



Brushy Creek Municipal Utility District Water Use, Water Needs, and Water Supply

This report has been developed by the Brushy Creek Municipal Utility District (BCMUD or District) staff to provide the District's Board, residents, and customers with an understanding of our water supply and water needs for the near future. This report was not completed with the assistance of engineers or consultants although previous consultant reports were used as resources. In those cases, the report and report data will be referenced.

Items not considered in this report include water pressure, fire flow, maximum daily demand, storage capacity, or treatment and pumping capacity. Treatment and pumping capacity are being analyzed through a task order with Bury Partners. Wastewater services were also not considered in this report.

Executive summary

The data as presented by staff indicate that the District currently has a raw water supply that will support build-out during normal operations. There are internal and external factors that will impact when and how much of this raw water capacity is available for production, including droughts, repairs, water leaks, and contractual obligations.

If, due to unusual conditions, one of the District's two sources of raw water became unavailable, the District would obviously be dependent on the alternate source. The surface water contract provides enough raw water to support basic needs of customers while the groundwater source falls short.

Staff's recommendations are to:

- Continue to rehabilitate the District's ground wells until a minimum of 1.6 million gallons of raw water is available on a daily basis,
- Re-confirm the District's emergency inter-local service with the City of Round Rock
- Continue to reduce the percentage of unaccountable water
- Continue to monitor District growth, water use, and water loss and report any changes to the assumptions in this report

Current Customer Status

BCMUD had 5,372 individual meters that were billed for water service as of 9-30-2012. The breakout of these meters is as follows with numbers for 9-30-2011 included for comparison:

In-District	9-30-2011	9-30-2012
Residential	4,923	5,028
Residential Irrigation	1	1
Commercial	65	64
Commercial Irrigation	46	44
District	14	19
District Irrigation	14	15
Total	5,063	5,171

Out-of-District	9-30-2011	9-30-2012
Residential	200	199
Residential Irrigation	0	0
Commercial	2	2
Commercial Irrigation	0	0
Total	202	201

The sizes of these meters are as follows:

In-District				
	9-30-2012		9-30-2013	
Size	Meters	LUEs	Meters	LUEs
5/8"	4,815	4,815	4,865	4,865
3/4"	149	223.5	203	304.5
1"	35	87.5	36	90
1.5"	21	105	21	105
2"	28	224	31	248
3"	9	144	9	152
4"	0	0	0	0
6"	2	100	2	100
8"	4	320	4	320
Total	5,063	6,019	5,171	6,184.5

Out-of-District				
	9-30-2012		9-30-2013	
Size	Meters	LUEs	Meters	LUEs
5/8"	184	184	181	181
3/4"	15	22.5	16	24
1"	2	5	3	7.5
2"	1	8	1	8
Total	202	219.5	201	220.5

The District has adopted a schedule that assigns values to Living Unit Equivalents (LUE) based on the size of the water meter. In analyzing water uses and water needs, this report will focus on LUE counts since it provides a better estimate of water use than simply the number of meters.

In 2008, the engineering firm of K Friese and Associates completed a study of the District's system and estimated that the District would have 7,930 LUEs at complete build-out not including out-of-District services. They estimated that build-out would occur in 2019. These estimates were based on Impact Fee studies from 2000 and 2002 and analysis of the acres of vacant land designated for development (**Attachment B**).

Staff has updated the projection for expected build-out based on the current trends and known developments. It appears the majority of build-out may still occur by 2019. There may be some individual residential lots and certainly commercial lots that will not be developed until beyond that date. We have revised our estimated build-out for in-District LUE count to be less than 7,600 LUEs.

The reduction is primarily due to two meter counts in the original K Friese report that Staff has revised. The previous report calculated the LUE count for the "Mansions" apartment complex (now known as The Monterone Round Rock) to be 411 based on four meters. Two of these meters were compound meters. However, the compound meters were counted twice in the previous report. Staff verified the actual LUEs for the "Mansions" to be 192 LUEs.

