Region L
South Central Texas Regional Water Planning Group

c/o San Antonio River Authority
100 East Guenther Street
San Antonio, Texas 78204
(210) 227-1373 Office
www.RegionLTexas.org

DATE: Friday, January 25, 2019

TO: Members of the South Central Texas Regional Water Planning Group

FROM: Steven J. Raabe, P.E.

The schedule and location of the meeting of the South Central Texas Regional Water Planning Group is as follows:

TIME AND LOCATION

Thursday, January 31, 2019
9:30 a.m.
San Antonio Water System
Customer Service Building
Room CR C145
2800 US Highway 281 North
San Antonio, Bexar County, Texas 78212

Enclosed is a copy of the posted public meeting notice.

Steven J. Raabe, P.E.

Enclosure
Agenda Packet for January 31, 2019

NOTICE OF OPEN MEETING OF THE
SOUTH CENTRAL TEXAS REGIONAL
WATER PLANNING GROUP

TAKE NOTICE that a meeting of the South Central Texas Regional Water Planning Group as established by the Texas Water Development Board will be held on Thursday, January 31, 2019, at 9:30 AM at San Antonio Water System (SAWS), Customer Service Building, Room CR 145, 2800 US Highway 281 North, San Antonio, Bexar County, Texas. The following subjects will be considered for discussion and/or action at said meeting.

1. Public Comment

2. Approval of the Minutes from the November 1, 2018, Meeting of the South Central Texas Regional Water Planning Group (SCTRWPG)

3. Election of Officers for Calendar Year 2019

4. Status of Edwards Aquifer Habitat Conservation Plan (EAHCP), Scott Storment

5. Status of Guadalupe, San Antonio, Mission, and Aransas Rivers and Mission, Copano, Aransas, and San Antonio Bays Basin and Bay Stakeholder Committee (BBASC) and Expert Science Team (BBEST)

6. Texas Water Development Board (TWDB) Communications

7. Chair's Report

8. Discussion and Appropriate Action Regarding the Consultant's Work and Schedule

9. Discussion and Appropriate Action to Amend the Adopted Population and Water Demand Projection for the 2021 South Central Regional Water Plan

10. Discussion and Appropriate Action Regarding a Request for the Texas Water Development Board to conduct a Socioeconomic Analysis of not Meeting the Water Needs in the 2021 South Central Texas Regional Water Plan

11. Discussion and Appropriate Action Identifying Potential Water Management Strategies

12. Discussion and Appropriate Action Authorizing the San Antonio River Authority (SARA) to Request a Notice-to-Proceed from the TWDB; authorizing the Consultant and/or SARA to work with the TWDB on any follow up information that might be required; and authorizing SARA to Negotiate and Execute the Subsequent TWDB Contract Amendment that will be Issued Following the Notice-to-Proceed.

13. Possible Agenda Items for the Next Region L Meeting

14. Public Comment

1. Public Comment

2. Approval of the Minutes from the November 1, 2018, Meeting of the South Central Texas Regional Water Planning Group (SCTRWPG)

Minutes of the
South Central Texas Regional Water Planning Group
November 1, 2018

Chair Suzanne Scott called the meeting to order at 9:30 a.m. in the San Antonio Water System's (SAWS) Customer Service Building, Room CR 145, 2800 US Highway 281 North, San Antonio, Bexar County, Texas.

26 of the 30 voting members, or their alternates, were present.

Voting Members Present:

Tim Andruss
Alan Cockerell
Curt Campbell
Charlie Flatten
Vic Hilderbran
Kenneth Ehler for Kevin Janak
Tom Jungman
Russell Labus
Glenn Lord
Dan Meyer
Gary Middleton
Con Mims
Kevin Patteson
Iliana Pena
Robert Puente
Humberto Ramos
Steve Ramsey
Weldon Riggs
Roland Ruiz
Dianne Savage
Suzanne Scott
Greg Sengelmann
Heather Sumpter
Thomas Taggart
Ian Taylor
Annalisa Peace for Dianne Wassenich

Voting Members Absent:

Pat Calhoun
Patrick Garcia for Rey Chavez
Will Conley
Adam Yablonski

Non-Voting Members Present:

Elizabeth McCoy, Texas Water Development Board (TWDB)
Chad Norris for Marty Kelly, Texas Department of Parks and Wildlife
Jamie McCool, Texas Department of Agriculture
Lawrence Brown for Rusty Ray, Texas State Soil & Water Conservation Board (TSSWCB)

Non-Voting Members Absent:

Ronald Fieseler, Region K Liaison
Iliana Delgado, South Texas Water Master, Texas Commission on Environmental Quality (TCEQ)
Carl Crull, Region N Liaison
Joseph McDaniel, Region J
Don McGhee, Region M Liaison

Beginning with the February 11, 2016, meeting of the South Central Texas Regional Water Planning Group, all recordings are available for the public at www.regionltexas.org.
All PowerPoint presentations and meeting materials referenced in the minutes are available in the meeting Agenda Packet at www.regionaltexas.org.

AGENDA ITEM NO. 1: PUBLIC COMMENT

Ms. Rachel Cywinski notified the group that the organization San Antonio Interfaith Power and Light has changed their name to San Antonio Interfaith Environmental Network. Ms. Cywinski made an additional comment about the difficulty in locating meeting information on the Region L and Texas Water Development Board websites.

AGENDA ITEM NO. 2: APPROVAL OF THE MINUTES FROM THE AUGUST 2, 2018, MEETING OF THE SOUTH CENTRAL TEXAS REGIONAL WATER PLANNING GROUP (SCTRWPG)

Chair Scott asked for a motion to approve the minutes from the May August 2, 2018, meeting of the SCTRWPG. Mr. Andruss moved to approve the minutes. Mr. Mims seconded the motion. The minutes were approved.

AGENDA ITEM NO. 3: STATUS OF EDWARDS AQUIFER HABITAT CONSERVATION PLAN (EAHCP), AND INTRODUCTION OF PROGRAM MANAGER OF THE EAHCP, SCOTT STORMENT

Mr. Roland Ruiz introduced Mr. Scott Storment to the group as the new Program Manager of the EAHCP. Mr. Storment mentioned a few items from the most recent stakeholder meeting including a review of the EAHCP's conservation measures, the phase two process of the EAHCP's conservation measures that will be implemented in spring of 2019.

AGENDA ITEM NO. 4: DISCUSSION AND APPROPRIATE ACTION REGARDING THE SELECTION OF VOTING MEMBERS TO FILL VACANCIES IN THE

FOLLOWING INTEREST CATEGORY: SMALL BUSINESS (2)

Chair Scott reminded the Planning Group that a re-solicitation for the Small Business vacancies (two) was approved by the group at the last meeting and there was one applicant, Mr. Mitch Sowards. Chair Scott introduced Mr. Sowards and asked him to share with the group some information about his small business. Mr. Sowards introduced himself and his IT consulting business, Entrust Technology Services. Greg Senglemann moved to approve Mitch Sowards as the small business representative. Weldon Riggs seconded the motion. The motion was approved.

AGENDA ITEM NO. 5: DISCUSSION AND APPROPRIATE ACTION AUTHORIZING THE SAN ANTONIO RIVER AUTHORITY (RIVER AUTHORITY) TO SOLICIT NOMINATIONS TO FILL REMAINING VACANT SCTRWPG VOTING MEMBER SEAT, AND TO POST PUBLIC NOTICE IN ACCORDANCE WITH THE SCTRWPG BYLAWS

Chair Scott then opened up the conversation to the Planning Group for discussion on soliciting nominations to fill the remaining vacancy or the alternative option of moving forward with a vacancy for one small business representative. A recommendation was laid out to the group to keep the group as is and not go out for an additional small business representative. The group decided by consensus that they would not go out for an additional nomination and leave the second small business representative vacant.

AGENDA ITEM NO. 6: DISCUSSION AND APPROPRIATE ACTION SETTING THE SCHEDULE FOR CALENDAR YEAR 2019 MEETINGS OF THE SCTRWPG

Chair Scott asked that Mr. Cole Ruiz go over the 2019 calendar of meetings. Mr. Ruiz explained that the only change in the schedule was that the February meeting was moved to January 31, 2019 due to scheduling conflicts. The other quarterly meetings will be held on the first Thursday of May, August and November of 2019. The schedule was then approved by consensus.

AGENDA ITEM NO. 7: STATUS OF GUADALUPE, SAN ANTONIO, MISSION, AND ARANSAS RIVERS AND MISSION, COPANO, ARANSAS, AND SAN ANTONIO BAYS BASIN AND BAY STATEHOLDER COMMITTEE (BBASC) AND EXPERT SCIENCE TEAM (BBEST)

Chair Scott reviewed the studies conducted by BBASC with the Planning Group. A meeting with BBASC will be scheduled for a briefing on the recent and existing studies and more information will be shared with the Planning Group as it becomes available.

AGENDA ITEM NO. 8: TEXAS WATER DEVELOPMENT BOARD (TWDB) COMMUNICATIONS

Elizabeth McCoy, TWDB, shared a few updates from the Water Development Board with the Planning Group. Ms. McCoy informed the group that the TWDB reviewed the Region L Technical Memorandum and it was found to be administratively complete. Ms. McCoy also shared with the group that the TWDB has created an interactive map that shows data for each

Water User Group that can be found on their website. The TWDB has two tools that can be used for evaluating Water Management Strategies. The first is a new tool, a conservation planning tool and the other is an updated uniform costing tool that can be used in estimating project cost.

The TWDB is amending the 2017 State Water Plan in regards to the 2016 Region L plan to reflect the SAWS advanced metering program. The amendment is scheduled to go in front of the Board in December 2018. Ms. McCoy went on to describe the process of the Socioeconomic Impact Analysis that is a required analysis of not meeting identified water needs.

AGENDA ITEM NO. 9: CHAIR'S REPORT

Chair Scott reviewed the conversation that was had by the RWPG Chairs during their Conference Call. Chair Scott asked the group for feedback on the project scoring criteria that was provided in the agenda packet. She went on to discuss the process of the evaluation and prioritization of the projects and plan. Ms. Peace requested a pubic feedback concept be a part of the evaluation. A recommendation for return of investment criteria was also provided. Mr. Mims suggested that the group not amend the evaluation criteria excessively due to the initial work that went into the agreement.

AGENDA ITEM NO. 10: DISCUSSION AND APPROPRIATE ACTION REGARDING CONSULTANT'S WORK AND SCHEDULE

Brian Perkins, Black and Veatch, provided an updated planning schedule, and reminded the Planning Group that the Legislative Session would be starting soon and that it could affect the next cycle. Mr. Perkins reminded the group that the Initially Prepared Plan is due March 3, 2020. Mr. Perkins went on to review the remainder of the cycle schedule.

Mr. Perkins then shared a presentation on the summary of population, demands supplies and needs.

AGENDA ITEM NO. 11: DISCUSSION AND APPROPRIATE ACTION AUTHORIZING THE CONSULTANT AND/OR THE ADMINISTRATOR TO SUBMIT A HYDROLOGIC VARIANCE REQUEST TO THE TWDB

Mr. Perkins reviewed the Canyon Reservoir permit and the impacts on the Water User Groups that are affected by the reservoir's evaluation. He then proposed to the group to use an alternate, previously used, WAM for Canyon Reservoir in order to better simulate the supply at the reservoir.

Jonathon Stinson moved for approval, seconded by Robert Puente. The item was approved.

AGENDA ITEM NO. 12: DISCUSSION AND APPROPRIATE ACTION TO SET A DEADLINE FOR POPULATION AND WATER DEMAND PROJECTION AMENDMENT REQUESTS AND SUPPORTING MATERIALS FOR THE 2021 SOUTH CENTRAL TEXAS REGIONAL WATER PLAN

Mr. Perkins gave a summary of the re-evaluation of population water demands and requests for amendments in various counties. He highlighted the requested amendments previously approved by the RWPG: CPS Energy, Cibolo and Green Valley SUD. Mr. Perkins also informed the planning group of the potential changes that could be approved: Saws – Atascosa County, Calhoun County Manufacturing, Goliad Steam – Electric, Canyon Lake WSC and NBU. There were a few clarifying questions including an inquiry about passive and active conservation.

Mr. Perkins proposed a schedule moving forward with a deadline of November 9, 2018 for any backup information from WUGs, then between that deadline and the next meeting on January 31, 2019 gather the TWDB, NBU and Canyon Lake Water Service Corp. together to determine how to meet the needs of Canyon Lake and NBU and present the decision to the Planning Group for their consideration. As well as the other potential amendments that were listed above. Mr. Raabe elaborated on the process.

Chair Scott inquired about including other WUGs in the conversation as supply is being moved around. The Chair requested that Mr. Perkins reach out to all parties when scheduling the discussion.

The item was approved by consensus.

AGENDA ITEM NO. 13: DISCUSSION AND APPROPRIATE ACTION AUTHORIZING THE SAN ANTONIO RIVER AUTHORITY (SARA) TO REQUEST A NOTICE-TO-PROCEED FROM THE TWDB; AUTHORIZING THE CONSULTANT AND/OR SARA TO WORK WITH THE TWDB ON ANY FOLLOW UP INFORMATION THAT MIGHT BE REQUIRED; AND AUTHORIZING SARA TO NEGOTIATE AND EXECUTE THE SUBSEQUENT TWDB CONTRACT AMENDMENT THAT WILL BE ISSUED FOLLOWING THE NOTICE-TO-PROCEED.

Chair Scott recognized Mr. Cole Ruiz to give an overview on a notice-to-proceed from the TWDB. He went on to explain that the projects that Mr. Perkins will cover in the next item require a notice-to-proceed for the next steps by the consultant.

Mr. Perkins reviewed the water management strategy process. He then listed and discussed the block 1 scope and fee estimates. He outlined the fees associated with the water management strategies and then opened it up to the Planning Group to discuss the approval of some or all of the strategies he described. Chair Scott reminded the group that their approval today would only be for evaluation of the described strategies and that there would be more opportunities to review the strategies before they are put into the plan.

Mr. Ramos moved to approve the item. Mr. Lord seconded the motion. The item was approved.

Chair Scott asked the group if they would like to continue or take a break. The group decided to push on.

AGENDA ITEM NO. 14: DISCUSSION AND APPROPRIATE ACTION IDENTIFYING POTENTIAL WATER MANAGEMENT STRATEGIES

Mr. Perkins shared the nineteen potential water management strategies in block 2. There was a question on the level of scope and engineering already done on the strategies being highlighted. Mr. Perkins responded that it varies between the strategies, some have quite a bit of data and some are more like concepts.

Chair Scott asked the group if there were any concerns with Mr. Perkins moving forward with developing the scopes and fees for block 2.

No further discussion, the item was approved by consensus.

AGENDA ITEM NO. 15: POSSIBLE AGENDA ITEMS FOR THE NEXT REGION L MEETING

Chair Scott then asked for possible items for the next meeting in addition to population water demand projections, the TWDB socioeconomic analysis and the scope and fee estimates for block 2. Mr. Perkins stated that it may be possible to have a water management strategy for presentation to the group. Chair Scott said that the next meeting would include officer elections and for members to keep that in mind and to let the group know if anyone is interested in an officer positions. Mr. Cole Ruiz mentioned that there is potential for Mr. Perkins to have a block 3 of water management strategies for review by the next meeting.

No further items were brought to the table for the meeting on January 31, 2019.

AGENDA ITEM NO. 16: PUBLIC COMMENT

No comments were made.

Chair Scott adjourned the meeting.

_____
GARY MIDDLETON, SECRETARY

Approved by the South Central Texas Regional Water Planning Group at a meeting held on January 31, 2019.

_____
SUZANNE SCOTT, CHAI

3. Election of Officers for Calendar Year 2019

2018 Officers

Chair, Suzanne Scott

Vice Chair, Tim Andruss

Secretary, Gary Middleton

At-Large, Kevin Janak

At-Large, Adam Yablonski

4. Status of Edwards Aquifer Habitat Conservation Plan (EAHCP), Scott Storment

5. Status of Guadalupe, San Antonio, Mission, and Aransas Rivers and Mission, Copano, Aransas, and San Antonio Bays Basin and Bay Stakeholder Committee (BBASC) and Expert Science Team (BBEST)

FY18-19 Study Updates

Assessing the Effects of Freshwater Inflows and Other Key Drivers on the Population Dynamics of Oysters and Sport Finfish in Three Estuaries (Colorado-Lavaca, Guadalupe-San Antonio-Mission-Aransas, and Nueces) – Phase III

- CANCELED – The contractor (UT Marine Science Institute) and the TWDB have agreed not to proceed with the Phase III study because the Phase II study is significantly delayed but also because results indicate that the predictive MAR models are not performing well, particularly with the finfish data which was to be the focus of Phase III. The funding initially allocated to this study will be reallocated to benefit other environmental flow studies currently being identified by TWDB staff.

Guadalupe Delta Ecological Assessment of Freshwater Inflows

- EXECUTED – TWDB Contract #1800012267. Interagency contract with Guadalupe Blanco River Authority (GBRA) was executed. A kickoff meeting via webinar with GBRA and their subcontractor (BioWest) occurred on Thursday, November 11, 2018.

Using Comparative Long-Term Benthic Data for Adaptive Management of Freshwater Inflow to Three Estuaries (Colorado-Lavaca, Guadalupe, and Nueces)

- EXECUTED – TWDB Contract #1800012223. Interagency contract with Harte Research Institute at Texas A&M University – Corpus Christi was executed and work is in progress.

Influence of Freshwater Inflow Gradients on Estuarine Nutrient-Phytoplankton Dynamics in the Three Estuaries (Guadalupe, Nueces, and upper Laguna Madre)

- EXECUTED – TWDB Contract #1800012228. Interagency contract with Texas A&M University – Corpus Christi was executed and work is in progress.

Statewide Synthesis of Environmental Flow Studies from Funding Cycles I and II

- EXECUTED – TWDB Contract #1800012284. A contract with Texas State University was executed. An opportunity for stakeholder engagement will be presented in the spring.

Environmental Flows Validation in Three River Basins (Brazos, Colorado-Lavaca, and Guadalupe-San Antonio)

- PENDING – A contract is being negotiated with the top-ranked candidate (Texas A&M University – College Station) from the request for qualifications process.

Nutrient and Sediment Monitoring in Four Lower River Basins (Trinity-San Jacinto, Colorado-Lavaca, Guadalupe-San Antonio, and Nueces)

- PENDING – A contract will be negotiated with the U.S. Geological Survey upon completion of their existing contract for nutrient and sediment monitoring which is pending the final deliverable.

6. Texas Water Development Board (TWDB) Communications

HB 4 Stakeholder Committee

Final Uniform Standards for Prioritization

Adopted by Consensus at 3pm, November 14, 2013

PROJECT NAME:	
PROJECT SPONSOR:	

Overall Criteria Weightings:

Decade of Need	40%
Project Feasibility	10%
Project Viability	25%
Project Sustainability	15%
Project Cost Effectiveness	10%
100%	

potential SWIFT funding category	flag all that may apply
mainstream	
rural/agricultural conservation	
conservation/reuse	

** indicates that additional data may have to be collected by RWPG in order to score projects

1. Decade of Need for Project

	Max Score	Actual Score
	10	0

A What is the decade the RWP shows the project comes online?

Points	Year
0	2070
2	2060
4	2050
6	2040
8	2030
10	2020

	Max Score	Actual Score
	10	0

** B In what decade is initial funding needed?

Points	Year
0	2070
2	2060
4	2050
6	2040
8	2030
10	2020

Criteria Total	20	0

2. Project Feasibility

	Max Score	Actual Score

A What supporting data is available to show that the quantity of water needed is available? — Max Score: 5 — Actual Score: 0

Points	Measure
0	Models suggest insufficient quantities of water or no modeling has been performed
3	Models suggest sufficient quantity of water
5	Field tests, ~~and~~ measurements, or project specific studies confirm sufficient quantities of water

** **B** If necessary, does the sponsor hold necessary legal rights, water rights and/or contracts to use the water that this project would require? — Max Score: 5 — Actual Score: 0

Points	Measure
0	legal rights, water rights and/or contract application not submitted
2	application submitted
3	application is administratively complete
5	legal rights, water rights and/or contracts obtained or not needed

** **C** What level of engineering and/or planning has been accomplished for this project? (Points based on progress on scientific data collection, stage of studies and design) — Max Score: 10 — Actual Score: 0

Points	Measure	Points	Measure
1	Project idea is outlined in Regional Plan.	6	Preliminary engineering report initiated.
2	Feasibility studies initiated.	7	Preliminary engineering report completed.
3	Feasibility studies completed.	8	Preliminary design initiated.
4	Conceptual design initiated.	9	Preliminary design completed.
5	Conceptual design completed.	10	Final design complete.

D Has the project sponsor requested ~~(~~in writing ~~for the 2016 Plan)~~ that the project be included in the Regional Water Plan?

Points	Measure
0	no
5	yes

5	0

Criteria Total

25	0

3. Project Viability

Max Score	Actual Score

For A and B, the calculation is to be based on the total needs of all WUGs receiving water from the project.

A In the decade the project supply comes online, what is the % of the WUG's (or WUGs') needs satisfied by this project?

0.00 %

10	0.00

B In the final decade of the planning period, what is the % of the WUG's (or WUGs') needs satisfied by this project?

0.00 %

10	0.00

C Is this project the only economically feasible source of new supply for the WUG, other than conservation?

Points	Measure
0	no
5	yes

5	0

D Does the project serve multiple WUGs?

5	0

Points	Measure
0	no
5	yes

Criteria Total

30	0

4. Project Sustainability

** **A** Over what period of time is this project expected to provide water (regardless of the planning period)?

10	0

Points	Measure
5	less than or equal to 20 years
10	greater than 20 years

B Does the volume of water supplied by the project change over the regional water planning period?

5	0

Points	Measure
0	decreases
3	no change
5	increases

Criteria Total

15	0

5. Project Cost Effectiveness

Max Score	Actual Score

A What is the expected unit cost of water supplied by this project compared to the median unit cost of all other recommended strategies in the region's current RWP? (Project's Unit Cost divided by the median project's unit cost)

5	0

Points	Relative to Median unit cost
0	200% or greater than median
1	150% to 199% of median
2	101% to 149% of median
3	100% of median
4	51% to 99% of median
5	0% to 50% of median

Criteria Total

5	0

SCORING RESULTS ON SCALE OF 1,000 POINTS MAXIMUM:

sub-score for: Decade of Need sub-score for:	-
Project Feasibility sub-score for: Project	-
Viability sub-score for: Project Sustainability	-
sub-score for: Project Cost Effectiveness	-
FINAL SCORE FOR PROJECT	-

0

0

7. Chair’s Report

HB 720 Larson, Lyle – Aquifer Storage & Reuse

Seeks to allow TCEQ to create an expedited permit process for water permits converting to the use of ASR and for the capture of flood flows to be stored in ASRs.

HB 723 Larson, Lyle – Water Availability Models

By December 1, 2022 TCEQ is to update the water availability models (WAMs) for the Brazos, Guadalupe, Nueces, Red, Rio Grande, San Antonio and San Jacinto river basins.

HB 726 Larson, Lyle – Groundwater

Aligns production and export permits. Provides a procedure for a GCD to adopt a moratorium that includes notice and hearing including the hearing requirements.

HB 807 Larson, Lyle – Interregional Planning Council

Creates an Interregional Planning Council consisting of one member from each regional water planning group. The purpose is to improve coordination amongst the regional planning groups and between each regional water planning group and TWDB “to meet the water needs of the state as a whole.”

HB 1052 Larson, Lyle – State Water Plan Funding Mechanism

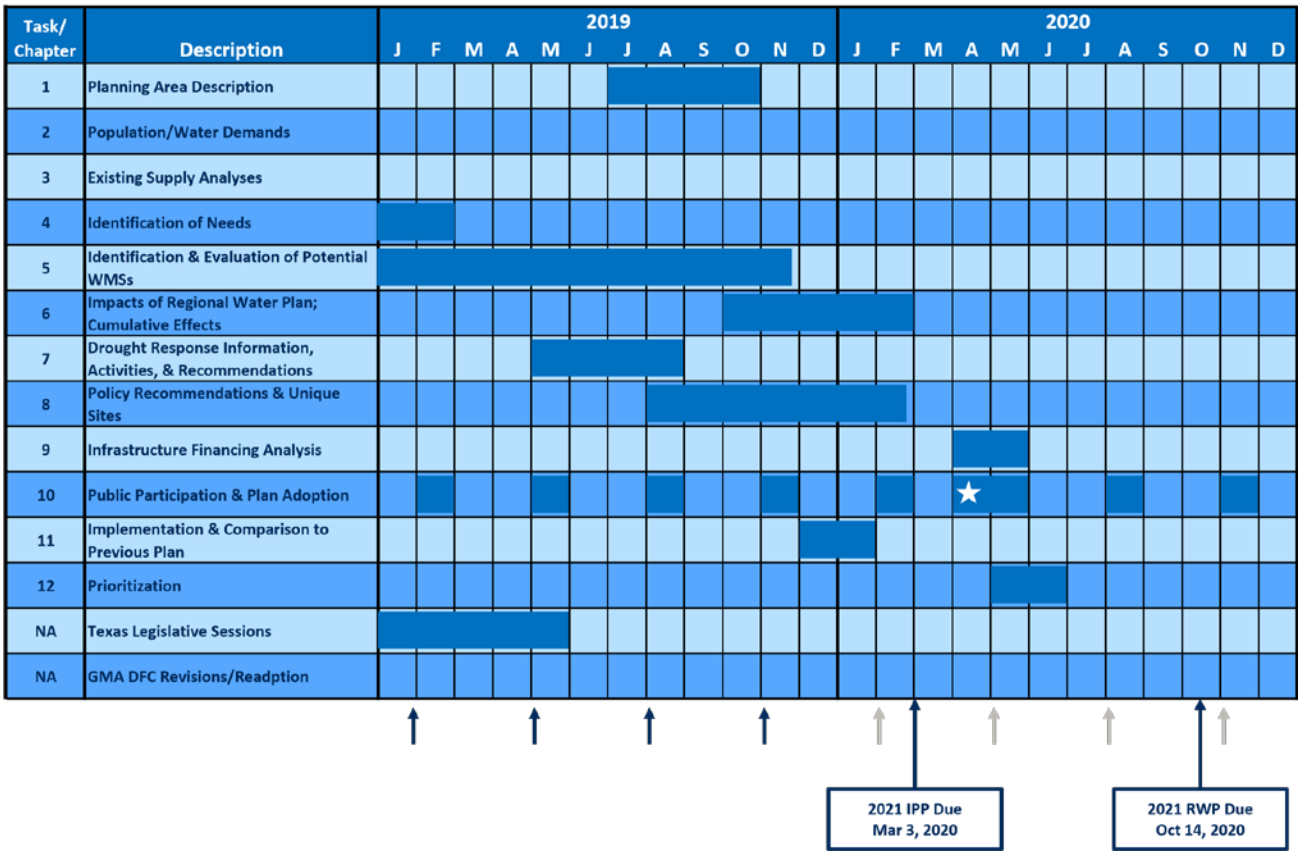
This bill creates an avenue for the TWDB to have ownership interest in desalination and aquifer storage and reuse projects through funding the projects from the state participation account II.

