjunction with local Soil and Water Conservation Districts (SWCDs) to encourage the wise and productive use of natural resources. The TSSWCB is the lead agency for planning, implementing, and managing coordinated natural resource conservation programs for preventing and abating agriculture and silviculture nonpoint sources of water pollution.*

*Through the TSSWCB Water Quality Management Plan Program (WQMP), farmers, ranchers, and silviculturalists receive technical and financial assistance to voluntarily conserve and protect natural resources. Participants receive assistance with conservation practices that address water quality, water quantity, and soil erosion while promoting the productivity of agricultural lands.”*



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Jennifer Walker

October 14, 2020

Mr. Barry Mahler  
Mr. Rex Isom  
Texas State Soil and Water Conservation Board  
1497 Country View Lane  
Temple, TX 76504  
[rray@tsswcb.texas.gov](mailto:rray@tsswcb.texas.gov)

**Subject: Response to your submitted comment on the Region K Initially Prepared Plan**

Dear Mr. Mahler and Mr. Isom:

Thank you for your comments on the 2021 Region K Initially Prepared Water Plan (IPP). The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future.

We will incorporate the language you provided into Section 8.1.6.1 of the final adopted 2021 Region K Water Plan.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Burke".

John E. Burke, Chairman  
Lower Colorado Regional Water Planning Group

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Williamson (partial)

*APPENDIX 10F*  
*PUBLIC INFORMATION REQUEST*

## Burke, Jaime

---

**Subject:** Public Records Request for Felps LLC

**From:** Mark Harral [<mailto:mark.harral.law@hotmail.com>]

**Sent:** Tuesday, September 29, 2020 2:07 PM

**To:** [administrative@regionk.org](mailto:administrative@regionk.org)

**Cc:** Robert Felps <[rjfelps@thirdrock.com](mailto:rjfelps@thirdrock.com)>; Darrell Peckham <[darrell@peckhampg.com](mailto:darrell@peckhampg.com)>

**Subject:** Public Records Request for Felps LLC

Stacy Pandey,

I represent the Felps LLC and we would like to request information according to the Texas Public Information Act. We are performing a Hydrology Study in Burnet County and would like the below information:

(1) all emails from or to the general manager, Mitchell Sodek, or Paul Babb of the Central Texas Groundwater Conservation District since January 1st, 2016;

(2) any recordings, meeting minutes, or agendas from the Region K water planning group meetings associated with the approval of the Version 2 Draft of the 2021 Region K Water Plan. We have provided the following link to clarify which meetings we are interested in requesting this information.

[https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/Region%20K/RegionK\\_2021DraftRWPV2.pdf?d=16173.794999951497](https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/Region%20K/RegionK_2021DraftRWPV2.pdf?d=16173.794999951497)

(3) Any emails between the City of Bertram staff or consultants with any Region K water planning representative or consultant.

Thank you for your assistance and help as we move forward with a Hydrology Study in Burnet County. Please let me know if you have any questions concerning this public information request.

Sincerely,

Mark A. Harral, JD  
Partner  
Harral and Associates, PLLC  
432-290-9178 cell

## Burke, Jaime

---

**From:** Mark Harral <mark.harral.law@hotmail.com>  
**Sent:** Friday, October 09, 2020 5:42 PM  
**To:** Burke, Jaime  
**Cc:** David Wheelock; Stacy Pandey; Vic Ramirez; Robert Felps; Darrell Peckham  
**Subject:** [EXTERNAL] Re: Region K information request response

Jamie,

Thank you so much for the providing the materials. I have had a chance to review a portion of the emails. I figured I would let you know the following in relation to the surface water vs. groundwater debate over quarry water:

(1) We have attached to this email a link to a stamped Professional Opinion by Peckham P.G., LLC, licensed Professional Geoscientist Firm, registration No. 50537, concerning the matter (Quarry Water Definition Opinion 09\_03\_20 FINAL Signed.pdf). The findings confirm TCEQ's determination that the water in the quarries is surface water;

(a) "When groundwater flows into the pit, it becomes surface water.";

(b) The Federal EPA Water Mask Layer, utilizing data from the USGS, has determined the water in the east quarry pit is "surface water;"

(c) 30 TAC 307.3 (a) Definitions (70)

(a) Definitions. The following words and terms, when used in this chapter, have the defined meanings, unless the context clearly indicates otherwise.