The K Friese report also calculated 181 LUEs for the 100 acre Round Rock ISD tract. Staff is estimating that this would be less than 48 LUEs based on remaining available land (**Attachment A LUEs by Section**).

The previous report from K Friese was also impacted by the District's lack of data on water loss, unmetered water and consumption trends.

Water Use

Staff based the following analysis of water consumption trends using data from 2011 and 2012. Both years were considered drought years although 2011 was considered a severe drought year. Additionally in 2011, the District was under emergency water restrictions for 6 weeks while the Brazos River Authority made repairs to their raw water line.

Calendar Year 2011 Water Use Data

Fiscal year 2011 was one of the most severe droughts in Central Texas. In addition to the drought, the District also faced a significant water loss and emergency water restrictions when the water line managed by the Brazos River Authority was damaged. The damaged water line reduced the amount of water flowing from Lake Stillhouse Hollow to Lake Georgetown. The District's single active ground well came online in December 2011 so all raw water for FY2011 came from Lake Georgetown.

Water Use	
Produced Water	1,272,484,000 gallons
Williamson County Park	36,286,998 gallons
Sold Water	989,874,000 gallons (77.8% of produced water)
Other Uses	3,876,200 gallons
Water Distribution Loss	278,733,800 gallons

Total Produced Water Use by Month and by type											
Billed Consumption, Year 2010-11											
Month/Year	In-District						Out-of-District				Total Consumption Billed
	Residential	Residential Irrigation	District	District Irrigation	Commercial	Commercial Irrigation	Residential	Residential Irrigation	Commercial	Commercial Irrigation	
October, 2010	55,705,000	0	831,000	1,131,000	5,583,000	7,113,000	1,916,000	0	73,000	0	72,352,000
November, 2010	55,034,000	0	517,000	870,000	4,870,000	6,978,000	1,834,000	0	63,000	0	70,166,000
December, 2010	46,494,000	0	282,000	603,000	4,110,000	5,443,000	1,740,000	0	84,000	0	58,756,000
January, 2011	36,041,000	0	346,000	1,854,000	6,173,000	5,282,000	1,579,000	0	65,000	0	51,340,000
February, 2011	30,544,000	0	295,000	372,000	5,682,000	2,708,000	1,214,000	0	54,000	0	40,869,000
March, 2011	30,823,000	0	413,000	244,000	8,193,000	2,857,000	1,269,000	0	80,000	0	43,879,000
April, 2011	54,912,000	6,000	531,000	436,000	6,684,000	4,131,000	2,806,000	0	130,000	0	69,636,000
May, 2011	69,092,000	0	702,000	591,000	5,878,000	5,236,000	2,779,000	0	108,000	0	84,386,000
June, 2011	83,488,000	0	778,000	826,000	6,762,000	7,849,000	4,386,000	0	133,000	0	104,222,000
July, 2011	108,386,000	0	875,000	1,814,000	6,807,000	9,221,000	4,226,000	0	136,000	0	131,265,000
August, 2011	103,927,000	0	933,000	1,514,000	6,846,000	9,466,000	4,502,000	0	115,000	0	127,303,000
September, 2011	110,553,000	0	1,086,000	1,320,000	7,235,000	10,083,000	5,271,000	0	152,000	0	135,700,000
Total Annual Usage, 2010-11	784,999,000	6,000	7,589,000	11,575,000	74,623,000	76,367,000	33,522,000	0	1,193,000	0	989,874,000
Average Monthly Usage, 2010-11	65,416,583	500	632,417	964,583	6,218,583	6,363,917	2,793,500	0	99,417	0	82,489,500
Peak Month Usage, 2010-11	110,553,000	6,000	1,086,000	1,854,000	8,193,000	10,083,000	5,271,000	0	152,000	0	135,700,000
Peak Month/Average Month	1.69	12.00	1.72	1.92	1.32	1.58	1.89	n/a	1.53	n/a	1.65

District

The assumption is that lowest month of residential use is nearly all indoor use (30.544 MG) and is equivalent to 6,108 gallons per month, per residential LUE or 6,204 gallons per connection. The daily indoor water use per connection would be 206.8 gallons. The Texas Water Development Board (TWDB) conducted a study of 17 Texas cities and those cities reported indoor water use by residences from 2004 through 2011 and the study indicated the median and average indoor use of cities surveyed was 191-192 gallons per day per residence (**Attachment C**).