8. Discussion and Appropriate Action Regarding the Consultant’s Work Schedule

2021 South Central Texas Regional Water Plan

Estimated Schedule

January 2019 RWPG Meeting



KEY:

Scheduled Region L Meetings

Anticipated Region L Meetings

Public Hearing(s) on 2021 IPP

Anticipated Activity

9. Discussion and Appropriate Action to Amend the Adopted Population and Water Demand Projection for the 2021 South Central Regional Water Plan

BUILDING A WORLD OF DIFFERENCE

January 31, 2019

Potential Amendment to Population & Water Demands

January 2019 SCTRWPG Meeting

BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH

Status

- TWDB Has Finalized Population and Water Demand Projections
- Region L Has Approved Amendments for:
- Cibolo
- Green Valley SUD
- CPS Energy (Guadalupe County Steam-Electric Water Demands)
- Additional Potential Amendments
- SAWS – Atascosa County
- Canyon Lake WSC
- NBU
- Potential Changes Discussed, Not Moving Forward
- Calhoun County Manufacturing (Industrial)
- Goliad County Steam-Electric

Previously Approved Amendments

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
	Board-Approved							136					10,567	11,737
CIBOLO		33,213	49,191	57,659	65,940	74,369	82,645		4,796	7,022	8,212	9,378		
	Potential Revision	23,066	32,087	36,598	38,853	39,981	40,545	99	2,374	3,251	3,695	3,915	4,024	4,077
	Change	(10,147)	(17,104)	(21,061)	(27,087)	(34,388)	(42,100)	(37)	(2,422)	(3,771)	(4,517)	(5,463)	(6,543)	(7,660)

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
	Board-Approved							81						
GREEN VALLEY SUD		28,098	33,582	39,150	44,591	50,090	55,462		2,209	2,473	2,764	3,086	3,452	3,818
	Potential Revision	38,245	50,686	60,211	71,678	84,478	97,562	113	4,377	5,548	6,408	7,529	8,851	10,213
	Change	10,147	17,104	21,061	27,087	34,388	42,100	32	2,168	3,075	3,644	4,443	5,399	6,395

		Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070
Guadalupe County Steam-Electric	Board-Approved	7,070	7,070	7,070	7,070	7,070	7,070
	Potential Revision	9,405	9,405	9,405	9,405	9,405	9,405
	Change	2,335	2,335	2,335	2,335	2,335	2,335

Potential Amendment: SAWS & Atascosa County

- Current TWDB Projections
- SAWS shown not to serve Atascosa County
- Previous Plans showed SAWS in Atascosa County
- Potential Amendment
- Move 475 (2020) to 638 (2070) people out of “County-Other” and into SAWS

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
SAN ANTONIO WATER SYSTEM	Board-Approved	1,812,792	2,056,014	2,287,677	2,500,490	2,696,122	2,874,852	127	238,553	261,786	284,928	308,016	331,299	353,035
	Potential Revision	1,816,408	2,060,058	2,292,113	2,505,291	2,701,257	2,880,045	127	239,028	262,301	285,481	308,607	331,930	353,673
	Change	3,616	4,044	4,436	4,801	5,135	5,193		475	515	553	591	631	638

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY OTHER	Board-Approved	10,382	11,998	13,468	14,905	16,259	17,510	125	1,333	1,480	1,618	1,768	1,924	2,071
	Potential Revision	6,766	7,954	9,032	10,104	11,124	12,317	125	868	982	1,085	1,198	1,317	1,456
	Change	(3,616)	(4,044)	(4,436)	(4,801)	(5,135)	(5,193)		(465)	(498)	(533)	(570)	(607)	(615)

Potential Amendment: Comal County

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
CANYON LAKE WATER SERVICE COMPANY	Board-Approved	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
	Potential Revision	48,660	63,573	79,783	96,323	112,342	127,327	119	6,095	7,826	9,760	11,747	13,682	15,496
	Change	10,804	10,447	11,224	12,216	12,765	12,836		1,353	1,286	1,372	1,489	1,555	1,562

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
NEW BRAUNFELS UTILITIES	Board-Approved	75,462	93,398	112,241	130,879	149,453	167,339	191	15,412	18,749	22,323	25,913	29,552	33,074
	Potential Revision	91,010	114,969	138,462	162,597	185,964	208,763	191	18,588	23,079	27,538	32,193	36,772	41,262
	Change	15,548	21,571	26,221	31,718	36,511	41,424		3,176	4,330	5,215	6,280	7,220	8,188

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
COMAL COUNTY OTHER	Board-Approved	21,719	24,270	26,533	29,828	31,997	33,936	160	3,673	3,996	4,275	4,750	5,084	5,392
	Potential Revision	7,041	7,041	7,041	7,041	7,041	7,041	160	1,191	1,159	1,134	1,121	1,118	1,118
	Change	(14,678)	(17,229)	(19,492)	(22,787)	(24,956)	(26,895)		(2,482)	(2,837)	(3,141)	(3,629)	(3,966)	(4,274)

		Population							Water Demand (acre-feet)					
		2020	2030	2040	2050	2060	2070	GPCD	2020	2030	2040	2050	2060	2070
COMAL COUNTY TOTALS	Board-Approved	140,825	178,399	216,562	255,092	293,362	330,099	25,918	31,943	38,194	44,461	50,927	57,169	140,825
	Potential Revision	152,499	193,188	234,515	276,239	317,682	357,464	27,981	34,742	41,665	48,629	55,769	62,682	152,499
	Change	11,674	14,789	17,953	21,147	24,320	27,365	2,063	2,799	3,471	4,168	4,842	5,513	11,674

Potential Amendment: Comal County

		2020
CANYON LAKE WATER SERVICE COMPANY	Board-Approved	37,856
	Potential Revision	48,660
	Change	10,804

		2020
NEW BRAUNFELS UTILITIES	Board-Approved	75,462
	Potential Revision	91,010
	Change	15,548

		2020
COMAL COUNTY OTHER	Board-Approved	21,719
	Potential Revision	7,041
	Change	(14,678)

		2020
COMAL COUNTY TOTALS	Board-Approved	140,825
	Potential Revision	152,499
	Change	11,674

10,804
+ ~~15,548~~
26,352 ✓

14,678
+ ~~11,674~~
26,352 ✓

Schedule

- Requesting an amendment from RWPG at January 31, 2019 Meeting
- TWDB will have previewed the requested amendments and received comment from other agencies
- If approved, formally submit to TWDB
- TWDB will review once more and take to their board, along with previous 3 amendments (August 2018 RWPG Mtg)

GOLIAD COUNTY GROUNDWATER CONSERVATION DISTRICT
118 S. Market St., P.O. Box 562, Goliad, Texas 77963-0562
Telephone: (361) 645-1716 Facsimile: (361) 645-1772
website: www.goliadcogcd.org | email: gcgcd@goliadgcd.org

January 11, 2019

Chair Suzanne Scott
South Central Texas Regional Water Planning Group
c/o San Antonio River Authority
100 East Guenther St.
San Antonio, TX. 78204

Re: Steam Electric Power Demands in Goliad County

On behave of the Goliad County Groundwater Conservation District Board of Directors please accept this as a letter of record regarding steam electric power demand total for Goliad County. Goliad County Groundwater Conservation District Board of Directors reviewed the Draft Technical Memorandum for the 2021 South Central Regional Water Plan and also reviewed projected demand numbers adopted by Texas Water Development Board and respectfully disagrees with the projected demand number associated with the steam electric power water user group.

After reviewing the Draft Technical Memorandum for 2021 South Central Texas Regional Water Plan, it was discovered Goliad County demands were heavily reduced compared to the 2016 Regional Water Plan. Goliad County's steam electric projected demand total in the 2016 Regional Water Plan totaled 17,080-acre feet per year while the 2021 Regional Water Plan shows to be reduced to 1,863-acre feet per year.

The District disagrees that water user group existing water supply for steam electric power in the Gulf Coast Aquifer System in the Guadalupe Basin of 1,863 is to high based on supporting Historic Use Allocation Certificates (HUAC) on file with the District. HUAC allocations on file for Coleto Creek Power water wells total 313-acre feet per year. Please find the attached HUAC's.

The District also believes that steam electric power water user group for the Coleto Creek Lake/Reservoir in the Guadalupe Basin was not included in the adopted projection demands based on existing water supply total of 24,160-acre feet per year.

The District gave comment and requested clarification of the value by email on September 5, 2018 to the Region L consultant that has explained it is unlikely for any changes to be made to the projections at this point in the planning cycle for a lack of evidence. After trying to sort out this discrepancy, Coleto Creek Power has not provided data to refute it.

The District understands that the revision of the Goliad County Steam Electric Demand Projections are unlikely to be revised during this planning cycle. However, as a member of the SCTRWPG, I will work with the planning group and its consultant to ensure that adequate supplies and strategies are included in the 2021 SCTRWP to meet the actual demands of Coleto Creek Power. In addition, we will continue to gather the necessary information and evidence so that the Goliad County Steam Electric Demand Projections can be accurately represented in the 2026 SCTRWP.

Sincerely,

Heather Sumpter

Heather Sumpter
GCGCD General Manager

Cc: Brian Perkins
Black & Veatch
1701 Directors Blvd., Suite 940
Austin, TX, 78744

10. Discussion and Appropriate Action Regarding a Request for the Texas Water Development Board to Conduct a Socioeconomic Analysis of not Meeting the Water Needs in the 2021 South Central Texas Regional Water Plan

11. Discussion and Appropriate Action Identifying Potential Water Management Strategies

Water Management Strategy Evaluations:
Block 2 Scope and Fee Estimates
Draft January 24, 2019

ARWA/GBRA Project (Phase 1) **$ 10,000**

ARWA and GBRA each own 15,000 acft/yr (30,000 acft/yr in total) of groundwater permits and leases in Gonzales and Caldwell Counties. ARWA and GBRA have agreed to develop a joint project to deliver water to San Marcos, Kyle, Buda, CRWA, NBU, Lockhart, and Goforth SUD within the 2020 decade. The strategy evaluation will include documentation of ARWA/GBRA's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

ARWA Project (Phase 2) **$ 11,000**

ARWA plans to expand their water service beyond their 15,000 acft/yr in Phase 1, to add additional supply of approximately 21,000 acft/yr within the 2030 decade. The strategy evaluation will include documentation of AWRA's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

ARWA Project (Phase 3) **$ 12,000**

ARWA plans to expand their water service beyond their 36,000 acft/yr in Phases 1 and 2, to add additional supply in the form of direct potable reuse in the 2060 decade. The strategy evaluation will include documentation of AWRA's latest plans, evaluation of the reuse supply available to the project in accordance with projected wastewater treatment plant capacity and influent, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

GBRA Mid-Basin (Phase 2) **$ 12,500**

GBRA has a pending water rights application with TCEQ for the addition of up to 75,000 acft/yr of runof-river diversions from the Guadalupe River near Gonzales, as well as storage in the form of an offchannel reservoir and/or ASR. This strategy seeks to expand upon the 15,000 acft/yr of groundwater in Phase 1, to deliver a total water supply between 42,000 acft/yr and 50,000 acft/yr to customers within the 2030 decade. The strategy evaluation will include documentation of GBRA's latest plans, evaluation of the surface water availability of the pending water right,

assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

GBRA Lower Basin Storage **$ 12,500**

GBRA owns 175,501 acft/yr of run-of-river diversions from the Guadalupe River at the Saltwater Barrier. GBRA has the authorization to add additional storage in Calhoun County to further firm up their run-ofriver water rights within the 2020 decade. The strategy evaluation will include documentation of GBRA's latest plans, review of the water mass balance associated with the designated off-channel storage facility, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

GBRA Lower Basin WR **$ 12,500**

GBRA has a pending application at TCEQ for a new run-of-river diversion from the Guadalupe River at the Saltwater Barrier and associated off-channel storage. The strategy evaluation will include documentation of GBRA's latest plans (including decade of implementation), evaluation of the run-ofriver water reliability associated with the new water right, mass balance / firm yield calculations for the off-channel reservoir, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

Victoria County Steam-Electric Project **$ 12,500**

Victoria County is projected to show a steam-electric need for a new power generation facility. This strategy uses existing run-of-river water rights, in combination with a new off-channel storage facility to develop approximately 20,000 - 50,000 acft/yr of firm supply to meet steam-electric needs. The strategy evaluation will include documentation of project concept (including decade of implementation), evaluation of the firm supply provided by the surface water rights and the off-channel storage, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

CRWA Wells Ranch (Phase 3) **$ 11,000**

CRWA owns and operates the Wells Ranch project in Gonzales and Guadalupe Counties which produces approximately 13,000 acft/yr of water for CRWA members. This strategy seeks to expand the project by adding an additional 5,000 acft/yr of treated brackish groundwater in the 2020 decade. The strategy evaluation will include documentation of CRWA's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water

supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

CRWA Siesta Project **$ 12,500**

CRWA owns water rights and lease agreements for surface water along Cibolo Creek. In addition, CRWA has MOUs in place for treated effluent discharges with SARA and CCMA. In addition, CRWA has been discussing a MOU with Green Valley SUD for treated effluent discharges at part of this project. This strategy seeks to develop a firm water supply project in the 2060 decade of approximately 5,000 acft/yr from the surface water rights, backed up with the treated effluent discharges. The strategy evaluation will include documentation of CRWA's latest plans, evaluation of the surface water rights reliability and availability of project treated effluent discharges, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

CVLGC Carrizo Project **$ 11,000**

CVLGC is in the process of developing a 10,000 acft/yr groundwater project from the Carrizo-Wilcox Aquifer in Wilson County to meet Needs for the cities of Cibolo and Schertz within the 2020 decade. The strategy evaluation will include documentation of CVLGC latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

SSLGC Expanded CZ Project (Guadalupe) **$ 10,000**

SSLGC owns and operates a Carrizo Aquifer well field in Gonzales County with approximately 17,000 acft/yr of supply. This strategy is the expansion of that Carrizo Aquifer supply by an additional 6,000 acft/yr of Carrizo-Wilcox Aquifer groundwater from Guadalupe County within the 2020 decade. The strategy evaluation will include documentation of SSLGC's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

SSLGC Brackish WX Project (Gonzales) **$ 10,000**

SSLGC owns and operates a Carrizo Aquifer well field in Gonzales County with approximately 17,000 acft/yr of supply. This strategy is the expansion of that Carrizo Aquifer supply by adding 5,000 acft/yr of treated brackish groundwater from the Carrizo-Wilcox Aquifer in Gonzales County within the 2030 decade. The strategy evaluation will include documentation of SSLGC's latest plans, evaluation of the groundwater supply available to the project in accordance with the

MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

NBU ASR **$ 12,000**

NBU is planning an ASR project, implemented in the 2020 decade, that would store excess water supplies when available in the brackish portion of the Edwards Aquifer, for subsequent use during dry periods. The strategy evaluation will include documentation of NBU latest plans, evaluation of the source water reliability/availability and the water mass balance of the ASR system, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

NBU Trinity Well Field Expansion **$ 10,000**

NBU owns and operates four Trinity Aquifer wells in Comal County. This strategy is the expansion of that Trinity Aquifer supply within the 2030 decade. The strategy evaluation will include documentation of
NBU's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

NBU-Seguin Project **$ 8,000**

NBU is in discussions with the City of Seguin to develop an interconnect between the two service areas within the 2020 decade. The strategy evaluation will include documentation of NBU's latest plans, evaluation of the sources of supply and the infrastructure necessary to convey the water to NBU, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

City of Victoria ASR **$ 11,000**

Victoria is considering an ASR project, implemented in the 2020 decade, to store excess surface water flows (under their existing permits) in the Gulf Coast Aquifer for subsequent use during dry periods. The strategy evaluation will include documentation of Victoria's latest plans, evaluation of the source water reliability/availability and the water mass balance of the ASR system, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

City of Victoria GW-SW Exchange **$ 5,000**

Victoria owns junior surface water rights that can be curtailed during drought periods. In addition, Victoria owns Gulf Coast groundwater rights and facilities. This strategy allows Victoria to continue diverting surface water, even during drought, on the basis that the pump and discharge an equal amount of groundwater back to the Guadalupe River. In doing so, Victoria avoids having to flush their systems and change treatment process, thereby saving time and money. The strategy evaluation will include documentation of this process. The information will be summarized in a Water Management Strategy evaluation.

Brackish Wilcox for SS WSC **$ 10,000**

SS WSC is considering development of a 1 MGD brackish groundwater facility from the Carrizo-Wilcox Aquifer in Wilson County to meet future needs in the 2060-2070 timeframe. The strategy evaluation will include documentation of SS WSC's latest plans, evaluation of the groundwater supply available to the project in accordance with the MAG, assessment of the environmental impacts of the project, estimate of cost to develop the water supply, and documentation of the implementation issues. The information will be summarized in a Water Management Strategy evaluation.

Allocated as Part of Block #1:

1. Advanced Water Conservation $15,000
2. Drought Management $10,000
3. Edwards Transfers $5,000
4. Local Groundwater $20,000
5. Local Carrizo Conversions $5,000
6. Surface Water Rights $5,000
7. Balancing Storage $5,000
8. Facilities Expansion $10,000
9. Recycled Water Strategies $12,500
10. Expanded Local Carrizo (SAWS) $12,500
11. Expanded Brackish GW (SAWS) $12,500

Total Block #1 **$112,500**

Total Task 5A Budget: $373,405 100.0% Total for Block 1: $112,500 30.1%

Total for Block 2:	**$193,500**	**51.8%**
Unallocated Remaining:	**$67,405**	**18.1%**

BUILDING A WORLD OF DIFFERENCE

January 31, 2019

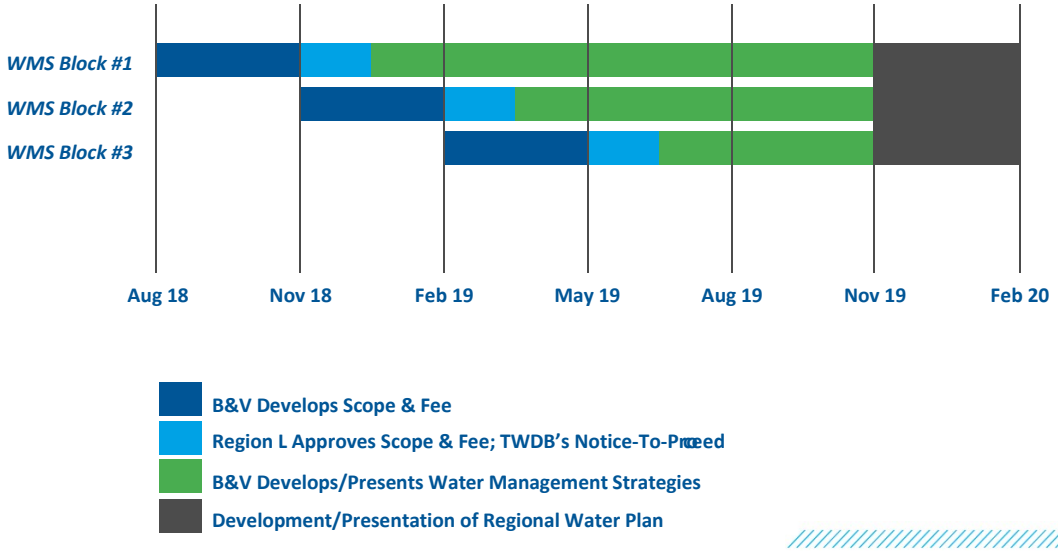
Potential Water Management Strategies – Block #3

January 2019 SCTRWPG Meeting

BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH

Schedule



Approval to Develop Scope & Fee (Block #3)

1. Uvalde ASR
2. City of Goliad Gulf Coast Aquifer Supply
   - Replace and Expand
3. City of Kenedy Carrizo Aquifer Supply
   - Near Falls City
4. Martindale WSC Carrizo Aquifer Supply (Guadalupe Co)
5. Maxwell WSC Trinity Aquifer Supply (Hays Co)
6. County Line SUD - ?

Water Conservation by the Yard:

REGIONAL APPENDICES

SIERRA CLUB

Texas Living Waters Project

PURPOSE OF THIS DOCUMENT

In *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential*, we provided a regional and statewide perspective of outdoor water use and the potential savings from no more than twice per week watering restrictions. The purpose of this document is to underscore the need for cities across Texas to adopt permanent, mandatory outdoor watering restrictions. Our analysis demonstrates that Texas cities can achieve significant water savings from the implementation of outdoor watering restrictions regardless of whether the state is experiencing a drought nor not. Through heightened education and enforcement efforts, cities can drive these savings even deeper.

This report serves as a call to action – as we face an uncertain climatic future, now is the time to exhaust every tool in our water conservation tool box. We may not know exactly when the next drought will hit, but we can be certain it will. Texas cities already implement outdoor watering restrictions as an emergency response to drought and recognize the benefits restrictions hold for our immediate water supplies. Why not, then, augment our water supplies over the long-term by adopting permanent twice per week watering restrictions?

There is no doubt water conservation will an integral role in Texas' water future. How we value and approach water conservation now through the regional water planning process is critical to the state's long-term water security. Because water conservation represents the most cost-effective water management strategy, the degree to which we conserve directly impacts the financial outlook of the state's water infrastructure. With the next state water planning cycle already underway, these regional appendices serve as a tool to help guide projections of future municipal demands and recommended water conservation water management strategies. Insight into the municipal water savings opportunities from outdoor watering restrictions will reveal how much further regional water planning groups (RWPGs) can push water conservation over the next planning horizon.

The challenge, then, is how can RWPGs translate these insights into actionable planning instruments. To help strengthen future statewide water conservation targets, we have created appendices containing a regional summary of outdoor water use and estimated municipal savings from outdoor watering restrictions and provide comparisons of these estimates against projected municipal water needs and recommended water management strategies. We present this information from both the regional and WUG-level perspective. The intent of these regional appendices is to help RWGPs in identifying opportunities where conservation targets can be broadened through outdoor water savings and to encourage them to recognize outdoor watering restrictions as a recommended municipal conservation strategy. In tandem with this effort, we have also developed a municipal best management practice focusing on outdoor watering restrictions that is currently under review by the Texas Water Development Board. Once adopted, the BMP will provide formal guidance to WUGs on how to develop and implement outdoor watering restrictions.

OUTDOOR WATERING RESTRICTIONS
AN OVERVIEW

WHAT

Outdoor watering restrictions generally limit the following: 1) the number of days in a week residents can water their lawns, gardens, and plants; 2) the hours during which residents can irrigate; and 3) the specific water delivering technologies that are allowed. Since the 2011 drought, more cities across Texas have moved to adopt mandatory, permanent outdoor watering restrictions to replace their temporary drought-related watering restrictions. Doing so can prevent a rebound in water usage following the end of a drought.

WHY

To help maintain a conservation mindset regardless of drought conditions, the *Water Conservation by the Yard* report **advocates the adoption of a mandatory, year-round no more than twice per week watering schedule**. Since all regions in Texas are prone to drought, keeping watering restrictions in place on a full-time basis is a proactive strategy for helping utilities meet their current and future municipal water needs. Having permanent, agreed upon watering restrictions not only sends consistent messaging to customers, it also provides stability for the landscape and irrigation industries that can assist customers in selecting regionally appropriate plants and technologies for long-term water efficiency.

HOW

Water utilities can enforce mandatory outdoor watering schedules by adopting these provisions as part of an ordinance or rule. Effective implementation of the watering schedule requires careful planning, stakeholder input, education, and enforcement mechanisms to ensure compliance.