(a) Definitions. The following words and terms, when used in this chapter, have the defined meanings, unless the context clearly indicates otherwise.

(70) Surface water in the state--Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuarine marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state as defined in the Texas Water Code, all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or nonnavigable, and beds and banks of all water-courses and bodies of surface water, that are wholly or partially inside or bordering the territory to the jurisdiction of the state; except that waters in treatment systems that are authorized by state or federal law permit, and that are created for the purpose of waste treatment are not considered to be water in the state.

(2) Further, the Texas Supreme Court Case in E.A.A. v. Day affirmed the Appellate Court ruling that

"The Water Code defines state water-water owned by the State-as "[t]he water of ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state" ....

"But the character of water as groundwater or state water can change. The Code recognizes this reality, providing, for example, that storm water or floodwater state water-when "put or allowed to sink into the ground, loses its character and classification and is considered percolating groundwater. By the same token, irrigation runoff draining into a stream or other watercourse wholly loses its character as groundwater and becomes state water."

Interestingly enough, E.A.A. v. Day recognized that this management plan submitted to TWDB is subject to review by the State Auditor's Office. Further, the three-part test established by the Texas Supreme Court determines when water entering a watercourse becomes surface water:

(I) A permanent source of water. (The source is largely groundwater which loses its groundwater status upon entering the quarry, as well as 450 acre-feet of surface water (180 acres times 32 inches a year average rainfall.) The GCD representative, per his emails with TWDB and Region K representatives, stated the quarry operator collected rain water into the quarry. Region K has shown the use of 380 acre feet consumptive use for Hanson to mine the quarry but the water consumed is easily considered as surface water (collected rainwater-not groundwater). Further, the rainwater/surface water never sank bank into the ground to be considered groundwater We also believe Hanson received approval from TCEQ prior to making land adjustments to collect rainwater from the 180 acres of the Felps land;

(II) A defined bed and banks. (The bottom of the quarry is the bed and sides of the quarry are the banks).

(III) A current of water. (Historical evidence documented by Virgil Barnes, Bureau of Economic Geology Guidebook Number 1 Field Excursion Eastern Llano Region, 1958, shows a current of water flows into the east quarry.);



To be blunt, the Felp's east quarry is an off-channel reservoir with a bed, banks, a current, and is a permanent source of water (rainwater and groundwater changed into surface water).

We can determine from the email correspondence that the TWDB changed its determination regarding the water in the quarry for the "GCD representative" in the face of a TCEQ review. We realize the TWDB likely did not consult the Texas Attorney General's Office relating to the impact of E.A.A v. Day case.

We request that the TWDB recognize the quarry water is surface water as summarized below:

- TCEQ declared the quarry water to be surface water as per the received emails with TWDB and Region K staff representatives.
- GCD representative emails reference collection of rainfall and stormwater as a groundwater management strategy is in violation of the Texas Water Code Chapter 11.
- Federal EPA Water Mask Layer classifies the quarry water as surface water.
- Based on the Professional Opinion of Peckham P.G., LLC, the quarry water is surface water.
- Texas Supreme Court Cases clarified the application of its three-part test to determine when water is surface water.
- The CTGCD Rules, Chapter 13, include quarries were published prior to the E.A.A. v. Day case and were never changed after 2012.

This would never have been an issue if CTGCD applied the E.A.A. v. Day three-part test and treated the water in the quarry like the above federal and state entities. After reviewing the above, we believe the water in the quarries is surface water. It is no different than pond or lake fed by spring water.

Should the TWDB not consider this request, then my client will file a formal complaint with the Texas State Auditors as recognized in the E.A.A. v. Day case.

Thank you again and I realize that LCRA is merely a conduit to communicate this email to the TWDB. LCRA would not be included in any review or litigation associated with this email.

