Appendix A
Historical/Supplemental Data

Appendix A
Description of Tables

Table A-1. Historical Population. Table A-1 provides detailed historical population totals for each county in the BGRWPA for each decade from 1900 through 2000. Data for the period from 1900 to 1990 were obtained from the *Texas Alamnac, 1994-1995*. Data for 2000 were obtained from the U.S. Census. Table A-1 also provides region totals for each year listed, percent change in population from decade to decade, the State's total population and its corresponding percent change from decade to decade.

Table A-2. Historical Population by Subregion. Table A-2 categorizes the data listed in Table A-1 by the subregions identified in the BGRWPA, including the Rolling Plains, IH-35 Corridor and Lower Basin. Population totals for each subregion are provided as the summation of the populations of the counties within that subregion.

Table A-3. Historical Use by Source. Table A-3 provides a listing of water use in the BGRWPA by source, either groundwater or surface water, for 1980 and 1984 through 2000. These data were obtained from the TWDB. The total water use for the region is also listed.

Table A-4. Historical Groundwater Pumpage by Aquifer. Table A-4 provides a detailed listing of groundwater use by aquifer for 1980 and 1984 through 2000. These data are a summary of data obtained from the TWDB for groundwater use in the BGRWPA.

Table A-5. BGRWPA Reservoirs. Table A-5 provides a complete listing of the reservoirs in the BGRWPA with a permitted capacity of at least 2,500 acre-feet. This table is provided to supplement Table 1-5 in the report.

Table A-6. **Permitted Surface Water Diversions.** Table A-6 lists the permitted diversions by county obtained from the TCEQ water-rights database. Table A-6 provides supplemental information to Table 1-6 in the report.

Table A-7. Historical Use by County. Table A-7 provides detailed water-use data by county for the BGRWPA for 1980 and 1984 through 2000. Region totals are also provided. The data were obtained from the TWDB.

Table A-8. Historical Water Use by Type. Table A-8 lists water use as municipal, manufacturing, power generation, mining, irrigation or livestock watering for the years 1980 and 1984 through 2000. Region totals are included for each year. All data were obtained from the TWDB.

Table A-9. Historical Water Use by County, Source and Type. Table A-9 provides 2000 water use by source and type for each county in the BGRWPA. The percentage of use by source for each county is also included. The data were obtained from the TWDB.

Table A-1.
BGRWPA Historical Population

County	Historical Population[1]										
	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Bell	45,535	49,186	46,412	50,030	44,863	73,824	94,097	124,483	157,889	191,088	237974
Bosque	17,390	19,013	18,032	15,750	15,761	11,836	10,809	10,966	13,401	15,125	17,204
Brazos	18,859	18,919	21,975	21,835	26,977	38,390	44,895	57,978	93,588	121,862	152,415
Burleson	18,367	18,687	16,855	19,848	18,334	13,000	11,177	9,999	12,313	13,625	16,470
Callahan	8,768	12,973	11,844	12,785	11,568	9,087	7,929	8,205	10,992	11,859	12,905
Comanche	23,009	27,186	25,748	18,430	19,245	15,516	11,865	11,898	12,617	13,381	14,026
Coryell	21,308	21,703	20,601	19,999	20,226	16,284	23,961	35,311	56,767	64,213	74,978
Eastland	17,971	23,421	58,505	34,156	30,345	23,942	19,526	18,092	19,480	18,488	18,297
Erath	29,966	32,095	28,385	20,804	20,760	18,434	16,236	18,141	22,560	27,991	33,001
Falls	33,342	35,649	36,217	38,771	35,984	26,724	21,263	17,300	17,946	17,712	18,576
Fisher	2,708	12,596	11,009	13,563	12,932	11,023	7,865	6,344	5,891	4,842	4,344
Grimes	26,106	21,205	23,101	22,642	21,960	15,135	12,709	11,855	13,580	18,828	23,552
Hamilton	13,520	15,315	14,676	13,523	13,303	10,660	8,488	7,198	8,297	7,733	8,229
Haskell	2,637	16,249	14,193	16,669	14,905	13,736	11,174	8,512	7,725	6,820	6,093
Hill	41,355	46,760	43,332	43,036	38,355	31,282	23,650	22,596	25,024	27,146	32,321
Hood	9,146	10,008	8,759	6,779	6,674	5,287	5,443	6,368	17,714	28,981	41,100
Johnson	33,819	24,460	37,286	33,317	30,384	31,390	34,720	45,769	67,649	97,165	126,811
Jones	7,053	24,299	22,323	24,233	23,378	22,147	19,299	16,106	17,268	16,490	20,785
Kent	899	2,655	3,335	3,851	3,413	2,249	1,727	1,434	1,145	1,010	859
Knox	2,322	9,625	9,240	11,368	10,090	10,082	7,857	5,972	5,329	4,837	4,253
Lampasas	8,625	9,532	8,800	8,677	9,167	9,929	9,418	9,323	12,005	13,521	17,762
Lee	14,595	13,132	14,014	13,390	12,751	10,144	8,949	8,048	10,952	12,854	15,657
Limestone	32,573	34,621	33,283	39,497	33,781	25,251	20,413	18,100	20,224	20,946	22,051
McLennan	59,772	73,250	82,921	98,682	101,898	130,194	150,091	147,553	170,755	189,123	213,517
Milam	39,666	36,780	38,104	37,915	33,120	23,585	22,263	20,028	22,732	22,946	24,238
Nolan	2,611	11,999	10,868	19,323	17,309	19,808	18,963	16,220	17,359	16,594	15,802

Table A-1 (Concluded)

County	Historical Population[1]										
	1900	***1910***	***1920***	***1930***	***1940***	***1950***	***1960***	***1970***	***1980***	***1990***	***2000***
Palo Pinto	12,291	19,506	23,431	17,576	18,456	17,154	20,516	28,962	24,062	25,055	27,026
Robertson	31,480	27,454	27,933	27,240	25,710	19,908	16,157	14,389	14,653	15,511	16,000
Shackelford	2,461	4,201	4,960	6,695	6,211	5,001	3,990	3,323	3,915	3,316	3,302
Somervell	3,498	3,931	3,563	3,016	3,071	2,542	2,577	2,793	4,154	5,360	6,809
Stephens	6,466	7,980	15,403	16,560	12,356	10,597	8,885	8,414	9,926	9,010	9,674
Stonewall	2,183	5,320	4,086	5,667	5,589	3,679	3,017	2,397	2,406	2,013	1,693
Taylor	10,499	26,293	24,081	41,023	44,147	63,370	101,078	97,853	110,932	119,655	126,551
Throckmorton	1,750	4,563	3,589	5,253	4,275	3,618	2,767	2,205	2,053	1,880	1,850
Washington	32,931	25,561	26,624	25,394	25,387	20,542	19,145	18,842	21,998	26,154	30,373
Williamson	38,072	42,228	42,934	44,146	41,698	38,853	35,044	37,305	76,521	139,551	211,474
Young	6,540	13,657	13,379	20,128	19,004	16,810	17,254	15,400	19,001	18,126	13,989
Region Total	**680,093**	**802,012**	**849,801**	**871,571**	**833,387**	**821,013**	**855,217**	**895,682**	**1,130,823**	**1,350,811**	**1,621,961**
% Change		**17.9%**	**6.0%**	**2.6%**	**-4.4%**	**-1.5%**	**4.2%**	**4.7%**	**26.3%**	**19.5%**	**20.1%**
Annual Growth Rate		**1.7%**	**0.6%**	**0.3%**	**-0.4%**	**-0.1%**	**0.4%**	**0.5%**	**2.4%**	**1.8%**	**1.8%**
State Total	**3,048,710**	**3,896,542**	**4,663,228**	**5,824,715**	**6,414,824**	**7,711,194**	**9,579,677**	**11,196,730**	**14,229,191**	**16,986,510**	**20,851,820**
% Change		**27.8%**	**19.7%**	**24.9%**	**10.1%**	**20.2%**	**24.2%**	**16.9%**	**27.1%**	**19.4%**	**22.8%**
Annual Growth Rate		**2.5%**	**1.8%**	**2.2%**	**1.0%**	**1.9%**	**2.2%**	**1.6%**	**2.4%**	**1.8%**	**2.1%**

[1] Historical population data through 1990 are from *The Texas Almanac, 1994-1995*.

2000 Data from U.S. Census Bureau

Table A-2.
BRGWPA Historical Population by Subregion

Sub-Region/ County	*Historical Population[1]*										
	1900	*1910*	*1920*	*1930*	*1940*	*1950*	*1960*	*1970*	*1980*	*1990*	*2000*
Rolling Plains											
Bosque	17,390	19,013	18,032	15,750	15,761	11,836	10,809	10,966	13,401	15,125	17,204
Callahan	8,768	12,973	11,844	12,785	11,568	9,087	7,929	8,205	10,992	11,859	12,905
Comanche	23,009	27,186	25,748	18,430	19,245	15,516	11,865	11,898	12,617	13,381	14,026
Coryell	21,308	21,703	20,601	19,999	20,226	16,284	23,961	35,311	56,767	64,213	74,978
Eastland	17,971	23,421	58,505	34,156	30,345	23,942	19,526	18,092	19,480	18,488	18,297
Erath	29,966	32,095	28,385	20,804	20,760	18,434	16,236	18,141	22,560	27,991	33,001
Fisher	2,708	12,596	11,009	13,563	12,932	11,023	7,865	6,344	5,891	4,842	4,344
Hamilton	13,520	15,315	14,676	13,523	13,303	10,660	8,488	7,198	8,297	7,733	8,229
Haskell	2,637	16,249	14,193	16,669	14,905	13,736	11,174	8,512	7,725	6,820	6,093
Hood	9,146	10,008	8,759	6,779	6,674	5,287	5,443	6,368	17,714	28,981	41,100
Jones	7,053	24,299	22,323	24,233	23,378	22,147	19,299	16,106	17,268	16,490	20,785
Kent	899	2,655	3,335	3,851	3,413	2,249	1,727	1,434	1,145	1,010	859
Knox	2,322	9,625	9,240	11,368	10,090	10,082	7,857	5,972	5,329	4,837	4,253
Lampasas	8,625	9,532	8,800	8,677	9,167	9,929	9,418	9,323	12,005	13,521	17,762
Nolan	2,611	11,999	10,868	19,323	17,309	19,808	18,963	16,220	17,359	16,594	15,802
Palo Pinto	12,291	19,506	23,431	17,576	18,456	17,154	20,516	28,962	24,062	25,055	27,026
Shackelford	2,461	4,201	4,960	6,695	6,211	5,001	3,990	3,323	3,915	3,316	3,302
Somervell	3,498	3,931	3,563	3,016	3,071	2,542	2,577	2,793	4,154	5,360	6,809
Stephens	6,466	7,980	15,403	16,560	12,356	10,597	8,885	8,414	9,926	9,010	9,674
Stonewall	2,183	5,320	4,086	5,667	5,589	3,679	3,017	2,397	2,406	2,013	1,693
Taylor	10,499	26,293	24,081	41,023	44,147	63,370	101,078	97,853	110,932	119,655	126,551
Throckmorton	1,750	4,563	3,589	5,253	4,275	3,618	2,767	2,205	2,053	1,880	1,850
Young	6,540	13,657	13,379	20,128	19,004	16,810	17,254	15,400	19,001	18,126	13,989
Totals	213,621	334,120	358,810	355,828	342,185	322,791	340,644	341,437	404,999	436,300	480,532

Table A-2 (Concluded)

Sub-Region/ County	Historical Population[1]										
	1900	**1910**	**1920**	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**
IH-35 Corridor											
Bell	45,535	49,186	46,412	50,030	44,863	73,824	94,097	124,483	157,889	191,088	237,974
Hill	41,355	46,760	43,332	43,036	38,355	31,282	23,650	22,596	25,024	27,146	32,321
Johnson	33,819	24,460	37,286	33,317	30,384	31,390	34,720	45,769	67,649	97,165	126,811
McLennan	59,772	73,250	82,921	98,682	101,898	130,194	150,091	147,553	170,755	189,123	213,517
Williamson	38,072	42,228	42,934	44,146	41,698	38,853	35,044	37,305	76,521	139,551	211,474
Totals	218,553	235,884	252,885	269,211	257,198	305,543	337,602	377,706	497,838	644,073	822,097
Lower Basin											
Brazos	18,859	18,919	21,975	21,835	26,977	38,390	44,895	57,978	93,588	121,862	152,415
Burleson	18,367	18,687	16,855	19,848	18,334	13,000	11,177	9,999	12,313	13,625	16,470
Falls	33,342	35,649	36,217	38,771	35,984	26,724	21,263	17,300	17,946	17,712	18,576
Grimes	26,106	21,205	23,101	22,642	21,960	15,135	12,709	11,855	13,580	18,828	23,552
Lee	14,595	13,132	14,014	13,390	12,751	10,144	8,949	8,048	10,952	12,854	15,657
Limestone	32,573	34,621	33,283	39,497	33,781	25,251	20,413	18,100	20,224	20,946	22,051
Milam	39,666	36,780	38,104	37,915	33,120	23,585	22,263	20,028	22,732	22,946	24,238
Robertson	31,480	27,454	27,933	27,240	25,710	19,908	16,157	14,389	14,653	15,511	16,000
Washington	32,931	25,561	26,624	25,394	25,387	20,542	19,145	18,842	21,998	26,154	30,373
Totals	247,919	232,008	238,106	246,532	234,004	192,679	176,971	176,539	227,986	270,438	319,332

[1] Historical population data through 1990 are from *The Texas Almanac, 1994-1995*.
2000 Data from U.S. Census Bureau

Table A-3.
Historical Use by Source

Water Source	*Year*						
	1980	***1990***	***2000***	***2001***	***2002***	***2003***	***2004***
Groundwater	270,270	280,840	356,557	305,807	328,382	342,806	349,267
Surface Water	274,999	300,680	406,990	397,965	388,865	402,934	403,857
Region Total	**545,269**	**581,520**	**763,547**	**703,772**	**717,247**	**745,740**	**753,124**

Table A-4.
Historical Groundwater Pumpage by Aquifer

Aquifer	*Year*					
	1980	***1990***	***2000***	***2001***	***2002***	***2003***
Brazos Alluvium	29,426	36,528	23,070	16,592	18,368	30,342
Carrizo-Wilcox	32,111	55,759	96,156	100,789	116,433	103,694
Dockum	2,067	2,071	4,884	2,416	2,448	2,712
Edwards-BFZ	9,428	12,314	34,372	16,004	16,363	17,106
Edwards-TP	1,607	1,486	303	283	279	446
Gulf Coast	3,326	4,870	7,251	7,328	7,844	7,150
Queen City	1,556	1,707	2,132	2,266	2,372	2,253
Seymour	94,996	60,795	101,710	66,743	75,543	83,037
Sparta	1,042	1,423	1,595	1,734	3,513	3,538
Trinity	80,601	92,655	90,180	91,635	91,970	86,062
Woodbine	1,635	1,024	1,363	1,316	1,360	1,529
Other-Undiff.	13,472	9,757	6,999	9,638	10,226	10,431
Region Total	**271,267**	**280,389**	**370,015**	**316,744**	**346,719**	**348,300**
Note: Groundwater pumpage is reported for entire counties within the Brazos G. No adjustments were made for partial counties.						

Table A-5.
BGRWPA Reservoirs[1]
(Permit Capacity Greater than 2,500 acft)

Reservoir	Stream	County	Permitted Storage (acft)	Permitted Diversion (acft/yr)					Owner	Water Right Holders (Greater Than 1,000 acft)
				Municipal	Industrial	Irrigation	Other	Total		
Abilene	Elm Creek	Taylor	11,868	1,675	0	0	0	1,675	City of Abilene	City of Abilene
Alcoa Lake	Sandy Creek	Milam	15,650	0	14,000	0	0	14,000	Aluminum Co. of America	Aluminum Co. of America
Alvarado	Turkey Creek	Johnson	4,781	500	300	0	0	800	City of Alvarado	
Anson North	Thompson Creek	Jones	2,500	542	0	0	0	542	City of Anson	
Aquilla	Aquilla Creek	Hill	52,400	13,896	0	0	0	13,896	Brazos River Authority	Brazos River Authority
Belton	Leon River	Bell	457,600	112,257	0	0	0	112,257	U.S. Army Corps of Engineers	U.S. Army Corps of Engineers, Brazos River Authority, City of Temple,
Brushy Creek	Brazos River	Falls	6,560	0	0	0	0	0	City of Marlin	
Camp Creek	Camp Creek	Robertson	8,400	0	0	0	0	0	Camp Creek Water Co.	
Cisco	Sandy Creek	Eastland	45,000	1,971	56	0	0	2,027	City of Cisco	City of Cisco
Pat Cleburne	Nolan Creek	Johnson	25,600	5,760	0	240	0	6,000	City of Cleburne	City of Cleburne
Clyde	North Prong Pecan Creek	Callahan	5,748	1,000	0	0	0	1,000	City of Clyde	City of Clyde
Squaw Creek[2]	Squaw Creek	Somervell	151,500	0	23,180	0	0	23,180	Texas Utilities Electric Co.	Texas Utilities Electric Co.
Daniel	Gonzales Creek	Stephens	11,400	2,100	0	0	0	2,100	City of Breckenridge	City of Breckenridge
Dansby Power Plant[2]	Thompson Creek	Brazos	15,227	0	850	0	0	850	City of Bryan	City of Bryan
Davis/Catherine	Unnamed Trib. Dutchman Creek	Knox	7,479	0	0	2,031	0	2,031	League Ranch	League Ranch
Fort Parker	Navasota River	Limestone	3,100	0	0	6	0	6	Texas Parks and Wildlife Dept.	
Fort Phantom Hill	Elm Creek	Jones	73,960	25,690	4,000	1,000	0	30,690	City of Abilene	City of Abilene
Georgetown	North Fork San Gabriel River	Williamson	37,100	13,610	0	0	0	13,610	Brazos River Authority	Brazos River Authority
Gibbons Creek[2]	Gibbons Creek	Grimes	32,084	0	9,740	0	0	9,740	Texas Municipal Power Agency	Texas Municipal Power Agency
Graham/Eddleman	Flint Creek	Young	52,386	11,000	8,400	100	500	20,000	City of Graham	City of Graham
Granbury	Brazos River	Hood	155,000	64,712	0	0	0	64,712	Brazos River Authority	Brazos River Authority
Granger	San Gabriel River	Williamson	65,500	19,840	0	0	0	19,840	Brazos River Authority	Brazos River Authority

Table A-5 (Concluded)

Reservoir	Stream	County	Permitted Storage (acft)	Permitted Diversion (acft/yr)					Owner	Water Right Holders (Greater Than 1,000 acft)
				Municipal	Industrial	Irrigation	Other	Total		
Hubbard Creek	Hubbard Creek	Stephens	317,750	56,000	0	0	0	56,000	West Central Texas MWD	West Central Texas MWD
Kirby	Cedar Creek	Taylor	8,500	3,880	0	0	0	3,880	City of Abilene	City of Abilene
Lake Creek	Brazos River	McLennan	8,500	0	10,000	0	0	10,000	Luminant Generation Co.	Luminant Generation Co.
Leon	Leon River	Eastland	28,000	5,450	350	500	0	6,300	Eastland Co. WSD	Eastland Co. WSD
Limestone	Navasota River	Robertson	225,400	65,074	0	0	0	65,074	Brazos River Authority	Brazos River Authority
McCarty	Salt Prong	Shackelford	2,600	600	0	0	0	600	City of Albany	
Mexia	Navasota River	Limestone	9,600	2,887	65	0	0	2,952	Bistone MWSD	Bistone MWSD
Millers Creek Lake		Baylor	30,696	3,500	1,500	0		5,000	North Central Texas MWD	North Central Texas MWD
New Marlin	Brazos River	Falls	3,135	6,000	2,000	0	0	8,000	City of Marlin	City of Marlin
Palo Pinto	Palo Pinto Creek	Palo Pinto	44,124	12,500	6,000	0	0	18,500	Palo Pinto MWD	Palo Pinto MWD
Possum Kingdom	Brazos River	Palo Pinto	724,739	230,750				230,750	Brazos River Authority	Brazos River Authority
Proctor	Leon River	Comanche	59,400	19,658	0	0	0	19,658	Brazos River Authority	Brazos River Authority
Robinson Off-Channel Reservoirs	Brazos River	McLennan	8,037	13,100	0	0	0	13,100	City of Robinson	City of Robinson
Sandow Lignite Mine	Unnamed Trib. Brazos River	Milam	20,665	0	0	0	0	0	Aluminum Co. of America	Aluminum Co. of America
Somerville	Yegua Creek	Washington	160,110	48,000	0	0	0	48,000	U.S. Army Corps of Engineers	Brazos River Authority
Stamford	Paint Creek	Haskell	59,810	10,000	0	0	0	10,000	City of Stamford	City of Stamford
Stillhouse Hollow	Lampasas River	Bell	235,700	67,768	0	0	0	67,768	U.S. Army Corps of Engineers	Brazos River Authority
Sweetwater	Cottonwood Creek	Nolan	10,000	2,730	960	50	0	3,740	City of Sweetwater	City of Sweetwater
Tradinghouse	Brazos River	McLennan	37,800	0	15,000	0	0	15,000	Texas Utilities Electric Co.	Texas Utilities Electric Co.
Trammel	Sweetwater Creek	Nolan	2,500	2,000	0	0	0	2,000	City of Sweetwater	City of Sweetwater
Truscott Brine	Bluff Creek	Knox	107,000	0	0	0	0	0	Red River Authority of Texas	
Twin Oak[2]	Duck Creek	Robertson	30,319	0	13,200	0	0	13,200	Texas Utilities Electric Co.	Texas Utilities Electric Co.
Lake Brazos	Brazos River	McLennan	3,537	5,600	0	0	0	5,600	City of Waco	City of Waco
Waco	Bosque River	McLennan	192,062	78,970	0	900	0	79,870	U.S. Army Corps of Engineers	City of Waco
Wheeler Branch	Wheeler Branch		4,118	0	0	0	0	0	Somervell County Water District	Somervell County Water District
Whitney	Brazos River	Hill	50,000	18,336	0	0	0	18,336	Brazos River Authority	Brazos River Authority

Table A-6.
Permitted Surface Water Diversions

County	Permitted Diversion[1, 2]					
	Municipal	Industrial	Irrigation	Mining	Other[3]	Total
Bell	215,829	38,802	5,507	69	5	**260,212**
Bosque	3,940	5	9,318	0	0	**13,263**
Brazos	0	850	13,485	0	119	**14,454**
Burleson	0	420	8,040	0	1,000	**9,460**
Callahan	1,550	0	1,042	0	0	**2,592**
Comanche	19,858	11	13,485	0	0	**33,354**
Coryell	0	0	2,086	0	38	**2,124**
Eastland	8,871	556	2,513	1,607	0	**13,547**
Erath	80	0	5,013	30	25	**5,148**
Falls	6,224	2,000	6,537	0	0	**14,761**
Fisher	0	26	724	0	0	**750**
Grimes	0	16,050	2,193	200	0	**18,443**
Hamilton	614	3	3,331	0	0	**3,947**
Haskell	10,000	0	1,316	0	0	**11,316**
Hill	32,232	0	1,493	0	0	**33,725**
Hood	64,747	0	3,901	0	0	**68,648**
Johnson	6,980	300	903	125	0	**8,308**
Jones	29,532	4,007	7,420	383	0	**41,342**
Kent	0	0	554	5,900	0	**6,454**
Knox	34	0	2,233	235	0	**2,502**
Lampasas	4,642	1	2,370	0	0	**7,013**
Lee	0	0	182	0	0	**182**
Limestone	5,547	67	14	0	0	**5,628**
McLennan	98,224	53,876	7,350	0	0	**159,450**
Milam	2,792	33,512	7,884	0	0	**44,188**
Nolan	4,730	1,005	686	0	0	**6,421**
Palo Pinto	243,870	6,012	3,232	41	1,582	**254,737**
Robertson	65,074	13,658	9,730	53	480	**88,995**
Shackelford	711	50	138	63	0	**962**
Somervell	2,000	20,780	764	0	0	**23,544**
Stephens	58,100	97	1,178	218	0	**59,593**
Stonewall	0	0	8	302	0	**310**
Taylor	5,785	3,149	1,106	0	50	**10,090**
Throckmorton	660	0	9	0	0	**669**
Washington	48,000	20	2	0	0	**48,022**
Williamson	58,760	20	869	172	0	**59,821**
Young	11,250	8,509	1,368	600	0	**21,727**
Region Total	**1,010,636**	**203,786**	**127,983**	**9,998**	**3,299**	**1,355,701**

[1] Data obtained from the TCEQ water rights database, 2007.
[2] Diversion includes certificate of adjudication and permits.
[3] Category Other includes hydroelectric, navigation, recreation and other uses as classified by the TCEQ

Table A-7.
Historical Use by County

County	Year								
	1980	1990	2000	2001	2002	2003	2004	2005	2006
Bell	31,507	35,866	49,886	45,011	49,908	49,673	49,323	51,341	48,831
Bosque	4,893	5,403	7,808	5,973	5,985	6,654	7,726	9,966	8,535
Brazos	29,300	41,264	39,097	42,624	38,086	42,613	44,050	45,216	48,199
Burleson	9,508	9,956	22,165	14,354	15,468	22,889	30,349	27,592	28,657
Callahan	3,608	3,396	3,378	3,974	4,154	3,193	3,118	3,502	2,431
Comanche	31,034	54,850	42,113	51,257	37,781	30,838	32,873	34,721	36,803
Coryell	11,898	11,202	18,044	12,854	18,060	15,887	16,230	17,601	24,033
Eastland	19,781	16,491	20,512	18,802	20,716	12,740	12,333	13,109	13,770
Erath	21,190	19,902	24,991	20,508	23,128	18,963	18,619	19,723	22,308
Falls	10,103	10,966	7,585	7,127	6,950	11,355	9,046	10,290	8,998
Fisher	5,075	4,630	4,358	4,585	4,836	4,252	4,455	5,284	6,577
Grimes	3,534	15,969	10,195	9,837	8,538	8,908	9,744	12,196	15,386
Hamilton	4,090	4,476	3,818	3,831	4,178	3,849	3,614	3,831	3,778
Haskell	43,140	24,172	52,851	32,003	38,397	37,356	38,375	40,229	41,503
Hill	5,648	5,286	6,553	7,256	6,808	7,171	7,003	9,232	7,482
Hood	8,513	15,605	12,864	12,414	12,545	16,655	11,857	16,338	16,100
Johnson	12,672	15,182	26,025	24,016	21,990	22,873	20,678	28,851	32,227
Jones	14,803	9,703	10,540	8,109	8,239	6,269	6,513	6,976	6,140
Kent	1,607	1,916	1,649	1,627	1,613	2,711	2,855	3,005	2,178
Knox	51,309	33,774	44,926	29,854	32,155	42,002	42,012	42,467	42,569
Lampasas	3,983	3,350	5,557	5,261	5,633	6,432	5,883	3,720	4,124
Lee	3,957	4,677	5,876	5,830	5,786	5,098	5,797	7,177	4,873
Limestone	4,800	9,766	27,494	20,346	23,257	25,938	30,364	28,039	26,788
McLennan	70,528	58,934	74,850	50,788	58,390	59,901	62,286	72,637	58,052
Milam	19,935	32,134	59,275	45,067	61,048	67,184	51,163	56,695	55,023
Nolan	9,719	7,389	10,170	8,381	8,861	8,093	7,782	10,310	9,040
Palo Pinto	8,749	7,067	8,302	9,174	8,853	10,823	10,270	11,358	11,967
Robertson	24,856	25,504	25,394	32,451	35,918	36,984	37,545	43,323	41,184
Shackelford	1,963	2,072	2,413	2,192	2,223	2,966	2,963	3,875	3,077
Somervell	1,578	11,424	20,101	60,149	34,483	43,728	47,062	40,989	48,931
Stephens	9,094	3,597	10,231	9,407	9,371	9,110	9,702	9,555	2,061
Stonewall	1,461	1,719	1,129	2,617	3,714	939	927	919	1,097
Taylor	32,040	31,573	43,122	29,461	29,003	34,066	37,123	31,000	28,625
Throckmorton	838	1,475	1,145	1,086	1,141	1,070	1,013	999	936
Washington	5,444	6,397	8,815	8,335	8,424	7,932	7,533	8,237	8,276
Williamson	16,471	27,458	44,125	50,065	55,240	53,164	59,985	53,353	58,363
Young	6,640	6,975	6,190	7,146	6,367	5,461	4,953	2,632	4,573
Region Total	**545,269**	**581,520**	**763,547**	**703,772**	**717,247**	**745,740**	**753,124**	**786,288**	**783,495**

Table A-8.
Historical Water Use by Type

Use Type	***Year***								
	1980	***1990***	***2000***	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***
Municipal	215,744	236,955	319,141	285,623	307,003	310,405	319,072	334,319	328,057
Manufacturing	21,124	32,240	56,993	43,931	57,545	62,966	49,548	52,239	54,828
Power	28,686	57,657	86,963	108,005	78,951	87,733	93,793	90,640	85,366
Mining	11,413	6,944	15,008	15,049	15,378	16,573	16,482	23,878	16,683
Irrigation	229,387	200,954	232,991	200,246	208,475	218,287	224,621	233,607	244,694
Livestock	38,915	46,770	52,451	50,918	49,895	49,776	49,608	51,605	53,867
Region Total	**545,269**	**581,520**	**763,547**	**703,772**	**717,247**	**745,740**	**753,124**	**786,288**	**783,495**

Table A-9.
Historical Water Use by County, Source and Type

County	Water Source	Use Type: Municipal	Manufacturing	Power	Irrigation	Mining	Livestock	County Total	Percent of Total
Bell	G	2,301	2	0	173	132	92	**2,700**	**5.5**
	S	44,593	453	0	749	0	828	**46,623**	**94.5**
	Total	46,894	455	0	922	132	920	**49,323**	**100.0**
Bosque	G	3,303	707	0	615	276	499	**5,400**	**69.9**
	S	4	0	0	1,823	0	499	**2,326**	**30.1**
	Total	3,307	707	0	2,438	276	998	**7,726**	**100.0**
Brazos	G	28,713	2,148	183	11,027	25	494	**42,590**	**96.7**
	S	0	0	94	626	0	740	**1,460**	**3.3**
	Total	28,713	2,148	277	11,653	25	1,234	**44,050**	**100.0**
Burleson	G	1,987	117	0	20,665	0	589	**23,358**	**77.0**
	S	0	0	0	6,106	0	885	**6,991**	**23.0**
	Total	1,987	117	0	26,771	0	1,474	**30,349**	**100.0**
Callahan	G	528	0	0	392	41	44	**1,005**	**32.2**
	S	1,269	0	0	15	0	829	**2,113**	**67.8**
	Total	1,797	0	0	407	41	873	**3,118**	**100.0**
Comanche	G	720	530	0	16,455	80	700	**18,485**	**56.2**
	S	740	2,474	0	8,168	0	3,006	**14,388**	**43.8**
	Total	1,460	3,004	0	24,623	80	3,706	**32,873**	**100.0**
Coryell	G	171	0	0	188	100	683	**1,142**	**7.0**
	S	14,402	3	0	0	0	683	**15,088**	**93.0**
	Total	14,573	3	0	188	100	1,366	**16,230**	**100.0**

Table A-9 (Continued)

County	Water Source	Use Type: Municipal	Manufacturing	Power	Irrigation	Mining	Livestock	County Total	Percent of Total
Eastland	G	258	2	0	8,328	78	110	**8,776**	**71.2**
	S	2,406	49	0	42	1	1,059	**3,557**	**28.8**
	Total	2,664	51	0	8,370	79	1,169	**12,333**	**100.0**
Erath	G	3,501	48	0	6,395	0	3,604	**13,548**	**72.8**
	S	493	5	0	969	0	3,604	**5,071**	**27.2**
	Total	3,994	53	0	7,364	0	7,208	**18,619**	**100.0**
Falls	G	567	0	0	2,483	133	203	**3,386**	**37.4**
	S	2,485	0	0	1,346	0	1,829	**5,660**	**62.6**
	Total	3,052	0	0	3,829	133	2,032	**9,046**	**100.0**
Fisher	G	471	158	0	2,844	170	57	**3,700**	**83.1**
	S	242	1	0	0	1	511	**755**	**16.9**
	Total	713	159	0	2,844	171	568	**4,455**	**100.0**
Grimes	G	4,193	269	0	60	0	227	**4,749**	**48.7**
	S	0	0	3,680	208	0	1,107	**4,995**	**51.3**
	Total	4,193	269	3,680	268	0	1,334	**9,744**	**100.0**
Hamilton	G	704	3	0	543	0	166	**1,416**	**39.2**
	S	636	1	0	70	0	1,491	**2,198**	**60.8**
	Total	1,340	4	0	613	0	1,657	**3,614**	**100.0**
Haskell	G	149	0	0	36,278	101	145	**36,673**	**95.6**
	S	649	0	400	71	0	582	**1,702**	**4.4**
	Total	798	0	400	36,349	101	727	**38,375**	**100.0**

Table A-9 (Continued)

County	Water Source	Use Type						County Total	Percent of Total
		Municipal	Manufacturing	Power	Irrigation	Mining	Livestock		
Hill	G	2,730	5	0	150	118	74	**3,077**	**43.9**
	S	2,690	5	0	15	0	1,216	**3,926**	**56.1**
	Total	5,420	10	0	165	118	1,290	**7,003**	**100.0**
Hood	G	4,089	17	3	0	167	275	**4,551**	**38.4**
	S	1,134	0	351	5,540	0	281	**7,306**	**61.6**
	Total	5,223	17	354	5,540	167	556	**11,857**	**100.0**
Johnson	G	6,812	685	0	0	272	395	**8,164**	**39.5**
	S	10,784	525	0	21	0	1,184	**12,514**	**60.5**
	Total	17,596	1,210	0	21	272	1,579	**20,678**	**100.0**
Jones	G	11	0	0	1,267	290	104	**1,672**	**25.7**
	S	2,760	0	477	670	0	934	**4,841**	**74.3**
	Total	2,771	0	477	1,937	290	1,038	**6,513**	**100.0**
Kent	G	680	0	0	1,121	721	29	**2,551**	**89.4**
	S	25	0	0	17	0	262	**304**	**10.6**
	Total	705	0	0	1,138	721	291	**2,855**	**100.0**
Knox	G	204	0	0	40,120	15	55	**40,394**	**96.1**
	S	553	0	0	0	26	1,039	**1,618**	**3.9**
	Total	757	0	0	40,120	41	1,094	**42,012**	**100.0**
Lampasas	G	845	0	0	0	66	245	**1,156**	**19.6**
	S	3,793	105	0	333	0	496	**4,727**	**80.4**
	Total	4,638	105	0	333	66	741	**5,883**	**100.0**

Table A-9 (Continued)

County	Water Source	Use Type						County Total	Percent of Total
		Municipal	Manufacturing	Power	Irrigation	Mining	Livestock		
Lee	G	3,540	13	0	580	8	481	**4,622**	**79.7**
	S	0	0	0	3	0	1,172	**1,175**	**20.3**
	Total	3,540	13	0	583	8	1,653	**5,797**	**100.0**
Limestone	G	2,123	0	1,277	0	792	160	**4,352**	**14.3**
	S	792	9	23,412	0	0	1,799	**26,012**	**85.7**
	Total	2,915	9	24,689	0	792	1,959	**30,364**	**100.0**
McLennan	G	14,529	201	597	2,232	0	185	**17,744**	**28.5**
	S	30,737	1,583	6,739	3,343	481	1,659	**44,542**	**71.5**
	Total	45,266	1,784	7,336	5,575	481	1,844	**62,286**	**100.0**
Milam	G	2,114	26,575	0	3,589	0	755	**33,033**	**64.6**
	S	1,419	9,859	4,048	1,672	0	1,132	**18,130**	**35.4**
	Total	3,533	36,434	4,048	5,261	0	1,887	**51,163**	**100.0**
Nolan	G	191	35	0	4,138	229	16	**4,609**	**59.2**
	S	2,253	526	0	93	0	301	**3,173**	**40.8**
	Total	2,444	561	0	4,231	229	317	**7,782**	**100.0**
Palo Pinto	G	241	10	0	54	0	76	**381**	**3.7**
	S	3,984	17	2,588	2,613	1	686	**9,889**	**96.3**
	Total	4,225	27	2,588	2,667	1	762	**10,270**	**100.0**
Robertson	G	2,614	38	4,338	19,244	90	750	**27,074**	**72.1**
	S	0	0	79	9,266	0	1,126	**10,471**	**27.9**
	Total	2,614	38	4,417	28,510	90	1,876	**37,545**	**100.0**

Table A-9 (Continued)

County	Water Source	Municipal	Manufacturing	Power	Irrigation	Mining	Livestock	County Total	Percent of Total
		Use Type							
Shackelford	G	1	0	0	0	1,337	78	**1,416**	**47.8**
	S	620	0	0	202	23	702	**1,547**	**52.2**
	Total	621	0	0	202	1,360	780	**2,963**	**100.0**
Somervell	G	1,070	4	475	0	756	64	**2,369**	**5.0**
	S	0	0	44,537	81	11	64	**44,693**	**95.0**
	Total	1,070	4	45,012	81	767	128	**47,062**	**100.0**
Stephens	G	43	0	0	0	75	44	**162**	**1.7**
	S	1,338	5	0	563	7,239	395	**9,540**	**98.3**
	Total	1,381	5	0	563	7,314	439	**9,702**	**100.0**
Stonewall	G	231	0	0	158	14	42	**445**	**48.0**
	S	98	0	0	6	0	378	**482**	**52.0**
	Total	329	0	0	164	14	420	**927**	**100.0**
Taylor	G	633	8	0	51	224	42	**958**	**2.6**
	S	34,538	923	0	0	0	704	**36,165**	**97.4**
	Total	35,171	931	0	51	224	746	**37,123**	**100.0**
Throckmorton	G	0	0	0	0	40	79	**119**	**11.7**
	S	180	0	0	0	0	714	**894**	**88.3**
	Total	180	0	0	0	40	793	**1,013**	**100.0**
Washington	G	1,861	386	0	550	98	188	**3,083**	**40.9**
	S	2,562	144	0	0	53	1,691	**4,450**	**59.1**
	Total	4,423	530	0	550	151	1,879	**7,533**	**100.0**

Table A-9 (Concluded)

County	Water Source	Use Type						County Total	Percent of Total
		Municipal	Manufacturing	Power	Irrigation	Mining	Livestock		
Williamson	G	17,855	310	0	0	1,812	131	**20,108**	**33.5**
	S	37,643	566	0	245	241	1,182	**39,877**	**66.5**
	Total	55,498	876	0	245	2,053	1,313	**59,985**	**100.0**
Young	G	79	0	0	0	145	75	**299**	**6.0**
	S	3,188	24	515	45	0	882	**4,654**	**94.0**
	Total	3,267	24	515	45	145	957	**4,953**	**100.0**

Appendix B
Aquifer Descriptions and Groundwater Availability Analysis

Appendix B
Blaine Aquifer

Location

The Blaine Aquifer, a minor aquifer, has recently been redelineated by TWDB and occurs in the extreme western part of Brazos G. The previous delineation showed the aquifer to occur only in the extreme western part of Knox County. Now, the delineation shows the aquifer to also occur in Fisher, Nolan, and Stonewall Counties (Figure B-1).

Geohydrology

The Blaine Formation of the Pease River Group of Permian Age consists of beds of gypsum, anhydrite, halite, dolomite, sandstone, and shale. Not all beds are found throughout the formation, however the individual beds of gypsum and dolomite are laterally continuous. Recharge primarily occurs from precipitation on the outcrop, which is along the eastern edge of the formation. Discharge is to the wells, seepage to streams, or leakage to other formations.

Development and Use

While the upper part of the Blaine provides irrigation supplies from solutioning of gypsum and dolomite beds in adjacent planning areas, Ogilbee (1962) reports that similar conditions are not present in Knox County, and probably do not exist in Fisher, Nolan and Stonewall Counties. The TWDB data base shows only a few livestock and household wells in the Blaine Aquifer in the four counties. These data show inventoried Blaine wells to be less than 200 ft deep. Water quality is highly variable. No withdrawals from the Blaine Aquifer are included in the TWDB 2000 groundwater pumpage tabulations. The aquifer is under water table conditions in the eastern part of the aquifer and under confined conditions to the west.

Availability

The Blaine Aquifer in BGRWPA is in GMA-6. As of February 2009, they have not established the desired future conditions (DFC). Thus, there is no preliminary estimate of managed available groundwater (MAG). For purposes of the 2011 Brazos G plan, groundwater availability of the Blaine is assumed to be equal to the amount of net recharge to the aquifer and is calculated by multiplying the rate of net recharge times the area of the outcrop, as mapped by the TWDB. Net recharge was estimated during the development of the Seymour GAM (Ewing, J.D., Jones, T.L., Pickens, J.F. and others, 2004). Based on their research and model calibration, the estimated long-term recharge rate to the Blaine Aquifer is 0.38 inches per year. The estimated annual groundwater availability, by county, is presented in the following table.

Blaine Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Fisher	3,600
Knox	700
Nolan	100
Stonewall	8,700
Total	13,100

Well Yields and Water Quality

Any extensive development of this aquifer is unlikely because of the frequent occurrence of poor quality water and low well yields.

Resource Considerations

Counties in groundwater districts include: Knox (Rolling Plains Groundwater Conservation District GCD), Fisher (Clear Fork GCD), and Nolan (Wes-Tex GCD).

References

Duffin, G.L., and Beynon, B.E., 1992, Evaluation of water resources in parts of the Rolling Prairies region of North-Central Texas: TWDB Report 337.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Ogilbee, William and Osborne, F.L., 1962, Ground-water resources of Haskell and Knox Counties, Texas: TWC Bulletin 6209.

Ewing, J.D., Jones, T.L., Pickens, J.F. and others, 2004, Groundwater Availability for the Seymour Aquifer: Texas Water Development Board Contract Report. http://www.twdb.state.tx.us/gam/symr/symr.htm

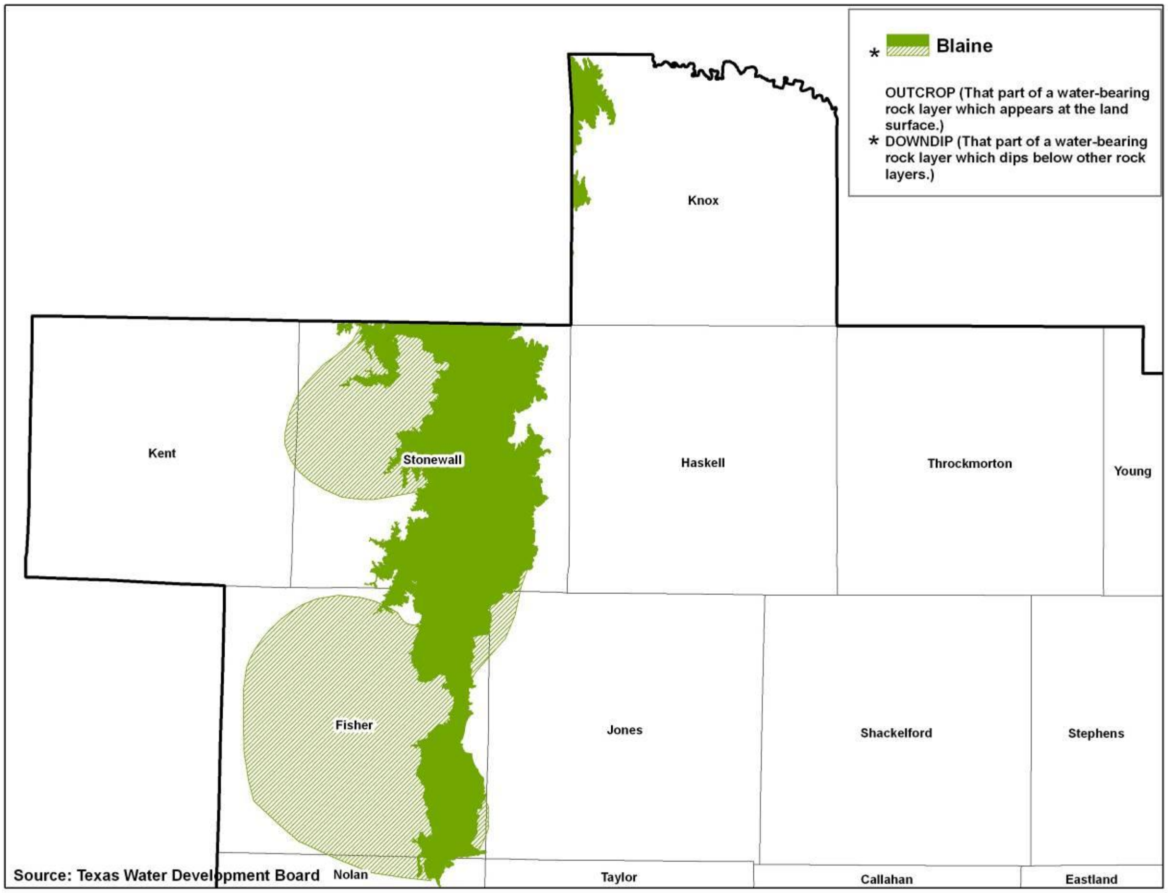


Figure B-1. Location of Blaine Aquifer in BGRWPA

(This page intentionally left blank.)

Brazos River Alluvium Aquifer

Location

The Brazos River Alluvium Aquifer is a minor aquifer and occurs along the floodplain and terrace deposits of the Brazos River downstream of Hill and Bosque Counties. The width of the aquifer ranges from one to almost seven miles. The Brazos River Alluvium Aquifer in BGRWPA occurs in parts of Hill, Bosque, McLennan, Falls, Milam, Robertson, Burleson, Brazos, Washington and Grimes Counties. It is limited to the valley area along the Brazos River (Figure B-2).

Geohydrology

The river alluvium forms a floodplain and a series of terraces. The floodplain is of primary significance as a source of groundwater locally, however, groundwater also may occur in the terrace deposits that are outside the floodplain. The alluvium consists of layers of clay, silt, sand and various mixtures. The coarsest and best water-bearing zones are in the lower part of the aquifer. Water in the floodplain alluvium usually exists under water table conditions, although leaky artesian conditions may occur locally where there are extensive lenses of clay. The maximum saturated thickness of the alluvium is about 85 feet. The primary source of recharge is precipitation on the floodplain. Lesser amounts of recharge are losses of runoff in streams crossing the floodplain, groundwater discharge from adjacent aquifers and return flow from irrigation water. Discharge is mostly by seepage to the Brazos River, evapotranspiration, and wells.

Development and Use

The year 2000 BGRWPA groundwater use for the Brazos River Alluvium Aquifer was estimated to be 23,070 acft with approximately 99 percent for irrigation, 0.5 percent for mining and 0.5 percent for livestock watering.

Availability

Estimated groundwater availability from the Brazos River Alluvium Aquifer was determined separately for two segments. In the GMA-8 area which includes the counties of Bosque, Hill, McLennan, Falls, and western Milam Counties, the MAG has been determined by the TWDB. In the GMA-12 and 14, which includes Brazos, Burleson, Grimes, Robertson and Washington Counties, the estimates of groundwater availability have not been determined by the DFC and MAG process. Based on discussions with the chairmen of GMA-12 and GMA-14 representatives, they suggested retaining the 2006 Brazos G estimates. These estimates were equal to the amount of effective recharge that was presented by the TWDB in the 1997 Water Plan.

The approach used for the GMA-8 counties to determine the MAG includes:

(1) Establishing a DFC that is based on maintaining a saturated thickness of 82 percent in McLennan County, 90 percent in Bosque and Hill Counties, and 100 percent in Falls County,
(2) Calculating the volume of water in storage by county,
(3) Calculating the annual net recharge from annual precipitation (7.5 percent of precipitation),
(4) Calculating the average saturated thickness,
(5) Prorating the allowable depletion in saturated thickness over 50 years, and
(6) Summing the allowable annual depletion and annual net recharge. Details of the approach, parameters and assumptions are presented in TWDB's *GTA Aquifer Assessment 07-05mag* document.

The groundwater availability estimates, by county, follow:

Brazos River Alluvium Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Bosque	830
Brazos	12,500
Burleson	9,400
Falls	16,684
Grimes	1,700
Hill	632
McLennan	15,023
Milam	475
Robertson	6,300
Washington	3,100
Total	66,644

Well Yields

Yields from large supply wells are typically between 250 and 500 gallons per minute (gpm). Well yields are considerably less at the edges of the alluvium, and where there is minimal sand thickness or a considerable amount of silt and/or clay is present.

Water Quality

Water quality from the Brazos River Alluvium Aquifer varies widely, even within short distances. Concentrations of dissolved solids exceed 1,000 milligrams per liter (mg/L) in many areas; but, water is sufficiently fresh to meet drinking water standards in some areas. Data show the aquifer generally having 500 to 3,000 mg/L dissolved solids content. Areas with dissolved solids concentrations less than 500 mg/L or greater than 3,000 mg/L are of limited extent. Local groundwater contamination from agriculture chemicals is likely in intensively irrigated areas.

Resource Considerations

Any extensive development of this aquifer is likely to cause some reductions of flow in the Brazos and Little Brazos Rivers.

Counties with groundwater conservation districts in the BGRWPA include: Grimes (Bluebonnet GCD), Robertson and Brazos (Brazos Valley GCD), McLennan (McLennan County GCD) and Milam and Burleson (Post Oak Savannah GCD).

References

Cronin, J.G., and Wilson, C.A., 1967, Groundwater in the flood-plain alluvium of the Brazos River, Whitney Dam to vicinity of Richmond, Texas: TWDB Report 41.

Ward, J.K., 2008, Managed available groundwater estimates for the Brazos River Alluvium Aquifer in Groundwater Management Area 8: TWDB letter dated Nov 7, 2008 with *GTA Aquifer Assessment 07-05mag* attachment.

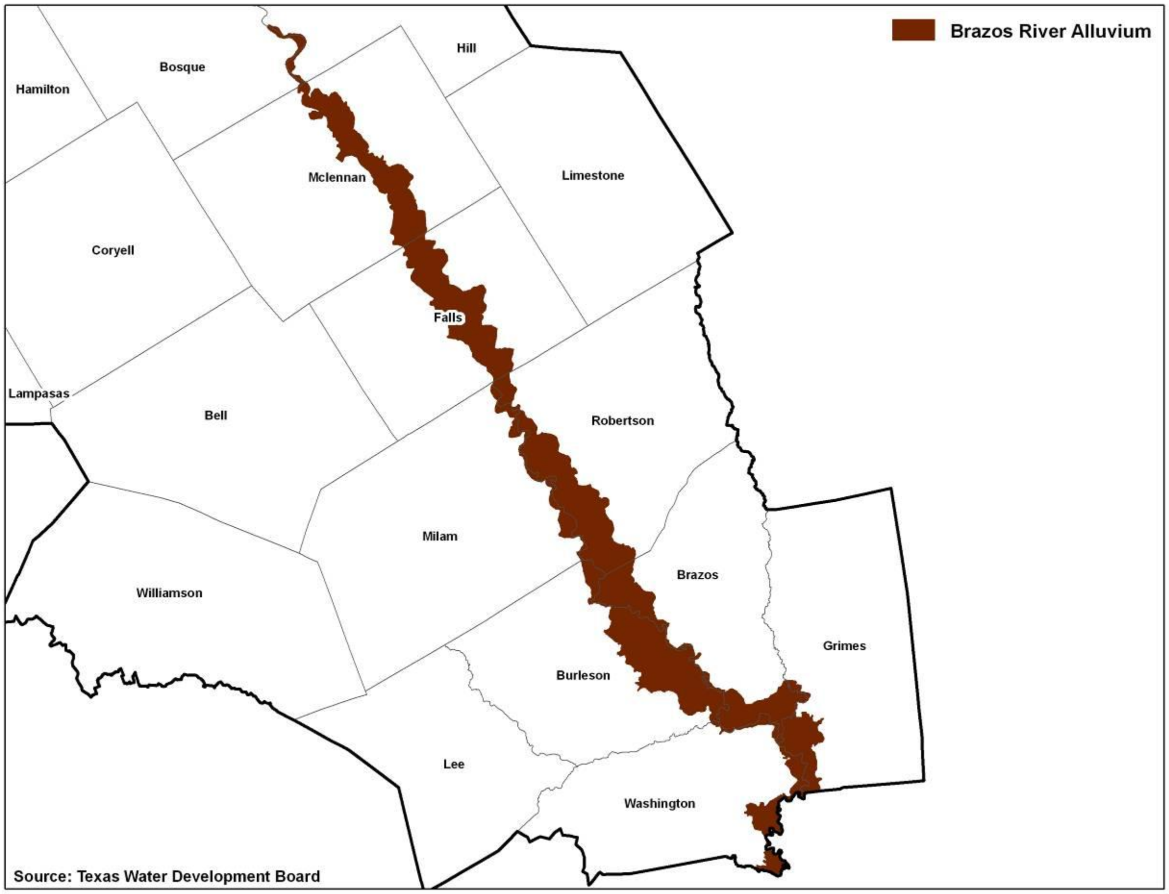


Figure B-2. Location of Brazos River Alluvium Aquifer in BGRWPA

Carrizo-Wilcox Aquifer

Location

The Carrizo-Wilcox, a major aquifer within the BGRWPA, is of major significance in water planning due to a relatively large supply of undeveloped water. It traverses a southeastern part of the BGRWPA in a northeast-southwest-trending band and extends into adjoining planning areas (Figure B-3). It occurs within the BGRWPA primarily in parts of Brazos, Burleson, Lee, Limestone, Milam, and Robertson Counties

Geohydrology

The Carrizo Formation and the underlying Wilcox Group, which is divided into the Calvert Bluff, Simsboro, and Hooper units, form the Carrizo-Wilcox Aquifer. The Simsboro is a major water-bearing unit across the BGRWPA and also in neighboring planning areas.. Between the Colorado and Trinity Rivers, the Simsboro sands are uniquely productive and are largely separated from overlying and underlying geologic units by clays of low permeability. The sands in the Simsboro and Carrizo are overwhelmingly the two most significant water-bearing zones in the Carrizo-Wilcox. The Calvert Bluff and Hooper are generally tapped only by shallow wells.

The Carrizo-Wilcox consists of a thick sequence of ancient river and delta deposits, consisting mostly of sand, silt, and clay. Total thickness is typically between 2,000 and 3,000 feet, and net sand thickness can exceed 50 percent of the total thickness. Some important coal (lignite) deposits occur primarily within the Calvert Bluff. From surface outcrops (recharge areas) the Carrizo-Wilcox zones dip coastward beneath younger strata. Water table conditions occur in recharge areas, and artesian conditions occur in downdip areas. Precipitation is the main source of recharge. A substantial, but unknown, amount of recharge is rejected by evapotranspiration in the outcrop. Freshwater sands occur up to 30 miles south of recharge areas and to depths up to about 3,000 feet in the most permeable sands. Slightly saline water occurs just to the southeast (coastward) of the fresh water. Faulting within the Mexia-Talco Fault Zone occurs in about a 5-mile wide belt across parts of Lee, Burleson, Milam, and Robertson Counties. The faults affect position, continuity, and possibly water quality within the Carrizo-Wilcox zones in variable and mostly unknown ways.

Development and Use

The year 2000 groundwater use within the BGRWPA totals 96,156 acft, according to Texas Water Development Board data. Approximately 43 percent of the total pumped water was used for municipal purposes, 33 percent for manufacturing, 6 percent for steam-electric power generation, 16 percent for irrigation, 1 percent for livestock watering, and 1 percent for mining. The Simsboro is the most productive zone. Relatively large amounts of water use is for municipal pumping by Bryan, College Station, Texas A&M, Hearne and Rockdale, industrial (mining) in Milam County and irrigation in Robertson County.

Availability

Estimates of groundwater availability from the Carrizo-Wilcox Aquifer range from small amounts by some local interests to great amounts by water marketers. The selected process in resolving this issue for water planning, management, and regulatory purposes is outlined by the TWDB on the basis of HB 1763. GMAs for the Carrizo-Wilcox in Brazos G includes GMA-12 and GMA-14. Counties in GMA-12 include: Brazos, Burleson, Falls, Lee, Limestone, Milam and Robertson. Counties in GMA-14 include Grimes and Washington.

Currently, the groundwater availability, or MAG, has not been determined in either GMA. However, the representatives for GMA-12 have reached, or nearly reached, a consensus with a simulation of specified pumpage in the Queen City-Sparta Groundwater Availability Model (GAM), which includes the Carrizo-Wilcox. This simulation is called GMA-12 Run-3B. For purposes of Brazos G, the year 2060 pumpages for the Carrizo, Calvert Bluff, Simsboro, and Hooper are being recommended as reasonable estimates for a potential MAG for the Carrizo-Wilcox Aquifer. These values are not official MAG values, but are considered to be more suitable for planning purposes than values in the 2006 Brazos G plan.

GMA-14 representatives are in the early stages of determining their DFC and do not have preliminary estimates of their MAG. Based on a conversation with the chairman of GMA-14, the 2011 plan should use estimates from the 2006 Brazos G plan.

The adopted groundwater availability estimates by county follow:

Carrizo-Wilcox Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Brazos	57,171
Burleson	35,369
Falls	923
Grimes	5,000
Lee	6,042
Limestone	12,178
Milam	22,988
Robertson	44,852
Total	184,523

In comparison, the estimates in the TWDB 1997 Water Plan totaled 278,840 acft/yr; estimates in the 2001 Brazos G regional water plan totaled 280,936 acft/yr, and estimates in the 2006 Brazos G plan totaled 251,000 acft/yr.

The modeled water levels in year 2060 for the Simsboro layer of the Carrizo-Wilcox Aquifer are shown in Figure B-4 for pumpage in GMA-12 Run-3B. The calculated drawdown for the Simsboro from year 2010 to 2060 for this simulation is shown in Figure B-5.

Well Yields

Wide variations occur in individual well yields for the four Carrizo-Wilcox hydrogeologic units, mostly depending on well depth and local sand thickness. Estimated ranges for maximum individual well yields are from 500 to 2,000 gpm for the Carrizo, from 100 to 300 gpm for the Calvert Bluff, from 500 to 3,000 gpm for the Simsboro, and from 100 to 300 gpm for the Hooper.

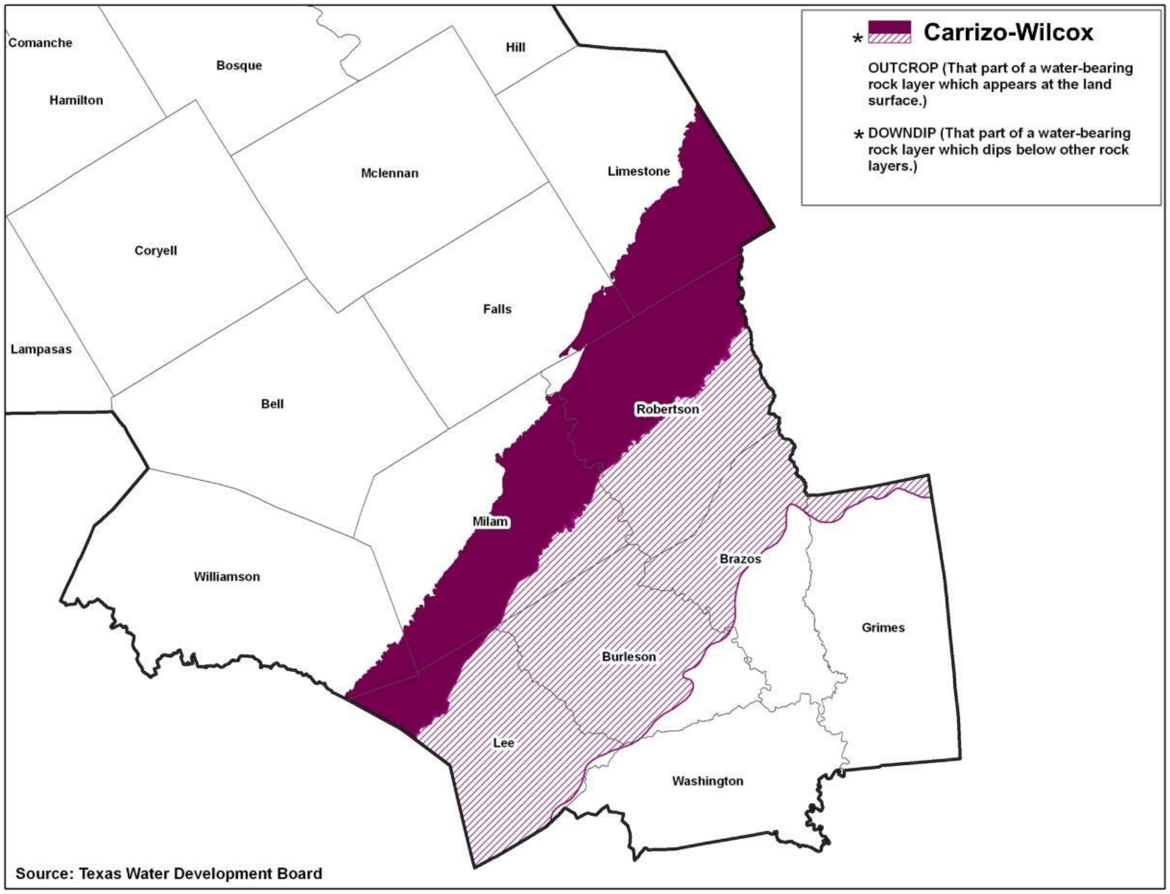


Figure B-3. Location of Carrizo-Wilcox Aquifer in BGRWPA

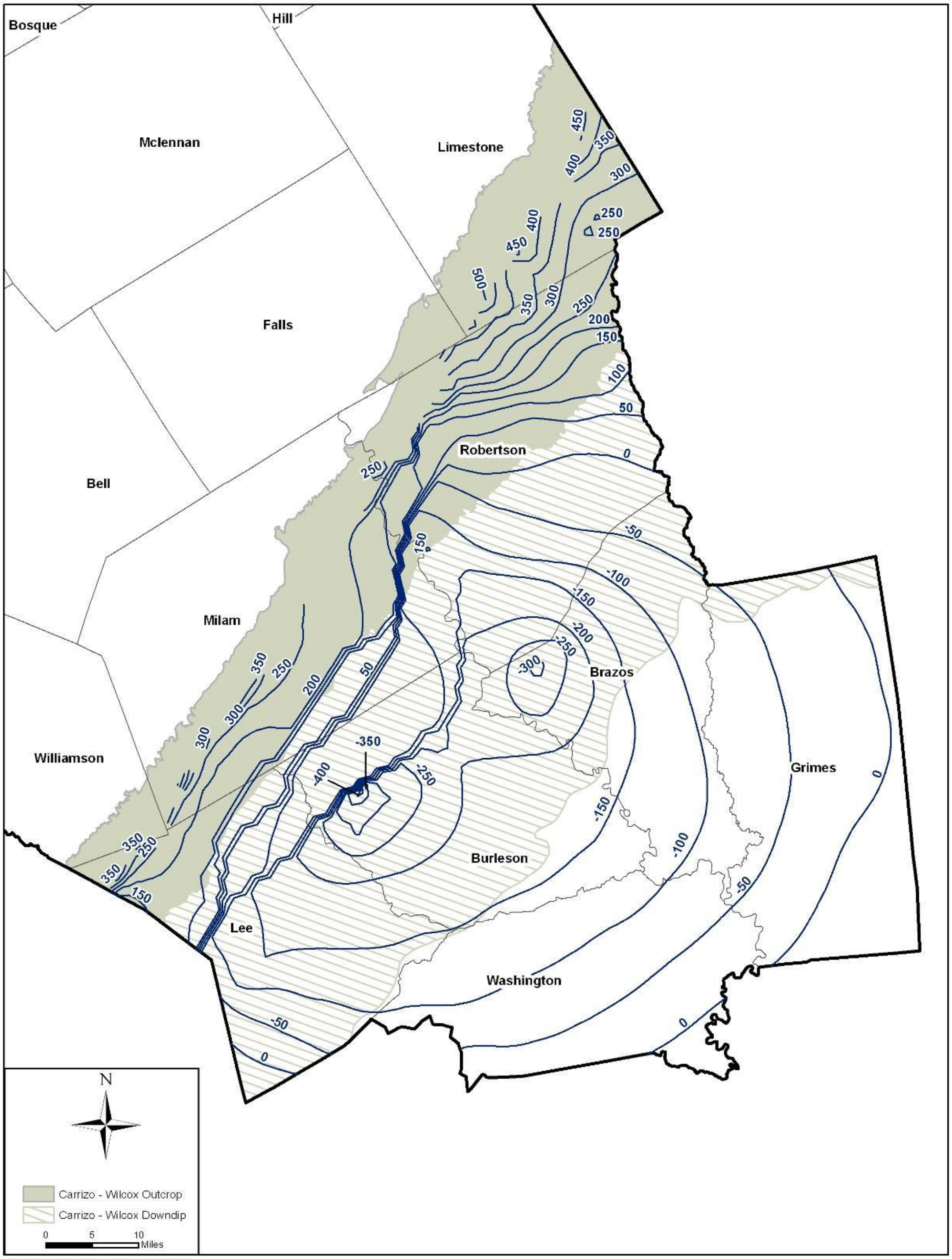


Figure B-4. Calculated Water Levels in the Simsboro Layer of the Carrizo-Wilcox Aquifer with Pumping in GMA-12 Run-3B, 2060

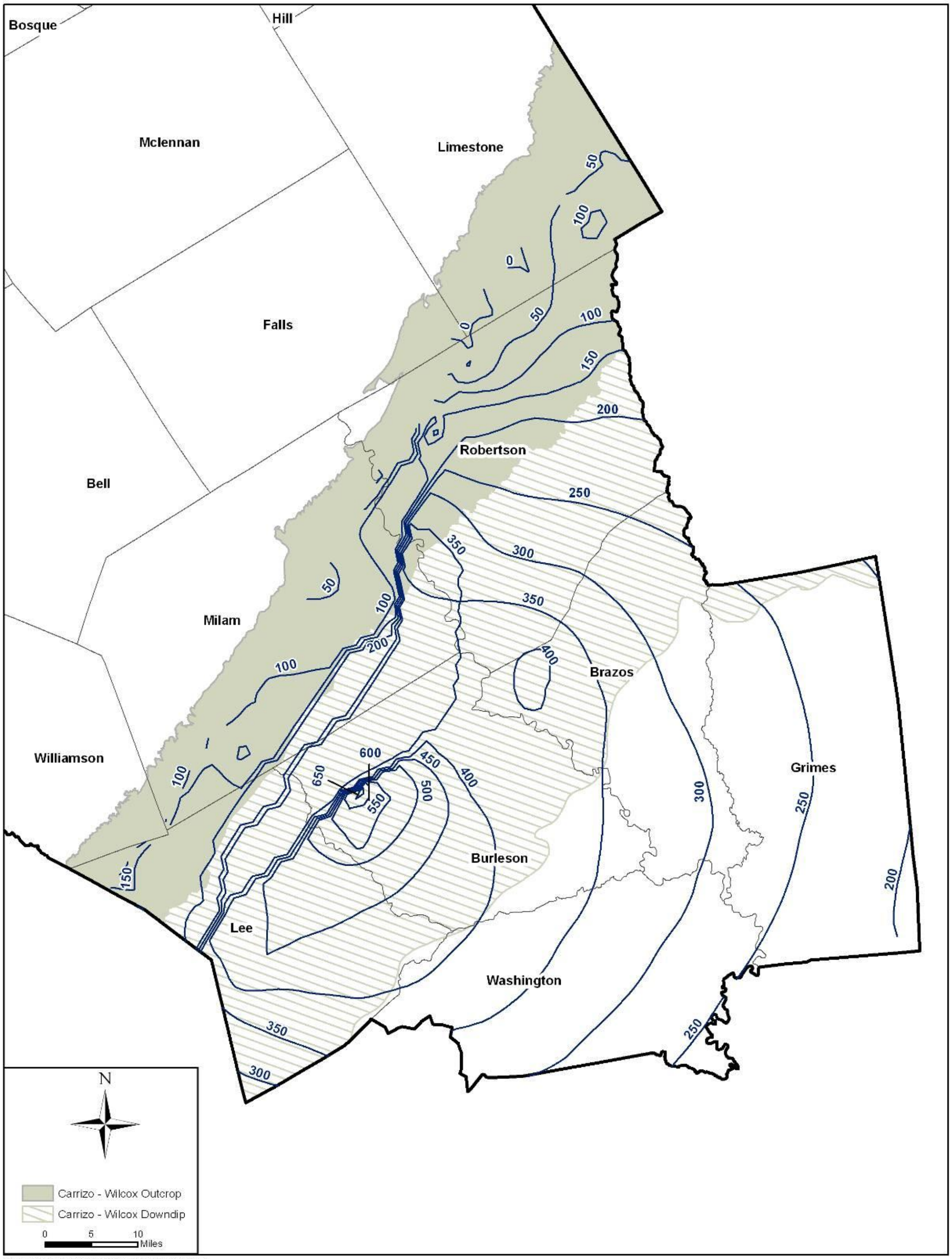


Figure B-5. Calculated Water Level Drawdowns in the Simsboro Layer of the Carrizo-Wilcox Aquifer with Pumping in GMA-12 Run-3B, 2010 – 2060

Water Quality

Water generally meets drinking water standards, but local exceptions occur. Excessive iron concentrations are the most common water quality problem, and some water supplies must be treated. Hydrogen sulfide and methane occurrences are occasionally reported. Water obtained near the outcrops of the water-bearing zones generally is higher in hardness and lower in total dissolved solids content. In downdip areas the water is commonly a sodium-bicarbonate-type water, with total dissolved solids content ranging from about 300 to 800 mg/L and averaging 400 to 500 mg/L. The dissolved solid concentrations tend to be greater at the downdip limit of the aquifer.

Resource Considerations

Few development problems have occurred to date, and water-level declines have been relatively small or restricted to pumping centers near larger developments. No important pollution problems are evident. One potential impact of a very significant drawdown is causing some wells would fail because they are either too shallow or the casing is too small to lower the pump as deep as needed.

There are four groundwater conservation districts that oversee the development and management of the Carrizo-Wilcox Aquifer within the BGRWPA. The counties with a groundwater conservation district include: Bastrop and Lee (Lost Pines GCD), Robertson and Brazos (Brazos Valley GCD), Milam and Burleson (Post Oak Savannah GCD), and Grimes (Bluebonnet GCD).

References

Dutton, A.R., 1999, Assessment of groundwater availability in the Carrizo-Wilcox Aquifer in Central Texas--Results of numerical simulations of six groundwater-withdrawal projections (2000-2050), The University of Texas at Austin, Bureau of Economic Geology.

Dutton, A.R. and Others, 2002, Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas: TWDB Contract Report.

Follett, C.R., 1970, Ground-water resources of Bastrop County, Texas: TWDB Report 109.

Follett, C.R., 1974, Ground-water resources of Brazos and Burleson Counties, Texas: TWDB Report 185.

Harden, R.W. & Associates, Inc., 1986, The most suitable areas for management of the Carrizo/Wilcox aquifer in Central Texas.

Kelley, V.A. and others, 2004, Groundwater availability models for the Queen City and Sparta Aquifers: TWDB Contract Report, http://www.twdb.state.tx.us/gam/czwx_c/czwx_c.htm

Rettman, P.L., 1987, Ground-water resources of Limestone County, Texas: TWDB Report 299.

Thompson, G.L., 1966, Ground-water resources of Lee County, Texas: TWDB Report 20.

Thorkildsen, D., and Price, R.D., 1991, Ground-water resources of the Carrizo-Wilcox aquifer in the Central Texas region: TWDB Report 332.

Dockum Aquifer

Location

The Dockum, a minor aquifer, occurs only along in the western parts of Nolan, Fisher, and Kent Counties within the BGRWPA (Figure B-6). It's important to note that there is a discrepancy in the occurrence of the Dockum as shown in Figure B-6 and in the Shamburger, 1967 report. The Shamburger report shows the Dockum extending into the mid-part of Nolan County, while the TWDB delineation is limited to the extreme western edge of the county.

Geohydrology

Water is derived largely from sands and gravels in the Santa Rosa Formation of Permian age or from the Santa Rosa and the overlying Trinity Sands in a western Nolan County. Water table conditions mostly prevail.

Development and Use

The year 2000 groundwater use within the BGRWPA totaled 4,880 acft, with 85 percent for irrigation and 14 percent for municipal use. The Dockum provides water over wide areas in adjacent planning areas, but it is used very sparingly within the BGRWPA, except in Nolan County. In Nolan County, the Dockum supplies irrigation, municipal and domestic and stock supplies

Availability

The Dockum Aquifer in BGRWPA is in GMA-6 and 7. As of February 2009, they have not established the DFC. Thus, there is no preliminary estimate of the MAG. A TWDB GAM has been completed for Dockum. However, its grid was too coarse for these relatively small areas and for analysis of Sweetwater's Champion Well Field.

The groundwater availability estimate in Nolan County has been updated with the development of a Brazos G (Study 2) GAM for western Nolan and eastern Mitchell Counties. The model's focus was on long-term groundwater supplies for City of Sweetwater's Champion Well Field. Based on model simulations from 2008 to 2060 when the predictive pumping was about 3,500 acft/yr in the Champion Well Field and about 2,250 acft/yr in other areas, the water level declines tended to stabilize, the magnitude of water level drawdown and the saturated thickness seems acceptable. These analyses and findings suggest that the estimate of groundwater availability is 5,750 acft/yr in Nolan County. The 2007-2060 drawdown for Scenario C, which spreads out the wells in the Champion Well Field, is shown in Figure B-7. The saturated thickness for 2060 is shown in Figure B-8. Groundwater availability in Kent and Fisher Counties is very limited and is set to 100 acft/yr for each of the two counties. This is the amount estimated in 2006 Brazos G plan.

The groundwater availability estimates by county follow:

Dockum Aquifer

County	*Groundwater Availability Estimates (acft/yr)*
Fisher	100
Kent	100
Nolan	5,750
Total	5,950

Well Yields and Water Quality

Well yields vary widely, ranging from less than 10 gpm to 400 gpm and averaging 200 gpm.

Water from the aquifer typically meets drinking water standards and contains 500 to 600 mg/L dissolved solids content. However, in heavily irrigated areas, elevated concentrations of nitrates have been reported. Few undeveloped supplies appear available, but it appears that recent levels of use will continue to be available in the future.

Resource Considerations

There are three groundwater conservation districts in BGRWPA counties where the Dockum Aquifer is present. Groundwater management in Nolan County is by Wes-Tex GCD. There is little pumpage from the Dockum in the Kent County (Salt Fork UWCD) and Fisher County (Clear Fork GCD).

References

Duffin, G.L., and Beynon, B.E., 1992, Evaluation of water resources in parts of the Rolling Prairies region of North-Central Texas: TWDB Report 337.

Ewing, J.E. and others, 2008, Groundwater Availability for the Dockum Aquifer, TWDB Contract Report, http://www.twdb.state.tx.us/gam/dckm/dckm.htm

HDR Engineering, Inc., March 2009, Study 2: Groundwater availability model of the Edwards-Trinity (Plateau) and Dockum Aquifers in Western Nolan and Eastern Mitchell Counties, Texas: Prepared for Brazos G Regional Water Planning Group.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Shamburger, Victor M., Jr., 1967, Ground-water resources of Mitchell and Western Nolan Counties, Texas: TWDB Report 50.