Region C

INTRODUCTION

Information presented in the Region C Appendix comes from two primary sources: the 2016 Region C Water Plan and the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

- Projected Municipal Demands
- Projected Municipal Needs
- Recommended Water Management Strategies

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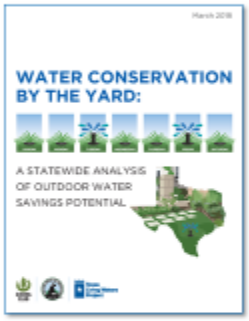


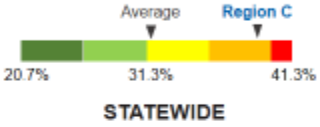
- Estimated savings from outdoor watering restrictions
- Single-family outdoor water use
- Daily household outdoor water use

With work on the 2021 Region C Water Plan already underway, the Region C Appendix serves as a planning tool to help inform the decisions of the Region C Water Planning Group. This document provides a summary of the estimated municipal savings from no more than twice per week watering restrictions to demonstrate how much further Region C can drive its municipal water conservation efforts during the next planning cycle.

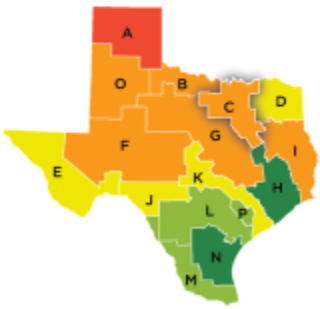
OUTDOOR WATER USE METRICS
REGION C

38.9%

SINGLE-FAMILY OUTDOOR WATER USE AS A PERCENTAGE OF TOTAL HOUSEHOLD USE



STATEWIDE



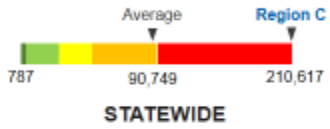
Outdoor Use as a Percentage of Total Household Use

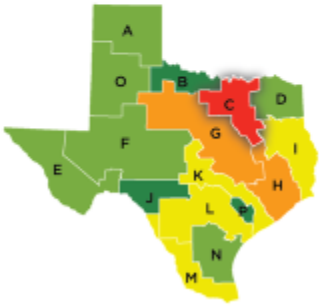
- 20.7% - 24.9%
- 25.0% - 29.9%
- 30.0% - 34.9%
- 35.0% - 39.9%
- 40.0% - 41.3%

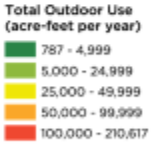
OUTDOOR WATER USE METRICS
REGION C

210,617 ac-feet/year

CURRENT SINGLE-FAMILY OUTDOOR WATER USE



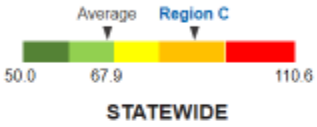


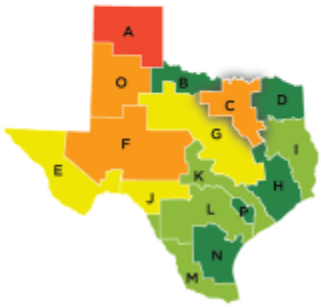


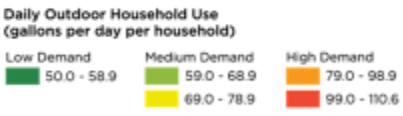
OUTDOOR WATER USE METRICS
REGION C

84.4 gal/day

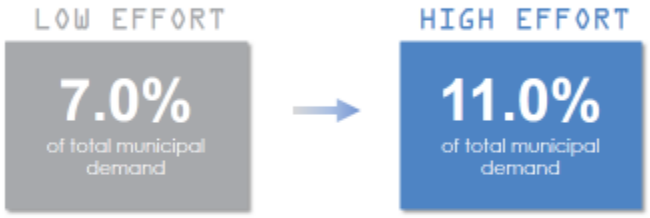
DAILY HOUSEHOLD OUTDOOR WATER USE







ESTIMATED SAVINGS POTENTIAL
OF OUTDOOR WATERING RESTRICTIONS



IMPORTANCE OF EDUCATION & ENFORCEMENT

For Region C, the estimated savings potential of twice per week outdoor watering restrictions ranges from 7 to 11 percent (of total municipal demand) – depending on the level of effort employed to implement the measure. Research indicates that education and enforcement have a direct impact on the effectiveness of outdoor watering restrictions. To achieve the greatest amount of water savings, robust education and enforcement mechanisms must be in place.

For additional information on how these savings percentages were determined, please see the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

ESTIMATED MUNICIPAL SAVINGS
FROM OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS BASED ON MUNICIPAL DEMANDS IDENTIFIED IN THE 2016 REGION C WATER PLAN

Planning Decade	Water Savings (ac-feet per year)*		Municipal Demand (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
Current	85,489	134,340	1,221,274
2020	103,707	162,968	1,481,530
2030	117,277	184,292	1,675,385
2040	132,631	208,419	1,675,385
2050	148,387	233,179	2,119,813
2060	164,697	258,810	2,352,818
2070	181,638	285,432	2,594,833

*Please note that these savings estimates are inclusive of the municipalities in Region C that already have watering restrictions in place.

KEY TAKEAWAYS

- The level of implementation effort (low or high) has a significant effect on the estimated municipal savings from outdoor watering restrictions. With more robust education and enforcement efforts, Region C can nearly double its outdoor water savings.
- Water savings will increase in proportion to municipal population and demand growth given the coincidence of new housing stock, especially in the single-family sector where in-ground irrigation systems and turf grass have become increasingly prevalent.

MEETING FUTURE MUNICIPAL NEEDS
WITH OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS AS A PERCENTAGE OF MUNICIPAL NEEDS IDENTIFIED IN THE 2016 REGION C WATER PLAN

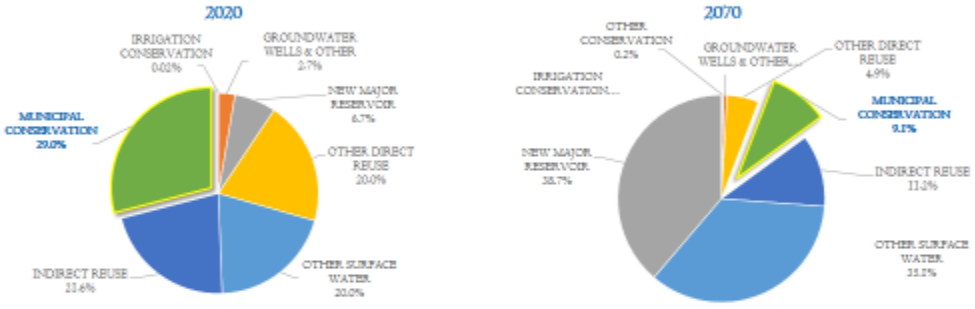
Planning Decade	Water Savings (ac-feet per year)		Municipal Needs (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
2020	97%	> 100%	106,718
2030	37%	58%	319,284
2040	25%	39%	539,183
2050	20%	31%	750,997
2060	17%	26%	981,697
2070	15%	23%	1,227,956

KEY TAKEAWAYS

- Projected municipal savings from no more than twice per week watering restrictions are enough to satisfy a significant portion of municipal needs (i.e., the deficit between municipal demand and available supplies from existing sources) identified in the Region C Water Plan.
- The rapid increase in municipal needs through 2070 stems from projected population growth in the region and subsequent rise in municipal demand. This trend could lead to more savings opportunities as there will likely be a greater need for single-family residences, which typically use more water outdoors.
- Permanent watering restrictions have the potential to drastically cut future municipal demands, thereby enhancing the resiliency of future municipal supplies and reducing future municipal needs.

RECOMMENDED STRATEGIES
BASED ON THE 2016 REGION C WATER PLAN

SHARE OF WATER SUPPLIES FROM RECOMMENDED WATER MANAGEMENT STRATEGIES BY STRATEGY TYPE



KEY TAKEAWAYS

- Municipal conservation water management strategies will deliver the largest share of water supplies in 2020. However, this share steadily decreases through 2070, with new major reservoirs and other surface water assuming the bulk of total water supplies from recommended water management strategies.
- Proactive, ongoing municipal conservation efforts represent the most cost-effective strategy for ensuring Region C has adequate supplies of water to meet growing municipal demands. Region C must set higher targets to ensure municipal conservation remains an integral component of the region's future water management approach.

EXPANDING FUTURE SUPPLIES
WITH OUTDOOR WATERING RESTRICTIONS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL WATER MANAGEMENT STRATEGIES BY TYPE		
Municipal WMS Type	Water Volume (ac-feet per year)	
	2020	2070
GROUNDWATER WELLS & OTHER	5,135	7,997
INDIRECT REUSE	41,442	160,801
IRRIGATION CONSERVATION	34	1,912
MUNICIPAL CONSERVATION	55,628	131,056
NEW MAJOR RESERVOIR	12,870	555,881
OTHER CONSERVATION	0	2,971
OTHER DIRECT REUSE	38,381	70,964
OTHER SURFACE WATER	38,371	504,106
TOTAL WATER VOLUME FROM RECOMMENDED WMSs	191,811	1,435,638
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	295,318 to 354,779	1,617,276 to 1,721,070
% INCREASE IN WATER VOLUME FROM ALL WMSs	54% to 85%	13% to 20%

KEY TAKEAWAYS

- Projected savings from outdoor watering restrictions are enough to cover a considerable share (13 to 85 percent) of the combined water supplies delivered by all recommended municipal water management strategies in Region C.
- Region C can significantly bolster its long-term municipal conservation efforts through permanent outdoor watering restrictions. Doing so will help reduce the region's reliance upon expensive supply-side water management strategies and stretch future water supplies even further.

OUTDOOR WATERING RESTRICTIONS
AS A MUNICIPAL CONSERVATION WMS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL CONSERVATION WATER MANAGEMENT STRATEGIES		
Municipal Conservation WMS Type	Water Volume (acre-feet per year)	
	2020	2070
GENERAL	28,794	125,774
WATER LOSS CONTROL	26,638	4,165
WATER WASTE PROHIBITION	137	829
IRRIGATION RESTRICTIONS*	59	288
TOTAL WATER VOLUME FROM RECOMMENDED MUNICIPAL CONSERVATION WMSs	55,628	131,056
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS (in addition to irrigation restrictions)	159,335 to 218,396	312,694 to 416,488
% INCREASE IN WATER VOLUME FROM MUNICIPAL CONSERVATION	> 100%	> 100%

*Region C's 2016 Regional Water Plan does not specifically define irrigation restrictions, but it appears to reflect permanent restrictions on both the time of day and the number of days per week lawns can be watered.

KEY TAKEAWAYS

- Region C's projected supply from irrigation restrictions severely underestimates the savings potential associated with this measure.
- Region C can more than double the supplies from municipal conservation water management strategies by encouraging all water user groups to adopt no more than twice per week outdoor watering restrictions supported by robust educational and enforcement mechanisms.

expensive supply-side water management strategies.

SUMMARY OF REGION C FINDINGS

OUTDOOR WATER USE

Due to its large population – and therefore high concentration of single-family residences – Region C uses more water outdoors than any other water planning region. Region C represents roughly 25% of Texas' total population, but the region consumes more than 35% of total outdoor water across the state.

MUNICIPAL WATER SAVINGS

At 84 gallons per day, Region C's daily household outdoor water use is considered high compared to other regions in the state. High outdoor water demands means there is a greater potential to cut down on excessive outdoor watering practices. Estimated savings from no more than twice per week outdoor watering restrictions range from 7 percent to 11 percent for Region C. The higher savings potential is achievable when water user groups pursue robust strategies to educate residents on water-efficient outdoor practices and enforce outdoor watering restrictions.

We estimate Region C can reduce its current municipal demand anywhere from 65,460 to 119,061 acre-feet annually. By 2070, these municipal savings will be twice as much based on projected increases in municipal demand. In the short-term, municipal water savings represent more than 100% of projected municipal water needs (i.e., unmet municipal demands) – in other words, municipal water savings can make up for all projected water supply shortages during the 2020 planning decade. However, over the long-term, municipal water needs are expected to grow at a much faster rate than municipal water savings, so by 2070, outdoor watering restrictions only have the potential to reduce municipal water needs by 23 percent.

In terms of projected water management strategies, Region C's recommended municipal water management strategies will yield 30 percent of future water supplies during the 2020 planning decade, but by 2070, this will drop to 9 percent. Most of these water supplies will come in the form of water loss control and general (i.e., unspecified) water conservation measures. Region C is one of the only regions that defines outdoor irrigation restrictions as a recommended municipal water conservation water management strategy. Region C estimates outdoor watering restrictions will yield 59 acre-feet per year by 2020, and by 2070, these savings will rise to 288 acre-feet per year.

Overall, estimated municipal savings identified in this report represent over 100 percent of total water supplies provided by Region C's recommended municipal water conservation water management strategies – in other words, municipal water savings from outdoor watering restrictions exceed the projected water supplies from water conservation water management strategies.

IMPLICATIONS FOR REGION C'S WATER PLANNING PROCESS

- Region C can do even more to drive municipal current and long-term water savings
- Region C can capture these municipal water savings by identifying no more than twice per week watering restrictions as a municipal conservation water management strategy
- To ensure a more robust conservation target, Region C should encourage WUGs to track and report their savings from outdoor watering restrictions
- Savings from outdoor watering restrictions can significantly reduce municipal water demand, which will in turn help close the gap between future municipal demand and future water supplies (i.e., municipal needs)
- Placing more emphasis on municipal water conservation WMSs, especially outdoor watering restrictions, can help Region C offset supply-side water management strategies requiring large capital investments