Based on the above assumption, residential outdoor water use for the District was 6,975 gallons per month, per residential LUE on average although obviously in warmer months, the use was higher. The outdoor use per connection was 7,084 per month or 236 gallons per day on average. In the same TWDB study, the 17 Texas cities surveyed averaged 108 gallons per day for residential outdoor water use and the median was 102 gallons. The statewide average was 86 gallons per day per residence.

Out-Of-District

Using the assumption that the lowest month of residential use is all indoor use (1.214 MG), this is equivalent to 5,518 gallons per month, per residential LUE. The daily use would be 184 gallons.

Based on the above assumption, residential irrigation was 7,180 gallons per month, per residential LUE or 7,898 gallons per connection. The daily average was 263 gallons.

Breakdown of FY2011 Water Use by Type of Service			
	MG	%	Per LUE, Per Month (Gallons)
Total Produced Water Distributed	1,272.484		
District Residential Indoor Water Use	366.528	28.8	6,106
District Residential Outdoor Water Use	418.471	32.9	6,972
District	7.589	.6	6,657
District Irrigation	11.575	.9	20,307
Commercial	74.623	5.9	9,005
Commercial Irrigation	76.367	6.0	34,587
Out-of-District Residential Indoor Water Use	14.568	1.1	5,767
Out-of-District Residential Outdoor Water Use	18.954	1.5	7,503
Out-of-District Commercial Use	1.193	.1	2,924
Other Uses	3.876	.3	
Water Loss	278.733	21.9	3,723

Total Irrigation Use – District and Out-Of-District

Total irrigation based on the above assumption on residential use plus irrigation meters was 525.367 MG for the fiscal year. This equates to 53% of total sold water.

The TWDB study which included communities across Texas indicated the average percentage of outdoor water use was 31% although the percentage varied from city to city. The median use was 36%. The average for the City of Round Rock was 38%.

Calendar Year 2012 Water Use Data

The 2011 drought continued into the first few months of FY2012. The District was in water restrictions, Drought Stage 2, through the end of March 2012. As the District moved into the spring and summer months, water consumption picked back up and was consistent with the 2010 numbers for the same months. The District's ground well number 3 came online in December 2011 and performed better than anticipated, generating on average, about 1 million gallons of raw water a day or about 26% of raw water.

Water Use (gallons)	
Produced Water	1,050,637,000
Williamson County Park	24,781,399
Sold Water	885,731,000 (84.3% of produced water)
Other Uses	8,554,705
Water Distribution Loss	156,351,295