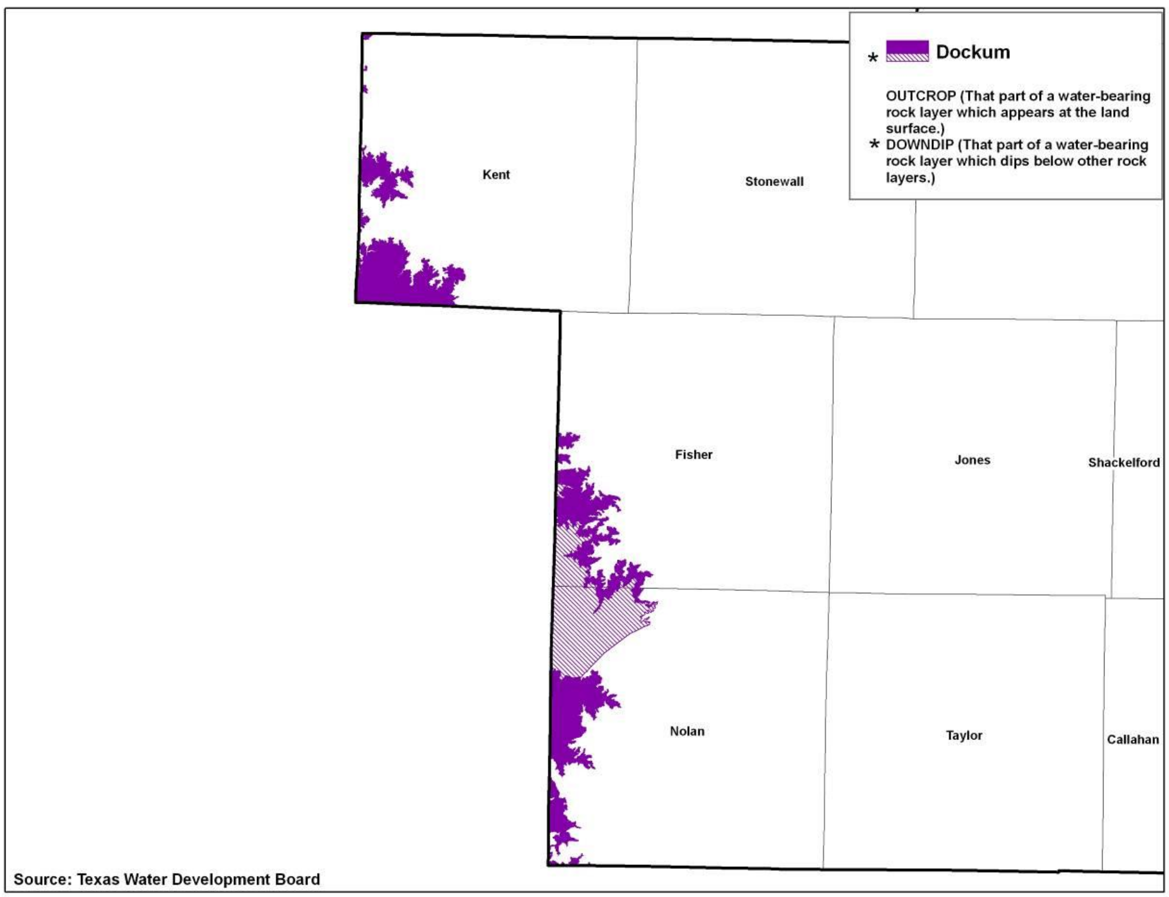


Figure B-6. Location of Dockum Aquifer in BGRWPA

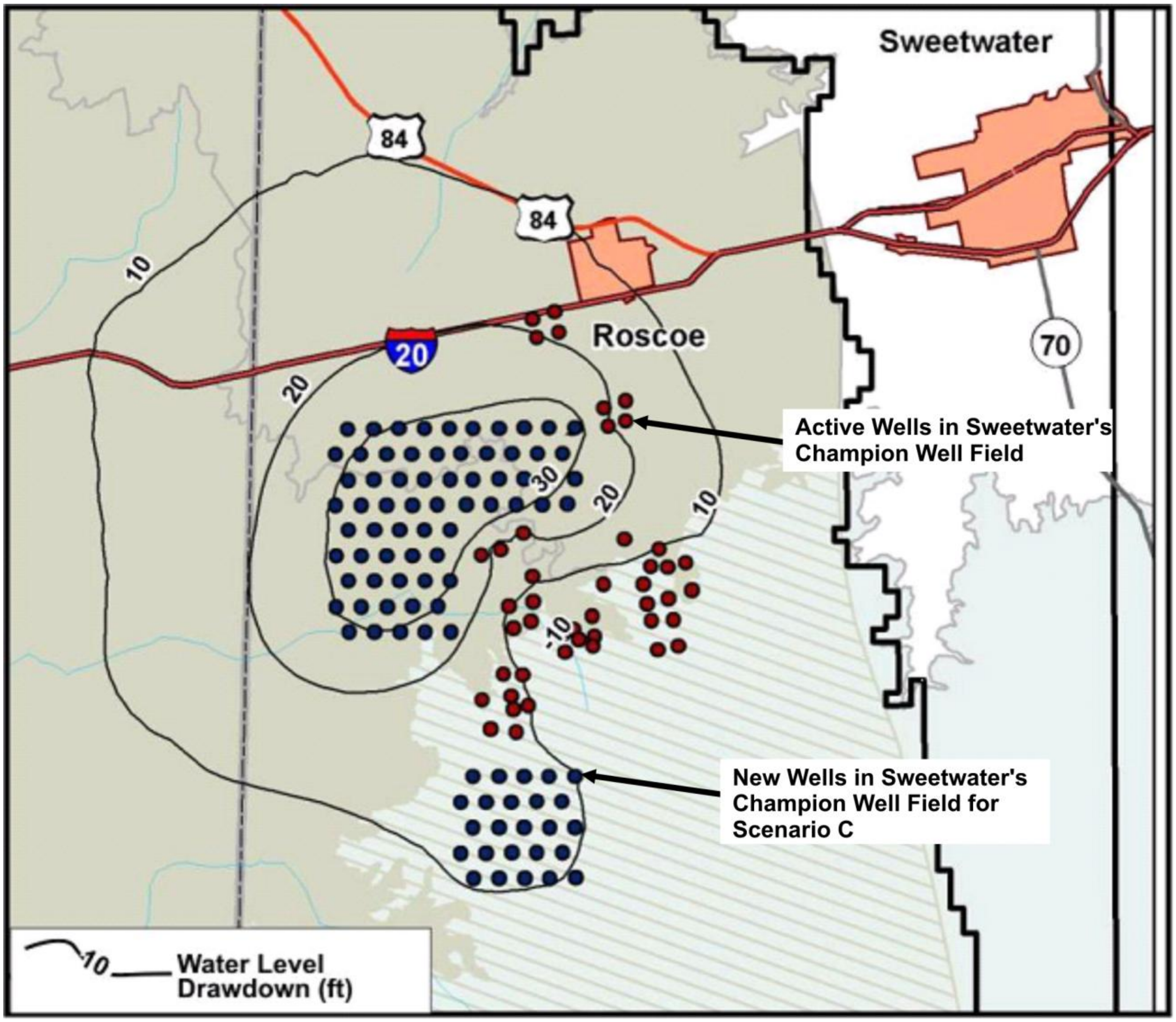


Figure B-7. Modeled Dockum Drawdown in Water Levels for Scenario C, 2007-2060.

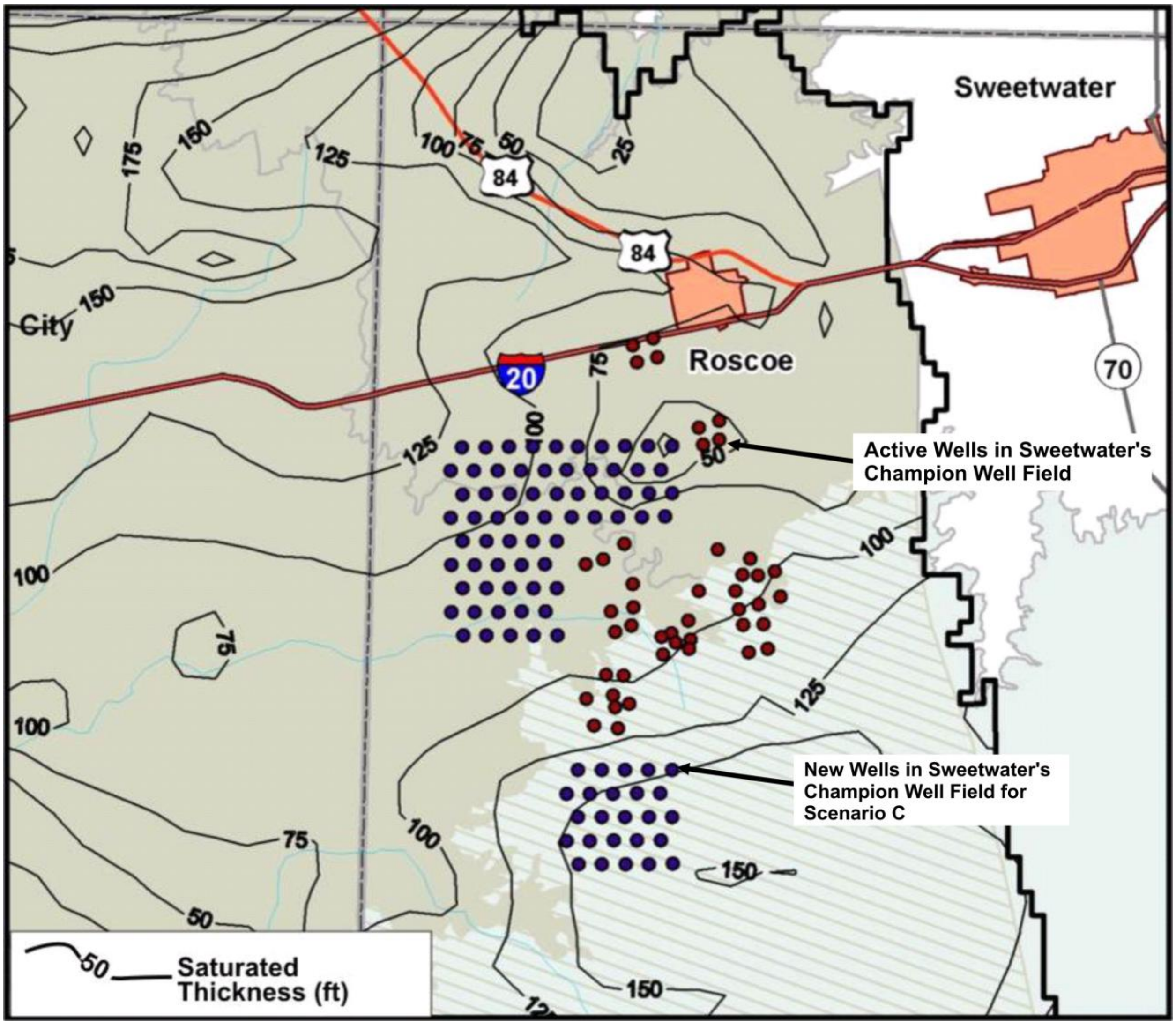


Figure B-8. Modeled Dockum Saturated Thickness for Scenario C, 2060.

(This page intentionally left blank.)

Edwards (Balcones Fault Zone) Aquifer

Location

The northern segment of the Edwards (Balcones Fault Zone (BFZ)) Aquifer, a major aquifer, occurs in part of central BGRWPA. This segment of the aquifer also extends into the adjacent planning area to the south (northern Travis County, but only to the Colorado River). The northern segment of the Edwards (BFZ) is hydraulically separate from the Edwards (BFZ) occurring south of the Colorado River (the Barton Springs segment) and the Edwards (BFZ) even further south (San Antonio segment). The northern segment of the Edwards (BFZ) appears to be overdeveloped except during average and wet times, and some supplies are subject to shortages in larger droughts.

The Edwards (BFZ) in the BGRWPA occurs in a narrow north-south-trending belt across parts of Williamson and Bell Counties (Figure B-9), essentially extending from Round Rock to Salado.

Geohydrology

The Edwards (BFZ) Aquifer consists of the Edwards and associated limestone, including the Comanche Peak, Kiamichi and Georgetown. However, significant water-bearing zones are normally restricted to the Edwards (BFZ), with associated limestone commonly yielding little to no water according to test drilling records (Harden, 1999). The source of the water is infiltration of rainfall and seepage from streams. The water moves primarily in honeycombed, solution-enlarged voids and other enlarged secondary porosity zones along joints and faults. The formation dips to the east beneath younger strata. Water table conditions occur in recharge areas (mostly west of IH-35), and artesian conditions occur further east. At the eastern boundary of the aquifer the water quality becomes more mineralized and eventually unusable for most purposes. The water moves from recharge areas to natural spring discharge points and to wells. The three largest springs (and their approximate high and low flows) include San Gabriel Springs at Georgetown (zero to 25 cubic feet per second (cfs)), Berry Springs north of Georgetown (zero to 48 cfs) and Salado Springs at Salado (5 to 59 cfs). The Edwards (BFZ) responds more quickly than most other aquifers to drought and wet cycles. With adequate rainfall, the aquifer is able to supply substantial water to current users and sustain substantial springflow at the three main locations. In times of below-average rainfall or drought, discharge exceeds recharge with the result being most springflow decreases greatly or dries up and some wells begin to fail. Over the years more and more wells have been drilled and increasingly diminished springflow has occurred. Introduction of surface water supplies has slowed the trend, but competition for Edwards (BFZ) water in the area is continuing.

Development and Use

The year 2000 groundwater use within the BGRWPA totaled 34,370 acft, of which 94 percent was municipal, 5 percent for mining and 1 percent for manufacturing. The cities of Round Rock and Georgetown are the main users along with many smaller public suppliers. Williamson County users accounted for 97 percent of the year 2000 pumpage.

Availability

An official MAG for the Northern Edwards (BFZ) Aquifer was determined by the TWDB using DFCs defined by GMA-8 representatives. The DFCs were defined as follows:

- Maintain at least 100 acft/mo (1.66 cfs) of stream/springflow in Salado Creek during a repeat of the drought of record;
- Maintain at least 42 acft/mo (0.70 cfs) of stream/springflow in Travis County during a repeat of the drought of record; and
- Maintain at least 100 acft/mo (1.66 cfs) of stream/springflow in Williamson County during a repeat of the drought of record.

Using the GAM for the Northern Segment of the Edwards (BFZ) Aquifer, the TWDB utilized pumpage distributions provided by GMA-8 to make predictive simulations from year 2000 to 2020. Pumpage was uniformly adjusted to produce the desired discharges in the streams and springs during drought of record conditions. Details of the approach, parameters and assumptions are presented in TWDB's *GAM Run 08-10mag* document.

Based on the DFC and MAG analysis, the estimated groundwater availability follows:

Edwards (BFZ) Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Bell	6,469
Williamson	3,452
Total	9,921

Well Yields

Wide variations occur in individual well yields obtainable from the Edwards (BFZ). Well yields depend upon boreholes encountering secondary, solution-enlarged openings in the limestone. Wells used for public supply range from 200 to about 2,000 gpm.

Water Quality

Water, although hard, meets drinking water standards with dissolved solids content mostly less than 500 mg/L in developed areas. Further east, the water becomes more mineralized. The fluoride content is high in some of the downdip eastern areas.

Resource Considerations

Groundwater resources appear to be overdeveloped during record drought conditions. Existing local plans of the larger users have long included conjunctive use plans with surface waters from Lakes Georgetown, Travis, and/or Stillhouse Hollow. Significant groundwater pumpage can reduce springflow, and the aquifer is locally subject to pollution from surface sources. The higher withdrawals by wells can directly affect springflow and downstream surface water supplies.

A groundwater district exists in Bell County (Clearwater UWCD).

References

Duffin, G.L., and Musick, S.P., 1991, Evaluation of water resources in Bell, Burnet, Travis, Williamson, and parts of adjacent counties, Texas: TWDB Report 326.

Harden, R. W., 1999, personal communication.

Jones, I.C., 2003, Groundwater Availability Model: Northern Segment of the Edwards Aquifer, Texas: TWDB Report 358.

Kreitler, C.W., Senger, R.K., and Collins, E.W., 1987, Geology and hydrology of the northern segment of the Edwards aquifer with an emphasis on the recharge zone in the Georgetown, Texas, area: Prepared for the Texas Water Development Board, IAC (86-67)-1046; Univ. of Texas, Bureau of Economic Geology.

William F. Guyton Associates, Inc., 1987, Ground-water availability update: consulting report to City of Georgetown.

Yelderman, Joe C., 1987, Hydrogeology of the Edwards Aquifer, Northern Balcones and Washita Prairie Segments: Austin Geological Society Guidebook 11.

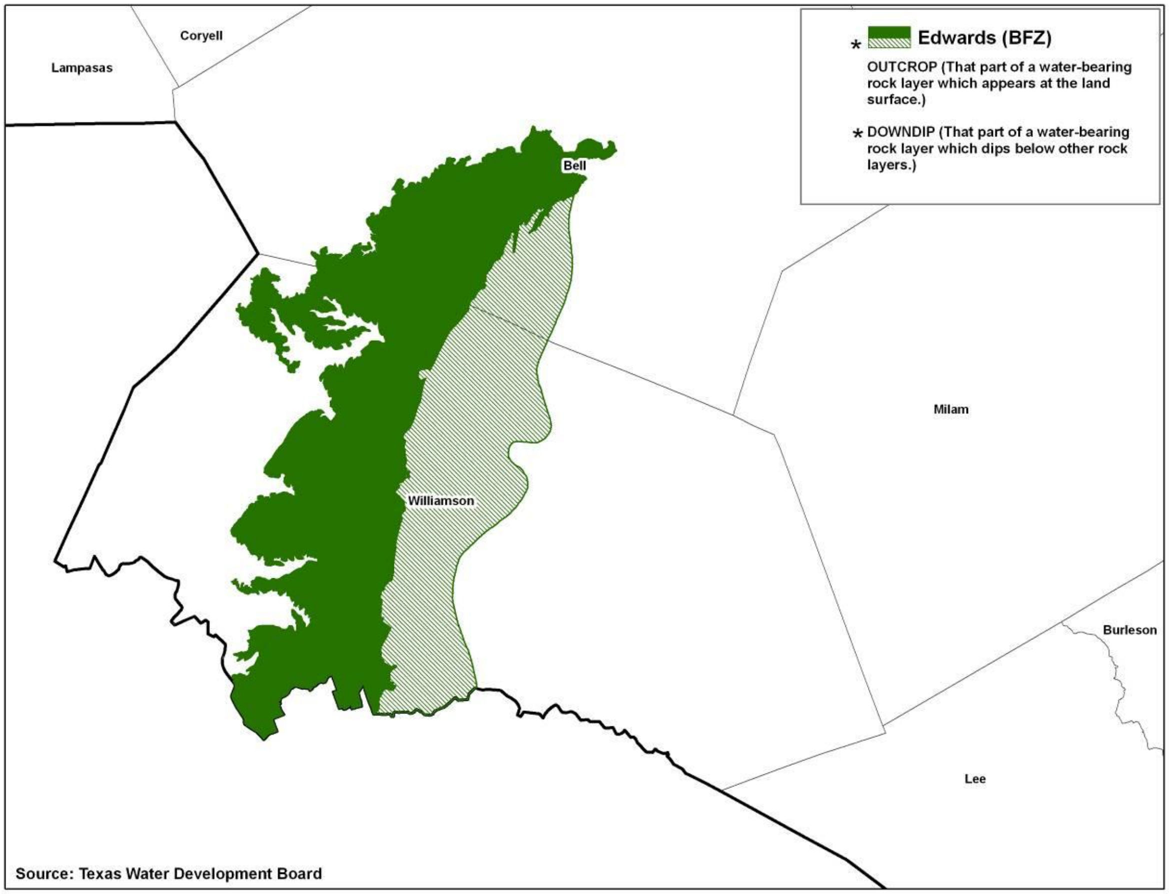


Figure B-9. Location of Edwards (BFZ) Aquifer (northern segment) in BGRWPA

Edwards-Trinity (Plateau) Aquifer

Location

The Edwards-Trinity (Plateau) Aquifer is a major aquifer in Texas due to its expansive coverage and available water supplies. In the BGRWPA, this aquifer is found only in parts of Nolan and Taylor Counties (Figure B-10). It provides only a very small water supply to the planning region.

Geohydrology

Water from the Edwards-Trinity (Plateau) is derived largely from Cretaceous sands (Trinity) in Nolan County in combination with the underlying Dockum, which exists in some areas. Water-table conditions are typical. Maximum well yields typically are less than 50 gallons per minute. In western Nolan County, much of the water production is associated with the Edwards-Trinity (Plateau) because of the surface geology, but the major water-bearing zone of higher capacity wells is the underlying Dockum.

Availability

An attempt by members of GMA-7 to utilize TWDB's Edwards-Trinity (Plateau) groundwater availability model (GAM) was determined to be unsuitable determining a MAG from a proposed DFC. An alternate method has not yet been devised by GMA-7 and TWDB. Thus, the groundwater availability estimates in Nolan and Taylor Counties are set to the values that were determined for 2006 Brazos G plan. These estimates are based on the response of water levels to annual precipitation and pumping and on the TWDB's 1997 State Water Plan.

Based on this hydrologic analysis, the estimated groundwater availability follows:

Edwards-Trinity (Plateau) Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Nolan	1,000
Taylor	500
Total	1,500

Well Yields and Water Quality

Potential well yields are generally less than 100 gpm. Typical waters meet drinking water standards and contain 400 to 500 mg/L dissolved solids content.

Resource Consideration

Groundwater availability was estimated in the 2006 Brazos G plan, which was based on historical pumpage and water level drawdowns in Nolan County with a proportional amount for Taylor County per aquifer area. Few undeveloped supplies appear available, but it is considered reasonable to assume that existing supplies will continue to be available in the future.

Groundwater in Nolan County is regulated by Wes-Tex GCD.

References

Anaya, R. and Jones, I., 2004, Groundwater availability model of the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium Aquifer systems, Texas: Texas Water Development Board, http://www.twdb.state.tx.us/gam/eddt_p/eddt_p.htm

HDR Engineering, Inc., March 2009, Study 2: Groundwater availability model of the Edwards-Trinity (Plateau) and Dockum Aquifers in Western Nolan and Eastern Mitchell Counties, Texas: Prepared for Brazos G Regional Water Planning Group.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Taylor, Howard D., 1978, Occurrence, Quantity, and Quality of Ground Water in Taylor County, Texas: TWDB Report 224.

Shamburger, Victor M., Jr., 1967, Ground-Water Resources of Mitchell and Western Nolan Counties, Texas: TWDB Report 50.

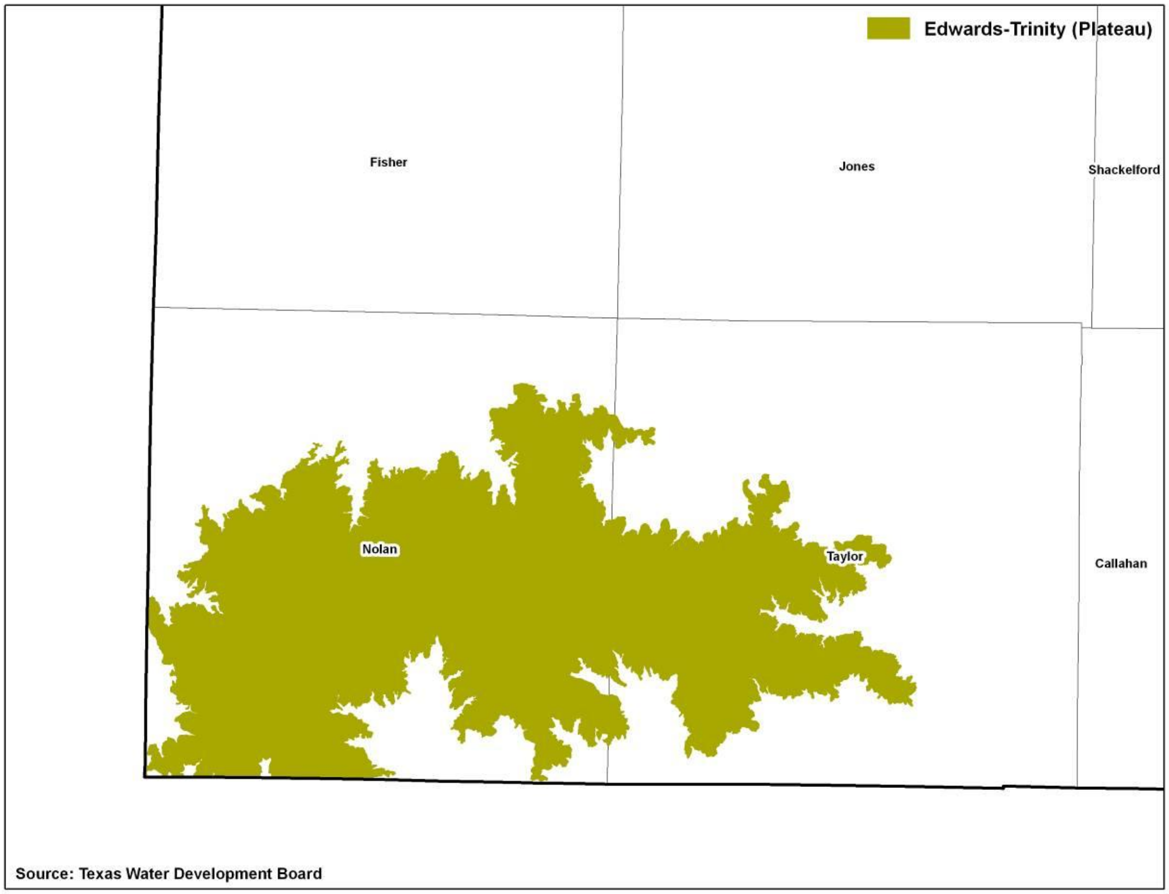


Figure B-10. Location of Edwards-Trinity (Plateau) Aquifer in BGRWPA

(This page intentionally left blank.)

Ellenburger-San Saba Aquifer

Location

The Ellenburger-San Saba Aquifer, a minor aquifer, occurs in the BGRWPA, but only in the southwestern part of Lampasas County (Figure B-11). It primarily occurs in adjacent planning area to the south and west.

Geohydrology

The aquifer consists of limestone and dolomites with secondary solutioning along fractures and faults. The aquifer extends from outcrops and dips to depths of perhaps 2,000 feet. Little is known about conditions in the deeper parts of the aquifer. In some areas the aquifer is believed to be connected to the Marble Falls Aquifer. Faults are believed to function as an important part in controlling groundwater flow and water levels. The aquifer supports numerous springs, is lightly used, and usually has less than 1,000 mg/L dissolved solids.

Development and Use

Use is very limited. No withdrawals in the BGRWPA are included in TWDB pumpage files for year 2000.

Availability

GMA-8 has adopted DFC and made a preliminary estimate of future groundwater availability from the Ellenburger-San Saba Aquifer. However, the TWDB has not formally reviewed the approach nor made an official MAG determination.

The approach which was adopted by GMA-8, includes:

(1) Estimate a DFC that is based on maintaining 90 percent saturated thickness after 50 years,
(2) Calculating the volume of water in storage within Lampasas County,
(3) Calculating the annual net recharge from annual precipitation and estimated recharge rates (2 percent of precipitation),
(4) Calculating the average saturated thickness,
(5) Prorating the allowable depletion over 50 years, and
(6) Summing the allowable depletion from storage and net recharge.

The preliminary groundwater availability estimates by GMA-8 for the Ellenburger-San Saba Aquifer in Lampasas County is 2,341 acft/yr.

Resource Considerations

Groundwater resources are large in relation to current use and future local demand. The Saratoga Underground Water Conservation District has jurisdiction in Lampasas County.

References

Bluntzer, R.L., 1992, Evaluation of the ground-water resources of the Paleozoic and Cretaceous aquifers in the Hill Country of Central Texas: TWDB Report 339.

Preston, R.D., Pavlicek, D.J., Bluntzer, R.L., Derton, J., 1996, The Paleozoic and related aquifers of Central Texas: TWDB Report 346.

Williams, C.R., 2008. Adopted desired future conditions of the Ellenburger-San Saba, Hickory, and Marble Falls Aquifers: Memorandum dated June 9, 2008 and directed to Cheryl Maxwell, Administrative Agent for Groundwater Management Area 8.

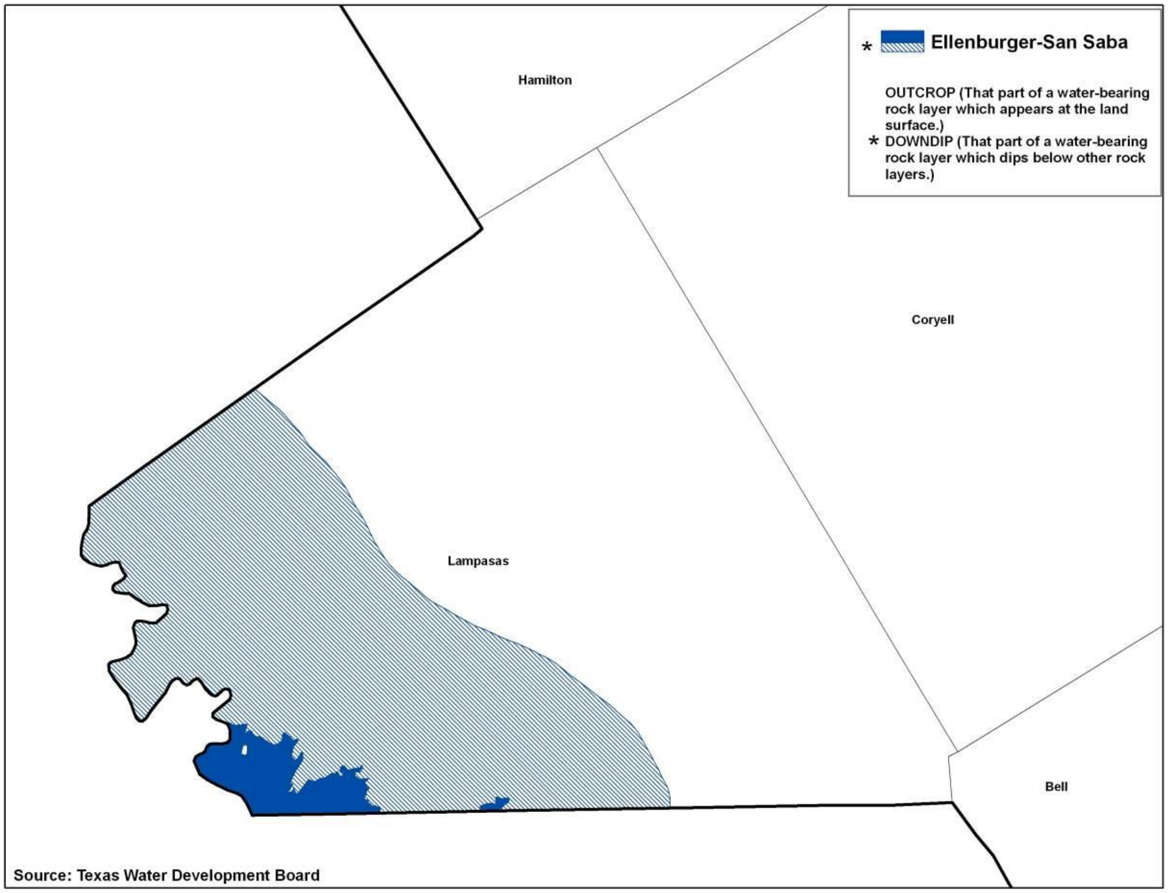


Figure B-11. Location of Ellenburger-San Saba Aquifer in BGRWPA

(This page intentionally left blank.)

Gulf Coast Aquifer

Location

The Gulf Coast Aquifer, a major aquifer, occurs in a limited area in the southeastern part of the BGRWPA. It occurs in a northeast-southwest-trending band and extends into adjoining planning areas (Figure B-12). In the BGRWPA the aquifer is present primarily in Washington and in the southern two-thirds of Grimes Counties. A small part of the aquifer exists in the extreme southernmost part of Brazos County, but is not considered to be sufficiently great for regional planning purposes.

Geohydrology

The Gulf Coast Aquifer consists primarily of four water-bearing zones, the deepest being the Catahoula. The Catahoula is overlain by the Jasper Aquifer (mostly within the Oakville Sandstone). The Burkeville confining layer separates the Jasper from the overlying Evangeline Aquifer, which is contained within the Fleming and Goliad Sands. The Chicot Aquifer overlies the Evangeline and is the uppermost component of the Gulf Coast Aquifer. The Chicot consists of the Lissie, Willis and younger formations.

The water-bearing zones present consist of a complex sequence of ancient river and delta deposits, consisting mostly of interbedded and interfingering sands, silts and clays which thicken coastward. The strata form a leaky artesian aquifer system of large extent along the Texas Coastal Plain. Total thickness in the BGRWPA is up to 1,200 feet, and net sand thickness is about 20 percent of the total thickness. From surface outcrops (recharge areas) the sand zones dip coastward beneath younger strata. Water table conditions occur in recharge areas, and artesian conditions occur in downdip areas. Precipitation is the main source of recharge, and large amounts of recharge are rejected by evapotranspiration in the outcrop. Mostly only freshwater sands occur in the BGRWPA, and they extend to depths as great as 1,200 feet. However, some slightly saline water sands occur in the deeper extents of the Catahoula.

Development and Use

The year 2000 BGRWPA groundwater use totaled 7,250 acft/yr, of which 65 percent was municipal, 6 percent manufacturing, 21 percent agriculture, 2 percent mining, and 7 percent livestock watering.

Availability

Grimes and Washington Counties are in GMA-14. As of February 2009, they have not established the DFC. Thus, there is no official or preliminary estimate of MAG. Groundwater availability is based on values used in the 2006 Brazos G plan, which were taken from the TWDB's 1997 State Water Plan. Within the BGRWPA the best areas for development are in the southern parts of Washington and Grimes Counties. Those areas are 10 to 20 miles north of the location of the 100-foot drawdown constraint that was used in the TWDB original method, and a larger availability seems reasonable in the southern parts of the two counties. Even so, the availability value of 28,296 acft/yr is approximately four times larger than the year 2000 withdrawals and is considered satisfactory for current planning. If and when pumpage or demands increase substantially, it will be appropriate to re-evaluate the availability for the Gulf Coast Aquifer with the northern Gulf Coast Aquifer GAM.

The availability estimates, by county, follow:

Gulf Coast Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Brazos	1,177
Grimes	14,083
Washington	13,036
Total	28,296

Well Yields

Wide variations occur in individual well yields obtainable from the primary water-bearing sands, depending on area, depth, and local sand thickness. Estimated ranges for maximum individual well yields are 300 to 800 gpm.

Water Quality

Water generally meets drinking water standards, but local exceptions occur. Iron content is occasionally a problem. Waters obtained near the outcrops of the water-bearing zones are generally higher in hardness and lower in total dissolved solids content. In downdip areas the water is commonly a calcium-bicarbonate-type water, with total dissolved solids content ranging up to 1,000 mg/L.

Resource Considerations

Groundwater resources are largely undeveloped, few development problems have occurred to date and water-level declines are minimal to none. Few and limited water pollution problems are apparent. Counties with groundwater conservation districts include: Grimes (Bluebonnet GCD) and Robertson and Brazos (Brazos Valley GCD).

References

Baker, E.T., Jr., Follett, C.D., McAdoo, G.D., and Bonnet, C.W., 1974, Ground-water resources of Grimes County, Texas: TWDB Report 186.

Baker, E.T., Jr., 1979, Stratigraphic and hydrogeologic framework of part of the Coastal Plain of Texas: TDWR Report 236.

Kasmarek, M.C. and Robinson, J.L., 2004, Hydrogeology and Simulation of Groundwater Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer System, Texas: USGS Scientific Report 2004-5102.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Sandeen, W.M., 1972, Ground-water resources of Washington County, Texas: TWDB Report 162.

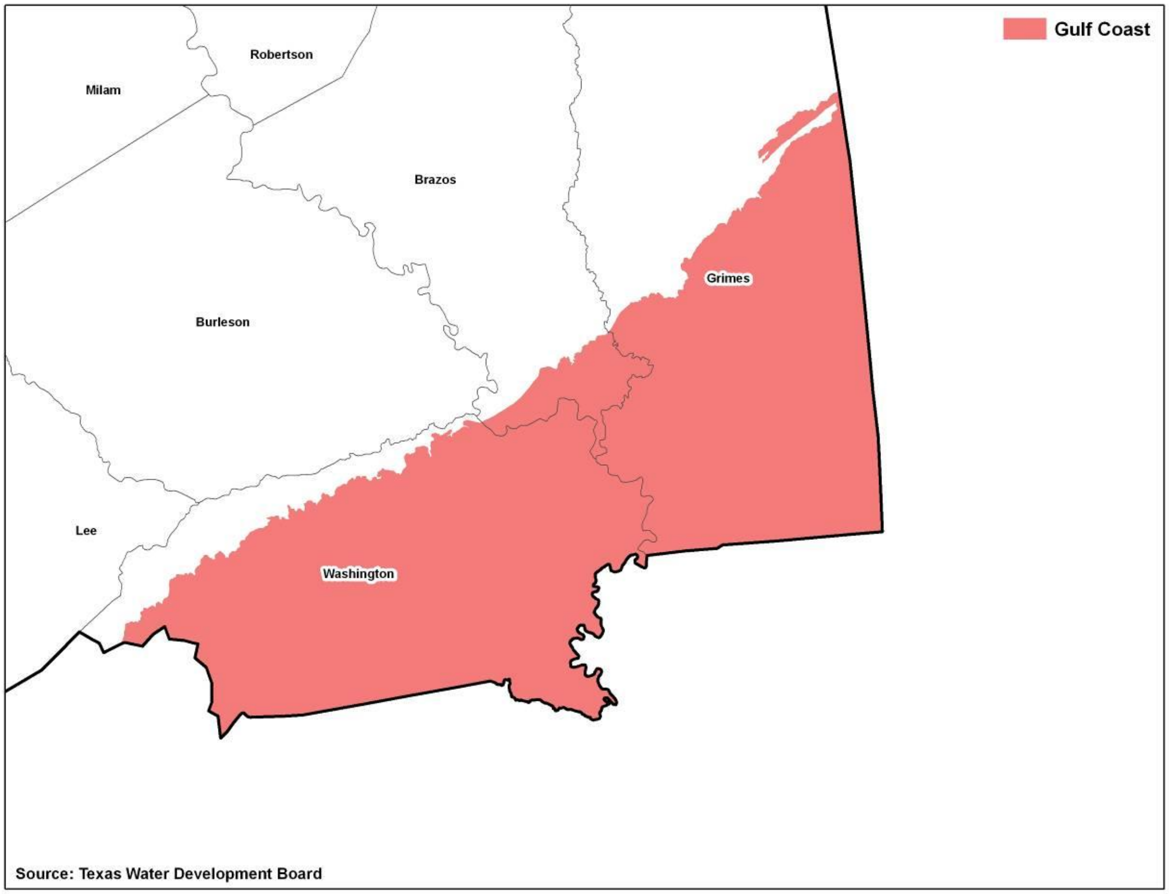


Figure B-12. Location of Gulf Coast Aquifer in BGRWPA

Hickory Aquifer

The Hickory Aquifer, a minor aquifer, occurs in parts of Lampasas and Williamson Counties in the BGRWPA. The aquifer primarily occurs in an adjacent planning area to the south and west.

The aquifer consists of sandstones which dip northeast away from the Llano Uplift. No pumpage is included for Lampasas County in TWDB data files for year 2000, and no Hickory wells are known to exist within the BGRWPA. Geophysical log data suggest that the aquifer is deeper than 3,500 feet. Water-bearing properties are unknown, and water quality with excessive radiological parameters is likely. For these reasons, it is not considered in planning for the BGRWPA.

At the time that groundwater availability estimates were determined in this process, MAG estimates for the Hickory Aquifer had not been made. As a result, the groundwater resources are too unknown to be considered in planning for the BGRWPA.

The Saratoga Underground Water Conservation District encompasses Lampasas County.

References

Bluntzer, R.L., 1992, Evaluation of the ground-water resources of the Paleozoic and Cretaceous aquifers in the Hill Country of Central Texas: TWDB Report 339.

Preston, R.D., Pavlicek, D.J., Bluntzer, R.L., Derton, J., 1996, The Paleozoic and related aquifers of Central Texas: TWDB Report 346.

Williams, C.R., 2008. Adopted desired future conditions of the Ellenburger-San Saba, Hickory, and Marble Falls Aquifers: Memorandum dated June 9, 2008 and directed to Cheryl Maxwell, Administrative Agent for Groundwater Management Area 8.

(This page intentionally left blank.)

Marble Falls Aquifer

Location

The Marble Falls Aquifer, a minor aquifer, occurs in the BGRWPA only in Lampasas County (Figure B-13). It primarily occurs in an adjacent planning area to the south and west.

Geohydrology

The Marble Falls Aquifer occurs in discontinuous outcrops in the southwestern part of Lampasas County. Water occurs in secondary solution fractures, cavities and channels in the Marble Falls Limestone. The aquifer is connected to the Ellenburger-San Saba Aquifer where intervening beds are thin or absent and via faults. The aquifer supports numerous springs. The larger ones include the springs at Lampasas, which average about 9 cfs.

Development and Use

Use is limited. No withdrawals are included for the BGRWPA in TWDB pumpage files for year 2000.

Availability

GMA-8 has adopted a DFC and made a preliminary estimate of future groundwater availability from the Marble Falls Aquifer. However, the TWDB has not formally reviewed the approach nor determined the official MAG.

The approach developed by consultant for GMA-8, which was adopted by GMA-8, includes:

(1) Establishing a DFC that is based on maintaining 90 percent saturated thickness after 50 years,
(2) Calculating the volume of water in storage within Lampasas County,
(3) Calculating the annual net recharge from annual precipitation and estimated recharge rates (5 percent of precipitation),
(4) Calculating the average saturated thickness,
(5) Prorating the allowable depletion over 50 years, and
(6) Summing the allowable depletion from storage and net recharge.

GMA-8's groundwater availability estimate from the Marble Falls Aquifer in Lampasas County is 2,872 acft/yr.

Well Yields and Water Quality

Aquifer use is limited to shallow, small wells. Water quality is suitable for most purposes near the outcrop area.

Resource Considerations

Groundwater resources are large in relation to current use and future local demand. Regulation is provided by the Saratoga Underground Water Conservation District for Lampasas County.

References

Bluntzer, R.L., 1992, Evaluation of the ground-water resources of the Paleozoic and Cretaceous aquifers in the Hill Country of Central Texas: TWDB Report 339.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Preston, R.D., Pavlicek, D.J., Bluntzer, R.L., Derton, J., 1996, The Paleozoic and related aquifers of Central Texas: TWDB Report 346.

Williams, C.R., 2008. Adopted desired future conditions of the Ellenburger-San Saba, Hickory, and Marble Falls Aquifers: Memorandum dated June 9, 2008 and directed to Cheryl Maxwell, Administrative Agent for Groundwater Management Area 8.

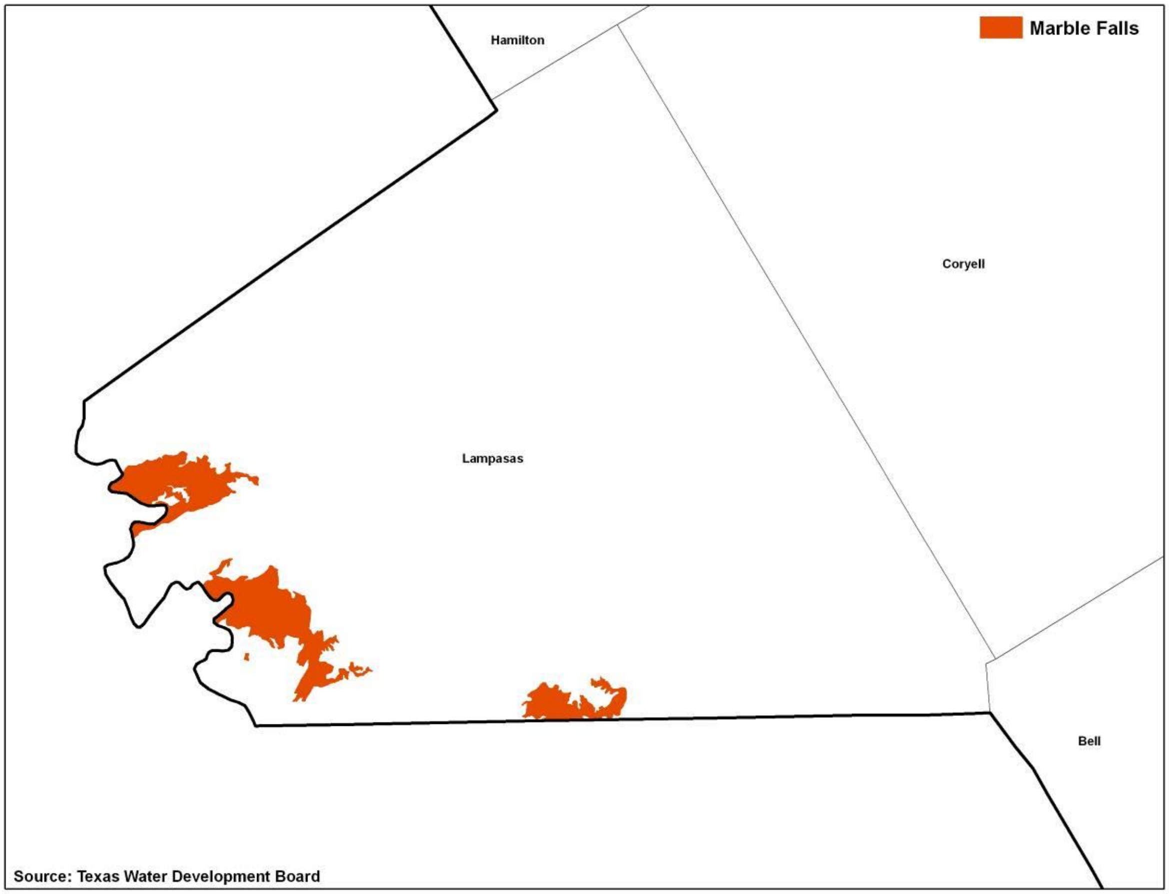


Figure B-13. Location of Marble Falls Aquifer in BGRWPA

(This page intentionally left blank.)

Queen City Aquifer

Location

The Queen City Aquifer, a minor aquifer, occurs in the southeastern part of the BGRWPA and in adjoining planning areas. It forms a northeast-southwest-trending band primarily across parts of Robertson, Brazos, Grimes, Milam, Burleson and Lee Counties (Figure B-14).

Geohydrology

The water-bearing zones consist of sands interbedded with silts and clays. Total sand thickness ranges up to 300 feet. From their surface outcrop (recharge area) the sands dip coastward beneath younger strata. Freshwater occurs to depths up to 2,000 feet or more. Water table conditions occur in recharge areas, and artesian conditions exist in downdip areas. Precipitation and vertical leakage are the main sources of recharge. A large amount of recharge is rejected by evapotranspiration in the outcrop.

Development and Use

The year 2000 groundwater use within the BGRWPA totaled 2,130 acft. Two-thirds of that use was in Lee County. Total use was about 74 percent municipal and 26 percent livestock watering. The small use is partly due to the presence and development of the Sparta Aquifer at shallower depths over most of the area where the Queen City is present.

Availability

The process in establishing groundwater availability estimates for the Queen City Aquifer is concurrently being performed with the Carrizo-Wilcox and Sparta Aquifers in that the GMA-12 officials used the Queen-City and Sparta GAM and a consensus on pumping to define the DFCs. The consensus pumping is in a simulation called GMA-12 Run-3B. However, this process only applies to counties in GMA-12, including Brazos, Burleson, Lee, and Robertson. The Queen City Aquifer within BGRWPA also exists in Grimes County, which is in GMA-14.

Currently, an official MAG has not been determined by the TWDB in either GMA. However, the officials for GMA-12 have reached, or nearly reached, a consensus on acceptable pumping. For purposes of 2011 Brazos G plan, the year 2060 pumpages for the Queen City

Aquifer are being accepted as the groundwater availability for the Queen City. While these values are not official MAG, they are considered to be more suitable for planning purposes than values in the 2006 Brazos G plan. GMA-14 officials are in the early stages of determining their DFCs and do not have preliminary estimates of their MAG. Based on a conversation with the chairman of GMA-14, Brazos G is to use groundwater availability estimates from the 2006 Brazos G plan.

The availability estimates, by county, follow:

Queen City Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Brazos	531
Burleson	293
Grimes	462
Lee	99
Milam	51
Robertson	356
Total	1,792

Well Yields

Estimated ranges for maximum individual well yields are 200 to 500 gpm. Wide variations can occur in individual well yields obtainable from the Queen City sands, depending on area, depth and local sand thickness.

Water Quality

Water typically meets drinking water standards, except for iron. High iron content is a common, but treatable, problem. Hydrogen sulfide or methane gas is reported occasionally. Waters obtained near the outcrops of the water-bearing zones generally are higher in hardness and lower in total dissolved solids content. In downdip areas the water is commonly a calcium/sodium- or sodium-bicarbonate-type water with total dissolved solids content ranging from 300 mg/L up to 1,000 mg/L or more.

Resource Considerations

Groundwater resources are partly undeveloped, and few development problems have occurred to date. Water level declines are minimal to none. Few and limited water pollution problems are apparent.

Counties with groundwater districts include: Grimes (Bluebonnet GCD), Robertson and Brazos (Brazos Valley GCD), Lee (Lost Pines GCD), and Milam and Burleson (Post Oak Savannah GCD).

References

Baker, E.T., Jr., Follett, C.D., McAdoo, G.D., and Bonnet, C.W., 1974, Ground-water resources of Grimes County, Texas: TWDB Report 186.

Brown, Eric, 1997, Water quality in the Queen City aquifer, TWDB Hydrologic Atlas No. 6.

Follett, C.R., 1974, Ground-water resources of Brazos and Burleson Counties, Texas: TWDB Report 185.

Kelley, V.A. and others, 2004, Groundwater availability models for the Queen City and Sparta Aquifers: TWDB Contract Report, http://www.twdb.state.tx.us/gam/czwx_c/czwx_c.htm

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238

Thompson, G.L., 1966, Ground-water resources of Lee County, Texas: TWDB Report 20.

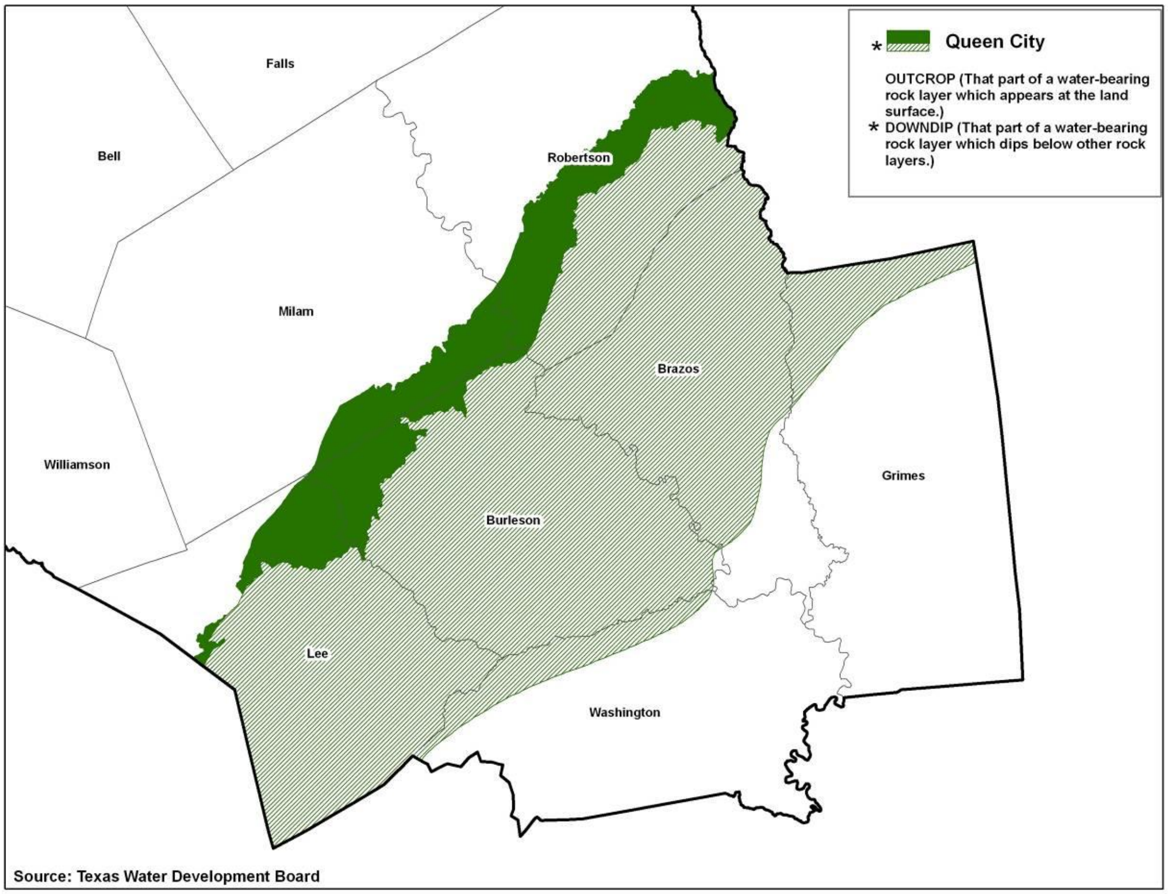


Figure B-14. Location of Queen City Aquifer in BGRWPA

Seymour Aquifer

Location

The Seymour Aquifer is classified as a major aquifer in Texas and occurs in scattered, isolated areas in the western part of the BGRWPA and in three other planning areas to the north. The Seymour is a shallow, alluvial aquifer used almost exclusively for irrigation.

The largest area of the Seymour Aquifer is in Haskell and Knox Counties where nearly 90 percent of the Seymour pumpage in BGRWPA occurs. Other scattered areas of the aquifer extend over parts of Jones, Fisher, Kent, Stonewall, and Throckmorton Counties (Figure B-15). While the Seymour has a large surficial extent in these four counties, the aquifer generally has a relatively thin saturated thickness, is less productive and does not support widespread irrigation as it does in Knox and Haskell Counties.

Geohydrology

The Seymour consists of isolated areas of alluvium and is composed of gravel, sand and silty clay. The gravels, deposited by eastward flowing streams in geologic times, are mostly in the lower part of the Seymour. Total formation thickness is generally less than 100 feet. Water table conditions predominate. Direct infiltration of precipitation is the main source of recharge and is reasonably high. The historical pumpage in Knox and Haskell Counties is equivalent to capturing about 2.0 inches, or over 8 percent, of the annual precipitation. Recharge amounting of over 20 percent of precipitation has been observed for some seasons near Rochester in Haskell County. Water levels have fluctuated mostly in response to variations in rainfall and irrigation pumpage. Continuing water level declines have not occurred in most areas in Haskell and Knox Counties, and some rises have been noted. In all the other counties most water levels show a level or declining trend; and, few rises have been noted.

Development and Use

Within the BGRWPA, well supplies are largely for irrigation. The groundwater use is relatively small for municipal, mining, rural domestic and livestock. However, this aquifer is an important resource for several municipal water users in the northern part of the region. In Kent County, groundwater from the Seymour accounts for nearly all of the municipal supplies. The year 2000 groundwater pumpage within the BGRWPA totaled 101,700 acft, with about

97 percent used for irrigation, 1 percent for mining, and 1 percent for municipal purposes. Haskell and Knox Counties accounted for 95,475 acft/yr, or 94 percent, of the total withdrawals in year 2000.

Availability

An attempt by GMA-6 representatives and TWDB officials to utilize TWDB's Seymour Groundwater Availability Model (GAM) was unsuccessful in determining a reasonable MAG estimate from a proposed DFC. Because of this finding, a part of the Seymour GAM is currently being refined. Thus, the groundwater availability estimates in Brazos G are set to the values that were determined for 2006 Brazos G. These estimates were revised in 2006 Brazos G on the basis of historical data on water levels, pumpage and precipitation and in consideration of estimates made for the 2001 Brazos G plan. Based on a conversation with the chairman of GMA-7, Brazos G is to use estimates from the 2006 Brazos G plan.

Until a MAG is determined for the Seymour, the following groundwater availability estimates from the 2006 Brazos G plan are to be utilized.

Seymour Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Fisher	7,000
Haskell	20,000
Jones	8,000
Kent	5,700
Knox	24,000
Stonewall	2,300
Total	67,000

Well Yields

Well yields average 270 gpm and are as high as 1,300 gpm. Wide variations occur in individual well yields obtainable from the Seymour, depending on area, depth and local character and thickness of gravels.

Water Quality

Water quality is variable for many reasons. The dissolved solids content of natural water ranges from 300 to 3,000 mg/L with most values between 400 and 1,000 mg/L. Most water meets drinking water standards, except for nitrate content which typically ranges from 30 to 90 mg/L and commonly exceeds the limit of 45 mg/L for public supplies. Past oil field practices have impacted water quality locally. Many detailed maps of individual water quality parameters for Haskell and Knox Counties are in included in the TDWR Report 226 (Harden, 1978).

Resource Considerations

Groundwater resources, while significant, are essentially fully developed, although some added supplies could be developed in some areas of water level rises or in other areas in average to wet times. Counties with groundwater conservation districts include: Kent (Salt Fork UWCD) and Haskell and Knox (Rolling Plains GCD). There may be additional opportunities for conjunctive use or for recharge and conservation projects in the region, depending on surface water availability and cost effectiveness.

References

Bradley, R. G. and Petrini, H., 1998, Priority groundwater management area update on Area 16, Rolling Prairies Region of North Central Texas, TWDB Open File Report 98-03.

Cronin, J. G., 1972, Ground water in Dickens and Kent Counties, Texas: TWDB Report 158.

Duffin, G.L., and Beynon, B.E., 1992, Evaluation of water resources in parts of the Rolling Prairies region of North-Central Texas: TWDB Report 337.

Ewing, J.D., Jones, T.L., Pickens, J.F. and others, 2004, Groundwater Availability for the Seymour Aquifer: Texas Water Development Board Contract Report. http://www.twdb.state.tx.us/gam/symr/symr.htm

Harden, R. W., and Associates, 1978, The Seymour aquifer, ground-water quality and availability in Haskell in Knox Counties, Texas: TDWR Report 226.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Preston, R. D., 1978, Occurrence and availability of ground water in Baylor County, Texas: TDWR Report 218.

Price, R.D., 1978, Occurrence, quality, and availability of ground water in Jones County, Texas: TDWR Report 215.

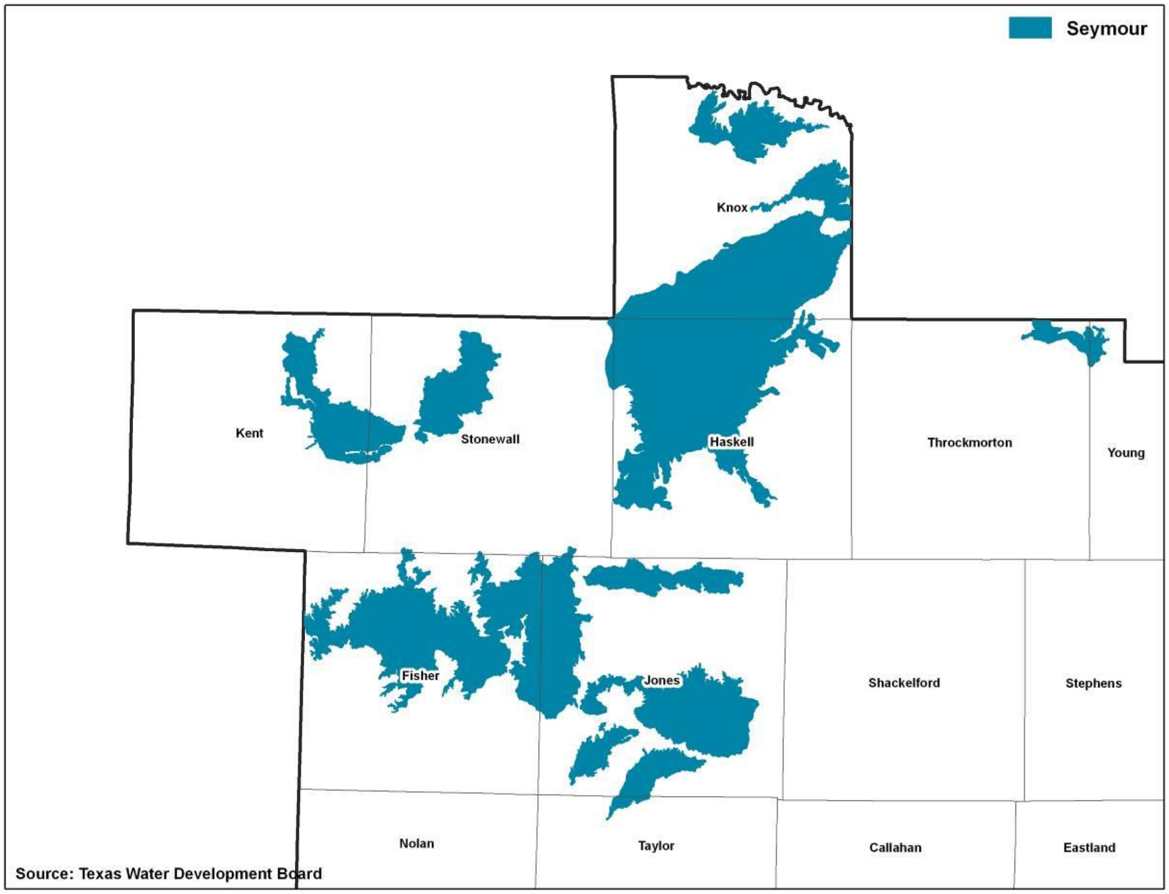


Figure B-15. Location of Seymour Aquifer in BGRWPA

Sparta Aquifer

Location

The Sparta Aquifer, a minor aquifer, occurs in the southeastern part of the BGRWPA and in adjoining planning areas. It occurs in a northeast-southwest-trending band primarily across parts of Brazos, Burleson, Grimes, Lee, Milam and Robertson Counties (Figure B-16). Its location is a short distance southeast of the Queen City Aquifer. Some users have wells screened across both zones.

Geohydrology

The water-bearing zones consist of sands interbedded with silts and clays. Total sand thickness ranges from about 100 to 200 feet. From their surface outcrop (recharge area) the sands dip coastward beneath younger strata. Freshwater occurs to depths up to 2,000 feet or more. Water table conditions occur in recharge areas, and artesian conditions occur in downdip areas. Precipitation and vertical leakage are the main sources of recharge. A large amount of recharge is rejected by evapotranspiration in the outcrop.

Development and Use

The 2000 groundwater use within the BGRWPA totaled 1,600 acft/yr, with approximately 69 percent used for municipal purposes, 7 percent for manufacturing, 1 percent for mining, and 23 percent for livestock watering. About 60 percent of the use was in Burleson County.

Availability

The process in establishing groundwater availability estimates for the Sparta Aquifer is concurrently performed with the Carrizo-Wilcox and Queen City Aquifers in that the GMA-12 representatives are using a TWDB GAM and a consensus on pumping to define the DFCs. The consensus pumping is in a simulation called GMA-12 Run-3B. However, this process only applies to counties in GMA-12, including Brazos, Burleson, Lee, and Robertson. The Sparta Aquifer within BGRWPA also exists in GMA-14, which includes Grimes County.

Currently, the MAG has not been officially determined in either GMA. However, the officials for GMA-12 have reached, or nearly reached, a consensus on acceptable pumping. For purposes of the 2011 Brazos G plan, the 2060 pumpages for the Sparta Aquifer are being accepted as the groundwater availability for the Sparta. These preliminary MAG values are considered to be more suitable for planning purposes than values in the 2006 Brazos G plan.

GMA-14 officials are in the early stages of determining their DFC and do not have preliminary estimates of their MAG. Based on a conversation with the chairman of GMA-14, Brazos G is to use groundwater availability estimates from the 2006 Brazos G plan.

The availability estimates, by county, follow:

Sparta Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Brazos	10,483
Burleson	1,107
Grimes	2,044
Lee	295
Robertson	0
Total	13,929

Well Yields

Estimated ranges for maximum individual well yields are 200 to 600 gpm. Wide variations can occur in individual well yields obtainable from the Sparta, depending on area, depth and local sand thickness.

Water Quality

Water typically meets drinking water standards, except for iron. High iron content is a common problem, and hydrogen sulfide gas is reported occasionally. Waters obtained near the outcrops of the water-bearing zones generally are higher in hardness and lower in total dissolved solids content. In downdip areas the water is commonly a calcium/sodium- or sodium-bicarbonate-type water with total dissolved solids content ranging from about 300 up to 1,000 mg/L or more.

Resource Considerations

Groundwater resources are largely undeveloped, except in the vicinity of College Station and Texas A&M well fields. Few development problems have occurred to date, and water level declines have been limited except near these well fields and the former Bryan well fields. Few and limited water pollution problems are apparent. Counties with groundwater conservation districts include: Lee (Lost Pines GCD), Robertson and Brazos (Brazos Valley GCD), Milam and Burleson (Post Oak Savannah GCD), and Grimes (Bluebonnet GCD).

References

Baker, E.T., Jr., Follett, C.D., McAdoo, G.D., and Bonnet, C.W., 1974, Ground-water resources of Grimes County, Texas: TWDB Report 186.

Follett, C.R., 1974, Ground-water resources of Brazos and Burleson Counties, Texas: TWDB Report 185.

Kelley, V.A. and others, 2004, Groundwater availability models for the Queen City and Sparta Aquifers: TWDB Contract Report, http://www.twdb.state.tx.us/gam/czwx_c/czwx_c.htm

Merrick, Biri, 1997, Water quality in the Sparta aquifer, TWDB Hydrologic Atlas No. 5.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Thompson, G.L., 1966, Ground-water resources of Lee County, Texas: TWDB Report 20.

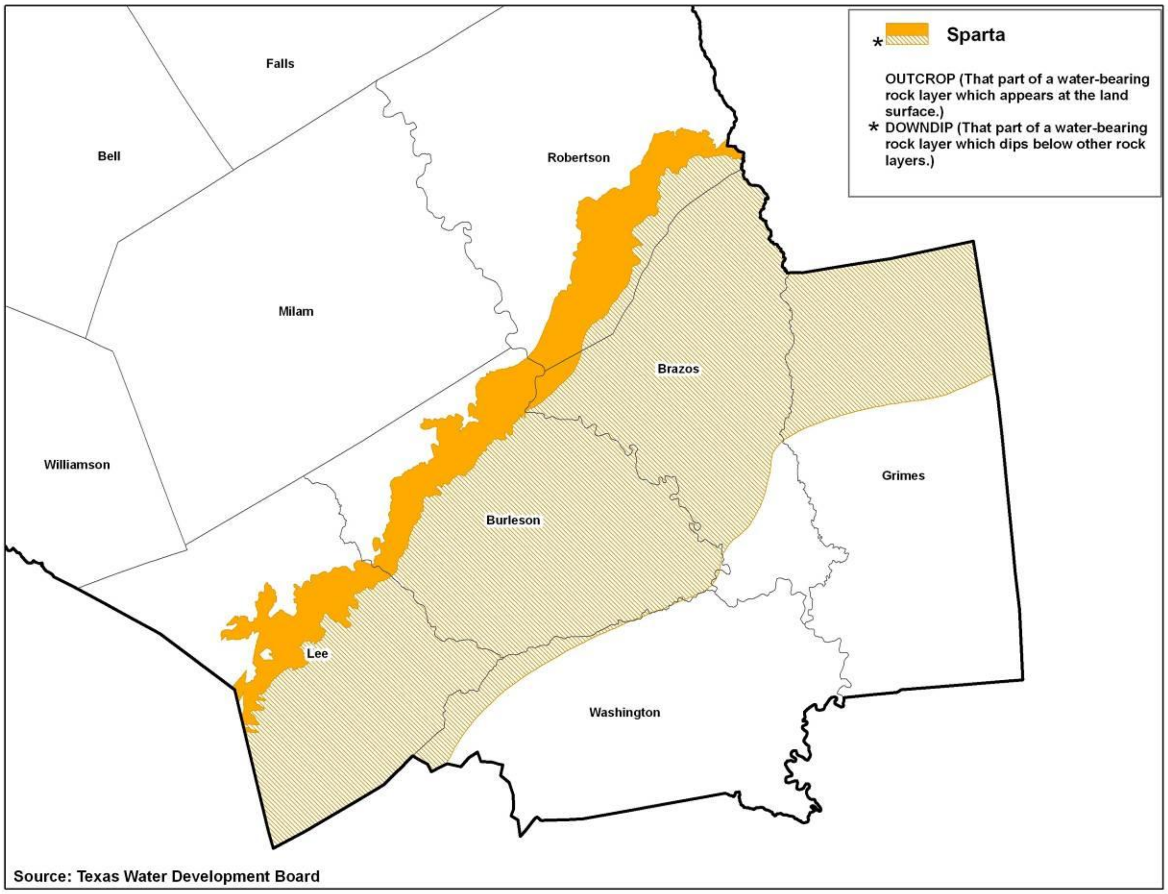


Figure B-16. Location of Sparta Aquifer in BGRWPA

Trinity Aquifer

Location

The Trinity Aquifer, a major aquifer, occurs in a north-south-trending band that extends in BGRWPA from Williamson County in the south to Hood and Johnson Counties in the north. The aquifer supplies drinking water to numerous communities, homes and farms in Central Texas and irrigation water to many farms, especially in Comanche and Erath Counties. Considering the trends in water level declines as a reference, the aquifer appears to be overdeveloped in a large part of the confined area.

The outcrop of the Trinity Aquifer in BGRWPA occurs mostly in Callahan, Eastland, Erath, Hood, Somervell, Comanche, Hamilton, Coryell and Lampasas Counties. The confined area is mostly in Johnson, Hill, Bosque, McLennan, Coryell, Bell and Williamson Counties (Figure B-17).

Geohydrology

The aquifer is composed of the Paluxy, Glen Rose and Travis Peak Formations. The Travis Peak Formation is subdivided into the Hensell, Pearsall/CowCreek/Hamett, and Hosston/Sligo members. Updip where the Glen Rose thins or is missing, the Paluxy and Travis Peak Formations coalesce to form the Antlers Formation. The uppermost water-bearing zone is the Paluxy Formation. The lower water-bearing zone consists of Travis Peak Formation and is divided into the Hensell and Hosston Members in much of the eastern part of BGRWPA. Groundwater is much more abundant in the lower zones than the upper zone.

The water-bearing zones consist of a sand and limestone and are often interbedded with clay and shale. The aquifer outcrops in the western part of the north-south-trending band and is confined in the eastern part. The rocks dip east-southeast at a rate of about 15 feet per mile in the northwest part of BGRWPA, gradually increase in dip to 40 feet per mile in the central part, and then rapidly increase in dip to 80 to 100 feet per mile east of the Luling-Mexia-Talco Fault Zone. Water table conditions occur in outcrop (recharge) areas, and confined (artesian) conditions occur in downdip areas. The aquifer is naturally recharged by precipitation in the outcrop area where soils have layers of sand and sandy loam. In the downdip area, some recharge to the heavily pumped water-bearing zones probably includes a very modest amount of leakage from over- and underlying formations. Discharge is mostly to wells, springs, seeps and evapotranspiration in the outcrop area, and to wells in the confined zone.

Development and Use

The year 2000 BGRWPA groundwater use totaled 90,180 acft, of which 44 percent was municipal use, 3 percent manufacturing, 41 percent irrigation, 2 percent mining, and 10 percent livestock.

Availability

Preliminary estimates of future groundwater availability, or managed available groundwater (MAG), from the Trinity Aquifer has been determined by GMA-8. The general approach by GMA-8 representatives was for each of the representative groundwater districts to propose pumping levels in their counties or adjustments to pumping in the Northern Trinity/Woodbine Aquifer GAM. Following several trials, GAM Run 08-06 with specified pumping was selected as producing an acceptable level of drawdown. The resulting water levels for the Hosston layer in the Trinity GAM are shown in Figure B-18; and the resulting drawdown from 2000 to 2060 is shown in Figure B-19. From the run, GMA-8 calculated a maximum average drawdown for each county and aquifer since year 2000 was set as the DFC. The TWDB has not formally made the necessary model runs, thus, the MAG determined by GMA-8 is considered preliminary, but are considered to be the best available estimates for the 2011 Brazos G plan.

The availability estimates, by county, follow:

Trinity Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Bell	7,075
Bosque	5,823
Callahan	3,787
Comanche	23,294
Coryell	3,722
Eastland	4,713
Erath	29,536
Falls	161
Hamilton	2,146
Hill	3,148
Hood	11,064
Johnson	12,870
Lampasas	3,146
Limestone	66
McLennan	20,689
Milam	321
Palo Pinto	12
Somervell	2,485
Taylor	431
Williamson	1,811
Total	136,300

Well Yields

Well yields have a wide variation in the Trinity Aquifer. In general, yields for large supply wells in the western part of the aquifer where the outcrop occurs are between 50 and 250 gpm. In the confined part, large wells usually produce between 200 and 700 gpm. Well yields are mostly related to the cumulative thickness of sand layers and water level in the water-bearing zone at the well. Potential well yields have declined substantially in areas with large declines in water levels from a combination of increased lift and the inability to create a cone of depression around the well.

Water Quality

Water quality from the Trinity Aquifer is acceptable for most municipal and industrial purposes; however, excess concentrations of certain constituents in some areas exceed drinking water standards. One concern is relatively high concentrations of bacteria and nutrients that have been found in some wells in Callahan, Eastland, Erath and Comanche Counties. Another concern is contamination from brines associated with oil and gas operations. Finally, limited areas are impacted by leakage of poor quality water from overlying formations.

Resource Considerations

Groundwater resources are considered to be within or less than development limits in the outcrop area and generally overdeveloped in the confined areas. The Trinity Aquifer in BGRWPA is overseen by five groundwater conservation districts, but these districts do not cover the entire aquifer area within the BGRWPA. Counties with groundwater conservation districts include: Lampasas (Saratoga UWCD), Bell (Clearwater UWCD), Comanche and Erath (Middle Trinity GCD), McLennan (McLennan County GCD), and Coryell (Tablerock GCD).

References

Baker, B., Duffin, G., Flores, R., and Lynch, T., 1990, Evaluation of water resources in part of Central Texas: TWDB Report 319.

Baker, B., Duffin, G., Flores, R., and Lynch, T., 1990, Evaluation of water resources in part of North-Central Texas: TWDB Report 318.

Bene', J. and Harden, B. and others, 2004, Northern Trinity/Woodbine Aquifer Groundwater Availability Model: TWDB Contract Report, http://www.twdb.state.tx.us/gam/trnt_n/trnt_n.htm

Duffin, G., and Musick, S.P., 1991, Evaluation of water resources in Bell, Burnet, Travis, Williamson, and parts of adjacent counties, Texas: TWDB Report 326.

Klemt, W.B., Perkins, R.D., and Alvarez, H.J., 17975, Ground-water resources in part of Central Texas, with emphasis on the Antlers and Travis Peak Formations: TWDB Report 195.

Nordstrom, P.L., 1982, Occurrence, availability, and chemical quality of ground-water in the Cretaceous aquifers of North-Central Texas: TDWR Report 269.

Nordstrom, P.L., 1987, Ground-water resources of the Antlers and Travis Peak Formations in the outcrop area of North-Central Texas: TWDB Report 298.

Sandeen, W.M., 1972, Ground-water resources of Washington County, Texas: TWDB Rept. 162.

Williams, C.R., 2008, Desired Future Conditions of N. Trinity Aquifer: Memorandum dated December 15, 2008 to Cheryl Maxwell, Administrative Agent for Groundwater Management Area 8.