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
ABLES SPRINGS WSC	319	22	35	25	89% - >100%	491	34	54	145	24% - 37%	662	60	95	365	17% - 26%
ADDISON	6,002	420	660	278	>100%	8,236	576	906	1,857	31% - 49%	11,701	819	1,287	4,257	19% - 30%
ALEDO	822	58	90	0	>100%	1,900	133	209	294	45% - 71%	1,990	139	219	561	25% - 39%
ALLEN	20,533	1,437	2,259	1,613	89% - >100%	20,215	1,415	2,224	5,938	24% - 37%	20,106	1,407	2,212	8,495	17% - 26%
ALVORD	110	8	12	0	>100%	155	11	17	4	>100%	242	17	27	91	19% - 29%
ANNA	1,898	133	209	77	>100%	3,588	251	395	998	25% - 40%	13,820	967	1,520	11,230	9% - 14%
ANNETTA	282	20	31	0	>100%	342	24	38	0	-	459	32	50	0	-
ARGYLE WSC	2,391	167	263	36	>100%	3,956	277	435	1,060	26% - 41%	3,948	276	434	1,716	16% - 25%
ARLEDGE RIDGE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARLINGTON	66,936	4,686	7,363	0	>100%	69,852	4,890	7,684	13,660	36% - 56%	70,148	4,910	7,716	30,451	16% - 25%
ATHENS	2,916	204	321	110	>100%	3,411	239	375	103	>100%	9,709	680	1,068	4,232	16% - 25%
AUBREY	563	39	62	0	>100%	847	59	93	331	18% - 28%	1,452	102	160	902	11% - 18%
AVALON WATER SUPPLY & SEWER SERVICE	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	-
AZLE	1,858	130	204	176	74% - >100%	2,068	145	227	404	36% - 56%	3,390	237	373	1,708	14% - 22%
B AND B WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B B S WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B H P WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BALCH SPRINGS	2,750	193	303	127	>100%	3,067	215	337	691	31% - 49%	3,809	267	419	1,386	19% - 30%
BEAR CREEK SUD	1,149	80	126	90	89% - >100%	1,962	137	216	576	24% - 37%	10,922	765	1,201	4,614	17% - 26%
BECKER JIBA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BEDFORD	9,139	640	1,005	0	>100%	10,121	708	1,113	1,836	39% - 61%	10,694	749	1,176	4,328	17% - 27%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
BELLS	175	12	19	0	>100%	223	16	25	48	33% - 51%	783	55	86	608	9% - 14%
BENBROOK WATER AUTHORITY	5,205	364	573	760	48% - 75%	6,130	429	674	1,685	25% - 40%	10,605	742	1,167	6,160	12% - 19%
BETHEL ASH WSC	218	15	24	0	>100%	264	18	28	0	>100%	327	23	36	0	>100%
BETHESDA WSC	1,903	133	209	534	25% - 39%	2,289	160	252	0	>100%	2,917	204	321	233	88% - >100%
BLACK ROCK WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BLACKLAND WSC	671	47	74	52	90% - >100%	747	52	82	220	24% - 37%	911	64	100	306	17% - 26%
BLOOMING GROVE	153	11	17	0	>100%	175	12	19	70	18% - 28%	228	16	25	135	12% - 19%
BLUE RIDGE	92	6	10	0	>100%	362	25	40	270	9% - 15%	5,461	382	601	5,369	7% - 11%
BOIS D ARC MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOLIVAR WSC	1,105	77	122	0	>100%	1,447	101	159	333	30% - 48%	2,277	159	250	1,163	14% - 22%
BONHAM	2,024	142	223	0	>100%	3,393	238	373	757	31% - 49%	6,883	482	757	4,070	12% - 19%
BOYD	217	15	24	0	>100%	316	22	35	48	46% - 72%	593	42	65	296	14% - 22%
BRANDON IRENE WSC	40	3	4	0	>100%	48	3	5	0	-	71	5	8	0	-
BRIDGEPORT	1,294	91	142	0	>100%	1,822	128	200	356	36% - 56%	4,149	290	456	2,445	12% - 19%
BUENA VISTA-BETHEL SUD	1,366	96	150	0	>100%	1,917	134	211	39	>100%	4,297	301	473	1,143	26% - 41%
BURLESON	1,305	91	144	354	26% - 41%	1,459	102	160	655	16% - 25%	2,747	192	302	1,696	11% - 18%
BUTLER WSC	7	0	1	0	>100%	7	0	1	0	>100%	6	1	1	0	-
CADDO BASIN SUD	279	20	31	23	85% - 100%	418	29	46	123	24% - 37%	720	50	79	304	17% - 26%
CALLISBURG WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CARROLLTON	23,566	1,650	2,592	1,058	>100%	23,112	1,618	2,542	5,178	31% - 49%	22,850	1,600	2,514	8,291	19% - 30%
CASH SUD	137	10	15	0	>100%	212	15	23	0	-	353	25	39	0	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
CEDAR HILL	10,652	746	1,172	485	>100%	16,005	1,050	1,651	3,342	31% - 49%	17,227	1,206	1,895	6,203	19% - 31%
CELINA	4,716	330	519	1,439	23% - 36%	10,303	1,281	2,013	15,026	9% - 13%	30,823	2,158	3,391	28,150	8% - 12%
CHATFIELD WSC	469	33	52	0	>100%	463	32	51	185	18% - 28%	455	34	53	287	12% - 19%
CHICO	207	14	23	1	>100%	221	15	24	15	>100%	652	46	72	446	10% - 16%
COCKRELL HILL	407	28	45	19	>100%	405	28	45	91	31% - 49%	1,141	80	126	415	19% - 30%
COLLEGE MOUND WSC	790	55	87	61	91% - >100%	1,218	85	134	400	21% - 33%	2,554	179	281	1,340	13% - 21%
COLLEYVILLE	9,320	652	1,025	0	>100%	10,314	722	1,135	2,017	36% - 56%	10,648	745	1,171	4,623	16% - 25%
COLLINSVILLE	233	16	26	0	>100%	338	24	37	96	25% - 39%	666	47	73	424	11% - 17%
COMBINE WSC	308	22	34	125	17% - 27%	423	30	47	234	13% - 20%	687	48	76	535	9% - 14%
COMMUNITY WSC	347	24	38	0	>100%	394	28	43	77	36% - 56%	502	35	55	218	16% - 25%
COPEVILLE SUD	319	22	35	25	89% - 100%	452	32	50	133	24% - 37%	1,773	124	195	749	17% - 26%
COPPELL	10,992	769	1,209	509	>100%	11,146	780	1,226	2,513	31% - 49%	11,074	775	1,218	4,029	19% - 30%
CORBET WSC	258	18	28	0	>100%	289	20	32	116	17% - 27%	372	26	41	221	12% - 19%
CORINTH	4,266	299	469	847	35% - 55%	4,956	347	545	2,688	13% - 20%	4,931	345	542	3,426	10% - 16%
CORSICANA	6,003	420	660	0	>100%	6,954	487	765	2,794	17% - 27%	9,101	637	1,001	5,395	12% - 19%
COUNTY-OTHER, COLLIN	1,613	113	177	88	>100%	1,560	109	172	312	35% - 55%	11,885	832	1,307	4,811	17% - 27%
COUNTY-OTHER, COOKE	1,179	83	130	0	>100%	1,272	89	140	7	>100%	3,838	269	422	1,370	20% - 31%
COUNTY-OTHER, DALLAS	3,106	217	342	8	>100%	2,416	169	266	460	37% - 58%	2,413	169	265	795	21% - 33%
COUNTY-OTHER, DENTON	3,868	271	425	0	>100%	4,699	329	517	0	>100%	19,698	1,379	2,167	9,747	14% - 22%
COUNTY-OTHER, ELLIS	882	62	97	24	>100%	989	69	109	68	>100%	12,082	846	1,329	9,266	9% - 14%
COUNTY-OTHER, FANNIN	1,641	115	181	0	>100%	1,554	109	171	15	>100%	6,736	472	741	5,167	9% - 14%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
COUNTY-OTHER, FREESTONE	1,208	86	133	198	43% - 67%	1,127	79	124	170	46% - 73%	4,644	325	511	3,566	9% - 14%
COUNTY-OTHER, GRAYSON	2,746	192	302	0	>100%	2,554	179	281	0	>100%	5,601	406	638	464	84% - >100%
COUNTY-OTHER, HENDERSON	394	28	43	0	>100%	299	21	33	28	75% - >100%	245	17	27	31	55% - 87%
COUNTY-OTHER, JACK	562	39	62	0	>100%	583	41	64	5	>100%	597	42	66	17	>100%
COUNTY-OTHER, KAUFMAN	1,817	127	200	140	91% - >100%	2,668	187	293	586	32% - 50%	9,732	681	1,071	4,313	16% - 25%
COUNTY-OTHER, NAVARRO	692	48	76	0	>100%	669	47	74	163	29% - 45%	3,783	265	416	2,070	13% - 20%
COUNTY-OTHER, PARKER	7,095	497	780	0	>100%	6,797	476	748	0	>100%	22,176	1,552	2,439	14,452	11% - 17%
COUNTY-OTHER, ROCKWALL	568	40	62	45	88% - >100%	562	39	62	163	24% - 38%	3,139	220	345	1,325	17% - 26%
COUNTY-OTHER, TARRANT	8,199	574	902	65	>100%	7,915	554	871	1,905	29% - 46%	19,345	1,354	2,128	8,439	16% - 25%
COUNTY-OTHER, WISE	3,964	277	436	467	59% - 93%	3,907	273	430	630	43% - 68%	8,497	595	935	4,746	13% - 20%
CRANDALL	779	55	86	174	31% - 49%	1,162	81	128	557	15% - 23%	1,395	98	153	790	12% - 19%
CRESCENT HEIGHTS WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CROSS TIMBERS WSC	1,643	115	181	1	>100%	1,731	121	190	339	36% - 56%	1,801	126	198	610	21% - 32%
CROWLEY	2,417	169	266	423	40% - 63%	3,254	228	358	1,264	18% - 28%	5,666	397	623	3,677	11% - 17%
CULLEOKA WSC	328	23	36	26	88% - >100%	605	42	67	178	24% - 37%	1,009	71	111	426	17% - 26%
DALLAS	276,299	19,271	30,283	12,799	>100%	326,913	22,884	35,960	73,745	31% - 49%	402,811	28,197	44,309	146,595	19% - 30%
DALWORTHINGTON GARDENS	912	64	100	17	>100%	933	65	103	192	34% - 53%	954	69	108	318	22% - 34%
DAWSON	149	10	16	0	>100%	172	12	19	69	17% - 27%	223	16	25	132	12% - 19%
DECATUR	2,319	162	255	1,113	15% - 23%	4,060	284	447	2,611	11% - 17%	7,156	501	787	6,101	8% - 13%
DELTA COUNTY MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DENISON	6,641	465	731	0	>100%	7,868	551	865	1,319	42% - 66%	12,668	886	1,396	5,969	15% - 23%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
DENTON	28,908	2,024	3,180	3,076	66% - >100%	47,013	3,291	5,171	20,957	16% - 25%	99,143	6,940	10,906	72,765	10% - 15%
DENTON COUNTY FWSD 10	1,456	104	163	0	>100%	3,127	219	344	1,214	18% - 28%	3,124	219	344	1,939	11% - 18%
DENTON COUNTY FWSD 1-A	3,659	256	402	57	>100%	7,777	544	855	2,619	21% - 33%	7,769	544	855	4,543	12% - 19%
DENTON COUNTY FWSD 7	3,418	239	376	0	>100%	3,403	238	374	1,330	18% - 28%	3,397	238	374	2,109	11% - 18%
DESERT WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DESOTO	9,442	661	1,039	437	>100%	10,878	761	1,197	2,452	31% - 49%	13,628	954	1,499	4,959	19% - 30%
DOGWOOD ESTATES WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DORCHESTER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUNCANVILLE	6,065	425	667	261	>100%	6,295	441	692	1,419	31% - 49%	6,203	434	682	2,257	19% - 30%
EAST CEDAR CREEK FWSD	1,829	128	201	578	22% - 35%	2,198	154	242	942	16% - 26%	4,424	310	487	3,168	10% - 15%
EAST FORK SUD	572	40	63	45	89% - >100%	891	62	98	262	24% - 37%	1,520	106	167	642	17% - 26%
EAST GARRETT WSC	346	24	38	6	>100%	546	38	60	16	>100%	1,970	138	217	1,455	9% - 15%
EDGECLIFF	503	35	55	9	>100%	480	34	53	152	22% - 35%	474	33	52	229	14% - 23%
ELMO WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ENNIS	4,146	290	456	148	>100%	5,447	381	599	1,061	36% - 56%	19,748	1,382	2,172	14,585	9% - 15%
EULESS	8,978	628	988	0	>100%	9,031	632	993	1,457	43% - 68%	8,913	624	980	3,184	20% - 31%
EUSTACE	119	8	13	0	>100%	132	9	15	0	>100%	297	21	33	103	20% - 32%
EVERMAN	541	38	60	0	>100%	514	36	57	0	>100%	499	35	55	0	>100%
FAIRFIELD	673	47	74	0	>100%	730	51	80	0	>100%	1,974	138	217	976	14% - 22%
FAIRVIEW	4,644	325	511	365	89% - >100%	7,094	497	780	2,084	24% - 37%	7,083	496	779	2,992	17% - 26%
FARMERS BRANCH	9,041	633	995	419	>100%	9,911	694	1,090	2,234	31% - 49%	11,618	813	1,278	4,227	19% - 30%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
FARMERSVILLE	958	67	106	75	89% - >100%	2,299	161	253	675	24% - 37%	2,291	160	252	968	17% - 26%
FATE	1,731	121	190	136	89% - >100%	3,291	230	362	967	24% - 37%	7,797	546	858	3,294	17% - 26%
FERRIS	461	32	51	32	>100%	622	44	68	145	29% - 46%	2,205	154	243	1,439	11% - 17%
FILES VALLEY WSC	119	8	13	0	>100%	182	13	20	0	>100%	330	23	36	0	>100%
FLO COMMUNITY WSC	40	3	4	0	>100%	41	3	5	0	>100%	43	3	5	0	>100%
FLOWER MOUND	19,049	1,333	2,095	2,406	55% - 87%	23,022	1,612	2,532	8,162	20% - 31%	22,922	1,605	2,521	11,994	13% - 21%
FOREST HILL	1,362	95	150	11	>100%	1,445	101	159	456	22% - 35%	2,817	197	310	1,356	15% - 23%
FORNEY	3,191	223	351	251	89% - >100%	4,803	336	528	1,411	24% - 37%	11,227	786	1,235	5,774	14% - 21%
FORNEY LAKE WSC	896	63	99	70	90% - >100%	1,355	95	149	396	24% - 37%	3,824	268	421	1,616	17% - 26%
FORT WORTH CRU	187,763	13,143	20,654	6,982	>100%	284,675	19,927	31,314	87,673	23% - 36%	368,852	25,820	40,574	173,520	15% - 23%
FRISCO	41,595	2,912	4,575	5,332	55% - 86%	67,267	4,710	7,402	23,755	20% - 31%	67,167	4,702	7,388	31,641	15% - 23%
FROGNOT WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GAINESVILLE	2,492	174	274	0	>100%	2,659	186	292	0	>100%	4,663	326	513	1,477	22% - 35%
GARLAND	37,871	2,651	4,166	2,975	89% - >100%	37,508	2,626	4,126	11,018	24% - 37%	37,060	2,594	4,077	15,657	17% - 26%
GASTONIA SCURRY SUD	1,004	70	110	116	61% - 95%	1,533	107	169	476	22% - 35%	4,718	330	519	3,032	11% - 17%
GLENN HEIGHTS	2,062	144	226	100	>100%	3,293	231	362	721	32% - 50%	6,604	462	726	2,363	20% - 31%
GRAND PRAIRIE	35,194	2,464	3,871	5,414	46% - 72%	44,164	3,091	4,858	12,453	25% - 39%	43,845	3,069	4,823	17,951	17% - 27%
GRAPEVINE	18,467	1,293	2,031	505	>100%	20,725	1,451	2,280	3,793	38% - 60%	20,623	1,444	2,269	7,241	20% - 31%
GUNTER	355	25	39	0	>100%	624	44	69	269	16% - 26%	1,085	76	119	730	10% - 16%
HACKBERRY	309	22	34	24	90% - >100%	498	35	56	146	24% - 38%	908	64	100	384	17% - 26%
HALTOM CITY	5,285	370	581	44	>100%	5,306	372	584	1,680	22% - 35%	6,640	465	730	3,201	15% - 23%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unikey-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
HASLET	632	37	69	4	>100%	736	52	81	213	24% - 38%	2,539	178	279	1,194	15% - 23%
HEATH	3,945	276	434	310	89% - >100%	7,826	548	861	2,299	24% - 37%	7,815	547	860	3,302	17% - 26%
HICKORY CREEK SUD	36	3	4	0	>100%	40	3	4	6	47% - 73%	50	4	6	33	11% - 17%
HIGH POINT WSC	807	56	89	137	41% - 65%	1,176	82	129	468	18% - 28%	2,520	176	277	1,453	12% - 19%
HIGHLAND PARK	4,056	284	446	34	>100%	4,106	287	452	41	>100%	4,068	286	450	62	>100%
HIGHLAND VILLAGE	3,832	268	422	0	>100%	3,924	275	432	844	33% - 51%	3,893	273	428	1,377	20% - 31%
HILCO UNITED SERVICES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HONEY GROVE	274	19	30	0	>100%	274	19	30	0	-	271	19	30	0	-
HORSESHOE BEND WATER SYSTEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOWE	287	20	32	1	>100%	352	25	39	20	>100%	474	33	52	81	41% - 64%
HUDSON OAKS	458	32	50	0	>100%	779	55	86	0	>100%	795	56	87	227	25% - 39%
HURST	6,828	478	751	219	>100%	6,660	466	735	1,656	28% - 44%	6,590	461	725	2,784	17% - 26%
HUTCHINS	1,022	72	112	47	>100%	1,779	125	196	401	31% - 49%	2,952	207	325	1,074	19% - 30%
IRVING	56,135	3,929	6,175	12,866	31% - 48%	59,460	4,162	6,541	18,270	23% - 36%	58,992	4,129	6,489	19,613	21% - 33%
ITALY	314	22	35	0	>100%	473	33	52	159	21% - 33%	976	68	107	662	10% - 16%
JACKSBORO	681	48	75	0	>100%	719	50	79	0	>100%	740	52	81	7	>100%
JOHNSON COUNTY SUD	297	21	33	0	>100%	360	25	40	0	>100%	480	34	53	40	64% - >100%
JOSEPHINE	258	18	28	22	82% - >100%	519	36	57	152	24% - 38%	641	45	71	271	17% - 26%
JUSTIN	695	49	76	244	20% - 31%	1,733	121	191	672	18% - 28%	1,727	121	190	941	13% - 20%
KAUFMAN	990	69	109	79	88% - >100%	1,442	101	159	424	24% - 37%	3,406	238	375	1,440	17% - 26%
KAUFMAN COUNTY DEVELOPMENT DISTRICT 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unikey-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
KAUFMAN COUNTY MUD 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KELLER	12,162	853	1,340	223	>100%	12,906	903	1,420	4,064	22% - 35%	12,646	899	1,413	6,193	15% - 23%
KEMP	306	22	34	39	55% - 87%	456	32	50	141	23% - 36%	1,162	83	130	766	11% - 17%
KENNEDALE	1,413	99	156	0	>100%	1,840	129	202	211	61% - 96%	1,961	137	216	442	31% - 49%
KENTUCKYTOWN WSC	367	26	40	0	>100%	482	34	53	0	>100%	865	61	95	0	>100%
KERENS	206	14	23	0	>100%	231	16	25	92	18% - 28%	300	21	33	178	12% - 19%
KRUM	1,154	81	127	0	>100%	1,731	121	190	448	27% - 43%	2,997	210	330	1,515	14% - 22%
LADONIA	120	8	13	0	>100%	155	11	17	35	31% - 49%	209	15	23	89	16% - 26%
LAKE CITIES MUNICIPAL UTILITY AUTHORITY	2,140	150	235	1	>100%	2,715	190	299	880	22% - 34%	2,908	204	320	1,532	13% - 21%
LAKE KIOWA SUD	786	55	86	0	>100%	800	56	88	0	>100%	826	58	91	0	>100%
LAKE WORTH	1,137	80	126	21	>100%	1,363	95	150	322	30% - 47%	2,501	175	275	1,039	17% - 26%
LAKESIDE	227	16	25	0	>100%	234	16	26	0	>100%	239	17	26	0	>100%
LANCASTER	7,686	538	845	380	>100%	11,429	800	1,257	2,606	31% - 48%	15,216	1,065	1,674	5,574	19% - 30%
LEONARD	331	23	36	0	>100%	368	26	40	37	70% - >100%	452	32	50	121	26% - 41%
LEWISVILLE	20,143	1,410	2,216	936	>100%	25,330	1,773	2,786	5,990	30% - 47%	31,970	2,238	3,517	12,252	18% - 29%
LINDSAY	144	10	16	0	>100%	154	11	17	0	>100%	605	42	67	447	9% - 15%
LITTLE ELM	4,108	288	452	322	89% - >100%	4,586	321	504	1,347	24% - 37%	4,564	319	502	1,929	17% - 26%
LUCAS	2,132	149	235	168	89% - >100%	3,165	222	348	930	24% - 37%	3,896	273	429	1,646	17% - 26%
LUELLA SUD	400	28	44	0	>100%	490	34	54	0	>100%	657	46	76	0	>100%
M E N WSC	472	33	52	0	>100%	548	38	60	219	18% - 28%	712	50	78	422	12% - 19%
MABANK	783	55	86	0	>100%	1,012	71	111	207	34% - 54%	3,056	214	336	2,110	10% - 16%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
MACBEE SUD	18	1	2	0	>100%	28	2	3	0	>100%	49	3	5	0	>100%
MALAKOFF	272	19	30	0	>100%	265	19	29	5	>100%	307	21	34	28	77% - >100%
MANSFIELD	19,007	1,330	2,091	4,847	27% - 43%	26,478	1,853	2,913	11,316	16% - 26%	45,957	3,217	5,055	28,374	11% - 18%
MARILEE SUD	946	66	104	0	>100%	904	63	99	0	>100%	885	62	97	0	>100%
MARKOUT WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MCKINNEY	34,365	2,406	3,780	2,700	89% - >100%	59,112	4,138	6,502	17,363	24% - 37%	76,814	5,377	8,450	32,454	17% - 26%
MELISSA	1,535	107	169	105	>100%	2,869	201	316	785	26% - 40%	16,216	1,135	1,784	6,766	17% - 26%
MESQUITE	22,344	1,564	2,458	1,756	89% - >100%	26,361	1,845	2,900	7,743	24% - 37%	32,947	2,306	3,624	13,930	17% - 26%
MIDLOTHIAN	4,196	294	462	0	>100%	7,069	495	778	2,335	21% - 33%	10,995	770	1,209	6,376	12% - 19%
MILLIGAN WSC	222	16	24	17	91% - >100%	308	22	34	90	24% - 38%	306	21	34	129	17% - 26%
MINERAL WELLS	346	24	38	0	>100%	320	22	35	0	>100%	294	21	32	0	>100%
MOUNT ZION WSC	395	28	43	31	89% - >100%	589	41	65	173	24% - 37%	954	67	105	403	17% - 26%
MOUNTAIN PEAK SUD	1,671	117	184	154	76% - >100%	2,627	184	289	784	23% - 37%	4,820	337	530	2,580	13% - 21%
MOUNTAIN SPRINGS WSC	456	32	50	0	>100%	499	35	55	0	>100%	1,296	91	143	776	12% - 18%
MUENSTER	266	19	29	0	>100%	261	18	29	0	>100%	265	19	29	0	>100%
MURPHY	5,285	370	581	415	89% - >100%	5,238	367	576	1,539	24% - 37%	5,220	366	574	2,205	17% - 26%
MUSTANG SUD	3,648	255	401	3	>100%	8,411	589	925	2,563	23% - 36%	14,536	1,018	1,599	9,093	11% - 18%
NAVARRO MILLS WSC	352	25	39	0	>100%	398	28	44	0	>100%	513	36	56	99	36% - 57%
NEVADA WSC	96	7	11	6	84% - >100%	133	9	15	39	24% - 38%	2,368	166	260	1,000	17% - 26%
NEWARK	195	14	21	0	>100%	345	24	38	150	16% - 25%	858	60	94	663	9% - 14%
NORTH COLLIN SUD	1,407	98	155	141	70% - >100%	5,975	418	657	4,720	9% - 14%	20,464	1,434	2,253	19,031	8% - 12%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Unley-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
NORTH FARMERSVILLE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTH HUNT SUD	36	3	4	0	>100%	42	3	5	0	>100%	52	4	6	0	>100%
NORTH KAUFMAN WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTH RICHLAND HILLS	12,733	891	1,401	7,090	13% - 20%	13,172	922	1,449	6,863	13% - 21%	13,034	912	1,434	7,447	12% - 19%
NORTH RURAL WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTHLAKE	911	64	100	3	>100%	6,198	434	682	2,258	19% - 30%	10,986	769	1,208	6,386	12% - 19%
NORTHWEST GRAYSON COUNTY WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OAK RIDGE SOUTH GALE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OVILLA	1,080	76	119	50	>100%	1,682	118	185	379	31% - 49%	4,610	323	507	1,677	19% - 30%
PALMER	289	20	32	64	32% - 50%	432	30	48	214	14% - 22%	1,242	87	137	941	9% - 15%
PALOMA CREEK NORTH CRU	2,562	179	282	1	>100%	3,470	243	382	1,357	18% - 28%	3,464	242	381	2,282	11% - 17%
PALOMA CREEK SOUTH CRU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PANTEGO	621	43	68	0	>100%	601	42	66	0	>100%	596	42	65	0	>100%
PARKER	2,561	179	282	201	89% - >100%	8,454	592	930	5,651	10% - 16%	8,449	591	929	5,646	10% - 16%
PARKER COUNTY SUD	655	46	72	0	>100%	1,060	74	117	169	44% - 69%	1,983	139	218	1,092	13% - 20%
PELICAN BAY	106	7	12	0	>100%	110	8	12	0	>100%	116	8	13	0	>100%
PILOT POINT	891	62	98	0	>100%	1,449	101	159	347	29% - 46%	3,527	247	388	2,425	10% - 16%
PINK HILL WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLANO	69,020	4,831	7,592	5,422	89% - >100%	73,054	5,114	8,036	21,459	24% - 37%	73,059	5,114	8,036	30,066	17% - 26%
PLEASANT GROVE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POETRY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
POINT ENTERPRISE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PONDER	254	18	28	0	>100%	451	32	50	0	>100%	853	62	97	407	15% - 24%
POST OAK SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
POTTSBORO	491	34	54	0	>100%	751	53	83	164	32% - 50%	2,921	204	321	2,504	8% - 13%
PRINCETON	974	68	107	76	90% - >100%	1,566	110	172	460	24% - 37%	7,919	554	871	3,346	17% - 26%
PROSPER	5,322	373	585	418	89% - >100%	11,405	798	1,255	5,800	14% - 22%	17,809	1,226	1,926	11,904	10% - 16%
PROVIDENCE VILLAGE WCID	938	66	103	0	>100%	929	65	102	363	18% - 28%	925	65	102	573	11% - 18%
R C H WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RED OAK	1,845	129	203	377	34% - 54%	2,750	193	303	695	22% - 34%	7,170	502	789	2,914	17% - 27%
RED RIVER AUTHORITY OF TEXAS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REMO (Parker)	172	12	19	0	>100%	178	12	20	0	>100%	193	14	21	4	>100%
RHOME	411	29	45	0	>100%	735	52	81	90	57% - 90%	2,011	141	221	906	14% - 22%
RICE WATER SUPPLY AND SEWER SERVICE	963	67	106	1	>100%	1,341	94	148	526	18% - 28%	2,254	158	248	1,344	12% - 18%
RICHARDSON	26,328	1,843	2,896	2,068	89% - >100%	27,364	1,915	3,010	8,036	24% - 37%	27,978	1,958	3,076	11,620	17% - 26%
RICHLAND HILLS	1,148	80	126	10	>100%	1,228	86	135	312	28% - 43%	1,700	119	187	703	17% - 27%
RIVER OAKS	850	60	94	0	>100%	790	55	87	155	36% - 56%	772	54	85	335	16% - 25%
ROANOKE	2,263	158	249	44	>100%	3,356	235	369	1,062	22% - 35%	3,348	234	368	1,614	15% - 23%
ROCKETT SUD	3,982	279	438	34	>100%	6,165	432	678	2,456	18% - 28%	12,162	853	1,340	8,156	10% - 16%
ROCKWALL	8,914	624	981	700	89% - >100%	13,526	947	1,488	3,976	24% - 37%	21,947	1,536	2,414	9,273	17% - 26%
ROSE HILL SUD	549	38	60	43	89% - >100%	790	55	87	232	24% - 37%	2,136	150	235	902	17% - 26%
ROWLETT	9,870	691	1,086	775	89% - >100%	10,348	724	1,138	3,040	24% - 37%	10,348	717	1,127	4,330	17% - 26%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
ROYSE CITY	1,218	86	134	95	90% - >100%	2,564	179	282	762	24% - 38%	9,943	696	1,094	4,201	17% - 26%
RUNAWAY BAY	350	25	39	0	>100%	428	30	47	84	36% - 56%	700	49	77	304	16% - 25%
SACHSE	5,179	363	570	407	89% - >100%	5,091	356	560	1,495	24% - 37%	5,062	354	557	2,139	17% - 26%
SAGINAW	3,148	220	346	26	>100%	3,876	271	426	1,227	22% - 35%	4,051	284	446	1,953	15% - 23%
SANGER	1,202	84	132	3	>100%	1,763	123	194	117	>100%	3,034	212	334	1,019	21% - 33%
SANSOM PARK	534	37	59	0	>100%	592	41	65	4	>100%	683	48	75	51	94% - >100%
SANTO SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SARDIS LONE ELM WSC	3,904	273	429	658	42% - 65%	5,824	408	641	2,250	18% - 28%	6,686	468	735	3,843	12% - 19%
SEAGOVILLE	2,062	144	227	832	17% - 27%	2,779	195	306	1,543	13% - 20%	3,571	250	393	2,761	9% - 14%
SEIS LAGOS UD	603	42	66	47	90% - >100%	596	42	66	175	24% - 37%	594	42	65	251	17% - 26%
SHERMAN	10,343	736	1,160	85	>100%	11,928	835	1,312	1,071	78% - >100%	24,600	1,736	2,726	11,616	15% - 23%
SOUTH ELLIS COUNTY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTH FREESTONE COUNTY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTH GRAYSON SUD	551	39	61	0	>100%	708	50	78	0	>100%	875	61	96	49	>100%
SOUTHLAKE	11,901	805	1,265	261	>100%	15,005	1,050	1,651	4,749	22% - 35%	21,642	1,515	2,381	10,434	15% - 23%
SOUTHMAYD	97	7	11	0	>100%	110	8	12	0	>100%	238	17	26	77	22% - 34%
SOUTHWEST FANNIN COUNTY SUD	859	39	61	0	>100%	763	53	84	153	35% - 55%	1,394	98	153	784	12% - 20%
SPRINGTOWN	577	40	63	142	28% - 45%	749	52	82	314	17% - 26%	743	52	82	321	16% - 25%
STARR WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUNNYVALE	2,357	165	259	185	89% - >100%	4,313	302	474	1,267	24% - 37%	5,957	417	655	2,517	17% - 26%
TALTY SUD	1,584	111	174	311	36% - 56%	2,083	146	229	829	18% - 28%	4,813	337	529	2,530	13% - 21%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Underlined - Retail / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
TEAGUE	380	27	42	0	>100%	515	36	57	0	>100%	899	63	99	218	29% - 45%
TERRELL	4,035	282	444	337	84% - >100%	5,636	605	950	3,289	18% - 29%	14,353	1,005	1,579	10,145	10% - 16%
THE COLONY	7,762	543	854	336	>100%	9,106	637	1,002	1,904	33% - 53%	9,841	689	1,083	3,262	21% - 33%
TIOGA	119	8	13	0	>100%	131	9	14	12	76% - >100%	608	43	67	489	9% - 14%
TOM BEAN	222	16	24	0	>100%	268	19	29	46	41% - 64%	536	38	59	316	12% - 19%
TRENTON	131	9	14	0	>100%	609	43	67	478	9% - 14%	1,733	121	191	1,602	8% - 12%
TRINIDAD	91	6	10	0	>100%	83	6	9	0	>100%	111	8	12	0	>100%
TROPHY CLUB MUD 1	6,125	429	674	233	>100%	6,075	425	668	1,923	22% - 35%	6,060	424	667	2,922	15% - 23%
TWO WAY SUD	710	50	78	0	>100%	1,060	74	117	350	21% - 33%	2,090	146	230	1,380	11% - 17%
UNIVERSITY PARK	7,422	534	838	63	>100%	7,427	520	817	74	>100%	7,370	516	811	147	>100%
VAN ALSTYNE	517	36	57	0	>100%	700	49	77	54	91% - >100%	3,243	227	357	1,435	16% - 25%
VENUS	16	1	2	16	7% - 11%	25	2	3	25	7% - 11%	45	3	5	45	7% - 11%
VERONA SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VIRGINIA HILL WSC	244	17	27	0	>100%	287	20	32	0	>100%	394	28	43	0	>100%
WALNUT CREEK SUD	1,745	122	192	0	>100%	2,386	167	262	0	>100%	5,835	408	642	0	>100%
WATAUGA	2,899	203	319	1,004	20% - 32%	2,707	189	298	1,281	15% - 23%	2,650	186	292	1,278	15% - 23%
WAXAHACHIE	6,672	467	734	0	>100%	9,320	652	1,025	723	90% - >100%	16,715	1,170	1,839	6,082	19% - 30%
WEATHERFORD	5,307	371	584	2,710	14% - 22%	7,273	509	800	3,116	16% - 26%	26,947	1,886	2,964	19,801	10% - 15%
WEST CEDAR CREEK MUD	2,234	156	246	303	52% - 81%	2,753	193	303	868	22% - 35%	5,470	383	602	3,664	10% - 16%
WEST LEONARD WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WEST WISE SUD	425	30	47	0	>100%	427	30	47	63	36% - 57%	464	32	51	204	16% - 25%

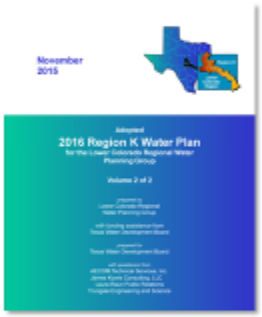
ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Underlined - Retail / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
WESTLAKE	1,388	97	153	25	>100%	3,007	210	331	952	22% - 35%	4,850	340	534	2,338	15% - 23%
WESTMINSTER WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WESTOVER HILLS	952	67	105	39	>100%	992	69	109	314	22% - 35%	1,056	74	116	510	15% - 23%
WESTWORTH VILLAGE	395	28	43	3	>100%	441	31	49	140	22% - 35%	530	37	58	256	14% - 23%
WHITE SETTLEMENT	2,061	146	229	17	>100%	2,146	150	236	350	43% - 67%	3,795	266	418	1,330	20% - 31%
WHITE SHED WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WHITESBORO	469	33	52	0	>100%	450	32	50	0	>100%	726	51	80	179	28% - 45%
WHITEWRIGHT	222	16	24	0	>100%	212	15	23	0	>100%	237	17	26	0	>100%
WILLOW PARK	759	53	83	2	>100%	1,074	75	118	317	24% - 37%	2,366	166	260	1,609	10% - 16%
WILMER	433	30	48	19	>100%	718	50	79	155	32% - 51%	3,763	263	414	1,359	19% - 30%
WOLFE CITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WOODBINE WSC	660	46	73	0	>100%	778	54	86	111	49% - 77%	1,004	70	110	337	21% - 33%
WORTHAM	165	12	18	11	>100%	179	13	20	22	57% - 90%	343	24	38	186	13% - 20%
WYLIE	7,308	512	804	574	89% - >100%	8,552	599	941	2,513	24% - 37%	9,519	666	1,047	4,022	17% - 26%
WYLIE NORTHEAST SUD	522	37	57	41	89% - >100%	718	50	79	211	24% - 37%	2,433	170	268	1,026	17% - 26%

Region K

INTRODUCTION

Information presented in the Region K Appendix comes from two primary sources: the 2015 Region K Water Plan and the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.



- Projected Municipal Demands
- Projected Municipal Needs
- Recommended Water Management Strategies

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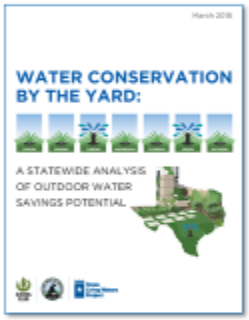


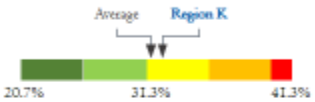
- Estimated savings from outdoor watering restrictions
- Single-family outdoor water use
- Daily household outdoor water use

With work on the 2021 Region K Water Plan already underway, the Region K Appendix serves as a planning tool to help inform the decisions of the Region K Water Planning Group. This document provides a summary of the estimated municipal savings from no more than twice per week watering restrictions to demonstrate how much further Region K can drive its municipal water conservation efforts during the next planning cycle.