Total Produced Water Use by Month and Type

Billed Consumption, Year 2011-12											
Month/Year	In-District						Out-of-District				Total Consumption Billed
	Residential	Residential Irrigation	District	District Irrigation	Commercial	Commercial Irrigation	Residential	Residential Irrigation	Commercial	Commercial Irrigation	
October, 2011	89,273,000	0	1,088,000	1,407,000	8,985,000	7,972,000	3,322,000	0	119,000	0	112,166,000
November, 2011	44,879,000	0	673,000	505,000	6,658,000	3,247,000	1,563,000	0	33,000	0	57,358,000
December, 2011	45,405,000	40,000	635,000	1,409,000	7,295,000	3,941,000	1,620,000	0	37,000	0	60,382,000
January, 2012	29,137,000	0	311,000	769,000	5,344,000	1,867,000	1,156,000	0	34,000	0	38,618,000
February, 2012	29,097,000	0	355,000	680,000	5,170,000	1,564,000	1,309,000	0	34,000	0	38,209,000
March, 2012	29,917,000	0	398,000	635,000	6,287,000	1,313,000	1,071,000	0	34,000	0	39,655,000
April, 2012	41,060,000	0	494,000	728,000	5,376,000	1,653,000	1,760,000	0	33,000	0	51,104,000
May, 2012	61,861,000	0	798,000	811,000	6,247,000	3,889,000	2,578,000	0	51,000	0	76,235,000
June, 2012	82,161,000	0	670,000	1,166,000	5,925,000	5,583,000	3,585,000	0	86,000	0	99,176,000
July, 2012	86,361,000	0	662,000	1,356,000	5,337,000	5,326,000	3,915,000	0	77,000	0	103,034,000
August, 2012	74,913,000	0	1,616,000	1,452,000	5,577,000	6,780,000	3,267,000	0	116,000	0	93,721,000
September, 2012	93,206,000	0	2,052,000	1,631,000	6,490,000	8,081,000	3,968,000	0	76,000	0	115,504,000
Total Annual Usage, 2011-12	707,070,000	40,000	9,752,000	12,549,000	74,691,000	51,216,000	29,114,000	0	730,000	0	885,162,000
Average Monthly Usage, 2011-12	58,922,500	3,636	812,667	1,045,750	6,224,250	4,268,000	2,426,167	0	60,833	0	73,763,500
Peak Month Usage, 2011-12	93,206,000	40,000	2,052,000	1,631,000	8,985,000	8,081,000	3,968,000	0	119,000	0	115,504,000
Peak Month/Average Month	1.58	11.00	2.53	1.56	1.44	1.89	1.64	n/a	1.96	n/a	1.57

District

The assumption is that the lowest month of residential use is nearly all indoor use (29.097 MG) and is equivalent to 5,671 gallons per month, per residential LUE or 5,787 gallons per connection. The daily indoor water use per connection would be 193 gallons. The TWDB conducted a study of 17 Texas cities and their reported indoor water use by residences from 2004 through 2011 and that study indicated the median and average indoor use of cities in their study was 191-192 gallons per day per residence.

Based on the above assumption, residential outdoor water use for the District was 5,813 gallons per month, per residential LUE on average although obviously in warmer months, the use was higher. The outdoor use per connection was 5,932 gallons per month or 198 gallons per day on average. In the same TWDB study, the 17 Texas cities averaged 108 gallons per day for residential outdoor water use and the median was 102 gallons. The statewide average was 86 gallons per day per residence.

Out-Of-District

Using the assumption that the lowest month of residential use is all indoor use 1.071 MG is equivalent to 4,868 gallons per month, per residential LUE. The daily use would be 162 gallons.

Based on the above assumption, residential irrigation was 6,160 gallons per month, per residential LUE or 6,775 gallons per connection. The daily average was 226 gallons.

Breakdown of FY2012 Water Use by Type of Service			
	MG	%	Per LUE, Per Month (gallons)
Total Produced Water Distributed	1,050.637		
District Residential Indoor Water Use	349.164	33.23	5,671
District Residential Outdoor Water Use	357.906	33.78	5,813
District	9.752	.9	20,995
District Irrigation	12.549	1.2	21,562
Commercial	74.691	7.1	7,331
Commercial Irrigation	51.216	4.9	23,580
Out-of-District Residential Indoor Water Use	12.852	1.2	5,064
Out-of-District Residential Outdoor Water Use	16.262	1.5	6,407
Out-of-District Commercial Use	.73	.005	1,789
Other Uses	8.554	.08	
Water Loss	156,961	16.105	2,037

Total Irrigation Use – District and Out-Of-District

Total irrigation based on the above assumption on residential use plus irrigation meters was 437.933 MG for the fiscal year. This equates to 49% of total sold water.

The TWDB study which included communities across Texas indicated the average percentage of outdoor water use was 31% although the percentage varied from city to city. The median use was 36%. The average for the City of Round Rock was 38%.