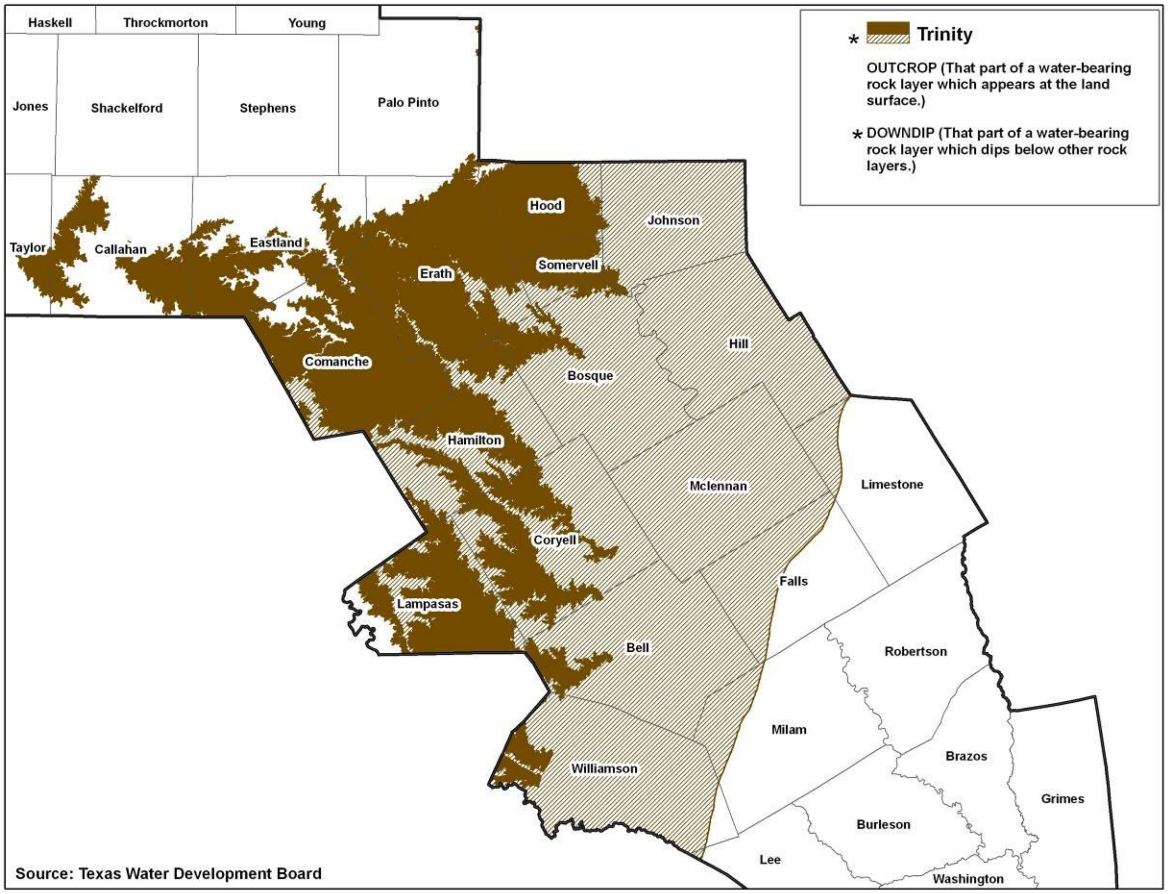
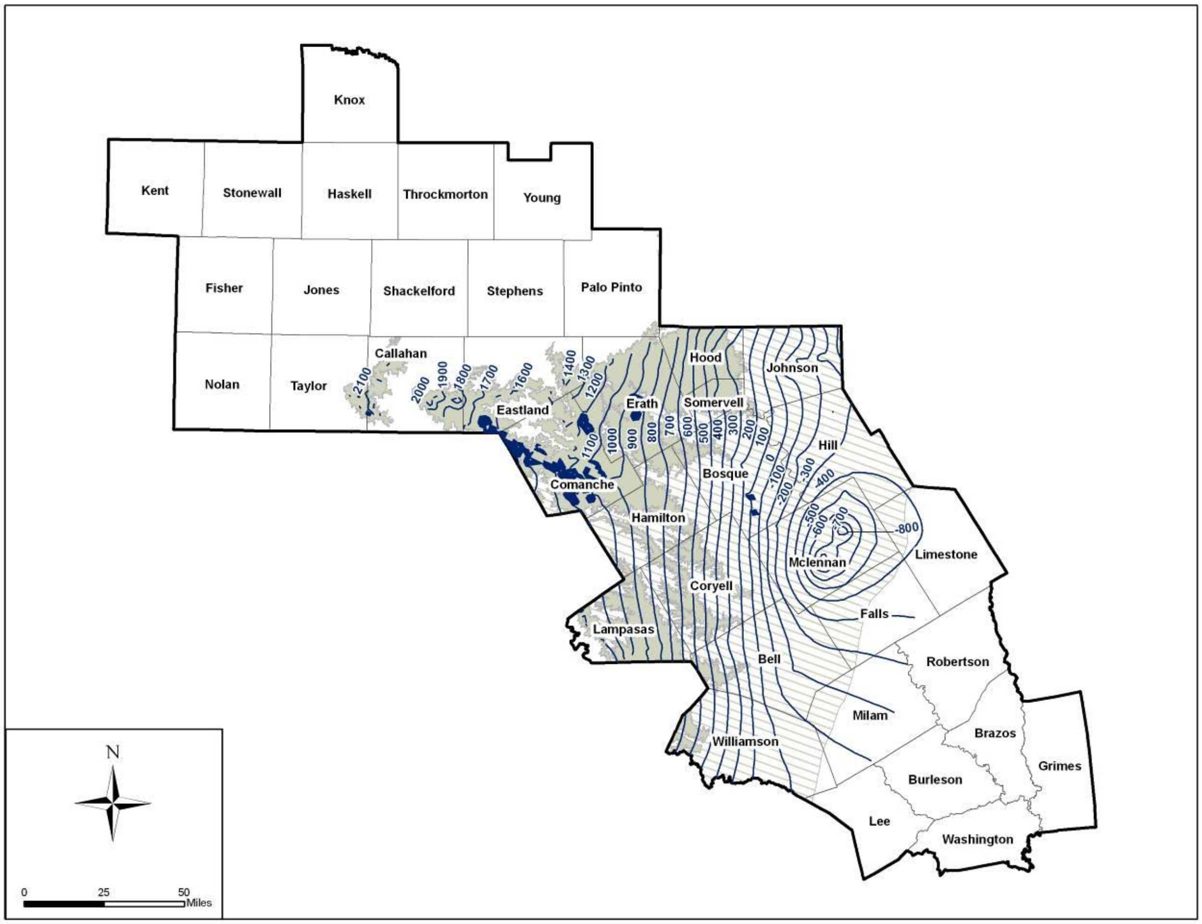


Figure B-17. Location of Trinity Aquifer in BGRWPA



5.MAG_2060_Hosston_Aquifer_Water_Level

Figure B-18. Calculated Water Levels in the Hosston Layer of the Trinity Aquifer with Pumping in GAM Run-08-06, 2060

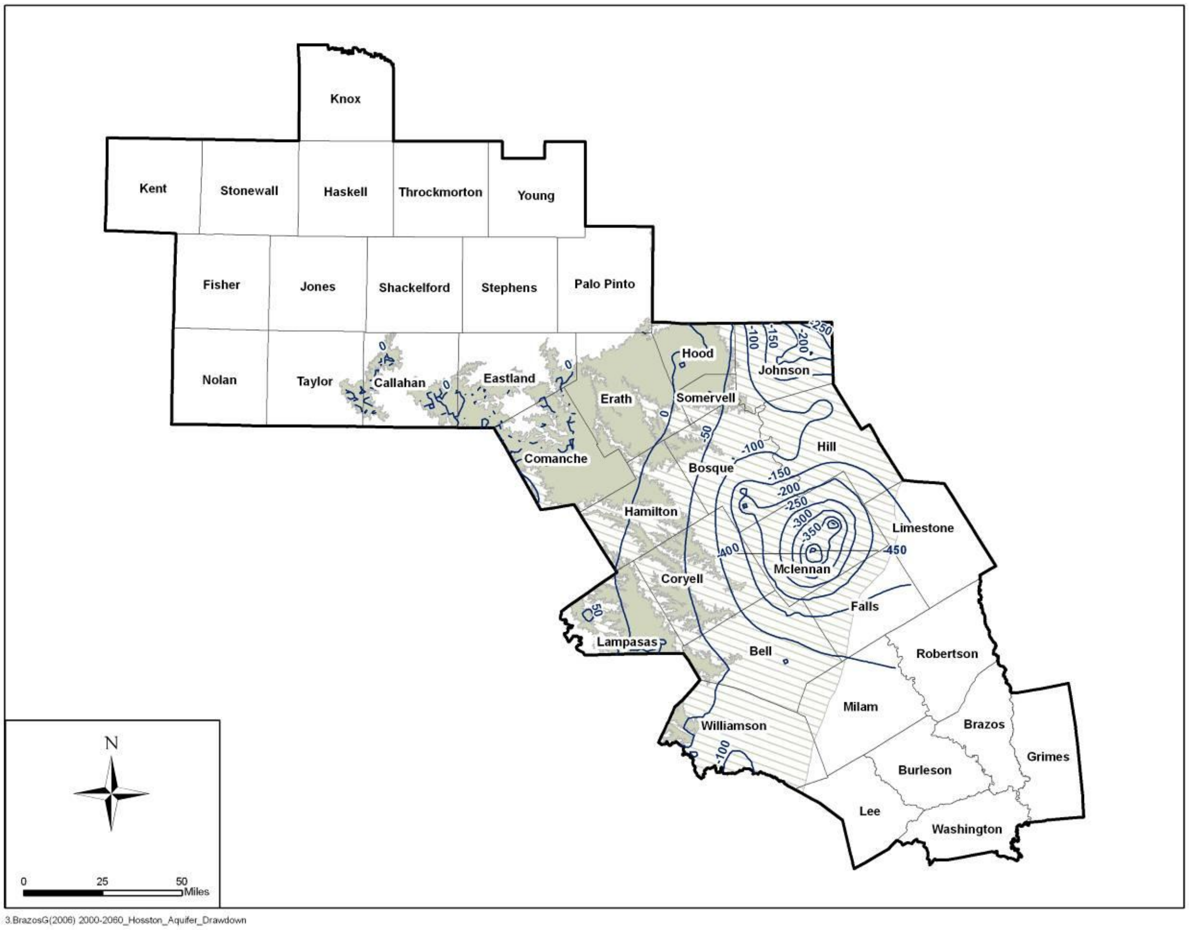


Figure B-19. Calculated Water Level Drawdowns in the Hosston Layer of the Trinity Aquifer with Pumping in GAM Run-08-06, 2000 – 2060

(This page intentionally left blank.)

Yegua-Jackson Aquifer

Location

The Yegua-Jackson Aquifer, recently classified by the TWDB as a minor aquifer, occurs in the southeastern part of the BGRWPA and in adjoining planning areas. It occurs in a northeast-southwest-trending band that is 15-20 miles wide and primarily across parts of Brazos, Burleson, Grimes, Lee, and Washington Counties (Figure B-20). Its location is a short distance downdip of the Sparta Aquifer and is covered by younger sediments in much of the area.

Geohydrology

The Yegua Formation consists of fine to medium sand that is interbedded with indurated fine-grained sandstone and clay. It has a maximum thickness in Grimes County of nearly 1,200 ft. The Jackson Group consists of fine to medium sand, clay, and siltstone. Its maximum thickness is about 1,600 ft. From their surface outcrop (recharge area) the sands dip coastward beneath younger strata. Water table conditions occur in recharge areas, and artesian conditions occur in downdip areas. Precipitation is the main source of recharge. A large amount of recharge is rejected by evapotranspiration in the outcrop.

Development and Use

Development is mostly limited to local use for household and livestock purposes.

Availability

Because the Yegua-Jackson has only recently been delineated as a minor aquifer and a groundwater availability model is in draft stages; and, groundwater availability for planning purposes has not been made. For purposes of the 2011 Brazos G plan, groundwater availability of the Yegua-Jackson is assumed to be equal to the amount of net recharge to the aquifer and is calculated by multiplying the rate of net recharge times the outcrop of the aquifer as mapped by the TWDB. Estimates of the net recharge rates are taken from Baker and others (1974) for Grimes County and is assumed to be representative for all the counties. The net recharge rates are based on the groundwater that originally moved through the aquifer as recharge prior to well development. The original hydraulic gradient in the Yegua Formation in Grimes County was assumed to be 5 ft/mi and the transmissivity of sands containing fresh to slightly saline water was estimated to be 3,100 ft squared per day. In Grimes County, this quantity of net recharge was estimated to be about 3 MGD, which is equivalent to about 0.3 inches per year. For the Jackson Group, the estimated hydraulic gradient is 5 ft/mi; transmissivity is 2,500 ft/day; and the resulting net recharge is 2.2 MGD.

The availability estimates, by county, follow:

Yegua-Jackson Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Brazos	6,100
Burleson	5,900
Grimes	5,800
Lee	3,700
Washington	1,400
Total	22,900

Well Yields

Estimated maximum individual well yields are about 500 gpm. Wide variations can occur in individual well yields obtainable from the Yegua-Jackson, depending on area, depth and local sand thickness.

Water Quality

Relatively shallow wells yield water that typically meets drinking water standards.. Waters obtained near the outcrops of the water-bearing zones generally are higher in hardness and lower in total dissolved solids content. In downdip areas, water with total dissolved solids content ranges from about 300 up to 1,000 mg/L or more.

Resource Considerations

Counties with groundwater conservation districts include: Lee (Lost Pines GCD), Robertson and Brazos (Brazos Valley GCD), and Grimes (Bluebonnet GCD).

References

Baker, E.T., Jr., Follett, C.D., McAdoo, G.D., and Bonnet, C.W., 1974, Ground-water resources of Grimes County, Texas: TWDB Report 186.

Follett, C.R., 1974, Ground-water resources of Brazos and Burleson Counties, Texas: TWDB Report 185.

Thompson, G.L., 1966, Ground-water resources of Lee County, Texas: TWDB Report 20.

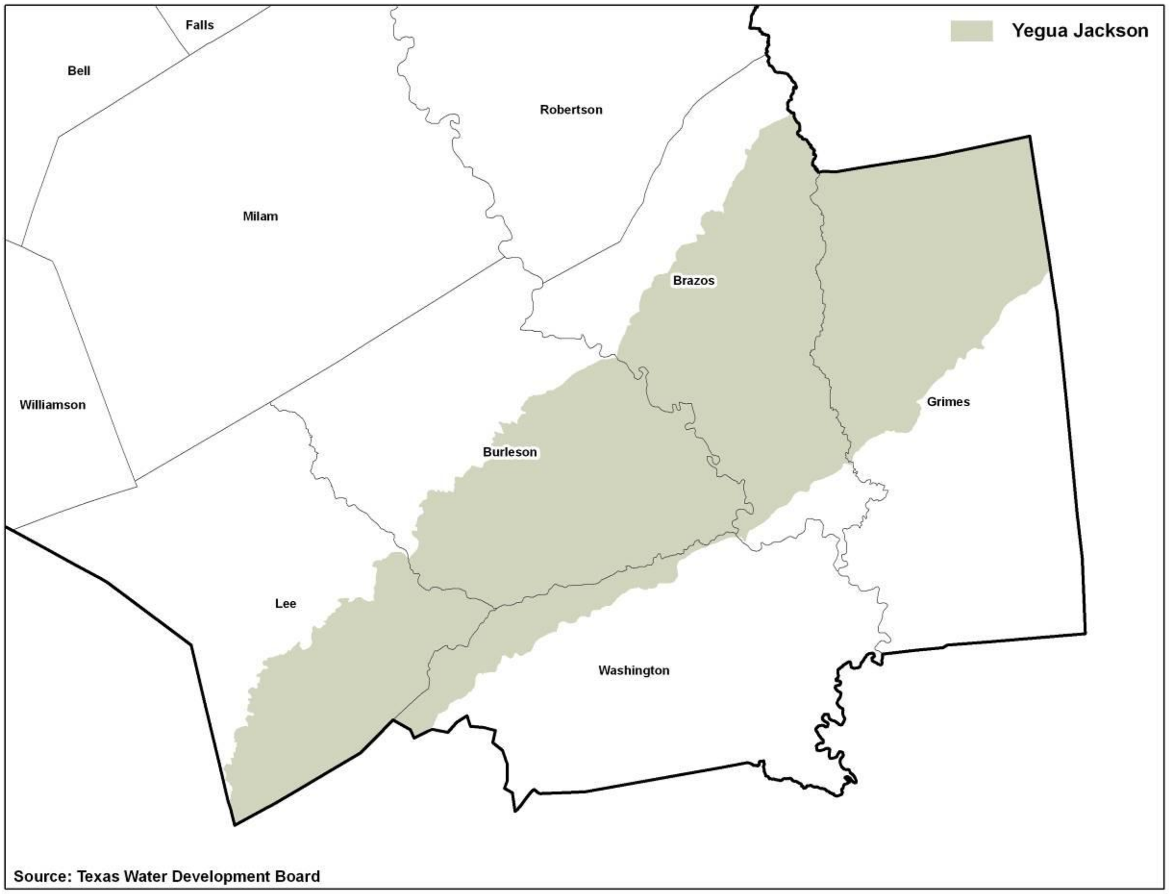


Figure B-20. Location of Yegua-Jackson Aquifer in BGRWPA

(This page intentionally left blank.)

Woodbine Aquifer

Location

The Woodbine Aquifer, a minor aquifer, is in the north-central part of the BGRWPA and in an adjacent planning areas to the north. It occurs in a north-south-trending belt primarily across parts of Johnson and Hill Counties (Figure B-21).

Geohydrology

The Woodbine consists of water-bearing sandstone interbedded with shale. The sandstone tends to be thicker in the lower part of the formation. The upper part of the Woodbine has distinctly poorer water quality. Total formation thickness ranges up to slightly over 200 feet and sand thickness up to 100 feet. From their surface outcrop (recharge area) the water-bearing sands dip eastward beneath younger strata. Water table conditions occur in recharge areas, and artesian conditions occur in downdip areas. Precipitation is the main source of recharge. Maximum estimated transmissivities for the best yielding zones in the lower Woodbine are about 250 to 500 square ft per day.

Development and Use

Use is limited to a few public supplies, some mining and rural domestic and livestock use. The year 2000 groundwater use within the BGRWPA totaled 1,360 acft, with approximately 42 percent municipal use, 8 percent mining and 50 percent livestock watering. The Hillsboro area in Johnson County has the greatest current use.

Availability

An official MAG for the Woodbine Aquifer has been determined by the TWDB on the basis of DFCs established by GMA-8. The general approach by GMA-8 officials was for each of the representative groundwater districts to propose pumping levels in their counties, or adjustments to the pumping, in the Northern Trinity/Woodbine Aquifer GAM. Following several trials, GAM Run 08-06 with specified pumping was selected as producing an acceptable level of drawdown. From the run, GMA-8 calculated a maximum average drawdown for each county since year 2000 and set this value as the DFC. The TWDB has formally made the necessary model runs and has defined a MAG for each county. Details of the approach, parameters and assumptions are presented in TWDB's *GAM Run 08-14mag* document.

The managed available groundwater, by county, follows:

Woodbine Aquifer

County	***Groundwater Availability Estimates (acft/yr)***
Hill	2,261
Johnson	4,732
Limestone	34
McLennan	5
Total	7,032

Well Yields

Estimated ranges for maximum individual well yields are 50 to 150 gpm. Wide variations occur in individual well yields obtainable from Woodbine sands, depending on area, depth, and local sand thickness.

Water Quality

Water typically meets drinking water standards. Waters obtained near the outcrop of the water-bearing zones generally are higher in hardness and lower in total dissolved solids content. In confined areas the water is commonly a sodium-bicarbonate-type water with total dissolved solids content ranging from 500 to over 1,000 mg/L. The higher mineralized waters contain appreciably higher sulfate content. High iron concentrations are common in the outcrop areas.

Resource Considerations

The Woodbine is a relatively weak aquifer, supports little development and has minimal potential within the BGRWPA. Few development problems have occurred to date, but large water level declines can be expected from any significant added development. Care must be taken in well construction to seal off the higher mineralized water in the upper part of the formation and to screen the best water-bearing zones in the lower part. No existing local plans are known. The only groundwater conservation district regulating the Woodbine in the BGRWPA is the McLennan County GCD.

References

Hopkins, Janie, 1996, Water quality in the Woodbine Aquifer, TWDB Hydrologic Atlas No. 4.

Bene', J. and Harden, B. and others, 2004, Northern Trinity/Woodbine Aquifer Groundwater Availability Model: TWDB Contract Report, http://www.twdb.state.tx.us/gam/trnt_n/trnt_n.htm

Klemt, W.B., Perkins, R.D., and Alvarez, H.J., 1975, Ground-water resources of part of Central Texas, with emphasis on the Antlers and Travis Peak Formations: TWDB Report 195.

Muller, Daniel A., and Price, Robert D., 1979, Ground-water availability in Texas: TDWR Report 238.

Nordstrom, P.L., 1982, Occurrence, availability, and chemical quality of ground water in the Cretaceous aquifers of North-Central Texas: TDWR Report 269.

Thompson, Gerald L., 1969, Ground water resources of Johnson County, Texas: TWDB Report 94.

Williams, C.R., 2008, Desired Future Conditions of N. Trinity Aquifer: Memorandum dated December 15, 2008 to Cheryl Maxwell, Administrative Agent for Groundwater Management Area 8.

Ward, J.K., Managed available groundwater estimates for the Woodbine Aquifer in Groundwater Management Area 8: TWDB letter dated Nov 10, 2008 with *GAM Run 08-14mag* attachment

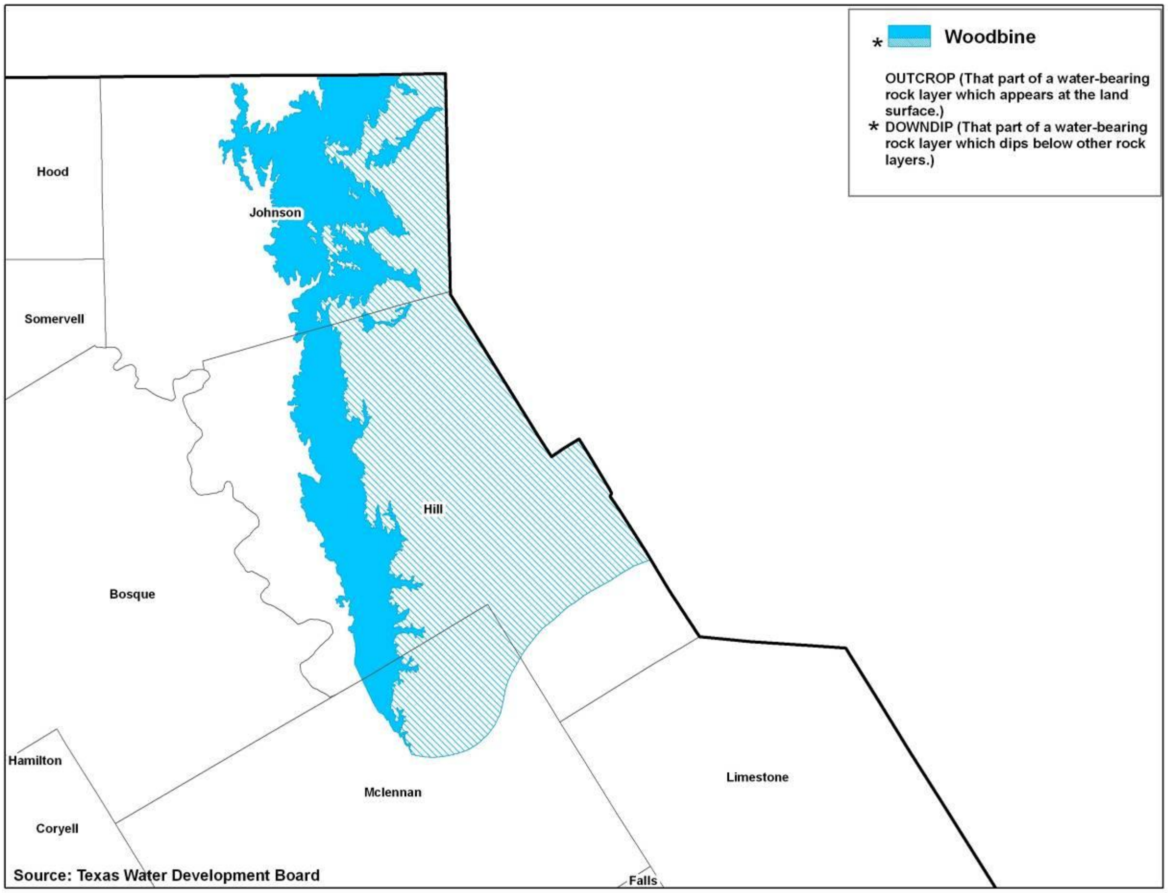


Figure B-21. Location of Woodbine Aquifer in BGRWPA

Appendix C
Comparison of Water Demands, Supplies, and Needs

Table C-1
Bell County
Population, Water Supply, and Water Demand Projections

Population Projection	Year						
	2000	2010	2020	2030	2040	2050	2060
	237,974	289,672	327,610	364,632	396,478	424,255	449,460

	Supply and Demand by Type of Use	Year						
		2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	48,665	60,039	70,010	76,412	81,485	85,999	90,422
	Contractual Demand	506	506	506	506	506	506	506
	Municipal Existing Supply							
	Groundwater	2,996	2,996	2,996	2,996	2,996	2,996	2,996
	Surface water (Less Contractual Demand)[1]	113,105	72,407	79,831	83,542	86,571	89,027	91,402
	Total Existing Municipal Supply	116,101	75,403	82,827	86,538	89,567	92,023	94,398
	Municipal Balance	67,436	15,364	12,817	10,126	8,082	6,024	3,976
Industrial	Manufacturing Demand	800	980	1,085	1,180	1,273	1,355	1,463
	Manufacturing Existing Supply							
	Groundwater	1,463	1,463	1,463	1,463	1,463	1,463	1,463
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	1,463	1,463	1,463	1,463	1,463	1,463	1,463
	Manufacturing Balance	663	483	378	283	190	108	0
	Steam-Electric Demand	0	0	3,674	4,296	5,053	5,977	7,102
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	(3,674)	(4,296)	(5,053)	(5,977)	(7,102)
	Mining Demand	174	155	150	147	144	141	139
	Mining Existing Supply							
	Groundwater	181	181	181	181	181	181	181
	Surface water	1	1	1	2	2	2	2
	Total Mining Supply	182	182	182	183	183	183	183
	Mining Balance	8	27	32	36	39	42	44
Agriculture	Irrigation Demand	1,679	1,656	1,634	1,611	1,591	1,569	1,546
	Irrigation Existing Supply							
	Groundwater	764	764	764	764	764	764	764
	Surface water	5,561	5,606	5,650	5,695	5,739	5,784	5,829
	Total Irrigation Supply	6,325	6,370	6,414	6,459	6,503	6,548	6,593
	Irrigation Balance	4,646	4,714	4,780	4,848	4,912	4,979	5,047
	Livestock Demand	953	953	953	953	953	953	953
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	953	953	953	953	953	953	953
	Total Livestock Supply	953	953	953	953	953	953	953
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	49,639	61,174	74,919	82,035	87,955	93,472	99,126
	Existing Municipal & Industrial Supply							
	Groundwater	4,640	4,640	4,640	4,640	4,640	4,640	4,640
	Surface water	113,105	72,408	79,832	83,544	86,572	89,029	91,404
	Total Municipal & Industrial Supply	117,745	77,048	84,472	88,184	91,212	93,669	96,044
	Municipal & Industrial Balance	68,106	15,874	9,553	6,149	3,257	197	(3,082)
	Agriculture Demand	2,632	2,609	2,587	2,564	2,544	2,522	2,499
	Existing Agricultural Supply							
	Groundwater	764	764	764	764	764	764	764
	Surface water	6,514	6,559	6,603	6,648	6,692	6,737	6,782
	Total Agriculture Supply	7,278	7,323	7,367	7,412	7,456	7,501	7,546
	Agriculture Balance	4,646	4,714	4,780	4,848	4,912	4,979	5,047
	Total Demand	52,271	63,783	77,506	84,599	90,499	95,994	101,625
	Total Supply							
	Groundwater	5,404	5,404	5,404	5,404	5,404	5,404	5,404
	Surface water	119,620	78,967	86,435	90,191	93,265	95,766	98,186
	Total Supply	125,024	84,371	91,839	95,595	98,669	101,170	103,590
	Total Balance	72,753	20,588	14,333	10,996	8,170	5,176	1,965

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-2
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Bell County							
439 WSC							
Demand	649	803	909	999	1,057	1,090	1,122
Supply	1,945	1,195	1,195	1,195	1,195	1,195	1,195
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,945	1,195	1,195	1,195	1,195	1,195	1,195
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,296	392	286	196	138	105	73
BARTLETT (P)							
Demand	165	184	196	206	211	216	220
Supply	126	126	126	126	126	126	126
Groundwater	126	126	126	126	126	126	126
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(39)	(58)	(70)	(80)	(85)	(90)	(94)
BELL-MILAM FALLS WSC							
Demand	299	342	371	398	415	425	435
Supply	351	351	351	351	351	351	351
Groundwater	155	155	155	155	155	155	155
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	196	196	196	196	196	196	196
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	52	9	(20)	(47)	(64)	(74)	(84)
BELTON							
Demand	2,412	2,824	3,199	3,542	3,723	3,875	3,920
Supply	6,066	2,824	3,199	3,542	3,723	3,875	3,920
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6,066	2,824	3,199	3,542	3,723	3,875	3,920
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	3,654	-	-	-	-	-	-
CHISHOLM TRAIL SUD							
Demand	56	103	127	149	166	176	183
Supply	383	382	382	381	381	380	380
Groundwater	16	16	16	16	16	16	16
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	367	366	366	365	365	364	364
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	327	279	255	232	215	204	197
DOG RIDGE WSC							
Demand	586	715	799	876	926	955	982
Supply	2,171	2,171	2,171	2,171	2,171	2,171	2,171
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,171	2,171	2,171	2,171	2,171	2,171	2,171
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,585	1,456	1,372	1,295	1,245	1,216	1,189

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-2
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
EAST BELL COUNTY WSC							
Demand	250	263	271	276	279	282	286
Supply	362	362	362	362	362	362	362
Groundwater	127	127	127	127	127	127	127
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	235	235	235	235	235	235	235
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	112	99	91	86	83	80	76
ELM CREEK WSC							
Demand	154	184	206	224	236	243	249
Supply	110	251	288	320	348	366	390
Groundwater	73	73	73	73	73	73	73
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	37	178	215	247	275	293	317
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(44)	67	82	96	112	123	141
FORT HOOD (P)							
Demand	3,822	4,395	4,337	4,279	4,221	4,182	4,182
Supply	6,144	6,144	6,144	6,144	6,144	6,144	6,144
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6,144	6,144	6,144	6,144	6,144	6,144	6,144
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,322	1,749	1,807	1,865	1,923	1,962	1,962
HARKER HEIGHTS							
Demand	2,908	3,904	4,959	5,800	6,507	6,698	6,815
Supply	8,262	3,904	4,959	5,800	6,507	6,698	6,815
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	8,262	3,904	4,959	5,800	6,507	6,698	6,815
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	5,354	-	-	-	-	-	-
HOLLAND							
Demand	130	125	121	117	114	111	111
Supply	258	258	258	258	258	258	258
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	258	258	258	258	258	258	258
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	128	133	137	141	144	147	147
JARRELL-SCHWERTNER WSC							
Demand	256	308	344	376	395	409	420
Supply	306	306	306	306	306	306	280
Groundwater	42	42	42	42	42	42	42
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	264	264	264	264	264	264	238
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	50	(2)	(38)	(70)	(89)	(103)	(140)
KEMPNER WSC							
Demand	913	1,142	1,297	1,443	1,535	1,591	1,636
Supply	2,346	1,809	1,781	1,713	1,654	1,667	1,636
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,346	1,809	1,781	1,713	1,654	1,667	1,636
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,433	667	484	270	119	76	-

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-2
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
KILLEEN							
Demand	12,882	19,530	25,462	27,985	30,141	32,207	34,432
Supply	39,964	19,530	25,462	27,985	30,141	32,207	34,432
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	39,964	19,530	25,462	27,985	30,141	32,207	34,432
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	27,082	-	-	-	-	-	-
LITTLE RIVER-ACADEMY							
Demand	260	275	285	292	294	297	301
Supply	274	274	274	274	274	274	274
Groundwater	206	206	206	206	206	206	206
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	68	68	68	68	68	68	68
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	14	(1)	(11)	(18)	(20)	(23)	(27)
MOFFAT WSC							
Demand	351	402	430	457	468	477	488
Supply	913	964	992	1,019	1,030	1,039	1,050
Groundwater	138	138	138	138	138	138	138
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	775	826	854	881	892	901	912
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	562	562	562	562	562	562	562
MORGANS POINT RESORT							
Demand	348	473	520	563	591	607	623
Supply	291	291	291	291	291	291	291
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	291	291	291	291	291	291	291
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(57)	(182)	(229)	(272)	(300)	(316)	(332)
NOLANVILLE							
Demand	299	348	359	365	365	369	374
Supply	740	349	359	365	365	369	374
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	740	349	359	365	365	369	374
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	441	1	-	-	-	-	-
PENDLETON WSC							
Demand	231	250	265	273	278	282	287
Supply	231	250	265	273	278	282	287
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	231	250	265	273	278	282	287
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
ROGERS							
Demand	199	195	191	188	184	181	181
Supply	368	368	368	368	368	368	368
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	368	368	368	368	368	368	368
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	169	173	177	180	184	187	187

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-2
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
SALADO WSC							
Demand	987	1,195	1,334	1,461	1,544	1,594	1,636
Supply	3,610	3,610	3,610	3,610	3,610	3,610	3,610
Groundwater	2,010	2,010	2,010	2,010	2,010	2,010	2,010
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,600	1,600	1,600	1,600	1,600	1,600	1,600
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,623	2,415	2,276	2,149	2,066	2,016	1,974
TEMPLE							
Demand	19,357	21,033	23,018	25,170	26,892	28,804	30,613
Contractual Demand	506	506	506	506	506	506	506
Supply	38,151	27,955	27,955	27,955	27,955	27,955	27,955
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	38,151	38,248	38,344	38,441	38,538	38,634	38,731
SW Constrained Supply		27,955	27,955	27,955	27,955	27,955	27,955
Balance	18,288	6,416	4,431	2,279	557	(1,355)	(3,164)
TROY							
Demand	191	185	181	176	171	168	168
Supply	214	214	214	214	214	214	214
Groundwater	90	90	90	90	90	90	90
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	124	124	124	124	124	124	124
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	23	29	33	38	43	46	46
WEST BELL COUNTY WSC							
Demand	678	660	642	623	605	599	599
Supply	921	921	921	921	921	921	921
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	921	921	921	921	921	921	921
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	243	261	279	298	316	322	322
COUNTY-OTHER							
Demand	282	200	187	174	167	161	159
Supply	2,101	1,101	1,101	1,101	1,101	1,101	1,101
Groundwater	13	13	13	13	13	13	13
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,088	1,088	1,088	1,088	1,088	1,088	1,088
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,819	901	914	927	934	940	942

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-3
Bosque County
Population, Water Supply, and Water Demand Projections

Population Projection	Year 2000	2010	2020	2030	2040	2050	2060
	17,204	19,831	22,646	24,622	25,364	25,667	26,032

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,539	2,839	3,159	3,369	3,410	3,418	3,468
	Contractual Demand	112	112	112	112	112	112	112
	Municipal Existing Supply							
	Groundwater	3,528	3,775	3,775	3,775	3,691	3,691	3,554
	Surface water (Less Contractual Demand)[1]	463	463	463	463	461	457	454
	Total Existing Municipal Supply	3,991	4,238	4,238	4,238	4,152	4,148	4,008
	Municipal Balance	1,452	1,399	1,079	869	742	730	540
Industrial	Manufacturing Demand	794	1,005	1,151	1,285	1,417	1,531	1,664
	Manufacturing Existing Supply							
	Groundwater	1,663	1,663	1,663	1,663	1,663	1,663	1,663
	Surface water	1	1	1	1	1	1	1
	Total Manufacturing Supply	1,664	1,664	1,664	1,664	1,664	1,664	1,664
	Manufacturing Balance	870	659	513	379	247	133	0
	Steam-Electric Demand	521	4,323	6,188	7,235	8,510	10,065	11,961
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	6,500	6,500	6,500	6,500	6,500	6,500	6,500
	Total Steam-Electric Supply	6,500	6,500	6,500	6,500	6,500	6,500	6,500
	Steam-Electric Balance	5,979	2,177	312	(735)	(2,010)	(3,565)	(5,461)
	Mining Demand	276	210	197	189	182	176	172
	Mining Existing Supply							
	Groundwater	345	345	345	345	345	345	345
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	345	345	345	345	345	345	345
	Mining Balance	69	135	148	156	163	169	173
Agriculture	Irrigation Demand	2,543	2,504	2,466	2,427	2,388	2,352	2,316
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	11,176	11,170	11,164	11,158	11,152	11,146	11,140
	Total Irrigation Supply	11,176	11,170	11,164	11,158	11,152	11,146	11,140
	Irrigation Balance	8,633	8,666	8,698	8,731	8,764	8,794	8,824
	Livestock Demand	1,048	1,048	1,048	1,048	1,048	1,048	1,048
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,048	1,048	1,048	1,048	1,048	1,048	1,048
	Total Livestock Supply	1,048	1,048	1,048	1,048	1,048	1,048	1,048
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	4,130	8,377	10,695	12,078	13,519	15,190	17,265
	Existing Municipal & Industrial Supply							
	Groundwater	5,536	5,783	5,783	5,783	5,699	5,699	5,562
	Surface water	6,964	6,964	6,965	6,965	6,962	6,958	6,955
	Total Municipal & Industrial Supply	12,500	12,747	12,748	12,748	12,661	12,657	12,517
	Municipal & Industrial Balance	8,370	4,370	2,053	670	(858)	(2,533)	(4,748)
	Agriculture Demand	3,591	3,552	3,514	3,475	3,436	3,400	3,364
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	12,224	12,218	12,212	12,206	12,200	12,194	12,188
	Total Agriculture Supply	12,224	12,218	12,212	12,206	12,200	12,194	12,188
	Agriculture Balance	8,633	8,666	8,698	8,731	8,764	8,794	8,824
	Total Demand	7,721	11,929	14,209	15,553	16,955	18,590	20,629
	Total Supply							
	Groundwater	5,536	5,783	5,783	5,783	5,699	5,699	5,562
	Surface water	19,188	19,183	19,177	19,171	19,162	19,153	19,143
	Total Supply	24,724	24,966	24,960	24,954	24,861	24,852	24,706
	Total Balance	17,003	13,037	10,751	9,401	7,906	6,262	4,077

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-4
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Bosque County							
CHILDRESS CREEK WSC							
Demand	283	322	361	389	395	396	402
Supply	506	506	506	506	506	506	506
Groundwater	506	506	506	506	506	506	506
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	223	184	145	117	111	110	104
CLIFTON							
Demand	647	709	773	819	824	827	837
Contractual Demand	112	112	112	112	112	112	112
Supply	1,088	1,088	1,088	1,088	1,088	1,088	951
Groundwater	683	683	683	683	683	683	683
GW Constrained Supply		NC	NC	NC	NC	NC	546
Surface water	405	405	405	405	405	405	405
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	329	267	203	157	152	149	2
CROSS COUNTRY WSC							
Demand	30	36	44	49	50	51	52
Supply	84	84	84	63	-	-	-
Groundwater	84	84	84	63	84	84	84
GW Constrained Supply		NC	NC	84	-	-	-
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	54	48	40	14	(50)	(51)	(52)
LAKE WHITNEY WATER COMPANY							
Demand	391	389	387	382	373	366	367
Supply	525	525	525	525	523	519	516
Groundwater	467	467	467	467	467	467	467
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	58	58	58	58	56	52	49
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	134	136	138	143	150	153	149
MERIDIAN							
Demand	217	229	242	249	247	247	250
Supply	487	487	487	487	487	487	487
Groundwater	375	375	375	375	375	375	375
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	112	112	112	112	112	112	112
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	270	258	245	238	240	240	237
MORGAN							
Demand		74	86	99	115	133	156
Supply	-	247	247	247	247	247	247
Groundwater	-	247	247	247	247	247	247
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	173	161	148	132	114	91

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-4
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
VALLEY MILLS (P)							
Demand	236	265	295	313	316	319	323
Supply	311	311	311	311	311	311	311
Groundwater	311	311	311	311	311	311	311
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	75	46	16	(2)	(5)	(8)	(12)
WALNUT SPRINGS							
Demand	94	97	100	101	100	99	100
Supply	111	111	111	111	111	111	111
Groundwater	111	111	111	111	111	111	111
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	17	14	11	10	11	12	11
COUNTY-OTHER							
Demand	641	718	871	968	990	980	981
Supply	991	991	991	991	991	991	991
Groundwater	991	991	991	991	991	991	991
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	350	273	120	23	1	11	10

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-5
Brazos County
Population, Water Supply, and Water Demand Projections

Population Projection	Year 2000	2010	2020	2030	2040	2050	2060
	152,415	178,187	205,099	229,850	248,962	271,608	279,182

	Supply and Demand by Type of Use	Year 2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	30,317	34,992	39,587	43,776	46,937	50,976	52,417
	Contractual Demand	0	1,120	1,120	1,120	1,120	1,120	1,120
	Municipal Existing Supply							
	Groundwater (Less Contractual Demand)[1]	47,570	48,183	48,183	48,183	48,183	48,183	48,183
	Surface water	4,000	2,880	2,880	2,880	2,880	2,880	2,880
	Total Existing Municipal Supply	51,570	51,063	51,063	51,063	51,063	51,063	51,063
	Municipal Balance	21,253	16,071	11,476	7,287	4,126	87	(1,354)
Industrial	Manufacturing Demand	244	316	365	413	462	506	549
	Manufacturing Existing Supply							
	Groundwater	2,475	2,475	2,475	2,475	2,475	2,475	2,475
	Surface water	14,720	14,720	14,720	14,720	14,720	14,720	14,720
	Total Manufacturing Supply	17,195	17,195	17,195	17,195	17,195	17,195	17,195
	Manufacturing Balance	16,951	16,879	16,830	16,782	16,733	16,689	16,646
	Steam-Electric Demand	545	526	488	394	446	303	393
	Steam-Electric Existing Supply							
	Groundwater	460	460	460	460	460	460	460
	Surface water	85	85	85	85	85	85	85
	Total Steam-Electric Supply	545	545	545	545	545	545	545
	Steam-Electric Balance	0	19	57	151	99	242	152
	Mining Demand	25	27	28	29	30	31	31
	Mining Existing Supply							
	Groundwater	32	32	32	32	32	32	32
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	32	32	32	32	32	32	32
	Mining Balance	7	5	4	3	2	1	1
Agriculture	Irrigation Demand	6,918	6,584	6,267	5,964	5,676	5,403	5,142
	Irrigation Existing Supply							
	Groundwater	12,133	12,133	12,133	12,133	12,133	12,133	12,133
	Surface water	4,359	4,379	4,399	4,420	4,440	4,460	4,480
	Total Irrigation Supply	16,492	16,512	16,532	16,553	16,573	16,593	16,613
	Irrigation Balance	9,574	9,928	10,265	10,589	10,897	11,190	11,471
	Livestock Demand	1,032	1,032	1,032	1,032	1,032	1,032	1,032
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,032	1,032	1,032	1,032	1,032	1,032	1,032
	Total Livestock Supply	1,032	1,032	1,032	1,032	1,032	1,032	1,032
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	31,131	35,861	40,468	44,612	47,875	51,816	53,390
	Existing Municipal & Industrial Supply							
	Groundwater	50,537	51,150	51,150	51,150	51,150	51,150	51,150
	Surface water	18,805	17,685	17,685	17,685	17,685	17,685	17,685
	Total Municipal & Industrial Supply	69,342	68,835	68,835	68,835	68,835	68,835	68,835
	Municipal & Industrial Balance	38,211	32,974	28,367	24,223	20,960	17,019	15,445
	Agriculture Demand	7,950	7,616	7,299	6,996	6,708	6,435	6,174
	Existing Agricultural Supply							
	Groundwater	12,133	12,133	12,133	12,133	12,133	12,133	12,133
	Surface water	5,391	5,411	5,431	5,452	5,472	5,492	5,512
	Total Agriculture Supply	17,524	17,544	17,564	17,585	17,605	17,625	17,645
	Agriculture Balance	9,574	9,928	10,265	10,589	10,897	11,190	11,471
	Total Demand	39,081	43,477	47,767	51,608	54,583	58,251	59,564
	Total Supply							
	Groundwater	62,670	63,283	63,283	63,283	63,283	63,283	63,283
	Surface water	24,196	23,096	23,116	23,137	23,157	23,177	23,197
	Total Supply	86,866	86,379	86,399	86,420	86,440	86,460	86,480
	Total Balance	47,785	42,902	38,632	34,812	31,857	28,209	26,916

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-6
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Brazos County							
BRYAN							
Demand	10,812	11,957	13,179	14,221	15,022	16,096	16,493
Contractual Demand		1,120	1,120	1,120	1,120	1,120	1,120
Supply	18,304	18,304	18,304	18,304	18,304	18,304	18,304
Groundwater	18,304	18,304	18,304	18,304	18,304	18,304	18,304
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	7,492	5,227	4,005	2,963	2,162	1,088	691
COLLEGE STATION							
Demand	17,110	20,032	22,977	25,779	27,844	30,432	31,342
Supply	25,711	25,711	25,711	25,711	25,711	25,711	25,711
Groundwater	25,711	25,711	25,711	25,711	25,711	25,711	25,711
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	8,601	5,679	2,734	(68)	(2,133)	(4,721)	(5,631)
WELLBORN SUD							
Demand	858	1,069	1,285	1,482	1,637	1,820	1,886
Supply	5,135	5,695	5,695	5,695	5,695	5,695	5,695
Groundwater	1,135	1,695	1,695	1,695	1,695	1,695	1,695
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	4,000	4,000	4,000	4,000	4,000	4,000	4,000
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4,277	4,626	4,410	4,213	4,058	3,875	3,809
WICKSON CREEK SUD							
Demand	624	1,126	1,451	1,701	1,924	2,206	2,301
Supply	1,437	2,050	2,050	2,050	2,050	2,050	2,050
Groundwater	1,437	2,050	2,050	2,050	2,050	2,050	2,050
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	813	924	599	349	126	(156)	(251)
COUNTY-OTHER							
Demand	913	808	695	593	510	422	395
Supply	983	1,543	1,543	1,543	1,543	1,543	1,543
Groundwater	983	1,543	1,543	1,543	1,543	1,543	1,543
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	70	735	848	950	1,033	1,121	1,148

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-7
Burleson County
Population, Water Supply, and Water Demand Projections

Population Projection	Year						
	2000	2010	2020	2030	2040	2050	2060
	16,470	18,477	20,663	22,249	23,465	24,358	25,146

	Supply and Demand by Type of Use	Year						
		2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,320	2,656	2,863	3,003	3,095	3,175	3,270
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	4,864	5,020	5,020	5,020	5,025	5,025	5,025
	Surface water	0	0	0	0	0	0	0
	Total Existing Municipal Supply	4,864	5,020	5,020	5,020	5,025	5,025	5,025
	Municipal Balance	2,544	2,364	2,157	2,017	1,930	1,850	1,755
Industrial	Manufacturing Demand	150	196	233	270	307	340	370
	Manufacturing Existing Supply							
	Groundwater	291	291	291	291	291	291	291
	Surface water	95	95	95	95	95	95	95
	Total Manufacturing Supply	386	386	386	386	386	386	386
	Manufacturing Balance	236	190	153	116	79	46	16
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	29	25	24	24	24	24	24
	Mining Existing Supply							
	Groundwater	29	29	29	29	29	29	29
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	29	29	29	29	29	29	29
	Mining Balance	0	4	5	5	5	5	5
Agriculture	Irrigation Demand	18,239	17,480	16,749	16,052	15,431	14,741	14,082
	Irrigation Existing Supply							
	Groundwater	9,400	9,400	9,400	9,400	9,400	9,400	9,400
	Surface water	8,840	8,840	8,840	8,840	8,840	8,840	8,840
	Total Irrigation Supply	18,240	18,240	18,240	18,240	18,240	18,240	18,240
	Irrigation Balance	1	760	1,491	2,188	2,809	3,499	4,158
	Livestock Demand	1,422	1,422	1,422	1,422	1,422	1,422	1,422
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,422	1,422	1,422	1,422	1,422	1,422	1,422
	Total Livestock Supply	1,422	1,422	1,422	1,422	1,422	1,422	1,422
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	2,499	2,877	3,120	3,297	3,426	3,539	3,664
	Existing Municipal & Industrial Supply							
	Groundwater	5,184	5,340	5,340	5,340	5,345	5,345	5,345
	Surface water	95	95	95	95	95	95	95
	Total Municipal & Industrial Supply	5,279	5,435	5,435	5,435	5,440	5,440	5,440
	Municipal & Industrial Balance	2,780	2,558	2,315	2,138	2,014	1,901	1,776
	Agriculture Demand	19,661	18,902	18,171	17,474	16,853	16,163	15,504
	Existing Agricultural Supply							
	Groundwater	9,400	9,400	9,400	9,400	9,400	9,400	9,400
	Surface water	10,262	10,262	10,262	10,262	10,262	10,262	10,262
	Total Agriculture Supply	19,662	19,662	19,662	19,662	19,662	19,662	19,662
	Agriculture Balance	1	760	1,491	2,188	2,809	3,499	4,158
	Total Demand	22,160	21,779	21,291	20,771	20,279	19,702	19,168
	Total Supply							
	Groundwater	14,584	14,740	14,740	14,740	14,745	14,745	14,745
	Surface water	10,357	10,357	10,357	10,357	10,357	10,357	10,357
	Total Supply	24,941	25,097	25,097	25,097	25,102	25,102	25,102
	Total Balance	2,781	3,318	3,806	4,326	4,823	5,400	5,934

Table C-8
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Burleson County							
CALDWELL							
Demand	630	807	835	854	865	878	894
Supply	2,352	2,352	2,352	2,352	2,352	2,352	2,352
Groundwater	2,352	2,352	2,352	2,352	2,352	2,352	2,352
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,722	1,545	1,517	1,498	1,487	1,474	1,458
MILANO WSC							
Demand	160	177	194	207	216	223	231
Supply	111	234	234	234	238	238	238
Groundwater	111	234	234	234	238	238	238
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(49)	57	40	27	22	15	7
SNOOK							
Demand	137	147	160	167	173	178	183
Supply	300	300	300	300	300	300	300
Groundwater	300	300	300	300	300	300	300
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	163	153	140	133	127	122	117
SOMERVILLE							
Demand	315	328	344	353	358	364	372
Supply	563	563	563	563	563	563	563
Groundwater	563	563	563	563	563	563	563
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	248	235	219	210	205	199	191
SOUTHWEST MILAM WSC							
Demand	49	58	67	73	79	82	86
Supply	30	63	63	63	64	64	64
Groundwater	30	63	63	63	64	64	64
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(19)	5	(4)	(10)	(15)	(18)	(22)
COUNTY-OTHER							
Demand	1,029	1,139	1,263	1,349	1,404	1,450	1,504
Supply	1,508	1,508	1,508	1,508	1,508	1,508	1,508
Groundwater	1,508	1,508	1,508	1,508	1,508	1,508	1,508
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	479	369	245	159	104	58	4

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-9
Callahan County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	12,905	12,829	12,980	12,750	12,492	12,206	11,968

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	1,500	1,445	1,417	1,351	1,296	1,245	1,224
	Contractual Demand	221	221	221	221	221	221	221
	Municipal Existing Supply							
	Groundwater	1,071	1,071	1,071	1,071	1,071	1,071	1,071
	Surface water (Less Contractual Demand)[1]	831	839	841	834	828	821	816
	Total Existing Municipal Supply	1,902	1,910	1,912	1,905	1,899	1,892	1,887
	Municipal Balance	402	465	495	554	603	647	663
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	81	92	96	98	100	101	103
	Mining Existing Supply							
	Groundwater	103	103	103	103	103	103	103
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	103	103	103	103	103	103	103
	Mining Balance	22	11	7	5	3	2	0
Agriculture	Irrigation Demand	819	806	793	780	767	755	742
	Irrigation Existing Supply							
	Groundwater	1,175	1,175	1,175	1,175	1,175	1,175	1,175
	Surface water	49	49	49	49	49	49	49
	Total Irrigation Supply	1,224	1,224	1,224	1,224	1,224	1,224	1,224
	Irrigation Balance	405	418	431	444	457	469	482
	Livestock Demand	976	976	976	976	976	976	976
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	976	976	976	976	976	976	976
	Total Livestock Supply	976	976	976	976	976	976	976
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,581	1,537	1,513	1,449	1,396	1,346	1,327
	Existing Municipal & Industrial Supply							
	Groundwater	1,174	1,174	1,174	1,174	1,174	1,174	1,174
	Surface water	831	839	841	834	828	821	816
	Total Municipal & Industrial Supply	2,005	2,013	2,015	2,008	2,002	1,995	1,990
	Municipal & Industrial Balance	424	476	502	559	606	649	663
	Agriculture Demand	1,795	1,782	1,769	1,756	1,743	1,731	1,718
	Existing Agricultural Supply							
	Groundwater	1,175	1,175	1,175	1,175	1,175	1,175	1,175
	Surface water	1,025	1,025	1,025	1,025	1,025	1,025	1,025
	Total Agriculture Supply	2,200	2,200	2,200	2,200	2,200	2,200	2,200
	Agriculture Balance	405	418	431	444	457	469	482
	Total Demand	3,376	3,319	3,282	3,205	3,139	3,077	3,045
	Total Supply							
	Groundwater	2,349	2,349	2,349	2,349	2,349	2,349	2,349
	Surface water	1,856	1,864	1,866	1,859	1,853	1,846	1,841
	Total Supply	4,205	4,213	4,215	4,208	4,202	4,195	4,190
	Total Balance	829	894	933	1,003	1,063	1,118	1,145

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-10
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Callahan County							
BAIRD							
Demand	396	389	384	378	373	369	369
Supply	137	137	137	137	137	137	137
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	137	137	137	137	137	137	137
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(259)	(252)	(247)	(241)	(236)	(232)	(232)
CLYDE							
Demand	285	305	297	278	259	245	238
Contractual Demand	221	221	221	221	221	221	221
Supply	807	807	807	807	807	807	807
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	807	807	807	807	807	807	807
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	301	281	289	308	327	341	348
COLEMAN COUNTY WSC							
Demand	51	49	51	44	38	31	26
Supply	41	49	51	44	38	31	26
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	41	49	51	44	38	31	26
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(10)	-	-	-	-	-	-
CROSS PLAINS							
Demand	171	167	164	160	157	154	154
Supply	411	411	411	411	411	411	411
Groundwater	411	411	411	411	411	411	411
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	240	244	247	251	254	257	257
POTOSI WSC							
Demand	8	8	8	7	6	6	6
Supply	6	6	6	6	6	6	6
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6	6	6	6	6	6	6
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(2)	(2)	(2)	(1)	(0)	(0)	(0)
COUNTY-OTHER							
Demand	589	527	513	484	463	440	431
Supply	721	721	721	721	721	721	721
Groundwater	660	660	660	660	660	660	660
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	61	61	61	61	61	61	61
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	132	194	208	237	258	281	290

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-11
Comanche County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	14,026	14,273	14,721	14,860	14,816	14,503	14,045

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	1,770	1,830	1,832	1,798	1,745	1,683	1,630
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	1,095	1,095	1,095	1,095	1,095	1,095	1,095
	Surface water	1,039	1,115	1,113	1,097	1,071	1,044	1,017
	Total Existing Municipal Supply	2,134	2,210	2,208	2,192	2,166	2,139	2,112
	Municipal Balance	364	380	376	394	421	456	482
Industrial	Manufacturing Demand	26	31	34	37	39	41	44
	Manufacturing Existing Supply							
	Groundwater	45	45	45	45	45	45	45
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	45	45	45	45	45	45	45
	Manufacturing Balance	19	14	11	8	6	4	1
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	80	54	51	50	49	48	47
	Mining Existing Supply							
	Groundwater	100	100	100	100	100	100	100
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	100	100	100	100	100	100	100
	Mining Balance	20	46	49	50	51	52	53
Agriculture	Irrigation Demand	35,969	35,598	35,230	34,867	34,507	34,151	33,798
	Irrigation Existing Supply							
	Groundwater	21,581	21,581	21,581	21,581	21,581	21,581	21,581
	Surface water	19,300	19,269	19,239	19,208	19,178	19,147	19,117
	Total Irrigation Supply	40,881	40,850	40,820	40,789	40,759	40,728	40,698
	Irrigation Balance	4,912	5,252	5,590	5,922	6,252	6,577	6,900
	Livestock Demand	4,253	4,253	4,253	4,253	4,253	4,253	4,253
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	4,253	4,253	4,253	4,253	4,253	4,253	4,253
	Total Livestock Supply	4,253	4,253	4,253	4,253	4,253	4,253	4,253
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,876	1,915	1,917	1,885	1,833	1,772	1,721
	Existing Municipal & Industrial Supply							
	Groundwater	1,240	1,240	1,240	1,240	1,240	1,240	1,240
	Surface water	1,039	1,115	1,113	1,097	1,071	1,044	1,017
	Total Municipal & Industrial Supply	2,279	2,355	2,353	2,337	2,311	2,284	2,257
	Municipal & Industrial Balance	403	440	436	452	478	512	536
	Agriculture Demand	40,222	39,851	39,483	39,120	38,760	38,404	38,051
	Existing Agricultural Supply							
	Groundwater	21,581	21,581	21,581	21,581	21,581	21,581	21,581
	Surface water	23,553	23,522	23,492	23,461	23,431	23,400	23,370
	Total Agriculture Supply	45,134	45,103	45,073	45,042	45,012	44,981	44,951
	Agriculture Balance	4,912	5,252	5,590	5,922	6,252	6,577	6,900
	Total Demand	42,098	41,766	41,400	41,005	40,593	40,176	39,772
	Total Supply							
	Groundwater	22,821	22,821	22,821	22,821	22,821	22,821	22,821
	Surface water	24,591	24,637	24,604	24,558	24,501	24,444	24,386
	Total Supply	47,412	47,458	47,425	47,379	47,322	47,265	47,207
	Total Balance	5,314	5,692	6,025	6,374	6,729	7,089	7,435

Table C-12
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Comanche County							
COMANCHE							
Demand	552	634	632	622	605	587	568
Supply	552	634	632	622	605	587	568
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	552	634	632	622	605	587	568
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
DE LEON							
Demand	286	280	280	274	265	256	248
Supply	286	280	280	274	265	256	248
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	286	280	280	274	265	256	248
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
COUNTY-OTHER							
Demand	932	916	920	902	875	840	814
Supply	1,296	1,296	1,296	1,296	1,296	1,296	1,296
Groundwater	1,095	1,095	1,095	1,095	1,095	1,095	1,095
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	201	201	201	201	201	201	201
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	364	380	376	394	421	456	482

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-13
Coryell County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	74,978	87,707	102,414	116,741	126,878	135,749	142,886

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	13,284	15,761	17,969	20,079	21,531	22,836	24,017
	Contractual Demand	359	452	554	633	691	734	769
	Municipal Existing Supply							
	Groundwater	3,156	3,156	3,156	3,156	3,156	3,156	3,156
	Surface water (Less Contractual Demand)[1]	23,534	19,162	19,579	19,999	20,272	20,475	20,707
	Total Existing Municipal Supply	26,690	22,318	22,735	23,155	23,428	23,631	23,863
	Municipal Balance	13,406	6,557	4,766	3,076	1,897	795	(154)
Industrial	Manufacturing Demand	7	9	10	11	12	13	14
	Manufacturing Existing Supply							
	Groundwater	14	14	14	14	14	14	14
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	14	14	14	14	14	14	14
	Manufacturing Balance	7	5	4	3	2	1	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	100	108	111	113	115	117	118
	Mining Existing Supply							
	Groundwater	125	125	125	125	125	125	125
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	125	125	125	125	125	125	125
	Mining Balance	25	17	14	12	10	8	7
Agriculture	Irrigation Demand	0	0	0	0	0	0	0
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,651	1,651	1,651	1,651	1,651	1,651	1,651
	Total Irrigation Supply	1,651	1,651	1,651	1,651	1,651	1,651	1,651
	Irrigation Balance	1,651	1,651	1,651	1,651	1,651	1,651	1,651
	Livestock Demand	1,339	1,339	1,339	1,339	1,339	1,339	1,339
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,339	1,339	1,339	1,339	1,339	1,339	1,339
	Total Livestock Supply	1,339	1,339	1,339	1,339	1,339	1,339	1,339
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	13,391	15,878	18,090	20,203	21,658	22,966	24,149
	Existing Municipal & Industrial Supply							
	Groundwater	3,295	3,295	3,295	3,295	3,295	3,295	3,295
	Surface water	23,534	19,162	19,579	19,999	20,272	20,475	20,707
	Total Municipal & Industrial Supply	26,829	22,457	22,874	23,294	23,567	23,770	24,002
	Municipal & Industrial Balance	13,438	6,579	4,784	3,091	1,909	804	(147)
	Agriculture Demand	1,339	1,339	1,339	1,339	1,339	1,339	1,339
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	2,990	2,990	2,990	2,990	2,990	2,990	2,990
	Total Agriculture Supply	2,990	2,990	2,990	2,990	2,990	2,990	2,990
	Agriculture Balance	1,651	1,651	1,651	1,651	1,651	1,651	1,651
	Total Demand	14,730	17,217	19,429	21,542	22,997	24,305	25,488
	Total Supply							
	Groundwater	3,295	3,295	3,295	3,295	3,295	3,295	3,295
	Surface water	26,524	22,152	22,569	22,989	23,262	23,465	23,697
	Total Supply	29,819	25,447	25,864	26,284	26,557	26,760	26,992
	Total Balance	15,089	8,230	6,435	4,742	3,560	2,455	1,504

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-14
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Coryell County							
COPPERAS COVE							
Demand	3,224	3,621	4,122	4,567	4,864	5,155	5,436
Supply	8,771	3,621	4,122	4,567	4,864	5,155	5,436
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	8,771	3,621	4,122	4,567	4,864	5,155	5,436
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	5,547	-	-	-	-	-	-
ELM CREEK WSC							
Demand	34	47	63	78	89	97	105
Supply	24	74	83	90	96	100	105
Groundwater	16	16	16	16	16	16	16
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	8	58	67	74	80	84	89
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(10)	27	20	12	7	3	-
FORT GATES WSC							
Demand	291	322	358	392	415	437	457
Supply	291	322	358	392	415	437	457
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	291	322	358	392	415	437	457
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(0)	(0)	(0)	(0)	(0)	(0)	(0)
FORT HOOD (P)							
Demand	3,633	4,178	4,123	4,068	4,013	3,976	3,976
Supply	5,856	5,856	5,856	5,856	5,856	5,856	5,856
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	5,856	5,856	5,856	5,856	5,856	5,856	5,856
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,223	1,678	1,733	1,788	1,843	1,880	1,880
GATESVILLE							
Demand	2,777	3,409	4,139	4,850	5,356	5,787	6,163
Contractual Demand	121	152	188	222	245	267	287
Supply	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	5,000	5,000	5,000	5,000	5,000	5,000	5,000
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,102	1,439	673	(72)	(601)	(1,054)	(1,450)
KEMPNER WSC							
Demand	1,165	1,699	2,311	2,913	3,334	3,698	4,000
Contractual Demand	238	300	366	411	446	467	482
Supply	2,999	3,789	3,762	3,775	3,780	3,709	3,670
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,999	3,789	3,762	3,775	3,780	3,709	3,670
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,596	1,790	1,085	451	-	(456)	(812)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-14
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER							
Demand	2,160	2,485	2,853	3,211	3,460	3,686	3,880
Supply	4,108	4,108	4,108	4,108	4,108	4,108	4,108
Groundwater	3,140	3,140	3,140	3,140	3,140	3,140	3,140
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	968	968	968	968	968	968	968
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,948	1,623	1,255	897	648	422	228

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-15
Eastland County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	18,297	18,336	18,382	18,061	17,566	16,989	16,226

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,003	2,962	2,909	2,796	2,662	2,535	2,421
	Contractual Demand	267	267	267	267	267	267	267
	Municipal Existing Supply							
	Groundwater	120	120	120	120	120	120	120
	Surface water (Less Contractual Demand)[1]	4,021	3,964	3,961	3,954	3,947	3,940	3,935
	Total Existing Municipal Supply	4,141	4,084	4,081	4,074	4,067	4,060	4,055
	Municipal Balance	1,138	1,122	1,172	1,278	1,405	1,525	1,634
Industrial	Manufacturing Demand	36	43	47	50	53	55	59
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	83	83	83	83	83	83	83
	Total Manufacturing Supply	83	83	83	83	83	83	83
	Manufacturing Balance	47	40	36	33	30	28	24
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	79	95	102	105	108	111	115
	Mining Existing Supply							
	Groundwater	29	29	29	29	29	29	29
	Surface water	745	745	745	745	745	745	745
	Total Mining Supply	774	774	774	774	774	774	774
	Mining Balance	695	679	672	669	666	663	659
Agriculture	Irrigation Demand	16,274	16,302	16,327	16,352	16,370	16,377	16,385
	Irrigation Existing Supply							
	Groundwater	4,563	4,563	4,563	4,563	4,563	4,563	4,563
	Surface water	2,404	2,404	2,404	2,404	2,404	2,404	2,404
	Total Irrigation Supply	6,967	6,967	6,967	6,967	6,967	6,967	6,967
	Irrigation Balance	(9,307)	(9,335)	(9,360)	(9,385)	(9,403)	(9,410)	(9,418)
	Livestock Demand	1,121	1,121	1,121	1,121	1,121	1,121	1,121
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,121	1,121	1,121	1,121	1,121	1,121	1,121
	Total Livestock Supply	1,121	1,121	1,121	1,121	1,121	1,121	1,121
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	3,118	3,100	3,058	2,951	2,823	2,701	2,595
	Existing Municipal & Industrial Supply							
	Groundwater	149	149	149	149	149	149	149
	Surface water	4,849	4,792	4,789	4,782	4,775	4,768	4,763
	Total Municipal & Industrial Supply	4,998	4,941	4,938	4,931	4,924	4,917	4,912
	Municipal & Industrial Balance	1,880	1,841	1,880	1,980	2,101	2,216	2,317
	Agriculture Demand	17,395	17,423	17,448	17,473	17,491	17,498	17,506
	Existing Agricultural Supply							
	Groundwater	4,563	4,563	4,563	4,563	4,563	4,563	4,563
	Surface water	3,525	3,525	3,525	3,525	3,525	3,525	3,525
	Total Agriculture Supply	8,088	8,088	8,088	8,088	8,088	8,088	8,088
	Agriculture Balance	(9,307)	(9,335)	(9,360)	(9,385)	(9,403)	(9,410)	(9,418)
	Total Demand	20,513	20,523	20,506	20,424	20,314	20,199	20,101
	Total Supply							
	Groundwater	4,712	4,712	4,712	4,712	4,712	4,712	4,712
	Surface water	8,374	8,316	8,313	8,306	8,299	8,292	8,287
	Total Supply	13,086	13,028	13,025	13,018	13,011	13,004	12,999
	Total Balance	(7,427)	(7,495)	(7,481)	(7,406)	(7,303)	(7,195)	(7,102)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-16
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Eastland County							
CISCO							
Demand	742	731	719	694	663	633	604
Contractual Demand	147	147	147	147	147	147	147
Supply	1,140	1,089	1,089	1,089	1,089	1,089	1,089
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,140	1,138	1,137	1,135	1,133	1,132	1,130
SW Constrained Supply		1,089	1,089	1,089	1,089	1,089	1,089
Balance	251	211	223	248	279	309	338
EASTLAND							
Demand	878	918	908	878	841	806	769
Contractual Demand	120	120	120	120	120	120	120
Supply	1,791	1,791	1,791	1,791	1,791	1,791	1,791
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,791	1,791	1,791	1,791	1,791	1,791	1,791
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	793	753	763	793	830	865	902
GORMAN							
Demand	143	137	134	127	120	113	108
Supply	143	137	134	127	120	113	108
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	143	137	134	127	120	113	108
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
RANGER							
Demand	327	316	308	294	278	263	252
Supply	710	710	710	710	710	710	710
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	710	710	710	710	710	710	710
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	383	394	402	416	432	447	458
RISING STAR							
Demand	77	74	71	67	63	59	56
Supply	58	58	58	58	58	58	58
Groundwater	58	58	58	58	58	58	58
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(19)	(16)	(13)	(9)	(5)	(1)	2
STEPHENS COUNTY RURAL WSC							
Demand	1	2	2	2	1	1	1
Supply	16	16	16	16	16	16	16
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	16	16	16	16	16	16	16
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	15	14	14	14	15	15	15

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-16
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER							
Demand	835	784	767	734	696	660	631
Supply	550	550	550	550	550	550	550
Groundwater	62	62	62	62	62	62	62
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	488	488	488	488	488	488	488
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(285)	(234)	(217)	(184)	(146)	(110)	(81)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-17
Erath County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	33,001	36,666	40,609	44,160	47,734	57,200	63,155

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	4,619	4,907	5,252	5,554	5,845	6,870	7,547
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	7,410	7,410	7,410	7,410	7,410	7,410	7,410
	Surface water	454	2,347	2,378	2,406	2,438	2,544	2,615
	Total Existing Municipal Supply	7,864	9,757	9,788	9,816	9,848	9,954	10,025
	Municipal Balance	3,245	4,850	4,536	4,262	4,003	3,084	2,478
Industrial	Manufacturing Demand	57	73	82	90	98	105	114
	Manufacturing Existing Supply							
	Groundwater	115	115	115	115	115	115	115
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	115	115	115	115	115	115	115
	Manufacturing Balance	58	42	33	25	17	10	1
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	0	0	0	0	0	0	0
	Mining Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	0	0	0	0	0	0	0
	Mining Balance	0	0	0	0	0	0	0
Agriculture	Irrigation Demand	10,816	10,658	10,502	10,349	10,197	10,048	9,901
	Irrigation Existing Supply							
	Groundwater	12,826	12,826	12,826	12,826	12,826	12,826	12,826
	Surface water	5,226	5,227	5,228	5,228	5,229	5,230	5,230
	Total Irrigation Supply	18,052	18,053	18,054	18,054	18,055	18,056	18,056
	Irrigation Balance	7,236	7,395	7,552	7,705	7,858	8,008	8,155
	Livestock Demand	9,321	9,321	9,321	9,321	9,321	9,321	9,321
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	9,321	9,321	9,321	9,321	9,321	9,321	9,321
	Total Livestock Supply	9,321	9,321	9,321	9,321	9,321	9,321	9,321
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	4,676	4,980	5,334	5,644	5,943	6,975	7,661
	Existing Municipal & Industrial Supply							
	Groundwater	7,525	7,525	7,525	7,525	7,525	7,525	7,525
	Surface water	454	2,347	2,378	2,406	2,438	2,544	2,615
	Total Municipal & Industrial Supply	7,979	9,872	9,903	9,931	9,963	10,069	10,140
	Municipal & Industrial Balance	3,303	4,892	4,569	4,287	4,020	3,094	2,479
	Agriculture Demand	20,137	19,979	19,823	19,670	19,518	19,369	19,222
	Existing Agricultural Supply							
	Groundwater	12,826	12,826	12,826	12,826	12,826	12,826	12,826
	Surface water	14,547	14,548	14,549	14,549	14,550	14,551	14,551
	Total Agriculture Supply	27,373	27,374	27,375	27,375	27,376	27,377	27,377
	Agriculture Balance	7,236	7,395	7,552	7,705	7,858	8,008	8,155
	Total Demand	24,813	24,959	25,157	25,314	25,461	26,344	26,883
	Total Supply							
	Groundwater	20,351	20,351	20,351	20,351	20,351	20,351	20,351
	Surface water	15,001	16,895	16,927	16,955	16,988	17,095	17,166
	Total Supply	35,352	37,246	37,278	37,306	37,339	37,446	37,517
	Total Balance	10,539	12,287	12,121	11,992	11,878	11,102	10,634

Table C-18
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Erath County							
DUBLIN							
Demand	454	485	516	544	576	682	753
Supply	454	485	516	544	576	682	753
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	454	485	516	544	576	682	753
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
STEPHENVILLE							
Demand	2,624	2,717	2,850	2,957	3,058	3,464	3,732
Supply	4,348	6,210	6,210	6,210	6,210	6,210	6,210
Groundwater	4,348	4,348	4,348	4,348	4,348	4,348	4,348
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	1,862	1,862	1,862	1,862	1,862	1,862
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,724	3,493	3,360	3,253	3,152	2,746	2,478
COUNTY-OTHER							
Demand	1,541	1,705	1,886	2,053	2,211	2,724	3,062
Supply	3,062	3,062	3,062	3,062	3,062	3,062	3,062
Groundwater	3,062	3,062	3,062	3,062	3,062	3,062	3,062
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,521	1,357	1,176	1,009	851	338	-

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-19
Falls County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	18,576	19,600	20,884	22,196	23,350	24,267	25,346

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,895	3,993	4,132	4,271	4,388	4,496	4,663
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	1,026	1,039	1,039	1,039	1,039	1,039	1,039
	Surface water	1,927	1,935	1,937	1,939	1,941	1,942	1,944
	Total Existing Municipal Supply	2,953	2,974	2,976	2,978	2,980	2,981	2,983
	Municipal Balance	(942)	(1,019)	(1,156)	(1,293)	(1,408)	(1,515)	(1,680)
Industrial	Manufacturing Demand	2	2	2	2	2	2	2
	Manufacturing Existing Supply							
	Groundwater	2	2	2	2	2	2	2
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	2	2	2	2	2	2	2
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	133	101	95	91	88	85	83
	Mining Existing Supply							
	Groundwater	166	166	166	166	166	166	166
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	166	166	166	166	166	166	166
	Mining Balance	33	65	71	75	78	81	83
Agriculture	Irrigation Demand	1,928	1,866	1,806	1,748	1,691	1,637	1,584
	Irrigation Existing Supply							
	Groundwater	4,340	4,340	4,340	4,340	4,340	4,340	4,340
	Surface water	8,260	8,248	8,236	8,224	8,212	8,200	8,188
	Total Irrigation Supply	12,600	12,588	12,576	12,564	12,552	12,540	12,528
	Irrigation Balance	10,672	10,722	10,770	10,816	10,861	10,903	10,944
	Livestock Demand	1,626	1,626	1,626	1,626	1,626	1,626	1,626
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,626	1,626	1,626	1,626	1,626	1,626	1,626
	Total Livestock Supply	1,626	1,626	1,626	1,626	1,626	1,626	1,626
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	4,030	4,096	4,229	4,364	4,478	4,583	4,748
	Existing Municipal & Industrial Supply							
	Groundwater	1,194	1,207	1,207	1,207	1,207	1,207	1,207
	Surface water	1,927	1,935	1,937	1,939	1,941	1,942	1,944
	Total Municipal & Industrial Supply	3,121	3,142	3,144	3,146	3,148	3,149	3,151
	Municipal & Industrial Balance	(909)	(954)	(1,085)	(1,218)	(1,330)	(1,434)	(1,597)
	Agriculture Demand	3,554	3,492	3,432	3,374	3,317	3,263	3,210
	Existing Agricultural Supply							
	Groundwater	4,340	4,340	4,340	4,340	4,340	4,340	4,340
	Surface water	9,886	9,874	9,862	9,850	9,838	9,826	9,814
	Total Agriculture Supply	14,226	14,214	14,202	14,190	14,178	14,166	14,154
	Agriculture Balance	10,672	10,722	10,770	10,816	10,861	10,903	10,944
	Total Demand	7,584	7,588	7,661	7,738	7,795	7,846	7,958
	Total Supply							
	Groundwater	5,534	5,547	5,547	5,547	5,547	5,547	5,547
	Surface water	11,813	11,809	11,799	11,789	11,779	11,768	11,758
	Total Supply	17,347	17,356	17,346	17,336	17,326	17,315	17,305
	Total Balance	9,763	9,768	9,685	9,598	9,531	9,469	9,347

Table C-20
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Falls County							
BELL-MILAM FALLS WSC							
Demand	138	178	229	281	327	362	407
Supply	161	161	161	161	161	161	161
Groundwater	70	70	70	70	70	70	70
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	91	91	91	91	91	91	91
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	23	(17)	(68)	(120)	(166)	(201)	(246)
BRUCEVILLE-EDDY							
Demand	1	2	3	4	5	5	6
Supply	48	49	51	52	53	54	55
Groundwater	40	40	40	40	40	40	40
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	8	9	11	12	13	14	15
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	47	47	48	48	48	49	49
EAST BELL COUNTY WSC							
Demand	67	77	89	101	112	120	132
Supply	140	140	140	140	140	140	140
Groundwater	34	34	34	34	34	34	34
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	106	106	106	106	106	106	106
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	73	63	51	39	28	20	8
ELM CREEK WSC							
Demand	3	5	6	8	9	11	12
Supply	3	9	10	10	11	11	12
Groundwater	2	2	2	2	2	2	2
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1	7	8	8	9	9	10
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(0)	4	4	2	2	-	-
LOTT							
Demand	99	97	94	92	89	88	88
Supply	184	184	184	184	184	184	184
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	184	184	184	184	184	184	184
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	85	87	90	92	95	96	96
MARLIN							
Demand	2,599	2,660	2,749	2,839	2,913	2,983	3,076
Supply	800	800	800	800	800	800	800
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	800	800	800	800	800	800	800
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(1,799)	(1,860)	(1,949)	(2,039)	(2,113)	(2,183)	(2,276)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-20
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
ROSEBUD							
Demand	177	171	166	161	156	152	152
Supply	693	693	693	693	693	693	693
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	693	693	693	693	693	693	693
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	516	522	527	532	537	541	541
TRI-COUNTY SUD							
Demand	234	253	280	305	327	347	375
Supply	379	392	392	392	392	392	392
Groundwater	379	392	392	392	392	392	392
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	145	139	112	87	65	45	17
WEST BRAZOS WSC							
Demand	159	190	230	267	304	331	368
Supply	127	127	127	127	127	127	127
Groundwater	127	127	127	127	127	127	127
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(32)	(63)	(103)	(140)	(177)	(204)	(241)
COUNTY-OTHER							
Demand	418	360	286	213	146	97	47
Supply	419	419	419	419	419	419	419
Groundwater	374	374	374	374	374	374	374
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	45	45	45	45	45	45	45
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1	59	133	206	273	322	372

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-21
Fisher County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	4,344	4,264	4,259	4,097	3,972	3,910	3,717

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	689	656	641	592	550	530	489
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	341	341	341	341	341	341	341
	Surface water	353	340	333	311	293	284	265
	Total Existing Municipal Supply	694	681	674	652	634	625	606
	Municipal Balance	5	25	33	60	84	95	117
Industrial	Manufacturing Demand	158	192	225	255	284	310	336
	Manufacturing Existing Supply							
	Groundwater	340	340	340	340	340	340	340
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	340	340	340	340	340	340	340
	Manufacturing Balance	182	148	115	85	56	30	4
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	468	375	359	354	349	344	337
	Mining Existing Supply							
	Groundwater	583	583	583	583	583	583	583
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	583	583	583	583	583	583	583
	Mining Balance	115	208	224	229	234	239	246
Agriculture	Irrigation Demand	2,459	2,386	2,314	2,245	2,178	2,113	2,049
	Irrigation Existing Supply							
	Groundwater	3,924	3,924	3,924	3,924	3,924	3,924	3,924
	Surface water	758	758	758	758	758	758	758
	Total Irrigation Supply	4,682	4,682	4,682	4,682	4,682	4,682	4,682
	Irrigation Balance	2,223	2,296	2,368	2,437	2,504	2,569	2,633
	Livestock Demand	585	585	585	585	585	585	585
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	585	585	585	585	585	585	585
	Total Livestock Supply	585	585	585	585	585	585	585
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,315	1,223	1,225	1,201	1,183	1,184	1,162
	Existing Municipal & Industrial Supply							
	Groundwater	1,264	1,264	1,264	1,264	1,264	1,264	1,264
	Surface water	353	340	333	311	293	284	265
	Total Municipal & Industrial Supply	1,617	1,604	1,597	1,575	1,557	1,548	1,529
	Municipal & Industrial Balance	302	381	372	374	374	364	367
	Agriculture Demand	3,044	2,971	2,899	2,830	2,763	2,698	2,634
	Existing Agricultural Supply							
	Groundwater	3,924	3,924	3,924	3,924	3,924	3,924	3,924
	Surface water	1,343	1,343	1,343	1,343	1,343	1,343	1,343
	Total Agriculture Supply	5,267	5,267	5,267	5,267	5,267	5,267	5,267
	Agriculture Balance	2,223	2,296	2,368	2,437	2,504	2,569	2,633
	Total Demand	4,359	4,194	4,124	4,031	3,946	3,882	3,796
	Total Supply							
	Groundwater	5,188	5,188	5,188	5,188	5,188	5,188	5,188
	Surface water	1,696	1,683	1,676	1,654	1,636	1,627	1,608
	Total Supply	6,884	6,871	6,864	6,842	6,824	6,815	6,796
	Total Balance	2,525	2,677	2,740	2,811	2,878	2,933	3,000