OUTDOOR WATER USE METRICS
REGION K

31.5%

SINGLE-FAMILY OUTDOOR WATER USE AS A PERCENTAGE OF TOTAL HOUSEHOLD USE



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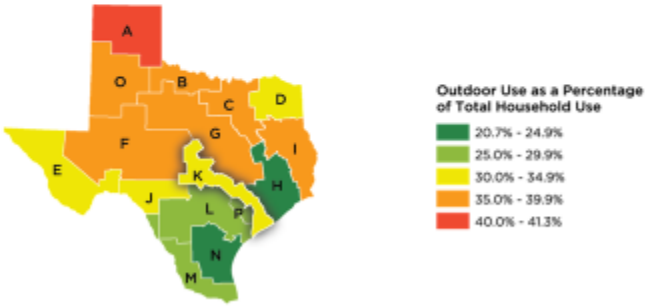
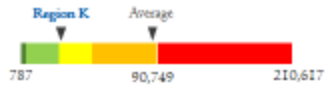


OUTDOOR WATER USE METRICS
REGION K

26,365 ac-feet/year

CURRENT SINGLE-FAMILY OUTDOOR WATER USE



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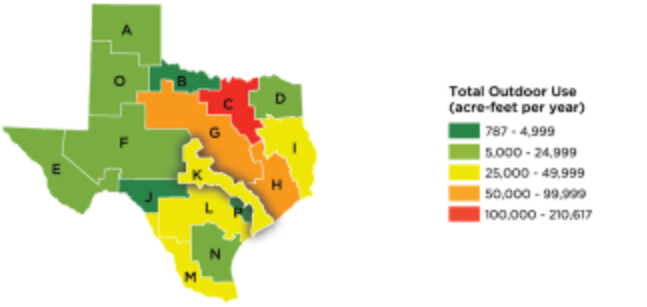
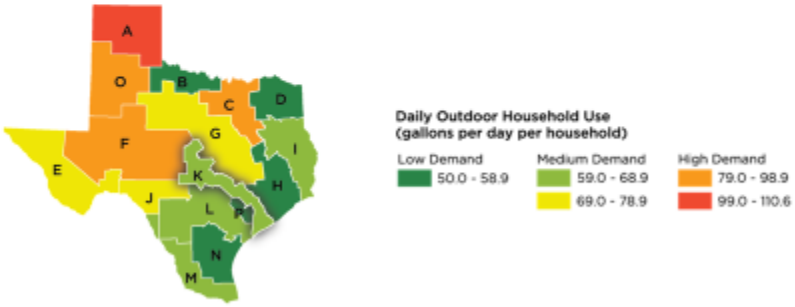


OUTDOOR WATER USE METRICS
REGION K

64.8 gal/day

DAILY HOUSEHOLD OUTDOOR WATER USE

STATEWIDE



ESTIMATED SAVINGS POTENTIAL
OF OUTDOOR WATERING RESTRICTIONS

LOW EFFORT

3.5%

of total municipal demand

HIGH EFFORT

8.5%

of total municipal demand

IMPORTANCE OF EDUCATION & ENFORCEMENT

For Region K, the estimated savings potential of twice per week outdoor watering restrictions ranges from 3.5 to 8.5 percent (of total municipal demand) – depending on the level of effort employed to implement the measure. Research indicates that education and enforcement have a direct impact on the effectiveness of outdoor watering restrictions. To achieve the greatest amount of water savings, robust education and enforcement mechanisms must be in place.

For additional information on how these savings percentages were determined, please see the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

ESTIMATED MUNICIPAL SAVINGS
FROM OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS BASED ON MUNICIPAL DEMANDS IDENTIFIED IN THE 2016 REGION K WATER PLAN

Planning Decade	Water Savings (ac-feet per year)*		Municipal Demand (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
Current	8,221	19,966	234,892
2020	10,730	26,058	306,560
2030	12,572	30,531	359,194
2040	14,412	35,000	411,761
2050	16,051	38,980	458,588
2060	17,675	42,926	505,009
2070	19,563	47,511	558,949

*Please note that these savings estimates are inclusive of the municipalities in Region K that already have watering restrictions in place.

KEY TAKEAWAYS

- The level of implementation effort (low or high) has a significant effect on the estimated municipal savings from outdoor watering restrictions. With more robust education and enforcement efforts, Region K can more than double its outdoor water savings.
- Water savings will increase in proportion to municipal population and demand growth given the coincidence of new housing stock, especially in the single-family sector where in-ground irrigation systems and turf grass have become increasingly prevalent.

MEETING FUTURE MUNICIPAL NEEDS
WITH OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS AS A PERCENTAGE OF MUNICIPAL NEEDS IDENTIFIED IN THE 2016 REGION K WATER PLAN

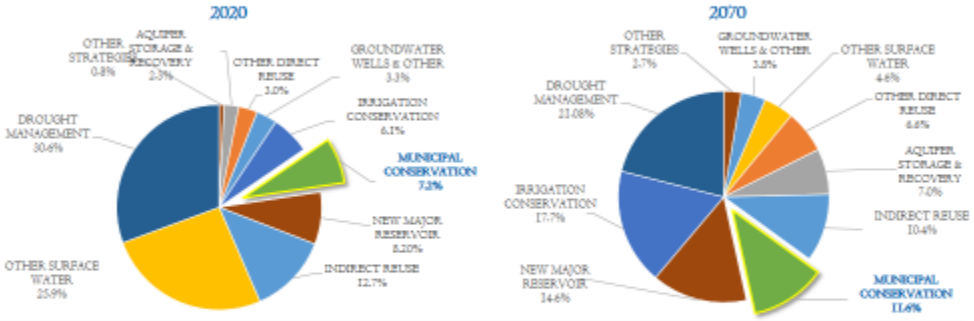
Planning Decade	Water Savings (ac-feet per year)		Municipal Needs (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
2020	>100%	>100%	7,881
2030	45%	>100%	28,176
2040	31%	76%	45,883
2050	24%	58%	67,359
2060	15%	36%	119,888
2070	11%	26%	182,173

KEY TAKEAWAYS

- Projected municipal savings from no more than twice per week watering restrictions are enough to satisfy a significant portion of municipal needs (i.e., the deficit between municipal demand and available supplies from existing sources) identified in the Region K Water Plan.
- The rapid increase in municipal needs through 2070 stems from projected population growth in the region and subsequent rise in municipal demand. This trend could lead to more savings opportunities as there will likely be a greater need for single-family residences, which typically use more water outdoors.
- Permanent watering restrictions have the potential to drastically cut future municipal demands, thereby enhancing the resiliency of future municipal supplies and reducing future municipal needs.

RECOMMENDED STRATEGIES
BASED ON THE 2016 REGION K WATER PLAN

SHARE OF WATER SUPPLIES FROM RECOMMENDED WATER MANAGEMENT STRATEGIES BY STRATEGY TYPE



KEY TAKEAWAYS

- Municipal conservation water management strategies will deliver fewer water supplies in 2020 and 2070 than other demand- and supply-side strategies, such as drought management and new major reservoir. Expected supplies from municipal conservation efforts will increase as a percent of total supplies from 2020 to 2070, though only marginally.
- Temporary outdoor watering restrictions are a key component of Region K's drought management strategy. As a conservation strategy, however, permanent outdoor watering restrictions can be more effective because they enable consistent customer messaging and drive savings over the long-term.

EXPANDING FUTURE SUPPLIES
WITH OUTDOOR WATERING RESTRICTIONS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL WATER MANAGEMENT STRATEGIES BY TYPE

Municipal WMS Type	Water Volume (ac-feet per year)	
	2020	2070
AQUIFER STORAGE & RECOVERY	10,000	52,100
DROUGHT MANAGEMENT	133,618	157,092
GROUNDWATER WELLS & OTHER	14,359	28,193
INDIRECT REUSE	55,221	77,213
IRRIGATION CONSERVATION	26,631	132,173
MUNICIPAL CONSERVATION	31,253	86,222
NEW MAJOR RESERVOIR	35,780	109,136
OTHER DIRECT REUSE	13,014	49,182
OTHER STRATEGIES	3,483	19,984
OTHER SURFACE WATER	113,044	34,005
TOTAL WATER VOLUME FROM RECOMMENDED WMSs	436,403	745,284
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	447,133 to 462,461	764,847 to 792,795
% INCREASE IN WATER VOLUME FROM ALL WMSs	2% to 6%	3% to 6%

KEY TAKEAWAYS

- Projected savings from no more than twice per week outdoor watering restrictions will increase total water supplies in 2020 and 2070 by upwards of 6 percent. Though this number seems small, it can be enough to delay entering drought stages. Proactive, ongoing measures like permanent restrictions help communities become better prepared for drought by reducing overall demands and stretching future water supplies.

OUTDOOR WATERING RESTRICTIONS
AS A MUNICIPAL CONSERVATION WMS

Region K's Conservation Targets:

- 1% per year GPCD reduction for water user groups with >200 GCPD
- 0.5% per year GPCD reduction for water user groups between 100 to 140 GPCD

WATER SUPPLY FROM RECOMMENDED MUNICIPAL CONSERVATION WATER MANAGEMENT STRATEGIES		
Municipal Conservation WMS Type	Water Volume (acre-feet per year)	
	2020	2070
GENERAL[a]	31,253	86,222
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	41,983 to 57,311	105,785 to 133,733
% INCREASE IN WATER VOLUME FROM MUNICIPAL CONSERVATION	34% - 83%	23% - 55%

[a]The Region K Water Plan identifies the following measures as general municipal conservation strategies: utility water loss audits & repair, smart meters/AMI, customer behavioral engagement software, **permanent water schedule (2 days per week)**, TCEQ 344 landscape irrigation standards for all new development, landscape standards for new development, landscape irrigation evaluations, and public outreach & education programs.

KEY TAKEAWAYS

- The conservation targets established by Region K underestimate the savings potential associated the wide mix of conservation strategies identified in the regional plan. Permanent outdoor watering restrictions alone can reduce municipal demands by 3.5 to 8.5 percent.
- Region K can more than double the supplies from municipal conservation water management strategies by encouraging all water user groups to adopt no more than twice per week outdoor watering restrictions supported by robust educational and enforcement mechanisms.

expensive supply-side water management strategies.

IMPLICATIONS FOR REGION K'S WATER PLANNING PROCESS

- Region K should place greater emphasis on proactive, ongoing municipal conservation efforts than temporary drought management strategies to help drive long-term savings
- Region K can capture these municipal water savings by identifying no more than twice per week watering restrictions as a standalone municipal conservation water management strategy
- To ensure a more robust conservation target, Region K should encourage WUGs to track and report their savings from outdoor watering restrictions
- Savings from outdoor watering restrictions can significantly reduce municipal water demand, which will in turn help close the gap between future municipal demand and future water supplies (i.e., municipal needs)
- Placing more emphasis on municipal water conservation WMSs, especially outdoor watering restrictions, can help Region K offset supply-side water management strategies requiring large capital investments

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
AQUA WSC	10,321	361	877	2,534	14% - 35%	16,681	584	1,418	7,145	8% - 20%	37,248	1,304	3,166	26,269	5% - 12%
AUSTIN	166,247	5,819	14,131	0	>100%	223,120	7,809	18,965	0	>100%	290,422	10,165	24,686	63,194	16% - 39%
BARTON CREEK WEST WSC	432	15	37	0	>100%	424	15	36	0	>100%	422	15	36	0	>100%
BARTON CREEK WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BASTROP	1,957	68	166	30	>100%	3,446	121	293	1,519	8% - 19%	6,317	291	707	6,390	5% - 11%
BASTROP COUNTY WCID 2	378	13	32	0	>100%	765	27	65	0	>100%	2,033	71	173	644	11% - 27%
BAY CITY	2,843	100	242	0	>100%	2,910	102	247	0	>100%	3,032	106	258	0	>100%
BERTRAM	410	14	35	40	36% - 87%	554	19	47	184	11% - 26%	728	25	62	358	7% - 17%
BLANCO	365	13	31	0	>100%	456	16	39	0	>100%	494	17	42	0	>100%
BOLING MWD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BRIARCLIFF	260	9	22	0	>100%	326	11	28	0	>100%	436	15	37	36	42% - >100%
BROOKESMITH SUD	8	0	1	0	>100%	8	0	1	0	>100%	8	0	1	0	>100%
BUDA	1,769	62	150	0	>100%	3,420	120	291	1,690	7% - 17%	7,336	257	624	6,066	4% - 10%
BURNET	1,848	65	157	0	>100%	2,502	88	213	0	>100%	3,291	116	280	0	>100%
CANEY CREEK MUD OF MATAGORDA COUNTY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CANYON LAKE WATER SERVICE	128	4	11	0	>100%	163	6	14	0	>100%	177	6	15	0	>100%
CEDAR PARK	2,432	85	207	505	17% - 41%	2,767	97	235	1,121	9% - 21%	2,760	97	235	1,194	8% - 20%
CHISHOLM TRAIL SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CIMARRON PARK WATER	249	9	21	0	>100%	234	8	20	0	>100%	229	8	19	0	>100%
COLUMBUS	1,135	40	96	0	>100%	1,186	42	101	36	>100%	1,313	46	112	163	28% - 68%
CORIX UTILITIES TEXAS INC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
COTTONWOOD CREEK MUD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COTTONWOOD SHORES	227	8	19	0	>100%	304	11	26	0	>100%	399	14	34	0	>100%
COUNTY-OTHER, BASTROP	1,573	56	139	361	16% - 44%	2,753	96	234	739	13% - 32%	5,634	197	479	1,490	13% - 32%
COUNTY-OTHER, BLANCO	964	34	82	0	>100%	1,191	42	101	0	>100%	1,286	45	109	55	82% - >100%
COUNTY-OTHER, BURNET	3,506	123	298	0	>100%	3,664	128	311	0	>100%	4,736	166	403	460	36% - 88%
COUNTY-OTHER, COLORADO	1,475	52	126	121	43% - >100%	1,489	52	127	130	40% - 97%	1,631	57	139	226	25% - 61%
COUNTY-OTHER, FAYETTE	1,236	43	105	272	16% - 39%	1,425	50	121	456	11% - 27%	1,615	57	137	639	9% - 21%
COUNTY-OTHER, GILLESPIE	1,823	64	156	0	>100%	1,962	69	167	0	>100%	2,291	80	195	0	>100%
COUNTY-OTHER, HAYS	3,327	116	283	0	>100%	4,957	173	421	530	33% - 79%	7,648	275	667	3,382	8% - 20%
COUNTY-OTHER, LLANO	610	21	52	0	>100%	553	19	47	0	>100%	500	18	43	0	>100%
COUNTY-OTHER, MATAGORDA	1,601	56	136	0	>100%	1,595	56	136	0	>100%	1,644	58	140	0	>100%
COUNTY-OTHER, MILLS	385	13	33	16	84% - >100%	379	13	32	14	95% - >100%	420	15	36	29	51% - >100%
COUNTY-OTHER, SAN SABA	316	11	27	0	>100%	314	11	27	0	>100%	322	11	27	0	>100%
COUNTY-OTHER, TRAVIS	8,471	296	720	0	>100%	7,067	247	601	25	>100%	3,070	107	261	66	>100%
COUNTY-OTHER, WHARTON	1,993	70	169	0	>100%	2,071	72	176	0	>100%	2,283	80	194	0	>100%
COUNTY-OTHER, WILLIAMSON	2,586	91	220	0	>100%	3,467	121	295	0	>100%	3,441	120	292	0	>100%
CREEDMOOR-MAHA WSC	678	24	58	0	>100%	813	28	69	43	66% - >100%	1,084	38	92	445	9% - 21%
CYPRESS RANCH WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEER CREEK RANCH WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DRIPPING SPRINGS WSC	1,012	35	86	0	>100%	1,471	51	125	104	50% - >100%	2,590	91	220	558	16% - 39%
EAGLE LAKE	523	18	44	0	>100%	528	18	45	0	>100%	579	20	49	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
EL CAMPO	6	0	1	0	>100%	6	0	1	0	>100%	6	0	1	0	>100%
ELGIN	1,549	54	132	472	11% - 28%	2,572	90	219	1,209	7% - 18%	5,624	197	478	4,124	5% - 12%
FAYETTE COUNTY WCID MONUMENT HILL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAYETTE WSC	737	26	64	0	>100%	893	31	76	0	>100%	1,017	36	86	0	>100%
FLATONIA	334	12	28	0	>100%	397	14	34	0	>100%	454	16	39	0	>100%
FREDERICKSBURG	3,146	110	267	0	>100%	3,476	122	295	0	>100%	4,056	142	345	222	64% - >100%
GARFIELD WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GOFORTH SUD	94	3	8	0	>100%	196	7	17	0	>100%	439	15	37	0	>100%
GOLDTHWAITE	361	13	31	48	26% - 64%	366	13	31	53	24% - 59%	407	14	35	94	15% - 37%
GRANITE SHOALS	653	23	56	0	>100%	868	30	74	38	80% - >100%	1,136	40	97	306	13% - 32%
HAYS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAYS COUNTY WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HAYS COUNTY WCID 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HORNSBY BEND UTILITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HORSESHOE BAY	2,601	91	221	0	>100%	3,236	113	275	495	23% - 56%	3,972	139	338	1,231	11% - 27%
HURST CREEK MUD	3,041	106	258	335	32% - 77%	3,516	123	299	818	15% - 37%	3,509	123	298	814	15% - 37%
JOHNSON CITY	354	12	30	46	26% - 63%	444	16	38	136	11% - 27%	451	17	41	175	10% - 23%
JONESTOWN WSC	408	14	35	93	15% - 37%	448	16	38	133	12% - 29%	521	18	44	206	9% - 21%
KELLY LANE WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KEMPNER WSC	135	5	11	0	>100%	181	6	15	0	>100%	237	8	20	0	>100%
KINGSLAND WSC	952	33	81	0	>100%	1,063	37	90	0	>100%	1,198	42	102	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
LA GRANGE	865	30	74	0	>100%	1,020	36	87	0	>100%	1,162	41	99	0	>100%
LAGO VISTA	1,668	65	159	0	>100%	2,466	87	211	0	>100%	3,428	120	291	0	>100%
LAKEWAY MUD	5,365	188	458	1,134	17% - 40%	7,016	246	597	2,767	9% - 22%	7,004	245	595	2,753	9% - 22%
LEANDER	1,134	40	96	0	>100%	5,020	176	427	3,282	5% - 13%	5,878	206	500	4,937	4% - 10%
LEE COUNTY WSC	251	9	21	0	>100%	343	12	29	0	>100%	356	21	50	0	>100%
LLANO	862	30	73	445	7% - 16%	878	31	75	461	7% - 16%	913	32	78	496	6% - 16%
LOOP 360 WSC	1,174	41	100	0	>100%	1,264	44	107	14	>100%	1,407	49	120	157	31% - 76%
MANOR	1,141	40	97	0	>100%	1,959	69	167	0	>100%	3,183	111	271	867	13% - 31%
MANVILLE WSC	2,954	104	254	0	>100%	4,201	147	357	0	>100%	6,074	213	516	2,346	9% - 22%
MARBLE FALLS	2,332	82	198	0	>100%	4,839	169	411	1,089	16% - 38%	6,386	224	543	2,636	8% - 21%
MARKHAM MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MATAGORDA COUNTY WCID 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MATAGORDA WASTE DISPOSAL & WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEADOWLAKES MUD	849	30	72	207	14% - 35%	1,167	41	99	525	8% - 19%	1,535	54	131	896	6% - 15%
NORTH AUSTIN MUD 1	856	30	73	0	>100%	803	28	68	0	>100%	786	28	67	0	>100%
NORTH SAN SABA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTHTOWN MUD	691	24	59	0	>100%	898	31	76	0	>100%	1,203	42	102	0	>100%
OAK SHORES WATER SYSTEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PALACIOS	679	24	58	0	>100%	694	24	59	0	>100%	716	25	61	0	>100%
PFLUGERVILLE	8,787	308	747	416	74% - >100%	14,612	511	1,242	6,241	8% - 20%	23,284	815	1,979	14,954	5% - 13%
POLONIA WSC	29	1	2	0	>100%	45	2	4	0	>100%	99	3	8	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
RANCHO DEL LAGO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RICHLAND SUD	168	6	14	0	>100%	169	6	14	0	>100%	172	6	15	0	>100%
ROLLINGWOOD	364	13	33	0	>100%	376	13	32	376	4% - 9%	376	13	32	376	4% - 9%
ROUND ROCK	265	9	23	0	>100%	336	12	29	126	9% - 23%	448	16	38	323	5% - 12%
SAN SABA	1,136	40	97	66	45% - >100%	1,174	41	100	124	33% - 80%	1,202	42	102	152	28% - 67%
SCHULENBURG	735	26	62	0	>100%	878	31	75	142	22% - 53%	1,003	35	85	267	13% - 32%
SENNA HILLS MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHADY HOLLOW MUD	779	27	66	0	>100%	741	26	63	0	>100%	730	26	62	0	>100%
SMITHVILLE	842	29	72	0	>100%	1,365	48	116	0	>100%	3,201	112	272	721	16% - 38%
SUNRISE BEACH VILLAGE	74	3	6	0	>100%	70	2	6	0	>100%	68	2	6	0	>100%
SUNSET VALLEY	386	14	33	0	>100%	606	21	52	0	>100%	934	33	79	0	>100%
TRAVIS COUNTY MUD 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRAVIS COUNTY MUD 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRAVIS COUNTY MUD 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRAVIS COUNTY MUD 4	2,611	91	222	0	>100%	3,357	119	285	0	>100%	4,533	159	385	710	22% - 54%
TRAVIS COUNTY WCID 10	3,692	129	314	0	>100%	4,254	149	362	4,254	4% - 9%	5,151	180	438	5,151	4% - 9%
TRAVIS COUNTY WCID 17	8,451	296	718	302	98% - >100%	11,017	386	936	2,565	13% - 33%	11,842	414	1,007	3,493	11% - 27%
TRAVIS COUNTY WCID 18	1,123	39	95	0	>100%	1,407	49	120	0	>100%	1,867	65	159	131	50% - >100%
TRAVIS COUNTY WCID 19	495	17	42	0	>100%	494	17	42	0	>100%	493	17	42	0	>100%
TRAVIS COUNTY WCID 20	590	21	50	0	>100%	584	20	50	0	>100%	582	20	49	0	>100%
TRAVIS COUNTY WCID POINT VENTURE	347	12	29	0	>100%	534	19	45	174	11% - 26%	815	29	69	455	6% - 15%

Region H

INTRODUCTION

Information presented in the Region H Appendix comes from two primary sources: the 2016 Region H Water Plan and the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

- Projected Municipal Demands
- Projected Municipal Needs
- Recommended Water Management Strategies

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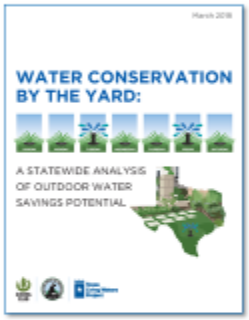


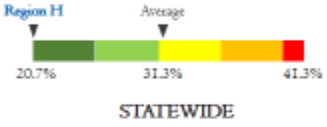
- Estimated savings from outdoor watering restrictions
- Single-family outdoor water use
- Daily household outdoor water use

With work on the 2021 Region H Water Plan already underway, the Region H Appendix serves as a planning tool to help inform the decisions of the Region H Water Planning Group. This document provides a summary of the estimated municipal savings from no more than twice per week watering restrictions to demonstrate how much further Region H can drive its municipal water conservation efforts during the next planning cycle.

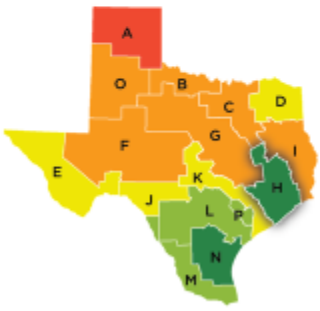
OUTDOOR WATER USE METRICS
REGION H

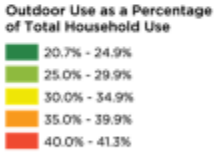
20.7%

SINGLE-FAMILY OUTDOOR WATER USE AS A PERCENTAGE OF TOTAL HOUSEHOLD USE



STATEWIDE

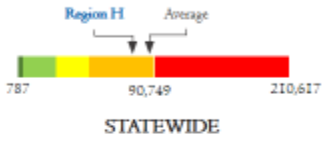


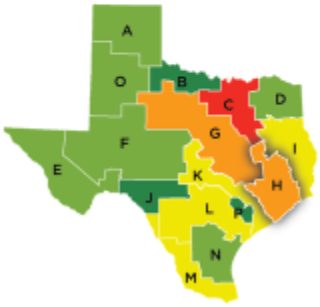


OUTDOOR WATER USE METRICS
REGION H

82,849 ac-feet/year

CURRENT SINGLE-FAMILY OUTDOOR WATER USE





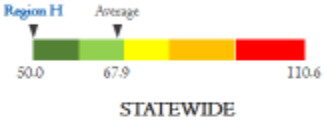
Total Outdoor Use (acre-feet per year)

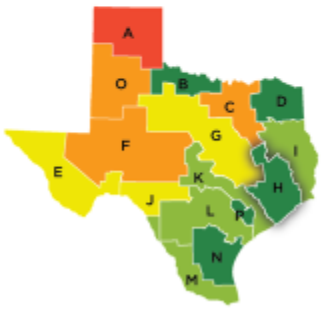
- 787 - 4,999
- 5,000 - 24,999
- 25,000 - 49,999
- 50,000 - 99,999
- 100,000 - 210,617

OUTDOOR WATER USE METRICS
REGION H

50.0 gal/day

DAILY HOUSEHOLD OUTDOOR WATER USE

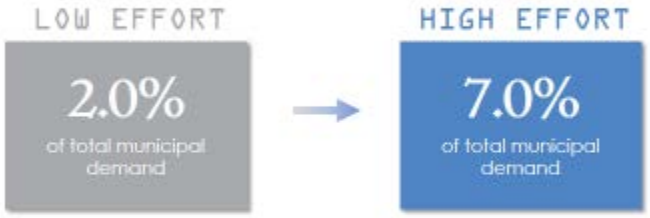




Daily Outdoor Household Use (gallons per day per household)

Low Demand	Medium Demand	High Demand
50.0 - 58.9	59.0 - 68.9	79.0 - 98.9
	69.0 - 78.9	99.0 - 110.6

ESTIMATED SAVINGS POTENTIAL
OF OUTDOOR WATERING RESTRICTIONS



IMPORTANCE OF EDUCATION & ENFORCEMENT

For Region H, the estimated savings potential of twice per week outdoor watering restrictions ranges from 2 to 7 percent (of total municipal demand) – depending on the level of effort employed to implement the measure. Research indicates that education and enforcement have a direct impact on the effectiveness of outdoor watering restrictions. To achieve the greatest amount of water savings, robust education and enforcement mechanisms must be in place.