Average Water Use Data for 2011 and 2012

Breakdown of Average Water Use by Type of Service for 2011 and 2012			
	MG	%	Per LUE, Per Month (gallons)
Total Produced Water Distributed	2,323.121		
District Residential Indoor Water Use	715.692	30.81	5,886
District Residential Outdoor Water Use	776.377	33.42	6,386
District	17.341	.7	6,737
District Irrigation	24.124	1.0	20,941
Commercial	149.314	6.4	9,416
Commercial Irrigation	127.583	5.5	29,129
Out-of-District Residential Indoor Water Use	27.420	1.2	5,415
Out-of-District Residential Outdoor Water Use	35.216	1.5	6,954
Out-of-District Commercial Use	1.923	.08	8,903
Other Uses	12.430	.5	
Water Loss	435.694	18.9	2,873

Water Loss

The District tracks water loss in three ways; in the transmission system, in the production system, and in the distribution system.

The District did not start a formal process of tracking water uses and losses on a monthly basis until fiscal year 2011. This was the same time the District began an aggressive leak detection and water loss reduction program. For purposes of this report, we are reflecting actual water losses in each of the three systems, but are basing future water needs on the following percentages; 1.5 % water loss in the transmission system, 4%, water loss in the production system, and 10% water loss in the distribution system. The District strives to reduce and eliminate water loss in all systems and our goal is to reduce loss to the lowest possible amount.

The average water losses in each of the three systems for the past two years was 1/2% for the transmission lines, 10% for production loss, and 19% in the distribution system. Most of the production loss is through evaporation in the ponds at the water facility. There are some inconsistencies in the meter reads on the transmission lines and in the production meters at the plant but as of 2013, these should be corrected.

Current Raw Water Supply

The District currently has two sources of raw water. A calendar year contract with the Brazos River Authority (BRA) allows the District to take up to 4,000 acre feet from Lake Georgetown. This is equivalent to 1,303,404,000 gallons. All Lake Georgetown water is pumped through the District's lakeside intake and pumped via the raw water line to the ponds at the water facility. The maximum capacity of the District's intake and raw water lines is more than double the 4,000 acre feet allocation.

In December 2011, the District brought online ground water well #3 located on Sam Bass Road. The ground water is transmitted to the water facility via a raw water line located along Sam Bass Road. All ground water is mixed with surface water at the water facility ponds and treated at the plant before being pumped into the distribution system. The volume of ground water from well #3 is dependent on pump capacity and the level of water in the aquifer. The well has consistently provided approximately 1.1 mgd even during summer months. This is equivalent to 396 MG or 1,215 acre feet. The raw water transmission line from the well field is capable of transporting up to 1.7 mgd or 1,878 acre feet.

Other Uses of Raw Water

Chisholm Trail SUD – The District has an agreement with Chisholm Trail SUD (CTSUD) to transmit raw water to the Cimarron Hills Golf Course. The raw water belongs to CTSUD as part of their Lake Georgetown allocation. The transmission of raw water only impacts the intake and transmission lines and does not reduce the amount of raw water available to the District under our contract with BRA.

Williamson County Park – The District has an agreement to provide raw water to the pond at Williamson County Regional Park. The pond is primarily used to irrigate the sports fields. The County may take up to 100,000 gallons per day under the contract rate and must pay a higher rate for additional water. The County averaged 95 acres of raw water over the past two years, or 2.3% of the Lake Georgetown allocation.

Raw Water Costs

Surface Water – There are two components to the cost of raw water from Lake Georgetown, the contractual payments to BRA for the Williamson County Regional Raw Water Line (WCRRWL) and the District's cost of moving the water.

The District pays BRA a fee based on the total amount of acre feet available under the contract. This fee was \$54.50 per acre in 2007 and \$62.50 per acre in 2012. In FY2014, this cost will be \$66.50 per acre foot. The total fee is paid to BRA regardless of the actual amount of water the District takes from the lake. The District also reimburses BRA annual debt service cost regardless of the amount of water taken from the lake. This has averaged \$125,000 per year from 2007 through 2012.