Table C-22
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Fisher County							
BITTER CREEK WSC							
Demand	121	117	114	113	111	110	113
Supply	83	83	83	83	83	83	83
Groundwater	58	58	58	58	58	58	58
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	25	25	25	25	25	25	25
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(38)	(34)	(31)	(30)	(28)	(27)	(30)
ROBY							
Demand	78	76	75	75	74	74	76
Supply	71	71	71	71	71	71	71
Groundwater	34	34	34	34	34	34	34
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	37	37	37	37	37	37	37
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(7)	(5)	(4)	(4)	(3)	(3)	(5)
ROTAN							
Demand	291	278	271	249	231	222	203
Supply	291	278	271	249	231	222	203
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	291	278	271	249	231	222	203
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
COUNTY-OTHER							
Demand	199	185	181	155	134	124	97
Supply	249	249	249	249	249	249	249
Groundwater	249	249	249	249	249	249	249
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	50	64	68	94	115	125	152

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-23
Grimes County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	23,552	26,635	30,073	32,785	34,670	36,176	37,657

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,923	3,320	3,629	3,855	3,983	4,129	4,302
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	4,391	4,391	4,391	4,391	4,391	4,391	4,391
	Surface water	0	0	0	0	0	0	0
	Total Existing Municipal Supply	4,391	4,391	4,391	4,391	4,391	4,391	4,391
	Municipal Balance	1,468	1,071	762	536	408	262	89
Industrial	Manufacturing Demand	197	257	297	336	375	410	445
	Manufacturing Existing Supply							
	Groundwater	445	445	445	445	445	445	445
	Surface water	112	112	112	112	112	112	112
	Total Manufacturing Supply	557	557	557	557	557	557	557
	Manufacturing Balance	360	300	260	221	182	147	112
	Steam-Electric Demand	4,405	12,000	31,760	33,160	34,660	36,660	39,660
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	9,740	16,461	16,461	16,461	16,461	16,461	16,461
	Total Steam-Electric Supply	9,740	16,461	16,461	16,461	16,461	16,461	16,461
	Steam-Electric Balance	5,335	4,461	(15,299)	(16,699)	(18,199)	(20,199)	(23,199)
	Mining Demand	158	166	169	171	173	174	175
	Mining Existing Supply							
	Groundwater	114	114	114	114	114	114	114
	Surface water	78	79	80	81	82	84	85
	Total Mining Supply	192	193	194	195	196	198	199
	Mining Balance	34	27	25	24	23	24	24
Agriculture	Irrigation Demand	241	241	241	241	241	241	241
	Irrigation Existing Supply							
	Groundwater	315	315	315	315	315	315	315
	Surface water	1,679	1,679	1,679	1,678	1,678	1,678	1,678
	Total Irrigation Supply	1,994	1,994	1,994	1,993	1,993	1,993	1,993
	Irrigation Balance	1,753	1,753	1,753	1,752	1,752	1,752	1,752
	Livestock Demand	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Total Livestock Supply	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	7,683	15,743	35,855	37,522	39,191	41,373	44,582
	Existing Municipal & Industrial Supply							
	Groundwater	4,950	4,950	4,950	4,950	4,950	4,950	4,950
	Surface water	9,930	16,652	16,653	16,654	16,655	16,656	16,657
	Total Municipal & Industrial Supply	14,880	21,602	21,603	21,604	21,605	21,606	21,607
	Municipal & Industrial Balance	7,197	5,859	(14,252)	(15,918)	(17,586)	(19,767)	(22,975)
	Agriculture Demand	1,795	1,795	1,795	1,795	1,795	1,795	1,795
	Existing Agricultural Supply							
	Groundwater	315	315	315	315	315	315	315
	Surface water	3,233	3,233	3,233	3,232	3,232	3,232	3,232
	Total Agriculture Supply	3,548	3,548	3,548	3,547	3,547	3,547	3,547
	Agriculture Balance	1,753	1,753	1,753	1,752	1,752	1,752	1,752
	Total Demand	9,478	17,538	37,650	39,317	40,986	43,168	46,377
	Total Supply							
	Groundwater	5,265	5,265	5,265	5,265	5,265	5,265	5,265
	Surface water	13,163	19,884	19,885	19,886	19,887	19,888	19,889
	Total Supply	18,428	25,149	25,150	25,151	25,152	25,153	25,154
	Total Balance	8,950	7,611	(12,500)	(14,166)	(15,834)	(18,015)	(21,223)

Table C-24
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Grimes County							
NAVASOTA							
Demand	1,384	1,426	1,464	1,494	1,505	1,526	1,555
Supply	2,561	2,561	2,561	2,561	2,561	2,561	2,561
Groundwater	2,561	2,561	2,561	2,561	2,561	2,561	2,561
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,177	1,135	1,097	1,067	1,056	1,035	1,006
WICKSON CREEK SUD							
Demand	303	625	878	1,044	1,175	1,286	1,396
Supply	284	284	284	284	284	284	284
Groundwater	284	284	284	284	284	284	284
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(19)	(341)	(594)	(760)	(891)	(1,002)	(1,112)
COUNTY-OTHER							
Demand	1,236	1,269	1,287	1,317	1,303	1,317	1,351
Supply	1,546	1,546	1,546	1,546	1,546	1,546	1,546
Groundwater	1,546	1,546	1,546	1,546	1,546	1,546	1,546
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	310	277	259	229	243	229	195

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-25
Hamilton County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	8,229	7,790	7,681	7,596	7,624	7,512	7,504

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	1,360	1,287	1,246	1,207	1,184	1,154	1,153
	Contractual Demand	968	968	968	968	968	968	968
	Municipal Existing Supply							
	Groundwater	1,007	1,007	1,007	1,007	1,007	1,007	1,007
	Surface water (Less Contractual Demand)[1]	1,032	1,032	1,032	1,032	1,032	1,032	1,032
	Total Existing Municipal Supply	2,039	2,039	2,039	2,039	2,039	2,039	2,039
	Municipal Balance	679	752	793	832	855	885	886
Industrial	Manufacturing Demand	3	4	5	6	7	8	9
	Manufacturing Existing Supply							
	Groundwater	10	10	10	10	10	10	10
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	10	10	10	10	10	10	10
	Manufacturing Balance	7	6	5	4	3	2	1
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	0	0	0	0	0	0	0
	Mining Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	0	0	0	0	0	0	0
	Mining Balance	0	0	0	0	0	0	0
Agriculture	Irrigation Demand	483	475	467	464	456	434	413
	Irrigation Existing Supply							
	Groundwater	751	751	751	751	751	751	751
	Surface water	4,090	4,087	4,084	4,080	4,077	4,074	4,070
	Total Irrigation Supply	4,841	4,838	4,835	4,831	4,828	4,825	4,821
	Irrigation Balance	4,358	4,363	4,368	4,367	4,372	4,391	4,408
	Livestock Demand	1,961	1,961	1,961	1,961	1,961	1,961	1,961
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,961	1,961	1,961	1,961	1,961	1,961	1,961
	Total Livestock Supply	1,961	1,961	1,961	1,961	1,961	1,961	1,961
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,363	1,291	1,251	1,213	1,191	1,162	1,162
	Existing Municipal & Industrial Supply							
	Groundwater	1,017	1,017	1,017	1,017	1,017	1,017	1,017
	Surface water	1,032	1,032	1,032	1,032	1,032	1,032	1,032
	Total Municipal & Industrial Supply	2,049	2,049	2,049	2,049	2,049	2,049	2,049
	Municipal & Industrial Balance	686	758	798	836	858	887	887
	Agriculture Demand	2,444	2,436	2,428	2,425	2,417	2,395	2,374
	Existing Agricultural Supply							
	Groundwater	751	751	751	751	751	751	751
	Surface water	6,051	6,048	6,045	6,041	6,038	6,035	6,031
	Total Agriculture Supply	6,802	6,799	6,796	6,792	6,789	6,786	6,782
	Agriculture Balance	4,358	4,363	4,368	4,367	4,372	4,391	4,408
	Total Demand	3,807	3,727	3,679	3,638	3,608	3,557	3,536
	Total Supply							
	Groundwater	1,768	1,768	1,768	1,768	1,768	1,768	1,768
	Surface water	7,083	7,080	7,076	7,073	7,070	7,066	7,063
	Total Supply	8,851	8,848	8,844	8,841	8,838	8,834	8,831
	Total Balance	5,044	5,121	5,165	5,203	5,230	5,277	5,295

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-26
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Hamilton County							
HAMILTON							
Demand	570	554	542	531	521	513	513
Contractual Demand	968	968	968	968	968	968	968
Supply	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,000	2,000	2,000	2,000	2,000	2,000	2,000
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	462	478	490	501	511	519	519
HICO							
Demand	291	302	297	292	288	285	285
Supply	383	383	383	383	383	383	383
Groundwater	383	383	383	383	383	383	383
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	92	81	86	91	95	98	98
COUNTY-OTHER							
Demand	499	431	407	384	375	356	355
Supply	624	624	624	624	624	624	624
Groundwater	624	624	624	624	624	624	624
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	125	193	217	240	249	268	269

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-27
Haskell County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	6,093	5,860	5,741	5,580	5,496	5,345	5,089

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	936	883	844	801	772	741	708
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	250	250	250	250	250	250	250
	Surface water	886	105	99	94	89	83	78
	Total Existing Municipal Supply	1,136	355	349	344	339	333	328
	Municipal Balance	200	(528)	(495)	(457)	(433)	(408)	(380)
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	507	422	336	393	462	547	650
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	898	898	898	898	898	898	898
	Total Steam-Electric Supply	898	898	898	898	898	898	898
	Steam-Electric Balance	391	476	562	505	436	351	248
	Mining Demand	101	93	91	90	89	88	87
	Mining Existing Supply							
	Groundwater	108	108	108	108	108	108	108
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	108	108	108	108	108	108	108
	Mining Balance	7	15	17	18	19	20	21
Agriculture	Irrigation Demand	50,820	49,309	47,844	46,422	45,040	43,702	42,405
	Irrigation Existing Supply							
	Groundwater	19,360	19,360	19,360	19,360	19,360	19,360	19,360
	Surface water	847	844	841	839	836	833	830
	Total Irrigation Supply	20,207	20,204	20,201	20,199	20,196	20,193	20,190
	Irrigation Balance	(30,613)	(29,105)	(27,643)	(26,223)	(24,844)	(23,509)	(22,215)
	Livestock Demand	492	492	492	492	492	492	492
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	492	492	492	492	492	492	492
	Total Livestock Supply	492	492	492	492	492	492	492
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,544	1,398	1,271	1,284	1,323	1,376	1,445
	Existing Municipal & Industrial Supply							
	Groundwater	358	358	358	358	358	358	358
	Surface water	1,784	1,002	997	992	986	981	975
	Total Municipal & Industrial Supply	2,142	1,360	1,355	1,350	1,344	1,339	1,333
	Municipal & Industrial Balance	598	(38)	84	66	21	(37)	(112)
	Agriculture Demand	51,312	49,801	48,336	46,914	45,532	44,194	42,897
	Existing Agricultural Supply							
	Groundwater	19,360	19,360	19,360	19,360	19,360	19,360	19,360
	Surface water	1,339	1,336	1,333	1,331	1,328	1,325	1,322
	Total Agriculture Supply	20,699	20,696	20,693	20,691	20,688	20,685	20,682
	Agriculture Balance	(30,613)	(29,105)	(27,643)	(26,223)	(24,844)	(23,509)	(22,215)
	Total Demand	52,856	51,199	49,607	48,198	46,855	45,570	44,342
	Total Supply							
	Groundwater	19,718	19,718	19,718	19,718	19,718	19,718	19,718
	Surface water	3,123	2,339	2,330	2,322	2,314	2,306	2,297
	Total Supply	22,841	22,057	22,048	22,040	22,032	22,024	22,015
	Total Balance	(30,015)	(29,142)	(27,559)	(26,158)	(24,823)	(23,546)	(22,327)

Table C-28
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Haskell County							
HASKELL							
Demand	585	559	538	518	503	487	472
Supply	558	20	16	12	8	4	-
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	558	20	16	12	8	4	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(27)	(539)	(522)	(506)	(495)	(483)	(472)
RULE							
Demand	86	81	77	72	69	66	62
Supply	164	121	120	120	120	119	119
Groundwater	119	119	119	119	119	119	119
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	45	2	1	1	1	0	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	78	40	43	48	51	53	57
STAMFORD (P)							
Demand	8	8	8	8	8	8	8
Supply	69	10	10	10	10	10	10
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	69	68	67	66	65	64	64
SW Constrained Supply		10	10	10	10	10	10
Balance	61	2	2	2	2	2	2
COUNTY-OTHER							
Demand	257	235	221	203	192	180	166
Supply	345	204	203	201	200	199	198
Groundwater	131	131	131	131	131	131	131
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	214	73	72	70	69	68	67
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	88	(31)	(18)	(2)	8	19	32

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-29
Hill County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	32,321	33,416	34,947	36,679	38,407	40,252	42,300

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	4,790	4,901	5,041	5,206	5,372	5,616	5,936
	Contractual Demand	420	420	420	420	420	420	420
	Municipal Existing Supply							
	Groundwater	2,871	2,871	2,871	2,871	2,871	2,871	2,871
	Surface water (Less Contractual Demand)[1]	6,335	6,136	6,118	6,101	5,821	5,425	5,036
	Total Existing Municipal Supply	9,206	9,007	8,989	8,972	8,692	8,296	7,907
	Municipal Balance	4,416	4,106	3,948	3,766	3,320	2,680	1,971
Industrial	Manufacturing Demand	67	85	97	108	119	129	140
	Manufacturing Existing Supply							
	Groundwater	142	142	142	142	142	142	142
	Surface water	250	250	250	250	250	250	250
	Total Manufacturing Supply	392	392	392	392	392	392	392
	Manufacturing Balance	325	307	295	284	273	263	252
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	118	100	96	94	92	90	89
	Mining Existing Supply							
	Groundwater	148	148	148	148	148	148	148
	Surface water	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Total Mining Supply	1,148	1,148	1,148	1,148	1,148	1,148	1,148
	Mining Balance	1,030	1,048	1,052	1,054	1,056	1,058	1,059
Agriculture	Irrigation Demand	43	43	42	42	42	42	41
	Irrigation Existing Supply							
	Groundwater	359	359	359	359	359	359	359
	Surface water	2,990	2,991	2,991	2,991	2,992	2,992	2,992
	Total Irrigation Supply	3,349	3,350	3,350	3,350	3,351	3,351	3,351
	Irrigation Balance	3,306	3,307	3,308	3,308	3,309	3,309	3,310
	Livestock Demand	1,401	1,401	1,401	1,401	1,401	1,401	1,401
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,401	1,401	1,401	1,401	1,401	1,401	1,401
	Total Livestock Supply	1,401	1,401	1,401	1,401	1,401	1,401	1,401
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	4,975	5,086	5,234	5,408	5,583	5,835	6,165
	Existing Municipal & Industrial Supply							
	Groundwater	3,161	3,161	3,161	3,161	3,161	3,161	3,161
	Surface water	7,585	7,386	7,368	7,351	7,071	6,675	6,286
	Total Municipal & Industrial Supply	10,746	10,547	10,529	10,512	10,232	9,836	9,447
	Municipal & Industrial Balance	5,771	5,461	5,295	5,104	4,649	4,001	3,282
	Agriculture Demand	1,444	1,444	1,443	1,443	1,443	1,443	1,442
	Existing Agricultural Supply							
	Groundwater	359	359	359	359	359	359	359
	Surface water	4,391	4,392	4,392	4,392	4,393	4,393	4,393
	Total Agriculture Supply	4,750	4,751	4,751	4,751	4,752	4,752	4,752
	Agriculture Balance	3,306	3,307	3,308	3,308	3,309	3,309	3,310
	Total Demand	6,419	6,530	6,677	6,851	7,026	7,278	7,607
	Total Supply							
	Groundwater	3,520	3,520	3,520	3,520	3,520	3,520	3,520
	Surface water	11,977	11,778	11,760	11,744	11,464	11,068	10,679
	Total Supply	15,497	15,298	15,280	15,264	14,984	14,588	14,199
	Total Balance	9,078	8,768	8,603	8,413	7,958	7,310	6,592

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-30
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Hill County							
BRANDON-IRENE WSC							
Demand	254	251	253	255	256	263	273
Supply	404	367	365	363	349	329	307
Groundwater	129	129	129	129	129	129	129
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	275	238	236	234	220	200	178
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	150	116	112	108	93	66	34
FILES VALLEY WSC							
Demand	413	413	417	421	424	433	447
Contractual Demand	420	420	420	420	420	420	420
Supply	1,103	960	950	940	882	801	717
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,103	960	950	940	882	801	717
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	270	127	113	99	38	(52)	(150)
HILLSBORO							
Demand	1,706	1,819	1,862	1,911	1,957	2,030	2,123
Supply	4,119	4,119	4,119	4,119	3,940	3,684	3,428
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	4,119	4,119	4,119	4,119	3,940	3,684	3,428
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,413	2,300	2,257	2,208	1,983	1,654	1,305
HUBBARD							
Demand	185	194	188	183	177	173	173
Supply	585	594	588	583	577	573	573
Groundwater	400	400	400	400	400	400	400
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	185	194	188	183	177	173	173
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	400	400	400	400	400	400	400
ITASCA							
Demand	214	239	233	225	219	215	214
Supply	244	244	244	244	244	244	244
Groundwater	244	244	244	244	244	244	244
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	30	5	11	19	25	29	30
JOHNSON COUNTY SUD							
Demand	34	37	41	46	53	59	65
Supply	59	59	59	59	59	59	65
Groundwater	19	19	19	19	19	19	19
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	40	40	40	40	40	40	46
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	25	22	18	13	6	(0)	-

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-30
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
LAKE WHITNEY WATER COMPANY							
Demand	638	623	608	593	578	570	574
Supply	857	857	857	857	853	847	841
Groundwater	765	765	765	765	765	765	765
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	92	92	92	92	88	82	76
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	219	234	249	264	275	277	267
PARKER WSC							
Demand	50	51	53	56	59	64	68
Supply	106	78	78	78	78	78	78
Groundwater	48	48	48	48	48	48	48
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	58	30	30	30	30	30	30
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	56	27	25	22	19	14	10
WHITE BLUFF COMMUNITY WS							
Demand	307	369	456	553	650	757	875
Supply	318	318	318	318	318	318	318
Groundwater	318	318	318	318	318	318	318
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	11	(51)	(138)	(235)	(332)	(439)	(557)
WHITNEY							
Demand	316	365	370	375	380	391	405
Supply	479	479	479	479	479	479	479
Groundwater	479	479	479	479	479	479	479
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	163	114	109	104	99	88	74
WOODROW-OSCEOLA WSC							
Demand	296	286	285	284	287	298	319
Supply	203	203	203	203	203	203	203
Groundwater	203	203	203	203	203	203	203
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(93)	(83)	(82)	(81)	(84)	(95)	(116)
COUNTY-OTHER							
Demand	377	268	289	317	345	376	413
Supply	1,150	1,150	1,150	1,150	1,130	1,102	1,074
Groundwater	266	266	266	266	266	266	266
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	884	884	884	884	864	836	808
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	773	882	861	833	785	726	661

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-31
Hood County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	41,100	49,207	58,364	66,888	75,814	87,059	100,045

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	7,794	9,544	11,235	12,801	14,516	16,697	19,337
	Contractual Demand	0	594	593	592	593	598	610
	Municipal Existing Supply							
	Groundwater	7,220	7,593	7,587	7,541	7,495	7,487	7,476
	Surface water (Less Contractual Demand)[1]	17,986	5,502	5,502	5,502	5,502	5,502	5,502
	Total Existing Municipal Supply	25,206	13,095	13,089	13,042	12,996	12,988	12,977
	Municipal Balance	17,412	3,551	1,854	241	(1,520)	(3,709)	(6,360)
Industrial	Manufacturing Demand	20	25	28	30	32	34	37
	Manufacturing Existing Supply							
	Groundwater	40	40	40	40	40	40	40
	Surface water	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Total Manufacturing Supply	10,040	10,040	10,040	10,040	10,040	10,040	10,040
	Manufacturing Balance	10,020	10,015	10,012	10,010	10,008	10,006	10,003
	Steam-Electric Demand	2,573	4,000	5,862	6,853	8,062	9,535	11,331
	Steam-Electric Existing Supply							
	Groundwater	59	59	59	59	59	59	59
	Surface water	43,447	43,447	43,447	43,447	43,447	43,447	43,447
	Total Steam-Electric Supply	43,506	43,506	43,506	43,506	43,506	43,506	43,506
	Steam-Electric Balance	40,933	39,506	37,644	36,653	35,444	33,971	32,175
	Mining Demand	167	162	161	160	159	158	157
	Mining Existing Supply							
	Groundwater	209	209	209	209	209	209	209
	Surface water	300	300	300	300	300	300	300
	Total Mining Supply	509	509	509	509	509	509	509
	Mining Balance	342	347	348	349	350	351	352
Agriculture	Irrigation Demand	3,240	3,179	3,120	3,062	3,005	2,948	2,893
	Irrigation Existing Supply							
	Groundwater	13	13	13	13	13	13	13
	Surface water	12,625	12,632	12,639	12,646	12,653	12,660	12,667
	Total Irrigation Supply	12,638	12,645	12,652	12,659	12,666	12,673	12,680
	Irrigation Balance	9,398	9,466	9,532	9,597	9,661	9,725	9,787
	Livestock Demand	623	623	623	623	623	623	623
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	623	623	623	623	623	623	623
	Total Livestock Supply	623	623	623	623	623	623	623
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	10,554	13,731	17,286	19,844	22,769	26,424	30,862
	Existing Municipal & Industrial Supply							
	Groundwater	7,528	7,901	7,895	7,849	7,803	7,795	7,784
	Surface water	71,733	59,249	59,249	59,249	59,249	59,249	59,249
	Total Municipal & Industrial Supply	79,261	67,150	67,144	67,097	67,051	67,043	67,032
	Municipal & Industrial Balance	68,707	53,419	49,858	47,253	44,282	40,619	36,170
	Agriculture Demand	3,863	3,802	3,743	3,685	3,628	3,571	3,516
	Existing Agricultural Supply							
	Groundwater	13	13	13	13	13	13	13
	Surface water	13,248	13,255	13,262	13,269	13,276	13,283	13,290
	Total Agriculture Supply	13,261	13,268	13,275	13,282	13,289	13,296	13,303
	Agriculture Balance	9,398	9,466	9,532	9,597	9,661	9,725	9,787
	Total Demand	14,417	17,533	21,029	23,529	26,397	29,995	34,378
	Total Supply							
	Groundwater	7,541	7,914	7,908	7,862	7,816	7,808	7,797
	Surface water	84,981	72,504	72,511	72,518	72,525	72,531	72,538
	Total Supply	92,522	80,418	80,419	80,379	80,340	80,339	80,335
	Total Balance	78,105	62,885	59,390	56,850	53,943	50,344	45,957

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-32
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Hood County							
ACTON MUD							
Demand	2,026	2,425	2,912	3,363	3,851	4,464	5,204
Contractual Demand		594	593	592	593	598	610
Supply	7,768	5,852	5,846	5,840	5,834	5,826	5,815
Groundwater	1,531	1,525	1,519	1,513	1,507	1,499	1,488
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6,237	6,237	6,237	6,237	6,237	6,237	6,237
SW Constrained Supply		4,327	4,327	4,327	4,327	4,327	4,327
Balance	5,742	2,833	2,341	1,885	1,390	764	1
CRESSON (P)							
Demand		43	52	62	74	90	110
Supply	-	140	140	140	140	140	140
Groundwater		140	140	140	140	140	140
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water		-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	97	88	78	66	50	30
DECORDOVA							
Demand		594	593	592	593	598	610
Supply	-	594	593	592	593	598	610
Groundwater		-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water		594	593	592	593	598	610
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
GRANBURY							
Demand	2,005	2,795	3,456	4,058	4,708	5,524	6,485
Supply	11,563	989	989	949	908	908	908
Groundwater	763	763	763	763	763	763	763
GW Constrained Supply		NC	NC	723	683	683	683
Surface water	10,800	10,800	10,800	10,800	10,800	10,800	10,800
SW Constrained Supply		226	226	226	226	226	226
Balance	9,558	(1,806)	(2,467)	(3,109)	(3,800)	(4,616)	(5,577)
LIPAN							
Demand		171	239	333	466	655	922
Supply	-	239	239	239	239	239	239
Groundwater		239	239	239	239	239	239
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water							
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	68	-	(94)	(227)	(416)	(683)
OAK TRAIL SHORES SUBDIVISION							
Demand	448	511	504	492	484	480	480
Supply	147	147	147	147	147	147	147
Groundwater	147	147	147	147	147	147	147
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(301)	(364)	(357)	(345)	(337)	(333)	(333)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-32
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
TOLAR							
Demand	98	143	179	213	246	289	342
Supply	195	195	195	195	195	195	195
Groundwater	195	195	195	195	195	195	195
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	97	52	16	(18)	(51)	(94)	(147)
COUNTY-OTHER							
Demand	3,217	2,863	3,301	3,689	4,094	4,597	5,184
Supply	5,533	5,533	5,533	5,533	5,533	5,533	5,533
Groundwater	4,584	4,584	4,584	4,584	4,584	4,584	4,584
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	949	949	949	949	949	949	949
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,316	2,670	2,232	1,844	1,439	936	349

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-33
Johnson County
Population, Water Supply, and Water Demand Projections

Population Projection	Year						
	2000	2010	2020	2030	2040	2050	2060
	126,811	159,451	200,381	238,590	268,082	304,454	346,999

	Supply and Demand by Type of Use	Year						
		2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	21,507	27,498	33,982	40,146	45,265	51,890	59,286
	Contractual Demand	0	0	33	119	219	353	528
	Municipal Existing Supply							
	Groundwater	11,955	11,948	11,954	11,900	11,906	11,737	11,690
	Surface water (Less Contractual Demand)[1]	32,486	25,815	28,513	30,028	29,583	28,938	28,345
	Total Existing Municipal Supply	44,441	37,762	40,466	41,928	41,489	40,675	40,035
	Municipal Balance	22,934	10,264	6,484	1,782	(3,776)	(11,215)	(19,251)
Industrial	Manufacturing Demand	1,533	2,121	2,517	2,903	3,295	3,646	3,994
	Manufacturing Existing Supply							
	Groundwater	762	762	762	762	762	762	762
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	762	762	762	762	762	762	762
	Manufacturing Balance	(771)	(1,359)	(1,755)	(2,141)	(2,533)	(2,884)	(3,232)
	Steam-Electric Demand	0	3,500	7,000	7,000	7,000	7,000	7,000
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water[2]	1,344	1,344	1,344	1,344	1,344	1,344	1,344
	Total Steam-Electric Supply	1,344	1,344	1,344	1,344	1,344	1,344	1,344
	Steam-Electric Balance	1,344	(2,156)	(5,656)	(5,656)	(5,656)	(5,656)	(5,656)
	Mining Demand	324	370	390	403	415	427	436
	Mining Existing Supply							
	Groundwater	401	401	401	401	401	401	401
	Surface water	51	53	55	57	58	60	62
	Total Mining Supply	452	454	456	458	459	461	463
	Mining Balance	128	84	66	55	44	34	27
Agriculture	Irrigation Demand	164	240	240	240	240	240	240
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,079	1,079	1,079	1,079	1,079	1,079	1,079
	Total Irrigation Supply	1,079	1,079	1,079	1,079	1,079	1,079	1,079
	Irrigation Balance	915	839	839	839	839	839	839
	Livestock Demand	2,117	2,117	2,117	2,117	2,117	2,117	2,117
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	2,117	2,117	2,117	2,117	2,117	2,117	2,117
	Total Livestock Supply	2,117	2,117	2,117	2,117	2,117	2,117	2,117
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	23,364	33,489	43,889	50,452	55,975	62,963	70,716
	Existing Municipal & Industrial Supply							
	Groundwater	13,118	13,111	13,117	13,063	13,069	12,900	12,853
	Surface water	33,882	27,212	29,912	31,429	30,985	30,342	29,751
	Total Municipal & Industrial Supply	47,000	40,323	43,028	44,492	44,054	43,242	42,604
	Municipal & Industrial Balance	23,636	6,834	(861)	(5,960)	(11,921)	(19,721)	(28,112)
	Agriculture Demand	2,281	2,357	2,357	2,357	2,357	2,357	2,357
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	3,196	3,196	3,196	3,196	3,196	3,196	3,196
	Total Agriculture Supply	3,196	3,196	3,196	3,196	3,196	3,196	3,196
	Agriculture Balance	915	839	839	839	839	839	839
	Total Demand	25,645	35,846	46,246	52,809	58,332	65,320	73,073
	Total Supply							
	Groundwater	13,118	13,111	13,117	13,063	13,069	12,900	12,853
	Surface water	37,077	30,408	33,107	34,624	34,181	33,538	32,947
	Total Supply	50,195	43,518	46,224	47,687	47,250	46,438	45,800
	Total Balance	24,550	7,672	(22)	(5,122)	(11,082)	(18,882)	(27,273)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.
[2] Steam-Electric surface water supplies includes 1,344 acft from City of Cleburne reuse

Table C-34
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Johnson County							
ACTON MUD							
Demand	17	21	27	33	39	47	58
Supply	778	51	57	63	69	77	88
Groundwater	15	21	27	33	39	47	58
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	763	763	763	763	763	763	763
SW Constrained Supply		30	30	30	30	30	30
Balance	761	30	30	30	30	30	30
ALVARADO							
Demand	460	570	607	654	697	766	858
Supply	354	354	354	354	354	354	354
Groundwater	354	354	354	354	354	354	354
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(106)	(216)	(253)	(300)	(343)	(412)	(504)
BETHANY WSC							
Demand	336	363	397	431	471	527	602
Supply	418	418	418	358	358	358	358
Groundwater	418	418	418	418	418	418	418
GW Constrained Supply		NC	NC	358	358	358	358
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	82	55	21	(73)	(113)	(169)	(244)
BETHESDA WSC							
Demand	2,199	2,751	3,415	4,115	4,898	5,863	7,096
Supply	3,613	3,613	3,613	3,613	3,613	3,436	3,436
Groundwater	2,035	2,035	2,035	2,035	2,035	2,035	2,035
GW Constrained Supply		NC	NC	NC	NC	1,858	1,858
Surface water	1,578	1,578	1,578	1,578	1,578	1,578	1,578
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,414	862	198	(502)	(1,285)	(2,427)	(3,660)
BURLESON							
Demand	2,943	4,449	6,687	8,272	8,153	8,096	8,095
Supply	2,943	4,449	6,687	8,272	8,153	8,096	8,095
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,943	4,449	6,687	8,272	8,153	8,096	8,095
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
CLEBURNE							
Demand	4,165	6,027	6,680	7,343	8,097	9,046	9,879
Supply	11,461	10,128	10,128	9,693	9,104	8,514	7,925
Groundwater	899	899	899	899	899	899	899
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	10,562	9,973	9,383	8,794	8,205	7,615	7,026
SW Constrained Supply		9,229	9,229	NC	NC	NC	NC
Balance	7,296	4,101	3,448	2,350	1,007	(532)	(1,954)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-34
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
CRESSON (P)							
Demand		12	14	17	20	24	29
Supply	-	37	37	37	37	37	37
Groundwater		37	37	37	37	37	37
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	25	23	20	17	13	8
GODLEY							
Demand	133	167	206	250	295	355	429
Supply	126	76	76	76	76	76	76
Groundwater	126	126	126	126	126	126	126
GW Constrained Supply		76	76	76	76	76	76
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(7)	(91)	(130)	(174)	(219)	(279)	(353)
GRANDVIEW							
Demand	201	230	281	342	334	331	331
Supply	369	369	369	369	369	369	369
Groundwater	369	369	369	369	369	369	369
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	168	139	88	27	35	38	38
JOHNSON COUNTY SUD							
Demand	6,154	8,036	10,423	13,058	16,201	20,192	24,506
Contractual Demand	-	-	33	119	219	353	528
Supply	15,165	8,336	8,336	8,336	8,336	8,336	8,330
Groundwater	1,995	1,995	1,995	1,995	1,995	1,995	1,995
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	13,170	13,170	13,170	13,170	13,170	13,170	13,170
SW Constrained Supply		6,341	6,341	6,341	6,341	6,341	6,335
Balance	9,011	300	(2,120)	(4,841)	(8,084)	(12,209)	(16,704)
JOSHUA							
Demand	680	801	882	968	1,068	1,202	1,377
Supply	849	849	882	968	1,068	1,202	1,377
Groundwater	849	849	849	849	849	849	849
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	33	119	219	353	528
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	169	48	-	-	-	-	-
KEENE							
Demand	549	620	705	798	896	1,028	1,202
Supply	1,163	1,163	1,163	1,163	1,163	1,163	1,105
Groundwater	406	406	406	406	406	406	406
GW Constrained Supply		NC	NC	NC	NC	NC	348
Surface water	757	757	757	757	757	757	757
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	614	543	458	365	267	135	(97)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-34
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
MANSFIELD							
Demand	148	165	172	172	173	175	178
Supply	148	165	172	172	173	175	178
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	148	165	172	172	173	175	178
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
MOUNTAIN PEAK WSC							
Demand	223	313	420	534	653	809	1,001
Supply	1,518	2,191	2,414	2,414	2,414	2,414	2,414
Groundwater	1,294	1,294	1,294	1,294	1,294	1,294	1,294
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	224	897	1,120	1,120	1,120	1,120	1,120
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,295	1,878	1,994	1,880	1,761	1,605	1,413
PARKER WSC							
Demand	238	287	344	402	470	555	664
Supply	512	540	540	540	540	540	540
Groundwater	234	234	234	234	234	234	234
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	278	306	306	306	306	306	306
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	274	253	196	138	70	(15)	(124)
RIO VISTA							
Demand	65	71	77	85	93	105	122
Supply	218	218	218	218	218	218	218
Groundwater	218	218	218	218	218	218	218
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	153	147	141	133	125	113	96
VENUS							
Demand	286	363	358	349	344	342	342
Supply	474	474	704	1,069	1,331	1,331	1,331
Groundwater	211	211	211	211	211	211	211
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	263	263	493	858	1,120	1,120	1,120
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	188	111	346	720	987	989	989
COUNTY-OTHER							
Demand	2,710	2,252	2,287	2,323	2,363	2,427	2,517
Supply	4,332	4,332	4,332	4,332	4,332	4,332	4,332
Groundwater	2,532	2,532	2,532	2,532	2,532	2,532	2,532
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,800	1,800	1,800	1,800	1,800	1,800	1,800
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,622	2,080	2,045	2,009	1,969	1,905	1,815

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-35
Jones County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	20,785	21,211	21,729	21,695	21,366	20,738	19,933

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,988	3,136	3,138	3,066	2,954	2,838	2,726
	Contractual Demand	4,092	4,093	4,087	4,070	4,042	4,012	3,982
	Municipal Existing Supply							
	Groundwater	35	35	35	35	35	35	35
	Surface water (Less Contractual Demand)[1]	6,998	1,211	578	580	583	587	590
	Total Existing Municipal Supply	7,033	1,246	613	615	618	622	625
	Municipal Balance	3,045	(1,890)	(2,525)	(2,451)	(2,336)	(2,216)	(2,101)
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	1,510	359	333	294	396	364	484
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	14,337	14,337	14,337	14,337	14,337	14,337	14,337
	Total Steam-Electric Supply	14,337	14,337	14,337	14,337	14,337	14,337	14,337
	Steam-Electric Balance	12,827	13,978	14,004	14,043	13,941	13,973	13,853
	Mining Demand	290	300	303	304	305	306	307
	Mining Existing Supply							
	Groundwater	363	363	363	363	363	363	363
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	363	363	363	363	363	363	363
	Mining Balance	73	63	60	59	58	57	56
Agriculture	Irrigation Demand	4,381	4,250	4,124	4,000	3,881	3,765	3,653
	Irrigation Existing Supply							
	Groundwater	3,235	3,235	3,235	3,235	3,235	3,235	3,235
	Surface water	2,601	2,596	2,591	2,585	2,580	2,575	2,570
	Total Irrigation Supply	5,836	5,831	5,826	5,820	5,815	5,810	5,805
	Irrigation Balance	1,455	1,581	1,702	1,820	1,934	2,045	2,152
	Livestock Demand	786	786	786	786	786	786	786
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	786	786	786	786	786	786	786
	Total Livestock Supply	786	786	786	786	786	786	786
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	5,788	3,795	3,774	3,664	3,655	3,508	3,517
	Existing Municipal & Industrial Supply							
	Groundwater	398	398	398	398	398	398	398
	Surface water	21,335	15,548	14,915	14,917	14,920	14,924	14,927
	Total Municipal & Industrial Supply	21,733	15,946	15,313	15,315	15,318	15,322	15,325
	Municipal & Industrial Balance	15,945	12,151	11,539	11,651	11,663	11,814	11,808
	Agriculture Demand	5,167	5,036	4,910	4,786	4,667	4,551	4,439
	Existing Agricultural Supply							
	Groundwater	3,235	3,235	3,235	3,235	3,235	3,235	3,235
	Surface water	3,387	3,382	3,377	3,371	3,366	3,361	3,356
	Total Agriculture Supply	6,622	6,617	6,612	6,606	6,601	6,596	6,591
	Agriculture Balance	1,455	1,581	1,702	1,820	1,934	2,045	2,152
	Total Demand	10,955	8,831	8,684	8,450	8,322	8,059	7,956
	Total Supply							
	Groundwater	3,633	3,633	3,633	3,633	3,633	3,633	3,633
	Surface water	24,722	18,930	18,292	18,289	18,286	18,285	18,283
	Total Supply	28,355	22,563	21,925	21,922	21,919	21,918	21,916
	Total Balance	17,400	13,732	13,241	13,472	13,597	13,859	13,960

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-36
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Jones County							
ABILENE (P)							
Demand	1,869	1,029	1,035	1,014	979	945	908
Supply	1,645	1,542	907	907	907	907	907
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,645	1,625	1,613	1,601	1,588	1,576	1,564
SW Constrained Supply		1,542	907	907	907	907	907
Balance	(224)	513	(128)	(107)	(72)	(38)	(1)
ANSON							
Demand	418	415	416	406	391	374	360
Contractual Demand	350	350	343	328	304	280	257
Supply	2,474	1,008	1,008	1,008	1,008	1,008	1,008
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,474	2,508	2,499	2,491	2,482	2,473	2,465
SW Constrained Supply		1,008	1,008	1,008	1,008	1,008	1,008
Balance	1,706	243	249	274	313	354	391
HAMLIN							
Demand	365	362	363	355	342	327	314
Supply	537	537	537	537	537	537	537
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	537	537	537	537	537	537	537
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	172	175	174	182	195	210	223
HAWLEY							
Demand	168	169	170	168	164	158	151
Supply	168	169	170	168	164	158	151
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	168	169	170	168	164	158	151
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
HAWLEY WSC							
Demand	404	401	393	380	363	347	333
Contractual Demand	168	169	170	168	164	158	151
Supply	558	571	566	553	532	512	492
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	558	571	566	553	532	512	492
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(14)	1	3	5	5	7	8
STAMFORD (P)							
Demand	640	637	640	626	604	582	560
Contractual Demand	3,574	3,574	3,574	3,574	3,574	3,574	3,574
Supply	5,671	1,441	1,441	1,441	1,441	1,441	1,441
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	5,671	5,606	5,533	5,461	5,388	5,316	5,243
SW Constrained Supply		1,441	1,441	1,441	1,441	1,441	1,441
Balance	1,457	(2,770)	(2,773)	(2,759)	(2,737)	(2,715)	(2,693)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-36
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER							
Demand	124	123	121	117	111	105	100
Supply	71	71	71	71	71	71	71
Groundwater	35	35	35	35	35	35	35
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	36	36	36	36	36	36	36
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(53)	(52)	(50)	(46)	(40)	(34)	(29)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-37
Kent County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	859	840	821	733	602	535	472

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	161	154	148	131	104	91	80
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	293	44	44	44	44	44	44
	Surface water	0	0	0	0	0	0	0
	Total Existing Municipal Supply	293	44	44	44	44	44	44
	Municipal Balance	132	(110)	(104)	(87)	(60)	(47)	(36)
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	686	464	436	427	418	410	399
	Mining Existing Supply							
	Groundwater	901	901	901	901	901	901	901
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	901	901	901	901	901	901	901
	Mining Balance	215	437	465	474	483	491	502
Agriculture	Irrigation Demand	532	517	503	488	475	462	449
	Irrigation Existing Supply							
	Groundwater	1,375	1,375	1,375	1,375	1,375	1,375	1,375
	Surface water	358	356	354	352	350	348	345
	Total Irrigation Supply	1,733	1,731	1,729	1,727	1,725	1,723	1,720
	Irrigation Balance	1,201	1,214	1,226	1,239	1,250	1,261	1,271
	Livestock Demand	459	459	459	459	459	459	459
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	459	459	459	459	459	459	459
	Total Livestock Supply	459	459	459	459	459	459	459
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	847	618	584	558	522	501	479
	Existing Municipal & Industrial Supply							
	Groundwater	1,194	945	945	945	945	945	945
	Surface water	0	0	0	0	0	0	0
	Total Municipal & Industrial Supply	1,194	945	945	945	945	945	945
	Municipal & Industrial Balance	347	327	361	387	423	444	466
	Agriculture Demand	991	976	962	947	934	921	908
	Existing Agricultural Supply							
	Groundwater	1,375	1,375	1,375	1,375	1,375	1,375	1,375
	Surface water	817	815	813	811	809	807	804
	Total Agriculture Supply	2,192	2,190	2,188	2,186	2,184	2,182	2,179
	Agriculture Balance	1,201	1,214	1,226	1,239	1,250	1,261	1,271
	Total Demand	1,838	1,594	1,546	1,505	1,456	1,422	1,387
	Total Supply							
	Groundwater	2,569	2,320	2,320	2,320	2,320	2,320	2,320
	Surface water	817	815	813	811	809	807	804
	Total Supply	3,386	3,135	3,133	3,131	3,129	3,127	3,124
	Total Balance	1,548	1,541	1,587	1,626	1,673	1,705	1,737

Table C-38
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Kent County							
JAYTON							
Demand	117	112	108	95	75	66	57
Supply	249	-	-	-	-	-	-
Groundwater	249	249	249	249	249	249	249
GW Constrained Supply		-	-	-	-	-	-
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	132	(112)	(108)	(95)	(75)	(66)	(57)
COUNTY-OTHER							
Demand	44	42	40	36	29	25	23
Supply	44	44	44	44	44	44	44
Groundwater	44	44	44	44	44	44	44
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	2	4	8	15	19	21

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-39
Knox County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	4,253	4,197	4,305	4,310	4,321	4,316	4,272

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	734	709	713	700	687	677	669
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	171	171	171	171	171	171	171
	Surface water	565	53	49	45	42	38	34
	Total Existing Municipal Supply	736	224	220	216	213	209	205
	Municipal Balance	2	(485)	(493)	(484)	(474)	(468)	(464)
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	26	26	26	26	26	26	26
	Mining Existing Supply							
	Groundwater	28	28	28	28	28	28	28
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	28	28	28	28	28	28	28
	Mining Balance	2	2	2	2	2	2	2
Agriculture	Irrigation Demand	43,124	42,065	41,033	40,025	39,041	38,082	37,147
	Irrigation Existing Supply							
	Groundwater	23,807	23,807	23,807	23,807	23,807	23,807	23,807
	Surface water	2,951	2,951	2,951	2,951	2,951	2,951	2,951
	Total Irrigation Supply	26,758	26,758	26,758	26,758	26,758	26,758	26,758
	Irrigation Balance	(16,366)	(15,307)	(14,275)	(13,267)	(12,283)	(11,324)	(10,389)
	Livestock Demand	1,040	1,040	1,040	1,040	1,040	1,040	1,040
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,040	1,040	1,040	1,040	1,040	1,040	1,040
	Total Livestock Supply	1,040	1,040	1,040	1,040	1,040	1,040	1,040
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	760	735	739	726	713	703	695
	Existing Municipal & Industrial Supply							
	Groundwater	199	199	199	199	199	199	199
	Surface water	565	53	49	45	42	38	34
	Total Municipal & Industrial Supply	764	252	248	244	241	237	233
	Municipal & Industrial Balance	4	(483)	(491)	(482)	(472)	(466)	(462)
	Agriculture Demand	44,164	43,105	42,073	41,065	40,081	39,122	38,187
	Existing Agricultural Supply							
	Groundwater	23,807	23,807	23,807	23,807	23,807	23,807	23,807
	Surface water	3,991	3,991	3,991	3,991	3,991	3,991	3,991
	Total Agriculture Supply	27,798	27,798	27,798	27,798	27,798	27,798	27,798
	Agriculture Balance	(16,366)	(15,307)	(14,275)	(13,267)	(12,283)	(11,324)	(10,389)
	Total Demand	44,924	43,840	42,812	41,791	40,794	39,825	38,882
	Total Supply							
	Groundwater	24,006	24,006	24,006	24,006	24,006	24,006	24,006
	Surface water	4,556	4,044	4,040	4,036	4,032	4,028	4,025
	Total Supply	28,562	28,050	28,046	28,042	28,038	28,034	28,031
	Total Balance	(16,362)	(15,790)	(14,766)	(13,749)	(12,756)	(11,791)	(10,851)

Table C-40
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Knox County							
KNOX CITY							
Demand	233	225	229	225	222	219	216
Supply	228	8	7	5	3	2	-
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	228	8	7	5	3	2	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(5)	(217)	(222)	(220)	(219)	(217)	(216)
MUNDAY							
Demand	275	267	265	260	255	251	250
Supply	235	8	7	5	3	2	-
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	235	8	7	5	3	2	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(40)	(259)	(258)	(255)	(252)	(249)	(250)
COUNTY-OTHER							
Demand	226	217	219	215	210	207	203
Supply	273	207	207	206	206	205	205
Groundwater	171	171	171	171	171	171	171
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	102	36	36	35	35	34	34
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	47	(10)	(12)	(9)	(4)	(2)	2

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-41
Lampasas County
Population, Water Supply, and Water Demand Projections

Population Projection	Year						
	2000	2010	2020	2030	2040	2050	2060
	17,762	20,114	22,596	24,396	25,731	26,606	27,160

	Supply and Demand by Type of Use	Year						
		2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,667	4,537	5,066	5,422	5,662	5,827	5,891
	Contractual Demand	121	130	141	147	152	155	159
	Municipal Existing Supply							
	Groundwater	1,114	1,114	1,114	1,114	1,114	1,114	1,114
	Surface water (Less Contractual Demand)[1]	8,790	8,270	8,316	8,335	8,346	8,339	8,320
	Total Existing Municipal Supply	9,904	9,384	9,430	9,449	9,460	9,453	9,434
	Municipal Balance	6,237	4,847	4,364	4,027	3,798	3,626	3,543
Industrial	Manufacturing Demand	108	129	142	153	164	174	187
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	18	18	18	18	18	18	18
	Total Manufacturing Supply	18	18	18	18	18	18	18
	Manufacturing Balance	(90)	(111)	(124)	(135)	(146)	(156)	(169)
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	193	152	144	139	135	131	128
	Mining Existing Supply							
	Groundwater	233	233	233	233	233	233	233
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	233	233	233	233	233	233	233
	Mining Balance	40	81	89	94	98	102	105
Agriculture	Irrigation Demand	170	168	166	164	162	160	159
	Irrigation Existing Supply							
	Groundwater	1	1	1	1	1	1	1
	Surface water	1,282	1,277	1,272	1,267	1,262	1,258	1,253
	Total Irrigation Supply	1,283	1,278	1,273	1,268	1,263	1,259	1,254
	Irrigation Balance	1,113	1,110	1,107	1,104	1,101	1,099	1,095
	Livestock Demand	688	688	688	688	688	688	688
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	688	688	688	688	688	688	688
	Total Livestock Supply	688	688	688	688	688	688	688
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	3,968	4,818	5,352	5,714	5,961	6,132	6,206
	Existing Municipal & Industrial Supply							
	Groundwater	1,347	1,347	1,347	1,347	1,347	1,347	1,347
	Surface water	8,808	8,288	8,334	8,353	8,364	8,357	8,338
	Total Municipal & Industrial Supply	10,155	9,635	9,681	9,700	9,711	9,704	9,685
	Municipal & Industrial Balance	6,187	4,817	4,329	3,986	3,750	3,572	3,479
	Agriculture Demand	858	856	854	852	850	848	847
	Existing Agricultural Supply							
	Groundwater	1	1	1	1	1	1	1
	Surface water	1,970	1,965	1,960	1,955	1,950	1,946	1,941
	Total Agriculture Supply	1,971	1,966	1,961	1,956	1,951	1,947	1,942
	Agriculture Balance	1,113	1,110	1,107	1,104	1,101	1,099	1,095
	Total Demand	4,826	5,674	6,206	6,566	6,811	6,980	7,053
	Total Supply							
	Groundwater	1,348	1,348	1,348	1,348	1,348	1,348	1,348
	Surface water	10,778	10,253	10,294	10,308	10,314	10,303	10,279
	Total Supply	12,126	11,601	11,642	11,656	11,662	11,651	11,627
	Total Balance	7,300	5,927	5,436	5,090	4,851	4,671	4,574

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-42
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Lampasas County							
COPPERAS COVE							
Demand	15	22	30	34	38	40	41
Supply	53	22	30	34	38	40	41
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	53	22	30	34	38	40	41
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	38	-	-	-	-	-	-
KEMPNER							
Demand	238	300	366	411	446	467	482
Supply	238	300	366	411	446	467	482
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	238	300	366	411	446	467	482
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
KEMPNER WSC							
Demand	1,053	1,293	1,547	1,734	1,870	1,956	2,015
Supply	2,717	2,166	2,138	2,108	2,080	2,050	2,015
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,717	2,166	2,138	2,108	2,080	2,050	2,015
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,664	873	591	374	210	94	-
LAMPASAS							
Demand	1,224	1,842	2,016	2,119	2,174	2,223	2,082
Contractual Demand	121	130	141	147	152	155	159
Supply	5,782	5,782	5,782	5,782	5,782	5,782	5,782
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	5,782	5,782	5,782	5,782	5,782	5,782	5,782
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4,437	3,810	3,625	3,516	3,456	3,404	3,541
LOMETA							
Demand	121	130	141	147	152	155	159
Supply	121	130	141	147	152	155	159
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	121	130	141	147	152	155	159
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
COUNTY-OTHER							
Demand	1,016	950	966	977	982	986	1,112
Supply	1,114	1,114	1,114	1,114	1,114	1,114	1,114
Groundwater	1,114	1,114	1,114	1,114	1,114	1,114	1,114
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	98	164	148	137	132	128	2

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-43
Lee County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	15,657	17,789	20,362	22,483	24,194	25,685	26,946

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,650	2,932	3,284	3,572	3,802	4,009	4,207
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	3,680	3,868	3,868	3,868	3,869	3,869	3,869
	Surface water	0	0	0	0	0	0	0
	Total Existing Municipal Supply	3,680	3,868	3,868	3,868	3,869	3,869	3,869
	Municipal Balance	1,030	936	584	296	67	(140)	(338)
Industrial	Manufacturing Demand	11	13	14	15	16	17	18
	Manufacturing Existing Supply							
	Groundwater	18	18	18	18	18	18	18
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	18	18	18	18	18	18	18
	Manufacturing Balance	7	5	4	3	2	1	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	20,000	5,450	5,450	5,450	5,450	13	13
	Mining Existing Supply							
	Groundwater	18,951	5,450	5,450	5,450	5,450	13	13
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	18,951	5,450	5,450	5,450	5,450	13	13
	Mining Balance	(1,049)	0	0	0	0	0	0
Agriculture	Irrigation Demand	965	940	916	891	867	842	818
	Irrigation Existing Supply							
	Groundwater	873	899	899	899	899	899	899
	Surface water	181	181	181	181	181	181	181
	Total Irrigation Supply	1,054	1,080	1,080	1,080	1,080	1,080	1,080
	Irrigation Balance	89	140	164	189	213	238	262
	Livestock Demand	1,547	1,547	1,547	1,547	1,547	1,547	1,547
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,547	1,547	1,547	1,547	1,547	1,547	1,547
	Total Livestock Supply	1,547	1,547	1,547	1,547	1,547	1,547	1,547
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	22,661	8,395	8,748	9,037	9,268	4,039	4,238
	Existing Municipal & Industrial Supply							
	Groundwater	22,649	9,336	9,336	9,336	9,337	3,900	3,900
	Surface water	0	0	0	0	0	0	0
	Total Municipal & Industrial Supply	22,649	9,336	9,336	9,336	9,337	3,900	3,900
	Municipal & Industrial Balance	(12)	941	588	299	69	(139)	(338)
	Agriculture Demand	2,512	2,487	2,463	2,438	2,414	2,389	2,365
	Existing Agricultural Supply							
	Groundwater	873	899	899	899	899	899	899
	Surface water	1,728	1,728	1,728	1,728	1,728	1,728	1,728
	Total Agriculture Supply	2,601	2,627	2,627	2,627	2,627	2,627	2,627
	Agriculture Balance	89	140	164	189	213	238	262
	Total Demand	25,173	10,882	11,211	11,475	11,682	6,428	6,603
	Total Supply							
	Groundwater	23,522	10,235	10,235	10,235	10,236	4,799	4,799
	Surface water	1,728	1,728	1,728	1,728	1,728	1,728	1,728
	Total Supply	25,250	11,963	11,963	11,963	11,964	6,527	6,527
	Total Balance	77	1,081	752	488	282	99	(76)

Table C-44
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Lee County							
AQUA WSC							
Demand	405	443	494	532	567	596	625
Supply	425	446	446	446	446	446	446
Groundwater	425	446	446	446	446	446	446
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	20	3	(48)	(86)	(121)	(150)	(179)
GIDDINGS							
Demand	984	1,106	1,258	1,382	1,476	1,564	1,645
Supply	1,655	1,747	1,747	1,747	1,747	1,747	1,747
Groundwater	1,655	1,747	1,747	1,747	1,747	1,747	1,747
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	671	641	489	365	271	183	102
LEE COUNTY WSC							
Demand	628	721	834	931	1,011	1,079	1,143
Supply	548	548	548	548	548	548	548
Groundwater	548	548	548	548	548	548	548
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(80)	(173)	(286)	(383)	(463)	(531)	(595)
LEXINGTON							
Demand	241	270	305	334	357	378	397
Supply	653	690	690	690	690	690	690
Groundwater	653	690	690	690	690	690	690
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	412	420	385	356	333	312	293
MANVILLE WSC							
Demand	14	19	25	30	34	38	41
Supply	57	59	59	59	59	59	59
Groundwater	57	59	59	59	59	59	59
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	43	40	34	29	25	21	18
SOUTHWEST MILAM WSC							
Demand	38	44	52	58	63	67	71
Supply	22	47	47	47	48	48	48
Groundwater	22	47	47	47	48	48	48
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(16)	3	(5)	(11)	(15)	(19)	(23)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

8/27/2010
1:11 PM

Table C-44
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER							
Demand	340	329	316	305	294	287	285
Supply	320	331	331	331	331	331	331
Groundwater	320	331	331	331	331	331	331
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(20)	2	15	26	37	44	46

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-45
Limestone County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	22,051	23,322	24,944	25,828	26,505	27,177	28,050

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,193	3,313	3,468	3,531	3,566	3,638	3,775
	Contractual Demand	5,534	5,534	5,534	5,534	5,534	5,534	5,534
	Municipal Existing Supply							
	Groundwater	3,146	3,151	3,151	3,151	3,151	3,151	3,151
	Surface water (Less Contractual Demand)[1]	(1,046)	(1,479)	(1,927)	(2,375)	(2,822)	(3,270)	(3,718)
	Total Existing Municipal Supply	2,100	1,672	1,224	776	329	(119)	(567)
	Municipal Balance	(1,093)	(1,641)	(2,244)	(2,755)	(3,237)	(3,757)	(4,342)
Industrial	Manufacturing Demand	39	48	53	58	63	67	72
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	36	30	25	19	14	8	3
	Total Manufacturing Supply	36	30	25	19	14	8	3
	Manufacturing Balance	(3)	(18)	(28)	(39)	(49)	(59)	(69)
	Steam-Electric Demand	22,065	22,332	22,598	26,420	31,079	36,758	43,681
	Steam-Electric Existing Supply							
	Groundwater	1,268	1,268	1,268	1,268	1,268	1,268	1,268
	Surface water	25,675	25,535	25,396	25,256	25,116	24,977	24,837
	Total Steam-Electric Supply	26,943	26,803	26,664	26,524	26,384	26,245	26,105
	Steam-Electric Balance	4,878	4,471	4,066	104	(4,695)	(10,513)	(17,576)
	Mining Demand	360	380	387	392	396	400	403
	Mining Existing Supply							
	Groundwater	1,168	1,168	1,168	1,168	1,168	1,168	1,168
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	1,168	1,168	1,168	1,168	1,168	1,168	1,168
	Mining Balance	808	788	781	776	772	768	765
Agriculture	Irrigation Demand	0	0	0	0	0	0	0
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	19	19	19	19	19	19	19
	Total Irrigation Supply	19	19	19	19	19	19	19
	Irrigation Balance	19	19	19	19	19	19	19
	Livestock Demand	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Total Livestock Supply	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	25,657	26,073	26,506	30,401	35,104	40,863	47,931
	Existing Municipal & Industrial Supply							
	Groundwater	5,582	5,587	5,587	5,587	5,587	5,587	5,587
	Surface water	24,664	24,087	23,494	22,901	22,308	21,715	21,122
	Total Municipal & Industrial Supply	30,246	29,674	29,081	28,488	27,895	27,302	26,709
	Municipal & Industrial Balance	4,589	3,601	2,575	(1,913)	(7,209)	(13,561)	(21,223)
	Agriculture Demand	1,487	1,487	1,487	1,487	1,487	1,487	1,487
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,506	1,506	1,506	1,506	1,506	1,506	1,506
	Total Agriculture Supply	1,506	1,506	1,506	1,506	1,506	1,506	1,506
	Agriculture Balance	19	19	19	19	19	19	19
	Total Demand	27,144	27,560	27,993	31,888	36,591	42,350	49,418
	Total Supply							
	Groundwater	5,582	5,587	5,587	5,587	5,587	5,587	5,587
	Surface water	26,170	25,592	24,999	24,406	23,813	23,220	22,627
	Total Supply	31,752	31,179	30,586	29,993	29,400	28,807	28,214
	Total Balance	4,608	3,619	2,593	(1,895)	(7,191)	(13,543)	(21,204)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-46
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Limestone County							
BISTONE MWSD							
Demand	150	148	146	144	142	141	141
Contractual Demand	5,534	5,534	5,534	5,534	5,534	5,534	5,534
Supply	3,480	3,256	3,032	2,808	2,584	2,360	2,136
Groundwater	1,937	1,937	1,937	1,937	1,937	1,937	1,937
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,543	1,319	1,095	871	647	423	199
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(2,204)	(2,426)	(2,648)	(2,870)	(3,092)	(3,315)	(3,539)
COOLIDGE							
Demand	88	95	103	108	110	114	120
Supply	63	91	82	72	63	54	45
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	63	91	82	72	63	54	45
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(25)	(4)	(21)	(36)	(47)	(60)	(75)
GROESBECK							
Demand	634	760	923	1,006	1,071	1,135	1,229
Supply	1,142	1,120	1,120	1,120	1,120	1,120	1,120
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,142	1,142	1,142	1,142	1,142	1,142	1,142
SW Constrained Supply		1,120	1,120	1,120	1,120	1,120	1,120
Balance	508	360	197	114	49	(15)	(109)
KOSSE							
Demand		75	75	74	73	73	74
Supply	-	-	-	-	-	-	-
Groundwater		-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water		-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	(75)	(75)	(74)	(73)	(73)	(74)
MEXIA							
Demand	1,213	1,250	1,289	1,328	1,358	1,408	1,479
Supply	1,249	1,068	887	705	524	343	161
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,249	1,068	887	705	524	343	161
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	36	(182)	(402)	(623)	(834)	(1,065)	(1,318)
THORNTON							
Demand	56	54	52	50	49	48	48
Supply	272	272	272	272	272	272	272
Groundwater	272	272	272	272	272	272	272
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	216	218	220	222	223	224	224

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

8/27/2010
1:11 PM

Table C-46
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
TRI-COUNTY SUD							
Demand	95	103	115	118	121	125	133
Supply	133	138	138	138	138	138	138
Groundwater	133	138	138	138	138	138	138
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	38	35	23	20	17	13	5
COUNTY-OTHER							
Demand	957	828	765	703	642	594	551
Supply	1,295	1,262	1,228	1,195	1,161	1,127	1,094
Groundwater	804	804	804	804	804	804	804
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	491	458	424	391	357	323	290
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	338	434	463	492	519	533	543

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-47
McLennan County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	213,517	231,882	250,398	266,002	282,177	292,449	307,378

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	44,105	46,914	49,741	52,122	54,570	56,158	58,728
	Contractual Demand	12,588	13,409	14,114	14,733	15,366	15,877	16,677
	Municipal Existing Supply							
	Groundwater	16,802	16,661	16,661	16,661	16,557	16,557	16,557
	Surface water (Less Contractual Demand)[1]	89,419	53,199	53,024	52,831	52,601	52,351	52,042
	Total Existing Municipal Supply	106,221	69,860	69,685	69,493	69,158	68,908	68,599
	Municipal Balance	62,116	22,946	19,944	17,371	14,588	12,750	9,871
Industrial	Manufacturing Demand	2,804	3,526	4,068	4,577	5,096	5,561	6,022
	Manufacturing Existing Supply							
	Groundwater	1,603	1,603	1,603	1,603	1,603	1,603	1,603
	Surface water	2,006	2,519	2,904	3,265	3,634	3,964	4,419
	Total Manufacturing Supply	3,609	4,122	4,507	4,868	5,237	5,567	6,022
	Manufacturing Balance	805	596	439	291	141	6	0
	Steam-Electric Demand	24,412	3,808	11,217	14,305	15,538	17,901	19,142
	Steam-Electric Existing Supply							
	Groundwater	1,815	1,349	1,349	1,349	1,349	1,349	1,349
	Surface water[2]	14,950	30,950	30,950	30,950	30,950	30,950	30,950
	Total Steam-Electric Supply	16,765	32,299	32,299	32,299	32,299	32,299	32,299
	Steam-Electric Balance	(7,647)	28,491	21,082	17,994	16,761	14,398	13,157
	Mining Demand	481	416	399	389	380	371	366
	Mining Existing Supply							
	Groundwater	481	481	481	481	481	481	481
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	481	481	481	481	481	481	481
	Mining Balance	0	65	82	92	101	110	115
Agriculture	Irrigation Demand	2,819	2,816	2,814	2,812	2,809	2,806	2,803
	Irrigation Existing Supply							
	Groundwater	883	883	883	883	883	883	883
	Surface water	8,868	8,868	8,868	8,868	8,868	8,868	8,868
	Total Irrigation Supply	9,751	9,751	9,751	9,751	9,751	9,751	9,751
	Irrigation Balance	6,932	6,935	6,937	6,939	6,942	6,945	6,948
	Livestock Demand	1,151	1,151	1,151	1,151	1,151	1,151	1,151
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,151	1,151	1,151	1,151	1,151	1,151	1,151
	Total Livestock Supply	1,151	1,151	1,151	1,151	1,151	1,151	1,151
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	71,802	54,664	65,425	71,393	75,584	79,991	84,258
	Existing Municipal & Industrial Supply							
	Groundwater	20,701	20,094	20,094	20,094	19,990	19,990	19,990
	Surface water	106,375	86,668	86,878	87,046	87,185	87,265	87,411
	Total Municipal & Industrial Supply	127,076	106,762	106,972	107,141	107,175	107,255	107,401
	Municipal & Industrial Balance	55,274	52,098	41,547	35,748	31,591	27,264	23,143
	Agriculture Demand	3,970	3,967	3,965	3,963	3,960	3,957	3,954
	Existing Agricultural Supply							
	Groundwater	883	883	883	883	883	883	883
	Surface water	10,019	10,019	10,019	10,019	10,019	10,019	10,019
	Total Agriculture Supply	10,902	10,902	10,902	10,902	10,902	10,902	10,902
	Agriculture Balance	6,932	6,935	6,937	6,939	6,942	6,945	6,948
	Total Demand	75,772	58,631	69,390	75,356	79,544	83,948	88,212
	Total Supply							
	Groundwater	21,584	20,977	20,977	20,977	20,873	20,873	20,873
	Surface water	116,394	96,687	96,896	97,065	97,204	97,284	97,430
	Total Supply	137,978	117,664	117,874	118,043	118,077	118,158	118,303
	Total Balance	62,206	59,033	48,484	42,687	38,533	34,210	30,091

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

[2] Steam-Electric surface water supplies includes 16,000 acft from WMARSS reuse

Table C-48
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
McLennan County							
BELLMEAD							
Demand	2,477	2,622	2,751	2,873	2,984	3,065	3,202
Supply	3,754	3,899	4,028	4,150	4,261	4,342	4,479
Groundwater	1,277	1,277	1,277	1,277	1,277	1,277	1,277
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,477	2,622	2,751	2,873	2,984	3,065	3,202
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,277	1,277	1,277	1,277	1,277	1,277	1,277
BEVERLY HILLS							
Demand	412	414	416	416	414	416	424
Supply	412	414	416	416	414	416	424
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	412	414	416	416	414	416	424
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
BRUCEVILLE-EDDY							
Demand	688	825	961	1,077	1,195	1,270	1,383
Supply	1,045	1,182	1,317	1,433	1,551	1,625	1,738
Groundwater	364	364	364	364	364	364	364
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	681	818	953	1,069	1,187	1,261	1,374
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	357	357	356	356	356	355	355
CHALK BLUFF WSC							
Demand	354	441	527	599	676	722	798
Supply	608	608	608	608	608	608	608
Groundwater	608	608	608	608	608	608	608
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	254	167	81	9	(68)	(114)	(190)
CRAWFORD							
Demand	63	65	67	68	69	70	73
Supply	92	92	92	92	92	92	92
Groundwater	91	91	91	91	91	91	91
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1	1	1	1	1	1	1
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	29	27	25	24	23	22	19
CROSS COUNTRY WSC							
Demand	396	445	497	541	585	614	661
Supply	520	520	520	541	416	416	416
Groundwater	520	520	520	541	520	520	520
GW Constrained Supply		NC	NC	520	416	416	416
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	124	75	23	-	(169)	(198)	(245)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-48
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
ELM CREEK WSC							
Demand	143	184	227	261	298	320	357
Supply	102	245	280	310	336	353	375
Groundwater	68	68	68	68	68	68	68
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	34	177	212	242	268	285	307
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(41)	61	53	49	38	33	18
GHOLSON							
Demand	130	150	169	184	202	213	231
Supply	788	788	788	788	788	788	788
Groundwater	788	788	788	788	788	788	788
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	658	638	619	604	586	575	557
HALLSBURG							
Demand	129	139	150	158	166	172	182
Supply	137	137	137	137	137	137	137
Groundwater	137	137	137	137	137	137	137
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	8	(2)	(13)	(21)	(29)	(35)	(45)
HEWITT							
Demand	1,838	2,029	2,237	2,395	2,571	2,684	2,877
Supply	3,305	3,496	3,704	3,862	4,038	4,151	4,344
Groundwater	1,467	1,467	1,467	1,467	1,467	1,467	1,467
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,838	2,029	2,237	2,395	2,571	2,684	2,877
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,467	1,467	1,467	1,467	1,467	1,467	1,467
LACY-LAKEVIEW							
Demand	678	835	989	1,116	1,256	1,338	1,477
Supply	1,120	1,120	1,120	1,120	1,120	1,120	1,120
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,120	1,120	1,120	1,120	1,120	1,120	1,120
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	442	285	131	4	(136)	(218)	(357)
LORENA							
Demand	331	369	408	440	475	497	533
Supply	1,274	1,274	1,274	1,274	1,274	1,274	1,274
Groundwater	274	274	274	274	274	274	274
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,000	1,000	1,000	1,000	1,000	1,000	1,000
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	943	905	866	834	799	777	741
MART							
Demand	318	335	354	367	383	394	415
Supply	143	143	143	143	143	143	143
Groundwater	143	143	143	143	143	143	143
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(175)	(192)	(211)	(224)	(240)	(251)	(272)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-48
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
MCGREGOR							
Demand	948	933	923	913	902	894	899
Supply	2,075	1,913	1,903	1,893	1,882	1,874	1,879
Groundwater	440	440	440	440	440	440	440
GW Constrained Supply		293	293	293	293	293	293
Surface water	1,635	1,620	1,610	1,600	1,589	1,581	1,586
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,127	980	980	980	980	980	980
MOODY							
Demand	199	202	203	203	204	206	212
Supply	378	381	382	382	383	385	391
Groundwater	179	179	179	179	179	179	179
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	199	202	203	203	204	206	212
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	179	179	179	179	179	179	179
NORTH BOSQUE WSC							
Demand	280	367	454	530	608	655	730
Supply	531	531	531	531	531	531	531
Groundwater	531	531	531	531	531	531	531
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	251	164	77	1	(77)	(124)	(199)
RIESEL							
Demand	104	109	116	120	126	129	137
Supply	106	106	106	106	106	106	106
Groundwater	106	106	106	106	106	106	106
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2	(3)	(10)	(14)	(20)	(23)	(31)
ROBINSON							
Demand	1,072	1,268	1,462	1,611	1,756	1,857	2,030
Supply	3,788	1,918	1,918	1,918	1,918	1,918	1,918
Groundwater	793	793	793	793	793	793	793
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,995	2,995	2,995	2,995	2,995	2,995	2,995
SW Constrained Supply		1,125	1,125	1,125	1,125	1,125	1,125
Balance	2,716	650	456	307	162	61	(112)
TRI-COUNTY SUD							
Demand	10	12	13	14	15	16	18
Supply	29	34	34	34	34	34	34
Groundwater	29	34	34	34	34	34	34
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	19	22	21	20	19	18	16
VALLEY MILLS (P)							
Demand	1	1	1	1	1	1	1
Supply	3	3	3	3	3	3	3
Groundwater	3	3	3	3	3	3	3
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2	2	2	2	2	2	2

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-48
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
WACO							
Demand	23,312	24,876	26,453	27,781	29,159	30,033	31,304
Contractual Demand	12,588	13,409	14,114	14,733	15,366	15,877	16,677
Supply	84,577	50,400	50,400	50,400	50,400	50,400	50,400
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	84,577	83,798	83,018	82,239	81,459	80,680	79,900
SW Constrained Supply		50,400	50,400	50,400	50,400	50,400	50,400
Balance	48,677	12,115	9,833	7,886	5,875	4,490	2,419
WEST							
Demand	446	459	467	475	482	490	506
Supply	1,351	1,351	1,351	1,351	1,351	1,351	1,351
Groundwater	231	231	231	231	231	231	231
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,120	1,120	1,120	1,120	1,120	1,120	1,120
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	905	892	884	876	869	861	845
WEST BRAZOS WSC							
Demand	141	161	181	195	214	224	244
Supply	112	113	113	113	113	113	113
Groundwater	112	113	113	113	113	113	113
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(29)	(48)	(68)	(82)	(101)	(111)	(131)
WESTERN HILLS WS							
Demand	307	384	458	520	588	627	694
Supply	531	531	531	531	531	531	531
Groundwater	531	531	531	531	531	531	531
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	224	147	73	11	(57)	(96)	(163)
WOODWAY							
Demand	2,974	2,944	2,925	2,903	2,882	2,867	2,874
Supply	4,699	4,669	4,650	4,628	4,607	4,592	4,599
Groundwater	1,615	1,615	1,615	1,615	1,615	1,615	1,615
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	3,084	3,054	3,035	3,013	2,992	2,977	2,984
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,725	1,725	1,725	1,725	1,725	1,725	1,725
COUNTY-OTHER							
Demand	6,354	6,345	6,332	6,361	6,359	6,384	6,466
Supply	7,329	7,402	7,450	7,483	7,488	7,483	7,483
Groundwater	6,495	6,495	6,495	6,495	6,495	6,495	6,495
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	834	907	955	988	993	988	988
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	975	1,057	1,118	1,122	1,129	1,099	1,017

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-49
Milam County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	24,238	26,053	28,086	29,396	30,201	30,405	30,496

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	4,633	4,980	5,291	5,464	5,559	5,560	5,580
	Contractual Demand	393	393	393	393	393	393	393
	Municipal Existing Supply							
	Groundwater	2,194	4,255	4,255	4,255	4,325	4,325	4,325
	Surface water (Less Contractual Demand)[1]	3,015	3,015	3,015	3,015	3,015	3,015	3,015
	Total Existing Municipal Supply	5,209	7,270	7,270	7,270	7,340	7,340	7,340
	Municipal Balance	576	2,290	1,979	1,806	1,781	1,780	1,760
Industrial	Manufacturing Demand	6,820	6,820	8,250	8,250	8,250	9,800	9,800
	Manufacturing Existing Supply							
	Groundwater	2,492	5,253	5,253	5,253	5,346	5,346	5,346
	Surface water	4,895	4,895	4,895	4,895	4,896	4,896	4,896
	Total Manufacturing Supply	7,387	10,148	10,148	10,148	10,242	10,242	10,242
	Manufacturing Balance	567	3,328	1,898	1,898	1,992	442	442
	Steam-Electric Demand	8,680	12,500	12,500	12,500	12,500	16,000	16,000
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	14,000	14,000	14,000	14,000	14,000	14,000	14,000
	Total Steam-Electric Supply	14,000	14,000	14,000	14,000	14,000	14,000	14,000
	Steam-Electric Balance	5,320	1,500	1,500	1,500	1,500	(2,000)	(2,000)
	Mining Demand	30,008	4,000	4,000	4,000	3,000	1,500	1,500
	Mining Existing Supply							
	Groundwater	13,989	3,930	3,930	3,930	3,000	1,500	1,500
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	13,989	3,930	3,930	3,930	3,000	1,500	1,500
	Mining Balance	(16,019)	(70)	(70)	(70)	0	0	0
Agriculture	Irrigation Demand	2,391	2,372	2,352	2,333	2,312	2,294	2,275
	Irrigation Existing Supply							
	Groundwater	230	484	484	484	493	493	493
	Surface water	8,797	8,801	8,806	8,810	8,814	8,819	8,823
	Total Irrigation Supply	9,027	9,285	9,290	9,294	9,307	9,312	9,316
	Irrigation Balance	6,636	6,913	6,938	6,961	6,995	7,018	7,041
	Livestock Demand	1,779	1,779	1,779	1,779	1,779	1,779	1,779
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,779	1,779	1,779	1,779	1,779	1,779	1,779
	Total Livestock Supply	1,779	1,779	1,779	1,779	1,779	1,779	1,779
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	50,141	28,300	30,041	30,214	29,309	32,860	32,880
	Existing Municipal & Industrial Supply							
	Groundwater	18,675	13,438	13,438	13,438	12,671	11,171	11,171
	Surface water	21,910	21,910	21,910	21,910	21,911	21,911	21,911
	Total Municipal & Industrial Supply	40,585	35,348	35,348	35,348	34,582	33,082	33,082
	Municipal & Industrial Balance	(9,556)	7,048	5,307	5,134	5,273	222	202
	Agriculture Demand	4,170	4,151	4,131	4,112	4,091	4,073	4,054
	Existing Agricultural Supply							
	Groundwater	230	484	484	484	493	493	493
	Surface water	10,576	10,580	10,585	10,589	10,593	10,598	10,602
	Total Agriculture Supply	10,806	11,064	11,069	11,073	11,086	11,091	11,095
	Agriculture Balance	6,636	6,913	6,938	6,961	6,995	7,018	7,041
	Total Demand	54,311	32,451	34,172	34,326	33,400	36,933	36,934
	Total Supply							
	Groundwater	18,905	13,922	13,922	13,922	13,164	11,664	11,664
	Surface water	32,486	32,490	32,495	32,499	32,504	32,508	32,513
	Total Supply	51,391	46,412	46,417	46,421	45,668	44,172	44,177
	Total Balance	(2,920)	13,961	12,245	12,095	12,268	7,239	7,243

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-50
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Milam County							
BELL-MILAM FALLS WSC							
Demand	201	245	288	316	334	341	347
Supply	238	238	238	238	238	238	238
Groundwater	106	106	106	106	106	106	106
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	132	132	132	132	132	132	132
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	37	(7)	(50)	(78)	(96)	(103)	(109)
CAMERON							
Demand	1,470	1,606	1,756	1,840	1,881	1,880	1,888
Contractual Demand	163	163	163	163	163	163	163
Supply	2,792	2,792	2,792	2,792	2,792	2,792	2,792
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,792	2,792	2,792	2,792	2,792	2,792	2,792
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,159	1,023	873	789	748	749	741
MILANO WSC							
Demand	174	195	212	224	230	232	235
Supply	120	253	253	253	258	258	258
Groundwater	120	253	253	253	258	258	258
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(54)	58	41	29	28	26	23
ROCKDALE							
Demand	1,145	1,254	1,287	1,310	1,325	1,332	1,337
Supply	1,023	2,157	2,157	2,157	2,195	2,195	2,195
Groundwater	1,023	2,157	2,157	2,157	2,195	2,195	2,195
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(122)	903	870	847	870	863	858
SOUTHWEST MILAM WSC							
Demand	911	1,086	1,251	1,350	1,422	1,448	1,472
Contractual Demand	230	230	230	230	230	230	230
Supply	556	1,173	1,173	1,173	1,194	1,194	1,194
Groundwater	556	1,173	1,173	1,173	1,194	1,194	1,194
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(585)	(143)	(308)	(407)	(458)	(484)	(508)
THORNDALE							
Demand	180	193	206	213	215	216	219
Supply	230	230	230	230	230	230	230
Groundwater	230	230	230	230	230	230	230
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	50	37	24	17	15	14	11