For additional information on how these savings percentages were determined, please see the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

ESTIMATED MUNICIPAL SAVINGS
FROM OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS BASED ON MUNICIPAL DEMANDS IDENTIFIED IN THE 2016 REGION H WATER PLAN

Planning Decade	Water Savings (ac-feet per year)*		Municipal Demand (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
Current	19,601	68,604	980,056
2020	25,146	88,009	1,257,276
2030	27,558	96,452	1,377,892
2040	29,838	104,432	1,491,882
2050	32,271	112,950	1,613,566
2060	34,961	122,364	1,748,052
2070	37,868	132,538	1,893,397

*Please note that these savings estimates are inclusive of the municipalities in Region H that already have watering restrictions in place.

KEY TAKEAWAYS

- The level of implementation effort (low or high) has a significant effect on the estimated municipal savings from outdoor watering restrictions. With more robust education and enforcement efforts, Region H can nearly double its outdoor water savings.
- Water savings will increase in proportion to municipal population and demand growth given the coincidence of new housing stock, especially in the single-family sector where in-ground irrigation systems and turf grass have become increasingly prevalent.

MEETING FUTURE MUNICIPAL NEEDS
WITH OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS AS A PERCENTAGE OF MUNICIPAL NEEDS IDENTIFIED IN THE 2016 REGION H WATER PLAN

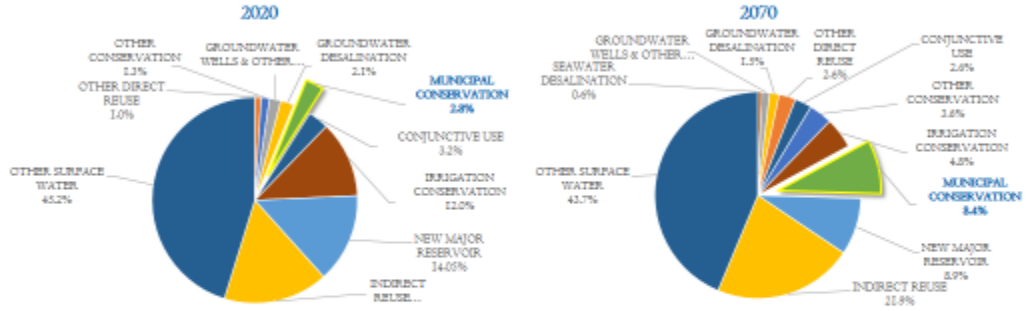
Planning Decade	Water Savings (ac-feet per year)		Municipal Needs (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
2020	18%	62%	141,908
2030	9%	31%	310,606
2040	7%	25%	420,866
2050	6%	22%	523,604
2060	5%	18%	635,865
2070	5%	17%	760,957

KEY TAKEAWAYS

- Projected municipal savings from no more than twice per week watering restrictions are enough to satisfy a significant portion of municipal needs (i.e., the deficit between municipal demand and available supplies from existing sources) identified in the Region H Water Plan.
- The rapid increase in municipal needs through 2070 stems from projected population growth in the region and subsequent rise in municipal demand. This trend could lead to more savings opportunities as there will likely be a greater need for single-family residences, which typically use more water outdoors.
- Permanent watering restrictions have the potential to drastically cut future municipal demands, thereby enhancing the resiliency of future municipal supplies and reducing future municipal needs.

RECOMMENDED STRATEGIES
BASED ON THE 2016 REGION H WATER PLAN

SHARE OF WATER SUPPLIES FROM RECOMMENDED WATER MANAGEMENT STRATEGIES BY STRATEGY TYPE



KEY TAKEAWAYS

- Municipal conservation accounts for a small share of the recommended water management strategies in Region H, which is dominated by supply-side options such as surface water, indirect reuse, and new major reservoirs. The share of water supplies coming from municipal conservation does, however, quadruple between 2020 and 2070.
- Proactive, ongoing municipal conservation efforts represent the most cost-effective strategy for ensuring Region H has adequate supplies of water to meet growing municipal demands. Region H must set higher targets to ensure municipal conservation remains an integral component of the region's future water management approach.

EXPANDING FUTURE SUPPLIES
WITH OUTDOOR WATERING RESTRICTIONS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL WATER MANAGEMENT STRATEGIES BY TYPE		
Municipal WMS Type	Water Volume (ac-feet per year)	
	2020	2070
CONJUNCTIVE USE	23,212	47,310
GROUNDWATER DESALINATION	14,740	26,642
GROUNDWATER WELLS & OTHER	12,856	21,875
INDIRECT REUSE	117,921	392,638
IRRIGATION CONSERVATION	86,123	86,123
MUNICIPAL CONSERVATION	20,364	150,660
NEW MAJOR RESERVOIR	100,611	159,819
OTHER CONSERVATION	9,281	65,261
OTHER DIRECT REUSE	7,214	47,270
OTHER SURFACE WATER	323,660	782,145
SEAWATER DESALINATION	-	11,200
TOTAL WATER VOLUME FROM RECOMMENDED WMSs	715,982	1,790,943
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	741,128 to 803,991	1,828,811 to 1,923,481
% INCREASE IN WATER VOLUME FROM ALL WMSs	4% to 12%	2% to 7%

KEY TAKEAWAYS

- Region H can bolster its long-term municipal conservation efforts through permanent outdoor watering restrictions. Doing so will help reduce the region's reliance upon expensive supply-side water management strategies and stretch future water supplies even further.

OUTDOOR WATERING RESTRICTIONS
AS A MUNICIPAL CONSERVATION WMS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL CONSERVATION WATER MANAGEMENT STRATEGIES		
Municipal Conservation WMS Type	Water Volume (acre-feet per year)	
	2020	2070
GENERAL*	9,052	101,203
WATER LOSS CONTROL	11,312	49,457
TOTAL WATER VOLUME FROM RECOMMENDED MUNICIPAL CONSERVATION WMSs	20,364	150,660
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	45,510 to 108,373	188,528 to 283,198
% INCREASE IN WATER VOLUME FROM MUNICIPAL CONSERVATION	>100%	25% to 88%

*Region H's 2016 Regional Water Plan identifies the following measures as general municipal conservation strategies: efficient residential irrigation controllers, efficient meter installations, tank-type ultra-low-flow toilet rebates, efficient commercial dishwashers, efficient commercial spray-rinse valves, efficient commercial steamers, efficient commercial cooking towers, large landscape surveys for single-family residences, large landscape water budgets for single-family residences, large landscape irrigation controllers for single-family residences, **outdoor watering restrictions (2x per week)**, and customer behavioral engagement software

KEY TAKEAWAYS

- No more than twice per week outdoor watering restrictions can yield significant water savings even in areas with higher annual precipitation rates like Region H. It is especially critical in this region given its projected population growth and the prevalence of in-ground irrigation systems in single-family homes.
- Region H can double the supplies from municipal conservation water management strategies by encouraging all water user groups to adopt permanent outdoor watering restrictions supported by robust educational and enforcement mechanisms.

expensive supply-side water management strategies.

IMPLICATIONS FOR REGION H'S WATER PLANNING PROCESS

- Region H can do even more to promote proactive, ongoing municipal conservation efforts
- Region H can drive deeper municipal water savings by identifying no more than twice per week watering restrictions as a standalone municipal conservation water management strategy
- To ensure a more robust conservation target, Region H should encourage WUGs to track and report their savings from outdoor watering restrictions
- Savings from outdoor watering restrictions can significantly reduce municipal water demand, which will in turn help close the gap between future municipal demand and future water supplies (i.e., municipal needs)
- Placing more emphasis on municipal water conservation WMSs, especially outdoor watering restrictions, can help Region H offset supply-side water management strategies requiring large capital investments

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
ALVIN	4,644	93	326	0	>100%	5,161	103	361	0	>100%	6,983	140	489	0	>100%
ANAHUAC	267	5	19	0	>100%	255	5	18	0	>100%	261	5	18	0	>100%
ANGLETON	1,964	39	137	0	>100%	1,835	37	128	0	>100%	1,830	37	128	0	>100%
BAOLIFF MUD	539	11	38	0	>100%	506	10	36	0	>100%	528	11	37	0	>100%
BAKER ROAD MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAYBROOK MUD 1	171	3	12	7	50% - >100%	191	4	13	35	11% - 38%	229	5	16	71	6% - 23%
BAYTOWN	10,150	203	711	0	>100%	10,062	202	706	0	>100%	10,765	215	754	0	>100%
BAYVIEW MUD	339	7	24	172	4% - 14%	455	9	32	277	3% - 11%	486	10	34	308	3% - 11%
BELLAIRE	3,804	76	266	305	25% - 87%	4,329	87	303	82	>100%	5,514	110	386	217	51% - >100%
BELLVILLE	1,217	24	85	0	>100%	1,366	27	96	0	>100%	1,722	34	121	0	>100%
BLUE BELL MANOR UTILITY	646	13	45	259	5% - 17%	681	14	48	382	4% - 12%	766	16	55	505	3% - 11%
BLUE RIDGE WEST MUD	931	19	65	6	>100%	1,289	26	90	390	7% - 23%	1,633	33	114	692	5% - 17%
BOLIVAR PENINSULA SUD	195	4	14	0	>100%	277	6	19	0	>100%	460	9	32	0	>100%
BRAZORIA	318	6	22	0	>100%	309	6	22	0	>100%	316	6	22	0	>100%
BRAZORIA COUNTY MUD 2	2,199	44	154	0	>100%	2,185	44	153	0	>100%	2,164	44	153	0	>100%
BRAZORIA COUNTY MUD 21	549	11	38	0	>100%	610	12	43	0	>100%	724	14	51	0	>100%
BRAZORIA COUNTY MUD 25	1,380	28	97	0	>100%	2,954	59	207	1,223	5% - 17%	6,065	121	425	4,335	3% - 10%
BRAZORIA COUNTY MUD 3	566	11	40	0	>100%	560	11	39	0	>100%	584	12	41	0	>100%
BRAZORIA COUNTY MUD 31	292	6	20	0	>100%	361	8	27	0	>100%	506	10	36	0	>100%
BRAZORIA COUNTY MUD 6	681	14	48	0	>100%	676	14	47	0	>100%	680	14	48	0	>100%
BROOKSHIRE MWD	663	13	46	0	>100%	921	18	64	0	>100%	1,460	29	102	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
BUFFALO	374	7	26	0	>100%	375	8	26	0	>100%	397	8	28	0	>100%
BUNKER HILL VILLAGE	1,626	33	114	130	25% - 88%	1,656	37	130	35	>100%	2,323	46	163	92	51% - >100%
BUTLER WSC	74	1	5	0	>100%	70	1	5	0	>100%	70	1	5	0	>100%
CAPE ROYALE UD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CENTERVILLE	180	4	13	0	>100%	195	4	14	0	>100%	230	5	16	0	>100%
CENTRAL HARRIS COUNTY REGIONAL WATER AUTHORITY CRU	4,789	96	336	407	24% - 82%	5,288	106	370	1,956	5% - 19%	5,998	120	420	2,661	5% - 16%
CHAMBERS COUNTY MUD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHIMNEY HILL MUD	563	12	41	159	7% - 26%	559	11	39	6	>100%	573	11	40	18	64% - >100%
CLEAR BROOK CITY MUD	1,649	33	115	0	>100%	1,772	35	124	0	>100%	2,052	41	144	0	>100%
CLEAR LAKE CITY WATER AUTHORITY (TAYLOR LAKE VILLAGE ONLY)	657	13	46	0	>100%	643	13	45	0	>100%	653	13	46	0	>100%
CLEVELAND	1,557	31	109	0	>100%	1,541	31	108	0	>100%	1,598	32	112	0	>100%
CLUTE	1,476	30	103	28	>100%	1,486	30	104	71	42% - >100%	1,631	33	114	180	18% - 63%
CONCORD-ROBBINS WSC	213	4	15	0	>100%	216	4	15	0	>100%	253	5	18	0	>100%
CONROE	13,336	267	934	604	44% - >100%	17,863	357	1,250	5,131	7% - 24%	24,564	491	1,719	11,832	4% - 15%
CORINTHIAN POINT MUD 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COUNTRY TERRACE WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COUNTY-OTHER, AUSTIN	2,563	51	179	23	>100%	3,401	68	238	182	37% - >100%	5,282	106	370	1,496	7% - 25%
COUNTY-OTHER, BRAZORIA	17,106	342	1,197	4,825	7% - 25%	25,676	514	1,797	12,491	4% - 14%	40,669	813	2,847	27,181	3% - 10%
COUNTY-OTHER, CHAMBERS	1,816	36	127	31	>100%	2,460	49	172	136	36% - >100%	3,661	74	256	337	22% - 76%

ESTIMATED MUNICIPAL SAVINGS by WUG

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		Low	High				Low	High				Low	High		
COUNTY-OTHER, FORT BEND	26,345	527	1,844	8,055	7% - 23%	37,764	755	2,643	18,614	4% - 14%	78,671	1,573	5,507	52,411	3% - 11%
COUNTY-OTHER, GALVESTON	2,559	51	179	2,040	3% - 9%	2,928	59	205	2,375	2% - 9%	3,490	70	244	2,922	2% - 8%
COUNTY-OTHER, HARRIS	34,106	682	2,387	2,016	34% - >100%	41,113	822	2,878	2,625	31% - >100%	50,653	1,014	3,545	3,720	27% - 95%
COUNTY-OTHER, LEON	681	14	48	0	>100%	753	15	53	0	>100%	943	19	66	0	>100%
COUNTY-OTHER, LIBERTY	5,340	107	374	9	>100%	5,665	113	397	45	>100%	6,537	131	458	765	17% - 59%
COUNTY-OTHER, MADISON	1,808	36	127	0	>100%	1,972	39	138	0	>100%	2,307	46	161	14	>100%
COUNTY-OTHER, MONTGOMERY	35,967	719	2,518	11,787	6% - 21%	69,071	1,381	4,835	44,891	3% - 11%	153,912	3,078	10,774	129,732	2% - 8%
COUNTY-OTHER, POLK	1,942	39	136	0	>100%	2,131	43	149	0	>100%	2,381	48	167	0	>100%
COUNTY-OTHER, SAN JACINTO	2,075	42	145	0	>100%	2,346	47	164	0	>100%	2,760	55	193	0	>100%
COUNTY-OTHER, TRINITY	214	4	15	0	>100%	218	4	15	0	>100%	232	5	16	0	>100%
COUNTY-OTHER, WALKER	3,232	65	226	0	>100%	3,216	64	225	0	>100%	3,274	65	229	0	>100%
COUNTY-OTHER, WALLER	3,197	64	224	6	>100%	4,368	87	306	71	>100%	6,790	136	475	1,665	8% - 28%
CROSBY MUD	313	6	22	0	>100%	322	6	23	0	>100%	338	7	24	0	>100%
CUT & SHOOT	116	2	8	0	>100%	134	3	9	0	>100%	235	5	16	55	9% - 30%
DAISETTA	128	3	9	0	>100%	148	3	10	0	>100%	186	4	13	0	>100%
DANBURY	176	4	12	0	>100%	163	3	11	0	>100%	159	3	11	0	>100%
DAYTON	2,273	45	159	0	>100%	3,500	70	245	0	>100%	5,280	106	370	0	>100%
DEER PARK	4,288	86	300	172	50% - >100%	4,408	88	309	42	>100%	4,776	96	334	94	>100%
DEVERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOBBIN PLANTERSVILLE WSC	642	13	45	216	6% - 21%	1,117	22	78	691	3% - 11%	2,614	52	183	2,188	2% - 8%
DODGE OAKHURST WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
DOMESTIC WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DOUGLAS UTILITY	176	4	12	102	3% - 12%	160	3	11	131	2% - 9%	162	3	11	136	2% - 8%
EAST PLANTATION UD	212	4	15	31	14% - 48%	244	5	17	63	8% - 27%	331	7	23	150	4% - 15%
EL DORADO UD	260	5	18	104	5% - 18%	256	5	18	139	4% - 13%	264	5	18	159	3% - 12%
FAR HILLS UD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FIRST COLONY MUD 9	1,024	20	72	7	>100%	1,418	28	99	429	7% - 23%	1,796	36	126	761	5% - 17%
FLO COMMUNITY WSC	297	6	21	0	>100%	276	6	19	0	>100%	284	6	20	0	>100%
FOREST HILLS MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY FWSD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY FWSD 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 115	212	4	15	1	>100%	293	6	21	69	7% - 23%	371	7	26	157	5% - 17%
FORT BEND COUNTY MUD 116	880	12	41	304	4% - 13%	767	15	54	566	3% - 9%	1,031	21	72	815	3% - 9%
FORT BEND COUNTY MUD 121	394	8	28	0	>100%	496	10	35	24	42% - >100%	730	15	51	233	6% - 22%
FORT BEND COUNTY MUD 129	664	13	46	0	>100%	1,211	24	86	546	4% - 16%	1,587	32	111	906	4% - 12%
FORT BEND COUNTY MUD 140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 156	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 187	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
FORT BEND COUNTY MUD 23	1,318	26	92	421	6% - 22%	1,428	29	100	797	4% - 13%	1,556	31	109	1,022	3% - 11%
FORT BEND COUNTY MUD 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 25	1,212	24	85	230	11% - 37%	1,200	24	84	451	5% - 17%	1,250	25	88	563	4% - 15%
FORT BEND COUNTY MUD 26	556	11	39	4	>100%	770	15	54	233	7% - 23%	975	20	68	413	5% - 17%
FORT BEND COUNTY MUD 42	496	10	35	3	>100%	690	14	48	209	7% - 23%	874	17	61	370	5% - 17%
FORT BEND COUNTY MUD 46	237	5	17	2	>100%	328	7	23	99	7% - 23%	416	8	29	176	5% - 17%
FORT BEND COUNTY MUD 47	149	3	10	1	>100%	207	4	14	63	7% - 23%	262	5	18	111	5% - 17%
FORT BEND COUNTY MUD 48	250	5	18	2	>100%	346	7	24	106	7% - 23%	439	9	31	186	5% - 17%
FORT BEND COUNTY MUD 49	135	3	9	1	>100%	186	4	13	56	7% - 23%	236	5	17	100	5% - 17%
FORT BEND COUNTY MUD 5	158	3	11	82	4% - 13%	187	4	13	138	3% - 9%	222	4	16	175	3% - 9%
FORT BEND COUNTY MUD 69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FORT BEND COUNTY MUD 81	1,657	33	116	530	6% - 22%	1,899	38	133	658	6% - 20%	2,325	47	163	1,105	4% - 15%
FORT BEND COUNTY WCID 2	9,259	185	648	915	20% - 71%	11,311	226	792	3,980	6% - 20%	13,634	273	954	6,133	4% - 16%
FORT BEND COUNTY WCID 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FREEPORT	1,429	29	100	0	>100%	1,472	29	103	0	>100%	1,634	33	114	0	>100%
FRIENDSWOOD	6,982	140	489	0	>100%	8,123	162	569	0	>100%	10,238	205	717	0	>100%
FULSHEAR	1,376	28	96	441	6% - 22%	1,679	34	118	970	3% - 12%	1,967	39	138	1,337	3% - 10%
G & W WSC	450	9	32	0	>100%	758	15	53	0	>100%	1,363	27	95	0	>100%
GALENA PARK	842	17	59	0	>100%	779	16	55	0	>100%	805	16	56	0	>100%
GALVESTON	16,623	332	1,164	0	>100%	18,285	366	1,280	0	>100%	21,152	423	1,481	0	>100%
GALVESTON COUNTY FWSD 6	243	5	17	0	>100%	240	5	17	0	>100%	242	5	17	0	>100%

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		Low	High				Low	High				Low	High		
GALVESTON COUNTY MUD 12	276	6	19	0	>100%	265	5	19	0	>100%	262	5	18	0	>100%
GALVESTON COUNTY WCID 1	2,435	49	170	0	>100%	2,354	51	179	0	>100%	2,669	58	202	0	>100%
GALVESTON COUNTY WCID 12	1,404	28	98	656	4% - 15%	1,704	34	119	924	4% - 13%	1,779	36	125	993	4% - 13%
GALVESTON COUNTY WCID 8	1,695	34	119	641	5% - 19%	1,717	34	120	649	5% - 19%	1,870	37	131	793	5% - 17%
GLENDALE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GREATWOOD CRU	1,469	29	103	470	6% - 22%	1,477	30	103	803	4% - 13%	1,482	30	104	939	3% - 11%
GREEN TRAILS MUD	555	11	39	222	5% - 18%	547	11	38	296	4% - 13%	555	11	39	333	3% - 12%
GREENWOOD UD	359	7	25	29	25% - 87%	395	8	28	7	>100%	403	8	28	16	50% - >100%
GROVETON	70	1	5	0	>100%	70	1	5	0	>100%	73	1	5	0	>100%
GULF UTILITY	592	12	41	140	8% - 30%	657	13	46	206	6% - 22%	782	16	55	330	5% - 17%
HARDIN WSC	562	11	39	0	>100%	786	16	55	0	>100%	1,130	23	79	0	>100%
HARRIS COUNTY FWSD 1-A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY FWSD 27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY FWSD 58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 106	1,301	26	91	521	5% - 17%	1,364	27	95	765	4% - 12%	1,445	29	101	900	3% - 11%
HARRIS COUNTY MUD 11	332	7	23	128	5% - 18%	332	7	23	177	4% - 13%	364	7	25	220	3% - 12%
HARRIS COUNTY MUD 119	504	10	35	202	5% - 17%	484	10	34	260	4% - 13%	510	10	36	307	3% - 12%
HARRIS COUNTY MUD 122	148	3	10	1	>100%	204	4	14	62	7% - 23%	259	5	18	110	5% - 17%
HARRIS COUNTY MUD 132	895	18	63	360	5% - 17%	873	17	61	471	4% - 13%	851	18	62	524	3% - 12%
HARRIS COUNTY MUD 148	269	5	19	22	24% - 86%	274	5	19	5	>100%	278	6	19	11	51% - >100%
HARRIS COUNTY MUD 151	1,012	20	71	406	5% - 17%	1,003	20	70	546	4% - 13%	1,007	20	70	602	3% - 12%