The District reimburses BRA for any capital expenditures based on the District's percentage of total water allocated in Lake Georgetown. The District's allocation is 6.54%.

The District also reimburses BRA for operation and maintenance (OM) costs of the Williamson County Regional Raw Water Line (WCRRWL). Operational costs are based on annual actual costs and allocated based on the current year's annual intake from the lake. This is the only expense item that can be affected by increasing or decreasing the amount of water the District takes from the lake. The other three entities included in the WCRRWL (Chisholm SUD, Georgetown, and Round Rock) can also impact how much the District pays in OM costs based on the amount of water they take from the lake.

The average cost per thousand gallons under the BRA contract for FY2007 through FY2012 was:

Operation and Maintenance	\$.11
Debt Service	\$.12
Fixed Fee (System Rate)	<u>\$.24</u>
Total	\$.47

The BRA OM costs have remained relatively steady over the last six years.

The debt service costs and fixed fee are scheduled to increase each year.

The projected cost per thousand gallons under the BRA contract for FY2023 assuming all entities use their total allocated water supply could be:

Operation and Maintenance	\$.14
Debt Service	\$.17
Fixed Fee (System Rate)	<u>\$.38</u>
Total	\$.69

The District also incurs cost to move the raw water to the Water Facility. These costs are primarily for utilities although there are occasional repairs and maintenance to the intake and raw water line.

Estimated District cost to transport surface water is \$.00073 per thousand gallons.

Well Water - The primary cost associated with transporting well water to the Water Facility is utilities. The estimated cost to transport ground water per million gallons ranges from \$.0051 when the pumps are at 40% up to \$.0139 per million when the pumps are at 75% capacity.

Other District costs not contemplated for this report include depreciation, debt service, personnel, production, and overhead costs.

Customer Status In 2019

Staff evaluated current customer database, known platted development and service commitments, and vacant property available for development to project water connections. Assuming the current real estate market continues in the same growth pattern as in the past two years, we expect to be 99% built out by 2019. Out-of-District connections are more difficult to predict due to the type of development occurring in Brushy Bend. The District engaged Half Engineering to study the Brushy Bend distribution system to present options.

In-District	9-30-2011	9-30-2012	Projected 9-30-2019
Residential	4,923	5,023	5,586
Residential Irrigation	1	1	1
Commercial	65	64	424
Commercial Irrigation	46	44	164
District	14	19	35
District Irrigation	14	15	41
Total	5,063	5,166	6,251

Out-of-District			
Residential	200	199	217
Residential Irrigation	0	0	0
Commercial	2	2	2
Commercial Irrigation	0	0	0
Total	202	201	219

The estimated size* of these meters follows:

In-District	9-30-2011		9-30-2012		9-30-2019	
Size	Meters	LUEs	Meters	LUEs	Meters	LUEs
5/8"	4,815	4,815	4,860	4,860	5,494	5,494
3/4"	149	224	203	305	608	912
1"	35	88	36	90	70	175
1.5"	21	105	21	105	33	165
2"	28	224	31	248	32	256
3"	9	144	9	144	9	144
4"	0	0	0	0	0	0
6"	2	100	2	100	2	100
8"	4	320	4	320	4	320
Totals	5,063	6,019	5,166	6,172	6,251	7,558

Out-of-District	9-30-2011		9-30-2012		9-30-2019	
Size	Meters	LUEs	Meter	LUEs	Meters	LUEs
5/8"	184	184	181	181	189	189
3/4"	15	22.5	16	24	25	38
1"	2	5	3	7.5	3	7.5
2"	1	8	1	8	1	8
Totals	202	219.5	201	220.5	218	242.5

*Staff estimated meter sizes based on property use and sizes compared to existing meter sizes.

Using the above data and the averages from FY2011 and 2012, we can predict the water uses and needs of the District in 2019.