Sincerely,

Mark A. Harral, JD  
Partner  
Harral and Associates, PLLC.  
432-290-9178 cell

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**From:** Burke, Jaime <Jaime.Burke@aecom.com>  
**Sent:** Tuesday, October 6, 2020 2:10 PM  
**To:** Mark Harral <mark.harral.law@hotmail.com>  
**Cc:** David Wheelock <David.Wheelock@LCRA.ORG>; Stacy Pandey <Stacy.Pandey@LCRA.ORG>; Vic Ramirez <Vic.Ramirez@LCRA.ORG>  
**Subject:** Region K information request response

Good afternoon Mark,

Please use this DropBox link to access the Region K-associated emails you have requested.

<https://www.dropbox.com/sh/bvhexjf0m01ervo/AAOfwJo0zsnCWeUkde-luyia?dl=0>

These emails include, based on your original and amended request:

(1) all emails from or to the general manager, Mitchell Sodek, or Paul Babb of the Central Texas Groundwater Conservation District since January 1st, 2018;

(3) Any emails between the City of Bertram staff or consultants with any Region K water planning representative or consultant.

Please let me know if you have any issues accessing the files in the link or the downloadable meeting-related files on the Region K website.

Thanks,  
Jaime

**Jaime Burke, P.E.**  
Project Manager  
Water  
Direct 512.457.7798  
[jaime.burke@aecom.com](mailto:jaime.burke@aecom.com)

**AECOM**  
9400 Amberglen Blvd.  
Austin, TX 78729  
T 512.454.4797 F 512.454.8807  
[www.aecom.com](http://www.aecom.com)

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**From:** Mark Harral <mark.harral.law@hotmail.com>  
**Sent:** Friday, October 02, 2020 9:55 AM  
**To:** Burke, Jaime <Jaime.Burke@aecom.com>  
**Subject:** [EXTERNAL] Re: Available for a call re: Region K information request?

Jamie,

Thank you for the phone call this morning. As we discussed, please find the below:

(1) if your organizations need more time to process this request, then we will give a 15 day extension beyond PIA statutes allow;

(2) you can eliminate item 2 since that information is available online;

(3) the start date can be changed from January 1st, 2016 to January1st, 2018.

Sincerely,

Mark Harral

**From:** Burke, Jaime <[Jaime.Burke@aecom.com](mailto:Jaime.Burke@aecom.com)>  
**Sent:** Thursday, October 1, 2020 5:54 PM  
**To:** Mark Harral <[mark.harral.law@hotmail.com](mailto:mark.harral.law@hotmail.com)>  
**Subject:** Available for a call re: Region K information request?