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		Low	High				Low	High				Low	High		
HARRIS COUNTY MUD 152	1,107	22	77	444	5% - 17%	1,140	23	80	633	4% - 13%	1,198	24	84	739	3% - 11%
HARRIS COUNTY MUD 153	1,200	24	84	481	5% - 17%	1,177	24	82	636	4% - 13%	1,174	23	82	696	3% - 12%
HARRIS COUNTY MUD 154	746	15	52	299	5% - 17%	737	15	52	401	4% - 13%	790	16	55	483	3% - 11%
HARRIS COUNTY MUD 158	834	11	37	180	7% - 28%	505	10	36	10	>100%	497	10	35	20	50% - >100%
HARRIS COUNTY MUD 180	514	10	36	206	5% - 17%	553	11	39	313	4% - 13%	548	11	38	336	3% - 11%
HARRIS COUNTY MUD 189	357	7	25	143	5% - 17%	375	8	26	210	4% - 13%	417	8	29	264	3% - 11%
HARRIS COUNTY MUD 216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 221	399	8	28	160	5% - 17%	443	9	31	254	3% - 12%	484	10	34	310	3% - 11%
HARRIS COUNTY MUD 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 278	967	19	68	388	5% - 17%	1,265	25	89	773	3% - 11%	1,260	25	88	825	3% - 11%
HARRIS COUNTY MUD 290	609	12	43	244	5% - 17%	658	13	46	373	4% - 12%	708	14	49	443	3% - 11%
HARRIS COUNTY MUD 321	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 342	628	13	44	25	50% - >100%	701	14	49	129	11% - 38%	840	17	59	359	6% - 23%
HARRIS COUNTY MUD 344	588	12	41	23	50% - >100%	656	13	46	121	11% - 38%	786	16	55	243	6% - 23%
HARRIS COUNTY MUD 345	786	16	55	315	5% - 17%	779	16	55	424	4% - 13%	784	16	55	465	3% - 12%
HARRIS COUNTY MUD 36	349	7	24	14	50% - >100%	389	8	27	72	11% - 38%	467	9	33	144	6% - 23%
HARRIS COUNTY MUD 361	649	13	45	26	50% - >100%	725	14	51	134	11% - 38%	868	17	61	268	6% - 23%
HARRIS COUNTY MUD 372	913	18	64	36	50% - >100%	1,019	20	71	188	11% - 38%	1,221	24	85	377	6% - 23%
HARRIS COUNTY MUD 386	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 400	785	16	55	315	5% - 17%	885	18	62	512	3% - 12%	956	19	67	614	3% - 11%
HARRIS COUNTY MUD 412	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
HARRIS COUNTY MUD 420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 46	664	13	46	266	5% - 17%	640	13	45	344	4% - 13%	633	13	44	371	3% - 12%
HARRIS COUNTY MUD 49	456	9	32	41	22% - 78%	472	9	33	22	43% - >100%	492	10	34	46	21% - 75%
HARRIS COUNTY MUD 5	508	10	36	143	7% - 25%	522	10	37	10	>100%	614	12	43	24	51% - >100%
HARRIS COUNTY MUD 50	273	5	19	0	>100%	265	5	19	0	>100%	268	5	19	0	>100%
HARRIS COUNTY MUD 55	1,442	29	101	0	>100%	1,480	30	104	0	>100%	1,625	32	128	0	>100%
HARRIS COUNTY MUD 58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY MUD 8	465	10	34	39	25% - 87%	443	9	31	6	>100%	440	9	31	17	52% - >100%
HARRIS COUNTY MUD 96	582	12	41	163	7% - 25%	625	13	44	12	>100%	738	15	52	29	51% - >100%
HARRIS COUNTY UD 14	204	4	14	82	5% - 17%	243	5	17	143	3% - 12%	337	7	24	234	3% - 10%
HARRIS COUNTY UD 15	521	10	36	209	5% - 17%	601	12	42	351	3% - 12%	763	15	53	515	3% - 10%
HARRIS COUNTY WCID 1	597	12	42	0	>100%	587	12	41	0	>100%	650	13	46	0	>100%
HARRIS COUNTY WCID 133	658	13	46	264	5% - 17%	648	13	45	352	4% - 13%	796	16	56	510	3% - 11%
HARRIS COUNTY WCID 156	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY WCID 50	322	6	23	0	>100%	301	6	21	0	>100%	303	6	21	0	>100%
HARRIS COUNTY WCID 70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY WCID 74	785	16	55	315	5% - 17%	809	16	57	450	4% - 13%	874	17	61	545	3% - 11%
HARRIS COUNTY WCID 89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HARRIS COUNTY WCID 96	1,942	39	136	545	7% - 25%	2,122	42	149	40	>100%	2,118	42	148	84	50% - >100%
HARRIS COUNTY WCID-FONDREN ROAD	389	8	27	3	>100%	539	11	38	163	7% - 23%	652	14	46	289	5% - 17%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
HEMPSTEAD	1,304	26	91	0	>100%	1,703	34	119	0	>100%	2,518	50	176	907	10% - 35%
HILLCREST VILLAGE	118	2	8	0	>100%	112	2	8	0	>100%	111	2	8	0	>100%
HILLTOP LAKES WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HILSHIRE VILLAGE	196	4	14	55	7% - 25%	217	4	15	4	>100%	291	6	20	11	53% - >100%
HITCHCOCK	949	19	66	0	>100%	1,157	23	81	0	>100%	1,337	27	94	0	>100%
HMW SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOUSTON CRU	452,163	9,044	31,653	16,059	50% - >100%	504,611	10,096	35,337	93,061	11% - 38%	604,799	12,096	42,336	166,735	6% - 23%
HUMBLE	2,687	54	188	754	7% - 25%	3,493	70	245	66	>100%	4,122	82	289	162	51% - >100%
HUNTSVILLE	7,897	158	553	0	>100%	8,214	164	575	0	>100%	8,707	174	609	0	>100%
JACINTO CITY	774	15	54	0	>100%	765	15	53	0	>100%	822	16	58	0	>100%
JAMAICA BEACH	261	5	18	0	>100%	259	5	18	0	>100%	266	5	19	0	>100%
JERSEY VILLAGE	1,746	35	122	185	19% - 66%	1,742	35	122	33	>100%	1,841	37	129	73	50% - >100%
JEWETT	238	5	17	0	>100%	307	6	21	0	>100%	433	9	30	0	>100%
JOHNSTON WATER UTILITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KATY	5,230	105	366	1,820	6% - 20%	7,745	155	542	4,410	4% - 12%	8,394	168	588	5,094	3% - 12%
KENDLETON	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KINGS MANOR MUD	329	7	23	34	19% - 68%	335	7	23	65	10% - 36%	352	7	25	54	8% - 29%
KIRKMONT MUD	378	8	26	0	>100%	425	9	30	0	>100%	528	11	37	72	15% - 51%
LA MARQUE	3,137	63	220	340	18% - 65%	3,351	67	235	505	13% - 46%	3,459	69	242	594	12% - 41%
LA PORTE	4,809	96	337	0	>100%	4,659	93	326	0	>100%	4,762	95	333	0	>100%
LAKE BONANZA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
LAKE CONROE HILLS MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LAKE JACKSON	5,320	106	372	0	>100%	5,401	108	378	0	>100%	5,663	118	412	536	22% - 77%
LAKE LIVINGSTON WATER SUPPLY AND SEWER SERVICE	1,732	36	121	0	>100%	2,127	43	149	0	>100%	2,588	52	181	5	>100%
LAKE MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LAZY RIVER IMPROVEMENT DISTRICT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEAGUE CITY	14,553	292	1,021	0	>100%	17,262	345	1,208	0	>100%	19,311	386	1,352	0	>100%
LEGGETT WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LIBERTY	1,543	31	108	0	>100%	1,695	34	119	0	>100%	1,992	40	139	0	>100%
LIBERTY COUNTY FWSD 1 HULL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LIVINGSTON	2,557	51	179	0	>100%	3,032	61	212	0	>100%	3,502	70	245	0	>100%
LONGHORN TOWN UD	287	6	20	115	5% - 17%	289	6	20	159	4% - 13%	292	6	20	176	3% - 12%
LUCE BAYOU PUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MADISON COUNTY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MADISONVILLE	870	17	61	0	>100%	947	19	66	0	>100%	1,107	22	77	0	>100%
MAGNOLIA	694	14	49	65	21% - 75%	997	20	70	368	5% - 19%	2,230	45	156	1,601	3% - 10%
MANVEL	276	6	19	0	>100%	594	12	42	246	5% - 17%	1,221	24	85	872	3% - 10%
MASON CREEK UD	1,268	25	89	508	5% - 17%	1,211	24	85	648	4% - 13%	1,206	24	84	707	3% - 12%
MEADOWCREEK MUD	304	6	21	2	>100%	420	8	29	127	7% - 23%	532	11	37	226	5% - 17%
MEADOWS PLACE	773	15	54	24	64% - >100%	761	15	53	196	8% - 27%	796	16	56	334	5% - 17%
MEMORIAL POINT UD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEMORIAL VILLAGES WATER AUTHORITY	5,573	111	390	447	25% - 87%	6,448	129	451	122	>100%	8,205	164	574	323	51% - >100%

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		Low	High				Low	High				Low	High		
MERCY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MISSOURI CITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONT BELVIEU	2,165	44	153	0	>100%	3,389	68	237	228	30% - >100%	5,515	110	386	2,357	5% - 16%
MONTGOMERY	631	13	44	149	8% - 30%	1,442	29	101	960	3% - 11%	2,459	49	172	1,977	2% - 9%
MONTGOMERY COUNTY MUD 112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 15	497	10	35	117	8% - 30%	598	12	42	218	5% - 19%	1,065	21	75	685	3% - 11%
MONTGOMERY COUNTY MUD 18	1,265	26	90	0	>100%	1,561	37	130	0	>100%	2,842	57	199	613	7% - 24%
MONTGOMERY COUNTY MUD 19	261	5	18	0	>100%	247	5	17	0	>100%	249	5	17	0	>100%
MONTGOMERY COUNTY MUD 56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 8	445	9	31	0	>100%	806	10	35	0	>100%	728	15	51	0	>100%
MONTGOMERY COUNTY MUD 83	281	6	20	0	>100%	295	6	21	0	>100%	323	6	23	0	>100%
MONTGOMERY COUNTY MUD 84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 89	335	7	23	0	>100%	341	7	24	0	>100%	415	8	29	0	>100%
MONTGOMERY COUNTY MUD 9	507	10	35	0	>100%	564	12	41	0	>100%	562	17	60	26	66% - >100%
MONTGOMERY COUNTY MUD 95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY MUD 99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MONTGOMERY COUNTY UD 2	172	3	12	0	>100%	172	3	12	0	>100%	217	4	15	0	>100%

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
MONTGOMERY COUNTY UD 3	267	5	19	0	>100%	305	6	21	0	>100%	557	11	39	72	15% - 54%
MONTGOMERY COUNTY UD 4	509	10	36	0	>100%	637	13	45	0	>100%	1,164	24	83	107	22% - 77%
MONTGOMERY COUNTY WCID 1	255	5	18	3	>100%	274	5	19	22	23% - 87%	361	7	25	109	7% - 23%
MORGANS POINT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOSCOW WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOUNT HOUSTON ROAD MUD	496	10	35	199	5% - 17%	676	14	47	419	3% - 11%	807	16	56	558	3% - 10%
MSEC ENTERPRISES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NASSAU BAY	1,065	21	75	0	>100%	1,057	21	74	0	>100%	1,091	22	76	0	>100%
NEEDVILLE	300	6	21	95	6% - 22%	287	6	20	100	6% - 20%	313	6	22	149	4% - 15%
NEW CANEY MUD	742	15	52	113	13% - 46%	818	16	57	189	9% - 30%	1,120	22	78	491	5% - 16%
NEW WAVERLY	181	4	13	0	>100%	185	4	13	0	>100%	195	4	14	0	>100%
NEWPORT MUD	945	19	66	0	>100%	967	19	68	0	>100%	1,027	21	72	0	>100%
NORMANGEE	122	2	9	0	>100%	130	3	9	0	>100%	153	3	11	0	>100%
NORTH BELT UD	341	7	24	137	5% - 17%	337	7	24	184	4% - 13%	363	7	25	222	3% - 11%
NORTH CHANNEL WATER AUTHORITY CRU	10,215	204	715	100	>100%	10,237	205	717	0	>100%	10,791	216	755	167	>100%
NORTH FOREST MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTH FORT BEND WATER AUTHORITY CRU	64,243	1,285	4,497	14,631	9% - 31%	105,812	2,116	7,407	89,077	4% - 13%	124,983	2,500	8,749	79,099	3% - 11%
NORTH GREEN MUD	476	10	33	191	5% - 17%	462	9	32	249	4% - 13%	474	9	33	283	3% - 12%
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY CRU	127,521	2,550	8,926	39,565	6% - 23%	135,939	2,719	9,726	78,627	4% - 12%	153,333	3,067	10,733	93,654	3% - 11%
NORTH ZULCH MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
NORTHWEST HARRIS COUNTY MUD 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OAK HOLLOW UTILITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OAK RIDGE NORTH	589	11	39	22	51% - >100%	595	12	42	58	21% - 72%	618	12	43	81	15% - 53%
ONALASKA WSC	316	6	22	0	>100%	449	9	31	0	>100%	579	12	41	0	>100%
ONE FIVE O WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OYSTER CREEK	250	5	18	11	45% - >100%	251	5	18	28	18% - 63%	275	6	19	60	9% - 32%
P S & S C WSC	27	1	2	0	>100%	30	1	2	0	>100%	35	1	2	0	>100%
PALMER PLANTATION MUD 1	207	4	15	1	>100%	287	6	20	87	7% - 23%	368	7	25	154	5% - 17%
PALMER PLANTATION MUD 2	312	6	22	2	>100%	432	9	30	131	7% - 23%	547	11	38	232	5% - 17%
PANORAMA VILLAGE	565	12	41	24	49% - >100%	617	12	43	56	22% - 77%	619	16	57	256	6% - 22%
PARKWAY MUD	520	10	36	42	25% - 87%	520	10	36	10	>100%	521	10	36	21	50% - >100%
PASADENA	22,829	457	1,598	0	>100%	22,564	457	1,600	0	>100%	24,343	487	1,704	0	>100%
PATTISON WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PEARLAND	16,728	335	1,171	0	>100%	19,603	392	1,372	0	>100%	24,846	497	1,739	419	>100%
PECAN GROVE MUD 1	2,016	40	141	0	>100%	1,922	38	135	0	>100%	1,928	39	135	0	>100%
PENNINGTON WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHELPS SUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PINE VILLAGE PUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PINEHURST DECKER PRAIRIE WSC	37	1	3	13	6% - 20%	71	1	5	47	3% - 11%	279	6	20	255	2% - 8%
PINEWOOD COMMUNITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLANTATION MUD	417	8	29	133	6% - 22%	385	8	27	203	4% - 13%	376	8	26	232	3% - 11%

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		Low	High				Low	High				Low	High		
POINT AQUARIUS MUD	339	7	24	46	15% - 52%	355	7	25	62	11% - 40%	478	10	33	185	5% - 18%
PORTER SUD	1,693	34	119	1,074	3% - 11%	2,543	51	178	1,924	3% - 9%	3,731	75	261	3,112	2% - 8%
PRAIRIE VIEW	703	14	49	0	>100%	946	19	66	0	>100%	1,435	29	100	0	>100%
PRAIRIE VIEW A&M UNIVERSITY	864	17	60	0	>100%	1,164	23	81	0	>100%	1,764	35	123	0	>100%
PROVIDENCE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QUADVEST	4,237	85	297	999	8% - 30%	8,272	165	579	5,034	3% - 12%	17,015	340	1,191	13,777	2% - 9%
QUAIL VALLEY UD	1,579	32	111	10	>100%	2,106	44	153	661	7% - 23%	2,769	55	194	1,174	5% - 17%
RANCH UTILITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RAYFORD ROAD MUD	994	20	70	46	41% - >100%	1,080	22	76	134	16% - 56%	1,262	26	90	336	8% - 27%
RICHMOND	2,023	40	142	0	>100%	2,098	42	147	0	>100%	2,463	49	172	133	37% - >100%
RICHWOOD	377	8	26	9	84% - >100%	360	8	27	23	33% - >100%	420	8	29	55	15% - 53%
RIVER PLANTATION MUD	511	10	36	0	>100%	651	13	46	0	>100%	944	19	66	256	7% - 26%
RIVERSIDE WSC	444	9	31	0	>100%	516	10	36	3	>100%	557	12	41	8	>100%
ROLLING FORK PUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ROMAN FOREST CONSOLIDATED MUD	320	6	22	76	8% - 29%	348	7	24	104	7% - 23%	524	10	37	280	4% - 13%
ROSENBERG	4,707	94	329	0	>100%	4,989	100	349	0	>100%	5,873	117	411	1,053	11% - 39%
ROYAL VALLEY UTILITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAGEMEADOW UD	727	15	51	0	>100%	780	16	55	0	>100%	937	19	66	0	>100%
SAN JACINTO SUD	355	7	25	0	>100%	356	8	27	0	>100%	452	9	32	0	>100%
SAN LEON MUD	373	7	26	0	>100%	435	9	30	0	>100%	516	10	36	0	>100%
SEABROOK	1,657	37	130	0	>100%	1,539	37	129	0	>100%	1,913	38	134	0	>100%

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	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
SEALY	1,380	28	97	0	>100%	1,671	33	117	0	>100%	2,334	47	163	0	>100%
SEDONA LAKES MUD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEQUOIA IMPROVEMENT DISTRICT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHENANDOAH	1,292	26	90	404	6% - 22%	1,620	36	127	932	4% - 14%	2,203	44	154	1,315	3% - 12%
SHEPHERD	314	6	22	0	>100%	349	7	24	0	>100%	409	8	29	0	>100%
SHOREACRES	332	7	23	0	>100%	327	7	23	0	>100%	337	7	24	0	>100%
SIENNA PLANTATION CRU	4,395	88	308	0	>100%	7,581	152	531	2,036	7% - 26%	13,423	268	940	7,042	4% - 13%
SODA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTH CLEVELAND WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTH HOUSTON	1,945	39	136	0	>100%	1,933	39	135	0	>100%	2,091	42	146	0	>100%
SOUTHEAST WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTHERN MONTGOMERY COUNTY MUD	561	17	60	9	>100%	668	17	61	13	>100%	894	18	63	42	43% - >100%
SOUTHERN WATER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOUTHSIDE PLACE	263	5	18	21	25% - 86%	266	6	20	5	>100%	353	7	25	14	50% - >100%
SOUTHWEST HARRIS COUNTY MUD 1	206	4	14	1	>100%	285	6	20	86	7% - 23%	361	7	25	153	5% - 17%
SPLENDORA	180	4	13	0	>100%	222	4	16	0	>100%	394	8	28	0	>100%
SPRING CREEK UD	648	13	45	152	8% - 30%	715	14	50	222	6% - 23%	877	18	61	384	5% - 16%
SPRING MEADOWS MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPRING VALLEY	1,048	21	73	420	5% - 17%	1,191	24	83	691	3% - 12%	1,472	29	103	984	3% - 10%
STANLEY LAKE MUD	569	11	40	0	>100%	807	16	56	0	>100%	1,765	35	124	662	5% - 18%
SUBURBAN UTILITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
SUGAR LAND	28,173	563	1,972	447	>100%	32,045	641	2,243	9,262	7% - 24%	36,352	727	2,545	14,203	5% - 18%
SUNBELT FWSD	1,693	34	119	193	18% - 61%	1,701	34	119	80	43% - >100%	1,963	39	137	178	22% - 77%
SURFSIDE BEACH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWEENY	540	11	38	0	>100%	513	10	36	0	>100%	511	10	36	0	>100%
T & W WATER SERVICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TARKINGTON SUD	416	8	29	0	>100%	528	11	37	0	>100%	706	14	49	0	>100%
TDCJ JESTER UNITS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TDCJ RAMSEY AREA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEMPE WSC 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TEXAS CITY	7,077	142	495	0	>100%	7,896	158	553	0	>100%	9,037	181	633	0	>100%
THE COMMONS WATER SUPPLY	359	7	25	144	5% - 17%	365	8	27	216	4% - 12%	407	8	28	255	3% - 11%
THE CONSOLIDATED WSC	17	0	1	8	4% - 15%	19	0	1	8	5% - 17%	22	0	2	10	4% - 15%
THE WOODLANDS CRU	27,860	557	1,950	904	62% - >100%	30,646	617	2,159	4,530	14% - 48%	36,073	761	2,665	11,744	6% - 23%
THUNDERBIRD UD	658	13	46	4	>100%	911	18	64	275	7% - 23%	1,154	23	81	489	5% - 17%
TOMBALL	3,210	64	225	1,664	3% - 12%	3,474	69	243	2,645	2% - 9%	3,826	77	268	3,212	2% - 8%
TRAIL OF THE LAKES MUD	1,043	21	73	418	5% - 17%	1,066	21	75	590	4% - 13%	1,078	22	75	653	3% - 12%
TRINITY	337	7	24	0	>100%	341	7	24	0	>100%	355	7	25	0	>100%
TRINITY BAY CONSERVATION DISTRICT	2,262	45	158	0	>100%	3,037	61	213	0	>100%	4,518	90	316	0	>100%
TRINITY RURAL WSC	569	11	40	66	17% - 60%	596	12	42	93	13% - 45%	629	13	44	126	10% - 35%
VALLEY RANCH MUD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VARNER CREEK UD	213	4	15	0	>100%	201	4	14	0	>100%	201	4	14	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
WALKER COUNTY RURAL SUD	1,043	21	73	0	>100%	1,097	22	77	0	>100%	1,182	24	83	0	>100%
WALLER	440	9	31	24	37% - >100%	494	10	35	2	>100%	626	13	44	4	>100%
WALLIS	161	3	11	0	>100%	171	3	12	0	>100%	207	4	14	0	>100%
WATERWOOD MUD 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WEBSTER	3,660	77	270	0	>100%	4,305	86	301	0	>100%	4,711	94	330	0	>100%
WEST COLUMBIA	437	9	31	0	>100%	404	8	28	0	>100%	409	8	29	0	>100%
WEST END WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WEST HARDIN WSC	24	0	2	0	>100%	29	1	2	0	>100%	37	1	3	0	>100%
WEST HARRIS COUNTY MUD 6	327	7	23	131	5% - 17%	352	7	25	200	4% - 12%	374	7	26	235	3% - 11%
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY CRU	72,527	1,451	5,077	12,264	12% - 41%	78,715	1,574	5,510	35,512	4% - 16%	86,264	1,726	6,040	43,139	4% - 14%
WEST UNIVERSITY PLACE	2,886	58	202	231	25% - 87%	3,202	64	224	61	>100%	3,959	79	277	156	51% - >100%
WESTWOOD NORTH WSC	351	7	25	83	8% - 30%	410	8	29	142	6% - 20%	551	11	39	283	4% - 14%
WESTWOOD SHORES MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WHITE OAK UTILITIES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WHITE OAK WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WILLIS	817	16	57	193	8% - 30%	874	17	61	250	7% - 24%	1,232	25	86	605	4% - 14%
WOOD BRANCH VILLAGE	105	2	7	21	10% - 35%	122	2	9	38	6% - 22%	225	5	16	141	3% - 11%
WOODCREEK MUD	266	6	20	113	5% - 18%	277	6	19	149	4% - 13%	351	6	20	167	3% - 12%
WOODCREEK WATER OF LIBERTY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YES COMMUNITIES INC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Region L

INTRODUCTION

Information presented in the Region L Appendix comes from two primary sources: the 2016 Region L Water Plan and the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

- Projected Municipal Demands
- Projected Municipal Needs
- Recommended Water Management Strategies

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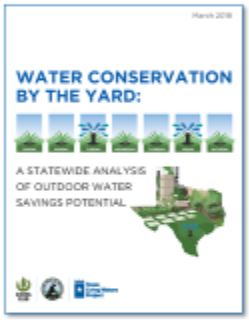


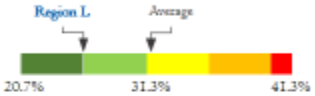
- Estimated savings from outdoor watering restrictions
- Single-family outdoor water use
- Daily household outdoor water use

With work on the 2021 Region L Water Plan already underway, the Region L Appendix serves as a planning tool to help inform the decisions of the Region L Water Planning Group. This document provides a summary of the estimated municipal savings from no more than twice per week watering restrictions to demonstrate how much further Region L can drive its municipal water conservation efforts during the next planning cycle.

OUTDOOR WATER USE METRICS
REGION L

25.0%

SINGLE-FAMILY OUTDOOR WATER USE AS A PERCENTAGE OF TOTAL HOUSEHOLD USE



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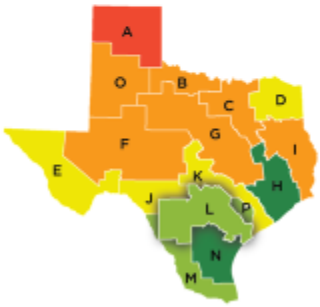


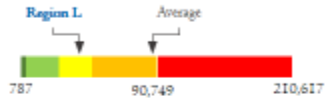
Outdoor Use as a Percentage of Total Household Use

- 20.7% - 24.9%
- 25.0% - 29.9%
- 30.0% - 34.9%
- 35.0% - 39.9%
- 40.0% - 41.3%

OUTDOOR WATER USE METRICS
REGION L

44,003 ac-feet/year

CURRENT SINGLE-FAMILY OUTDOOR WATER USE



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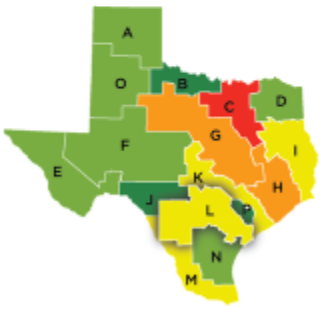


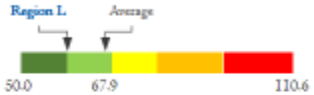
Total Outdoor Use (acre-feet per year)

- 787 - 4,999
- 5,000 - 24,999
- 25,000 - 49,999
- 50,000 - 99,999
- 100,000 - 210,617

OUTDOOR WATER USE METRICS
REGION L

59.4 gal/day

DAILY HOUSEHOLD OUTDOOR WATER USE



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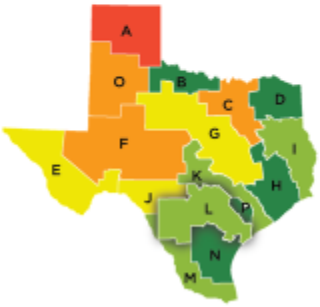


Daily Outdoor Household Use (gallons per day per household)

Low Demand	Medium Demand	High Demand
50.0 - 58.9	59.0 - 68.9	79.0 - 98.9
	69.0 - 78.9	99.0 - 110.6

ESTIMATED SAVINGS POTENTIAL
OF OUTDOOR WATERING RESTRICTIONS

LOW EFFORT

3.5%

of total municipal demand

HIGH EFFORT

8.5%

of total municipal demand

IMPORTANCE OF EDUCATION & ENFORCEMENT

For Region L, the estimated savings potential of twice per week outdoor watering restrictions ranges from 3.5 to 8.5 percent (of total municipal demand) – depending on the level of effort employed to implement the measure. Research indicates that education and enforcement have a direct impact on the effectiveness of outdoor watering restrictions. To achieve the greatest amount of water savings, robust education and enforcement mechanisms must be in place.