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-50
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER							
Demand	552	401	291	211	152	111	82
Supply	643	820	820	820	826	826	826
Groundwater	159	336	336	336	342	342	342
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	484	484	484	484	484	484	484
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	91	419	529	609	674	715	744

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-51
Nolan County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	15,802	16,550	17,177	17,464	17,412	16,747	15,954

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	3,419	3,523	3,581	3,582	3,512	3,359	3,200
	Contractual Demand	2,354	2,354	2,354	2,354	2,354	2,354	2,354
	Municipal Existing Supply							
	Surface water (Less Contractual Demand)[1]	(44)	(44)	(44)	(44)	(44)	(44)	(44)
	Surface water	57	57	57	57	57	57	57
	Total Existing Municipal Supply	13	13	13	13	13	13	13
	Municipal Balance	(3,406)	(3,510)	(3,568)	(3,569)	(3,499)	(3,346)	(3,187)
Industrial	Manufacturing Demand	643	779	915	1,038	1,159	1,266	1,372
	Manufacturing Existing Supply							
	Groundwater	841	841	841	841	841	841	841
	Surface water	59	59	59	59	59	59	59
	Total Manufacturing Supply	900	900	900	900	900	900	900
	Manufacturing Balance	257	121	(15)	(138)	(259)	(366)	(472)
	Steam-Electric Demand	1,093	807	11,311	20,000	20,000	20,000	20,000
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	(1,093)	(807)	(11,311)	(20,000)	(20,000)	(20,000)	(20,000)
	Mining Demand	277	278	278	278	278	278	278
	Mining Existing Supply							
	Groundwater	170	170	170	170	170	170	170
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	170	170	170	170	170	170	170
	Mining Balance	(107)	(108)	(108)	(108)	(108)	(108)	(108)
Agriculture	Irrigation Demand	5,276	5,138	5,003	4,871	4,741	4,618	4,497
	Irrigation Existing Supply							
	Groundwater	3,286	3,286	3,286	3,286	3,286	3,286	3,286
	Surface water	120	120	120	120	120	120	120
	Total Irrigation Supply	3,406	3,406	3,406	3,406	3,406	3,406	3,406
	Irrigation Balance	(1,870)	(1,732)	(1,597)	(1,465)	(1,335)	(1,212)	(1,091)
	Livestock Demand	464	464	464	464	464	464	464
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	464	464	464	464	464	464	464
	Total Livestock Supply	464	464	464	464	464	464	464
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	5,432	5,387	16,085	24,898	24,949	24,903	24,850
	Existing Municipal & Industrial Supply							
	Groundwater	967	967	967	967	967	967	967
	Surface water	116	116	116	116	116	116	116
	Total Municipal & Industrial Supply	1,083	1,083	1,083	1,083	1,083	1,083	1,083
	Municipal & Industrial Balance	(4,349)	(4,304)	(15,002)	(23,815)	(23,866)	(23,820)	(23,767)
	Agriculture Demand	5,740	5,602	5,467	5,335	5,205	5,082	4,961
	Existing Agricultural Supply							
	Groundwater	3,286	3,286	3,286	3,286	3,286	3,286	3,286
	Surface water	584	584	584	584	584	584	584
	Total Agriculture Supply	3,870	3,870	3,870	3,870	3,870	3,870	3,870
	Agriculture Balance	(1,870)	(1,732)	(1,597)	(1,465)	(1,335)	(1,212)	(1,091)
	Total Demand	11,172	10,989	21,552	30,233	30,154	29,985	29,811
	Total Supply							
	Groundwater	4,253	4,253	4,253	4,253	4,253	4,253	4,253
	Surface water	700	700	700	700	700	700	700
	Total Supply	4,953	4,953	4,953	4,953	4,953	4,953	4,953
	Total Balance	(6,219)	(6,036)	(16,599)	(25,280)	(25,201)	(25,032)	(24,858)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-52
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Nolan County							
BITTER CREEK WSC							
Demand	122	122	122	120	115	109	104
Supply	83	83	83	83	83	83	83
Groundwater	58	58	58	58	58	58	58
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	25	25	25	25	25	25	25
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(39)	(39)	(39)	(37)	(32)	(26)	(21)
ROSCOE							
Demand	187	189	190	188	182	173	165
Supply	252	252	252	252	252	252	252
Groundwater	252	252	252	252	252	252	252
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	65	63	62	64	70	79	87
SWEETWATER							
Demand	2,915	3,013	3,072	3,081	3,029	2,900	2,763
Contractual Demand	2,354	2,354	2,354	2,354	2,354	2,354	2,354
Supply	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Groundwater	2,000	2,000	2,000	2,000	2,000	2,000	2,000
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(3,269)	(3,367)	(3,426)	(3,435)	(3,383)	(3,254)	(3,117)
COUNTY-OTHER							
Demand	195	199	197	193	186	177	168
Supply	32	32	32	32	32	32	32
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	32	32	32	32	32	32	32
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(163)	(167)	(165)	(161)	(154)	(145)	(136)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-53
Palo Pinto County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	27,026	28,895	31,147	33,048	34,897	37,074	39,589

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	4,756	4,926	5,187	5,407	5,602	5,901	6,288
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	6,275	6,516	5,397	5,229	5,046	4,862	4,675
	Total Existing Municipal Supply	6,275	6,516	5,397	5,229	5,046	4,862	4,675
	Municipal Balance	1,519	1,590	210	(178)	(556)	(1,039)	(1,613)
Industrial	Manufacturing Demand	23	29	33	36	39	42	46
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,200	1,200	1,200	1,200	1,200	1,200	1,200
	Total Manufacturing Supply	1,200	1,200	1,200	1,200	1,200	1,200	1,200
	Manufacturing Balance	1,177	1,171	1,167	1,164	1,161	1,158	1,154
	Steam-Electric Demand	1,378	840	4,000	4,000	4,000	4,000	4,000
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	13,624	12,383	13,819	13,337	12,876	12,405	11,935
	Total Steam-Electric Supply	13,624	12,383	13,819	13,337	12,876	12,405	11,935
	Steam-Electric Balance	12,246	11,543	9,819	9,337	8,876	8,405	7,935
	Mining Demand	2	2	2	2	2	2	2
	Mining Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	835	835	835	835	835	835	835
	Total Mining Supply	835	835	835	835	835	835	835
	Mining Balance	833	833	833	833	833	833	833
Agriculture	Irrigation Demand	947	935	923	911	901	889	877
	Irrigation Existing Supply							
	Groundwater	11	11	11	11	11	11	11
	Surface water	3,141	3,139	3,138	3,137	3,136	3,134	3,133
	Total Irrigation Supply	3,152	3,150	3,149	3,148	3,147	3,145	3,144
	Irrigation Balance	2,205	2,215	2,226	2,237	2,246	2,256	2,267
	Livestock Demand	909	909	909	909	909	909	909
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	909	909	909	909	909	909	909
	Total Livestock Supply	909	909	909	909	909	909	909
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	6,159	5,797	9,222	9,445	9,643	9,945	10,336
	Existing Municipal & Industrial Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	21,934	20,934	21,251	20,602	19,957	19,303	18,644
	Total Municipal & Industrial Supply	21,934	20,934	21,251	20,602	19,957	19,303	18,644
	Municipal & Industrial Balance	15,775	15,137	12,029	11,157	10,314	9,358	8,308
	Agriculture Demand	1,856	1,844	1,832	1,820	1,810	1,798	1,786
	Existing Agricultural Supply							
	Groundwater	11	11	11	11	11	11	11
	Surface water	4,050	4,048	4,047	4,046	4,045	4,043	4,042
	Total Agriculture Supply	4,061	4,059	4,058	4,057	4,056	4,054	4,053
	Agriculture Balance	2,205	2,215	2,226	2,237	2,246	2,256	2,267
	Total Demand	8,015	7,641	11,054	11,265	11,453	11,743	12,122
	Total Supply							
	Groundwater	11	11	11	11	11	11	11
	Surface water	25,984	24,983	25,298	24,648	24,002	23,346	22,686
	Total Supply	25,995	24,994	25,309	24,659	24,013	23,357	22,697
	Total Balance	17,980	17,353	14,255	13,394	12,560	11,614	10,575

Table C-54
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Palo Pinto County							
FORT BELKNAPP WSC							
Demand	1	2	2	3	3	4	5
Supply	6	6	6	6	6	6	6
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6	6	6	6	6	6	6
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	5	4	4	3	3	2	1
GRAFORD							
Demand	65	65	65	64	64	65	67
Supply	140	140	140	140	140	140	140
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	140	140	140	140	140	140	140
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	75	75	75	76	76	75	73
MINERAL WELLS (P)							
Demand	2,895	2,887	3,049	3,184	3,278	3,425	3,611
Supply	2,646	2,887	1,768	1,601	1,417	1,234	1,046
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,646	2,887	1,768	1,601	1,417	1,234	1,046
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(249)	-	(1,281)	(1,583)	(1,861)	(2,191)	(2,565)
STEPHENS COUNTY RURAL WSC							
Demand	1	2	2	2	1	1	1
Supply	16	16	16	16	16	16	16
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	16	16	16	16	16	16	16
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	15	14	14	14	15	15	15
STRAWN							
Demand	156	160	164	167	170	176	183
Supply	160	160	160	160	160	160	160
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	160	160	160	160	160	160	160
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4	-	(4)	(7)	(10)	(16)	(23)
COUNTY-OTHER							
Demand	1,638	1,810	1,905	1,987	2,086	2,230	2,421
Supply	3,307	3,307	3,307	3,307	3,307	3,307	3,307
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	3,307	3,307	3,307	3,307	3,307	3,307	3,307
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,669	1,497	1,402	1,320	1,221	1,077	886

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-55
Robertson County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	16,000	17,164	18,704	19,674	20,335	20,419	20,353

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,812	2,874	2,979	3,026	3,044	3,021	3,015
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	5,778	5,753	5,753	5,753	5,753	5,753	5,753
	Surface water	0	0	0	0	0	0	0
	Total Existing Municipal Supply	5,778	5,753	5,753	5,753	5,753	5,753	5,753
	Municipal Balance	2,966	2,879	2,774	2,727	2,709	2,732	2,738
Industrial	Manufacturing Demand	65	85	101	117	134	150	163
	Manufacturing Existing Supply							
	Groundwater	165	165	165	165	165	165	165
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	165	165	165	165	165	165	165
	Manufacturing Balance	100	80	64	48	31	15	2
	Steam-Electric Demand	15,000	15,789	17,882	31,113	36,369	48,118	50,319
	Steam-Electric Existing Supply							
	Groundwater	5,983	5,983	5,983	5,983	5,983	5,983	5,983
	Surface water	27,901	27,893	27,884	27,876	27,868	27,859	27,851
	Total Steam-Electric Supply	33,884	33,876	33,867	33,859	33,851	33,842	33,834
	Steam-Electric Balance	18,884	18,087	15,985	2,746	(2,518)	(14,276)	(16,485)
	Mining Demand	7,500	10,300	10,300	10,300	78	77	76
	Mining Existing Supply							
	Groundwater	7,500	10,300	10,300	10,300	78	77	76
	Surface water	9	9	9	9	9	9	9
	Total Mining Supply	7,509	10,309	10,309	10,309	87	86	85
	Mining Balance	9	9	9	9	9	9	9
Agriculture	Irrigation Demand	16,572	16,175	16,019	15,561	15,115	14,682	14,261
	Irrigation Existing Supply							
	Groundwater	12,429	12,429	12,429	12,429	12,429	12,429	12,429
	Surface water	9,080	9,080	9,080	9,080	9,080	9,081	9,081
	Total Irrigation Supply	21,509	21,509	21,509	21,509	21,509	21,510	21,510
	Irrigation Balance	4,937	5,334	5,490	5,948	6,394	6,828	7,249
	Livestock Demand	1,508	1,508	1,508	1,508	1,508	1,508	1,508
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,508	1,508	1,508	1,508	1,508	1,508	1,508
	Total Livestock Supply	1,508	1,508	1,508	1,508	1,508	1,508	1,508
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	25,377	29,048	31,262	44,556	39,625	51,366	53,573
	Existing Municipal & Industrial Supply							
	Groundwater	19,426	22,201	22,201	22,201	11,979	11,978	11,977
	Surface water	27,910	27,902	27,893	27,885	27,877	27,868	27,860
	Total Municipal & Industrial Supply	47,336	50,103	50,094	50,086	39,856	39,846	39,837
	Municipal & Industrial Balance	21,959	21,055	18,832	5,530	231	(11,520)	(13,736)
	Agriculture Demand	18,080	17,683	17,527	17,069	16,623	16,190	15,769
	Existing Agricultural Supply							
	Groundwater	12,429	12,429	12,429	12,429	12,429	12,429	12,429
	Surface water	10,588	10,588	10,588	10,588	10,588	10,589	10,589
	Total Agriculture Supply	23,017	23,017	23,017	23,017	23,017	23,018	23,018
	Agriculture Balance	4,937	5,334	5,490	5,948	6,394	6,828	7,249
	Total Demand	43,457	46,731	48,789	61,625	56,248	67,556	69,342
	Total Supply							
	Groundwater	31,855	34,630	34,630	34,630	24,408	24,407	24,406
	Surface water	38,498	38,490	38,481	38,473	38,465	38,457	38,449
	Total Supply	70,353	73,120	73,111	73,103	62,873	62,864	62,855
	Total Balance	26,896	26,389	24,322	11,478	6,625	(4,692)	(6,487)

Table C-56
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Robertson County							
BREMOND							
Demand	160	157	154	151	148	146	146
Supply	391	391	391	391	391	391	391
Groundwater	391	391	391	391	391	391	391
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	231	234	237	240	243	245	245
CALVERT							
Demand	332	327	323	318	313	310	310
Supply	513	513	513	513	513	513	513
Groundwater	513	513	513	513	513	513	513
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	181	186	190	195	200	203	203
FRANKLIN							
Demand	324	344	373	389	397	396	395
Supply	628	628	628	628	628	628	628
Groundwater	628	628	628	628	628	628	628
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	304	284	255	239	231	232	233
HEARNE							
Demand	1,145	1,124	1,108	1,093	1,077	1,066	1,066
Supply	2,931	2,931	2,931	2,931	2,931	2,931	2,931
Groundwater	2,931	2,931	2,931	2,931	2,931	2,931	2,931
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,786	1,807	1,823	1,838	1,854	1,865	1,865
ROBERTSON COUNTY WSC							
Demand	218	258	315	348	370	368	365
Supply	417	417	417	417	417	417	417
Groundwater	417	417	417	417	417	417	417
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	199	159	102	69	47	49	52
TRI-COUNTY SUD							
Demand	75	77	82	83	84	83	83
Supply	120	95	95	95	95	95	95
Groundwater	120	95	95	95	95	95	95
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	45	18	13	12	11	12	12

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-56
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
WICKSON CREEK SUD							
Demand	10	20	30	35	39	39	39
Supply	93	93	93	93	93	93	93
Groundwater	93	93	93	93	93	93	93
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	83	73	63	58	54	54	54
COUNTY-OTHER							
Demand	548	567	594	609	616	613	611
Supply	685	685	685	685	685	685	685
Groundwater	685	685	685	685	685	685	685
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	137	118	91	76	69	72	74

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-57
Shackelford County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	3,302	3,456	3,638	3,603	3,406	2,997	2,516

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	931	963	997	975	913	798	670
	Contractual Demand	284	291	300	292	273	238	200
	Municipal Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water (Less Contractual Demand)[1]	2,769	1,409	1,409	1,409	1,408	1,408	1,407
	Total Existing Municipal Supply	2,769	1,409	1,409	1,409	1,408	1,408	1,407
	Municipal Balance	1,838	446	412	434	495	610	737
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	50	50	50	50	50	50	50
	Total Manufacturing Supply	50	50	50	50	50	50	50
	Manufacturing Balance	50	50	50	50	50	50	50
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	524	656	724	752	779	806	845
	Mining Existing Supply							
	Groundwater	488	620	688	716	743	770	809
	Surface water	37	37	37	37	37	37	37
	Total Mining Supply	525	657	725	753	780	807	846
	Mining Balance	1	1	1	1	1	1	1
Agriculture	Irrigation Demand	195	189	183	178	173	168	163
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	85	85	85	85	85	85	85
	Total Irrigation Supply	85	85	85	85	85	85	85
	Irrigation Balance	(110)	(104)	(98)	(93)	(88)	(83)	(78)
	Livestock Demand	760	760	760	760	760	760	760
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	760	760	760	760	760	760	760
	Total Livestock Supply	760	760	760	760	760	760	760
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	1,455	1,619	1,721	1,727	1,692	1,604	1,515
	Existing Municipal & Industrial Supply							
	Groundwater	488	620	688	716	743	770	809
	Surface water	2,856	1,495	1,495	1,495	1,494	1,494	1,493
	Total Municipal & Industrial Supply	3,344	2,115	2,183	2,211	2,237	2,264	2,302
	Municipal & Industrial Balance	1,889	496	462	484	545	660	787
	Agriculture Demand	955	949	943	938	933	928	923
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	845	845	845	845	845	845	845
	Total Agriculture Supply	845	845	845	845	845	845	845
	Agriculture Balance	(110)	(104)	(98)	(93)	(88)	(83)	(78)
	Total Demand	2,410	2,568	2,664	2,665	2,625	2,532	2,438
	Total Supply							
	Groundwater	488	620	688	716	743	770	809
	Surface water	3,701	2,341	2,341	2,341	2,340	2,340	2,339
	Total Supply	4,189	2,961	3,029	3,057	3,083	3,110	3,148
	Total Balance	1,779	393	365	392	458	578	710

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-58
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Shackelford County							
ALBANY							
Demand	641	665	690	676	635	555	466
Contractual Demand	284	291	300	292	273	238	200
Supply	2,317	953	953	953	953	953	953
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,317	2,351	2,343	2,336	2,328	2,320	2,312
SW Constrained Supply		953	953	953	953	953	953
Balance	1,392	(3)	(37)	(15)	45	160	287
HAWLEY WSC							
Demand	5	5	5	5	4	4	3
Supply	13	17	17	17	16	16	15
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	13	17	17	17	16	16	15
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	8	12	12	12	12	12	12
STEPHENS COUNTY RURAL WSC							
Demand	1	2	2	2	1	1	1
Supply	16	16	16	16	16	16	16
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	16	16	16	16	16	16	16
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	15	14	14	14	15	15	15
COUNTY-OTHER							
Demand	284	291	300	292	273	238	200
Supply	707	714	723	715	696	661	623
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	707	714	723	715	696	661	623
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	423	423	423	423	423	423	423

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-59
Somervell County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	6,809	7,542	8,393	9,094	9,554	9,740	9,804

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	1,013	1,140	1,247	1,332	1,376	1,392	1,402
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	1,363	1,363	1,363	1,363	1,363	1,363	1,363
	Surface water	2,000	2,000	2,000	2,000	2,000	2,000	2,000
	Total Existing Municipal Supply	3,363	3,363	3,363	3,363	3,363	3,363	3,363
	Municipal Balance	2,350	2,223	2,116	2,031	1,987	1,971	1,961
Industrial	Manufacturing Demand	5	6	7	8	9	10	11
	Manufacturing Existing Supply							
	Groundwater	11	11	11	11	11	11	11
	Surface water	300	300	300	300	300	300	300
	Total Manufacturing Supply	311	311	311	311	311	311	311
	Manufacturing Balance	306	305	304	303	302	301	300
	Steam-Electric Demand	18,000	84,817	84,817	84,817	84,817	84,817	84,817
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	49,200	49,238	49,275	49,313	49,350	49,388	49,425
	Total Steam-Electric Supply	49,200	49,238	49,275	49,313	49,350	49,388	49,425
	Steam-Electric Balance	31,200	(35,580)	(35,542)	(35,505)	(35,467)	(35,430)	(35,392)
	Mining Demand	393	304	287	278	270	263	257
	Mining Existing Supply							
	Groundwater	894	894	894	894	894	894	894
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	894	894	894	894	894	894	894
	Mining Balance	501	590	607	616	624	631	637
Agriculture	Irrigation Demand	475	474	471	468	467	464	461
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,062	1,069	1,077	1,084	1,091	1,098	1,105
	Total Irrigation Supply	1,062	1,069	1,077	1,084	1,091	1,098	1,105
	Irrigation Balance	587	595	606	616	624	634	644
	Livestock Demand	166	166	166	166	166	166	166
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	166	166	166	166	166	166	166
	Total Livestock Supply	166	166	166	166	166	166	166
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	19,411	86,267	86,358	86,435	86,472	86,482	86,487
	Existing Municipal & Industrial Supply							
	Groundwater	2,268	2,268	2,268	2,268	2,268	2,268	2,268
	Surface water	51,500	51,538	51,575	51,613	51,650	51,688	51,725
	Total Municipal & Industrial Supply	53,768	53,806	53,843	53,881	53,918	53,956	53,993
	Municipal & Industrial Balance	34,357	(32,462)	(32,515)	(32,555)	(32,554)	(32,527)	(32,494)
	Agriculture Demand	641	640	637	634	633	630	627
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,228	1,235	1,243	1,250	1,257	1,264	1,271
	Total Agriculture Supply	1,228	1,235	1,243	1,250	1,257	1,264	1,271
	Agriculture Balance	587	595	606	616	624	634	644
	Total Demand	20,052	86,907	86,995	87,069	87,105	87,112	87,114
	Total Supply							
	Groundwater	2,268	2,268	2,268	2,268	2,268	2,268	2,268
	Surface water	52,728	52,773	52,818	52,862	52,907	52,952	52,996
	Total Supply	54,996	55,041	55,086	55,130	55,175	55,220	55,264
	Total Balance	34,944	(31,866)	(31,909)	(31,939)	(31,930)	(31,892)	(31,850)

Table C-60
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Somervell County							
GLEN ROSE							
Demand	530	659	728	785	817	830	836
Supply	759	759	759	759	759	759	759
Groundwater	759	759	759	759	759	759	759
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	229	100	31	(26)	(58)	(71)	(77)
COUNTY-OTHER							
Demand	483	481	519	547	559	562	566
Supply	2,604	2,604	2,604	2,604	2,604	2,604	2,604
Groundwater	604	604	604	604	604	604	604
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,000	2,000	2,000	2,000	2,000	2,000	2,000
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,121	2,123	2,085	2,057	2,045	2,042	2,038

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-61
Stephens County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	9,674	9,873	10,030	10,102	10,005	9,624	9,321

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	1,469	1,778	1,778	1,764	1,720	1,640	1,589
	Contractual Demand	442	442	442	442	442	442	442
	Municipal Existing Supply							
	Groundwater	301	301	301	301	301	301	301
	Surface water (Less Contractual Demand)[1]	3,800	2,575	2,575	2,575	2,574	2,574	2,574
	Total Existing Municipal Supply	4,101	2,876	2,876	2,876	2,875	2,875	2,875
	Municipal Balance	2,632	1,098	1,098	1,112	1,155	1,235	1,286
Industrial	Manufacturing Demand	6	7	8	9	10	11	12
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	61	61	61	61	61	61	61
	Total Manufacturing Supply	61	61	61	61	61	61	61
	Manufacturing Balance	55	54	53	52	51	50	49
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	7,315	8,715	9,328	9,567	9,798	10,024	10,347
	Mining Existing Supply							
	Groundwater	94	94	94	94	94	94	94
	Surface water	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Total Mining Supply	1,094	1,094	1,094	1,094	1,094	1,094	1,094
	Mining Balance	(6,221)	(7,621)	(8,234)	(8,473)	(8,704)	(8,930)	(9,253)
Agriculture	Irrigation Demand	802	791	781	771	760	750	740
	Irrigation Existing Supply							
	Groundwater	4	4	4	4	4	4	4
	Surface water	3,571	3,566	3,561	3,556	3,551	3,546	3,541
	Total Irrigation Supply	3,575	3,570	3,565	3,560	3,555	3,550	3,545
	Irrigation Balance	2,773	2,779	2,784	2,789	2,795	2,800	2,805
	Livestock Demand	576	576	576	576	576	576	576
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	576	576	576	576	576	576	576
	Total Livestock Supply	576	576	576	576	576	576	576
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	8,790	10,500	11,114	11,340	11,528	11,675	11,948
	Existing Municipal & Industrial Supply							
	Groundwater	395	395	395	395	395	395	395
	Surface water	4,861	3,635	3,635	3,635	3,635	3,635	3,635
	Total Municipal & Industrial Supply	5,256	4,030	4,030	4,030	4,030	4,030	4,030
	Municipal & Industrial Balance	(3,534)	(6,470)	(7,084)	(7,310)	(7,498)	(7,645)	(7,918)
	Agriculture Demand	1,378	1,367	1,357	1,347	1,336	1,326	1,316
	Existing Agricultural Supply							
	Groundwater	4	4	4	4	4	4	4
	Surface water	4,147	4,142	4,137	4,132	4,127	4,122	4,117
	Total Agriculture Supply	4,151	4,146	4,141	4,136	4,131	4,126	4,121
	Agriculture Balance	2,773	2,779	2,784	2,789	2,795	2,800	2,805
	Total Demand	10,168	11,867	12,471	12,687	12,864	13,001	13,264
	Total Supply							
	Groundwater	399	399	399	399	399	399	399
	Surface water	9,008	7,777	7,772	7,767	7,762	7,757	7,752
	Total Supply	9,407	8,176	8,171	8,166	8,161	8,156	8,151
	Total Balance	(761)	(3,691)	(4,300)	(4,521)	(4,703)	(4,845)	(5,113)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-62
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Stephens County							
BRECKENRIDGE							
Demand	979	1,214	1,220	1,215	1,190	1,138	1,102
Contractual Demand	442	442	442	442	442	442	442
Supply	3,116	1,891	1,891	1,891	1,891	1,891	1,891
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	3,116	3,178	3,162	3,147	3,132	3,116	3,101
SW Constrained Supply		1,891	1,891	1,891	1,891	1,891	1,891
Balance	1,695	235	229	234	259	311	347
FORT BELKNAPP WSC							
Demand	4	4	3	3	3	3	3
Supply	5	5	5	4	4	4	4
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	5	5	5	4	4	4	4
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1	1	2	1	1	1	1
STEPHENS COUNTY RURAL WSC							
Demand	245	318	314	308	296	279	271
Supply	1,122	1,122	1,122	1,122	1,122	1,122	1,122
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,122	1,122	1,122	1,122	1,122	1,122	1,122
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	877	804	808	814	826	843	851
COUNTY-OTHER							
Demand	241	242	241	238	231	220	213
Supply	301	301	301	301	301	301	301
Groundwater	301	301	301	301	301	301	301
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	60	59	60	63	70	81	88

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-63
Stonewall County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	1,693	1,687	1,634	1,555	1,455	1,365	1,279

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	299	292	277	258	237	219	205
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	398	398	398	398	398	398	398
	Surface water	118	4	3	3	2	1	0
	Total Existing Municipal Supply	516	402	401	401	400	399	398
	Municipal Balance	217	110	124	143	163	180	193
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	14	15	15	15	15	15	15
	Mining Existing Supply							
	Groundwater	18	18	18	18	18	18	18
	Surface water	175	175	175	175	175	175	175
	Total Mining Supply	193	193	193	193	193	193	193
	Mining Balance	179	178	178	178	178	178	178
Agriculture	Irrigation Demand	347	336	326	317	307	298	290
	Irrigation Existing Supply							
	Groundwater	3,574	3,574	3,574	3,574	3,574	3,574	3,574
	Surface water	11	11	11	11	11	11	11
	Total Irrigation Supply	3,585	3,585	3,585	3,585	3,585	3,585	3,585
	Irrigation Balance	3,238	3,249	3,259	3,268	3,278	3,287	3,295
	Livestock Demand	469	469	469	469	469	469	469
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	469	469	469	469	469	469	469
	Total Livestock Supply	469	469	469	469	469	469	469
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	313	307	292	273	252	234	220
	Existing Municipal & Industrial Supply							
	Groundwater	416	416	416	416	416	416	416
	Surface water	293	179	178	178	177	176	175
	Total Municipal & Industrial Supply	709	595	594	594	593	592	591
	Municipal & Industrial Balance	396	288	302	321	341	358	371
	Agriculture Demand	816	805	795	786	776	767	759
	Existing Agricultural Supply							
	Groundwater	3,574	3,574	3,574	3,574	3,574	3,574	3,574
	Surface water	480	480	480	480	480	480	480
	Total Agriculture Supply	4,054	4,054	4,054	4,054	4,054	4,054	4,054
	Agriculture Balance	3,238	3,249	3,259	3,268	3,278	3,287	3,295
	Total Demand	1,129	1,112	1,087	1,059	1,028	1,001	979
	Total Supply							
	Groundwater	3,990	3,990	3,990	3,990	3,990	3,990	3,990
	Surface water	773	659	658	657	657	656	655
	Total Supply	4,763	4,649	4,648	4,647	4,647	4,646	4,645
	Total Balance	3,634	3,537	3,561	3,588	3,619	3,645	3,666

Table C-64
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Stonewall County							
ASPERMONT							
Demand	206	202	192	179	165	153	143
Supply	400	286	285	285	284	283	282
Groundwater	282	282	282	282	282	282	282
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	118	4	3	3	2	1	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	194	84	93	106	119	130	139
COUNTY-OTHER							
Demand	93	90	85	79	72	66	62
Supply	116	116	116	116	116	116	116
Groundwater	116	116	116	116	116	116	116
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	23	26	31	37	44	50	54

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

8/27/2010
1:11 PM

Table C-65
Taylor County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	126,551	136,370	142,645	145,634	146,529	143,772	139,309

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	39,404	23,731	24,341	24,374	24,037	23,423	22,696
	Contractual Demand	15,492	15,677	15,786	15,882	15,974	16,050	16,161
	Municipal Existing Supply							
	Groundwater	22	22	22	22	22	22	22
	Surface water (Less Contractual Demand)[1]	21,577	19,193	5,608	5,510	5,412	5,330	5,213
	Total Existing Municipal Supply	21,599	19,215	5,630	5,532	5,434	5,352	5,235
	Municipal Balance	(17,805)	(4,516)	(18,711)	(18,842)	(18,603)	(18,071)	(17,461)
Industrial	Manufacturing Demand	789	972	1,081	1,177	1,270	1,349	1,462
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	789	972	1,081	1,177	1,270	1,349	1,462
	Total Manufacturing Supply	789	972	1,081	1,177	1,270	1,349	1,462
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	31	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	(31)	0	0	0	0	0	0
	Mining Demand	242	285	304	313	322	330	340
	Mining Existing Supply							
	Groundwater	340	340	340	340	340	340	340
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	340	340	340	340	340	340	340
	Mining Balance	98	55	36	27	18	10	0
Agriculture	Irrigation Demand	174	170	166	162	158	154	150
	Irrigation Existing Supply							
	Groundwater	168	168	168	168	168	168	168
	Surface water	241	239	238	236	235	233	232
	Total Irrigation Supply	409	407	406	404	403	401	400
	Irrigation Balance	235	237	240	242	245	247	250
	Livestock Demand	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Total Livestock Supply	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	40,466	24,988	25,726	25,864	25,629	25,102	24,498
	Existing Municipal & Industrial Supply							
	Groundwater	362	362	362	362	362	362	362
	Surface water	22,366	20,165	6,689	6,687	6,682	6,679	6,675
	Total Municipal & Industrial Supply	22,728	20,527	7,051	7,049	7,044	7,041	7,037
	Municipal & Industrial Balance	(17,738)	(4,461)	(18,675)	(18,815)	(18,585)	(18,061)	(17,461)
	Agriculture Demand	1,479	1,475	1,471	1,467	1,463	1,459	1,455
	Existing Agricultural Supply							
	Groundwater	168	168	168	168	168	168	168
	Surface water	1,546	1,544	1,543	1,541	1,540	1,538	1,537
	Total Agriculture Supply	1,714	1,712	1,711	1,709	1,708	1,706	1,705
	Agriculture Balance	235	237	240	242	245	247	250
	Total Demand	41,945	26,463	27,197	27,331	27,092	26,561	25,953
	Total Supply							
	Groundwater	530	530	530	530	530	530	530
	Surface water	23,912	21,709	8,232	8,228	8,222	8,217	8,212
	Total Supply	24,442	22,239	8,762	8,758	8,752	8,747	8,742
	Total Balance	(17,503)	(4,224)	(18,435)	(18,573)	(18,340)	(17,814)	(17,211)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-66
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Taylor County							
ABILENE (P)							
Demand	37,607	21,862	22,450	22,493	22,202	21,643	20,971
Contractual Demand	15,420	15,603	15,712	15,808	15,901	15,980	16,093
Supply	34,904	32,730	19,253	19,253	19,253	19,253	19,253
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	34,904	34,497	34,235	33,971	33,709	33,447	33,183
SW Constrained Supply		32,730	19,253	19,253	19,253	19,253	19,253
Balance	(18,123)	(4,735)	(18,909)	(19,048)	(18,850)	(18,370)	(17,811)
COLEMAN COUNTY WSC							
Demand	18	19	20	20	19	19	18
Supply	28	19	20	20	19	19	18
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	28	19	20	20	19	19	18
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	10	-	-	-	-	-	-
HAWLEY WSC							
Demand	55	57	57	57	55	53	52
Supply	85	68	68	66	62	59	56
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	85	68	68	66	62	59	56
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	30	11	11	9	7	6	4
MERKEL							
Demand	437	458	469	469	462	450	436
Supply	353	353	353	353	353	353	353
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	353	353	353	353	353	353	353
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(84)	(105)	(116)	(116)	(109)	(97)	(83)
POTOSI WSC							
Demand	396	414	420	420	409	397	385
Supply	301	301	301	301	301	301	301
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	301	301	301	301	301	301	301
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(95)	(113)	(119)	(119)	(108)	(96)	(84)
STEAMBOAT MOUNTAIN WSC							
Demand	262	271	270	267	260	251	243
Contractual Demand	72	74	74	74	73	70	68
Supply	307	307	307	307	307	307	307
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	307	307	307	307	307	307	307
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(27)	(38)	(37)	(34)	(26)	(14)	(4)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

8/27/2010
1:11 PM

Table C-66
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
TUSCOLA							
Demand	72	74	74	74	73	70	68
Supply	72	74	74	74	73	70	68
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	72	74	74	74	73	70	68
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
TYE							
Demand	171	178	181	181	177	172	167
Supply	184	184	184	184	184	184	184
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	184	184	184	184	184	184	184
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	13	6	3	3	7	12	17
COUNTY-OTHER							
Demand	386	398	400	393	380	368	356
Supply	856	856	856	856	856	856	856
Groundwater	22	22	22	22	22	22	22
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	834	834	834	834	834	834	834
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	470	458	456	463	476	488	500

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-67
Throckmorton County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	1,850	1,851	1,793	1,713	1,584	1,483	1,407

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	354	348	332	311	283	262	248
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	40	40	40	40	40	40	40
	Surface water	294	293	293	293	293	292	292
	Total Existing Municipal Supply	334	333	333	333	333	332	332
	Municipal Balance	(20)	(15)	1	22	50	70	84
Industrial	Manufacturing Demand	0	0	0	0	0	0	0
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	0	0	0	0	0	0	0
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	40	49	53	55	57	59	61
	Mining Existing Supply							
	Groundwater	61	61	61	61	61	61	61
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	61	61	61	61	61	61	61
	Mining Balance	21	12	8	6	4	2	0
Agriculture	Irrigation Demand	0	4,000	4,000	4,000	4,000	4,000	4,000
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	12	12	12	12	12	12	12
	Total Irrigation Supply	12	12	12	12	12	12	12
	Irrigation Balance	12	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)
	Livestock Demand	752	752	752	752	752	752	752
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	752	752	752	752	752	752	752
	Total Livestock Supply	752	752	752	752	752	752	752
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	394	397	385	366	340	321	309
	Existing Municipal & Industrial Supply							
	Groundwater	101	101	101	101	101	101	101
	Surface water	294	293	293	293	293	292	292
	Total Municipal & Industrial Supply	395	394	394	394	394	393	393
	Municipal & Industrial Balance	1	(3)	9	28	54	72	84
	Agriculture Demand	752	4,752	4,752	4,752	4,752	4,752	4,752
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	764	764	764	764	764	764	764
	Total Agriculture Supply	764	764	764	764	764	764	764
	Agriculture Balance	12	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)	(3,988)
	Total Demand	1,146	5,149	5,137	5,118	5,092	5,073	5,061
	Total Supply							
	Groundwater	101	101	101	101	101	101	101
	Surface water	1,058	1,057	1,057	1,057	1,057	1,056	1,056
	Total Supply	1,159	1,158	1,158	1,158	1,158	1,157	1,157
	Total Balance	13	(3,991)	(3,979)	(3,960)	(3,934)	(3,916)	(3,904)

Table C-68
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Throckmorton County							
FORT BELKNAPP WSC							
Demand	11	10	10	9	8	8	7
Supply	13	13	12	12	12	11	11
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	13	13	12	12	12	11	11
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2	3	2	3	4	3	4
STEPHENS COUNTY RURAL WSC							
Demand	8	10	9	9	8	7	7
Supply	51	51	51	51	51	51	51
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	51	51	51	51	51	51	51
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	43	41	42	42	43	44	44
THROCKMORTON							
Demand	236	232	222	209	191	177	168
Supply	200	200	200	200	200	200	200
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	200	200	200	200	200	200	200
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(36)	(32)	(22)	(9)	9	23	32
COUNTY-OTHER							
Demand	99	96	91	84	76	70	66
Supply	70	70	70	70	70	70	70
Groundwater	40	40	40	40	40	40	40
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	30	30	30	30	30	30	30
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(29)	(26)	(21)	(14)	(6)	-	4

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-69
Washington County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	30,373	32,559	35,253	36,973	37,908	38,747	39,426

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	5,047	5,265	5,546	5,682	5,717	5,795	5,893
	Contractual Demand	0	0	0	0	0	0	0
	Municipal Existing Supply							
	Groundwater	2,847	2,847	2,847	2,847	2,847	2,847	2,847
	Surface water	4,200	3,909	3,909	3,909	3,909	3,909	3,909
	Total Existing Municipal Supply	7,047	6,756	6,756	6,756	6,756	6,756	6,756
	Municipal Balance	2,000	1,491	1,210	1,074	1,039	961	863
Industrial	Manufacturing Demand	334	414	461	504	547	585	633
	Manufacturing Existing Supply							
	Groundwater	635	635	635	635	635	635	635
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	635	635	635	635	635	635	635
	Manufacturing Balance	301	221	174	131	88	50	2
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	157	185	198	206	213	220	226
	Mining Existing Supply							
	Groundwater	226	226	226	226	226	226	226
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	226	226	226	226	226	226	226
	Mining Balance	69	41	28	20	13	6	0
Agriculture	Irrigation Demand	1,724	1,724	1,724	1,724	1,724	1,724	1,724
	Irrigation Existing Supply							
	Groundwater	1,639	1,639	1,639	1,639	1,639	1,639	1,639
	Surface water	2,876	2,876	2,876	2,876	2,876	2,876	2,876
	Total Irrigation Supply	4,515	4,515	4,515	4,515	4,515	4,515	4,515
	Irrigation Balance	2,791	2,791	2,791	2,791	2,791	2,791	2,791
	Livestock Demand	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Total Livestock Supply	1,554	1,554	1,554	1,554	1,554	1,554	1,554
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	5,538	5,864	6,205	6,392	6,477	6,600	6,752
	Existing Municipal & Industrial Supply							
	Groundwater	3,708	3,708	3,708	3,708	3,708	3,708	3,708
	Surface water	4,200	3,909	3,909	3,909	3,909	3,909	3,909
	Total Municipal & Industrial Supply	7,908	7,617	7,617	7,617	7,617	7,617	7,617
	Municipal & Industrial Balance	2,370	1,753	1,412	1,225	1,140	1,017	865
	Agriculture Demand	3,278	3,278	3,278	3,278	3,278	3,278	3,278
	Existing Agricultural Supply							
	Groundwater	1,639	1,639	1,639	1,639	1,639	1,639	1,639
	Surface water	4,430	4,430	4,430	4,430	4,430	4,430	4,430
	Total Agriculture Supply	6,069	6,069	6,069	6,069	6,069	6,069	6,069
	Agriculture Balance	2,791	2,791	2,791	2,791	2,791	2,791	2,791
	Total Demand	8,816	9,142	9,483	9,670	9,755	9,878	10,030
	Total Supply							
	Groundwater	5,347	5,347	5,347	5,347	5,347	5,347	5,347
	Surface water	8,630	8,339	8,339	8,339	8,339	8,339	8,339
	Total Supply	13,977	13,686	13,686	13,686	13,686	13,686	13,686
	Total Balance	5,161	4,544	4,203	4,016	3,931	3,808	3,656

Table C-70
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Washington County							
BRENHAM							
Demand	2,950	3,078	3,223	3,303	3,320	3,364	3,415
Supply	4,434	4,143	4,143	4,143	4,143	4,143	4,143
Groundwater	234	234	234	234	234	234	234
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	4,200	4,200	4,200	4,200	4,200	4,200	4,200
SW Constrained Supply		3,909	3,909	3,909	3,909	3,909	3,909
Balance	1,484	1,065	920	840	823	779	728
COUNTY-OTHER							
Demand	2,097	2,187	2,323	2,379	2,397	2,431	2,478
Supply	2,613	2,613	2,613	2,613	2,613	2,613	2,613
Groundwater	2,613	2,613	2,613	2,613	2,613	2,613	2,613
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	516	426	290	234	216	182	135

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-71
Williamson County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	211,474	360,086	492,701	626,291	789,743	949,309	1,114,510

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	39,993	68,167	92,375	116,187	145,655	174,373	204,294
	Contractual Demand	8,788	6,062	5,553	6,386	7,309	7,754	8,832
	Municipal Existing Supply							
	Groundwater	8,970	13,614	13,499	13,499	13,609	13,049	13,049
	Surface water (Less Contractual Demand)[1]	95,358	75,902	76,510	77,231	77,987	78,857	79,261
	Total Existing Municipal Supply	104,328	89,516	90,009	90,729	91,596	91,905	92,310
	Municipal Balance	64,335	21,349	(2,366)	(25,458)	(54,059)	(82,468)	(111,984)
Industrial	Manufacturing Demand	1,171	1,587	1,854	2,120	2,388	2,630	2,856
	Manufacturing Existing Supply							
	Groundwater	233	233	233	233	233	233	233
	Surface water	103	103	103	103	103	103	103
	Total Manufacturing Supply	336	336	336	336	336	336	336
	Manufacturing Balance	(836)	(1,252)	(1,519)	(1,785)	(2,053)	(2,295)	(2,521)
	Steam-Electric Demand	0	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	0	0	0	0	0	0	0
	Mining Demand	1,874	2,354	2,615	2,795	2,972	3,149	3,280
	Mining Existing Supply							
	Groundwater	444	444	444	444	444	444	444
	Surface water	39	39	39	39	39	39	39
	Total Mining Supply	483	483	483	483	483	483	483
	Mining Balance	(1,391)	(1,871)	(2,132)	(2,312)	(2,489)	(2,666)	(2,797)
Agriculture	Irrigation Demand	80	80	80	80	80	80	80
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,081	1,082	1,083	1,084	1,085	1,086	1,087
	Total Irrigation Supply	1,081	1,082	1,083	1,084	1,085	1,086	1,087
	Irrigation Balance	1,001	1,002	1,003	1,004	1,005	1,006	1,007
	Livestock Demand	1,344	1,344	1,344	1,344	1,344	1,344	1,344
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,344	1,344	1,344	1,344	1,344	1,344	1,344
	Total Livestock Supply	1,344	1,344	1,344	1,344	1,344	1,344	1,344
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	43,038	72,108	96,844	121,102	151,015	180,152	210,430
	Existing Municipal & Industrial Supply							
	Groundwater	9,647	14,291	14,176	14,176	14,286	13,726	13,726
	Surface water	95,500	76,043	76,651	77,372	78,128	78,998	79,402
	Total Municipal & Industrial Supply	105,147	90,334	90,827	91,548	92,414	92,724	93,128
	Municipal & Industrial Balance	62,109	18,226	(6,017)	(29,554)	(58,601)	(87,428)	(117,302)
	Agriculture Demand	1,424	1,424	1,424	1,424	1,424	1,424	1,424
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	2,425	2,426	2,427	2,428	2,429	2,430	2,431
	Total Agriculture Supply	2,425	2,426	2,427	2,428	2,429	2,430	2,431
	Agriculture Balance	1,001	1,002	1,003	1,004	1,005	1,006	1,007
	Total Demand	44,462	73,532	98,268	122,526	152,439	181,576	211,854
	Total Supply							
	Groundwater	9,647	14,291	14,176	14,176	14,286	13,726	13,726
	Surface water	97,924	78,469	79,078	79,800	80,557	81,428	81,834
	Total Supply	107,571	92,760	93,254	93,976	94,843	95,154	95,559
	Total Balance	63,109	19,228	(5,014)	(28,550)	(57,596)	(86,422)	(116,295)

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-72
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Williamson County							
AQUA WSC							
Demand	65	76	88	103	121	140	161
Supply	69	76	76	76	76	76	76
Groundwater	69	76	76	76	76	76	76
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4	-	(12)	(27)	(45)	(64)	(85)
BARTLETT (P)							
Demand	173	176	181	188	195	205	217
Supply	132	132	132	132	132	132	132
Groundwater	132	132	132	132	132	132	132
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(41)	(44)	(49)	(56)	(63)	(73)	(85)
BELL-MILAM FALLS WSC							
Demand	41	53	66	83	101	120	142
Supply	48	48	48	48	48	48	48
Groundwater	21	21	21	21	21	21	21
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	27	27	27	27	27	27	27
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	7	(5)	(18)	(35)	(53)	(72)	(94)
BLOCKHOUSE MUD							
Demand	578	903	1,288	1,749	2,242	2,796	3,389
Supply	1,331	1,331	1,331	1,331	1,331	1,331	1,331
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,331	1,331	1,331	1,331	1,331	1,331	1,331
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	753	428	43	(418)	(911)	(1,465)	(2,058)
BRUSHY CREEK MUD							
Demand	1,902	2,643	3,596	3,869	3,869	3,869	3,869
Supply	6,751	3,391	3,391	3,391	3,391	3,391	3,391
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	6,751	3,391	3,391	3,391	3,391	3,391	3,391
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4,849	748	(205)	(478)	(478)	(478)	(478)
CEDAR PARK							
Demand	5,286	11,961	16,571	17,910	21,779	21,779	21,780
Contractual Demand	3,585	3,585	2,366	2,366	2,366	2,366	2,366
Supply	18,000	14,372	14,270	14,176	14,117	14,054	13,990
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	18,000	18,000	18,000	18,000	18,000	18,000	18,000
SW Constrained Supply		14,372	14,270	14,176	14,117	14,054	13,990
Balance	9,129	(1,174)	(4,667)	(6,100)	(10,028)	(10,091)	(10,156)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-72
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
CHISHOLM TRAIL SUD							
Demand	1,380	3,025	4,595	6,473	8,619	10,954	13,335
Supply	9,425	9,406	9,395	9,381	9,370	9,357	9,343
Groundwater	382	382	382	382	382	382	382
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	9,043	9,024	9,013	8,999	8,988	8,975	8,961
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	8,045	6,381	4,800	2,908	751	(1,597)	(3,992)
FERN BLUFF MUD							
Demand	745	1,339	2,049	2,882	3,805	4,810	5,888
Supply	745	1,339	2,049	2,882	3,805	4,810	5,888
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	745	1,339	2,049	2,882	3,805	4,810	5,888
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
FLORENCE							
Demand	192	242	283	332	386	447	515
Supply	171	171	171	171	171	171	171
Groundwater	171	171	171	171	171	171	171
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(21)	(71)	(112)	(161)	(215)	(276)	(344)
GEORGETOWN							
Demand	6,127	10,342	13,956	18,187	22,826	27,979	33,506
Supply	27,316	17,424	17,424	17,424	17,424	17,424	17,424
Groundwater	45	45	45	45	45	45	45
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	27,271	27,271	27,271	27,271	27,271	27,271	27,271
SW Constrained Supply		17,379	17,379	17,379	17,379	17,379	17,379
Balance	21,189	7,082	3,468	(763)	(5,402)	(10,555)	(16,082)
GRANGER							
Demand	178	207	219	234	248	268	293
Supply	340	340	340	340	340	340	340
Groundwater	340	340	340	340	340	340	340
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	162	133	121	106	92	72	47
HUTTO							
Demand	176	1,689	2,290	3,001	3,766	4,627	5,550
Supply	1,940	6,398	6,398	6,398	6,496	5,936	5,936
Groundwater	1,604	6,062	6,062	6,062	6,160	5,600	5,600
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	336	336	336	336	336	336	336
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1,764	4,709	4,108	3,397	2,730	1,309	386
JARRELL							
Demand		208	210	212	216	219	207
Supply	-	43	43	43	43	43	43
Groundwater		43	43	43	43	43	43
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water		-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	(165)	(167)	(169)	(173)	(176)	(164)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-72
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
JARRELL-SCHWERTNER WSC							
Demand	567	479	722	1,006	1,308	1,651	2,019
Supply	634	634	634	634	634	634	660
Groundwater	50	50	50	50	50	50	50
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	584	584	584	584	584	584	610
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	67	155	(88)	(372)	(674)	(1,017)	(1,359)
JONAH WATER SUD							
Demand	1,159	1,676	2,229	2,804	3,415	4,092	4,845
Supply	3,226	1,675	2,228	2,803	3,270	3,270	3,270
Groundwater	430	430	430	430	430	430	430
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	2,796	3,313	3,866	4,441	4,908	4,908	4,908
SW Constrained Supply		1,245	1,798	2,373	2,840	2,840	2,840
Balance	2,067	(1)	(1)	(1)	(145)	(822)	(1,575)
LEANDER							
Demand	1,344	3,887	5,380	7,119	9,028	11,156	13,439
Supply	7,619	7,619	6,400	6,400	6,400	6,400	6,400
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	7,619	7,619	6,400	6,400	6,400	6,400	6,400
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	6,275	3,732	1,020	(719)	(2,628)	(4,756)	(7,039)
LIBERTY HILL							
Demand	268	454	673	940	1,223	1,537	1,874
Supply	192	192	77	77	77	77	77
Groundwater	192	192	192	192	192	192	192
GW Constrained Supply		NC	77	77	77	77	77
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(76)	(262)	(596)	(863)	(1,146)	(1,460)	(1,797)
MANVILLE WSC							
Demand	732	1,064	1,466	1,933	2,446	3,022	3,640
Contractual Demand	560	560	560	560	560	-	-
Supply	3,514	3,825	3,825	3,825	3,832	3,832	3,832
Groundwater	3,514	3,825	3,825	3,825	3,832	3,832	3,832
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	2,222	2,201	1,799	1,332	826	810	192
ROUND ROCK							
Demand	13,522	23,103	31,146	40,704	51,176	62,801	75,268
Contractual Demand	4,295	1,569	2,279	3,112	4,035	5,040	6,118
Supply	21,892	21,766	21,646	21,543	21,466	21,356	21,247
Groundwater	821	821	821	821	821	821	821
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	21,071	20,945	20,825	20,722	20,645	20,535	20,426
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4,075	(2,906)	(11,779)	(22,273)	(33,745)	(46,485)	(60,139)
SOUTHWEST MILAM WSC							
Demand	209	259	318	386	465	549	643
Supply	134	281	281	281	286	286	286
Groundwater	134	281	281	281	286	286	286
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(75)	22	(37)	(105)	(179)	(263)	(357)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-72
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
TAYLOR							
Demand	2,281	2,913	3,279	3,705	4,183	4,727	5,342
Contractual Demand	348	348	348	348	348	348	348
Supply	7,304	3,261	3,627	4,053	4,531	5,075	5,690
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	7,304	3,261	3,627	4,053	4,531	5,075	5,690
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	4,675	-	-	-	-	-	-
THRALL							
Demand	106	140	165	196	228	263	304
Supply	11	11	11	11	11	11	11
Groundwater	11	11	11	11	11	11	11
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(95)	(129)	(154)	(185)	(217)	(252)	(293)
WEIR							
Demand	101	156	223	301	386	480	581
Supply	13	13	13	13	13	13	13
Groundwater	13	13	13	13	13	13	13
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	-	-	-	-	-	-	-
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(88)	(143)	(210)	(288)	(373)	(467)	(568)
WELLS BRANCH MUD							
Demand	31	31	30	30	30	29	29
Supply	31	31	30	30	30	29	29
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	31	31	30	30	30	29	29
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	-	-	-	-	-	-	-
WILLIAMSON-TRAVIS COUNTY MUD #1							
Demand	510	770	1,085	1,462	1,865	2,320	2,807
Supply	1,022	824	748	678	637	589	540
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	1,022	824	748	678	637	589	540
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	512	54	(337)	(784)	(1,228)	(1,731)	(2,267)
COUNTY-OTHER							
Demand	2,320	371	267	378	1,729	3,533	4,651
Supply	1,256	974	974	974	974	974	974
Groundwater	1,041	719	719	719	719	719	719
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	215	255	255	255	255	255	255
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	(1,064)	603	707	596	(755)	(2,559)	(3,677)

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-73
Young County
Population, Water Supply, and Water Demand Projections

Population Projection	Year						
	2000	2010	2020	2030	2040	2050	2060
	13,989	14,125	14,433	14,453	14,287	14,079	13,947

	Supply and Demand by Type of Use	Year						
		2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	2,259	2,224	2,225	2,183	2,115	2,056	2,037
	Contractual Demand	565	552	542	528	513	501	497
	Municipal Existing Supply							
	Groundwater	286	286	286	286	286	286	286
	Surface water (Less Contractual Demand)[1]	3,986	3,663	3,663	3,627	3,508	3,388	3,269
	Total Existing Municipal Supply	4,272	3,949	3,949	3,913	3,794	3,674	3,555
	Municipal Balance	2,013	1,725	1,724	1,730	1,679	1,618	1,518
Industrial	Manufacturing Demand	27	33	36	39	42	44	48
	Manufacturing Existing Supply							
	Groundwater	50	50	50	50	50	50	50
	Surface water	0	0	0	0	0	0	0
	Total Manufacturing Supply	50	50	50	50	50	50	50
	Manufacturing Balance	23	17	14	11	8	6	2
	Steam-Electric Demand	2,610	2,170	1,730	2,023	2,379	2,814	3,344
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	14,000	14,000	14,000	14,000	14,000	14,000	14,000
	Total Steam-Electric Supply	14,000	14,000	14,000	14,000	14,000	14,000	14,000
	Steam-Electric Balance	11,390	11,830	12,270	11,977	11,621	11,186	10,656
	Mining Demand	159	200	222	231	240	249	261
	Mining Existing Supply							
	Groundwater	261	261	261	261	261	261	261
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	261	261	261	261	261	261	261
	Mining Balance	102	61	39	30	21	12	0
Agriculture	Irrigation Demand	77	74	71	69	66	64	61
	Irrigation Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	985	980	975	970	964	959	954
	Total Irrigation Supply	985	980	975	970	964	959	954
	Irrigation Balance	908	906	904	901	898	895	893
	Livestock Demand	1,008	1,008	1,008	1,008	1,008	1,008	1,008
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,008	1,008	1,008	1,008	1,008	1,008	1,008
	Total Livestock Supply	1,008	1,008	1,008	1,008	1,008	1,008	1,008
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	5,055	4,627	4,213	4,476	4,776	5,163	5,690
	Existing Municipal & Industrial Supply							
	Groundwater	597	597	597	597	597	597	597
	Surface water	17,986	17,663	17,663	17,627	17,508	17,388	17,269
	Total Municipal & Industrial Supply	18,583	18,260	18,260	18,224	18,105	17,985	17,866
	Municipal & Industrial Balance	13,528	13,633	14,047	13,748	13,329	12,822	12,176
	Agriculture Demand	1,085	1,082	1,079	1,077	1,074	1,072	1,069
	Existing Agricultural Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,993	1,988	1,983	1,978	1,972	1,967	1,962
	Total Agriculture Supply	1,993	1,988	1,983	1,978	1,972	1,967	1,962
	Agriculture Balance	908	906	904	901	898	895	893
	Total Demand	6,140	5,709	5,292	5,553	5,850	6,235	6,759
	Total Supply							
	Groundwater	597	597	597	597	597	597	597
	Surface water	19,979	19,651	19,646	19,605	19,480	19,355	19,230
	Total Supply	20,576	20,248	20,243	20,202	20,077	19,952	19,827
	Total Balance	14,436	14,539	14,951	14,649	14,227	13,717	13,068

[1] Contractual demands are subtracted from the supplies available to municipal water user groups in order to not double-count demands and supplies available within a County.

Table C-74
Brazos G Regional Water Planning Area
Municipal Water Demand & Supply By City/County
(acft)

City/County	2000	2010	2020	2030	2040	2050	2060
Young County							
FORT BELKNAPP WSC							
Demand	342	334	333	325	314	306	303
Contractual Demand	60	59	57	55	53	51	51
Supply	403	395	391	381	368	360	357
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	403	395	391	381	368	360	357
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	1	2	1	1	1	3	3
GRAHAM							
Demand	1,552	1,528	1,531	1,503	1,456	1,415	1,402
Contractual Demand	505	493	485	473	460	450	446
Supply	3,935	3,612	3,612	3,575	3,455	3,335	3,215
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	3,935	3,815	3,695	3,575	3,455	3,335	3,215
SW Constrained Supply		3,612	3,612	NC	NC	NC	NC
Balance	1,878	1,591	1,596	1,599	1,539	1,470	1,367
NEWCASTLE							
Demand	60	59	57	55	53	51	51
Supply	114	113	111	109	107	105	105
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	114	113	111	109	107	105	105
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	54	54	54	54	54	54	54
STEPHENS COUNTY RURAL WSC							
Demand	1	2	2	2	1	1	1
Supply	21	21	21	21	21	21	21
Groundwater	-	-	-	-	-	-	-
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	21	21	21	21	21	21	21
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	20	19	19	19	20	20	20
COUNTY-OTHER							
Demand	304	301	302	298	291	283	280
Supply	363	360	356	355	355	354	353
Groundwater	286	286	286	286	286	286	286
GW Constrained Supply		NC	NC	NC	NC	NC	NC
Surface water	77	74	70	69	69	68	67
SW Constrained Supply		NC	NC	NC	NC	NC	NC
Balance	59	59	54	57	64	71	73

(P) Indicates city is in multiple counties. Projections shown are for this county's portion only.
Dash represents a value of zero (0)
NC indicates the supply is "not constrained"

Table C-75
Region Total
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	1,621,961	1,957,767	2,278,243	2,576,783	2,873,382	3,164,777	3,448,879

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	316,798	361,419	417,462	466,106	515,151	565,027	615,483
	Municipal Existing Supply							
	Groundwater	148,267	156,145	156,030	155,930	155,888	155,151	154,956
	Surface water	456,626	323,830	319,059	324,454	326,686	328,131	328,964
	Total Existing Municipal Supply	604,893	479,975	475,088	480,384	482,573	483,282	483,921
	Municipal Surplus (Shortage)	288,095	118,556	57,626	14,278	(32,578)	(81,745)	(131,562)
Industrial	Manufacturing Demand	16,939	19,787	23,201	25,077	26,962	30,191	31,942
	Manufacturing Existing Supply							
	Groundwater	13,855	16,616	16,616	16,616	16,709	16,709	16,709
	Surface water	34,776	35,467	35,956	36,407	36,864	37,268	37,831
	Total Manufacturing Supply	48,631	52,083	52,572	53,023	53,573	53,977	54,540
	Manufacturing Surplus (Shortage)	31,692	32,296	29,371	27,946	26,611	23,786	22,598
	Steam-Electric Demand	103,330	168,193	221,696	254,803	271,271	300,859	319,884
	Steam-Electric Existing Supply							
	Groundwater	9,585	9,119	9,119	9,119	9,119	9,119	9,119
	Surface water	235,701	257,070	258,396	257,804	257,232	256,650	256,069
	Total Steam-Electric Supply	245,286	266,189	267,515	266,923	266,351	265,769	265,188
	Steam-Electric Surplus (Shortage)	141,956	97,996	45,819	12,120	(4,920)	(35,090)	(54,696)
	Mining Demand	72,854	36,664	37,591	38,037	27,251	20,744	21,243
	Mining Existing Supply							
	Groundwater	49,283	28,655	28,723	28,751	17,626	10,715	10,753
	Surface water	4,269	4,272	4,275	4,278	4,282	4,285	4,288
	Total Mining Supply	53,552	32,927	32,998	33,029	21,908	15,000	15,041
	Mining Surplus (Shortage)	(19,302)	(3,737)	(4,593)	(5,008)	(5,343)	(5,744)	(6,202)
Agriculture	Irrigation Demand	233,686	232,541	227,697	222,691	217,859	213,055	208,386
	Irrigation Existing Supply							
	Groundwater	143,019	143,299	143,299	143,299	143,308	143,308	143,308
	Surface water	138,217	138,222	138,227	138,232	138,238	138,243	138,248
	Total Irrigation Supply	281,236	281,521	281,526	281,531	281,546	281,551	281,556
	Irrigation Surplus (Shortage)	47,550	48,980	53,829	58,840	63,687	68,496	73,170
	Livestock Demand	51,576	51,576	51,576	51,576	51,576	51,576	51,576
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	51,576	51,576	51,576	51,576	51,576	51,576	51,576
	Total Livestock Supply	51,576	51,576	51,576	51,576	51,576	51,576	51,576
	Livestock Surplus (Shortage)	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	509,921	586,063	699,950	784,023	840,635	916,821	988,552
	Existing Municipal & Industrial Supply							
	Groundwater	220,990	210,535	210,488	210,416	199,342	191,694	191,537
	Surface water	731,372	620,640	617,685	622,944	625,063	626,334	627,152
	Total Municipal & Industrial Supply	952,362	831,175	828,173	833,360	824,405	818,028	818,689
	Municipal & Industrial Surplus (Shortage)	442,441	245,112	128,223	49,337	(16,230)	(98,793)	(169,863)
	Agriculture Demand	285,262	284,117	279,273	274,267	269,435	264,631	259,962
	Existing Agricultural Supply							
	Groundwater	143,019	143,299	143,299	143,299	143,308	143,308	143,308
	Surface water	189,793	189,798	189,803	189,808	189,814	189,819	189,824
	Total Agriculture Supply	332,812	333,097	333,102	333,107	333,122	333,127	333,132
	Agriculture Surplus (Shortage)	47,550	48,980	53,829	58,840	63,687	68,496	73,170
	Total Demand	795,183	870,180	979,223	1,058,290	1,110,070	1,181,452	1,248,514
	Total Supply							
	Groundwater	364,009	353,834	353,787	353,715	342,650	335,002	334,845
	Surface water	921,165	810,438	807,489	812,752	814,877	816,153	816,976
	Total Supply	1,285,174	1,164,272	1,161,275	1,166,467	1,157,527	1,151,155	1,151,822
	Total Surplus (Shortage)	489,991	294,092	182,052	108,177	47,457	(30,297)	(96,692)

Appendix D
Water Rights — Permitted and Actual Use

						Reported Use		
Water Right	**County**	**Water Right Holder**	**Water Source (Lake/River)**	**Use**	**Permitted Amount**	**2005**	**2006**	**2007**
2315	McLennan	CITY OF WACO	LAKE WACO	MUN	58,200	37,356	34,551	30
				IRR	900	992	950	655
2936	Bell	U S DEPT OF THE ARMY	LAKE BELTON	MUN	12,000	6,824	0	0
2938	Bell	CITY OF TEMPLE	BELTON RESERVOIR	MUN	35,804	12,882	12,968	10,461
3444	Baylor	NORTH CENTRAL TEXAS MWA	MILLER CREEK RESERVOIR	MUN	3,500	1,358	1,423	1,255
3458	Young	CITY OF GRAHAM	LAKE EDDLEMAN/LAKE GRAHAM	MUN	11,000	2,787	2,962	3,106
3465	Eastland	EASTLAND CO WSD	LAKE EASTLAND	MUN	450	0	1,662	0
3470	Eastland	EASTLAND CO WSD	LAKE LEON	MUN	5,450	0	0	1,489
				IND	350	1,604	0	0
				IRR	500	0	500	500
3557	Comanche	LAKE PROCTOR IRRIGATION AUTHORITY	SABANA RIVER	IRR	98	1,948	1,885	512
3693	Crosby	WHITE RIVER MWD	WHITE RIVER RESERVOIR	MUN	4,000	1,653	1,535	1,414
				MIN	2,000	188	90	7
3718	Kent	OCCIDENTAL PERMIAN LTD	DBL MTN FRK BRAZOS RIVER	MIN	5,900	0	64	64
3758	Milam	ALCOA INC	LAKE ALCOA	IND	18,000	11,229	10,798	4,510
3761	Milam	CITY OF CAMERON	LITTLE RIVER	MUN	2,792	1,358	1,401	1,210
3775	Milam	JESSE ROBERTSON/LLOYD E LEIFESTE ET UX	LITTLE RIVER	IRR	67	502	27	0
				IRR	1,700			
3808	Comanche	DON FRAZIER CLARK ET AL	COPPERAS (RUSH) CRK	IRR	1,060	1,030	1,015	1,180
3936	McLennan	HOLY LAND & CATTLE	BRAZOS RIVER	IRR	2,600	1,660	2,019	0
3985	Lubbock	CITY OF LUBBOCK	EFFLUENT	IRR	18,430	10,587	11,803	6,002
				IND	4,480	3,957	4,072	1,678
4031	Palo Pinto	PALO PINTO CO MWD 1	LAKE PALO PINTO	MUN	12,500	3,970	0	0
				IND	6,000	0	0	0
4097	Somervell	TXU ELECTRIC CO	SQUAW CREEK RESERVOIR	IND	23,180	18,470	19,905	18,846
4104	Bosque	CHISHOLM TRAIL VENTURES LP	BRAZOS RIVER	IRR	3,811	0	3,621	0
4106	Johnson	CITY OF CLEBURNE	LAKE PAT CLEBURNE and NOLAN RIVER	MUN	5,760	4,155	5,607	7,322
4139	Jones	CITY OF ABILENE	DIVERSION TO FT PHANTOM HILL and CLEAR FRK BRAZOS RIVER	MUN		5,772	8,989	6,609
4161	Jones	CITY OF ABILENE	FORT PHANTOM HILL RES	MUN	25,690	19,026	13,908	4,737
				IND	4,000	2	2	4
				IRR	1,000	0	17	1
4165	Jones	CITY OF ABILENE	DEADMAN CRK	MUN	3,000	0	0	6,117
4179	Haskell	CITY OF STAMFORD	LAKE STAMFORD	MUN	10,000	1,453	1,146	0
			DETENTION POND	IND		0	0	905
4211	Eastland	CITY OF CISCO	LAKE CISCO	MUN	1,971	658	0	746
4212	Eastland	CITY OF CISCO	BATTLE CRK	MUN	1,000	0	3,041	0

						Reported Use		
Water Right	**County**	**Water Right Holder**	**Water Source (Lake/River)**	**Use**	**Permitted Amount**	**2005**	**2006**	**2007**
4213	Stephens	WEST CENTRAL TEXAS MWD	HUBBARD CREEK LAKE	MUN	56,000	3,809	11,718	16,022
				MIN		51	84	64
4266	Jones/ Shackelford	CITY OF ABILENE	7 HOLDING PONDS and DEADMAN CRK	IRR	4,330	848	1,303	53
4318	Bosque	SMITH BEND RANCH LTD/LAKEVIEW RECREATION ASSOCIATION INC/CHS FARMS LTD/JOHN MCPHERSON ET AL	BRAZOS RIVER	IRR	2,820	350	350	350
4342	McLennan	TRADINGHOUSE POWER CO LLC	TRADINGHOUSE CREEK LAKE and BRAZOS RIVER	IND	27,000	429	509	428
4344	McLennan	LOLA ROBINSON	TEHUACANA CRK	IRR	1,060	1,020	1,035	0
4345	McLennan	LUMINANT GENERATION CO LLC	LAKE CREEK	IND	10,000	69	101	80
4355	Falls	CITY OF MARLIN	NEW MARLIN RES	MUN	6,000	1,679	0	1,450
4363	Robertson	JOE REISTINO ESTATE	BRAZOS RIVER	IRR	1,500	0	0	1,500
4364	Robertson	CLIFF A SKILES JR	LTL BRAZOS RIVER	IRR	724	3,935	634	670
5155	Palo Pinto	BRAZOS RIVER AUTHORITY	POSSUM KINGDOM LAKE	MUN	230,750	355	989	961
				IND		2,925	23,851	1,144
				IRR		1,815	3,008	305
				MIN		2,322	2,655	2,639
				Other		309,816	129,808	300,264
5156	Hood	BRAZOS RIVER AUTHORITY	LAKE GRANBURY	MUN	64,712	6,326	6,906	5,371
				IND		41,590	44,898	42,830
				IRR		4,959	4,473	1,382
				MIN		702	538	1,683
5157	Hill	BRAZOS RIVER AUTHORITY	LAKE WHITNEY	MUN	18,336	16	12	12
				IND		116	7,302	833
5158	Hill	BRAZOS RIVER AUTHORITY	LAKE AQUILLA	MUN	13,896	4,717	4,590	3,313
5159	Comanche	BRAZOS RIVER AUTHORITY	LAKE PROCTOR	MUN	19,658	4,485	4,063	2,617
				IRR		5,486	5,767	437
5160	Bell	BRAZOS RIVER AUTHORITY	LAKE BELTON	MUN	100,257	37,102	47,123	36,187
				IND		171	3,378	0
				IRR		146	218	94
				IRR	456	146	218	94
5161	Bell	BRAZOS RIVER AUTHORITY	LAKE STILLHOUSE HOLLOW	MUN	67,768	16,740	19,948	16,558
				IND		0	3,956	0
				IRR		287	365	398
5162	Williamson	BRAZOS RIVER AUTHORITY	LAKE GEORGETOWN and N FRK SAN GABRIEL RIVER	MUN	13,610	13,440	13,440	13,440
5163	Williamson	BRAZOS RIVER AUTHORITY	LAKE GRANGER and SAN GABRIEL RIVER	MUN	19,840	2,790	2,693	2,326

Water Right	County	Water Right Holder	Water Source (Lake/River)	Use	Permitted Amount	Reported Use 2005	Reported Use 2006	Reported Use 2007
				IND		1,548	22,572	0
5164	Washington	BRAZOS RIVER AUTHORITY	LAKE SOMERVILLE	MUN	48,000	4,032	3,627	2,752
				IND		18,253	15	0
5165	Robertson	BRAZOS RIVER AUTHORITY	LAKE LIMESTONE	MUN	65,074	165	176	165
				IND		23,803	22,930	20,833
5166	Fort Bend	BRAZOS RIVER AUTHORITY	EXCESS FLOWS and BRAZOS RIVER	IND		13,353	1,462	27,891
5168	Fort Bend	GULF COAST WATER AUTHORITY	BRAZOS RIVER	MUN	99,932	15,896	0	0
				IND		23,182	0	0
				IRR		2,501	0	0
	Galveston	GULF COAST WATER AUTHORITY	RESERVOIR FOR FIREFIGHTING and BRAZOS RIVER	IND		23,182	0	0
5171	Fort Bend	GULF COAST WATER AUTHORITY	BRAZOS RIVER	MUN	75,000	15,847	0	0
				IND		32,871	0	0
				IRR	50,000	3,117	0	0
				MIN		61,481	0	0
5268	Brazos	CITY OF BRYAN	THOMPSONS CRK	IND	55,708	76,056	73,451	0
5271	Burleson	TEXAS A&M UNIVERSITY	BRAZOS RIVER	IND	420	0	170	0
				IRR	1,200	126	0	44
5287	Limestone	BISTONE MUNICIPAL WSD	LAKE MEXIA and NAVASOTA RIVER	MUN	2,887	76	77	0
5289	Limestone	CITY OF GROESBECK	NAVASOTA RIVER	MUN	2,500	552	631	601
5307	Grimes	TEXAS MUNICIPAL POWER AGENCY	NAVASOTA RIVER	IND	6,000	880	4,520	953
5311	Grimes	TEXAS MUNICIPAL POWER AGENCY	GIBBONS CREEK RES	IND	9,740	135,397	4,541	4,469
5320	Fort Bend	NRG TEXAS POWER LLC	BRAZOS RIVER	IND	12,000	0	6,452	0
				IRR	28,000	0	12,835	0
5322	Fort Bend	GULF COAST WATER AUTHORITY	JULIFF RES, BONNEY RES, LIVERPOOL RES	IND		14,135	0	0
				IRR		85,714	0	0
5325	Fort Bend	NRG TEXAS POWER LLC	SMITHERS LAKE	IND	28,711	0	4,936	0
5328	Brazoria	DOW CHEMICAL CO	BRAZORIA & HARRIS RES-OFF-CHANNEL and BRAZOS RIVER	IND	300,675	33,516	31,566	29,646
5366	Brazoria	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER	MUN	45,000	8,266	7,179	8,035
5470	Robertson	CLIFFORD A SKILES JR ET UX	BRAZOS RIVER	IRR	514	3,710	390	414
5551	Bosque	CITY OF CLIFTON	N BOSQUE RIVER	MUN	2,004	528	823	212
5603	Burleson	WILLIAM GAVRANOVIC JR	BRAZOS RIVER	IRR	1,350	4,074	0	3,475
5752	Burleson	WILLIAM GAVRANOVIC ET UX	BRAZOS RIVER	IRR	2,460	2,412	2,435	2,400

Appendix E
Detailed Description of
Vegetative Regions and Biotic Provinces

Appendix E
Detailed Description of
Vegetative Regions and Biotic Provinces

Vegetative Regions

Rolling Plains. The original prairie vegetation included tall and mid-grasses such as little bluestem (*Schizachyrium scoparium* var. *frequens*), big bluestem (*Andropogon gerardii*), sand bluestem (*Andropogon halli*), side-oats grama (*Bouteloua curtipendula*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), hairy grama (*B. hirsuta*), blue grama (*B. gracilis*), Canada wildrye (*Elymus canadensis*) and western wheat (*Agropyron smithii*).

Mesquite (*Prosopis glandulosa*) is a common invader on all soils, while shinnery oak (*Quercus harvardii*) and sand sage (*Artemisia filifolia*) invade only sandy soils. Juniper (*Juniperus* spp.) clings to steep slopes along rivers.

Blackland Prairies. Studies have shown that the native vegetation of the Blackland Prairies should be classified as true prairie with little bluestem being a climax dominant.[1] Big bluestem, Indiangrass, switchgrass, hairy grama, sideoats grama, tall dropseed (*Sporobolus asper* var. *asper*), silver bluestem (*Bothriochloa saccharoides*) and Texas wintergrass (*Stipa leucotricha*) represent other important grasses in the vegetational region. With heavy grazing practices, invading or increasing species such as buffalograss (*Buchloe dactyloides*), Texas grama (*Bouteloua rigidiseta*) and smutgrass (*Sporobolus indicus*), along with other annuals, may become prevalent.[2] Improved pastures with the introduced grass species such as dallisgrass (*Paspalum dilatatum*) and bermudagrass (*Cynodon dactylon*) are common in the area. Asters (*Aster* spp.), prairie bluet (*Hedyotis nigricans* var. *nigricans*), prairie clover (*Dalea* spp.) and late coneflower (*Rudbeckia serotina*) are common forbs of these prairies.[3]

Wooded areas along riparian strips in the Blackland Prairies include such species as black willow (*Salix nigra*), oaks (*Quercus* spp.), pecan (*Carya illinoinensis*), osage orange (*Maclura pomifera*), elms (*Ulmus* spp.) and eastern cottonwood (*Populus deltoides*).[4] Woody invasive species that are commonly found in the vegetational area include post oak (*Quercus stellata*),

[1] Gould, 1975.
[2] Gould, 1975 and Correll, S.S. and Johnston, M.C., *Manual of the Vascular Plants of Texas,* University of Texas at Dallas, 1970.
[3] Hatch, S.L., Ghandi, K.N. and Brown, L.E., *Checklist of the Vascular Plants of Texas*, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas, 1990.
[4] Hatch, et. al., 1990.

blackjack oak (*Q. marilandica*) and cedar elm (*Ulmus crassifolia*) in the north, with honey mesquite (*Prosopis glandulosa*) being a common invader in the southern portion of the region.[5]

Post Oak Savannah. Typical native woody vegetation in this area includes post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), eastern juniper (*Juniperus virginiana*) and hackberries (*Celtis* spp.). Yaupon (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*) and greenbriar (*Smilax bona-nox*) are common understory constituents of wooded areas. Common native grasses in this region include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*) and Texas wintergrass (*Stipa leucotricha*). Forbs typical of the prairie portions include indigobush (*Amorpha fruiticosa* v. *angustifolia*), senna (*Cassia* sp.), tick-clover (*Desmodium* spp.), prairie-clover (*Petalostemon* spp.), western ragweed (*Ambrosia psilostachya*) and croton (*Croton* spp.).[6]

Cross Timbers and Prairies. Upland vegetation within this region may vary from open savannah consisting of such native grasses as little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Canada wild-rye (*Elymus canadensis*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), tall dropseed (*Sporobolus* sp.) and Texas wintergrass (*Stipa leucotricha*).