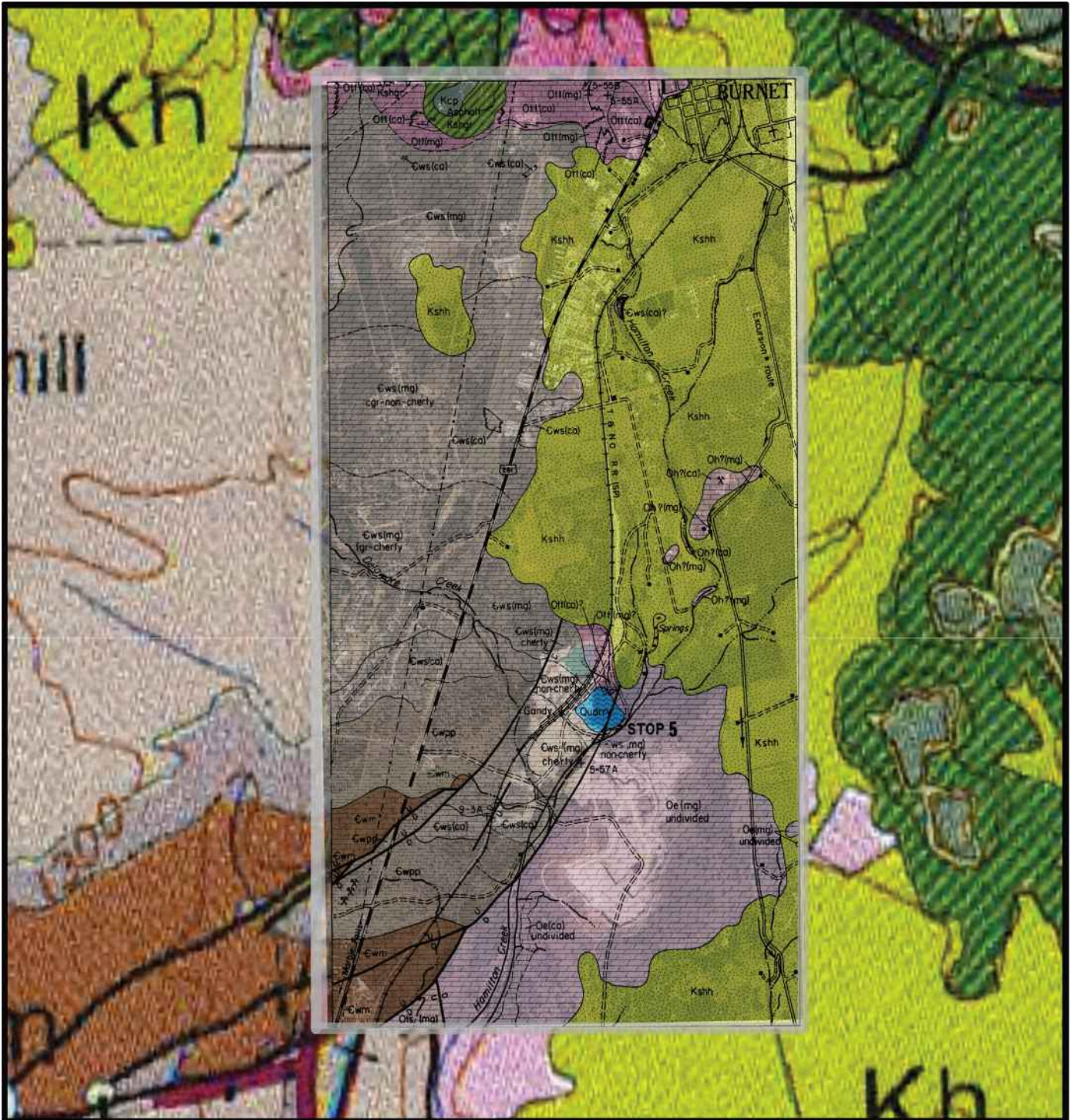
Hi Mr. Harral,

Region K received your information request. Would you be available tomorrow morning sometime to discuss the request to see if we can get clarification on the information you are looking for? David Wheelock from LCRA (administrative agent for Region K) and I (consultant for Region K) will be on the call. If so, let me know what time works for you and I will send out an invite.

Thanks,  
Jaime

**Jaime Burke, P.E.**  
Project Manager  
Water  
Direct 512.457.7798  
[jaime.burke@aecom.com](mailto:jaime.burke@aecom.com)

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[www.aecom.com](http://www.aecom.com)



*Professional Opinion Regarding Water  
within the  
East Quarry Pit, Felps Ranch,  
Burnet County, Texas  
September 3, 2020*

Prepared for Felps, LLC  
Burnet County, Texas

**Darrell** **Christine**

**PECKHAM**

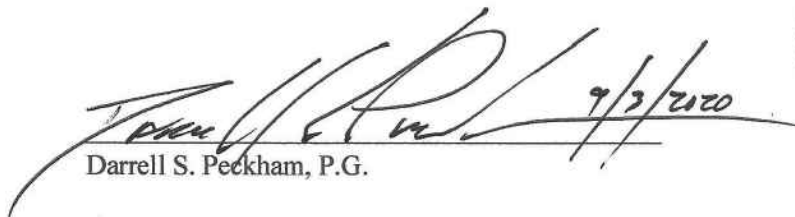
**P.G., LLC**

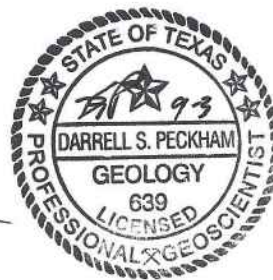
## GEOSCIENTIST'S SEAL

September 3, 2020

Darrell S. Peckham, P.G., No. 639

Mr. Peckham was responsible for working on all aspects of compiling and reviewing available information and preparing the findings. This memorandum letter report was prepared by Peckham P.G., LLC, licensed Professional Geoscientist Firm, registration No. 50537, in the State of Texas. The seal appearing on this document was authorized on September 3, 2020.