Breakdown of Average Water Use by Type of Service Projected for 2019 based on 2011 Usage Numbers			
	MG	%	Per LUE, Per Month (gallon)
Total Produced Water Distributed	1,378.627		
District Residential Indoor Water Use	409.444	30.6	6,106
District Residential Outdoor Water Use	467.514	34.8	6,972
District	11.743	.9	6,657
District Irrigation	19.378	1.4	20,307
Commercial	128.888	9.4	9,005
Commercial Irrigation	136.455	9.9	34,587
Out-of-District Residential Indoor Water Use	16.194	1.18	5,767
Out-of-District Residential Outdoor Water Use	21.068	1.5	7,503
Out-of-District Commercial Use	1.193	.01	2,924
Other Uses	3.876	.3	
Water Loss	137.862	10.0	3,723

Assuming a 4% production loss and a 1.5% transmission loss, the District would need 4,454 acre feet of raw water. If distribution water loss remains at the 15% level, the District would need 4,716 acre feet.

The K Friese report from 2008 indicated that the District would need 4,091 acre feet at build-out.

Using the 2011 minimum District monthly water use of 6,106 gallons per LUE and 5,767 gallons per out-of-District minimum water use, the District would need 1,751 acre feet to provide basic water needs.

Using the 2012 minimum District monthly water use of 5,671 gallons per LUE and 4,848 gallons per out-of-District minimum water use, the District would need 1,621 acre feet to provide basic water needs.

Future Raw Water Supply

The District has a 4,000 acre foot contract with BRA for raw water from Lake Georgetown and approximately 1,120 acre feet from ground well sources. If these two sources of raw water remain stable, the District has enough raw water for build-out.

If the ground well went offline, the District would need access to 1,751 acre feet on an annual basis or 1,563,000 gallons on a daily basis. There is an adequate supply of available surface water under the BRA contract to provide minimum raw water supplies.

However, if the surface water became unavailable, the District is only able to produce 1.1 million gallons a day or 1,215 acre feet annually from ground well #3. If ground well #5 is brought back online, the District would have access to 1.3 million gallons a day or annually, 1,440 acre feet. The District would still need to locate an additional 300 acre feet of raw water.

In an emergency, the District has an inter-local agreement with the City of Round Rock to provide treated water to the District's distribution system.

Additional Sources of Raw Water

Well #5

The District could choose to bring ground well #5 back online, which would generate 200,000 gallons of water a day or 225 acre feet annually without impacting well #3's production based on a study by the engineering firm of HDR, Inc. in 2012 (**Attachment D**). The estimated costs for bringing well #5 online would be \$125,000. Operating costs for transporting well water is generally limited to utility costs. These costs are higher per thousand gallons of water than transporting surface water (due to volume) but overall, costs are lower since the District does not have to reimburse fixed and operating costs to a water authority.

Wells #1, #2, and #4

Wells #1 and #2 are located further east on Sam Bass Road. These wells were capped in 2009 and are no longer functional. The District still owns the property and the raw water line extends to these sites. When the wells were functional, peripheral data indicated that the water was not of high quality and previous staff experienced significant maintenance problems with the pumps due to the water quality.

Lake Georgetown

There are five entities that have purchased 100% of the water rights in Lake Georgetown, the District (4,000 acre feet), City of Round Rock (18,134 AF), City of Georgetown (25,448 AF), Chisholm SUD (11,100 AF), and Jonah SUD (2,439 AF). Of these entities, only Jonah SUD has excess capacity. Jonah SUD has indicated that they are interested in selling some of their rights but only if the purchaser agrees to treat some of the raw water and send it back to Jonah. The District does not have this capability.

Lake Travis

The Lower Colorado River Authority (LCRA) manages Lake Travis. There are still available water rights in Lake Travis although we would most likely have to negotiate those rights through BRA since we are located in Williamson County. The cost of LCRA water is extremely high, the system rate is currently \$94.38 AF (146% of the BRA system rate) and operation and maintenance cost per acre foot actually used is \$188.76 (184% of the District's BRA costs). The District would also have to either contract with the Brushy Creek Regional Utility to transfer the water from Lake Travis or construct our own facilities. Either option would be costly for the amount of water the District would require.