Much of this region has been utilized for agriculture, primarily in the form of ranchland. With the advent of overgrazing and land mismanagement, invading grasses such as hairy tridens (*Erioneuron pilosum*), Texas grama (*B. rigidiseta*) and red lovegrass (*Eragrostis secundiflora*) have become common, along with dense brush consisting of post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), mesquite (*Prosopis glandulosa*) and junipers (*Juniperus* sp.). Along streams, riparian vegetation is typically dominated by such hardwood tree species as cedar elm (*Ulmus crassifolia*) and pecan (*Carya illinoinensis*) and oaks, but mesquite is also a typical invader in these areas.[7]

Edwards Plateau. Grasses that are typical of the Edwards Plateau region include switchgrass (*Panicum virgatum*), Indian grass (*Sorghastrum nutans*), beardgrass (*Bothriochloa* spp.), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), Canada wildrye (*Elymus canadensis*), curly mesquite (*Hilaria belangeri*) and buffalograss (*Buchloe dactyloides*). Other plants commonly found within this vegetational area include ashe

[5] Gould, 1975.
[6] Correll and Johnston, 1970 and Gould, 1975.

juniper (*Juniperus ashei*), plateau live oak (*Quercus fusiformis*), Texas oak (*Q. texana*), Texas persimmon (*Diospyros texana*), elbowbush (*Forestiera pubescens*), Texas mountain laurel (*Sophora secundiflora*), prickly-pear cactus (*Opuntia* spp.) and pencil cactus (*O. leptocaulis*).[8]

Biotic Provinces

Kansan. The mixed-grass plains region is dominated by little bluestem, big bluestem (*Andropogon gerardii*) and western wheatgrass. The mesquite-grass association is dominated by mesquite (*prosopis grandulosa*), with various species of grama (*Bouteloua* spp.), three-awn (*Aristida* spp.) and broomweed (*Gutierrezia texana*). The short-grass plains are dominated by buffalograss (*Buchloe dactyloides*) with various species of grama grasses.

Characteristic mammals of the Kansan province include: black-footed ferret (*Mustela nigripes*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), northern grasshopper mouse (*Onychomys leucogaster*), southern plains woodrat (*Neotoma micropus*) and Ord=s Kangaroo rat (*Dipodomys ordii*).

Austroriparian. Common Austroriparian province mammals within Texas include: Virginia opossum (*Didelphis virginaiana*), eastern mole (*Scalopus aquaticus*), eastern pipistrelle (*Pipistrellus subflavus*), eastern red bat (*Lasiurus borealis*), eastern gray squirrel (*Sciurus carolinesis*), eastern flying squirrel (*Glaucomys volans*), Baird's pocket gopher (*Geomys breviceps*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern woodrat (*Neotoma floridana*), eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*Sylvilagus aquaticus*).

Land turtles common to this province are ornate box turtle (*Terrapene ornata*) and eastern box turtle (*Terrapene carolina*). Common snake species found in this Texas region include: cottonmouth moccasin (*Agkistrodon piscivorus leucostoma*), copperhead (*Agkistrodon contortirx*), rough green snake (*Opheodrys aestivus*), rat snake (*Elaphe obsoleta*), coachwhip (*Masticophis flagellum*) and speckled kingsnake (*Lampropeltis geluta holbrooki*). Several Austroriparian species apparently reach their western limits in this Texas province, including the eastern harvest mouse (*Reithrodontomys humulis*), cotton mouse (*Peromyscus gossypinus*), spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*), mole salamander (*Ambystoma talpoideum*), pig frog (*Rana grylio*) and pickerel frog (*Rana palustris*).

---

[7] Correll and Johnston, 1970 and Hatch, et. al., 1990.
[8] Hatch, et. al., 1990.

Balconian. Fifty-seven species of mammals are known from the Balconian province but no species is restricted to this province. The mammalian fauna of the Balconian contains a strong influence from the Chihuahuan species that range into the province from the west and the Austroriparian province from the east.

Some common mammals are the nine-banded armadillo (*Dasypus novimcinctus*), fox squirrel (*Sciurus niger*), white-footed mouse (*Peromyscus leucopus*), black rat (*Rattus rattus*), house mouse (*Mus musculus*), raccoon (*Procyon lotor*) and white-tailed deer (*Odocoileus virginiana*).

Approximately 400 avian species have been recorded as occurring in the Balconian Biotic Province. Common species include mourning dove (*Zenaida macroura*), yellow-billed cuckoo (*Coccyzus americanus*), chimney swift (*Chaetura pelagica*), black-chinned hummingbird (*Archilochus alexandri*), red-bellied woodpecker (*Melanerpes carolinus*), purple *martin (Progne subis*), cliff swallow (*Hirundo pyrrhonota*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), Carolina wren (*Thryothorus ludovicianus*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), white-eyed vireo (*Vireo griseus*), black-and-white warbler (*Mniotilta varia*), northern cardinal (*Cardinalis cardinalis*), rufous-crowned sparrow (*Aimophila ruficeps*), lark sparrow (*Chodestes grammacus*), great-tailed grackle (*Quiscalus mexicanus*) and house sparrow (*Passer domesticus*).

Texan. Mammals typical of this province include the Virginia opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), fox squirrel (*Sciurus niger*), Louisiana pocket gopher (*Geomys breviceps*), fulvous harvest mouse (*Reithrodontomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*S. aquaticus*). Animals typical of grasslands of this province include the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), hispid pocket mouse (*Chaetodipus hispidus*), deer mouse (*Peromyscus maniculatus*) and black-tailed jackrabbit (*Lepus californicus*).

Typical anuran species to this province are the Hurter's spadefoot (*Scaphiopus holbrookii hurteri*), Gulf Coast toad (*Bufo valliceps*), Woodhouse's toad (*Bufo woodhousii*), gray treefrog (*Hyla versicolor/chrysoscelis*), green treefrog (*Hyla cinerea*), bullfrog (*Rana catesbeiana*), southern leopard frog (*Rana sphenocephala*) and eastern narrowmouth toad (*Microhylla carolinensis*).

Table E-1.
Federal and State-Listed Threatened and Endangered Species of Potential Occurrence in the BGRWPA

Common Name	Scientific Name	USFWS/State	County of Occurrence
Amphibians			
Georgetown Salamander	*Eurycea naufragia*	C/--	Wi
Houston Toad	*Bufo houstonensis*	LE/E	Br, Bu, Le, Mi, Ro, Wa
Jollyville Plateau Salamander	*Eurycea tonkawae*	C/--	Be, Wi
Salado Springs Salamander	*Eurycea chisholmensis*	C/--	Be, Wi
Crustaceans			
An amphipod	*Stygobromus russelii*	--/--	WI
Bifurcated cave amphipod	*Stygobromus bifurcates*	--/--	Wi
Ezell's cave amphipod	*Stygobromus flagellates*	--/--	Wi
Reptiles			
Alligator Snapping Turtle	*Macroclemys temminckii*	--/T	Br, Bu, Fa, Gr, Mi, Ro, Wa,
Brazos Water Snake	*Nerodia harteri*	--/T	Bo, Er, Hs, Hi, Ho,, Jn, Jo, Kn,, Li, Pa, Sh,, Sn, So, St, Th, Yo
Concho Water Snake	*Nerodia paucimaculata*	--/T	La
Louisiana Pine Snake	*Pituophis melanoleucus ruthveni*	C/T	Gr,
Spot-tailed Earless Lizard	*Holbrookia lacerata*	--/--	No, Ta, Wi
Texas Garter Snake	*Thamnophis sirtalis annectens*	--/--	Be, Bo, Cr, Fa, Hi, Ho, Jo, Le, Li, Mc, Mi, So, Wi
Texas Horned Lizard	*Phrynosoma cornutum*	--/T	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, La, Le, Li, Mc, Mi, No, Pa, Ro, Sh, Sn, So, St. Th, Wa,, Wi, Yo
Timber/ Canebrake Rattlesnake	*Crotalus horridus*	--/T	Bo, Br, Bu, Cr, Ea, Fa, Gr, Hi, Ho, Jo, Le, Li, Mc, Mi, Ro, So, Wa, Wi
Arachnids			
Bandit Cave Spider	*Cicurina bandida*	--/--	WI
Bone Cave Harvestman	*Texella reyesi*	LE/--	Wi
Insects			
A mayfly	*Procloeon distinctum*	--/--	Wi
A mayfly	*Pseudocentroptiloides morihari*	--/--	Wi
A mayfly	*Procloeon texanum*	--/--	Br
Coffin Cave Mold Beetle	*Batrisodes texanus*	LE/--	Wi
Gulf coast clubtail	*Gomphus modestus*	--/--	Br,
Leon River Winter Stonefly	*Taeniopteryx starki*	--/--	Cr, Ha
Leonora's dancer damselfly	*Argia leonorae*	--/--	Wi
Smoky shadowfly	*Neurocordulia molesta*	--/--	Br
Tooth Cave Ground Beetle	*Rhandine peresphone*	LE/--	Wi

Common Name	***Scientific Name***	***USFWS/State***	***County of Occurrence***
Birds			
American Peregrine Falcon	*Falco peregrinus anatum*	DL/T	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, La, Le, Li, Mc, Mi, No, Pa, Ro, So, St, Sh, St, Sn, Ta, Th, Wa,Wi,Yo
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL/--	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, La, Le, Li, Mc, Mi, No, Pa, Ro, Sh, So, St, Sn, Ta, Th, Wa, Wi, Yo
Baird's Sparrow	*Ammodramus bairdii*	--/--	Ca, Co, Ea, Fi, Hs, Ho,, Jn,, Ke, Kn, No, Ta Sh, St, Ta, Th, Yo
Bald Eagle	*Haliaeetus leucocephalus*	DL/T	Be, Bo, Br, Bu, Ca, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, La, Le, Li, Mc, Mi, No, Pa, Ro, Sh, So, St, Sn, Ta, Th, Wa, Wi, , Yo
Black-capped Vireo	*Vireo atricapillus*	LE/E	Be, Bo, Ca, Co, Cr, Er, Ha, Ho,, Jo, La, No, Pa, So, St, Sn, Ta, Wi
Ferruginous Hawk	*Buteo regalis*	--/--	Fi, Hs,, Jn,, Ke, Kn,, No,, Sn, Ta
Golden-cheeked Warbler	*Dendroica chrysoparia*	LE/E	Be, Bo, Co, Cr, Er, Ha, Hi, Ho, Jo, La, Mc, Pa, So, St, Sn, Wi, Yo
Henslow's Sparrow	*Ammodramus henslowii*	--/--	Be, Br, Bu, Fa, Gr, Hi, Ho, Jo, Le, Li, Mc, Mi, Ro, Wa,Wi, Yo
Interior Least Tern	*Sterna antillarum athalassos*	LE/E	Be, Bo, Br, Bu, Co, Fa, Gr, Hs, Hi, Ho, Jo, Kn, La, Le, Li, Mc, Pa, So, St, Sn, Yo
Mountain Plover	*Charadrius montanus*	--/--	Be, Bo, Ca, Co, Cr, Ea, Er, Fi, Ha, Hs, Ho, Jn, Ke, Kn, La, No, Pa, Sh, St, Sn, Ta, Th, Wa, Wi, Yo
Piping Plover	*Charadrius melodus*	LE/T	Th
Red-cockaded Woodpecker	*Picoides borealis*	LE/E	Gr,
Snowy Plover	Charadrius alexandrinus	--/--	Fi, Hs,, Jn,, Ke,, Kn,, No, Sn Ta
Western Burrowing Owl	*Athene cunicularia hypugaea*	--/--	Be, Bo, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Ha, Hs Hi, Ho, Jo, Ke,, Kn,, La, Le Li, Mc, Mi, No, Pa, Sh, So, St, Sn, Ta, Th, Wa, Wi, Yo
Western Snowy Plover	*Charadrius alexandrines nivosus*	--/--	Fi, Hs, Ke, Kn, No, Sn, Ta
White-faced Ibis	*Plegadis chihi*	--/T	Gr,, Hi, Jo, Li, Mc, Wa
Whooping Crane	*Grus americana*	LE/E	Ba, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, La, Le, Li, Mc, Mi, No, Pa, Ro, Sh, Sn, So, St, Ta, Th, Wa, Wi, Yo
Wood Stork	*Mycteria americana*	--/T	Br, Bu, Fa, Gr, Hi, Le, Li, Mc, Mi, Ro,, Wa
Fishes			
Blue Sucker	*Cycleptus elongatus*	--/T	Br, Bu, Gr, Mi, Ro, Wa,
Guadalupe Bass	*Micropterus treculi*	--/--	Be, Bo, Cr, La, Mc, Mi, Pa, Wi
Sharpnose Shiner	*Notropis oxyrhynchus*	C/--	Bo, Br, Bu, Fa, Fi, Gr, Hs, Hi, Ho, Jo, Jn, Ke, Kn,, Mc, Mi, Pa, Ro, Sn, So, Th, Wa, Wi, Yo
Smalleye Shiner	*Notropis buccula*	C/--	Be, Bo, Br, Bu, Co, Cr, Ea, Er, Fa,, Fi, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn,, La, Li, Mc, Mi, Pa, Ro, Sh, Sn, So, St, Th, Wa, Wi, Yo
Mammals			
Black Bear	*Ursus americanus*	T-SA/T	Ho, Wa
Black-footed Ferret	*Mustela nigripes*	LE/E	Fi, Hs, Jn, Ke, Kn, No, Sn,
Black-tailed Prairie Dog	*Cynomys ludovicianus*	C/R	Ca, Fi, Ha, Hs, Jo, Jn, Ke Kn,, No, Sh, Sn, Ta, Th, Yo

Common Name	***Scientific Name***	***USFWS/State***	***County of Occurrence***
Cave Myotis Bat	*Myotis velifer*	--/--	Be, Bo, Bu, Ca, Co, Cr, Ea, Fa,, Fi,, Ha, Hs, Hi,, Jn, Ke, Kn, La, Le,, Mc, Mi, No, Sh, Sn, St, Ta, Th, Wi, Yo
Gray Wolf	*Canis lupus*	LE/E	Extirpated, Formerly in Ca, Co, Ea, Er, Ha, Hs, Ho, Jo, Jn, Kn, La, No, Pa, Sh, Sn, So, St, Ta, Th, Yo
Llano pocket gopher	*Geomys texensis texensis*	--/--	La,
Louisiana Black Bear	*Ursus americanus luteolus*	LT/T	Br, Bu, Gr, Ro, Wa,
Pale Townsend's Big-eared bat	*Corynorhinus townsendii pallescens*	--/--	Fi, Hs, Ke, Kn, Sn,
Plains Spotted Skunk	*Spilogale putorius interrupta*	--/--	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Fi, Gr, Ha, Hs, Ho, Hi, Jo, Jn, Ke, Kn, Le, Li, Mc, Mi, No, Pa, Ro, Sh, Sn, So, St, Ta, Th, Wa, Wi, Yo
Red Wolf	*Canis rufus*	LE/E	Extirpated, Formerly in Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Gr, Ha, Hs, Hi, Ho, Jn, Kn, La, Le, Li, Mc, Mi, Pa, Ro, Sh, So, St, Ta, Th, Wa, Wi, Yo
Southeastern Myotis Bat	*Myotis austroriparius*	--/--	Gr,
Texas Kangaroo Rat	*Dipodomys elato*	--/T	Kn, Yo
Mussels			
Creeper (squawfoot)	*Strophitus undulates*	--/--	La, Wi
False spike mussel	*Quadrula mitchelli*	--/T	Be, Bo, Br, Bu, Co, Cr, Fa, Gr, Ha, Le, Mc, Mi, Ro, Wa, Wi,
Pistolgrip	*Tritogonia verrucosa*	--/--	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Gr, Ha, Hs, Hi, Ho, Jn, Kn, La, Le, Mc, Mi, No, Pa, Ro, Sh, So, St, Ta, Th, Wa, Wi, Yo
Rock pocketbook	*Arcidens confragosts*	--/--	Be, Bo, Br, Bu, Cr, Fa, Gr, Ha, Hi, Ho, La, Le, Mc, Mi, Pa, Ro, So, Wa, Wi
Smooth pimpleback	*Quadrula houstonensis*	--/T	Be, Bo, Br, Bu, Co, Cr, Fa, Gr, Ha, Hi, La, Le, Mc, Mi, Ro, Sh, Wa, Wi
Texas fatmucket	*Lampsilis bracteata*	--/T	La,
Texas fawnsfoot	*Truncilla macrodon*	--/T	Be, Bo, Br, Bu, Ca, Co, Cr, Ea, Er, Fa, Gr, Ha, Hs, Hi, Ho, Jo, Jn, La, Le, Mc, Mi, Pa, Ro, Sh, So, St, Ta, Th, Wa, Wi, Yo
Texas pimpleback	*Quadrula petrina*	--/T	La, Wi
Plants			
Branched gayfeather	*Liatris cymosa*	--/--	Br, Bu, Gr, Le, Wa
Comanche Peak prairie-clove	*Dalea reverchonii*	--/--	Ho
Dwarf broomspurge	*Chamaesyce jejuna*	--/--	No
Elmendorf's onion	*Allium elmendorfii*	--/--	WI
Glen Rose yucca	*Yucca necopina*	--/--	Ho, So, Yo
Large-fruited sand verbena	*Abronia macrocarpa*	LE/E	Ro
Navasota false foxglove	*Agalinis navasotensis*	--/--	Gr
Navasota ladies tresses	*Sprianthes parksii*	LE/E	Br, Bu, Gr, Li, Mi, Ro, Wa
Parks' jointweed	*Polygonella parksii*	--/--	Bu, Mi, Ro,

Common Name	***Scientific Name***	***USFWS/State***	***County of Occurrence***
Sandhill woolywhite	*Hymenopappus carrizoanus*	--/--	Ro,
Shinner's sunflower	*Helianthus occidentalis ssp.*	--/--	Le, Wa,
Texabama croton	*Croton alabamensis var. texensis*	--/--	Be, Cr
Texas meadow rue	*Thalictrum texanum*	--/--	Br, Gr, Wa,
Texas windmill-grass	*Chloris texensis*	--/--	Br
Warnock's coral root	*Hexalectris warnockii*	--/--	Ta

United States Fish and Wildlife Service Listing Abbreviations (USFWS):

LE: Endangered (in danger of extinction throughout all or a significant portion of its range)
LT: Threatened (likely to become endangered within the foreseeable future)
PE, PT: Proposed endangered/threatened
LE/SA,LT S/A: Endangered/threatened by similarity of appearance
DL, PDL: Delisted, proposed delisted
C: Candidate for listing, with biological vulnerability and threats to support listing
LT w/CH: Threatened with Critical Habitat in Texas
-- Not Federally Listed

Texas Parks and Wildlife Department (TPWD) Listing Abbreviations:

E: Listed as Endangered by the State of Texas
T: Listed as Threatened by the State of Texas
--: Rare, but with no regulatory listing status

County Name Abbreviations

Be:	Bell	Hs:	Haskell	No:	Nolan
Bo:	Bosque	Hi:	Hill	Pa:	Palo Pinto
Br:	Brazos	Ho:	Hood	Ro:	Robertson
Bu:	Burleson	Jo:	Johnson	Sh:	Shackelford
Ca:	Callahan	Jn:	Jones	So:	Somervell
Co:	Comanche	Ke:	Kent	St:	Stephens
Cr:	Coryell	Kn:	Knox	Sn:	Stonewall
Ea:	Eastland	La:	Lampasas	Ta:	Taylor
Er:	Erath	Le:	Lee	Th:	Throckmorton
Fa:	Falls	Li:	Limestone	Wa:	Washington
Fi:	Fisher	Mc:	McLennan	Wi:	Williamson
Gr:	Grimes	Mi:	Milam	Yo:	Young
Ha:	Hamilton				

Data obtained from the Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service February 9, 2010.

Appendix F
Detailed Information for Agricultural Resources

Appendix F
Detailed Information for Agricultural Resources

Irrigation

Surveys of the BGRWPA counties were completed in 1994 by the TWDB and in 1997 and 2002 by the US Department of Commerce (Census of Agriculture). The agricultural production statistics from the 2002 census data for the counties in the Brazos G Regional Water Planning Area (BGRWPA) are given in Tables F-1 through F-3. The compiled irrigated acreage from the 1994 to 2002 surveys is shown in Table F-4. The total irrigated acreage for the BGRWPA was 214,096 acres in the 1994 survey, 202,442 acres in the 1997 survey, and 207,102 acres in 2002. Figures F-1 and F-2 show the 2002 distribution of cropland and irrigated acreage in the BGRWPA. Irrigated water use in the region in year 2000 is shown in Figure F-3.

Irrigated acreage declined from 1994 to the current time in the Cross Timbers Region by 19,600 acres. This decline was a result of a change in the governmental peanut program in the 1995 Farm Bill. The peanut-poundage quota was allowed to transfer across county lines, with the result that a significant portion of the peanut quota from the peanut growing counties of the Cross Timbers was moved to West Texas where the profits were greater from higher yields and lower costs of production. The movement of the peanut quota is thought to be the primary reason for the decrease of 21,128 irrigated acres in Comanche County. This decrease should not be regarded as a trend; the peanut quota transfer is largely complete (only 40 percent of the quota is allowed to transfer out of a county). The irrigated acres may increase in the future as profitable field, tree and horticultural irrigated crops increase. None of the irrigated acreage decrease was the result of a transfer of irrigation water to municipal use. The town of Comanche is not expanding into farmland with peanut production. Most of the irrigation water was from the Trinity Aquifer from individual wells and pumps. Some peanuts are irrigated with surface water from the Leon River and Lake Proctor.

Irrigated acreage decreased in Rolling Plains by 13,047 acres since 1994. The region is exhibiting a trend toward dry land crops such as small grains, hay and silage. Haskell and Knox Counties are the largest irrigating counties in the BGRWPA totaling 53,927 acres which declined 11,975 acres since 1994.

The Blackland, and Southeast and Central Regions showed an increase of irrigation acreage. Most of these counties are located along the Brazos River. Corn acreage increased to more than 450,000 acres in the Blacklands, an increase of 181,439 acres over 1994. Corn is a large water user. A full season (120 days) commercial hybrid requires approximately 20 to 25 gallons from seedling to maturity. Multiplied by a final population of 22,000 to 26,000 plants per acre, classifies corn as a high maintenance crop.

Livestock

The Cross Timbers region is a major dairy area of the state. Erath County is the leading county in milk production, Comanche County ranks third, Hamilton County is sixth and Johnson County ranks eighth. The 199 farms in these four counties produce over 38 percent of the milk in Texas in 2002. Dairy water requirements vary widely, depending on the types of waste removal and cow washing systems. Surveys of 11 dairies in Erath County in the early 1990s showed a daily water use of about 100 gallons per milking cow on dairies with sprinklers for washing cow udders prior to milking. The water use included about 30 gallons of drinking water, 40 gallons for manure removal and 30 gallons for washing cow udders prior to milking. If the dairy does not use a cow washing system, the daily water use averaged about 80 gallons per milking cow. For an average of 100 gallons of water per day per milking cow, the BGRWPA dairy water use for 118,106 milking cows is 1,087 acre feet per month. The source of this water is virtually all ground water from the Trinity Aquifer as each dairy has its own water supply. With farm numbers declining and size increasing more producers are adopting the latest technology to increase profitability. The evolution from pasture and dry lot to free stall barns will require greater water use. Misting and evaporative systems for summer months will be needed for animal cooling purposes. Manure removal, sanitation, and disinfection will elevate water use as well

Other significant livestock raised in the BGRWPA in 2002 were beef cattle, swine, and sheep. Total number of swine and sheep of all ages were 21,825 and 59,734, respectively. Beef cows numbered 784,668 head and all cattle and calves totaling 2,392,991. Figure F-4 represents livestock water use in 2000 for the BGRWPA.

Table F-1.
2002 Agricultural Production Statistics

Agricultural District	Market Value ($1,000) Crops	Livestock	Total	Livestock % value	Area (acres) Farmland	Cropland	Harvested	Irrigated
Rolling Plains (2N and 2S)								
Fisher	9,862	9,053	18,915	48%	479,270	229,332	98,490	3,284
Haskell	26,513	14,283	40,796	35%	491,957	332,159	229,991	30,894
Jones	19,347	19,877	39,224	51%	517,244	352,336	198,863	3,701
Kent	680	4,601	5,281	87%	560,695	75,302	NA	1,300
Knox	14,691	31,489	46,180	68%	564,263	218,743	125,275	23,033
Nolan	7,105	6,288	13,393	47%	481,183	151,786	68,909	2,987
Stonewall	3,051	5,978	9,029	66%	524,308	120,936	40,323	1,454
Taylor	6,519	48,893	55,412	88%	533,937	227,440	94,860	2,434
Subtotal, Rolling Plains	*87,768*	*140,462*	*228,230*	62%	*4,152,857*	*1,708,034*	*856,711*	*69,087*
Cross Timbers (3)								
Callahan	2,024	14,859	16,883	88%	515,396	128,993	37,230	1,331
Comanche	14,637	87,876	102,513	86%	543,386	225,401	102,541	21,283
Eastland	9,101	21,257	30,358	70%	498,047	192,143	62,926	14,594
Erath	9,968	197,746	207,714	95%	580,627	212,494	86,406	14,505
Hood	4,123	17,606	21,729	81%	202,131	75,814	27,690	3,433
Palo Pinto	2,384	12,950	15,334	84%	484,964	110,578	29,024	1,902
Shackelford	1,267	13,783	15,050	92%	557,102	55,661	24,178	550
Somervell	519	1,507	2,026	74%	84,262	21,777	6,736	129
Stephens	497	8,260	8,757	94%	427,859	69,531	15,509	195
Throckmorton	2,435	13,984	16,419	85%	561,306	92,858	38,581	NA
Young	1,721	22,205	23,926	93%	509,721	143,433	36,372	114
Subtotal, Cross Timbers	*48,676*	*412,033*	*460,709*	89%	*4,964,801*	*1,328,683*	*467,193*	*58,036*
Blacklands (4)								
Bell	17,454	23,378	40,832	57%	450,923	233,430	144,185	2,690
Bosque	11,760	26,190	37,950	69%	562,851	136,770	46,538	1,592
Coryell	5,149	29,541	34,690	85%	493,087	164,982	68,258	1,050
Falls	17,479	50,515	67,994	74%	408,692	261,496	134,925	1,424
Hamilton	2,623	38,980	41,603	94%	449,671	125,290	47,635	1,064
Hill	29,808	24,210	54,018	45%	504,322	294,300	211,217	3,864
Johnson	6,754	36,847	43,601	85%	362,004	167,128	80,868	1,004
Lampasas (7)	1,353	12,022	13,375	90%	412,491	80,181	20,748	445
Limestone	4,142	28,637	32,779	87%	529,924	205,322	60,169	539
McLennan	21,722	39,330	61,052	64%	538,473	298,447	187,338	3,194
Milam	17,655	54,695	72,350	76%	576,809	246,893	127,795	2,631
Williamson	30,588	15,808	46,396	34%	583,009	304,568	217,331	3,810
Subtotal, Blacklands	*166,487*	*380,153*	*546,640*	70%	*5,872,256*	*2,518,807*	*1,347,007*	*23,307*
Southeast and Central (5S and 8N)								
Brazos	8,846	38,215	47,061	81%	308,814	116,660	48,579	14,001
Burleson	10,424	25,824	36,248	71%	388,982	131,265	66,466	17,415
Grimes	4,512	27,284	31,796	86%	414,887	131,142	40,017	2,659
Lee	4,270	809	5,079	16%	366,367	112,681	34,295	2,377
Robertson	11,513	63,218	74,731	85%	515,311	171,078	73,565	19,179
Washington	6,690	1,184	7,874	15%	354,813	151,429	54,740	1,041
Subtotal, Southeast and Central	*46,255*	*156,534*	*202,789*	77%	*2,349,174*	*814,255*	*317,662*	*56,672*
Region Totals	***349,186***	***1,089,182***	***1,438,368***	***76%***	***17,339,088***	***6,369,779***	***2,988,573***	***207,102***

Source: 2002 Census of Agriculture
http://www.nass.usda.gov/census/census02/volume1/tx/st48_2_002_002.pdf
http://www.nass.usda.gov/census/census02/volume1/tx/st48_2_008_008.pdf
http://www.nass.usda.gov/census/census02/volume1/tx/st48_2_010_010.pdf

Table F-2.
Livestock Numbers—2002 Census of Agriculture

Agricultural District	Cattle and Calves	Beef Cows	Dairy Cows	Swine	Sheep
Rolling Plains (2N and 2S)					
Fisher	29,352	NA	NA	361	468
Haskell	42,274	8,631	62	254	66
Jones	49,433	13,514	85	650	441
Kent	17,471	10,923	38	0	NA
Knox	68,576	9,086	19	0	0
Nolan	13,413	NA	NA	50	840
Stonewall	23,990	12,300	0	105	NA
Taylor	42,148	12,849	225	1,361	1,808
Subtotal, Rolling Plains	*286,657*	*67,303*	*429*	*2,781*	*3,623*
Cross Timbers (3)					
Callahan	49,922	NA	NA	160	898
Comanche	112,412	42,547	23,500	725	3,121
Eastland	63,653	35,644	810	186	849
Erath	163,698	35,452	66,680	464	3,363
Hood	30,059	NA	NA	123	606
Palo Pinto	39,615	21,450	558	257	830
Shackelford	33,814	14,456	89	111	NA
Somervell	6,876	3,954	12	17	489
Stephens	25,334	13,627	9	NA	361
Throckmorton	41,300	18,465	28	15	0
Young	57,530	20,796	150	304	227
Subtotal, Cross Timbers	*624,213*	*206,391*	*91,836*	*2,362*	*10,744*
Blacklands (4)					
Bell	51,149	NA	NA	1,957	3,465
Bosque	59,941	NA	NA	281	1,790
Coryell	73,347	30,728	0	913	4,779
Falls	115,092	NA	NA	101	707
Hamilton	63,734	25,812	8,241	92	11,768
Hill	63,681	34,604	2,906	578	1,830
Johnson	67,520	27,436	8,080	823	1,111
Lampasas (7)	37,090	19,597	347	155	8,434
Limestone	117,280	55,950	232	142	609
McLennan	98,194	39,858	3,505	944	2,649
Milam	113,853	65,822	74	489	1,122
Williamson	67,487	32,923	387	1,407	3,737
Subtotal, Blacklands	*928,368*	*332,730*	*23,772*	*7,882*	*42,001*
Southeast and Central (5S and 8N)					
Brazos	67,675	NA	NA	2,326	952
Burleson	86,731	NA	NA	577	508
Grimes	86,935	58,239	441	1,298	178
Lee	91,579	NA	NA	3,460	1,008
Robertson	112,588	67,016	610	565	161
Washington	108,245	52,989	1,018	574	559
Subtotal, Southeast and Central	*553,753*	*178,244*	*2,069*	*8,800*	*3,366*
Region Total	***2,392,991***	***784,668***	***118,106***	***21,825***	***59,734***
Source: 2002 Census of Agriculture http://www.nass.usda.gov/census/census02/volume1/tx/st48_2_001_001.pdf					

Table F-3.
Selected Crop Acreages—2002 Census of Agriculture

Agricultural District	*Grains*			*Cotton*	*Soybeans*	*All Hay & Silage*	*Peanuts*	*Total in County*
	Corn	*Sorghum*	*Wheat*					
Rolling Plains (2N and 2S)								
Fisher	0	5,160	10,252	72,194	0	12,534	0	100,140
Haskell	NA	9,845	107,486	95,227	0	12,779	6,078	231,415
Jones	0	13,945	83,859	84,671	0	21,453	178	204,106
Kent	0	455	4,723	2,171	0	5,141	NA	12,490
Knox	0	1,662	89,863	22,875	0	8,727	169	123,296
Nolan	0	4,963	5,247	49,668	0	9,704	0	69,582
Stonewall	0	NA	25,508	7,729	0	6,877	518	40,632
Taylor	NA	6,233	54,187	13,140	0	21,199	0	94,759
Subtotal, Rolling Plains	*0*	*42,263*	*381,125*	*347,675*	*0*	*98,414*	*6,943*	*876,420*
Cross Timbers (3)								
Callahan	NA	317	17,379	0	0	18,254	14	35,964
Comanche	364	1,966	3,772	0	0	63,564	4,530	74,196
Eastland	NA	369	3,434	NA	0	47,077	6,412	57,292
Erath	NA	724	1,818	0	NA	73,677	805	77,024
Hood	NA	100	380	0	0	23,327	NA	23,807
Palo Pinto	NA	108	1,446	0	NA	23,628	NA	25,182
Shackelford	0	397	14,602	1,741	0	7,222	0	23,962
Somervell	0	NA	0	0	0	6,045	3	6,048
Stephens	0	NA	7,590	0	0	6,896	0	14,486
Throckmorton	0	1,812	27,709	2,027	0	6,889	0	38,437
Young	14	649	12,446	1,010	0	21,073	0	35,192
Subtotal, Cross Timbers	*378*	*6,442*	*90,576*	*4,778*	*0*	*297,652*	*11,764*	*411,590*
Blacklands (4)								
Bell	67,421	18,363	17,372	747	613	36,015	NA	140,531
Bosque	1,003	1,215	3,475	0	NA	36,020	0	41,713
Coryell	6,180	7,371	13,315	NA	NA	29,008	0	55,874
Falls	74,311	10,723	8,454	NA	1,593	36,934	0	132,015
Hamilton	1,043	2,076	3,932	0	NA	27,574	0	34,625
Hill	44,251	43,529	48,118	15,387	312	48,822	0	200,419
Johnson	1,539	8,053	12,769	623	394	55,173	0	78,551
Lampasas (7)	NA	0	1,746	NA	0	15,633	NA	17,379
Limestone	11,786	870	1,037	1,467	0	43,801	0	58,961
McLennan	61,351	17,153	34,975	3,262	3,048	55,585	0	175,374
Milam	57,326	15,031	3,008	5,482	NA	46,106	NA	126,953
Williamson	124,507	30,333	11,194	9,506	0	40,530	30	216,100
Subtotal, Blacklands	*450,718*	*154,717*	*159,395*	*36,474*	*5,960*	*471,201*	*30*	*1,278,465*
Southeast and Central (5S and 8N)								
Brazos	4,928	2,288	NA	11,536	NA	26,588	0	45,340
Burleson	14,273	7,741	1,582	7,739	3,719	32,640	NA	67,694
Grimes	NA	NA	NA	NA	0	35,695	0	35,695
Lee	2,129	357	223	NA	NA	29,775	638	33,122
Robertson	7,018	2,385	166	14,979	NA	47,421	NA	71,969
Washington	1,602	670	NA	NA	0	49,724	NA	51,996
Subtotal, Southeast and Central	*29,950*	*13,441*	*1,971*	*34,254*	*3,719*	*221,843*	*638*	*305,816*
Region Total	***295,291***	***312,068***	***703,385***	***461,376***	***13,757***	***1,006,915***	***53,900***	***2,846,692***
Source: 2002 Census of Agriculture, http://www.nass.usda.gov/census/census02/volume1/tx/st48_2_023_023.pdf								

Table F-4.
Summary of Irrigation Surveys

Agricultural District	*Irrigated Acreage*		
	1994 TWDB Survey	*1997 US Agricultural Census*	*2002 US Agricultural Census*
Rolling Plains (2N and 2S)			
Fisher	1,785	1,838	3,284
Haskell	30,402	34,313	30,894
Jones	8,975	5,431	3,701
Kent	1,133	905	1,300
Knox	35,500	28,347	23,033
Nolan	2,562	2,581	2,987
Stonewall	647	605	1,454
Taylor	1,130	317	2,434
Subtotal, Rolling Plains	*82,134*	*74,337*	*69,087*
Cross Timbers (3)			
Callahan	1,355	761	1,331
Comanche	42,411	44,972	21,283
Eastland	13,280	13,280	14,594
Erath	14,155	15,094	14,505
Hood	3,919	4,064	3,433
Palo Pinto	537	371	1,902
Shackelford	299	212	550
Somervell	810	474	129
Stephens	870	393	195
Throckmorton	0	0	* 0
Young	0	0	114
Subtotal, Cross Timbers	*77,636*	*79,621*	*58,036*
Blacklands (4)			
Bell	1,212	956	2,690
Bosque	2,136	1,999	1,592
Coryell	330	363	1,050
Falls	5,057	4,763	1,424
Hamilton	775	1,092	1,064
Hill	283	259	3,864
Johnson	0	0	1,004
Lampasas (7)	243	380	445
Limestone	0	0	539
McLennan	1,180	2,613	3,194
Milam	799	638	2,631
Williamson	0	0	3,810
Subtotal, Blacklands	*12,015*	*13,063*	*23,307*
Southeast and Central (5S and 8N)			
Brazos	10,250	8,542	14,001
Burleson	13,512	8,410	17,415
Grimes	277	431	2,659
Lee	703	565	2,377
Robertson	17,381	17,381	19,179
Washington	188	92	1,041
Subtotal, Southeast and Central	*42,311*	*35,421*	*56,672*
Region Total	***214,096***	***202,442***	***207,102***

Source of 2002 data: http://www.usda.gov/nass/census/census02/volume1/tx/st48_2_010_010.pdf
* Withheld to avoid disclosing data for individual farms

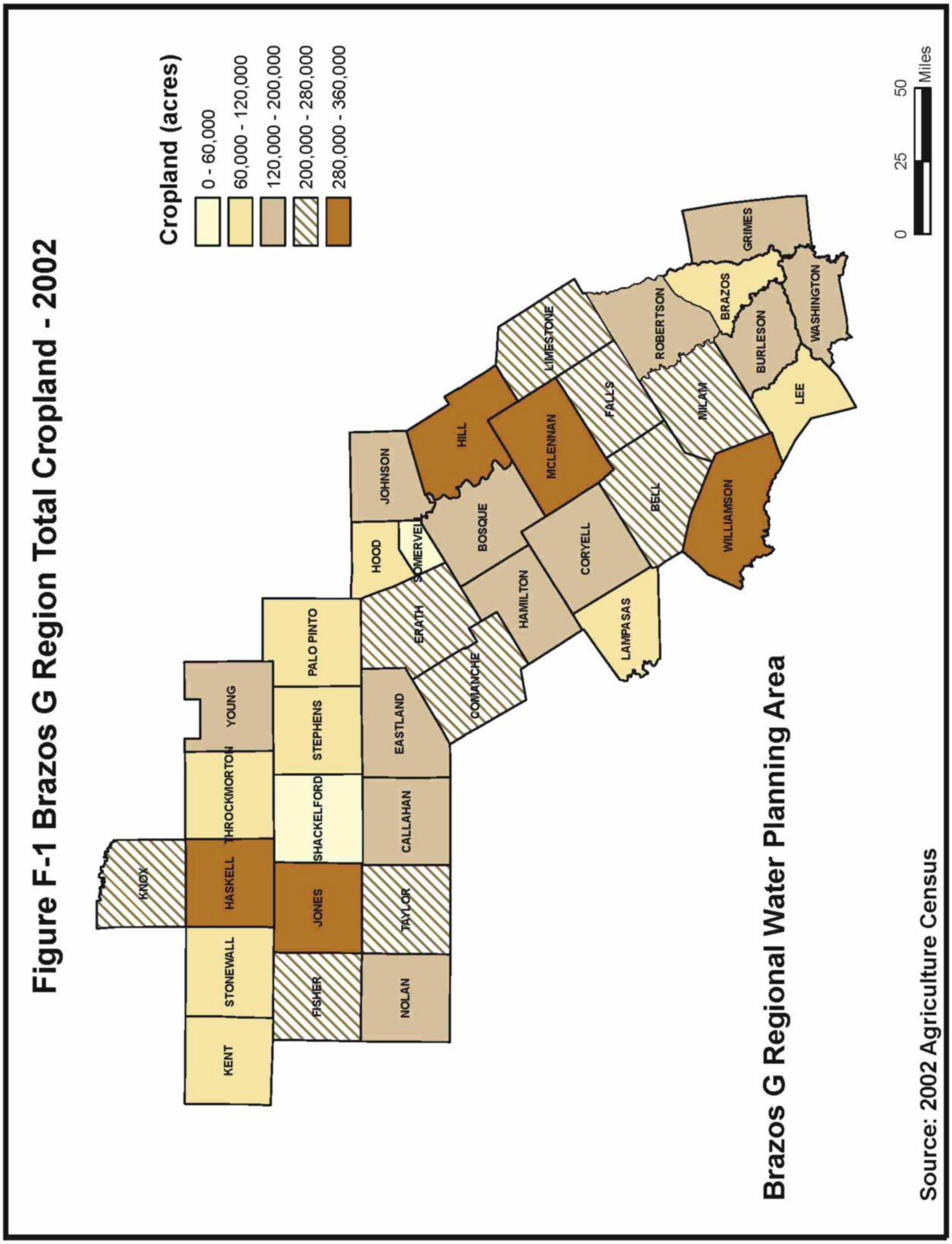


Figure F-1 Brazos G Region Total Cropland - 2002

Source: 2002 Agriculture Census

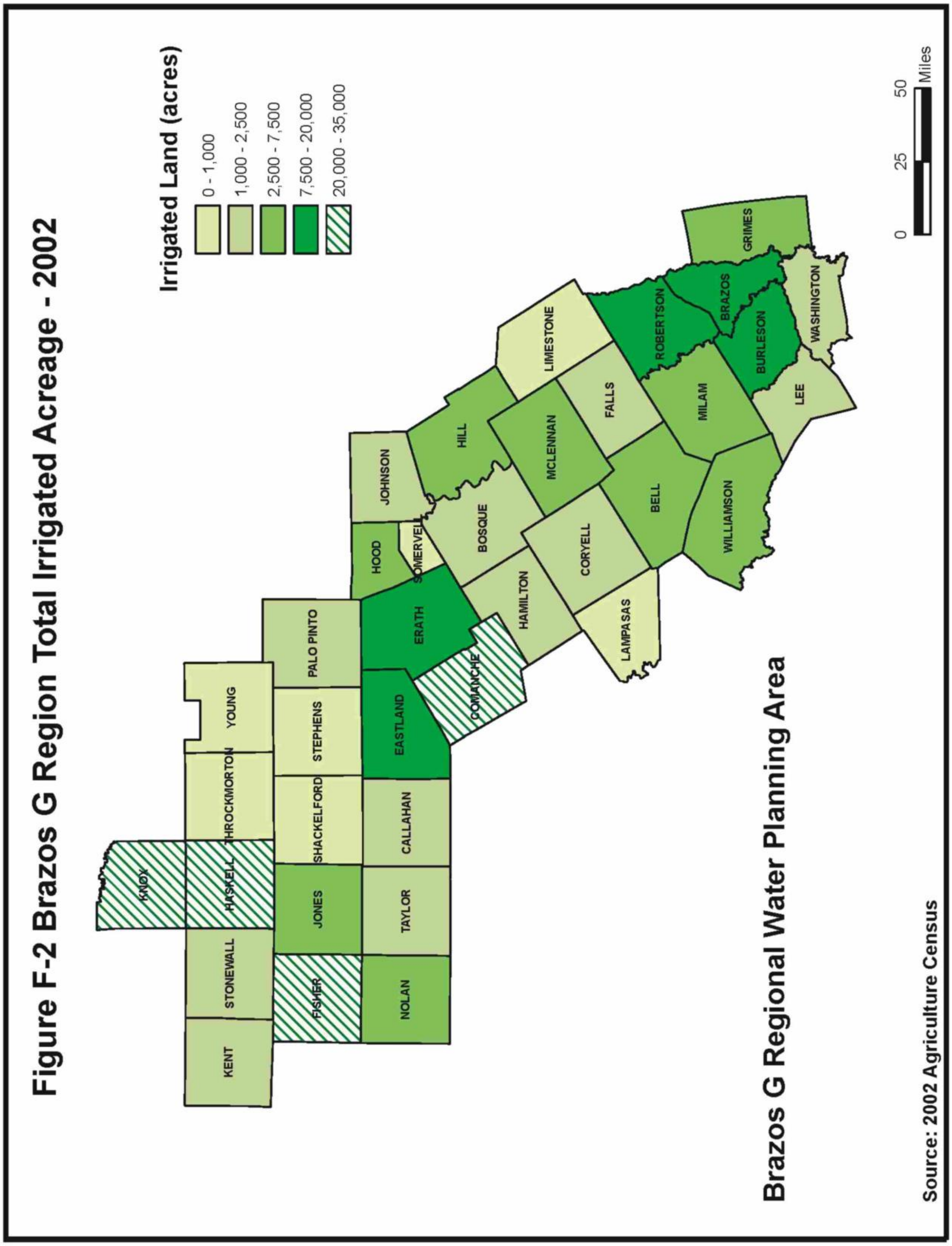


Figure F-2 Brazos G Region Total Irrigated Acreage - 2002

Source: 2002 Agriculture Census

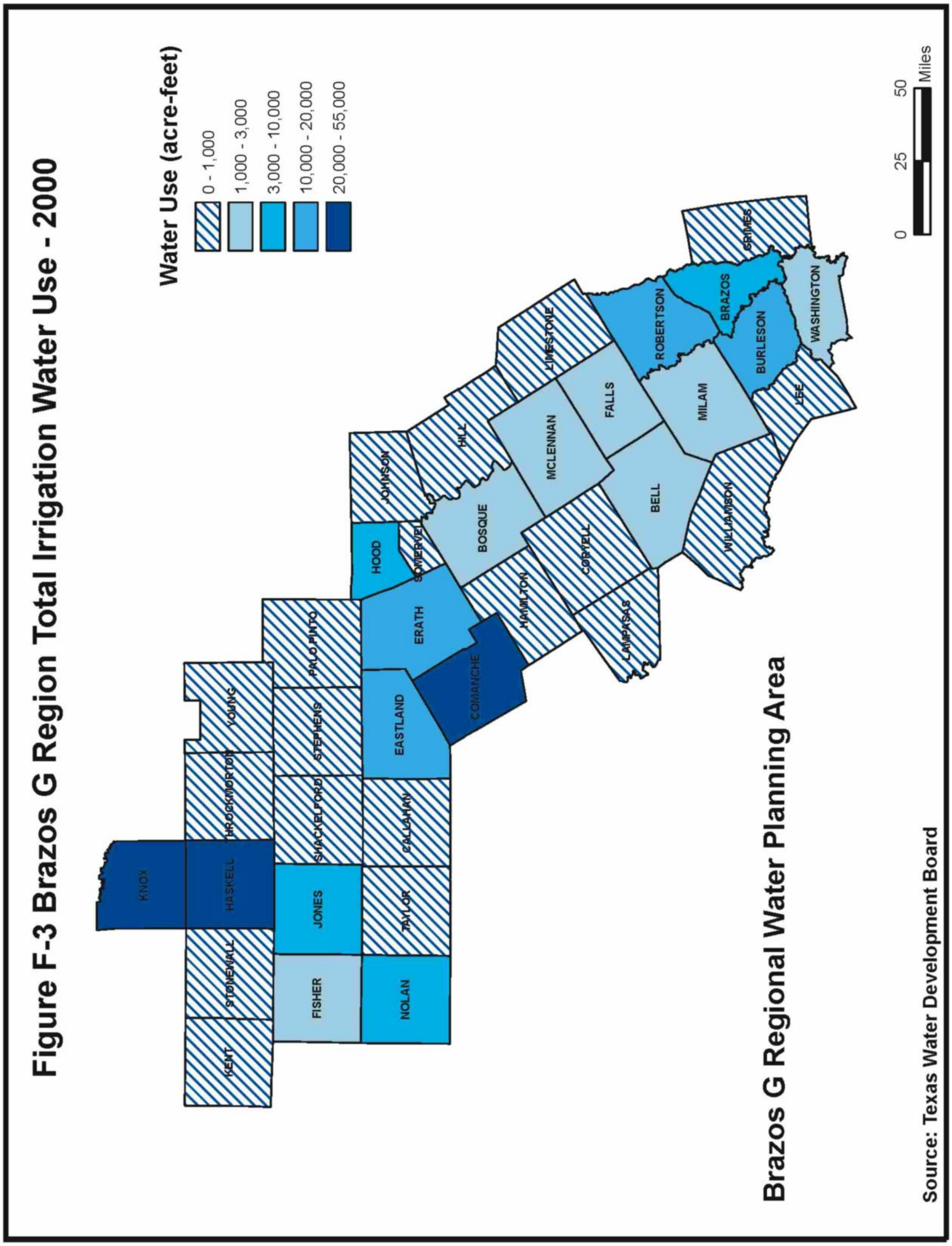


Figure F-3 Brazos G Region Total Irrigation Water Use - 2000
Water Use (acre-feet)
0 - 1,000
1,000 - 3,000
3,000 - 10,000
10,000 - 20,000
20,000 - 55,000
KENT
STONEWALL
KNOX
HASKELL
THROCKMORTON
YOUNG
FISHER
JONES
SHACKELFORD
STEPHENS
PALO PINTO
NOLAN
TAYLOR
CALLAHAN
EASTLAND
ERATH
HOOD
COMANCHE
SOMERVELL
JOHNSON
HAMILTON
BOSQUE
HILL
CORYELL
LAMPASAS
MCLENNAN
LIMESTONE
BELL
FALLS
WILLIAMSON
MILAM
ROBERTSON
LEE
BURLESON
BRAZOS
WASHINGTON
GRIMES
0
25
50
Miles
Brazos G Regional Water Planning Area
Source: Texas Water Development Board

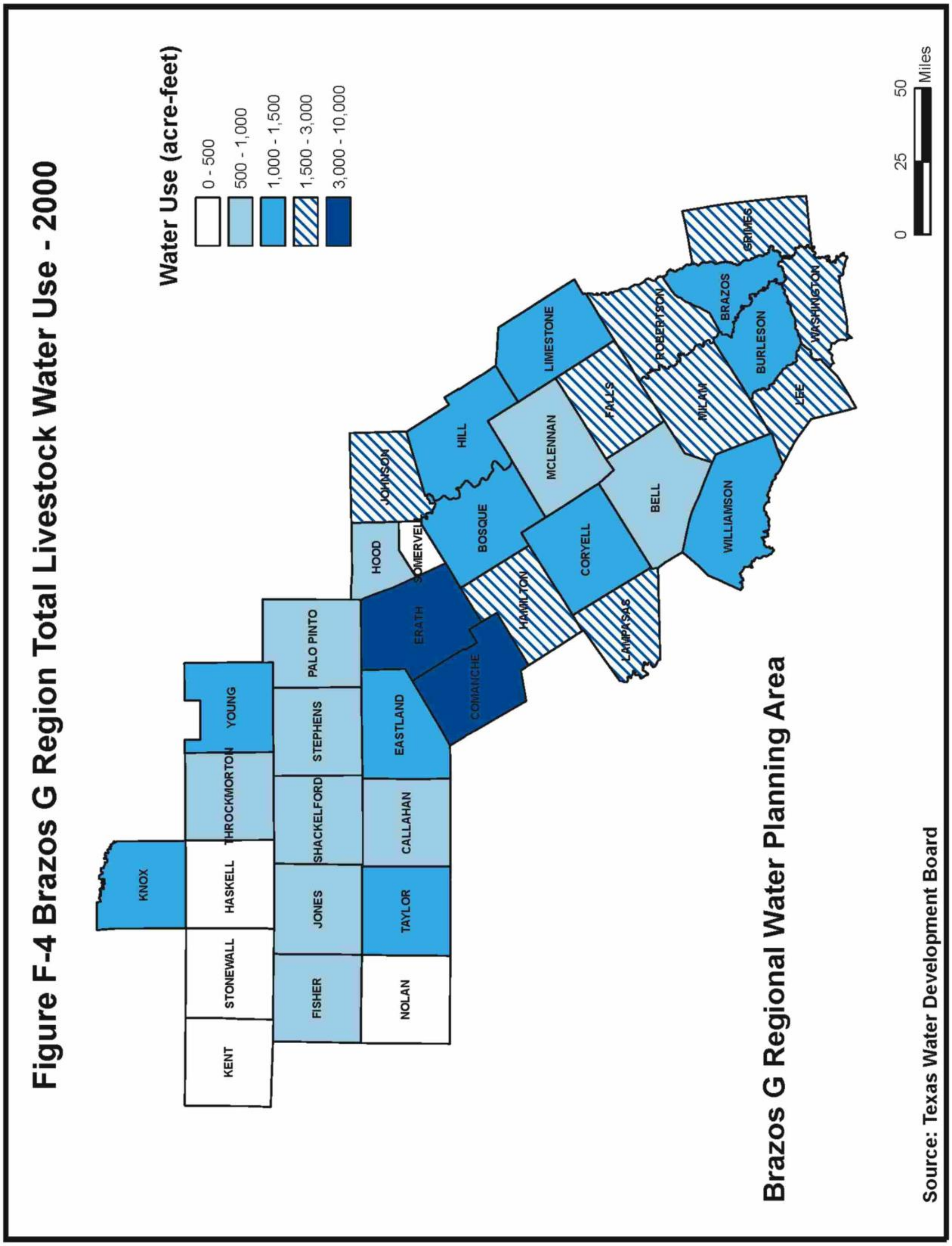


Figure F-4 Brazos G Region Total Livestock Water Use - 2000

Appendix G
Surface Water Supplies

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
1015	6	1		BETTY JUNE PASCHAL	45	Irrigation	11/4/1969		
1030	6	1		ALVA C ALEXANDER	17	Irrigation	1/1/1964		
1051	6	1		DOUGLAS R STEVENS	4	Irrigation	1/1/1966		
1052	6	1		CAROLYN MAY BROWN	22	Irrigation	1/1/1963		
1053	6	1		JANET BURNS	110	Irrigation	1/1/1962		
1054	6	1		MARY L MARKS	26	Irrigation	1/1/1961		
1061	6	1		GARLAND H RICHARDS	549	Irrigation	9/2/1969		713
1103	6	1		BETTY SMITH WESSELS	50	Irrigation	6/20/1961		
1104	6	1		DAVID SMITH	25	Irrigation	4/1/1963		
1105	6	1		JAMES E SMITH JR	69	Irrigation	4/1/1963		
1106	6	1		LLOYD H GILES	5	Irrigation	1/1/1967		
1107	6	1		DALE K PRICE ET UX	30	Irrigation	5/1/1963		
1660	6	1		CITY OF CLYDE	1000	Municipal	2/2/1965	LAKE CLYDE	5748
1660	6	2		CITY OF CLYDE		Recreation	2/2/1965	LAKE CLYDE	
1661	6	1		L G CHRANE	26	Irrigation	5/15/1967		29
1662	6	1		L G CHRANE	35	Irrigation	5/15/1967		35
1663	6	1		LINDA JO PARKER	36	Irrigation	5/15/1967		36
1664	6	1		ROSALEA C BONNER ET AL	164	Irrigation	10/13/1969		200
1666	6	1		J H SMART	65	Irrigation	2/24/1969	LITTLE PECAN	76
1667	6	1		JOHN D MONTGOMERY	120	Irrigation	7/29/1974		124
1672	6	1		EDWIN M EDWARDS ET UX		Domestic/Livestock	1/26/1970		93
1673	6	1		ESTATE OF CLAUD JOY	22	Irrigation	1/1/1966		
1674	6	1		PAULINE COATS LAWSON	88	Irrigation	9/9/1968		88
1675	6	1		YVONNE PEEVEY & E GALLIVAN	2	Irrigation	1/1/1963		
1676	6	1		ESTATE OF DAN L CHILDRESS ET AL	45	Irrigation	3/16/1964		45
1677	6	1		CHAD CUNNINGHAM ET UX	90	Irrigation	5/13/1963		111
1678	6	1		WELDON J LAMB ET AL	134	Irrigation	12/9/1963		183
1679	6	1		DOROTHY W WHITTINGTON	40	Irrigation	3/24/1969		132
1680	6	1		COLLIS EAGER	40	Irrigation	3/24/1969		132
1681	6	1		MATACORP LTD A TEXAS LP	40	Irrigation	3/24/1969		132
1682	6	1		G V CUNNINGHAM	30	Irrigation	2/10/1971		185
1683	6	1		OLIVER D WORTHY	65	Irrigation	2/10/1971		185
1684	6	1		RAYMOND A DEBUSK	7	Irrigation	1/1/1966		
1689	6	1		LAKEWOOD RECREATIONAL CENTER	22	Irrigation	8/9/1965		150
1694	6	1		J W VINSON		Domestic/Livestock	2/21/1966		12
1695	6	1		R & N CATTLE CO	34.235	Irrigation	2/2/1970		
1695	6	2		BELIA I LOYOLA	145.765	Irrigation	2/2/1970		180
1696	6	1		GERALD N REID	49	Irrigation	3/1/1947		
1697	6	1		TOMMY JOE & HELEN R ABBOTT	5	Irrigation	11/22/1918		450
1697	6	2		TOMMY JOE & HELEN R ABBOTT	7	Irrigation	6/20/1961		
1697	6	3		TOMMY JOE & HELEN R ABBOTT	48	Industrial	6/20/1961		
1763	6	1		ERWIN T BAUCUM TRUSTEE	2.7	Irrigation	11/22/1918		
1763	6	2		ERWIN T BAUCUM TRUSTEE	3.5	Irrigation	6/20/1961		
1764	6	1		I H STEED TRUSTEE	26.9	Irrigation	11/22/1918		
1764	6	2		I H STEED TRUSTEE	34.5	Irrigation	6/20/1961		
2201	6	1		A B COPELAND JR	197	Irrigation	3/18/1968		
2202	6	1		JAMES F EVERETT		Domestic/Livestock	8/21/1972		252
2203	6	1		LARRY R JONES		Domestic/Livestock	8/21/1972		252

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2204	6	1		JERRY J RANKIN ET AL		Domestic/Livestock	8/21/1972		252
2205	6	1		JACK BERRY	150	Irrigation	12/21/1970		307
2206	6	1		RONNIE DUANE BRANCH ET UX	60	Irrigation	1/3/1972		185
2207	6	1		ELVIS RAY STONE SR ET AL	23	Irrigation	1/3/1972		185
2208	6	1		B R FANNING	40	Irrigation	7/6/1971		121
2208	6	2		JOHN MOCEK ET UX	20	Irrigation	7/6/1971		
2209	6	1		H B LANE	3	Irrigation	9/12/1977		7
2210	6	1		RAYMOND L JARRATT	92	Irrigation	4/1/1953		
2211	6	1		J T HICKS	85	Irrigation	1/24/1977		147
2212	6	1		BRUCE S TERRILL		Domestic/Livestock	8/21/1972		200
2213	6	1		WILBURN L GAINES		Domestic/Livestock	8/21/1972		200
2214	6	1		G K LEWALLEN		Domestic/Livestock	8/21/1972		200
2215	6	1		GREAT SOUTHERN RANCH INC	54	Irrigation	2/26/1968		160
2216	6	1		CRAIG W RAY	54	Irrigation	2/26/1968		160
2217	6	1		O H FRAZIER & M B CASEY		Domestic/Livestock	2/5/1973		240
2218	6	1		SAMUEL M FRAZIER ET AL		Domestic/Livestock	7/10/1978		240
2219	6	1		JAMES F JOHNSON ET UX	13	Irrigation	12/31/1964		
2220	6	1		HAROLD PACK	12	Irrigation	5/31/1963		
2221	6	1		KENNETH & BETTY YVON LESLEY	18	Irrigation	12/31/1962		
2221	6	2		KENNETH & BETTY YVON LESLEY	82	Irrigation	11/4/1999		
2222	6	1		HARM & ZWAANTINA TE VELDE TRST	110	Irrigation	10/31/1962		
2223	6	1		JEFF BUSBY		Irrigation	8/15/1977		
2224	6	1		VALERIE JANE HICKIE		Domestic/Livestock	3/11/1974		280
2225	6	1		TY MURRAY	34	Irrigation	6/30/1966		
2226	6	1		T T FAIR ET UX	61	Irrigation	7/31/1960		
2227	6	1		CHARLIE S EVERETT & WIFE	60	Irrigation	11/18/1965		
2228	6	1		ERMA GAYNELLE RICHARDSON	60	Irrigation	2/26/1968		272
2229	6	1		W T CRUMLEY ET UX	44	Irrigation	5/31/1953		
2230	6	1		TY MURRAY	76	Irrigation	10/24/1966		200
2231	6	1		ESTATE OF C C WINTERS	42	Irrigation	10/24/1966		200
2232	6	1		CHARLES A & ROBERT S ELLIOTT	16	Irrigation	3/25/1968		172
2233	6	1		J W OGLE ET AL	18	Irrigation	7/31/1957		
2234	6	1		BRUCE E TODD	125	Irrigation	12/31/1963		
2235	6	1		7 M RANCH TRUST	8	Irrigation	4/30/1963		
2236	6	1		BRUCE E TODD	24	Irrigation	12/31/1961		
2237	6	1		MAX L GORDON & ELOISE GORDON	90	Irrigation	6/4/1958		181
2238	6	1		JON DAVID MAYFIELD TRUST	106.02	Irrigation	7/31/1955		60
2238	6	2		LYNDA KIKER MAYFIELD	89.98	Irrigation	7/31/1955		
2239	6	1		A H LINNE	32	Irrigation	6/27/1955		164
2240	6	1		A DWAIN MAYFIELD ET AL	137	Irrigation	10/13/1970		137
2241	6	1		WAYNE PITTMAN ET AL	33	Irrigation	12/22/1969		148
2242	6	1		MRS W K RICHARDSON	40	Irrigation	12/22/1969		148
2243	6	1		BETTY E ROBBINS ET AL	90	Irrigation	9/8/1958		188
2244	6	1		DONALD MCLEAN	27	Irrigation	2/2/1965		54
2245	6	1		DORIS S HEIZER	20	Irrigation	2/2/1965		54
2246	6	1		DON MITCHELL ET AL	152	Irrigation	3/30/1966		199
2247	6	1		BAR-TO-LO CORPORATION	35	Irrigation	4/8/1968		179
2247	6	2		BAR-TO-LO CORPORATION	50	Irrigation	7/13/1995		27

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2248	6	1		ALWINA LUINE HEIZER HANCOCK	62	Irrigation	9/30/1957		179
2249	6	1		THOMAS H & DOLORES C BENSON	19	Irrigation	4/8/1968		179
2250	6	1		JAMES ALLEN SHADDEN	4	Irrigation	7/31/1967		
2251	6	1		TOMMY W TRIMBLE JR	28	Irrigation	7/18/1963		
2252	6	1		J B PUTTY TRUSTEE	30	Irrigation	12/31/1963		
2253	6	1		J P CATTLE COMPANY		Domestic/Livestock	7/30/1973		270
2254	6	1		W E PUTTY	65	Irrigation	12/31/1955		
2255	6	1		WAYNE V DUNCAN ET UX	47.65	Irrigation	12/31/1962		
2255	6	2		ROBERT L BOYKIN ET AL	26.83	Irrigation	12/31/1962		
2255	6	3		GARY W DUNCAN ET AL	84.52	Irrigation	12/31/1962		
2258	6	1		ROBERT E SPOLEC ET UX	32	Irrigation	12/31/1966		
2259	6	1		F MELVIN JOHNSON	112	Irrigation	12/31/1965		
2260	6	1		F MELVIN & HELENE JOHNSON	56	Irrigation	7/31/1950		
2261	6	1		CECIL PARKS	8	Irrigation	12/31/1967		
2262	6	1		VERNON CLARK BEAIRD	30	Irrigation	12/31/1967		
2263	6	1		WILLIAM VAN ZANDT SLOAN & WIFE	65	Irrigation	12/31/1959		
2264	6	1		WILLIAM VAN ZANDT SLOAN & WIFE	45	Irrigation	12/31/1955		
2265	6	1		DEREL FILLINGIM	268	Irrigation	12/31/1955		
2266	6	1		KARL T BUTZ JR	18	Irrigation	12/31/1966		
2267	6	1		RONNIE W PARTAIN	0.2572	Irrigation	12/31/1947		
2267	6	2		MARGO JOY PARTAIN BATTERSHELL	0.7428	Irrigation	12/31/1947		
2268	6	1		BARRY L POLK ET UX	11	Irrigation	12/31/1963		
2269	6	1		MICHAEL J LOTT ET UX	4	Irrigation	12/31/1966		
2270	6	1		J N BURNS	24	Irrigation	5/31/1967		26
2271	6	1		ALBERT N PIKE	15	Irrigation	12/31/1950		
2271	6	2		EUGENIA PIKE GOODMAN		Irrigation	12/31/1950		
2272	6	1		KKW2 LTD	42	Irrigation	12/31/1966		
2273	6	1		W F LONG	98	Irrigation	11/6/1979	UPPER HOUSE, HOUSE & SHIPMAI	528
2276	6	1		LOUIS A BEECHERL JR	90	Irrigation	12/31/1954	10 RESERVOIRS	3399
2276	6	2		LOUIS A BEECHERL JR	81	Irrigation	10/20/1969	10 RESERVOIRS	
2276	6	3		LOUIS A BEECHERL JR	155	Irrigation	10/20/1969	10 RESERVOIRS	
2277	6	1		THOMAS G PETERS ET UX	10	Irrigation	12/31/1951		
2278	6	1		WILLIAM E GIPSON	114	Irrigation	12/31/1966		
2279	6	1		JOHN DAVID BELL ET UX	9	Irrigation	12/31/1967		
2280	6	1		JOHN DAVID BELL ET UX	69	Irrigation	7/31/1955		
2281	6	1		RAY J MILLER	7	Irrigation	4/30/1960		
2282	6	1		LESTER M ALBERTHAL JR	253	Irrigation	12/31/1958		
2283	6	1		MARGARET D WHITE	8	Irrigation	12/31/1964		
2284	6	1		L C HOWARD JR ET UX	25	Irrigation	12/31/1939		
2284	6	2		E R HOWARD ET UX		Irrigation	12/31/1939		
2285	6	1		LEONARD C RADDE	35	Irrigation	12/31/1949		
2287	6	1		BILLY G AND IRIS S HODGES	7	Irrigation	12/31/1965		13
2288	6	1		SHANNON LAIRD HODGES ET AL	3.5	Irrigation	12/31/1965		
2289	6	1		TEXAS PARKS & WILDLIFE DEPT		Recreation	9/22/1969		360
2290	6	1		J L JENSON	16.1	Irrigation	12/31/1956		
2290	6	2		LINNIE B CROSLEY ET VIR	28.9	Irrigation	12/31/1956		
2291	6	1		CITY OF CLIFTON	600	Municipal	3/14/1963	EXEMPT	100
2291	6	2		CITY OF CLIFTON	7	Irrigation	12/31/1963		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2292	6	1		W O GLOFF	261	Irrigation	12/31/1949		
2293	6	1		PATRICK H WILSON ET UX	7	Irrigation	12/31/1905		
2294	6	1		RD JL & ML LUNDBERG	80	Irrigation	6/30/1946		
2295	6	1		REGINALD & NALLIE LINDBERG	49	Irrigation	6/30/1953		
2298	6	1		CHARLES E STEVENS	104	Irrigation	4/5/1965		
2299	6	1		D I BULLION	22	Irrigation	12/31/1960		
2300	6	1		WILLIAM J HIX ET AL	100	Irrigation	12/31/1967		
2301	6	1		ABIGAIL HALBERT KAMM	70	Irrigation	5/31/1958		
2302	6	1		STEVEN K CAPERTON ET UX	122	Irrigation	12/31/1966		
2303	6	1		THEODORE A NUGENT ET UX	30	Irrigation	6/30/1955		
2304	6	1		HUGH WHITFIELD DAVIS	3.132	Irrigation	6/30/1955		
2304	6	2		THEODORE A NUGENT ET UX	43.868	Irrigation	6/30/1955		
2305	6	1		TALBERT FARMS LLC	40	Irrigation	7/31/1963		
2306	6	1		LYNDA GAIL BRITTON POWERS	5	Irrigation	12/31/1899		
2307	6	1		SAMUEL N & TESSIE B CARROLL	23	Irrigation	12/31/1963		
2308	6	1		IRA H WESTERFIELD	10	Irrigation	7/31/1966		
2309	6	1		JERRY AND JOY CLEMMONS	10	Irrigation	12/31/1967		
2310	6	1		JIM HERING	16	Irrigation	12/31/1946		18
2311	6	1		W T HIX		Domestic/Livestock	5/16/1977		740
2312	6	1		ROBERT HALL	162	Irrigation	12/31/1950		55
2313	6	1		IRA H WESTERFIELD	14	Irrigation	7/31/1985		5
2314	6	1		RAINBOW LAKE INC		Recreation	12/31/1930		105
2315	6	1		CITY OF WACO	39100	Municipal	1/10/1929	LAKE WACO	104100
2315	6	2		CITY OF WACO		Industrial	1/10/1929	LAKE WACO	
2315	6	3		CITY OF WACO	19100	Municipal	4/16/1958	LAKE WACO	
2315	6	4		CITY OF WACO		Industrial	4/16/1958	LAKE WACO	
2315	6	5		CITY OF WACO	900	Irrigation	2/21/1979	LAKE WACO	
2315	6	6		CITY OF WACO	16802	Industrial	1/10/1929	LAKE WACO	
2316	6	1		C L SLIGH FARMS	193	Irrigation	10/30/1925		
2317	6	1		CHARLOTTE B JOHNSON ET AL	248	Irrigation	11/20/1918		
2318	6	1		FRANK W SIPAN ET AL	35	Irrigation	12/31/1957		
2579	6	1		JAMES GENE PLENTL ET UX	7.1	Irrigation	12/31/1942		
2579	6	2		JAMES LEE RICE ET UX	15.9	Irrigation	12/31/1942		
2580	6	1		JAMES I HARDY ET UX	8.73	Irrigation	12/31/1930		
2580	6	2		LESLIE HARDY	33.98	Irrigation	12/31/1930		
2580	6	3		JANICE MILES	30.29	Irrigation	12/31/1930		
2581	6	1		BONNIE TERRY	24.95	Irrigation	12/31/1930		
2581	6	2		ROBERT E TERRY	47.51	Irrigation	12/31/1930		
2581	6	3		FLOYD G SELF JR ET UX	47.56	Irrigation	12/31/1930		
2581	6	4		DANNY LEE TERRY	23.98	Irrigation	12/31/1930		
2585	6	1		LAZY H INC	119	Irrigation	12/31/1959		
2586	6	1		W A SPIVEY	86	Irrigation	12/31/1955		
2587	6	1		LESTER GIBSON AND FOY GIBSON	83	Irrigation	2/28/1955		
2588	6	1		FOY GIBSON	15	Irrigation	12/31/1911		
2589	6	1		LESTER GIBSON	26	Irrigation	12/31/1911		
2590	6	1		LESTER GIBSON AND FOY GIBSON	66	Irrigation	12/31/1911		
2592	6	1		LESTER GIBSON AND FOY GIBSON	94	Irrigation	12/31/1911		
2594	6	1		MORRIS L ELLIS ET UX	122	Irrigation	12/31/1911		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2596	6	1		VICKIE R MARLEY MCDANIEL ET AL	6	Irrigation	12/31/1966		
2597	6	1		PHILLIP L MORRIS	4.9	Irrigation	3/31/1964		
2597	6	2		LOLA E MORRIS	2.1	Irrigation	3/31/1964		
2599	6	1		STANLEY MERLIN MCANELLY	96	Irrigation	12/31/1930		
2600	6	1		ELSIE MILLICAN ET AL	203	Irrigation	12/31/1954		
2605	6	1		VICKI LEE WILLIAMS BROWN	65	Irrigation	12/31/1965		
2813	6	1		RUDOLPH CARL DROSCHE JR	153	Irrigation	7/22/1965		
2814	6	1		GRACE OLENA ADAMS	0	Storage	12/31/1953		3
2814	6	2		LARRY WAYNE ADAMS	118.6	Irrigation	12/31/1953		
2814	6	3		LARRY WAYNE ADAMS	83	Irrigation	12/31/1953		
2814	6	4		CHARLIE THOMAS	170	Irrigation	12/31/1953		
2815	6	1		NANCY PAGE ALLEN ET VIR	69	Irrigation	12/31/1968		
2816	6	1		JOE B COOPER III ET UX	36	Irrigation	12/31/1968		
2818	6	1		P D GUNTER	18	Irrigation	8/31/1950		
2819	6	1		J B GUNTER	32	Irrigation	8/31/1950		
2820	6	1		WILLIAM R & CAROLINE MILLER	46	Irrigation	12/31/1966		
2821	6	1		JUANITA M ANDERS ET VIR	29	Irrigation	12/31/1965		
2822	6	1		MCMINN RANCHES LTD	106	Irrigation	12/31/1965		
2823	6	1		J E TATUM	22	Irrigation	12/31/1957		
2824	6	1		MAX DERDEN	39.42	Irrigation	12/31/1963		
2824	6	2		CHARLES S THOMAS ET UX	50.58	Irrigation	12/31/1963		
2825	6	1		MONTE CARMICHAEL ET AL	80	Irrigation	3/31/1967		
2826	6	1		BURK DENMAN	46	Irrigation	7/31/1966		
2827	6	1		J A DENMAN	6	Irrigation	12/31/1957		
2828	6	1		J A DENMAN	24	Irrigation	12/31/1957		
2829	6	1		MARTIN L GEYE ET AL	56	Irrigation	3/31/1960		
2830	6	1		O J BLAKEY	87	Irrigation	8/31/1954		
2830	6	2		DON GROMATZKY	30	Irrigation	8/31/1954		
2831	6	1		GARY CROW	57	Irrigation	12/31/1960		
2832	6	1		ANN WEAVER ADAIR	47	Irrigation	12/31/1966		
2833	6	1		JOANNA HOFER	24	Irrigation	7/31/1966		
2834	6	1		WILLIE EYVONNE MANNING RAY	43	Irrigation	12/31/1961		
2835	6	1		WILLIAM MILTON NORTH	293.62	Irrigation	5/31/1958		
2836	6	1		NELSON SHAVE	87	Irrigation	12/31/1967		
2837	6	1		WADE N CARAWAY	135.92	Irrigation	5/31/1958		
2837	6	2		WADE N CARAWAY	47.46	Irrigation	5/31/1967		
2838	6	1		ED A ROSS ET AL	37	Irrigation	12/31/1961		
2839	6	1		ED A ROSS ET AL	40	Irrigation	12/31/1961		
2840	6	1		ED A ROSS ET AL		Storage	11/6/1978		13
2841	6	1		WALTER E & JOYCE SWINDLE	26.7	Irrigation	8/31/1965		
2842	6	1		BILLY JACK & PATSY TYUS	4.3	Irrigation	8/31/1965		
2843	6	1		WINDY HILL RANCH LTD	29	Irrigation	1/30/1967		59
2844	6	1		WINDY HILL RANCH LTD	29	Irrigation	1/30/1967		
2845	6	1		WINDY HILL RANCH LTD	27.5	Irrigation	6/10/1968		55
2846	6	1		GUY G HALL	27.5	Irrigation	6/10/1968		
2846	6	2		GUY G HALL	10.5	Irrigation	6/14/1971		
2847	6	1		G G HALL	13	Irrigation	12/31/1966		2.6
2848	6	1		M D STEPHEN	31.5	Irrigation	4/5/1971		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2849	6	1		J & J DAIRY	28.93	Irrigation	4/5/1971		
2849	6	2		BYRON JONES ET AL	2.57	Irrigation	4/5/1971		
2850	6	1		J A HULSEY	29	Irrigation	12/31/1966		
2851	6	1		J W BARBEE	72	Irrigation	12/31/1945		164
2851	6	2		J W BARBEE	87	Irrigation	8/1/1966		
2852	6	1		DEAN H BOTTLINGER ET UX	149	Irrigation	12/31/1964		
2853	6	1		GAYLON D & CLARA JONES	52	Irrigation	12/31/1957		
2854	6	1		ROY L NEWSOM	25.2	Irrigation	12/31/1963		
2854	6	2		VERNON N NEWSOM		Irrigation	12/31/1963		
2854	6	3		CLETA J (MILLER) STAPP	18.8	Irrigation	12/31/1963		
2855	6	1		CHARLES S THOMAS ET UX	91	Irrigation	12/31/1946		
2856	6	1		JACK D GRAHAM	1	Irrigation	12/31/1954		
2857	6	1		J L ROBERSON JR ET AL	47.723	Irrigation	12/31/1955		
2857	6	2		J RALPH LEE	105.277	Irrigation	12/31/1955		
2858	6	1		J RALPH LEE ET UX	18	Irrigation	12/31/1967		
2859	6	1		LARRY A DUNN ET UX	98	Irrigation	12/31/1965		
2860	6	1		EARL KAVANAUGH	15	Irrigation	12/31/1936		
2860	6	2		ORENA KAVANAUGH		Irrigation	12/31/1936		
2860	6	3		MAURINE K WATTS		Irrigation	12/31/1936		
2861	6	1		ACY L WATSON	1	Irrigation	12/31/1967		5
2862	6	1		MEL ANDERS ET UX	15	Irrigation	10/31/1955		
2863	6	1		RIVERSIDE RANCH LP	43	Irrigation	12/31/1961		
2864	6	1		K A SPARKS ET AL	185	Irrigation	12/31/1934		
2865	6	1		RIVERSIDE RANCH LP	169	Irrigation	12/31/1934		
2866	6	1		RIVERSIDE RANCH LP	82	Irrigation	12/31/1939		
2867	6	1		KIRBY JACK WARREN ET AL	4	Irrigation	12/31/1889		
2868	6	1		ARVORD M ABERNETHY	50	Irrigation	12/31/1908		
2869	6	1		BETTY JEAN HARRIS TOOLEY	105	Irrigation	12/31/1962		
2870	6	1		CITY OF HAMILTON	614	Municipal	1/22/1923		614
2871	6	1		TRUST FOR SETH THOMAS MOORE JR	72	Irrigation	12/31/1944		15
2872	6	1		TRUST FOR SETH THOMAS MOORE JR	2.5	Industrial	12/31/1944	3 RESERVOIRS	15
2873	6	1		R F MANNING	20	Irrigation	12/31/1964		
2874	6	1		PAULA MEADE KUNETKA ET AL	85	Irrigation	12/31/1954		75
2875	6	1		LEONARD T WARLICK ET UX	54	Irrigation	12/31/1958		75
2876	6	1		CHARLES CRAIG JR	15	Irrigation	12/31/1963		
2877	6	1		JOHNNY O HARPER ET UX	126.54	Irrigation	12/31/1954		
2877	6	2		JAMES CHESEBROUGH ET UX	14.03	Irrigation	12/31/1954		
2877	6	3		JOSEPH H MCGOWEN ET UX	9.43	Irrigation	12/31/1954		
2878	6	1		O C & WILLIE NADINE MARSHALL	37	Irrigation	12/31/1957		
2879	6	1		PAUL F MCCLINTON	46	Irrigation	12/31/1960		12
2879	6	2		PAUL F MCCLINTON	93	Irrigation	12/31/1960		
2880	6	1		TEXAS STARDANCE HOLDINGS LP	19	Irrigation	12/31/1945		
2881	6	1		MOODY E COURTNEY	124	Irrigation	12/31/1963		
2882	6	1		TEXAS STARDANCE HOLDINGS LP	196	Irrigation	12/31/1950		
2883	6	1		DAVID C COURTNEY	5	Irrigation	12/31/1960		
2884	6	1		TEXAS STARDANCE HOLDINGS LP	200	Irrigation	12/31/1954		
2885	6	1		MOODY E COURTNEY	71	Irrigation	12/31/1966		
2886	6	1		W J ALEXANDER	10	Irrigation	12/31/1966		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2887	6	1		JOHN F TAYLOR ET AL	30	Irrigation	7/31/1964		
2888	6	1		GEORGE T REYNOLDS III ET UX	2	Irrigation	12/31/1929		
2890	6	1		DON THOMAS ROGERS	8	Irrigation	12/31/1963		
2891	6	1		W F MORELAND BY PASS TRUST	57	Irrigation	8/31/1964		
2892	6	1		W N & MARY JANE WHISENHUNT	32	Irrigation	12/31/1957		
2893	6	1		SEABORN L ASHBY	10	Irrigation	8/1/1918		
2894	6	1		SAN PABLO CORPORATION	2	Irrigation	12/31/1965		
2895	6	1		WILLIAM TRAVIS LAXSON	29	Irrigation	12/31/1959		
2896	6	1		MARGARET CALLAWAY	124	Irrigation	12/31/1965		
2897	6	1		R H MELTON	8	Irrigation	12/31/1967		
2898	6	1		DONALD J MACKIE ET UX	8	Irrigation	12/31/1925		
2898	6	2		GLENNIS G EGGER	15	Irrigation	12/31/1925		
2899	6	1		TEXAS DEPT OF CRIMINAL JUSTICE	70	Irrigation	1/25/1971		
2900	6	1		CHARLES C POWELL	14	Irrigation	12/31/1964		
2901	6	1		MORSE FAMILY PARTNERSHIP LTD	100	Irrigation	12/31/1965		
2902	6	1		QUENTIN G MCCORKLE ET UX	18	Irrigation	12/31/1957		
2903	6	1		GLENROOK FARMS	530	Irrigation	11/8/1913		
2904	6	1		STERLIN J BARNARD	40	Irrigation	12/31/1939		
2905	6	1		DAN G DAVIDSON ESTATE	14	Irrigation	12/31/1967		
2906	6	1		THELMA R CARTER	36	Irrigation	8/6/1925		
2907	6	1		LEO LUEDTKE ET UX	237	Irrigation	12/31/1958		
2907	6	2		DENNIS CHARLES LUEDTKE ET AL	150	Irrigation	12/31/1958		
2908	6	1		DAN G DAVIDSON	22	Irrigation	12/31/1967		
2909	6	1		RUDOLF DROSCHE	26	Irrigation	7/22/1965		
2910	6	1		CARL DROSCHE	77	Irrigation	12/31/1963		
2911	6	1		GLENN DIPPEL ET AL	74	Irrigation	4/30/1963		
2911	6	2		JOHN SHAUD ET UX		Irrigation	4/30/1963		
2914	6	1		PAT & MABEL RUTH GRIMES	18	Irrigation	12/31/1928		
2915	6	1		ROBERT L MOORE	38	Irrigation	3/31/1959		
2921	6	1		W J & ANITA FAYE HOPPER	28	Irrigation	3/31/1967		
2922	6	1		EDNA HOPPER	9	Irrigation	6/30/1966		
2923	6	1		HENRY MARWITZ ET AL	12.54	Irrigation	12/31/1913		
2923	6	2		BILLY H ROBERTS ET UX	32.46	Irrigation	12/31/1913		
2924	6	1		JERRY W & BONNIE JEAN HOPPER	59	Irrigation	5/31/1966		3
2926	6	1		WILLIAM JACKSON WISDOM	13	Irrigation	5/31/1938		
2927	6	1		ELVIN L GENTRY ET UX	9	Irrigation	6/30/1950		
2928	6	1		GARY L LUNDBERG ET UX	13	Irrigation	7/31/1950		
2929	6	1		REGINALD & NONA FA WIEDEBUSCH	4	Irrigation	3/31/1970		
2930	6	1		CYRUS B CATHEY ESTATE	31	Irrigation	9/30/1962		
2931	6	1		RONNAL S BEASLEY ET UX	52	Irrigation	12/31/1965		
2932	6	1		JAMES BILLINGSLEY	6	Irrigation	5/31/1962		
2933	6	1		MARSHALL JOE HANNA	46	Irrigation	8/31/1954		
2934	6	1		ROBERT M SCOTT ET AL	66	Irrigation	11/30/1965		
2935	6	1		ESTATE OF JEAN WOODWARD WHALEY	38	Storage	4/30/1963		190
2936	6	1		U S DEPT OF THE ARMY	10000	Municipal	8/24/1953	LAKE BELTON	12000
2936	6	2		U S DEPT OF THE ARMY	2000	Municipal	8/23/1954		
2937	6	1		BARGE RANCH LTD	59	Irrigation	7/31/1963		
2938	6	1		CITY OF TEMPLE	15804	Municipal	10/30/1915		500