  
Darrell S. Peckham, P.G.



Christine S. Peckham, P.G., No. 567

Mrs. Peckham was responsible for working on all aspects of compiling and reviewing available information and preparing the findings. This memorandum letter report was prepared by Peckham P.G., LLC, licensed Professional Geoscientist Firm, registration No. 50537, in the State of Texas. The seal appearing on this document was authorized on September 3, 2020.

  
Christine S. Peckham, P.G.



September 3, 2020

Mr. Robert Felps  
Member/Manager  
Felps, LLC  
Burnet County, Texas

**Re: Professional Opinion Regarding Water within the East Quarry Pit, Felps Ranch, Burnet County, Texas**

Dear Mr. Felps:

Per your request, Peckham P.G., LLC (PPG) has conducted an evaluation of available information from the United States Environmental Protection Agency (EPA), United States Geological Survey (USGS), Texas Water Development Board (TWDB), Texas Water Code (TWC) Title 2, Subtitle E, Chapter 36 Groundwater Conservation Districts, 30 Texas Administrative Code (TAC), Title 1, Chapter 307, University of Texas Bureau of Economic Geology (BEG) and R.W. Harden and Associates (RWHA) to form a professional opinion regarding the classification of the water contained within the East Quarry Pit located 3 miles south of the intersection of State Highway 29 and State Highway 281 in the City of Burnet on the Felps Ranch property, Burnet County, Texas.

## Conclusions

In agreement with the United States Environmental Protection Agency, our professional opinion regarding the classification of the water contained within the Felps East Quarry Pit is that the water is surface water. It is also our professional opinion that RWHA is correct in concluding most of the water in the pit originates from ground-water sources.

## Opinion Basis

### Background

Mining of dolomite at the quarry site began in 1948. It is documented in Bureau of Economic Geology Guidebook Number 1 *Field Excursion Eastern Llano Region* by Virgil E. Barnes, 1958, that a ground-water source was encountered.

Excerpt from Page 24, paragraphs 2 - 3, Barnes 1958:

The quarry, opened in 1948 by Houston Clinton, was acquired January 1, 1958, by the Texas Construction Material Company; this operation is known as the Burnet Stone Division, and Ramsey Clinton is General Manager.

The quarry operation requires very little stripping. However, this advantage is countered by the quarry bottom being beneath ground-water level. It is necessary to operate continuously two electrically driven pumps having a combined capacity of 750 gallons per minute. Part of this water is used in the operation.

In the early 1960s, a large ground-water conduit was encountered.

## Groundwater-Surface Water Interface

When groundwater exits the confines of the host rock by crossing the plane of the outlet from the host rock and enters into the environment open to the atmosphere, it transitions from groundwater to surface water. A spring is an excellent example of this transition.

### Groundwater as an originating source

Before the water enters into the open quarry pit and transitions to surface water it is groundwater within one of the Gandy Subdivisions of the Ellenburger–San Saba aquifer groundwater reservoir (PPG delineation work in progress).

TWC, Title 2, Subtitle E, Chapter 36, Subchapter A:

Sec. 36.001. DEFINITIONS. In this chapter:

(5) "Groundwater" means water percolating below the surface of the earth.

Using the definition of groundwater in TWC Chapter 36, Barnes, 1958, and RWHA, 2020, were both correct in identifying the majority of water entering the pit as originating from groundwater.