For additional information on how these savings percentages were determined, please see the *Water Conservation by the Yard: A Statewide Analysis of Outdoor Water Savings Potential* report.

ESTIMATED MUNICIPAL SAVINGS
FROM OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS BASED ON MUNICIPAL DEMANDS IDENTIFIED IN THE 2016 REGION L WATER PLAN

Planning Decade	Water Savings (ac-feet per year)*		Municipal Demand (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
Current	14,314	34,762	408,966
2020	16,417	39,871	469,065
2030	18,438	44,779	526,806
2040	20,385	49,506	582,421
2050	22,351	54,280	638,594
2060	24,309	59,037	694,556
2070	26,401	64,116	754,306

*Please note that these savings estimates are inclusive of the City of Kyle, which is the only municipality in Region L that currently has mandatory twice per week watering restrictions.

KEY TAKEAWAYS

- The level of implementation effort (low or high) has a significant effect on the estimated municipal savings from outdoor watering restrictions. With more robust education and enforcement efforts, Region L can nearly double its outdoor water savings.
- Water savings will increase in proportion to municipal population and demand growth given the coincidence of new housing stock, especially in the single-family sector where in-ground irrigation systems and turf grass have become increasingly prevalent.

MEETING FUTURE MUNICIPAL NEEDS
WITH OUTDOOR WATERING RESTRICTIONS

PROJECTED MUNICIPAL SAVINGS AS A PERCENTAGE OF MUNICIPAL (UNMET) NEEDS IDENTIFIED IN THE 2016 REGION L WATER PLAN

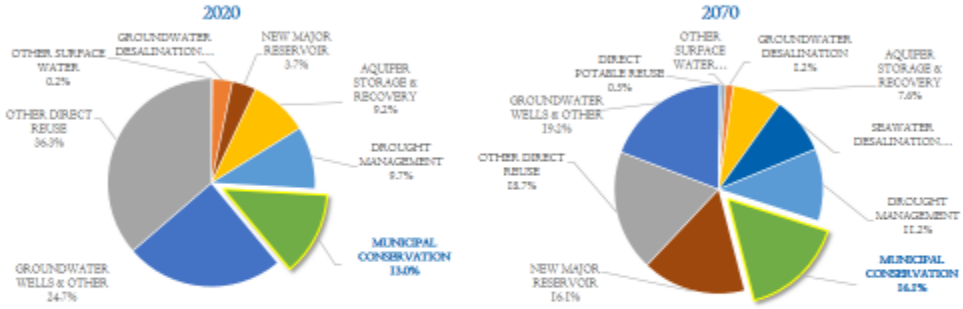
Planning Decade	Water Savings (ac-feet per year)		Municipal (Unmet) Needs (ac-feet per year)
	LOW EFFORT	HIGH EFFORT	
2020	23%	55%	72,636
2030	17%	41%	108,068
2040	14%	33%	148,627
2050	11%	28%	197,279
2060	10%	24%	249,846
2070	9%	21%	304,164

KEY TAKEAWAYS

- Projected municipal savings from no more than twice per week watering restrictions are enough to satisfy a significant portion of municipal (unmet) needs (i.e., the deficit between municipal demand and available supplies from existing sources) identified in the Region L Water Plan.
- The rapid increase in municipal (unmet) needs through 2070 stems from projected population growth and the subsequent rise in municipal demand. This trend could lead to more savings opportunities as there will likely be a greater need for single-family residences, which typically use more water outdoors.
- Permanent watering restrictions have the potential to drastically cut future municipal demands, thereby enhancing the resiliency of future municipal supplies and reducing future municipal (unmet) needs.

RECOMMENDED STRATEGIES
BASED ON THE 2016 REGION L WATER PLAN

SHARE OF WATER SUPPLIES FROM RECOMMENDED WATER MANAGEMENT STRATEGIES BY STRATEGY TYPE



KEY TAKEAWAYS

- Municipal conservation water management strategies will deliver fewer water supplies in 2020 and 2070 than supply-side strategies, such as direct reuse, groundwater wells, and new major reservoir. Expected supplies from municipal conservation efforts will increase as a percent of total supplies from 2020 to 2070, though only marginally.
- Proactive, ongoing municipal conservation efforts represent the most cost-effective strategy for ensuring Region L has adequate supplies of water to meet growing municipal demands. Region L must set higher targets to ensure municipal conservation remains an integral component of the region's future water management approach.

EXPANDING FUTURE SUPPLIES
WITH OUTDOOR WATERING RESTRICTIONS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL WATER MANAGEMENT STRATEGIES BY TYPE

Municipal WMS Type	Water Volume (ac-feet per year)	
	2020	2070
AQUIFER STORAGE & RECOVERY	16,447	48,325
DIRECT POTABLE REUSE	-	2,809
DROUGHT MANAGEMENT	17,494	68,190
GROUNDWATER DESALINATION	5,622	7,116
GROUNDWATER WELLS & OTHER	44,393	117,099
MUNICIPAL CONSERVATION	23,426	97,947
NEW MAJOR RESERVOIR	6,684	98,122
OTHER DIRECT REUSE	65,253	114,163
OTHER SURFACE WATER	297	4,010
SEAWATER DESALINATION	-	53,978
TOTAL WATER VOLUME FROM RECOMMENDED WMSs	179,616	609,779
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	196,033 to 219,487	636,160 to 673,895
% INCREASE IN WATER VOLUME FROM ALL WMSs	9% to 22%	4% to 11%

KEY TAKEAWAYS

- Region L can bolster its long-term municipal conservation efforts through permanent outdoor watering restrictions. Doing so will reduce the region's reliance upon expensive supply-side water management strategies, such as seawater desalination, and provide greater resilience against the impacts of future droughts.

OUTDOOR WATERING RESTRICTIONS
AS A MUNICIPAL CONSERVATION WMS

WATER SUPPLY FROM RECOMMENDED MUNICIPAL CONSERVATION WATER MANAGEMENT STRATEGIES		
Municipal Conservation WMS Type	Water Volume (acre-feet per year)	
	2020	2070
GENERAL*	23,426	97,947
TOTAL WATER VOLUME IF OUTDOOR WATERING RESTRICTIONS ARE IMPLEMENTED AS A MUNICIPAL CONSERVATION WMS	39,843 to 63,297	124,348 to 162,063
% INCREASE IN WATER VOLUME FROM MUNICIPAL CONSERVATION	70% to >100%	27% to 65%

*Region L's 2016 Regional Water Plan relies upon the Texas Water Development Board's list of best management practices for municipal water conservation. These BMPs include: landscape irrigation conservation and incentives, water-wise landscape design and conversion programs, system water audit and water loss, water survey for single-family and multi-family customers, water conservation pricing, prohibition on wasting water, showerhead, aerator, and toilet flapper retrofit, residential ultra-low flow toilet replacement programs, residential clothes washer incentive program, etc. Outdoor watering restrictions are currently not identified as a BMP.

KEY TAKEAWAYS

- Region L can nearly than double the supplies from municipal conservation water management strategies by encouraging all water user groups to adopt no more than twice per week outdoor watering restrictions supported by robust educational and enforcement mechanisms.
- The Region L Water Plan only addresses outdoor watering restrictions as a drought management strategy. As a conservation strategy, however, permanent outdoor watering restrictions can be more effective because they enable consistent customer messaging and drive savings over the long-term.

expensive supply-side water management strategies.

IMPLICATIONS FOR REGION L'S WATER PLANNING PROCESS

- Region L can do even more to promote proactive, ongoing municipal conservation efforts
- Region L can drive deeper municipal water savings by identifying no more than twice per week watering restrictions as a standalone municipal conservation water management strategy
- To ensure a more robust conservation target, Region L should encourage WUGs to track and report their savings from outdoor watering restrictions
- Savings from outdoor watering restrictions can significantly reduce municipal water demand, which will in turn help close the gap between future municipal demand and future water supplies (i.e., municipal needs)
- Placing more emphasis on municipal water conservation WMSs, especially outdoor watering restrictions, can help Region L offset supply-side water management strategies requiring large capital investments

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
AIR FORCE VILLAGE II INC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALAMO HEIGHTS	2,216	78	188	796	10% - 24%	2,240	76	190	820	10% - 23%	2,225	78	189	805	10% - 23%
AQUA WSC	265	10	24	0	>100%	396	14	34	0	>100%	370	20	48	0	>100%
ASHERTON	341	12	29	28	43% - >100%	374	13	32	61	21% - 52%	287	10	24	0	>100%
ATASCOSA RURAL WSC	1,736	61	148	1,167	5% - 13%	2,302	81	196	1,708	5% - 11%	3,061	106	262	2,446	4% - 11%
BATESVILLE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENTON CITY WSC	1,611	56	137	0	>100%	2,041	71	173	0	>100%	2,611	91	222	25	>100%
BEXAR COUNTY WCID 10	1,209	42	102	326	12% - 31%	1,238	43	105	361	12% - 29%	1,328	46	113	451	10% - 25%
BIG WELLS	174	6	15	0	>100%	165	6	16	0	>100%	141	5	12	0	>100%
BOERNE	3,091	108	263	0	>100%	4,942	173	420	0	>100%	7,863	275	668	2,613	11% - 26%
BUDA	299	10	25	0	>100%	499	17	42	0	>100%	979	34	83	0	>100%
CANYON LAKE WATER SERVICE	4,686	164	398	0	>100%	8,010	280	681	2,373	12% - 29%	13,091	458	1,113	7,468	6% - 15%
CARRIZO HILL WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CARRIZO SPRINGS	2,270	79	193	267	30% - 72%	2,479	87	211	476	18% - 44%	1,903	67	162	0	>100%
CASTROVILLE	794	28	67	224	12% - 30%	760	27	66	210	13% - 32%	754	27	67	214	13% - 31%
CHARLOTTE	344	12	29	0	>100%	425	15	36	0	>100%	547	19	46	0	>100%
CIBOLO	5,343	187	454	1,417	13% - 32%	9,145	320	778	5,222	6% - 15%	13,075	458	1,111	9,149	5% - 12%
CLEAR WATER ESTATES WATER SYSTEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CONVERSE	2,536	89	216	903	10% - 24%	2,930	103	249	1,297	8% - 19%	2,597	101	246	1,264	8% - 19%
COTULLA	1,868	65	159	0	>100%	2,155	75	183	155	49% - >100%	1,777	62	151	0	>100%
COUNTY LINE WSC	441	15	37	0	>100%	697	24	59	78	31% - 76%	1,271	44	108	641	7% - 17%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
COUNTY-OTHER, ATASCOSA	922	32	78	0	>100%	1,119	39	95	0	>100%	1,432	50	122	0	>100%
COUNTY-OTHER, BEXAR	5,185	181	441	0	>100%	6,909	315	764	0	>100%	15,606	546	1,327	6,084	9% - 22%
COUNTY-OTHER, CALDWELL	725	25	62	0	>100%	990	35	84	0	>100%	1,420	50	121	0	>100%
COUNTY-OTHER, CALHOUN	244	9	21	0	>100%	288	10	24	0	>100%	361	13	31	0	>100%
COUNTY-OTHER, COMAL	4,164	146	354	0	>100%	4,123	144	350	0	>100%	4,007	140	341	0	>100%
COUNTY-OTHER, DEWITT	1,432	50	122	0	>100%	1,415	50	120	0	>100%	1,228	43	104	0	>100%
COUNTY-OTHER, DIMMIT	611	21	52	297	7% - 17%	654	23	56	340	7% - 16%	496	17	42	184	9% - 23%
COUNTY-OTHER, FRIO	528	18	45	0	>100%	602	21	51	0	>100%	715	25	61	0	>100%
COUNTY-OTHER, GOLIAD	1,035	36	88	0	>100%	1,186	42	101	0	>100%	910	32	77	0	>100%
COUNTY-OTHER, GONZALES	422	15	36	0	>100%	477	17	41	0	>100%	527	18	45	0	>100%
COUNTY-OTHER, GUADALUPE	1,067	37	91	0	>100%	1,245	44	106	0	>100%	2,011	70	171	0	>100%
COUNTY-OTHER, HAYS	3,106	109	264	0	>100%	5,999	210	510	191	>100%	19,584	685	1,665	13,038	5% - 13%
COUNTY-OTHER, KARNES	622	22	53	0	>100%	623	22	53	0	>100%	557	21	50	0	>100%
COUNTY-OTHER, KENDALL	2,670	93	227	0	>100%	3,499	122	297	0	>100%	4,959	174	422	0	>100%
COUNTY-OTHER, LA SALLE	522	18	44	22	63% - >100%	590	21	50	90	23% - 56%	454	17	41	0	>100%
COUNTY-OTHER, MEDINA	1,257	44	107	0	>100%	1,359	48	116	0	>100%	1,511	53	128	0	>100%
COUNTY-OTHER, REFUGIO	518	18	44	0	>100%	498	17	42	0	>100%	360	13	31	0	>100%
COUNTY-OTHER, UVALDE	1,395	49	119	0	>100%	1,546	54	131	0	>100%	1,831	64	156	0	>100%
COUNTY-OTHER, VICTORIA	3,050	107	259	0	>100%	3,176	111	270	0	>100%	3,433	120	292	0	>100%
COUNTY-OTHER, WILSON	1,493	52	127	0	>100%	2,093	73	178	0	>100%	2,878	101	245	0	>100%
COUNTY-OTHER, ZAVALA	572	20	49	0	>100%	672	24	57	0	>100%	626	29	70	0	>100%

ESTIMATED MUNICIPAL SAVINGS by WUG

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		Low	High				Low	High				Low	High		
CREEDMOOR-MAHA WSC	224	8	19	0	>100%	303	11	26	0	>100%	439	16	37	0	>100%
CRYSTAL CITY	1,702	60	145	0	>100%	2,000	70	170	0	>100%	2,455	86	209	0	>100%
CRYSTAL CLEAR WSC	14,461	507	1,231	0	>100%	19,602	693	1,653	3,112	22% - 54%	32,571	1,140	2,769	15,881	7% - 17%
CUERO	2,195	77	187	0	>100%	2,232	78	190	0	>100%	1,955	68	166	0	>100%
DEVINE	663	23	57	0	>100%	657	24	56	0	>100%	736	26	63	0	>100%
DILLEY	1,026	36	87	0	>100%	1,186	41	101	0	>100%	1,405	49	119	0	>100%
EAST CENTRAL SUD	3,965	139	337	386	36% - 87%	4,729	166	402	806	21% - 50%	5,890	206	501	1,980	10% - 25%
EAST MEDINA COUNTY SUD	753	26	64	0	>100%	893	31	76	0	>100%	1,080	38	92	70	54% - >100%
EL OSO WSC	634	22	54	0	>100%	644	23	55	0	>100%	625	22	53	0	>100%
ELMENDORF	311	11	26	0	>100%	478	17	41	0	>100%	696	24	59	0	>100%
ENCINAL WSC	213	7	18	0	>100%	243	9	21	0	>100%	201	7	17	0	>100%
FAIR OAKS RANCH	2,073	73	176	0	>100%	2,684	94	228	0	>100%	3,478	122	296	0	>100%
FALLS CITY	147	5	12	0	>100%	146	5	12	0	>100%	141	5	12	0	>100%
FLORESVILLE	1,940	68	165	0	>100%	2,741	96	233	406	24% - 58%	3,781	132	321	1,445	9% - 22%
FORT SAM HOUSTON	161	6	14	33	17% - 42%	192	7	16	59	11% - 28%	236	8	20	106	8% - 19%
GARDEN RIDGE	1,662	58	141	1,023	6% - 14%	2,827	99	240	2,188	5% - 11%	4,596	161	391	3,957	4% - 10%
GOFORTH SUD	1,500	53	128	62	85% - >100%	2,394	84	203	105	80% - >100%	4,564	160	390	725	22% - 54%
GOLIAD	611	21	52	0	>100%	713	25	61	0	>100%	551	19	47	0	>100%
GONZALES	2,200	77	187	0	>100%	2,545	89	216	0	>100%	2,895	101	246	310	33% - 79%
GONZALES COUNTY WSC	2,192	77	186	0	>100%	2,585	90	220	0	>100%	2,786	98	237	63	>100%
GREEN VALLEY SUD	6,867	310	754	82	>100%	13,251	464	1,126	1,566	30% - 72%	19,517	683	1,659	9,884	7% - 17%

ESTIMATED MUNICIPAL SAVINGS by WUG

WUG Name (Utility-Based / New)	2020 Planning Decade					2040 Planning Decade					2070 Planning Decade				
	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs	Municipal Demand	Water Savings		Municipal Needs	Savings as a % of Needs
		Low	High				Low	High				Low	High		
GUADALUPE-BLANCO RIVER AUTHORITY	356	12	30	0	>100%	398	14	34	0	>100%	490	17	42	0	>100%
HONDO	2,053	72	175	523	14% - 33%	2,346	82	199	816	10% - 24%	2,710	95	230	1,160	8% - 20%
JOURDANTON	969	34	82	0	>100%	1,198	42	102	0	>100%	1,544	54	131	0	>100%
KARNES CITY	625	22	53	336	7% - 16%	617	22	52	295	7% - 18%	580	20	49	249	8% - 20%
KENDALL COUNTY WCID 1	303	11	26	0	>100%	384	13	33	0	>100%	531	19	45	0	>100%
KENDALL WEST UTILITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KENEDY	1,421	50	121	161	31% - 75%	1,435	50	122	179	28% - 68%	1,362	48	116	151	32% - 77%
KIRBY	942	33	80	137	24% - 58%	956	35	84	181	19% - 46%	974	34	83	169	20% - 49%
KNIPPA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KT WATER DEVELOPMENT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KYLE	5,156	180	438	0	>100%	9,133	320	776	2,801	11% - 28%	9,104	319	774	2,783	11% - 28%
LA COSTE	127	4	11	10	44% - >100%	145	5	12	28	18% - 44%	173	6	15	56	11% - 26%
LA VERNIA	277	10	24	0	>100%	391	14	33	0	>100%	539	19	46	0	>100%
LACKLAND AIR FORCE BASE	1,054	37	90	0	>100%	981	34	83	0	>100%	959	34	82	0	>100%
LEON VALLEY	1,860	65	158	97	67% - >100%	2,001	70	170	196	36% - 87%	2,260	79	192	377	21% - 51%
LIVE OAK	2,677	94	228	0	>100%	2,648	93	225	0	>100%	2,621	92	223	0	>100%
LOCKHART	2,251	79	191	166	48% - >100%	3,105	109	264	1,042	10% - 25%	4,463	156	380	2,402	7% - 16%
LOMA ALTA CHULA VISTA WATER SYSTEM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LULING	954	33	81	0	>100%	1,306	46	111	218	21% - 51%	1,875	66	159	787	8% - 20%
LYTLE	577	20	49	171	12% - 29%	739	26	63	333	8% - 19%	960	34	82	554	6% - 15%
MARION	164	6	14	0	>100%	216	8	18	0	>100%	306	11	26	0	>100%

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		Low	High				Low	High				Low	High		
MARTINDALE WSC	187	7	16	0	>100%	256	9	22	66	14% - 33%	367	13	31	177	7% - 18%
MAXWELL WSC	531	19	45	0	>100%	692	24	59	0	>100%	981	34	83	0	>100%
MCCOY WSC	952	33	81	0	>100%	1,177	41	100	0	>100%	1,515	53	129	0	>100%
MEDINA COUNTY WCID 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEDINA RIVER WEST WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MOORE WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NATALIA	281	10	24	101	10% - 24%	333	12	28	153	8% - 19%	400	14	34	220	6% - 15%
NEW BRAUNFELS	14,908	522	1,267	0	>100%	21,586	756	1,835	4,187	18% - 44%	31,979	1,119	2,718	14,580	8% - 19%
NIXON	435	15	37	0	>100%	493	17	42	0	>100%	555	20	50	0	>100%
OAK HILLS WSC	904	32	77	0	>100%	1,275	45	108	0	>100%	1,757	61	149	0	>100%
PEARSALL	2,021	71	172	0	>100%	2,323	81	197	0	>100%	2,750	96	234	19	>100%
PICOSA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PLEASANTON	2,263	80	194	0	>100%	2,659	100	243	0	>100%	3,665	129	313	0	>100%
POINT COMFORT	87	3	7	0	>100%	99	3	8	0	>100%	124	4	11	0	>100%
POLONIA WSC	578	31	75	0	>100%	1,205	42	102	0	>100%	1,729	61	147	541	11% - 27%
PORT LAVACA	1,927	67	164	0	>100%	2,237	78	190	0	>100%	2,786	98	237	0	>100%
PORT OCONNOR MUD	110	4	9	0	>100%	123	4	10	0	>100%	152	5	13	0	>100%
POTEET	472	17	40	0	>100%	571	20	49	0	>100%	730	26	62	0	>100%
POTH	387	14	33	0	>100%	537	19	46	0	>100%	738	26	63	0	>100%
QUAIL CREEK MUD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RANDOLPH AIR FORCE BASE	97	3	8	0	>100%	121	4	10	0	>100%	151	5	13	0	>100%

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		Low	High				Low	High				Low	High		
REFUGIO	803	28	68	0	>100%	797	28	68	0	>100%	580	20	49	0	>100%
RUNGE	231	8	20	0	>100%	226	8	19	0	>100%	216	8	18	0	>100%
S S WSC	1,956	70	169	0	>100%	2,762	97	236	0	>100%	3,827	134	325	234	57% - >100%
SABINAL	445	16	38	121	13% - 31%	505	18	43	181	10% - 24%	601	21	51	277	8% - 18%
SAN ANTONIO WATER SYSTEM	269,916	9,447	22,943	52,049	18% - 44%	322,932	11,303	27,449	101,705	11% - 27%	401,145	14,040	34,098	180,194	8% - 19%
SAN MARCOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SCHERTZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEADRIFT	256	9	22	0	>100%	300	11	26	0	>100%	374	13	32	0	>100%
SEGUIN	4,707	165	400	0	>100%	6,326	221	535	0	>100%	8,970	314	762	0	>100%
SELMA	1,167	41	99	0	>100%	1,787	63	152	104	60% - >100%	2,028	71	172	345	21% - 50%
SHAVANO PARK	1,104	39	94	425	9% - 22%	1,356	47	115	677	7% - 17%	1,692	59	144	1,013	6% - 14%
SMILEY	136	5	12	0	>100%	156	5	13	0	>100%	177	6	15	0	>100%
SOUTH BUDA WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPRINGS HILL WSC	1,417	50	120	0	>100%	1,845	65	157	0	>100%	2,594	91	220	0	>100%
STOCKDALE	364	13	33	0	>100%	539	19	46	0	>100%	742	26	63	0	>100%
SUNKO WSC	822	29	70	0	>100%	1,142	40	97	0	>100%	1,427	50	121	117	43% - >100%
TEXAS STATE UNIVERSITY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
THE OAKS WSC	370	13	31	0	>100%	492	17	42	1	>100%	656	23	56	165	14% - 34%
TRI COMMUNITY WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UNIVERSAL CITY	3,195	112	272	416	27% - 65%	3,151	110	268	372	30% - 72%	3,111	109	264	332	33% - 80%
UVALDE	4,052	142	344	943	15% - 37%	4,593	161	390	1,484	11% - 26%	5,474	192	465	2,365	8% - 20%

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		Low	High				Low	High				Low	High		
VICTORIA	17,110	599	1,464	9,897	6% - 15%	16,629	582	1,583	11,416	5% - 14%	20,471	716	1,740	13,258	5% - 13%
VICTORIA COUNTY WCID 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WAELDER	224	8	19	0	>100%	258	9	22	0	>100%	292	10	25	0	>100%
WATER SERVICES	746	26	63	0	>100%	884	31	75	0	>100%	1,108	39	94	0	>100%
WEST MEDINA WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIMBERLEY WSC	1,076	38	91	0	>100%	1,937	68	165	410	17% - 40%	4,029	141	342	2,502	6% - 14%
WINDMILL WSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WINGERT WATER SYSTEMS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WOODSBORO	361	13	31	0	>100%	354	12	30	0	>100%	259	9	22	0	>100%
YANCEY WSC	660	23	56	28	83% - >100%	786	28	67	154	18% - 43%	941	33	80	309	11% - 26%
YOAKUM	455	16	39	0	>100%	455	16	39	0	>100%	404	14	34	0	>100%
YORKTOWN	447	16	38	0	>100%	446	16	38	0	>100%	390	14	33	0	>100%
ZAVALA COUNTY WCID 1	477	17	41	0	>100%	567	20	48	0	>100%	697	24	59	0	>100%

12. Discussion and Appropriate Action Authorizing the San Antonio River Authority (SARA) to Request a Notice-to-Proceed from the TWDB; Authorizing the Consultant and/or SARA to Work with the TWDB on any Follow up Information that Might be Required; and Authorizing SARA to Negotiate and Execute the Subsequent TWDB Contract Amendment that will be Issued Following the Notice to Proceed.

13. Possible Agenda Items for the Next Region L Meeting

2019 Future Meeting Dates

Thursday, May 2, 2019

Thursday, August 1, 2019

Thursday, November 7, 2019

14. Public Comment