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2938	6	2		CITY OF TEMPLE		Industrial	10/30/1915		
2938	6	3		CITY OF TEMPLE	20000	Municipal	1/11/1957	BELTON RESERVOIR	
2939	6	1		BRAZOS RIVER AUTHORITY	38800	Industrial	2/7/1949		
2940	6	1		EVELYN FRANCES BYLER ET AL	63	Irrigation	6/30/1965		
2941	6	1		SHALLOW FORD CONSTRUCTION CO	36	Irrigation	12/31/1966		
2942	6	1		PYLE BROTHERS INC	5.135	Irrigation	12/31/1915		
2942	6	2		VAUGHN T BAIRD	194.865	Irrigation	12/31/1915		
2943	6	1		CITY OF KILLEEN & KILLEEN WILLOWS INC	220	Irrigation	7/31/1978	3 RES	46
2943	6	2		CITY OF KILLEEN & KILLEEN WILLOWS INC		Recreation	7/31/1978		
2944	6	1		FRANKLIN LIMESTONE COMPANY	138	Mining	4/28/1975		28
2945	6	1		GLENN BAIRD	36	Irrigation	6/30/1966		
2946	6	1		J BARRY SIEBENLIST ET UX	24	Irrigation	5/20/1974		
2947	6	1		PHILLIP E POWELL ET UX	11	Irrigation	8/31/1952		
2948	6	1		CHESTER E DICKSON ET UX	278	Irrigation	7/31/1960		
2949	6	1		CHESTER E DICKSON ET UX	37	Irrigation	7/31/1960		
2950	6	1		DAVID R KRAUSS ET UX	25	Irrigation	8/31/1962		
2951	6	1		MICHAEL ANDREW MONTGOMERY ET AL	33.83	Irrigation	7/31/1963		
2952	6	1		CLOUD CONSTRUCTION CO INC	16	Irrigation	12/31/1962		37
2953	6	1		ROGER W HINDS ET UX	89.08	Irrigation	4/15/1984		
2953	6	2		CHARLES N VERHEYDEN ET UX	75.27	Irrigation	4/15/1984		
2953	6	3		DENNIS J LYNCH ET UX	69.65	Irrigation	4/15/1984		
2958	6	1		FOSSIL CREEK REALTY INC	2.63	Irrigation	9/27/1976		
2958	6	2		SAMUEL G TOUB	7.25	Irrigation	9/27/1976		
2958	6	3		W G BETTIS ET AL	0.12	Irrigation	9/27/1976		
2959	6	1		JOHN R & LYNN COATS	23	Irrigation	12/31/1950		
2960	6	1		NORTH MIDLAND DEVELOPMENT INC	46	Irrigation	12/31/1967		
2961	6	1		M K & RUTH NEAL PATTESON	54	Irrigation	5/31/1957		
2962	6	1		LEONARD J TROVERO SR	28	Irrigation	3/31/1925		
2963	6	1		FRANCES VIRGINIA NUCKLES ET AL	40.86	Irrigation	6/30/1957		45
2963	6	2		JOSEPH HENRY LANGFORD ET UX	7.14	Irrigation	6/30/1957		
2964	6	1		EARL BROOKS	1	Irrigation	5/31/1929		
2965	6	1		JIMMIE E BOULTINGHOUSE ET AL	34.25	Irrigation	6/30/1963		
2965	6	2		ROY LEE BOULTINGHOUSE	18.75	Irrigation	6/30/1963		
2966	6	1		MARVIN E & MARY BLANCHE WHITE	31	Irrigation	6/30/1963		4
2967	6	1		H Y JR & LOIS POLLARD PRICE	5	Irrigation	12/31/1963		40
2968	6	1		MARK J NASH JR		Recreation	1/7/1974		200
2969	6	1		BURRELL ROITCH	8	Irrigation	12/31/1946		
2970	6	1		FRED WILLIS ET UX	2.63	Irrigation	12/31/1946		
2970	6	2		CHARLES E BLANTON	51.17	Irrigation	12/31/1946		
2970	6	3		CITY OF LAMPASAS	6.2	Irrigation	12/31/1946		
2971	6	1		CITY OF LAMPASAS	3760	Municipal	6/23/1914		
2972	6	1		CITY OF LAMPASAS		Recreation	12/31/1956		20
2972	6	2		CITY OF LAMPASAS	228	Irrigation	12/31/1963		22
2973	6	1		MELVIN POTTS	6	Irrigation	3/31/1964		3
2974	6	1		E C O'NEAL JR	144	Irrigation	5/11/1913		
2975	6	1		RAY A & ELIZABETH K JONES	46	Irrigation	6/13/1914		
2976	6	1		RAY A JONES	48	Industrial	6/26/1914		
2977	6	1		CURTIS KIDD ET UX	42	Irrigation	5/7/1914		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
2978	6	1		GUNDERLAND PARK RANCH INC	54	Irrigation	12/31/1961		15
2979	6	1		JOHN T HIGGINS	95	Irrigation	12/31/1915		21
2980	6	1		JUDITH ANN LANSFORD ET AL	1	Irrigation	1/29/1926		
2981	6	1		DOROTHY N CAPPS	6.32	Irrigation	5/31/1963		
2981	6	2		JOE D BOYD	45.36	Irrigation	5/31/1963		
2981	6	3		WYLIE R CAPPS	6.32	Irrigation	5/31/1963		
2982	6	1		A J DEWAYNE KENDRICK	6	Irrigation	5/31/1963		
2983	6	1		LARRY L BROWN ET UX	7	Irrigation	5/31/1963		
2984	6	1		DOYLE & BARBARA J WALKER	18	Irrigation	5/31/1963		
2985	6	1		RAYMOND DWAYNE JONAS ET UX	18	Irrigation	5/31/1963		
2986	6	1		JAMES BUFORD BRIGGS	46.8	Irrigation	2/6/1919		
2987	6	1		ROBERT C HALLMARK ET AL	2	Irrigation	6/24/1914		
2988	6	1		JOE T & CAROLINE PARKS	3	Irrigation	6/23/1914		
2996	6	1		BRADLEY B WARE	100	Irrigation	4/1/1966		
2997	6	1		SUNTEX FULLER CORP	60.1	Irrigation	9/30/1963		
2997	6	2		CLIFFORD D FRIESEN ET UX	3.9	Irrigation	9/30/1963		
2998	6	1		CW DUNCAN JR TRUSTEE	157	Irrigation	12/31/1925		
2999	6	1		PAUL EUGENE BLUM	3	Irrigation	5/31/1947		
3000	6	1		JAMES L SHEPHERD	105	Irrigation	4/30/1957		
3001	6	1		EDD MELTON	12	Irrigation	12/31/1967		
3002	6	1		GENE & NELDA FAY RAY	150	Irrigation	12/31/1961		
3003	6	1		BENNIE M GIBBS	32	Irrigation	6/30/1967		
3004	6	1		ESTATE OF DR JAMIE W BARTON	50	Irrigation	8/2/1967		
3005	6	1		VAIL E & BETTY LOGSDON	5	Irrigation	6/30/1965		
3006	6	1		KARL B WAGNER ESTATE	48	Irrigation	4/30/1967		
3007	6	1		RIVER FARM LTD	48	Irrigation	12/31/1947		
3007	6	2		RIVER FARM LTD	192	Irrigation	9/20/1982		
3008	6	1		ELEANOR B TUTTLE	61	Irrigation	6/30/1950		
3009	6	1		JOSEPH LEWIS ET UX	81	Irrigation	12/31/1962		
3010	6	1		CLIFFORD D JONES	10	Irrigation	6/30/1955		
3011	6	1		LOYCE W RAY	16.55	Irrigation	12/31/1962		
3011	6	2		LAWANA ELLIS ET VIR	46.99	Irrigation	12/31/1962		
3011	6	3		MIKEL DUPES ET AL	0.46	Irrigation	12/31/1962		
3012	6	1		STAGECOACH INN PROPERTIES INC		Recreation	8/2/1976	1 ON-CHAN & 1 OFF-CHAN RES	9
3013	6	1		STAGECOACH MILL CREEK RESORTS INC	168	Irrigation	4/15/1965		10
3013	6	2		STAGECOACH MILL CREEK RESORTS INC	168	Irrigation	5/14/1999		
3014	6	1		EDWIN A BAILEY ESTATE	63	Irrigation	12/31/1883		6
3014	6	2		EDWIN A BAILEY ESTATE	2	Industrial	12/31/1883		
3015	6	1		PAUL T BOSTON	36	Irrigation	12/31/1963		
3355	1	1	3645	DAVID THOMAS BRIDGFORD	30	Irrigation	8/16/1976	2 RES	24
3364	6	1		MUSTANG CREEK RANCH	183	Irrigation	5/31/1963		70
3389	6	1		MOUNTAIN VALLEY COUNTRY CLUB		Recreation	6/11/1979		218
3410	6	1		UNITED FEDERAL SAVINGS & LOAN		Recreation	6/11/1979		24
3413	6	1		SAMUEL E CLONTS	182	Irrigation	8/31/1957		100
3413	6	2		MARION C PERDUE		Irrigation	8/31/1957		
3413	6	3		MABEL C WILSON		Irrigation	8/31/1957		
3414	6	1		CITY OF BENJAMIN	34	Municipal	1/2/1929		915
3440	6	1		LEAGUE RANCH	2000	Irrigation	6/13/1958	LAKE DAVIS	4477

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3440	6	2		LEAGUE RANCH	31	Irrigation	5/17/1965	LAKE CATHERINE	1750
3440	6	3		LEAGUE RANCH		Recreation	5/17/1965	LAKE CATHERINE	
3440	6	4		LEAGUE RANCH		Storage	5/15/1972	LAKE DAVIS/LAKE CATHERINE	1252
3441	6	1		CITY OF MUNDAY		Recreation	12/18/1939		150
3446	6	1		J J KEETER TRUST	4.5	Irrigation	9/2/1959		
3446	6	2		CLYDE STUTEVILLE	4.5	Irrigation	9/2/1959		
3447	6	1		R T WELLS JR	45	Irrigation	5/31/1964		
3448	6	1		GEORGE W WILKINSON	45	Irrigation	2/28/1966		2
3449	6	1		THROCKMORTON LAND & CATTLE CO		Domestic/Livestock	1/23/1950		705
3450	6	1		CITY OF THROCKMORTON	600	Municipal	11/20/1940		1675
3451	6	1		GEORGE W WILKINSON	26	Irrigation	8/31/1966		
3451	6	2		GEORGE W WILKINSON	27	Industrial	8/31/1966		
3452	6	1		CITY OF NEWCASTLE	250	Municipal	11/22/1966	WHISKEY CR RES & NEWCASTLE	801
3453	6	1		PITCOCK BROTHERS READY-MIX	100	Mining	12/19/1960		
3455	6	1		CHARLES D CROW & WANDA L CROW	76	Industrial	6/30/1967		
3455	6	2		CHARLES D CROW & WANDA L CROW	6	Industrial	6/20/1977		82
3455	6	3		CHARLES D CROW & WANDA L CROW		Irrigation	6/20/1977		
3456	6	1		RONALD D STEPHENS	59	Irrigation	12/31/1959		55
3457	6	1		LOUIS PITCOCK JR ET AL	60	Irrigation	12/8/1969		
3458	6	1		CITY OF GRAHAM	4000	Municipal	11/21/1927	LAKE EDDLEMAN	13386
3458	6	2		CITY OF GRAHAM	7000	Municipal	11/15/1954	LAKE GRAHAM	39000
3458	6	3		CITY OF GRAHAM	1000	Industrial	11/21/1927		
3458	6	4		CITY OF GRAHAM	7400	Industrial	11/15/1954		
3458	6	5		CITY OF GRAHAM	100	Irrigation	11/15/1954		
3458	6	6		CITY OF GRAHAM	500	Mining	11/15/1954		
3458	6	7		CITY OF GRAHAM		Storage	2/8/1982	SALT CREEK RESERVOIR	40
3459	6	1		ZACK BURKETT	12	Irrigation	8/31/1964		
3460	6	1		JANE H CRAVENS	76	Irrigation	8/20/1928		
3461	6	1		MRS T T CAMPBELL	27	Irrigation	3/31/1963		
3465	6	1		EASTLAND CO WSD	450	Municipal	10/28/1919	LAKE EASTLAND	1740
3465	6	2		EASTLAND CO WSD		Recreation	10/28/1919	LAKE EASTLAND	
3465	6	3		CITY OF EASTLAND	50	Industrial	10/28/1919		
3465	6	4		CITY OF EASTLAND	100	Irrigation	10/28/1919		
3466	6	1		CITY OF EASTLAND		Recreation	1/12/1976	RINGLING LAKE	144
3467	6	1		WAYNE HARGRAVE ET UX	12	Irrigation	12/31/1965		
3468	6	1		EBAA IRON INC	1000	Mining	12/15/1919	LAKE OLDEN	1607
3468	6	2		EASTLAND INDUSTRIAL FOUNDATION	607	Mining	12/15/1919		
3469	6	1		LARRY MORROW	21	Irrigation	8/21/1967		
3470	6	1		EASTLAND CO WSD	2437.5	Municipal	3/21/1952	LAKE LEON	28000
3470	6	2		EASTLAND CO WSD	1747.5	Municipal	3/25/1986	LAKE LEON	
3470	6	3		EASTLAND CO WSD	1265	Municipal	5/17/1931	LAKE LEON	
3470	6	4		EASTLAND CO WSD	350	Industrial	3/25/1986		
3470	6	5		EASTLAND CO WSD	500	Irrigation	3/25/1986		
3471	6	1		GLYNN A WILSON	50	Irrigation	10/11/1977	RESERVOIR 1	115
3471	6	2		GLYNN A WILSON	50	Irrigation	4/1/1991	RESERVOIR 2	125
3473	6	1		RONNIE LOVE	40	Irrigation	10/27/1969		
3474	6	1		JERRY P MEHAFFEY	30	Irrigation	4/28/1969		
3475	6	1		C M PIPPIN JR	8	Irrigation	5/26/1969		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3476	6	1		GARTH PETTIT	51	Irrigation	4/30/1952		
3479	6	1		TEDDY J SNIDER ET UX	30	Irrigation	4/5/1966		35
3480	6	1		SAUL PULLMAN		Domestic/Livestock	10/31/1977		60
3481	6	1		WILL D BROWN ET UX	25	Irrigation	7/29/1968		40
3482	6	1		JOHNNY W & MARY C EAVES	13	Irrigation	7/31/1964		25
3483	6	1		MATTHEW STANLEY HOUSE	90	Irrigation	7/21/1969		244
3484	6	1		MURTICE C RODGERS	40	Irrigation	5/13/1970		
3485	6	1		H L PERRIN ET UX	148	Irrigation	1/2/1973		350
3485	6	2		H L PERRIN ET UX		Irrigation	4/6/1973		
3486	6	1		RONNIE N LOVE ET UX	150	Irrigation	10/20/1975	3 EXEMPT DAMS/RESERVOIRS	225
3486	6	2		RONNIE N LOVE ET UX	148	Irrigation	1/2/1973	1 RES	
3486	6	3		RONNIE N LOVE ET UX		Irrigation	4/6/1973		
3487	6	1		D B WARREN	40	Irrigation	2/19/1968		
3488	6	1		MAX BUSH ET UX	30	Irrigation	9/22/1969		
3489	6	1		THOMAS H BIRDSONG III	140	Irrigation	10/13/1969		323
3490	6	1		JOHN J HOLLAND	60	Irrigation	6/5/1967		60
3492	6	1		G D LINDLEY	52	Irrigation	8/21/1967		52
3493	6	1		EDDIE LINDLEY	35	Irrigation	4/27/1970		35
3494	6	1		MOODY B KOONCE	140	Irrigation	3/22/1971		
3495	6	1		MOODY B KOONCE	94	Irrigation	5/23/1967		
3496	6	1		NANNIE LEE THOMPSON	21	Irrigation	10/28/1968		
3497	6	1		HERRALD ABELS	50	Irrigation	7/28/1975		
3498	6	1		RAYMOND L GILDER	100	Irrigation	12/14/1970		189
3499	6	1		N L BOX	3	Irrigation	8/31/1951		25
3500	6	1		OBBCO RANCH CORPORATION	24	Irrigation	4/30/1966		
3501	6	1		HAROLD D HIGGINBOTTOM	65	Irrigation	3/22/1971		70
3502	6	1		DONALD K SETZLER	64	Irrigation	1/30/1978		
3503	6	1		HAROLD LEE MORRIS ET UX		Domestic/Livestock	2/28/1977		45
3504	6	1		ELMER RAY JOINER	20	Irrigation	4/8/1968		
3505	6	1		RONNIE P STEPHENS ET AL	36	Irrigation	7/22/1968		
3506	6	1		J V STEWART	3	Irrigation	3/31/1963		10
3511	6	1		A D MCCLELLAN	73	Irrigation	8/31/1966		
3512	6	1		JIMMY DALE JOHNSON	6	Irrigation	12/31/1963		
3514	6	1		GAINES OIL COMPANY	7	Irrigation	8/1/1966		
3515	6	1		ROBERT JESS HOFFMAN		Domestic/Livestock	5/1/1972		292
3516	6	1		RUBY JOHNSON		Domestic/Livestock	5/1/1972		292
3517	6	1		MERLE JO PARKS TRUSTEE	250	Irrigation	7/29/1968		266
3518	6	1		KELLER-HYDEN INC	110	Irrigation	8/8/1967		
3519	6	1		GARY D BEARD ET AL	25	Irrigation	6/15/1970		
3520	6	1		BEN HAMNER	40	Irrigation	9/11/1967		
3521	6	1		TRUETT & PATSY SPRUILL	40	Irrigation	5/5/1969		
3522	6	1		JAMES L HUGHES	7	Irrigation	7/31/1965		10
3523	6	1		ROBERT M & IMOGENE BURNS	20	Irrigation	6/9/1969		
3524	6	1		JULIA BETH COOK ET AL	25	Irrigation	12/8/1975		
3525	6	1		THOMAS H BIRDSONG III	10	Irrigation	10/13/1969		
3526	6	1		TROYAT UNDERWOOD	20	Irrigation	8/30/1976		20
3528	6	1		ROBERT EARL DENNIS	100	Irrigation	9/15/1969		121
3530	6	1		LOUIS SCHKADE ET AL	14	Irrigation	6/30/1967		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3530	6	2		LOUIS SCHKADE ET AL	46	Irrigation	9/9/1969		
3531	6	1		JOHN R SCOTT ET UX	40	Irrigation	12/8/1975		
3532	6	1		JIMMY L BINGHAM ET AL	29	Irrigation	3/29/1971		29
3533	6	1		BOBBY L SKAGGS & GENE E SKAGGS	25	Irrigation	3/24/1969		
3534	6	1		JUNE M ROUNTREE TRUSTEE	24	Irrigation	7/31/1967		8
3535	6	1		JACK & THELMA LOU RILEY	8	Irrigation	10/26/1971		
3536	6	1		LYNDELL F COAN	31	Irrigation	4/26/1971		
3537	6	1		RODNEY C STEPHENS		Storage	12/17/1973		9
3538	6	1		WILLIAM T MORRIS ET UX	30	Irrigation	11/19/1973		
3539	6	1		ED GLOVER JR	75	Irrigation	3/17/1969		
3540	6	1		SPRUILL BROS DRILLING CO	1	Irrigation	4/25/1967		
3540	6	2		JAMES L FARLEY ET UX	89	Irrigation	4/25/1967	NORTH RESERVOIR & SOUTH RES	153
3540	6	3		JAMES L FARLEY ET UX	23	Irrigation	7/31/1967		
3541	6	1		SAM D & MARTHA L UPSHAW	45	Irrigation	5/6/1968		
3542	6	1		NABORS LAKE DEVELOPMENT CORP		Recreation	4/28/1976	NABORS LAKE	450
3543	6	1		PETER G FAGAN ET UX	28	Irrigation	5/4/1970		29
3544	6	1		JIM LAMPMAN ET AL	17	Irrigation	12/31/1964		
3546	6	1		E A WALKER	7.5	Irrigation	7/31/1965		11
3546	6	2		E A WALKER	1.5	Irrigation	4/26/1971		
3547	6	1		ELISABETH LEE SANDERS	70	Irrigation	4/1/1968		
3548	6	1		SEBORN E GOLDEN	166	Irrigation	5/17/1965		
3549	6	1		T A NOWLIN	42	Irrigation	5/20/1968		
3550	6	1		THOMAS A LEE JR ET UX	27.6	Irrigation	9/11/1967		
3551	6	1		BOBBY W STRAUB	30	Irrigation	4/5/1985		
3552	6	1		J V SKAGGS	80	Irrigation	6/7/1971		
3553	6	1		LEE ROY COTTON	53	Irrigation	6/13/1966		
3554	6	1		E J TERRY	25	Irrigation	6/30/1969		
3555	6	1		MARK C GRIFFIN ET UX	100	Irrigation	5/22/1978		
3556	6	1		GAYLE MCGINNIS	7.5	Irrigation	4/15/1968		
3557	6	1		LAKE PROCTOR IRRIGATION AUTHORITY	97.5	Irrigation	4/15/1968		
3558	6	1		STEVEN MARK BIGGS ET AL	12	Irrigation	7/31/1961		
3560	6	1		CHARLES BOB & DEALVA SNELL		Domestic/Livestock	12/8/1975		
3561	6	1		ROBERT S BUTLER		Domestic/Livestock	6/24/1974		267
3565	6	1		ROBERT S BUTLER		Domestic/Livestock	1/28/1974		236
3567	6	1		BYRON R GIBSON		Recreation	9/3/1974		81
3568	6	1		ALICE MAE JONES	50	Irrigation	9/17/1970		25
3569	6	1		MARGARET JANES	10	Irrigation	2/7/1972		
3572	6	1		A T GILCHREST	140	Irrigation	3/18/1968		
3573	6	1		G H BINGHAM DBA 4B FARMS	42.9	Irrigation	5/8/1972		
3573	6	2		MICHAEL BINGHAM	17.1	Irrigation	5/8/1972		
3575	6	1		BOBBY N HUDDLESTON	16	Irrigation	4/30/1955		
3575	6	2		BOBBY N HUDDLESTON	130	Irrigation	9/25/1972		130
3578	6	1		ORO PECANLANDS INC ET AL	700	Irrigation	11/11/1974		829
3579	6	1		T A NOWLIN	32	Irrigation	7/31/1969		50
3580	6	1		G E BINGHAM ET AL	70	Irrigation	4/24/1972		
3581	6	1		ELDON WADE BUTLER	65	Irrigation	1/5/1970		
3584	6	1		DINA BAXTER NEAL	30	Irrigation	12/31/1959		4
3585	6	1		WAYNE D GILLIAM	17	Irrigation	7/30/1973		17.39

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3585	6	2		WAYNE D GILLIAM	23	Irrigation	9/2/1980		
3586	6	1		GLENDA G HENRY	154	Irrigation	10/13/1970		960
3587	6	1		GEORGE E BINGHAM ET UX	95.61	Irrigation	10/13/1970		
3587	6	2		GEORGE E BINGHAM ET AL	99.32	Irrigation	10/13/1970		
3587	6	3		GEORGE E BINGHAM ET AL		Recreation	10/13/1970		
3588	6	1		BILLY J GRESSETT ET AL	29.24	Irrigation	10/13/1970		
3588	6	2		BILLY J GRESSETT ET AL		Recreation	10/13/1970		
3589	6	1		LOUIS G & BETTY HARELIK	185.19	Irrigation	10/13/1970		
3589	6	2		LOUIS G & BETTY HARELIK		Recreation	10/13/1970		
3590	6	1		CLINTON D GEYE	321.64	Irrigation	10/13/1970		
3590	6	2		CLINTON D GEYE		Recreation	10/13/1970		
3592	6	1		LEON Y NICHOLS	109	Irrigation	4/23/1967		
3593	6	1		VERA MULL	8	Irrigation	6/30/1965		25
3593	6	2		VERA MULL	17	Irrigation	6/30/1969		
3594	6	1		WOLFE PECANLANDS INC	16	Irrigation	2/22/1971		
3595	6	1		REX MCGINNIS	10	Irrigation	4/15/1956		4
3596	6	1		R C PINKARD	280	Irrigation	8/25/1969		400
3596	6	2		GENE E CAGLE ET UX		Irrigation	8/25/1969		
3596	6	3		BILLIE STEWART KINSEY		Irrigation	8/25/1969		
3597	6	1		J F REED		Recreation	2/7/1972		657
3598	6	1		JOE MCENTIRE & JOHN MCENTIRE		Recreation	2/7/1972		
3599	6	1		JOE J MCENTIRE		Recreation	2/7/1972		
3600	6	1		GARY HALL ET AL		Recreation	2/7/1972		
3601	6	1		H REESE WARD & DONALD L WARD		Recreation	2/7/1972		657
3601	6	2		H REESE WARD & DONALD L WARD		Domestic/Livestock	2/7/1972		
3602	6	1		DENNIS L & LAVORICE M SHELTON		Domestic/Livestock	5/28/1974		
3603	6	1		PAUL L RAINS		Domestic/Livestock	5/19/1975		
3604	6	1		LARRY C STEELE ET UX		Domestic/Livestock	8/10/1972		15
3604	6	2		LARRY C STEELE ET UX		Domestic/Livestock	5/19/1975		35
3605	6	1		GARY G & MARY LOU HALL		Domestic/Livestock	2/28/1972		41
3606	6	1		GARY G HALL ET UX	3	Irrigation	7/31/1963		
3607	6	1		T C MAZUREK JR		Domestic/Livestock	2/17/1975		
3608	6	1		NORMAN MOORE ET UX	21	Irrigation	10/26/1971		
3608	6	2		AVERY MOORE		Irrigation	10/26/1971		
3609	6	1		JOHN M HATHCOCK	50	Irrigation	10/18/1971		
3610	6	1		JOHN C TAYLOR ET UX	143	Irrigation	7/19/1971		193
3611	6	1		HUGH MONSELLE O'BRIEN	38	Irrigation	12/31/1969		
3612	6	1		FRED S DAVIS	93	Irrigation	5/31/1959		40
3613	6	1		HUGH MONSELLE O'BRIEN	95	Irrigation	5/17/1971		
3614	6	1		JAMES DONALD CHESTER	10	Irrigation	11/18/1965		10
3615	6	1		A E VINEYARD	48	Irrigation	6/16/1969		
3616	6	1		B J VINEYARD	12	Irrigation	6/16/1969		
3617	6	1		WALTER MAZUREK	3	Irrigation	4/29/1968		
3618	6	1		OBBCO RANCH CORPORATION	85	Irrigation	7/31/1967		
3618	6	2		OBBCO RANCH CORPORATION	9	Irrigation	5/6/1968		
3619	6	1		JFB FARMS A PARTNERSHIP	20	Irrigation	2/22/1971		30
3620	6	1		E J ALDERMAN	25	Irrigation	5/31/1967		
3620	6	2		E J ALDERMAN	72	Irrigation	9/11/1967		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3622	6	1		CURTIS LESLEY & ROYCE LESLEY	50	Irrigation	6/28/1976		50
3623	6	1		TIMOTHY LEN MATTHEWS	26	Irrigation	4/23/1966		10
3624	6	1		PAULINE HALL	14	Irrigation	4/23/1966		
3626	6	1		WOLFE PECANLANDS INC	160	Irrigation	7/15/1963		
3627	6	1		DINAH KAY DENSMAN	13	Irrigation	1/15/1967		
3629	6	1		CAROLUS VOLLEMAN ET UX	48	Irrigation	9/8/1975		
3630	6	1		J H VAN ZANT	30	Irrigation	12/31/1929		
3631	6	1		J Z STARK	50	Irrigation	7/31/1966		
3632	6	1		RANDLE JOE EVANS	3	Irrigation	6/10/1967		
3633	6	1		DONALD DEE SALTER ET AL	61	Irrigation	5/31/1967		
3634	6	1		BEATRICE LOGGINS	31	Irrigation	7/31/1964		
3635	6	1		JOE RILEY	84	Irrigation	6/30/1952		
3636	1	1	3931	GEORGE CHASE	109	Irrigation	11/6/1978	HOG CREEK WATERSHED PROJE(	419
3636	1	2	3931	EVELYN WILIE MOODY	110	Irrigation	11/6/1978	HOG CREEK WATERSHED PROJECT	
3636	6	1		GAYLAND STEPHENS ET UX	40	Irrigation	7/31/1952		
3637	6	1		GORES INCORPORATED	450	Irrigation	12/31/1946		84
3638	6	1		J B GUNTER & P D GUNTER	40	Irrigation	12/31/1958		25
3639	6	1		GAIL W & MARY L YORK	35	Irrigation	7/31/1951		4.5
3640	6	1		SCOTT G SALTER	23	Irrigation	12/31/1963		4
3641	6	1		BERRY RAY BINGHAM		Domestic/Livestock	10/29/1973		
3642	6	1		CARL DWAIN HALL	9	Irrigation	7/31/1960		
3643	6	1		JOE PAUL MCCULLOUGH ET UX	69	Irrigation	4/30/1953		36
3644	6	1		BILL BLUE	1.35	Irrigation	7/5/1976		
3644	6	2		RODNEY STEPHENS	13.65	Irrigation	7/5/1976		15
3645	6	1		CLAYTON W MERCER	18	Irrigation	7/12/1971		18
3646	6	1		THOMAS E LUKER	7	Irrigation	6/30/1967		
3647	6	1		DONALD W MOORE	41	Irrigation	9/30/1954		126
3648	6	1		EVA F MOORE	49	Irrigation	8/31/1952		6
3649	6	1		CULLEN STEPHENS	130	Irrigation	6/30/1950		
3650	6	1		GUY E MOORE	34	Irrigation	7/31/1964		7.5
3651	6	1		JOHN R MOORE ET UX	107	Irrigation	7/31/1961		
3651	6	2		JOE D MOORE	15	Irrigation	7/31/1961		
3652	6	1		O A DICKEY	8	Irrigation	7/31/1964		
3653	6	1		LARRY WAYNE ADAMS	851.4	Irrigation	8/31/1963		
3654	6	1		CAROLYN RINEHART HAYES	32.67	Irrigation	7/31/1963		
3654	6	2		CAROLYN RINEHART HAYES ET VIR	32.66	Irrigation	7/31/1963		
3654	6	3		KENNETH RAY RINEHART	32.67	Irrigation	7/31/1963		
3655	6	1		ARBIE N BOYD ET UX	22	Irrigation	12/31/1957		
3655	6	2		GARY K BOYD		Irrigation	12/31/1957		
3656	6	1		MARTIN W & JUANITA SEIDER	36	Irrigation	7/31/1966		
3657	6	1		LEO C HAGGARD ET UX	56	Irrigation	7/31/1965		
3658	6	1		H L WILLINGHAM ESTATE	7	Irrigation	3/31/1963		
3659	6	1		ERW INC	200	Municipal	7/20/1925	LAKE EANES	1000
3659	6	2		ERW INC	200	Irrigation	3/29/1976	LAKE EANES	
3660	6	1		BELVE BEAN	58	Irrigation	7/31/1952		
3660	6	2		BELVE BEAN	11	Industrial	7/31/1961		
3661	6	1		C H MCCALL ET UX	187	Irrigation	6/30/1964		
3662	6	1		JIMMY E GORE	2.77	Irrigation	12/18/1947		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3662	6	2		DORIS S GORE	166.45	Irrigation	4/22/1975		4800
3662	6	3		JIMMY E GORE ET AL	291.46	Irrigation	4/22/1975		4800
3662	6	4		KENNETH D HARVICK ET AL	139.32	Irrigation	4/22/1975		
3663	6	1		R E BASHAM JR	67	Irrigation	4/30/1949		36
3701	6	1		COUNTY OF KENT		Storage	10/1/1925		296
3702	6	1		DON H MURPHY		Recreation	11/24/1969		850
3716	6	1		CAROL SUE REED	134	Irrigation	12/31/1958		2
3717	6	1		BALDRIDGE FAMILY LAND	420	Irrigation	8/31/1951		
3718	6	1		OCCIDENTAL PERMIAN LTD	3525	Mining	3/5/1958		
3718	6	2		OCCIDENTAL PERMIAN LTD	2375	Mining	7/22/1969		
3720	6	1		BILLIE JOE MCCOMBS	44	Irrigation	10/5/1963		185
3721	1	1	3969	MCTAN CORPORATION		Irrigation	3/12/1979		128
3721	1	2	3969	MCTAN CORPORATION		Recreation	3/12/1979		
3721	6	1		BRUCE & PATSY K COX	100	Irrigation	2/28/1965		176
3721	6	2		BRUCE & PATSY K COX	26	Industrial	3/31/1966		
3724	6	1		FRANCES DAVIS	1016	Irrigation	8/31/1955		
3725	6	1		OLIN E TEAGUE VETERANS CENTER		Recreation	1/24/1977		96
3726	6	1		MOLLIE H BROOKS ET AL	5	Irrigation	7/31/1960		12
3726	6	2		MOLLIE H BROOKS ET AL	5	Irrigation	11/6/1969		
3727	6	1		B R LAUTERBORN	72	Irrigation	10/11/1977		201
3727	6	2		DOYR CORNELISON ET UX		Irrigation	10/11/1977		
3727	6	3		ROBERT L OGDEN ET UX		Irrigation	10/11/1977		
3728	6	1		PATRICK J ATKINSON JR ET UX		Recreation	6/5/1978		246
3728	6	2		LARRY J HOWELL ET UX		Recreation	6/5/1978		
3728	6	3		JERRY D GRIFFITH ET UX		Recreation	6/5/1978		
3729	6	1		JOE GLASER	100	Industrial	9/27/1976		387
3730	6	1		JOE P (JR) & HENRIETTA CALLAN	21	Irrigation	3/1/1967		0.187
3731	6	1		REUBEN FLOYD CLARK	29	Irrigation	12/31/1962		
3732	6	1		SAN GABRIEL RIVER RANCH INC		Recreation	5/17/1976		26
3733	6	1		GEORGETOWN BUILDERS INC		Recreation	9/17/1970		40
3733	6	2		GEORGETOWN BUILDERS INC		Recreation	11/22/1976		4
3734	6	1		GEORGETOWN COUNTRY CLUB	45	Irrigation	12/31/1941		10
3736	6	1		HENRY GRADY RYLANDER	1	Irrigation	6/30/1961		
3737	6	1		ALAMO CONCRETE PRODUCTS LTD	300	Mining	5/4/1970		
3738	6	1		CITY OF GEORGETOWN		Recreation	12/6/1976		11
3739	6	1		GENE H BINGHAM ET AL	240	Mining	3/1/1964		
3740	6	1		WENDELL F GIBSON	20	Irrigation	5/1/1963		
3741	6	1		LINDA ANN SMITH	10.9	Irrigation	5/1/1964		
3741	6	2		THEODORE & MARY KALLUS REV LIVING TRUST	17.1	Irrigation	5/1/1964		
3742	6	1		MAXINE HARRIS	16.85	Irrigation	5/1/1964		
3742	6	2		R SCOTT POPE ET UX	7.15	Irrigation	5/1/1964		
3743	6	1		J L ENTERPRISES LLP	32	Irrigation	3/31/1954		
3744	6	1		T D VAUGHAN	110.3	Irrigation	9/30/1952		
3745	6	1		BEN W KURIO (BWK PARTNERSHIP)	33	Irrigation	12/31/1963		
3746	6	1		CHARLENE M SEFCIK	12	Irrigation	12/31/1957		
3747	6	1		JIMMY F BYERS	284	Irrigation	7/31/1966		
3748	6	1		A C STEARNS ESTATE	203	Industrial	12/31/1945		
3749	6	1		W T PEARSON JR	110	Irrigation	4/30/1967		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3750	6	1		T R COFFIELD	125	Irrigation	6/30/1943		
3751	6	1		BERTHA S JOHNSON	30	Irrigation	8/18/1922		
3752	6	1		CITY OF TAYLOR		Recreation	5/17/1976		26
3753	6	1		THE ESTATE OF JOHN V STILES	1	Irrigation	7/1/1963		0.5
3754	6	1		CITY OF THORNDALE	60	Municipal	6/20/1961		
3755	6	1		W A & JACK WINTERROWD	50	Irrigation	4/30/1963		263
3756	6	1		LESTER W STILES	3	Irrigation	7/1/1953		
3757	6	1		CITY OF THORNDALE	100	Municipal	9/15/1966		469
3757	6	2		CITY OF THORNDALE	150	Municipal	9/20/1982		
3758	6	1		ALCOA INC	18000	Industrial	12/12/1951	LAKE ALCOA	
3759	6	1		JAMES FERGUSON ET UX	300	Irrigation	8/29/1977		50
3760	6	1		CLIFFORD L GUSTAFSON ET UX	41.5	Irrigation	7/17/1925		
3761	1	1	4047	ROBERT W NORRIS	400	Irrigation	5/27/1980		
3761	6	1		CITY OF CAMERON	2792	Municipal	3/20/1914		10
3762	1	1	4048	ELLIS G & JEAN M MARSHALL	100	Irrigation	5/27/1980		
3762	6	1		B & B MINNOW FARM		Industrial	2/12/1973		
3763	1	1	4049	PAUL J MEYER ET AL	360.655	Irrigation	5/27/1980		20
3763	6	1		SHERWOOD PROPERTIES INC	40	Irrigation	7/31/1952		
3764	6	1		HAROLD B & OPAL B FISHER	45	Irrigation	7/1/1952		
3765	6	1		BRL RANCHES LP	148	Irrigation	7/28/1956		
3766	6	1		FORTY-FOUR FARMS LP	90	Irrigation	12/31/1952		2
3767	6	1		FIVE WELLS RANCH COMPANY	120	Irrigation	7/19/1971		358
3768	6	1		MICHAEL LLOYD ET UX	112	Industrial	2/28/1977		
3768	6	2		MICHAEL LLOYD ET UX	12.7	Irrigation	5/31/1965		
3768	6	3		MICHAEL LLOYD ET UX		Irrigation	2/28/1977		309
3769	6	1		LARRY WAYNE MCCLAREN	150	Irrigation	8/31/1956		
3770	6	1		COLVIN COBB ET AL	149	Irrigation	6/30/1959		
3771	6	1		ELLIOTT W ATKINSON ET AL	15	Irrigation	7/31/1962		
3772	6	1		V T WHITE	8	Irrigation	7/31/1966		
3773	6	1		ARLEDGE & SHANAHAN LP	1300	Irrigation	8/31/1956		11.56
3774	6	1		COLVIN COBB ET AL	30	Irrigation	6/30/1959		
3775	6	1		LLOYD E LEIFESTE ET UX	1200.25	Irrigation	4/10/1960		
3775	6	2		LLOYD E LEIFESTE ET UX	500	Irrigation	9/29/2000		
3775	6	3		JESSE ROBERTSON	66.75	Irrigation	4/10/1960		
3808	1	1	4087	DON FRAZIER CLARK ET AL	808.84	Irrigation	12/3/1980		1271
3808	1	2	4087	DON FRAZIER CLARK ET AL	251.16	Irrigation	12/3/1980		
3809	1	1	4079	L P REED RANCH LTD	230	Irrigation	11/3/1980	6 EXEMPT RESERVOIRS	
3826	1	1	4122	UPPER LEON RIVER MWD		Irrigation	5/11/1981	RELEASED FROM LAKE PROCTOR	45
3844	1	1	4088	CUSTER D SWIFT ET AL	107.22	Irrigation	11/10/1980		421
3844	1	2	4088	WINNIE D ANDERSON	246	Irrigation	11/10/1980		
3844	1	3	4088	DONALD FEIST ET AL	48.78	Irrigation	11/10/1980		
3851	1	1	4180	WALNUT CREEK FARMS OF GRANBURY	2.99	Irrigation	12/12/1981		
3851	1	2	4180	MURRAY RANDLE	2.4	Irrigation	12/12/1981		
3851	1	3	4180	SAM C COWAN JR	1.56	Irrigation	12/12/1981		
3851	1	4	4180	GERALD E KIMMEL ET UX	10.05	Irrigation	12/12/1981		17
3880	1	1	4197	LYNDELL F COAN ET AL		Domestic/Livestock	3/22/1982		60
3902	1	1	4210	ESTATE OF PAUL L RAINS	30	Irrigation	5/3/1982		
3902	1	2	4210	GARY G HALL ET UX	20	Irrigation	5/3/1982		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
3902	1	3	4210	DENNIS L SHELTON	10	Irrigation	5/3/1982		
3913	1	1	4212	CAPITOL AGGREGATES LTD	118	Mining	5/3/1982		70
3913	1	2	4212	CAPITOL AGGREGATES LTD		Industrial	5/3/1982		
3934	1	1	4263	TROY MORRIS ET UX	25	Irrigation	11/8/1982		25
3936	1	1	4235	HOLY LAND & CATTLE	2600	Irrigation	8/30/1982		
3939	1	1	4257	KENNETH & BETTY YVON LESLEY	245	Irrigation	11/1/1982		725
3941	6	1		SELECTED LANDS CORP	300	Irrigation	7/1/1974		160
3941	6	2		SELECTED LANDS CORP		Recreation	7/1/1974		
3953	6	1		LAKE WINONA PROP OWNERS ASSN		Recreation	10/27/1975		
3956	6	1		LAKE HOLLYHILL OWNERS ASSN		Recreation	11/10/1975		
3971	1	1	4314	TONKAWA SPRINGS HOMEOWNERS ASSN INC		Recreation	1/31/1983		7.5
3971	1	2	4314	TONKAWA SPRINGS HOMEOWNERS ASSN INC		Domestic/Livestock	1/31/1983		
3999	6	1		MARVIN H MCMURREY JR ET AL	25	Irrigation	8/16/1956		
4000	1	1	4246	THOMAS E LOVELACE ET AL	20	Irrigation	9/20/1982		
4000	6	1		CURTIS MITCHELL	31	Irrigation	4/30/1963		
4001	6	1		JENNIE M & M F EWTON	40	Irrigation	5/31/1962		
4002	1	1	4241	JOSEPH B MORROW ET UX	32.9	Irrigation	9/20/1982		
4002	1	2	4241	TIPTON MALONE MURRELL	7.1	Irrigation	9/20/1982		
4003	1	1	4242	MIKE H BERRY ET UX	29.7	Irrigation	9/20/1982		
4003	6	1		MRS G C MOORE	41	Irrigation	9/30/1974		
4004	6	1		CITY OF GRAFORD	50	Municipal	2/1/1957		50
4004	6	2		CITY OF GRAFORD	5	Municipal	3/18/1932		
4005	6	1		W J RHODES ET AL	781	Irrigation	4/30/1932		250
4006	6	1		SAN ROC LLC	63	Irrigation	12/31/1958		
4007	6	1		MARY E RIPPETOE	50	Irrigation	6/7/1976		
4008	6	1		LAWRENCE M CAREY ET AL	46.94	Irrigation	7/1/1956		
4008	6	2		CHRISTMANN CORPORATION	63.052	Irrigation	7/1/1956		
4009	6	1		ERNEST E AMMONS	4.32	Irrigation	12/31/1962		
4009	6	2		CHRISTMANN CORPORATION	19.68	Irrigation	12/31/1962		
4010	6	1		CHARLES W & JEAN WELCH	33	Irrigation	12/31/1962		
4011	1	1	4282	HARVEST GUARD INC	1398.29	Irrigation	12/20/1982		
4011	1	2	4282	GERTRUDIS C ESTRADA ET UX (MARIA PAULA)	4.71	Irrigation	12/20/1982		
4011	6	1		JACKIE LEE CHASTAIN ET AL	8	Irrigation	7/31/1966		
4012	1	1	4280	BILLY G CURRY ET AL	440	Irrigation	12/13/1982		
4012	6	1		EARL W & ANITA GARDNER	236	Irrigation	9/30/1964		
4013	1	1	4276	ROBERT L MACHA ET AL	1200	Irrigation	11/29/1982		
4013	6	1		ROCKING W RANCH LP	900	Irrigation	11/14/1947	7 RESERVOIRS	646
4013	6	2		DALTON BEND RANCH LTD	429	Storage	11/14/1947		
4014	1	1	4270	WALSH RANCH LTD PARTNERSHIP	1851	Irrigation	9/22/1982		
4014	6	1		FRED HAGAMAN ET AL	500	Irrigation	4/12/1926		1158
4014	6	2		FRED HAGAMAN ET AL	100	Industrial	4/12/1926		
4015	1	1	4249	CHAMBERLIN FAMILY TRUST	350	Irrigation	9/20/1982		
4015	1	2	4249	CALVIN KRAEMER ET UX	350	Irrigation	9/20/1982		
4015	6	1		FRED HAGAMAN ET AL	27	Irrigation	12/31/1963		
4016	1	1	4283	KR SOD-BRAZOS LP	1742.45	Irrigation	12/20/1982		
4016	1	2	4283	KR SOD-BRAZOS LP	990	Irrigation	3/13/1984		
4016	1	3	4283	KR SOD-BRAZOS LP		Domestic/Livestock	12/20/1982	RES 1 (21 AF) & RES 3 (9 AF) ON BI	30
4016	1	4	4283	KR SOD-BRAZOS LP	1400	Irrigation	12/20/1982		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4016	1	5	4283	HARVEST GUARD INC	756.55	Irrigation	12/20/1982		
4016	1	6	4283	TED HIGGINBOTTOM ET AL	551	Irrigation	12/20/1982	RES 2	13
4016	6	1		HUBERT H CAPPS	22	Irrigation	5/17/1971		
4017	1	1	4284	JERRY M MOORE	591.876	Irrigation	12/20/1982		
4017	1	2	4284	MELANIE M KOLBY	370.524	Irrigation	12/20/1982		
4017	6	1		LYNDAL D GARNER JR ET UX	40	Irrigation	11/19/1973		
4018	6	1		ROSS HODGES	40	Irrigation	11/19/1973		48
4019	6	1		CITY OF STRAWN	160	Municipal	4/19/1937		1200
4020	6	1		PERRY R HORTON ET AL	362	Irrigation	2/15/1963		
4021	6	1		R J CARAWAY	30	Irrigation	3/1/1971		164
4021	6	2		R J CARAWAY	41	Mining	3/1/1971		
4022	6	1		PENNY SPARKS	60	Irrigation	4/30/1963		
4023	1	1	4320	DON WEINACHT ET AL	600	Irrigation	2/7/1983		
4023	6	1		A D CRAWFORD	30	Irrigation	4/30/1964		30
4024	1	1	4322	LVGC INC	300	Irrigation	2/7/1983		15
4024	6	1		CITY OF GORDON	360	Municipal	6/4/1973		1023
4024	6	2		CITY OF GORDON	45	Municipal	5/22/1978		60
4025	6	1		TARRANT INVESTMENT CO INC	60	Municipal	10/15/1973		700
4025	6	2		TARRANT INVESTMENT CO INC	30	Mining	10/15/1973		
4025	6	3		TARRANT INVESTMENT CO INC		Recreation	10/15/1973		
4026	6	1		WINGSHOT LP	20	Municipal	10/15/1973		
4027	6	1		JACK R DAUGHERTY	80	Irrigation	1/20/1965		969
4028	6	1		HELEN H MCDANIEL	38	Irrigation	5/31/1933		30
4029	6	1		FAWCETT LIMITED	2	Irrigation	1/5/1970		26
4030	6	1		FAWCETT LIMITED		Recreation	2/7/1977		307
4031	6	1		PALO PINTO CO MWD 1	10000	Municipal	7/3/1962	LAKE PALO PINTO	44100
4031	6	2		PALO PINTO CO MWD 1	2500	Municipal	9/8/1964	LAKE PALO PINTO	24
4031	6	3		PALO PINTO CO MWD 1	6000	Industrial	7/3/1962	LAKE PALO PINTO	
4032	6	1		CHARLIE RAY COCKBURN	16	Irrigation	7/31/1965		
4033	6	1		JAMES R & JANICE MOORE	12	Industrial	6/26/1972		24
4034	6	1		HELEN H MCDANIEL	30	Irrigation	3/31/1955		15
4035	6	1		HELEN H MCDANIEL	5	Irrigation	12/31/1963		
4036	6	1		FAWCETT LIMITED	55	Irrigation	10/11/1977		139
4037	6	1		WILLIAM S SQUYRES ET AL	100	Irrigation	4/30/1965		
4038	6	1		HERMAN PETTY	150	Irrigation	5/31/1964		
4042	1	1	4321	T W WHALEY JR	700	Irrigation	10/3/1983		
4048	6	1		H D HOWARD	25	Irrigation	11/8/1976		
4048	6	2		H D HOWARD	35	Municipal	11/8/1976		
4048	6	3		H D HOWARD		Recreation	11/8/1976		
4049	6	1		FRED L THORMANN	12	Irrigation	4/30/1964		2
4050	6	1		ROBIN THORMANN ET AL	23	Irrigation	4/30/1964		2
4054	6	1		JESSE T CROWDER JR TRUST	4.31	Irrigation	7/31/1962		
4054	6	2		JOHN WESSLER ET AL	26.85	Irrigation	7/31/1962		
4054	6	3		T J WELLMAN	7.84	Irrigation	7/31/1962		
4055	6	1		JUSRYN COMPANY INC	42	Irrigation	7/31/1955		
4056	6	1		J M LEONARD TRUST	144	Irrigation	8/31/1967		1454
4057	6	1		MARY L & C W KILLOUGH	109	Irrigation	6/30/1962		
4058	6	1		OAK TRAIL OWNERS ASSOCIATION		Recreation	12/20/1976		24

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4059	6	1		HELEN T DURHAM ESTATE	35	Irrigation	12/31/1963		
4060	6	1		ESTATE OF E E DURHAM ET UX	248.438	Irrigation	7/31/1950		
4060	6	2		MAXIE OVERSTREET	74.344	Irrigation	7/31/1950		
4060	6	3		DURHAM OVERSTREET TRUST	146.609	Irrigation	7/31/1950		
4060	6	4		DURHAM OVERSTREET TRUST		Municipal	7/31/1950		
4060	6	5		DURHAM OVERSTREET TRUST		Industrial	7/31/1950		
4060	6	6		OVERSTREET FAMILY LP ET AL	146.609	Irrigation	7/31/1950		
4060	6	7		OVERSTREET FAMILY LP		Municipal	7/31/1950		
4060	6	8		OVERSTREET FAMILY LP		Industrial	7/31/1950		
4061	6	1		BURTON S BURKS SR ET AL	65	Irrigation	5/31/1956		
4062	6	1		MARK O THOMAS FAMILY IRREVOCABLE ASSET	383	Irrigation	12/31/1955	LAKE GRANBURY	
4063	1	1	4384	N S WATERMAN JR ET UX	270	Irrigation	7/11/1983		30
4063	6	1		GRANPEN ASSOCIATES LP	270.13	Irrigation	7/31/1963		
4063	6	2		ALAMO BUILDERS LP	4.42	Irrigation	7/31/1963		
4063	6	3		THE RESORT AT EAGLE MOUNTAIN LAKE LP	24.47	Irrigation	7/31/1963		
4063	6	4		JUSRYN COMPANY INC	48.98	Irrigation	7/31/1963		
4064	6	1		BURTON S BURKS ET UX	25	Irrigation	12/31/1963		
4065	6	1		ROBERT & C J WHITEHEAD	84	Irrigation	8/31/1963		
4066	6	1		COMANCHE HARBOR OWNERS ASSN		Recreation	12/20/1976		43
4067	6	1		COURTS K CLEVELAND JR	63	Irrigation	12/31/1956		
4068	6	1		LOU ANN LANGFORD	72	Irrigation	7/31/1967		
4069	6	1		WALKER MURRAY RANDLE	120	Irrigation	10/21/1974		
4070	6	1		LESLIE L MABERY	141	Irrigation	8/31/1956		
4071	6	1		R E MABERY	83	Irrigation	8/31/1956		
4072	6	1		LENMO INC	308	Irrigation	12/31/1956	OFF-CHANNEL RES	1
4072	6	2		LENMO INC	172	Irrigation	12/31/1963	FROM LAKE GRANBURY	
4072	6	3		LENMO INC	117	Irrigation	5/31/1962	FROM LAKE GRANBURY	
4073	6	1		JAMES R ROBINSON	42	Irrigation	8/19/1956		
4074	6	1		E F ALLISON	26	Irrigation	8/19/1956		
4075	6	1		THE R K HANGER TRUST		Recreation	7/5/1976		300
4076	1	1	4410	CULLEN V MANCUSO ET UX	93	Irrigation	11/7/1983		
4076	1	2	4410	JAMES BARNETT ET AL	157	Irrigation	11/7/1983		
4076	6	1		D J VAUGHN	15.49	Irrigation	7/10/1966		
4076	6	2		ROBIN K SNIDER ET AL	23.51	Irrigation	7/10/1966		
4077	6	1		D J BROWN ET UX	30	Irrigation	8/31/1964		
4078	1	1	4401	JOHN R WOODALL ET AL	825	Irrigation	9/26/1983		
4078	6	1		ROBERT & MARGARET KING INV INC	54	Irrigation	9/30/1957		
4079	6	1		JAMES ROBERT HILL	92	Irrigation	8/31/1964		20
4080	1	1	4398	GATHAN REISTINO	1500	Irrigation	7/19/1983		47
4080	6	1		J V & M G DURANT	112	Irrigation	7/2/1966		
4081	6	1		F L VAUGHN	160	Irrigation	7/2/1966		
4082	6	1		S B GRISSOM	203	Irrigation	7/31/1950		
4083	6	1		ROBERT L FOREE JR	45	Irrigation	9/30/1963		
4084	6	1		EARL R ALLISON	9.12	Irrigation	11/19/1973		25
4084	6	2		EARL R ALLISON	25	Other	11/19/1973		
4084	6	3		DANE ALLISON ET UX	15.88	Irrigation	11/19/1973		
4085	6	1		EARL R ALLISON	10.34	Irrigation	12/9/1974		
4085	6	2		DANE ALLISON ET UX	17.66	Irrigation	12/9/1974		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4086	6	1		GARY & BEVERLY LEWELLEN	15	Irrigation	9/2/1975		2
4087	6	1		LELAND A HODGES ET AL	81	Irrigation	9/30/1965		360
4088	6	1		MILTON C & VIVIAN YOUNG	55	Irrigation	6/30/1966		2
4089	6	1		JACOB T & LAURA DAMERON	31	Irrigation	3/31/1963		
4090	6	1		RICHARD T LIETZ ESTATE	197	Irrigation	8/14/1967		332
4091	1	1	4419	RIVER CHASE SUBDIVISION II LTD		Domestic/Livestock	1/3/1984		11
4091	6	1		KENNETH LESLEY	360	Irrigation	1/20/1965		511
4092	6	1		ROBERT D ADAMS SR	6	Irrigation	7/31/1964		
4093	6	1		ERNEST H CANNON	94	Irrigation	12/31/1963		
4094	6	1		J B SANDERSON ET AL	16	Irrigation	6/30/1935		
4095	1	1	4430	SIDNEY KACIR	240	Irrigation	1/17/1984		
4095	1	2	4430	SIDNEY KACIR	308	Irrigation	8/16/1999		
4095	6	1		J C MCFALL	10	Irrigation	12/31/1949		
4096	6	1		CITY OF GLEN ROSE		Recreation	5/28/1974		2
4097	6	1		TXU ELECTRIC CO	23180	Industrial	4/25/1973	SQUAW CREEK RESERVOIR	151500
4098	6	1		BOB HARRIS OIL CO	258	Irrigation	7/31/1954		
4099	6	1		DOROTHY W LITTLE ET AL	5	Irrigation	8/31/1949		
4100	6	1		TRINITY MATERIALS INC	125	Mining	12/31/1959		
4101	6	1		TEXAS PARKS & WILDLIFE DEPT		Recreation	9/9/1969	CEDAR LAKE	1450
4102	6	1		STANDARD INVESTMENT CO	77	Irrigation	12/31/1963		
4102	6	2		STANDARD INVESTMENT CO		Industrial	12/31/1963		
4103	6	1		CYRIL WAGNER JR ET AL	186	Irrigation	12/31/1955		
4104	6	1		CHISHOLM TRAIL VENTURES LP	3811	Irrigation	12/31/1957		
4105	6	1		WESLEY RAY CARSON	8.04	Irrigation	1/31/1977		
4105	6	2		CREPE MYRTLE OF TEXAS INC	3.96	Irrigation	1/31/1977		
4106	6	1		CITY OF CLEBURNE	5760	Municipal	8/6/1962	LAKE PAT CLEBURNE	25600
4106	6	2		CITY OF CLEBURNE		Industrial	8/6/1962	LAKE PAT CLEBURNE	
4106	6	3		CITY OF CLEBURNE	240	Irrigation	3/29/1976	LAKE PAT CLEBURNE	
4106	6	4		CITY OF CLEBURNE		Municipal	8/30/2004	LAKE PAT CLEBURNE	
4106	6	5		CITY OF CLEBURNE		Industrial	8/30/2004	LAKE PAT CLEBURNE	
4106	6	6		CITY OF CLEBURNE		Irrigation	8/30/2004	LAKE PAT CLEBURNE	
4107	6	1		RIVERVIEW GOLF CLUB LP	231	Irrigation	12/31/1964		12
4108	6	1		HARRY V DULICK	15.19	Irrigation	6/30/1961		
4108	6	2		HARRY V DULICK	5	Industrial	6/30/1961		
4108	6	3		DSF LTD	11.815	Irrigation	6/30/1961		
4109	1	1	4436	BETTY KACIR WHEELER	400	Irrigation	2/28/1984		
4109	6	1		LOUIS & VIRGINIA GREGORY	10	Irrigation	5/8/1969		10
4110	6	1		LUCILLE C BUTLER	20	Irrigation	7/31/1966		
4111	6	1		PAUL C MURPHY JR	6	Irrigation	7/31/1953		15
4112	6	1		LOUIS & VIRGINIA GREGORY	12	Irrigation	3/23/1964		
4113	6	1		JAMES M WALKER	43	Irrigation	5/31/1964		140
4114	6	1		THOMAS BROTHERS GRASS LTD	300	Irrigation	7/31/1955		
4114	6	2		THOMAS BROTHERS GRASS LTD		Irrigation	7/31/1955	LAKE GRANBURY	
4114	6	3		THOMAS BROTHERS GRASS LTD		Irrigation	7/31/1955	LAKE GRANBURY	
4115	6	1		H & H FEEDLOT INC	45	Industrial	12/31/1958		127
4116	6	1		MARJORIE HAMBRIGHT	2	Irrigation	12/31/1926		
4117	6	1		BETTY BELL	1	Irrigation	12/31/1955		
4118	6	1		ZANNA H ANDERSON	8	Irrigation	12/31/1963		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4119	6	1		ALFRED L CAREY ET UX	5	Irrigation	12/31/1963		5
4120	6	1		MAX D CARRIKER ESTATE ET AL	74	Irrigation	12/31/1937		15
4121	6	1		WILLARD L BURK	263	Irrigation	5/31/1936		26
4122	6	1		MAX D CARRIKER ESTATE	60	Irrigation	12/31/1962		22
4123	6	1		FREDDIE MAC STUART	17	Irrigation	2/29/1928		12
4124	1	1	4226	BRUCE E TODD	225	Irrigation	6/21/1982		180
4124	6	1		ALFRED S WALDROP ET AL	55	Irrigation	4/3/1926		
4126	6	1		BOYD H LAKEY	55	Irrigation	12/31/1949		20
4127	6	1		JAMES RANDOLPH SCOTT	120	Irrigation	4/30/1967		
4128	1	1	4451	FLOYD GUNN	102	Irrigation	5/8/1984		
4128	6	1		CITY OF SWEETWATER	2000	Municipal	10/8/1914	LAKE TRAMMEL	2500
4129	6	1		SWEETWATER COUNTRY CLUB INC	40	Irrigation	7/6/1916		892
4130	1	1	4450	UNITED STATES ARMY CORP ENG	5	Recreation	5/8/1984		5
4130	6	1		CITY OF SWEETWATER	2730	Municipal	10/17/1927	LAKE SWEETWATER	10000
4130	6	2		CITY OF SWEETWATER	960	Industrial	10/17/1927		
4130	6	3		CITY OF SWEETWATER	50	Irrigation	10/17/1927		
4132	6	1		HARRY C REAUGH & WIFE	212	Irrigation	12/31/1965		
4133	6	1		THOMAS HICKS ET UX	59.84	Irrigation	12/31/1964		
4133	6	2		KENNETH M FARRINGTON	165.16	Irrigation	12/31/1964		7
4134	6	1		BILLY DOAN	45	Irrigation	10/6/1969		
4135	1	1	4453	CITY OF CRAWFORD	55	Municipal	5/15/1983		230
4135	6	1		TIN CUP COUNTRY CLUB LP	28	Irrigation	5/2/1966		
4136	6	1		TLC INVESTMENTS LLC	338	Mining	7/22/1948		850
4136	6	2		TLC INVESTMENTS LLC	7	Industrial	7/22/1948		
4136	6	3		TLC INVESTMENTS LLC		Recreation	7/22/1948		
4137	6	1		TERRI THOMAS	54	Irrigation	7/13/1926		
4138	6	1		ROGER F BOYD ET UX	2	Irrigation	3/16/1964		
4139	6	1		CITY OF ABILENE		Municipal	8/3/1949	DIVERSION TO FT PHANTOM HILL	608
4140	1	1	4443	JOE D DUNCAN		Other	4/10/1984		
4140	6	1		RALPH BRIDWELL ET UX	10	Irrigation	12/31/1966		
4140	6	2		JAMES GRAY BRIDWELL	155	Irrigation	12/31/1966		
4141	6	1		DOLLY KEESEE	69	Irrigation	5/31/1967		
4142	6	1		CITY OF ABILENE	1675	Municipal	1/23/1918	LAKE ABILENE	11868
4143	6	1		KICKAPOO LAND CO	50	Recreation	12/18/1972		66
4144	6	1		FIRST CHOICE FEEDERS LP	73	Industrial	12/31/1964		120
4145	1	1	4454	JOHN W NIGLIAZZO ET UX	448	Irrigation	5/15/1984		
4145	6	1		BILL JAY ET AL	168	Industrial	12/31/1964		150
4146	6	1		J H TAYLOR GAS COMPANY	4	Irrigation	5/31/1948		6
4147	6	1		LEE ARTHUR PRESSWOOD	14	Irrigation	5/31/1963		
4148	6	1		RILEY G MAXWELL CO	3.48	Irrigation	8/31/1964		
4148	6	2		A L RHODES	0.01	Irrigation	8/31/1964		
4148	6	3		EDWARD DUSTY RHODES	1.51	Irrigation	8/31/1964		
4149	6	1		NOEL W PETRE	42	Irrigation	4/30/1963		
4150	6	1		CITY OF ABILENE	3880	Municipal	10/10/1927	LAKE KIRBY	8500
4150	6	2		CITY OF ABILENE		Industrial	10/10/1927	LAKE KIRBY	
4150	6	3		CITY OF ABILENE		Irrigation	10/10/1927		
4151	6	1		AEP TEXAS NORTH COMPANY	2500	Industrial	10/12/1928	UPPER LYTLE LAKE	
4152	6	1		LYTLE LAKE WCID	230	Municipal	6/10/1914	LYTLE LAKE	1184

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4152	6	2		LYTLE LAKE WCID	360	Industrial	11/21/1967	LYTLE LAKE	
4152	6	3		LYTLE LAKE WCID		Recreation	11/21/1967	LYTLE LAKE	
4153	6	1		CITY OF ABILENE		Industrial	6/10/1914		62
4153	6	2		CITY OF ABILENE		Recreation	6/10/1914		
4154	6	1		AEP TEXAS NORTH COMPANY		Industrial	5/12/1921	CEDAR CREEK	10
4155	6	1		RAYMOND MCNUTT	6	Irrigation	12/31/1959		
4156	6	1		ROY ELTON ROBBINS & WIFE	5	Irrigation	5/31/1964		
4157	6	1		H C WELCH	70	Irrigation	12/31/1967		
4158	6	1		ROY J GRIFFITH	75	Irrigation	11/30/1944		175
4158	6	2		ROY J GRIFFITH		Irrigation	11/30/1944		
4159	6	1		J C GRIFFITH	42	Irrigation	12/31/1938		80
4160	6	1		WOODROW W GRIFFITH		Recreation	10/15/1974		40
4161	6	1		CITY OF ABILENE	25690	Municipal	3/25/1937	FORT PHANTOM HILL RES	73960
4161	6	2		CITY OF ABILENE	4000	Industrial	3/25/1937	FORT PHANTOM HILL RES	
4161	6	3		CITY OF ABILENE	1000	Irrigation	3/25/1937	FORT PHANTOM HILL RES	
4162	6	1		JAMES H ICE	179	Irrigation	12/31/1959		
4163	6	1		PATRICIA A COOK ET AL	44	Irrigation	12/31/1959		
4164	6	1		J N MONTGOMERY & WIFE	32	Irrigation	12/31/1966		
4165	6	1		CITY OF ABILENE	3000	Municipal	9/3/1954		
4166	1	1	4470	SAMUEL W JONES ET UX	120	Irrigation	7/31/1984		
4166	1	2	4470	SAMUEL W JONES ET UX		Irrigation	7/31/1984		
4166	6	1		IRLENE M SMITH ET AL	32	Irrigation	12/31/1965		
4167	6	1		GEOCHEMICAL SURVEYS	40	Mining	8/28/1967		6
4168	6	1		ZOHN MILAM	15	Irrigation	5/31/1956		
4169	6	1		RICHARD SCHKADE	62	Irrigation	10/19/1970		
4169	6	2		RICHARD SCHKADE	5	Mining	10/19/1970		0.1
4170	6	1		J M ALEXANDER RANCH CO LTD	200	Irrigation	7/31/1962		
4171	1	1	4482	35/45 INVESTORS LP		Recreation	8/14/1984	EXEMPT RESERVOIR	19
4171	6	1		MARY LOIS WILSON	310	Irrigation	12/31/1918		
4172	6	1		VIOLET H FRAZIER	92	Irrigation	7/31/1963		
4173	6	1		VIOLET H FRAZIER	40	Irrigation	7/31/1965		
4174	6	1		MARILOU DOUTHIT RYDL		Recreation	10/2/1918		375
4174	6	2		ADRON STALEY		Recreation	10/2/1918		375
4174	6	3		C G VICKERS ET AL		Recreation	10/2/1918		375
4175	6	1		H R STASNEY & SONS LTD	21	Municipal	7/1/1926		108
4175	6	2		H R STASNEY & SONS LTD	63	Mining	7/1/1926		
4176	6	1		JOSEPH ELMER COX	28.8	Irrigation	12/31/1962		
4176	6	2		KIRK MERRITT ET UX	91.2	Irrigation	12/31/1962		1
4177	6	1		W B GRIFFITH ET AL	95	Irrigation	12/31/1955		18
4178	6	1		EMILEE G GOFF ET AL	78	Irrigation	12/31/1955		30
4179	6	1		CITY OF STAMFORD	10000	Municipal	6/8/1949	LAKE STAMFORD	59810
4179	6	2		CITY OF STAMFORD		Industrial	6/8/1949	LAKE STAMFORD	
4179	6	3		CITY OF STAMFORD		Storage	6/8/1949	COLLEGE LAKE	190
4179	6	4		CITY OF STAMFORD		Municipal	4/4/2000	DETENTION POND	705
4179	6	5		CITY OF STAMFORD		Industrial	4/4/2000	DETENTION POND	
4180	6	1		CITY OF HAMLIN	300	Municipal	3/3/1939		1900
4181	6	1		CITY OF ANSON	542	Municipal	4/18/1950	ANSON NORTH LAKE	2500
4182	6	1		CITY OF ANSON		Recreation	3/3/1975	CITY LAKE	560