### Surface water designation for water in the pit

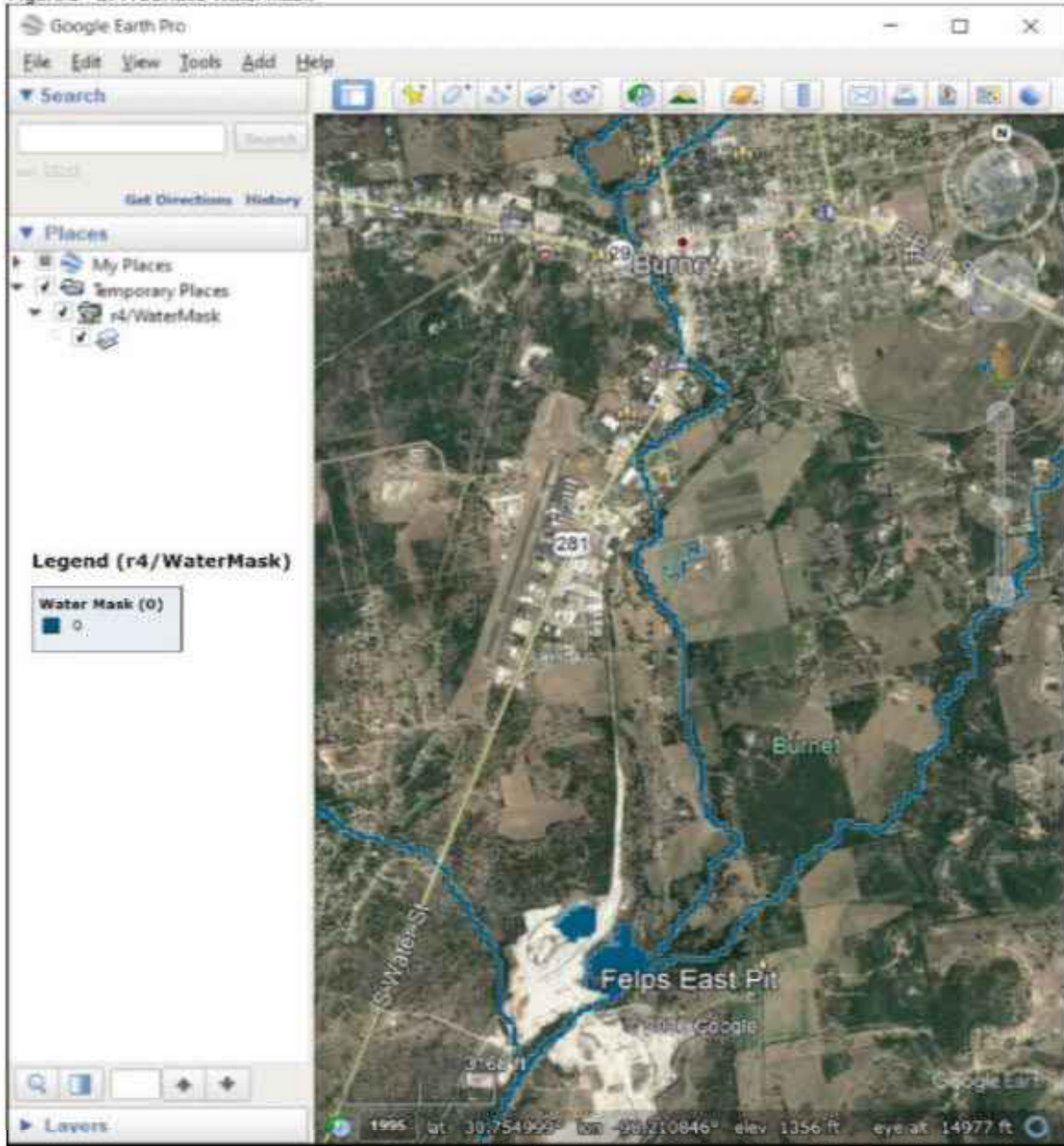
EPA's Water Mask Layer was utilized in determining the classification of the water in the East Pit. Water Mask Layer may be accessed at <https://gispub.epa.gov/arcgis/rest/services/r4/WaterMask/MapServer>. USGS is a partner with EPA in supplying data utilized in the Water Mask Layer. The Water Mask Layer description is as follows:

**Description:** The Water Mask is a grid file indicating all surface water; including, lakes, rivers, streams, wetlands, estuaries, and nearshore ocean waters, as mapped in the 1:100,000-scale. The Water Mask is created using grid analysis to combine surface water features of two datasets. First, the surface water features from the 2016 National Land Cover Database (NLCD). Features included are 'Open Water' (code 11), 'Woody Wetlands' (code 90) and 'Emergent Herbaceous Wetlands' (code 95). Source data used was NLCD 2016 version 1 (see NLCD meta-data for more information). Second, the flowline and waterbody features as represented in the catseed grid from the National Hydrography Dataset (NHD) Plus version 2. Source data used

was NHD Plus Version 2.1 (see NHD Plus Version 2.1 metadata for more information). A cell value of 1 in the grid indicates that the cell represents surface water. The combination of these two datasets into a grid represents surface water and is referred to as the Water Mask.

ArcGIS Earth option was used to evaluate the designation for the East Pit. EPA Surface Water designations are indicated in blue on the resulting Google Earth map illustration (Figure 1). Additionally, groundwater entering the pit is similar to a spring-fed pond where the groundwater, upon entering the environment with exposure to the atmosphere, is considered to be surface water.

Figure 1 - EPA Surface Water Mask





30 TAC, TITLE 1, CHAPTER 307:

307.3(a) Definitions. The following words and terms, when used in this chapter, have the defined meanings, unless the context clearly indicates otherwise.

(70) Surface water in the state--Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, wetlands, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state as defined in the Texas Water Code, §26.001, and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or non-navigable, and including the beds and banks of all water-courses and bodies of surface water, that are wholly or partially inside or bordering the state or subject to the jurisdiction of the state; except that waters in treatment systems that are authorized by state or federal law, regulation, or permit, and that are created for the purpose of waste treatment are not considered to be water in the state.

### Schematic illustrations of groundwater-surface water transitions

Figure 2 is extracted from Figure 8. Geologic Map, Barnes 1958, and modified to highlight the geology interpretations. The geologic map provides the conceptual basis for the following Figure 3, a series of schematic cross sections illustrating the groundwater-surface water interfaces pre- and post- final blasting in the East Pit, and current conditions. Final blasting occurred in the early 1960s. The schematic illustrations are not to scale and groundwater conduits illustrated are conceptual, as the actual conduits were not described prior to flooding of the pit covering the outlets. All discussion to this point has been describing groundwater transitioning into surface water. Transitioning from surface water into groundwater is also possible. When groundwater flows into the pit, it becomes surface water. Should the pit water level rise above the artesian head of the surrounding groundwater, surface water from the pit will infiltrate into what was originally the water host rock, transitioning the infiltrated water into groundwater. Once a pressure equilibrium is obtained, transitioning ceases.

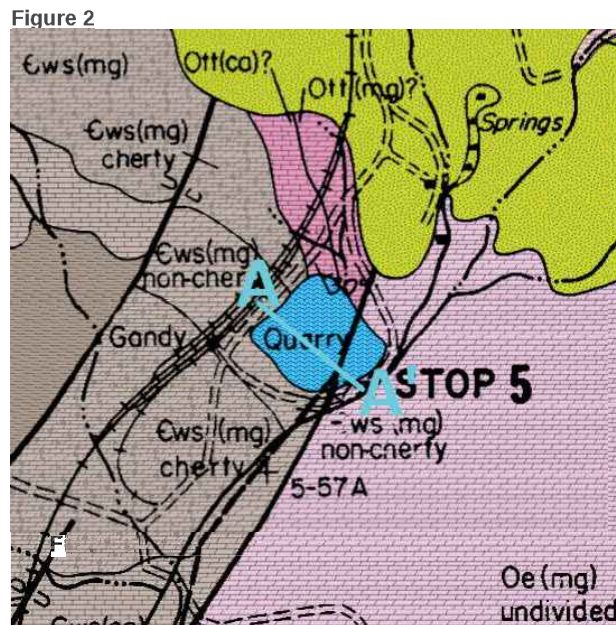


Figure 3