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4183	6	1		MARSHALL D O'DELL	150	Irrigation	5/8/1978		7
4184	6	1		HASKELL COUNTY COUNTRY CLUB	7	Irrigation	7/25/1977	2 RES: 75 AF & 15 AF	75
4184	6	2		HASKELL COUNTY COUNTRY CLUB		Recreation	7/25/1977	2 RES: 75 AF & 15 AF	
4185	6	1		ERNEST D FINCHER	10	Irrigation	7/14/1975		10
4186	6	1		RAYMOND C TAYLOR ET AL	43	Irrigation	9/16/1966		60
4187	6	1		GEORGE E CLARK EXEMPT INVESTMENT TRUST	300	Irrigation	12/31/1952		
4188	6	1		T C HARRIS JR	40	Irrigation	12/31/1914		
4189	6	1		GEORGE E CLARK EXEMPT INVESTMENT TRUST	69	Irrigation	8/31/1958		
4190	6	1		BRECKENRIDGE PARTNERSHIP LTD	70	Irrigation	8/31/1958		
4191	6	1		MICHELLE SMITH	33.3803	Irrigation	5/31/1964		
4191	6	2		WILLIAM RANDOLPH SMITH	47.53	Irrigation	5/31/1964		
4191	6	3		DAVID IVAN BANDY ET AL	96.4122	Irrigation	5/31/1964		
4191	6	4		KILLION PARTNERS LTD	17.6775	Irrigation	5/31/1964		
4192	6	1		MRS W R POWERS ESTATE	30	Irrigation	12/31/1915		
4193	6	1		MONTY CHRIS CLEVELAND		Domestic/Livestock	4/13/1920		165
4194	6	1		CITY OF WOODSON		Storage	3/14/1963		1003
4194	6	2		STEPHENS REGIONAL SPECIAL UTILITY DIST	60	Municipal	3/14/1963		
4195	6	1		GILBERT E BRANDENBERGER ET UX	22	Irrigation	6/30/1962		
4196	6	1		ICBT BRAZOS BEND LLC	18	Irrigation	5/20/1967		
4197	6	1		J W SULLIVAN	20	Irrigation	12/31/1955		
4198	6	1		MONTY CHRIS CLEVELAND		Domestic/Livestock	2/16/1920		430
4199	6	1		OWEN D WOODWARD	98	Irrigation	12/31/1924		3
4200	6	1		CHARLES EZZELL ET UX		Domestic/Livestock	11/15/1976		200
4201	6	1		CITY OF BAIRD		Domestic/Livestock	6/19/1914	T P LAKE	390
4202	6	1		CITY OF BAIRD	550	Municipal	7/6/1949	BAIRD LAKE	2070
4203	6	1		A E DYER JR	24	Irrigation	7/31/1963	2 RES; 2.5 AF & 5 AF	7.5
4204	6	1		MARTHA W GEORGE ET AL	16	Irrigation	7/31/1963		
4205	6	1		EUGENE LEE FINLEY	50	Irrigation	12/31/1946		
4206	6	1		TERRY T POSEY ET UX	40	Irrigation	9/8/1927		13
4207	6	1		CITY OF MORAN	90	Municipal	4/2/1923	MORAN CITY LAKE & UNNAMED RE	181
4208	6	1		CITY OF ALBANY	600	Municipal	3/25/1941	MCCARTY LAKE	2600
4209	6	1		DAMSON OIL CORP ET AL	50	Industrial	3/3/1925	LAKE DELAFOSSE	773
4210	6	1		JAMES R GREEN	35	Irrigation	5/31/1965		72
4211	6	1		CITY OF CISCO	1971	Municipal	4/16/1920	LAKE CISCO	45000
4211	6	2		CITY OF CISCO	56	Industrial	9/5/1978		
4212	1	1	4528	CARL MOODY ET AL	300	Irrigation	1/3/1985		
4212	6	1		CITY OF CISCO	1000	Municipal	11/8/1954		110
4213	6	1		WEST CENTRAL TEXAS MWD	56000	Municipal	5/28/1957	HUBBARD CREEK LAKE	317750
4213	6	2		WEST CENTRAL TEXAS MWD		Industrial	5/28/1957		
4213	6	3		WEST CENTRAL TEXAS MWD		Irrigation	8/14/1972		
4213	6	4		WEST CENTRAL TEXAS MWD		Mining	5/28/1957		
4213	6	5		WEST CENTRAL TEXAS MWD		Domestic/Livestock	8/14/1972		
4214	6	1		CITY OF BRECKENRIDGE	2100	Municipal	4/26/1946	LAKE DANIEL	11400
4215	6	1		T C FAMBRO & SONS	6	Irrigation	7/31/1947		7
4216	6	1		SARAH SATTERWHITE	30	Irrigation	4/30/1966		
4217	6	1		SWANSON MULESHOE RANCH LTD	218	Mining	4/28/1975	GRAND LAKE	375
4218	1	1	4520	THE SILVER QUAIL COMPANY	172	Irrigation	11/27/1984		
4218	6	1		JACK T ROBERTSON JR	32	Irrigation	6/30/1955		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4219	6	1		ELLA PEARL ROBERTSON	22	Irrigation	12/31/1945		
4220	6	1		ELLA PEARL ROBERTSON	39	Irrigation	4/30/1964		
4221	6	1		ELLA PEARL ROBERTSON	42	Irrigation	8/31/1949		
4222	6	1		ELLA PEARL ROBERTSON	45	Irrigation	4/30/1961		
4223	6	1		BRECKENRIDGE GASOLINE CO	97	Industrial	6/1/1926		
4223	6	2		BRECKENRIDGE GASOLINE CO		Mining	6/1/1926		
4224	6	1		BRECKENRIDGE GASOLINE CO		Recreation	3/16/1920		454
4225	6	1		E E RILEY	30	Irrigation	12/31/1954		
4226	6	1		LAURA ELIZABETH STOKES ROACH	628	Irrigation	6/30/1961		
4227	6	1		C R BALDWIN JR	181	Irrigation	8/31/1946		
4242	6	1		WILLIAM T MORAN ESTATE		Recreation	10/6/1975		270
4244	6	1		DARRELL R HALL		Recreation	6/23/1975		290
4245	6	1		W T BRACEWELL		Recreation	4/14/1975		
4258	1	1	4567	CITY OF CLEBURNE	720	Municipal	5/21/1985		552
4264	1	1	4577	GEORGE BINGHAM ET AL	40	Irrigation	6/18/1985		
4266	1	1	4589	CITY OF ABILENE	4330	Irrigation	7/2/1985	7 HOLDING PONDS	1003.6
4266	1	2	4589	CITY OF ABILENE		Irrigation	7/2/1985	7 HOLDING PONDS	
4279	1	1	4591	WARRENS TURF NURSERY INC	52.2	Irrigation	7/9/1985		
4279	1	2	4591	HILLIARD RANCHES INC	606.47	Irrigation	7/9/1985		38
4279	1	3	4591	JAMES GREGORY WILSON ET AL	91.33	Irrigation	7/9/1985		
4315	6	1		CLIFFORD N AUTEN	30	Irrigation	12/31/1960		
4316	6	1		B W BOWERS & WIFE	75	Irrigation	12/31/1961		
4317	6	1		MARY ANN JENKINS ET AL	243	Irrigation	12/31/1963		
4318	6	1		CHS FARMS LTD	497	Irrigation	12/31/1921		
4318	6	2		JOHN MCPHERSON ET AL	150	Irrigation	12/31/1921		
4318	6	3		LAKEVIEW RECREATION ASSOCIATION INC	20	Irrigation	12/31/1921	2 RES	8.54
4318	6	4		SMITH BEND RANCH LTD	2153	Irrigation	12/31/1921		288
4318	6	5		SMITH BEND RANCH LTD		Municipal	12/31/1921		
4318	6	6		SMITH BEND RANCH LTD		Industrial	12/31/1921		
4319	6	1		BIRCH WILFONG	34	Irrigation	3/31/1962		
4320	6	1		WARREN D WHITLOW ET UX	84	Irrigation	7/31/1967		
4321	6	1		DAVID BALLEW	337	Irrigation	8/31/1963		
4322	6	1		RONALD LEE BURNETTE	175	Irrigation	6/30/1964		
4323	6	1		RONALD LEE BURNETTE	18	Irrigation	6/30/1956		
4323	6	2		KENNETH GAGE BURNETTE	155	Irrigation	6/30/1956		
4324	6	1		CHARLES L HARLESS ET UX	305	Irrigation	6/30/1965		12
4325	6	1		NELDA KATHRYN CARGILL	48	Irrigation	6/30/1967		
4326	6	1		DAN WELDON WILLIAMS	6	Irrigation	12/31/1959		
4327	6	1		DAN WELDON WILLIAMS	4	Irrigation	12/31/1959		
4328	6	1		GEORGE L MOORE	40	Irrigation	7/1/1964		
4329	6	1		THOMAS BROTHERS GRASS LTD	74	Industrial	12/31/1964		
4329	6	2		JIMMY LEWIS GIFFORD ET UX	856	Irrigation	12/31/1964		
4330	6	1		KARL LEE REDDELL & WIFE	16	Irrigation	12/31/1940		
4331	6	1		DIANA M WELLBORN ET AL	44	Irrigation	12/31/1940		
4332	6	1		KARL LEE REDDELL ET AL	32	Irrigation	12/31/1940		
4333	6	1		HILLSBORO COUNTRY CLUB	8	Irrigation	6/14/1976		18
4334	6	1		JOE R CUNNINGHAM ET UX	1	Irrigation	8/11/1964		50
4335	6	1		ALPHONS D URBANOVSKY	40	Irrigation	7/31/1964		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4336	6	1		FAYE SMITH ROMINE	55	Irrigation	6/30/1953		
4336	6	2		KAYE SMITH BOYD	55	Irrigation	6/30/1953		
4337	6	1		NATALIE RISINGER	58	Irrigation	6/30/1966		
4338	6	1		JIM G DOLLINS SR	130	Irrigation	5/23/1963		
4339	6	1		BONNIE T GEORGE	100	Irrigation	5/23/1963		
4339	6	2		CHARLENE WALKER		Irrigation	5/23/1963		
4339	6	3		JEANNETTE & BILLY O ENGLISH		Irrigation	5/23/1963		
4340	6	1		CITY OF WACO	5600	Municipal	6/29/1914	LAKE BRAZOS	3537
4340	6	2		CITY OF WACO		Industrial	6/29/1914	LAKE BRAZOS	
4340	6	3		CITY OF WACO		Recreation	1/8/1968	LAKE BRAZOS	
4342	6	1		TRADINGHOUSE POWER CO LLC	12000	Industrial	8/21/1926	TRADINGHOUSE CREEK LAKE	37800
4342	6	2		TRADINGHOUSE POWER CO LLC	15000	Industrial	9/16/1966	TRADINGHOUSE CREEK LAKE	
4343	6	1		OAK LAKE CLUB		Recreation	2/12/1973		
4344	6	1		LOLA ROBINSON	1060	Irrigation	3/16/1918		
4345	6	1		LUMINANT GENERATION CO LLC	10000	Industrial	3/6/1951	LAKE CREEK	8500
4346	6	1		W J DUBE	200	Irrigation	8/28/1925		
4347	6	1		VANCE DUNNAM JR	12	Irrigation	11/2/1970	TRIB OF SOUTH FORK COW BAYO	200
4348	6	1		JOE RAY HATTER SR	70	Irrigation	1/6/1965	TRIB OF S FK COW	
4349	6	1		RDS LAND CO LLC	199	Irrigation	1/23/1978		
4350	6	1		JOHN P ESTES ESTATE TRUST ET AL	20	Irrigation	5/24/1966	NORTH COW BAYOU	44
4351	6	1		MONT HAMM	160	Irrigation	5/2/1955		80
4352	6	1		GOELZER CATTLE COMPANY		Recreation	1/25/1965		569
4353	6	1		DENNIS L BIRKES ET AL	40	Irrigation	6/21/1965		200
4354	6	1		JEAN W EPPERSON	50	Irrigation	6/21/1965		
4355	6	1		CITY OF MARLIN	4000	Municipal	4/9/1948	NEW MARLIN RES	3135
4355	6	2		CITY OF MARLIN	2000	Municipal	11/27/1956		
4355	6	3		CITY OF MARLIN		Recreation	11/1/1976	MARLIN CITY LAKE	791
4355	6	4		CITY OF MARLIN	2000	Industrial	11/27/1956		
4355	6	5		CITY OF MARLIN		Recreation	6/16/1986	BRUSHY CR RES	6560
4356	6	1		DAVID L ROBERTS ET UX	84	Irrigation	2/7/1967		512
4356	6	2		DAVID L ROBERTS ET UX		Recreation	2/7/1967		
4357	6	1		CAMP FIRE INC BLUEBONNET COUNCIL		Recreation	2/11/1965		195
4358	6	1		JOHN C ISAACS ET AL	991	Irrigation	5/3/1982		
4359	6	1		JOHN C ISAACS ET AL	991	Irrigation	10/22/1925		
4360	6	1		CITY OF ROSEBUD	224	Municipal	11/28/1961	CITY LAKE	408
4361	6	1		ELIOT FAMILY LIMITED PARTNERSHIP	184	Irrigation	12/31/1961		
4362	6	1		LEE J FAZZINO ET UX	363	Irrigation	6/30/1959		
4363	6	1		JOE REISTINO ESTATE	1068	Irrigation	9/19/1983		
4363	6	2		JOE REISTINO ESTATE	432	Irrigation	12/31/1951		
4364	6	1		CLIFF A SKILES JR	724	Irrigation	12/31/1958		6
4365	6	1		WESLEY E ANDERSON ET AL	976	Irrigation	12/31/1953		
4366	6	1		ELLEN WIESE BRIEN ET AL	275	Irrigation	6/30/1957		
4366	6	2		ELLEN WIESE BRIEN ET AL	125	Irrigation	10/31/1983		
4367	6	1		CLIFFORD A SKILES ET UX	46.83	Irrigation	12/31/1959		
4367	6	2		PLANTERS AND MERCHANTS STATE BANK	98.17	Irrigation	12/31/1959		
4368	6	1		GLORIA ELY HOLDEN	76	Irrigation	8/31/1956		
4369	6	1		GENE W BONORDEN	4	Irrigation	12/31/1965		4
4370	6	1		ONAH B PENN ET AL	297	Irrigation	12/31/1954		15

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
4371	6	1		SAM F DESTEFANO	410	Irrigation	7/31/1956		
4371	6	2		SAM F DESTEFANO	290	Irrigation	2/7/1983		
4372	6	1		FORBIN INVESTMENTS N V	700	Irrigation	3/9/1981		120
4373	6	1		DRAYTON MCLANE JR		Recreation	2/24/1975		177
4373	6	2		DRAYTON MCLANE JR		Recreation	2/24/1975		156
4374	6	1		LAKE WOODROW INC		Recreation	6/26/1972		166
4375	6	1		FLOYD KEMPENSKI	2.3	Irrigation	12/31/1963		
4375	6	2		JOHN D KEMPENSKI ET UX	1.7	Irrigation	12/31/1963	2 RES EQUALLING 20 AF	20
4376	6	1		NELSON FAMILY FARMING TRUST	74	Irrigation	8/31/1963		
4377	6	1		GEORGE C GASSEN	20	Irrigation	12/31/1958	3 DAMS & RESERVOIRS	48
4378	6	1		ROBERT H BENBOW		Recreation	6/27/1977		166
4767	6	1		JAMES IRA DUFF	60	Irrigation	12/31/1961		
4987	6	1		CITY OF HUBBARD		Recreation	12/15/1975		
4988	6	1		ROSSON RANCHES INC		Recreation	7/6/1970		
4989	6	1		VELMA MASH ET AL	24	Irrigation	7/24/1972		
4990	6	1		F J MCCAULEY	8	Irrigation	8/11/1964		
4990	6	2		F J MCCAULEY		Recreation	8/11/1964		
4991	6	1		THE RUDMAN PARTNERSHIP ET AL	83	Irrigation	8/11/1964		
4991	6	2		THE RUDMAN PARTNERSHIP ET AL		Recreation	8/11/1964		
4996	6	1		CITY OF COOLIDGE	160	Municipal	11/27/1956	RESERVOIRS 1, 2, & 3	538
4996	6	2		CITY OF COOLIDGE	2	Industrial	11/30/1981	RESERVOIRS 1, 2, & 3	
4996	6	3		CITY OF COOLIDGE		Recreation	11/30/1981	RESERVOIRS 1, 2, & 3	
4999	6	1		CARL G LARAMORE	43	Irrigation	5/31/1961		96
4999	6	2		CARL G LARAMORE		Recreation	5/31/1961		
5000	1	1	5000	CITY OF MART	500	Municipal	9/3/1985	NEW LAKE MART	1640
5000	1	2	5000	CITY OF MART		Recreation	9/3/1985	NEW LAKE MART	
5000	6	1		JOHN MICHAEL PERCIFIELD ET AL	8	Irrigation	6/30/1966	SEE 08-4999 FOR 96-AF RES	
5000	6	2		JOHN MICHAEL PERCIFIELD ET AL		Recreation	6/30/1966	SEE 08-4999 FOR 96-AF RES	
5001	6	1		CITY OF ALVARADO	500	Municipal	8/29/1961	LAKE ALVARADO	4781
5001	6	2		CITY OF ALVARADO	300	Industrial	8/29/1961		
5002	6	1		DAN A PARKER ET UX	135	Irrigation	8/17/1970		
5004	6	1		GEORGE W MARTI ET AL	30	Irrigation	5/31/1965		65
5005	6	1		BILLIE LOUISE YOUNG	21	Irrigation	7/31/1963		
5006	6	1		ISLAND GROVE RANCH LTD	200	Irrigation	4/8/1975		239
5028	1	1	5028	O'GRADY SIX O RANCH & CATTLE CO LC		Recreation	11/8/1985		895
5053	1	1	5053	TEXAS MUNICIPAL POWER AGENCY		Mining	4/3/1986	6 RES. RESERVOIR DP-1	1420
5053	1	2	5053	TEXAS MUNICIPAL POWER AGENCY		Recreation	4/3/1986	RESERVOIR DP-1	
5053	1	3	5053	TEXAS MUNICIPAL POWER AGENCY		Other	4/3/1986	RESERVOIR DP-1	
5053	1	4	5053	TEXAS MUNICIPAL POWER AGENCY		Domestic/Livestock	4/3/1986	RESERVOIR DP-1	
5073	1	1	5073	THOMAS RANDOLPH SIMPSON	60	Irrigation	7/8/1986		
5076	1	1	5076	HAYNES CORPORATION	25	Irrigation	7/18/1986		
5077	1	1	5077	BILL F FULTON ET UX	600	Irrigation	7/21/1986		
5081	1	1	5081	BRAZOS COAL LIMITED		Recreation	8/6/1986	RES 4, RES 11, RES 12	106
5085	1	1	5085	CITY OF ROBINSON	3290	Municipal	8/14/1986		1550
5085	1	2	5085	CITY OF ROBINSON	3172	Municipal	8/14/1986		2197
5085	1	3	5085	CITY OF ROBINSON	1805	Municipal	8/14/1986		1290
5085	1	4	5085	CITY OF ROBINSON	4833	Municipal	8/14/1986		3000
5088	1	1	5088	TC & E REALTY INC	37	Irrigation	8/19/1986		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
5089	1	1	5089	TC & E REALTY INC	60	Irrigation	8/19/1986		
5094	1	1	5094	CITY OF WACO	20081	Municipal	9/12/1986	LAKE WACO ENLARGEMENT	87962
5094	1	2	5094	CITY OF WACO	688	Municipal	1/21/1988	LAKE WACO ENLARGEMENT	
5094	1	3	5094	CITY OF WACO		Recreation	9/12/1986	LAKE WACO ENLARGEMENT	
5106	1	1	5106	WALNUT CREEK MINING COMPANY		Mining	10/22/1986		95
5116	6	1		RED RIVER AUTHORITY		Other	9/20/1976	TRUSCOTT BRINE RES	107000
5117	1	1	5117	WALNUT CREEK MINING COMPANY		Other	12/31/1986	SPC 17 & SPC 3	126
5118	1	1	5118	KILLEEN SAVINGS & LOAN ASSN		Recreation	1/12/1987		3
5119	6	1		INEZ H BOYD ET AL	20	Irrigation	9/8/1969		
5132	1	1	5132	TEXAS MUNICIPAL POWER AGENCY		Industrial	5/13/1987	RESERVOIRS P-14, SP-7, SP-4, SP-	2157
5132	1	2	5132	TEXAS MUNICIPAL POWER AGENCY		Recreation	5/13/1987	RESERVOIRS P-14, SP-7, SP-4, SP-8, DITCH CD	
5132	1	3	5132	TEXAS MUNICIPAL POWER AGENCY		Other	5/13/1987	RESERVOIRS P-14, SP-7, SP-4, SP-8, DITCH CD	
5132	1	4	5132	TEXAS MUNICIPAL POWER AGENCY		Domestic/Livestock	5/13/1987	RESERVOIRS P-14, SP-7, SP-4, SP-8, DITCH CD	
5148	1	1	5148	ALTURA POWER LP	458	Industrial	7/23/1987		178
5155	6	1		BRAZOS RIVER AUTHORITY	230750	Municipal	4/6/1938	POSSUM KINGDOM LAKE	724739
5155	6	2		BRAZOS RIVER AUTHORITY		Industrial	4/6/1938	POSSUM KINGDOM LAKE	
5155	6	3		BRAZOS RIVER AUTHORITY		Irrigation	4/6/1938	POSSUM KINGDOM LAKE	
5155	6	4		BRAZOS RIVER AUTHORITY		Mining	4/6/1938	POSSUM KINGDOM LAKE	
5155	6	5		BRAZOS RIVER AUTHORITY		Hydropower	4/6/1938	POSSUM KINGDOM LAKE	
5155	6	6		BRAZOS RIVER AUTHORITY		Recreation	4/6/1938	POSSUM KINGDOM LAKE	
5156	6	1		BRAZOS RIVER AUTHORITY	64712	Municipal	2/13/1964	LAKE GRANBURY	155000
5156	6	2		BRAZOS RIVER AUTHORITY		Industrial	2/13/1964	LAKE GRANBURY	
5156	6	3		BRAZOS RIVER AUTHORITY		Irrigation	2/13/1964	LAKE GRANBURY	
5156	6	4		BRAZOS RIVER AUTHORITY		Mining	2/13/1964	LAKE GRANBURY	
5156	6	5		BRAZOS RIVER AUTHORITY		Recreation	2/13/1964	LAKE GRANBURY	
5157	6	1		BRAZOS RIVER AUTHORITY	18336	Municipal	8/30/1982	LAKE WHITNEY	50000
5157	6	2		BRAZOS RIVER AUTHORITY		Industrial	8/30/1982	LAKE WHITNEY	
5157	6	7		BRAZOS RIVER AUTHORITY		Recreation	8/30/1982	LAKE WHITNEY	
5158	6	1		BRAZOS RIVER AUTHORITY	13896	Municipal	10/25/1976	LAKE AQUILLA	52400
5158	6	2		BRAZOS RIVER AUTHORITY		Industrial	10/25/1976	LAKE AQUILLA	
5158	6	3		BRAZOS RIVER AUTHORITY		Mining	10/25/1976	LAKE AQUILLA	
5158	6	4		BRAZOS RIVER AUTHORITY		Recreation	10/25/1976	LAKE AQUILLA	
5159	6	1		BRAZOS RIVER AUTHORITY	19658	Municipal	12/16/1963	LAKE PROCTOR	59400
5159	6	2		BRAZOS RIVER AUTHORITY		Industrial	12/16/1963	LAKE PROCTOR	
5159	6	3		BRAZOS RIVER AUTHORITY		Irrigation	12/16/1963	LAKE PROCTOR	
5159	6	4		BRAZOS RIVER AUTHORITY		Mining	12/16/1963	LAKE PROCTOR	
5159	6	5		BRAZOS RIVER AUTHORITY		Recreation	12/16/1963	LAKE PROCTOR	
5160	1	1	5160	CAMP COOLEY LTD		Domestic/Livestock	10/2/1987	ARTESIAN & WOLF LAKES DAMS	923.2
5160	1	2	5160	CAMP COOLEY LTD	456	Irrigation	7/27/1999	ARTESIAN & WOLF LAKES DAMS	
5160	1	3	5160	CAMP COOLEY LTD	480	Storage	7/27/1999	ARTESIAN & WOLF LAKES DAMS	480
5160	6	1		BRAZOS RIVER AUTHORITY	100257	Municipal	12/16/1963	LAKE BELTON	457600
5160	6	2		BRAZOS RIVER AUTHORITY		Industrial	12/16/1963	LAKE BELTON	
5160	6	3		BRAZOS RIVER AUTHORITY		Irrigation	12/16/1963	LAKE BELTON	
5160	6	4		BRAZOS RIVER AUTHORITY		Mining	12/16/1963	LAKE BELTON	
5160	6	5		BRAZOS RIVER AUTHORITY		Recreation	12/16/1963	LAKE BELTON	
5161	1	1	5161	WILLIAM D CARROLL ET UX	54	Irrigation	11/13/1987		
5161	6	1		BRAZOS RIVER AUTHORITY	67768	Municipal	12/16/1963	LAKE STILLHOUSE HOLLOW	235700
5161	6	2		BRAZOS RIVER AUTHORITY		Industrial	12/16/1963	LAKE STILLHOUSE HOLLOW	

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
5161	6	3		BRAZOS RIVER AUTHORITY		Irrigation	12/16/1963	LAKE STILLHOUSE HOLLOW	
5161	6	4		BRAZOS RIVER AUTHORITY		Mining	12/16/1963	LAKE STILLHOUSE HOLLOW	
5161	6	5		BRAZOS RIVER AUTHORITY		Recreation	12/16/1963	LAKE STILLHOUSE HOLLOW	
5162	1	1	5162	CITY OF ASPERMONT	8	Irrigation	11/12/1987		1196
5162	6	1		BRAZOS RIVER AUTHORITY	13610	Municipal	2/12/1968	LAKE GEORGETOWN	37100
5162	6	2		BRAZOS RIVER AUTHORITY		Industrial	2/12/1968	LAKE GEORGETOWN	
5162	6	3		BRAZOS RIVER AUTHORITY		Irrigation	2/12/1968	LAKE GEORGETOWN	
5162	6	4		BRAZOS RIVER AUTHORITY		Mining	2/12/1968	LAKE GEORGETOWN	
5162	6	5		BRAZOS RIVER AUTHORITY		Recreation	2/12/1968	LAKE GEORGETOWN	
5163	6	1		BRAZOS RIVER AUTHORITY	19840	Municipal	2/12/1968	LAKE GRANGER	65500
5163	6	2		BRAZOS RIVER AUTHORITY		Industrial	2/12/1968	LAKE GRANGER	
5163	6	3		BRAZOS RIVER AUTHORITY		Irrigation	2/12/1968	LAKE GRANGER	
5163	6	4		BRAZOS RIVER AUTHORITY		Mining	2/12/1968	LAKE GRANGER	
5163	6	5		BRAZOS RIVER AUTHORITY		Recreation	2/12/1968	LAKE GRANGER	
5164	6	1		BRAZOS RIVER AUTHORITY	48000	Municipal	12/16/1963	LAKE SOMERVILLE	160110
5164	6	2		BRAZOS RIVER AUTHORITY		Industrial	12/16/1963	LAKE SOMERVILLE	
5164	6	3		BRAZOS RIVER AUTHORITY		Irrigation	12/16/1963	LAKE SOMERVILLE	
5164	6	4		BRAZOS RIVER AUTHORITY		Mining	12/16/1963	LAKE SOMERVILLE	
5164	6	5		BRAZOS RIVER AUTHORITY		Recreation	12/16/1963	LAKE SOMERVILLE	
5165	6	1		BRAZOS RIVER AUTHORITY	65074	Municipal	5/6/1974	LAKE LIMESTONE	225400
5165	6	2		BRAZOS RIVER AUTHORITY		Industrial	5/6/1974	LAKE LIMESTONE	
5165	6	3		BRAZOS RIVER AUTHORITY		Irrigation	5/6/1974	LAKE LIMESTONE	
5165	6	4		BRAZOS RIVER AUTHORITY		Mining	5/6/1974	LAKE LIMESTONE	
5165	6	5		BRAZOS RIVER AUTHORITY		Recreation	5/6/1974	LAKE LIMESTONE	
5188	1	1	5188	CITY OF TAYLOR		Recreation	7/20/1988		11.62
5226	1	1	5226	CITY OF TEMPLE		Recreation	3/28/1989		
5227	1	1	5227	FIVE WELLS RANCH COMPANY		Domestic/Livestock	3/30/1989		295
5255	1	1	5255	GLORIA JEAN DUKES	75	Irrigation	8/28/1989		
5268	6	1		CITY OF BRYAN	55708	Industrial	5/30/1972		15227
5268	6	2		CITY OF BRYAN		Recreation	5/30/1972		
5269	6	1		THE TRAVELERS INSURANCE CO	37.82	Irrigation	1/30/1978		
5269	6	2		R O LAWRENCE III ET UX	716.73	Irrigation	1/30/1978		
5269	6	3		WILLARD H ZUMWALT JR ET UX	180.45	Irrigation	1/30/1978		
5270	6	1		LEISURE LAKE INC		Recreation	6/1/1976		
5271	6	1		TEXAS A&M UNIVERSITY	1200	Irrigation	5/11/1954		64
5271	6	2		TEXAS A&M UNIVERSITY	420	Industrial	9/21/1970		
5272	6	1		ALCOA INC	14000	Industrial	12/12/1951	ALCOA LAKE	15650
5273	6	1		ROCKDALE COUNTRY CLUB	1	Irrigation	10/11/1977		2
5274	1	1	5274	J R GRIMSHAW ET UX	25	Irrigation	12/13/1989		
5274	6	1		JOHN MEKOLIK & WIFE	18	Irrigation	9/23/1974		
5275	6	1		LUDWIG M KIPP & WIFE	58	Irrigation	7/28/1969		
5276	6	1		GEORGE W SPRANKLE	2.25	Irrigation	6/26/1972		
5277	6	1		TOMMY BREDTHAUER ET AL	20	Irrigation	6/30/1959	RES 1, RES 2, RES 3	101
5278	6	1		K L NIXON		Recreation	11/16/1950		135.2
5279	6	1		BIRCH CREEK FOREST PROPERTIES		Recreation	12/2/1974	RES 1, RES 2, RES 3	15
5280	6	1		WALDO NIENSTEDT	20	Industrial	6/1/1981		4
5281	6	1		HARRY H BOWERS		Recreation	3/3/1980		60
5282	1	1	5282	CITATION 1994 INVEST LTD PART	235	Mining	2/2/1990		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
5282	6	1		RUSSELL F WIGGINS		Recreation	11/9/1981	EAST-WEST LAKE & LAKE NO 3	675
5283	6	1		BEAVER CREEK DEVELOPERS		Recreation	2/3/1975		113
5284	6	1		SEALY & ROBERT HUTCHINGS	30	Irrigation	1/9/1967	EXEMPT LAKE	
5285	6	1		WILLIAM J TERRELL ET AL	752	Irrigation	12/20/1982		
5286	6	1		JOYCE ANN FREDE	463.973	Irrigation	12/31/1956		
5286	6	2		JOYCE ANN FREDE	403.455	Irrigation	12/31/1956		
5286	6	3		WILLIE BALDOBINO ET UX	53.527	Irrigation	12/31/1956		
5286	6	4		WILLIE BALDOBINO ET UX	46.545	Irrigation	12/31/1956		
5287	6	1		BISTONE MUNICIPAL WSD	2887	Municipal	4/15/1957	LAKE MEXIA	9600
5287	6	2		BISTONE MUNICIPAL WSD	65	Industrial	4/15/1957		
5288	6	1		TEXAS PARKS & WILDLIFE DEPT	6	Irrigation	1/18/1939	FORT PARKER LAKE	3100
5288	6	2		TEXAS PARKS & WILDLIFE DEPT		Recreation	1/18/1939	FORT PARKER LAKE	
5289	6	1		CITY OF GROESBECK	2500	Municipal	6/13/1921		150
5290	1	1	5290	TEXAS DEPT OF CRIMINAL JUSTICE	250	Irrigation	4/3/1990		30
5290	1	2	5290	TEXAS DEPT OF CRIMINAL JUSTICE	598	Irrigation	4/3/1990		277
5290	6	1		ERNI LUNA ET AL	8	Irrigation	12/4/1972		
5294	6	1		D G BROWN		Recreation	12/31/1954	BROWNS LAKE	186.8
5295	1	1	5295	JAY D & DEBORAH MILLS	200	Irrigation	5/11/1990	RESERVOIR 1	175
5295	6	1		J G KENNEDY		Recreation	3/29/1976	KENNEDY LAKE	285
5297	6	1		CAMP COOLEY LTD		Recreation	4/3/1972	ANTELOPE LAKE	420
5298	6	1		TXU ELECTRIC CO	1378000	Industrial	7/1/1974	TWIN OAK RESERVOIR	30319
5300	6	1		DAVID PATE ET UX		Recreation	4/11/1955	KURY LAKE	290
5301	6	1		CAMP CREEK WATER CO		Recreation	6/14/1948	CAMP CREEK LAKE	8400
5305	6	1		JOHN E SMITH		Recreation	1/17/1977	OAKLAND LAKE	272
5306	6	1		SELECTED LANDS LTD NO 18		Recreation	4/28/1975	K RANCH LAKE	216
5307	6	1		TEXAS MUNICIPAL POWER AGENCY	6000	Industrial	12/15/1980	NAVASOTA RIVER INTAKE	17
5308	6	1		BRIARCREST COUNTRY CLUB INC	12	Irrigation	9/27/1976		12
5308	6	2		BRIARCREST COUNTRY CLUB INC		Recreation	9/27/1976		
5309	6	1		CITY OF BRYAN		Recreation	1/6/1975	COUNTRY CLUB LAKE	73
5310	6	1		CARTER LAKE HOME OWNERS CORP		Recreation	1/6/1969	CARTER LAKE	481
5311	6	1		TEXAS MUNICIPAL POWER AGENCY	9740	Industrial	2/22/1977	GIBBONS CREEK RES	32084
5312	6	1		TEXAS MUNICIPAL POWER AGENCY	200	Mining	5/24/1982	LAKE CARLOS	91.9
5312	6	2		TEXAS MUNICIPAL POWER AGENCY		Industrial	5/24/1982	LAKE CARLOS	
5312	6	3		TEXAS MUNICIPAL POWER AGENCY		Recreation	5/24/1982	LAKE CARLOS	
5312	6	4		TEXAS MUNICIPAL POWER AGENCY		Other	5/24/1982	LAKE CARLOS	
5312	6	5		TEXAS MUNICIPAL POWER AGENCY		Domestic/Livestock	5/24/1982	LAKE CARLOS	
5313	6	1		TEXAS MUNICIPAL POWER AGENCY		Recreation	8/9/1971	WALTRIP LAKE	519
5314	6	1		WOODLAKE PRESERVATION ASSOCIATION		Recreation	10/21/1974	FRIERSON LAKE	230
5315	6	1		NAVASOTA FISHING CLUB INC		Recreation	2/14/1972		
5316	6	1		CHAPPELL HILLS INC		Recreation	4/7/1980	RES 1, 2, 3, 4, 5	56
5326	1	1	5326	WALNUT CREEK MINING COMPANY		Industrial	10/24/1990	STRUCTURES SPC-4 & SPC-18	49.8
5329	1	1	5329	PEBBLE CREEK COUNTRY CLUB INC	325	Irrigation	11/16/1990		16
5329	1	2	5329	PEBBLE CREEK COUNTRY CLUB INC		Recreation	11/16/1990		16
5330	1	1	5330	CITY OF TEMPLE	187	Irrigation	11/19/1990	LAKE JIM THORNTON & MARVIN F	210.5
5330	1	2	5330	CITY OF TEMPLE		Recreation	11/19/1990		
5345	1	1	5345	TAC REALTY INC		Recreation	2/8/1991		14.3
5346	1	1	5346	SPECIAL CAMPS FOR SPECIAL KIDS		Recreation	3/8/1991		90
5349	1	1	5349	BRAZOS FARM LTD	780	Irrigation	2/28/1991		

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
5354	1	1	5354	TEXAS MUNICIPAL POWER AGENCY	200	Industrial	4/1/1991	SP-13 & SP-20	191.4
5357	1	1	5357	COLLEGE STATION, CITY OF		Recreation	4/11/1991	WOLF PEN CR	13.35
5367	6	1		CAMP COOLEY LTD		Recreation	2/25/1974		1298
5385	1	1	5385	NANTUCKET LTD		Recreation	9/19/1991		
5416	1	1	5416	JAMES DONALD CHESTER	10	Irrigation	4/15/1992		13
5419	6	1		DELBERT L GERSCH	11	Irrigation	7/31/1965		
5422	1	1	5422	ARKEMA INC	119	Other	6/10/1992		
5430	6	1		DORMAN SELL FARM INC	20	Irrigation	6/28/1971	1 RESERVOIR	275
5431	6	1		KERMIT BLUME	15	Irrigation	7/31/1958	1 RESERVOIR	159
5435	1	1	5435	PLAINS PETROLEUM OPERATING CO	235	Mining	11/5/1992		
5447	1	1	5447	PALO PINTO MWD 1	1153	Recreation	2/3/1993		1153
5458	1	1	5458	TEXAS MUNICIPAL POWER AGENCY	100	Industrial	4/5/1993	POND SP-50	253
5470	6	1		CLIFFORD A SKILES JR ET UX	514	Irrigation	11/22/1917		
5473	1	1	5473	TEXAS MUNICIPAL POWER AGENCY	10	Industrial	11/19/1993	POND SP-64	5.7
5482	1	1	5482	WALNUT CREEK MINING COMPANY		Other	6/29/1994	POND SPC-22	7.6
5533	1	1	5533	DEL WEBB TEXAS LP	26.1	Irrigation	7/11/1995	RES 1, RES 2, RES 3	45.4
5540	1	1	5540	ALCOA INC		Domestic/Livestock	10/9/1995	NORTH END LAKE	356.1
5540	1	2	5540	ALCOA INC		Other	10/9/1995	E-AREA END LAKE	7173.3
5551	1	1	5551	CITY OF CLIFTON	2004	Municipal	4/3/1996		2000
5566	1	1	5566	STEWART & MARY THOMPSON &TRUST	250	Irrigation	1/15/1997		7
5570	1	1	5570	DAVID MOODY TRUSTEE ET AL	365	Irrigation	1/17/1997		
5594	1	1	5594	BRADLEY B WARE	130	Irrigation	7/1/1997		
5603	1	1	5603	WILLIAM GAVRANOVIC JR	3500	Irrigation	10/10/1997		
5603	1	2	5603	WILLIAM GAVRANOVIC JR	850	Irrigation	10/10/1997		
5616	1	1	5616	PROTESTANT EPISCOPAL CHURCH COUNCIL TX		Recreation	9/30/1998		730.3
5619	1	1	5619	CITY OF STEPHENVILLE		Recreation	11/30/1998		2
5619	1	2	5619	CITY OF STEPHENVILLE		Recreation	11/30/1998		2
5628	1	1	5628	BLUEGREEN SOUTHWEST		Recreation	5/5/1999	RES NO 2, NORTH SITE RESERVOI	1773
5628	1	2	5628	BLUEGREEN SOUTHWEST		Recreation	5/5/1999	RES NO 1, SOUTH SITE RESERVOI	538
5658	1	1	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	MALLOW POND	10
5658	1	2	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	CEDAR ELM POND	30
5658	1	3	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	D'S POND	40
5658	1	4	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	FLIPPAN POND	30
5658	1	5	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	KITE POND	38
5658	1	6	5658	UNITED STATES ARMY CORPS OF ENGINEERS		Other	10/18/1999	ZGABAY POND	60
5658	1	7	5658	UNITED STATES ARMY CORPS OF ENGINEERS	1000	Other	10/18/1999	FLAG POND	900
5667	1	1	5667	NNP-TERAVISTA LP		Recreation	12/13/1999	12 ON-CHANNEL RESERVOIRS	90.64
5677	1	2	5677	LOWER COLORADO RIVER AUTHORITY		Municipal	2/2/2000		
5680	1	1	5680	RONNIE P STEPHENS ET UX		Irrigation	3/3/2000		3.3
5689	1	1	5689	LEE J FAZZINO ET UX	492	Irrigation	6/23/2000		
5690	1	1	5690	LEE J FAZZINO ET UX	414	Irrigation	6/23/2000		
5691	1	1	5691	LEE J FAZZINO ET UX	200	Irrigation	6/23/2000		
5692	1	1	5692	ZEBRA INVESTMENTS INC	67	Mining	7/19/2000		
5715	1	1	5715	LOWER COLORADO RIVER AUTHORITY	882	Municipal	10/30/2000	LOMETA RESERVOIR	
5715	1	2	5715	LOWER COLORADO RIVER AUTHORITY		Storage	10/30/2000	LOMETA RESERVOIR	554.6
5729	1	1	5729	MICHAEL HORTON ET UX	60	Irrigation	2/7/2001		
5729	1	2	5729	MICHAEL HORTON ET UX		Domestic/Livestock	2/7/2001		48
5730	1	1	5730	BRAZOS RIVER AUTHORITY	25000	Municipal	3/7/1938	LAKES TRAVIS & BUCHANAN	

TABLE G-1. Brazos River Basin Water Rights in Region G

Water Right Number	Type (6 = Certificate of Adjudication, 1 = Permit)	Sequence	Permit #	OwnerName	Annual Authorized Diversion (acft)	Use Type	Priority (yyyymmdd)	Reservoir Name	Reservoir Capacity (acft)
5730	1	2	5730	BRAZOS RIVER AUTHORITY		Industrial	3/7/1938	LAKES TRAVIS & BUCHANAN	
5730	1	3	5730	BRAZOS RIVER AUTHORITY		Irrigation	3/7/1938	LAKES TRAVIS & BUCHANAN	
5738	1	1	5738	TEXAS MUNICIPAL POWER AGENCY ET AL		Recreation	2/5/2001	POND B1P-5	207.95
5741	1	1	5741	TEXAS MUNICIPAL POWER AGENCY		Recreation	5/24/2001	POND A1P-1	631.2
5741	1	2	5741	TEXAS MUNICIPAL POWER AGENCY		Recreation	5/24/2001	POND B1P-6	571.3
5744	1	1	5744	SOMERVELL COUNTY WATER DISTRICT	5000	Municipal	6/27/2001	PALUXY RIVER RESERVOIR	35.2
5744	1	2	5744	SOMERVELL COUNTY WATER DISTRICT		Industrial	6/27/2001	PALUXY RIVER RESERVOIR	
5744	1	3	5744	SOMERVELL COUNTY WATER DISTRICT		Irrigation	6/27/2001	PALUXY RIVER RESERVOIR	
5744	1	4	5744	SOMERVELL COUNTY WATER DISTRICT		Recreation	6/27/2001	PALUXY RIVER RESERVOIR	
5744	1	5	5744	SOMERVELL COUNTY WATER DISTRICT		Municipal	6/27/2001	WHEELER BRANCH RESERVOIR	4118
5744	1	6	5744	SOMERVELL COUNTY WATER DISTRICT		Industrial	6/27/2001	WHEELER BRANCH RESERVOIR	
5744	1	7	5744	SOMERVELL COUNTY WATER DISTRICT		Irrigation	6/27/2001	WHEELER BRANCH RESERVOIR	
5744	1	8	5744	SOMERVELL COUNTY WATER DISTRICT		Recreation	6/27/2001	WHEELER BRANCH RESERVOIR	
5748	1	1	5748	CITY OF NAVASOTA	430	Irrigation	2/28/2003		0.2521
5752	1	1	5752	WILLIAM GAVRANOVIC ET UX	1200	Irrigation	10/18/2001		
5752	1	2	5752	WILLIAM GAVRANOVIC ET UX		Irrigation	10/18/2001		
5752	1	3	5752	WILLIAM GAVRANOVIC ET UX		Irrigation	10/18/2001		
5752	1	4	5752	WILLIAM GAVRANOVIC ET UX		Irrigation	10/18/2001	OFF-CHANNEL RES	367.26
5752	1	5	5752	WILLIAM GAVRANOVIC ET UX	1260	Irrigation	10/18/2001		
5753	1	1	5753	BAR W RANCH	100	Irrigation	10/15/2001		83.5
5755	1	1	5755	RIVER PLACE PROPERTY OWNERS ASSN INC		Recreation	12/4/2001		132.65
5770	1	1	5770	TXU MINING COMPANY LP	685	Mining	4/3/2002		
5770	1	2	5770	TXU MINING COMPANY LP		Mining	4/3/2002		
5770	1	3	5770	TXU MINING COMPANY LP		Mining	4/3/2002		
5770	1	4	5770	TXU MINING COMPANY LP		Mining	4/3/2002		
5771	1	1	5771	BUHARI INC	2	Irrigation	4/12/2002		20.8
5771	1	2	5771	BURL G HARRIS	18	Irrigation	4/12/2002		
5788	1	1	5788	SMILING MALLARD DEVELOPMENT LTD		Recreation	9/30/2002	LAKE ARAPAHO	436
5791	1	1	5791	EDWARD D JOHNSON ET UX	40	Irrigation	11/14/2002	RES 1 AND RES 2	89.3
5802	1	1	5802	CITY OF ALBANY	50	Irrigation	4/10/2003		5
5802	1	2	5802	CITY OF ALBANY		Recreation	4/10/2003		
5803	1	1	5803	ALCOA INC	650	Industrial	7/24/2003	POND 026	936
5803	1	2	5803	ALCOA INC		Irrigation	7/24/2003	C AREA RESERVOIR	13492
5803	1	3	5803	ALCOA INC		Mining	7/24/2003		
5803	1	4	5803	ALCOA INC		Domestic/Livestock	7/24/2003		
5816	1	1	5816	ALCOA INC	650	Industrial	10/23/2003	RESERVOIR F	506
5816	1	2	5816	ALCOA INC		Irrigation	10/23/2003	RESERVOIR FG-1	462
5816	1	3	5816	ALCOA INC		Mining	10/23/2003	RESERVOIR FG-2	1669
5816	1	4	5816	ALCOA INC		Domestic/Livestock	10/23/2003	RESERVOIR G	1743
5858	1	1	5858	TEXAS MUNICIPAL POWER AGENCY		Recreation	10/21/2004	26 ON-CHANNEL RESERVOIRS	3515.4
5858	1	2	5858	TEXAS MUNICIPAL POWER AGENCY		Other	10/21/2004	26 ON-CHANNEL RESERVOIRS	
5882	1	1	5882	KIMBERLIN PK TRST/CHARLOTTE J PARKS TRST		Recreation	4/18/2005		1282
5882	1	2	5882	KIMBERLIN PK TRST/CHARLOTTE J PARKS TRST		Other	4/18/2005		
5882	1	3	5882	KIMBERLIN PK TRST/CHARLOTTE J PARKS TRST		Domestic/Livestock	4/18/2005		
5899	1	1	5899	CITY OF MERIDIAN	1336	Municipal	9/8/2005		
12023	1	1	12023	KIM R SMITH LOGGING INC		Domestic/Livestock	7/20/2006		
12023	1	2	12023	KIM R SMITH LOGGING INC		Recreation	7/20/2006		

(This page intentionally left blank.)

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2201_1	197	0	0	IRRERAT	ERATH	IRRIGATION	"A. B. COPELAND, JR."
C2205_1	150	0	0	IRRERAT	ERATH	IRRIGATION	JACK BERRY
C2206_1	60	0	0	IRRERAT	ERATH	IRRIGATION	H. W. NORTHCUTT
C2207_1	23	0	0	IRRERAT	ERATH	IRRIGATION	"ELVIS RAY STONE SR, ET AL"
C2208_1	40	0	0	IRRERAT	ERATH	IRRIGATION	B R FANNING
C2208_2	20	0	0	IRRMCLE	MCLENNAN	IRRIGATION	JOHN MOCEK ET UX
C2209_1	3	0	0	IRRERAT	ERATH	IRRIGATION	H. B. LANE
C2210_1	92	0	0	IRRERAT	ERATH	IRRIGATION	RAYMOND L. JARRATT
C2211_1	85	0	0	IRRERAT	ERATH	IRRIGATION	J. T. HICKS
C2215_1	54	0	0	IRRERAT	ERATH	IRRIGATION	GREAT SOUTHERN RANCH INC
C2216_1	54	0	0	IRRERAT	ERATH	IRRIGATION	CRAIG W. RAY
C2219_1	13	0	0	IRRERAT	ERATH	IRRIGATION	"JAMES F JOHNSON, ET UX"
C2220_1	12	0	0	IRRERAT	ERATH	IRRIGATION	HAROLD PACK
C2221_1	18	0	0	IRRERAT	ERATH	IRRIGATION	KENNETH & BETTY YVON LESLEY
C2222_1	110	0	0	IRRERAT	ERATH	IRRIGATION	HARM & ZWAANTINA TE VELDE TRST
C2225_1	34	0	0	IRRERAT	ERATH	IRRIGATION	TY MURRAY
C2226_1	61	0	0	IRRERAT	ERATH	IRRIGATION	T T FAIR ET UX
C2227_1	60	0	0	IRRERAT	ERATH	IRRIGATION	CHARLIE S EVERETT & WIFE
C2228_1	60	15	19	IRRERAT	ERATH	IRRIGATION	SWAN E RICHARDSON JR
C2229_1	44	0	0	IRRERAT	ERATH	IRRIGATION	J B MCCONNELL
C2230_1	76	0	0	IRRERAT	ERATH	IRRIGATION	TY MURRAY
C2231_1	42	0	0	IRRERAT	ERATH	IRRIGATION	ESTATE OF C C WINTERS
C2232_1	16	6	7	IRRERAT	ERATH	IRRIGATION	CHARLES A & ROBERT S ELLIOTT
C2233_1	18	0	0	IRRERAT	ERATH	IRRIGATION	J W OGLE ET AL
C2234_1	125	0	0	IRRERAT	ERATH	IRRIGATION	BRUCE E TODD
C2235_1	8	0	0	IRRERAT	ERATH	IRRIGATION	7 M RANCH TRUST
C2236_1	24	0	0	IRRERAT	ERATH	IRRIGATION	BRUCE E TODD
C2237_1	90	0	0	IRRERAT	ERATH	IRRIGATION	MAX L GORDON & ELOISE GORDON
C2238_1	130	5	5	IRRERAT	ERATH	IRRIGATION	JON DAVID MAYFIELD TRUST
C2238_2	99	8	8	IRRERAT	ERATH	IRRIGATION	0
C2239_1	32	3	3	IRRERAT	ERATH	IRRIGATION	A. H. LINNE
C2240_1	137	0	0	IRRERAT	ERATH	IRRIGATION	A DWAIN MAYFIELD ET AL
C2241_1	33	0	0	IRRERAT	ERATH	IRRIGATION	"WAYNE PITTMAN, ET AL"
C2242_1	40	0	0	IRRERAT	ERATH	IRRIGATION	MRS W K RICHARDSON
C2243_1	90	11	33	IRRERAT	ERATH	IRRIGATION	BEN E. ROBBINS
C2244_1	27	0	0	IRRERAT	ERATH	IRRIGATION	DONALD MCLEAN
C2245_1	20	0	0	IRRERAT	ERATH	IRRIGATION	DORIS S HEIZER
C2246_1	152	0	0	IRRERAT	ERATH	IRRIGATION	DON MITCHELL ET AL
C2247_1	35	0	0	IRRERAT	ERATH	IRRIGATION	BAR-TO-LO CORPORATION
C2248_1	62	11	11	IRRERAT	ERATH	IRRIGATION	ALWINA LUINE HEIZER HANCOCK
C2249_1	19	0	0	IRRERAT	ERATH	IRRIGATION	THOMAS H. & DOLORES C. BENSON
C2250_1	4	0	0	IRRERAT	ERATH	IRRIGATION	OTEY SHADDEN
C2251_1	28	0	0	IRRERAT	ERATH	IRRIGATION	WANDA TRIMBLE
C2252_1	30	0	0	IRRERAT	ERATH	IRRIGATION	J B PUTTY TRUSTEE
C2254_1	65	0	0	IRRHAMI	HAMILTON	IRRIGATION	W E PUTTY
C2255_1	48	0	0	IRRERAT	ERATH	IRRIGATION	WAYNE V DUNCAN ET UX
C2255_2	27	0	0	IRRERAT	ERATH	IRRIGATION	ROBERT L BOYKIN ET AL
C2255_3	85	0	0	IRRERAT	ERATH	IRRIGATION	GARY W DUNCAN ET AL
C2258_1	32	0	0	IRRHAMI	HAMILTON	IRRIGATION	RANDOLPH M ROTEN
C2259_1	112	0	0	IRRHAMI	HAMILTON	IRRIGATION	F MELVIN JOHNSON

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2260_1	56	0	0	IRRHAMI	HAMILTON	IRRIGATION	F. MELVIN & HELENE JOHNSON
C2261_1	8	0	0	IRRHAMI	HAMILTON	IRRIGATION	CECIL PARKS
C2262_1	30	0	0	IRRHAMI	HAMILTON	IRRIGATION	VERNON CLARK BEAIRD
C2263_1	65	0	0	IRRHAMI	HAMILTON	IRRIGATION	WILLIAM VAN ZANDT SLOAN & WIFE
C2264_1	45	0	0	IRRHAMI	HAMILTON	IRRIGATION	WILLIAM VAN ZANDT SLOAN & WIFE
C2265_1	268	0	0	IRRHAMI	HAMILTON	IRRIGATION	DEREL FILLINGIM
C2266_1	18	0	0	IRRBOSQ	BOSQUE	IRRIGATION	KARL T BUTZ JR
C2267_1	0	0	0	IRRERAT	ERATH	IRRIGATION	RONNIE W PARTAIN
C2267_2	1	0	0	IRRERAT	ERATH	IRRIGATION	MARGO JOY PARTAIN BATTERSHELL
C2268_1	11	0	0	IRRERAT	ERATH	IRRIGATION	"BARRY L. POLK, ET UX"
C2269_1	4	0	0	IRRBOSQ	BOSQUE	IRRIGATION	MICHAEL J LOTT ET UX
C2270_1	24	0	0	IRRBOSQ	BOSQUE	IRRIGATION	J. N. BURNS
C2271_1	15	0	0	IRRBOSQ	BOSQUE	IRRIGATION	ALBERT N PIKE & EUGENIA PIKE GOODMAN
C2272_1	42	0	0	IRRBOSQ	BOSQUE	IRRIGATION	DAVID H. MONNICH
C2273_1	98	0	0	IRRSOME	SOMERVELL	IRRIGATION	W.F.LONG
C2273_2	6	0	0	IRRSOME	SOMERVELL	IRRIGATION	W.F.LONG
C2276_1	81	81	81	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS A BEECHERL JR
C2276_4	155	0	0	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS A BEECHERL JR
C2276_5	96	3	3	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS A BEECHERL JR
C2276_6	0	0	0	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS A BEECHERL JR
C2276_8	90	6	6	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS A BEECHERL JR
C2277_1	10	0	0	IRRBOSQ	BOSQUE	IRRIGATION	"THOMAS G PETERS, ET UX"
C2278_1	114	0	0	IRRBOSQ	BOSQUE	IRRIGATION	WILLIAM E. GIPSON
C2279_1	9	0	0	IRRBOSQ	BOSQUE	IRRIGATION	LOUISE P L HAMPE ET AL
C2280_1	69	0	0	IRRBOSQ	BOSQUE	IRRIGATION	JOHN DAVID BELL ET UX
C2281_1	7	0	0	IRRBOSQ	BOSQUE	IRRIGATION	RAY J MILLER
C2282_1	253	0	0	IRRBOSQ	BOSQUE	IRRIGATION	LESTER M ALBERTHAL JR
C2283_1	8	0	0	IRRBOSQ	BOSQUE	IRRIGATION	MARGARET D WHITE
C2284_1	25	0	0	IRRBOSQ	BOSQUE	IRRIGATION	L C AND ISABELLE C HOWARD
C2285_1	35	0	0	IRRBOSQ	BOSQUE	IRRIGATION	LEONARD C RADDE
C2287_1	7	1	1	IRRHAMI	HAMILTON	IRRIGATION	BILLY G AND IRIS S HODGES
C2288_1	4	0	0	IRRHAMI	HAMILTON	IRRIGATION	SHANNON LAIRD HODGES ET AL
C2290_1	16	0	0	IRRBOSQ	BOSQUE	IRRIGATION	J. L. JENSON
C2290_2	29	0	0	IRRBOSQ	BOSQUE	IRRIGATION	JAMES CROSLEY ET UX
C2291_1	7	0	0	IRRBOSQ	BOSQUE	IRRIGATION	CITY OF CLIFTON
C2291_2	600	0	0	MUNBOSQ	BOSQUE	MUNICIPAL	CLIFTON
C2292_1	261	0	0	IRRBOSQ	BOSQUE	IRRIGATION	W. O. GLOFF
C2293_1	7	7	7	IRRBOSQ	BOSQUE	IRRIGATION	ESTHER K WIEDERAENDERS
C2294_1	80	0	0	IRRBOSQ	BOSQUE	IRRIGATION	"R.D.,J.L.,&M.L. LUNDBERG"
C2295_1	49	0	0	IRRBOSQ	BOSQUE	IRRIGATION	REGINALD & NALLIE LINDBERG
C2298_1	104	0	0	IRRHAMI	HAMILTON	IRRIGATION	CHARLES E. STEVENS
C2299_1	22	0	0	IRRBOSQ	BOSQUE	IRRIGATION	D. I. BULLION
C2300_1	100	0	0	IRRBOSQ	BOSQUE	IRRIGATION	WILLIAM J. HIX ET AL
C2301_1	70	0	0	IRRMCLE	MCLENNAN	IRRIGATION	ABIGAIL HALBERT KAMM
C2302_1	122	0	0	IRRMCLE	MCLENNAN	IRRIGATION	STEVEN K CAPERTON ET UX
C2303_1	30	0	0	IRRMCLE	MCLENNAN	IRRIGATION	"WALTER WARREN FAIR, ET UX"
C2304_1	3	0	0	IRRMCLE	MCLENNAN	IRRIGATION	HUGH WHITFIELD DAVIS
C2304_2	44	0	0	IRRMCLE	MCLENNAN	IRRIGATION	WALTER WARREN FAIR ET UX
C2305_1	40	0	0	IRRMCLE	MCLENNAN	IRRIGATION	BERTRAND A TALBERT
C2306_1	5	5	5	IRRMCLE	MCLENNAN	IRRIGATION	HARRY A. & ATHALIA P. BRITTON

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2307_1	23	0	0	IRRMCLE	MCLENNAN	IRRIGATION	SAMUEL N. & TESSIE B. CARROLL
C2308_1	10	0	0	IRRMCLE	MCLENNAN	IRRIGATION	IRA H WESTERFIELD
C2309_1	10	0	0	IRRMCLE	MCLENNAN	IRRIGATION	JERRY AND JOY CLEMMONS
C2310_1	16	0	0	IRRMCLE	MCLENNAN	IRRIGATION	JIM HERING
C2312_1	162	31	31	IRRMCLE	MCLENNAN	IRRIGATION	ROBERT HALL
C2313_1	14	0	0	IRRMCLE	MCLENNAN	IRRIGATION	IRA H. WESTERFIELD
C2315_1	39,100	39,100	39,100	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
C2315_2	19,100	19,100	19,100	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
C2315_3	900	900	900	IRRMCLE	MCLENNAN	IRRIGATION	CITY OF WACO
C2315_4	271	271	271	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
C2315_5	825	825	825	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
C2316_1	193	26	26	IRRMCLE	MCLENNAN	IRRIGATION	C. L. SLIGH FARMS
C2317_1	248	190	248	IRRMCLE	MCLENNAN	IRRIGATION	CHARLOTTE B JOHNSON ET AL
C2318_1	35	3	3	IRRMCLE	MCLENNAN	IRRIGATION	FRANK W SIPAN ET AL
C2813_1	153	0	0	IRRCORY	CORYELL	IRRIGATION	RUDOLPH CARL DROSCHE JR
C2814_1	83	6	10	IRRCOMA	COMANCHE	IRRIGATION	ESTATE OF WAYNE ADAMS; GRACE OLENA
C2814_2	170	14	20	IRRCOMA	COMANCHE	IRRIGATION	ESTATE OF WAYNE ADAMS; GRACE OLENA
C2815_1	69	0	0	IRRCOMA	COMANCHE	IRRIGATION	NANCY PAGE ALLEN ET VIR
C2816_1	36	0	0	IRRCOMA	COMANCHE	IRRIGATION	E W CANTRELL ET UX
C2818_1	18	3	3	IRRCOMA	COMANCHE	IRRIGATION	P D GUNTER
C2819_1	32	5	5	IRRCOMA	COMANCHE	IRRIGATION	J B GUNTER
C2820_1	46	0	0	IRRCOMA	COMANCHE	IRRIGATION	WILLIAM R & CAROLINE MILLER
C2821_1	29	0	0	IRRCOMA	COMANCHE	IRRIGATION	ERICH & META SEIDER
C2822_1	106	0	0	IRRCOMA	COMANCHE	IRRIGATION	JUANITA MARTHA ANDERS
C2823_1	22	1	2	IRRCOMA	COMANCHE	IRRIGATION	J E TATUM
C2824_1	90	0	0	IRRCOMA	COMANCHE	IRRIGATION	MAX DERDEN & CHARLES S THOMAS ET UX
C2825_1	80	0	0	IRRCOMA	COMANCHE	IRRIGATION	MONTE CARMICHAEL ET AL
C2826_1	46	0	0	IRRCOMA	COMANCHE	IRRIGATION	BURK DENMAN
C2827_1	6	0	1	IRRCOMA	COMANCHE	IRRIGATION	J A DENMAN
C2828_1	24	1	2	IRRCOMA	COMANCHE	IRRIGATION	J A DENMAN
C2829_1	56	3	5	IRRCOMA	COMANCHE	IRRIGATION	MARTIN L GEYE ET AL
C2830_1	87	5	7	IRRCOMA	COMANCHE	IRRIGATION	RICKIE STEPHENS
C2830_2	30	2	3	IRRHAMI	HAMILTON	IRRIGATION	DON GROMATZKY
C2831_1	57	3	5	IRRCOMA	COMANCHE	IRRIGATION	GARY CROW
C2832_1	47	0	0	IRRCOMA	COMANCHE	IRRIGATION	ANN WEAVER ADAIR
C2833_1	24	0	0	IRRCOMA	COMANCHE	IRRIGATION	CHARLIE BRANDT SHOCKLEY
C2834_1	43	2	4	IRRCOMA	COMANCHE	IRRIGATION	WILLIE EYVONNE MANNING RAY
C2835_1	294	17	24	IRRHAMI	HAMILTON	IRRIGATION	HARTENSE NORTH
C2836_1	87	0	0	IRRCOMA	COMANCHE	IRRIGATION	NELSON SHAVE
C2837_1	136	8	11	IRRHAMI	HAMILTON	IRRIGATION	WADE N CARAWAY
C2837_2	47	3	4	IRRHAMI	HAMILTON	IRRIGATION	WADE N CARAWAY
C2838_1	37	2	3	IRRHAMI	HAMILTON	IRRIGATION	ED A ROSS ET AL
C2839_1	40	2	3	IRRHAMI	HAMILTON	IRRIGATION	ED A ROSS ET AL
C2841_1	27	0	0	IRRERAT	ERATH	IRRIGATION	WALTER E & JOYCE SWINDLE
C2842_1	4	0	0	IRRERAT	ERATH	IRRIGATION	BILLY JACK & PATSY TYUS
C2843_1	29	0	0	IRRERAT	ERATH	IRRIGATION	DEBORAH VINES
C2844_1	29	0	0	IRRERAT	ERATH	IRRIGATION	BOBBY JOHN FOSTER
C2845_1	28	0	0	IRRERAT	ERATH	IRRIGATION	BOBBY JOHN FOSTER
C2846_1	28	0	0	IRRERAT	ERATH	IRRIGATION	GUY G HALL
C2846_2	11	0	0	IRRERAT	ERATH	IRRIGATION	GUY G HALL

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2847_1	13	0	0	IRRERAT	ERATH	IRRIGATION	G G HALL
C2848_1	32	0	0	IRRERAT	ERATH	IRRIGATION	M D STEPHEN
C2849_1	32	0	0	IRRERAT	ERATH	IRRIGATION	J & J DAIRY & BYRON JONES ET AL
C2850_1	29	0	0	IRRERAT	ERATH	IRRIGATION	J A HULSEY
C2850_2	9	0	0	IRRERAT	ERATH	IRRIGATION	J A HULSEY
C2851_1	72	34	26	IRRCOMA	COMANCHE	IRRIGATION	J W BARBEE
C2851_2	87	12	12	IRRCOMA	COMANCHE	IRRIGATION	J W BARBEE
C2852_1	149	0	0	IRRCOMA	COMANCHE	IRRIGATION	DEAN H BOTTLINGER ET UX
C2853_1	52	3	4	IRRCOMA	COMANCHE	IRRIGATION	GAYLON D & CLARA JONES
C2854_1	44	0	0	IRRHAMI	HAMILTON	IRRIGATION	ERNEST L NEWSOM
C2855_1	91	14	14	IRRHAMI	HAMILTON	IRRIGATION	LARRY WAYNE ADAMS
C2856_1	1	0	0	IRRHAMI	HAMILTON	IRRIGATION	JACK D GRAHAM
C2857_1	153	9	13	IRRHAMI	HAMILTON	IRRIGATION	J L ROBERSON JR ET AL
C2858_1	18	0	0	IRRHAMI	HAMILTON	IRRIGATION	J L ROBERSON JR ET AL
C2859_1	98	0	0	IRRHAMI	HAMILTON	IRRIGATION	LARRY A DUNN ET UX
C2860_1	15	2	3	IRRHAMI	HAMILTON	IRRIGATION	EARL& ORENA KAVANAUGH & MAURINE K V
C2861_1	1	0	0	IRRHAMI	HAMILTON	IRRIGATION	ACY L WATSON
C2862_1	15	1	1	IRRHAMI	HAMILTON	IRRIGATION	TOM J THOMPSON
C2863_1	43	2	4	IRRHAMI	HAMILTON	IRRIGATION	RIVERSIDE ACQUISITIONS LLC
C2864_1	185	29	32	IRRHAMI	HAMILTON	IRRIGATION	K A SPARKS ET AL
C2865_1	169	27	30	IRRHAMI	HAMILTON	IRRIGATION	RIVERSIDE ACQUISITIONS LLC
C2866_1	82	13	14	IRRHAMI	HAMILTON	IRRIGATION	RIVERSIDE ACQUISITIONS LLC
C2867_1	4	3	3	IRRHAMI	HAMILTON	IRRIGATION	GERALDINE D WARREN ET AL
C2868_1	50	37	37	IRRHAMI	HAMILTON	IRRIGATION	ARVORD M ABERNETHY
C2869_1	105	6	9	IRRHAMI	HAMILTON	IRRIGATION	BETTY JEAN HARRIS TOOLEY
C2870_1	614	14	14	MUNHAMI	HAMILTON	MUNICIPAL	HAMILTON
C2871_1	72	3	3	IRRHAMI	HAMILTON	IRRIGATION	"SETH THOMAS MOORE, SR., ET AL"
C2872_1	3	0	0	INDHAMI	HAMILTON	INDUSTRIAL	SETH MOORE
C2873_1	20	0	0	IRRHAMI	HAMILTON	IRRIGATION	R F MANNING
C2874_1	85	49	49	IRRHAMI	HAMILTON	IRRIGATION	HARRIET MEAD HAVENS
C2875_1	54	20	20	IRRHAMI	HAMILTON	IRRIGATION	LEONARD T WARLICK ET UX
C2876_1	15	0	0	IRRHAMI	HAMILTON	IRRIGATION	CHARLES CRAIG JR
C2877_1	150	9	12	IRRHAMI	HAMILTON	IRRIGATION	THOMAS E MURDOCK ESTATE
C2878_1	37	1	1	IRRHAMI	HAMILTON	IRRIGATION	O C & WILLIE NADINE MARSHALL
C2878_2	15	0	0	IRRHAMI	HAMILTON	IRRIGATION	O C & WILLIE NADINE MARSHALL
C2879_1	46	10	10	IRRHAMI	HAMILTON	IRRIGATION	PAUL F MCCLINTON
C2879_2	93	5	8	IRRHAMI	HAMILTON	IRRIGATION	PAUL F MCCLINTON
C2880_1	19	3	3	IRRHAMI	HAMILTON	IRRIGATION	BILLY R FISHER ET UX
C2881_1	124	0	0	IRRHAMI	HAMILTON	IRRIGATION	MOODY E COURTNEY
C2882_1	196	30	31	IRRHAMI	HAMILTON	IRRIGATION	JOHN C COURTNEY ET UX
C2883_1	5	0	0	IRRHAMI	HAMILTON	IRRIGATION	DAVID C COURTNEY
C2884_1	200	11	16	IRRHAMI	HAMILTON	IRRIGATION	JOHN C COURTNEY ET UX
C2885_1	71	0	0	IRRHAMI	HAMILTON	IRRIGATION	MOODY E COURTNEY
C2886_1	10	0	0	IRRCORY	CORYELL	IRRIGATION	W J ALEXANDER
C2887_1	30	0	0	IRRCORY	CORYELL	IRRIGATION	JOE TRUETT LIGHTSEY ET AL
C2888_1	2	0	0	IRRCORY	CORYELL	IRRIGATION	GEORGE T REYNOLDS III ET UX
C2890_1	8	0	0	IRRCORY	CORYELL	IRRIGATION	DON THOMAS ROGERS
C2891_1	57	0	0	IRRCORY	CORYELL	IRRIGATION	W F MORELAND BY PASS TRUST
C2892_1	32	2	3	IRRCORY	CORYELL	IRRIGATION	W N & MARY JANE WHISENHUNT
C2893_1	10	2	2	IRRCORY	CORYELL	IRRIGATION	SEABORN L ASHBY

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2894_1	2	0	0	IRRCORY	CORYELL	IRRIGATION	SAN PABLO CORPORATION
C2895_1	29	2	2	IRRCORY	CORYELL	IRRIGATION	WILLIAM TRAVIS LAXSON
C2895_2	11	0	0	IRRCORY	CORYELL	IRRIGATION	WILLIAM TRAVIS LAXSON
C2896_1	124	0	0	IRRCORY	CORYELL	IRRIGATION	MARGARET CALLAWAY
C2897_1	8	0	0	IRRCORY	CORYELL	IRRIGATION	R H MELTON
C2898_1	23	4	4	IRRCORY	CORYELL	IRRIGATION	DONALD J MACKIE ET UX& GLENNIS G EGG
C2900_1	14	0	0	IRRCORY	CORYELL	IRRIGATION	CHARLES C POWELL
C2901_1	100	0	0	IRRCORY	CORYELL	IRRIGATION	JACK & MINNIE MORSE
C2902_1	18	1	2	IRRCORY	CORYELL	IRRIGATION	QUENTIN G MCCORKLE ET UX
C2903_1	530	510	530	IRRCORY	CORYELL	IRRIGATION	GLENROOK FARMS
C2904_1	40	6	7	IRRCORY	CORYELL	IRRIGATION	STERLIN J BARNARD
C2905_1	14	0	0	IRRCORY	CORYELL	IRRIGATION	DAN G DAVIDSON ESTATE
C2906_1	36	5	6	IRRCORY	CORYELL	IRRIGATION	THELMA R CARTER
C2907_1	237	0	0	IRRCORY	CORYELL	IRRIGATION	LEO LUEDTKE ET UX
C2907_2	150	0	0	IRRCORY	CORYELL	IRRIGATION	DENNIS CHARLES LUEDTKE ET AL
C2908_1	22	0	0	IRRCORY	CORYELL	IRRIGATION	DAN G DAVIDSON
C2909_1	26	0	0	IRRCORY	CORYELL	IRRIGATION	RUDOLF DROSCHE
C2910_1	77	0	0	IRRCORY	CORYELL	IRRIGATION	CARL DROSCHE
C2911_1	74	5	6	IRRCORY	CORYELL	IRRIGATION	GLENN DIPPEL ET AL& JOHN SHAUD ET UX
C2914_1	18	3	3	IRRCORY	CORYELL	IRRIGATION	PAT & MABEL RUTH GRIMES
C2915_1	38	1	1	IRRBELL	BELL	IRRIGATION	ROBERT L MOORE
C2921_1	28	0	0	IRRHAMI	HAMILTON	IRRIGATION	W J & ANITA FAYE HOPPER
C2922_1	9	0	0	IRRHAMI	HAMILTON	IRRIGATION	LEE R HOPPER
C2923_1	13	5	5	IRRHAMI	HAMILTON	IRRIGATION	HENRY MARWITZ ET AL
C2923_2	33	8	8	IRRHAMI	HAMILTON	IRRIGATION	BILLY H ROBERTS ET UX
C2924_1	59	0	0	IRRHAMI	HAMILTON	IRRIGATION	JERRY W & BONNIE JEAN HOPPER
C2926_1	13	2	2	IRRHAMI	HAMILTON	IRRIGATION	WILLIAM JACKSON WISDOM
C2927_1	9	1	1	IRRHAMI	HAMILTON	IRRIGATION	ELVIN L GENTRY ET UX
C2928_1	13	2	2	IRRHAMI	HAMILTON	IRRIGATION	GARY L LUNDBERG ET UX
C2929_1	4	0	0	IRRHAMI	HAMILTON	IRRIGATION	REGINALD & NONA FA WIEDEBUSCH
C2930_1	31	3	3	IRRHAMI	HAMILTON	IRRIGATION	CYRUS B CATHEY ESTATE
C2931_1	52	0	0	IRRHAMI	HAMILTON	IRRIGATION	RONNAL S BEASLEY ET UX
C2932_1	6	1	1	IRRHAMI	HAMILTON	IRRIGATION	JAMES BILLINGSLEY
C2933_1	46	6	6	IRRCORY	CORYELL	IRRIGATION	MARSHALL JOE HANNA
C2934_1	66	0	0	IRRCORY	CORYELL	IRRIGATION	ROBERT M SCOTT ET AL
C2935_1	38	1	1	IRRCORY	CORYELL	IRRIGATION	JEAN ARMOR WHALEY
C2935_2	15	0	0	IRRCORY	CORYELL	IRRIGATION	JEAN ARMOR WHALEY
C2936_1	10,000	10,000	10,000	MUNBELL	BELL	MUNICIPAL	FORT HOOD
C2936_2	2,000	2,000	2,000	MUNBELL	BELL	MUNICIPAL	FORT HOOD
C2937_1	59	4	5	IRRBELL	BELL	IRRIGATION	VERNON & BETTY ANN BARGE
C2938_1	9,957	6,830	7,314	MUNBELL	BELL	MUNICIPAL	TEMPLE
C2938_2	5,847	2,688	2,783	MUNBELL	BELL	MUNICIPAL	TEMPLE
C2940_1	63	1	1	IRRBELL	BELL	IRRIGATION	"EVELYN FRANCES BYLER, ET AL"
C2941_1	36	1	1	IRRBELL	BELL	IRRIGATION	SHALLOW FORD CONSTRUCTION CO
C2942_1	200	200	200	IRRBELL	BELL	IRRIGATION	PYLE BROTHERS INC&VAUGHN T BAIRD
C2943_1	20	5	6	IRRBELL	BELL	IRRIGATION	CITY OF KILLEEN & Killeen Willows, Inc.
C2944_1	138	1	2	MINBELL	BELL	MINING	FRANKLIN LIMESTONE COMPANY
C2945_1	36	1	1	IRRBELL	BELL	IRRIGATION	GLENN BAIRD
C2946_1	24	0	0	IRRBELL	BELL	IRRIGATION	J BARRY SIEBENLIST ET UX
C2947_1	11	1	2	IRRBELL	BELL	IRRIGATION	PETER GROTHAUS ET UX

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C2948_1	278	29	34	IRRBELL	BELL	IRRIGATION	"CHESTER E. DICKSON, ET UX"
C2949_1	37	4	5	IRRBELL	BELL	IRRIGATION	"CHESTER E. DICKSON, ET UX"
C2950_1	25	3	3	IRRBELL	BELL	IRRIGATION	DAVID R KRAUSS ET UX
C2951_1	35	4	4	IRRBELL	BELL	IRRIGATION	ALFRED F NAGEL ET UX
C2952_1	16	11	11	IRRBELL	BELL	IRRIGATION	CLOUD CONSTRUCTION CO INC
C2953_1	89	1	1	IRRBELL	BELL	IRRIGATION	ROGER W HINDS ET UX
C2953_2	75	1	1	IRRBELL	BELL	IRRIGATION	CHARLES N VERHEYDEN ET UX
C2953_3	70	1	1	IRRBELL	BELL	IRRIGATION	DENNIS J LYNCH ET UX
C2958_1	3	0	0	IRRLAMP	LAMPASAS	IRRIGATION	FOSSIL CREEK REALTY INC
C2958_2	7	0	0	IRRLAMP	LAMPASAS	IRRIGATION	SAMUEL G TOUB
C2958_3	0	0	0	IRRLAMP	LAMPASAS	IRRIGATION	W G BETTIS ET AL
C2959_1	23	4	4	IRRLAMP	LAMPASAS	IRRIGATION	JOHN R & LYNN COATS
C2960_1	46	0	0	IRRLAMP	LAMPASAS	IRRIGATION	ALBERT S & WINIFRED L BAKER
C2961_1	54	7	8	IRRLAMP	LAMPASAS	IRRIGATION	M K & RUTH NEAL PATTESON
C2962_1	28	21	21	IRRLAMP	LAMPASAS	IRRIGATION	"LEONARD J TROVERO, SR"
C2963_1	48	48	44	IRRLAMP	LAMPASAS	IRRIGATION	FRANCES VIRGINIA NUCKLES ET AL
C2964_1	1	0	0	IRRLAMP	LAMPASAS	IRRIGATION	EARL BROOKS
C2965_1	34	3	4	IRRLAMP	LAMPASAS	IRRIGATION	JIMMIE E BOULTINGHOUSE ET AL
C2965_2	19	2	2	IRRLAMP	LAMPASAS	IRRIGATION	ROY LEE BOULTINGHOUSE
C2966_1	31	9	9	IRRLAMP	LAMPASAS	IRRIGATION	MARVIN E & MARY BLANCHE WHITE
C2967_1	5	0	0	IRRLAMP	LAMPASAS	IRRIGATION	H Y JR & LOIS POLLARD PRICE
C2969_1	8	0	0	IRRLAMP	LAMPASAS	IRRIGATION	BURRELL ROITCH
C2970_1	3	0	0	IRRLAMP	LAMPASAS	IRRIGATION	FRED WILLIS ET UX
C2970_2	51	0	0	IRRLAMP	LAMPASAS	IRRIGATION	CHARLES E BLANTON
C2970_3	6	0	0	IRRLAMP	LAMPASAS	IRRIGATION	CITY OF LAMPASAS
C2971_1	3,760	815	815	MUNLAMP	LAMPASAS	MUNICIPAL	LAMPASAS
C2972_2	228	0	0	IRRLAMP	LAMPASAS	IRRIGATION	CITY OF LAMPASAS
C2973_1	6	0	0	IRRLAMP	LAMPASAS	IRRIGATION	MELVIN POTTS
C2974_1	144	70	70	IRRLAMP	LAMPASAS	IRRIGATION	E C O'NEAL JR
C2975_1	46	12	12	IRRLAMP	LAMPASAS	IRRIGATION	RAY A & ELIZABETH K JONES
C2976_1	48	18	18	INDLAMP	LAMPASAS	INDUSTRIAL	RAY A JONES
C2977_1	42	14	14	IRRLAMP	LAMPASAS	IRRIGATION	CURTIS KIDD ET UX
C2978_1	54	20	10	IRRLAMP	LAMPASAS	IRRIGATION	"GUNDERLAND PARK RANCH, INC"
C2979_1	95	42	42	IRRLAMP	LAMPASAS	IRRIGATION	JOHN T HIGGINS
C2980_1	1	0	0	IRRLAMP	LAMPASAS	IRRIGATION	ROBERT L GUYLER
C2981_1	6	1	1	IRRLAMP	LAMPASAS	IRRIGATION	DOROTHY N CAPPS
C2981_2	45	4	5	IRRLAMP	LAMPASAS	IRRIGATION	JOE D BOYD
C2981_3	6	1	1	IRRLAMP	LAMPASAS	IRRIGATION	WYLIE R CAPPS
C2982_1	6	1	1	IRRLAMP	LAMPASAS	IRRIGATION	A J DEWAYNE KENDRICK
C2983_1	7	1	1	IRRLAMP	LAMPASAS	IRRIGATION	RALPH D & ROBBIE BURROW
C2984_1	18	2	2	IRRLAMP	LAMPASAS	IRRIGATION	DOYLE & BARBARA J WALKER
C2985_1	18	2	2	IRRLAMP	LAMPASAS	IRRIGATION	R B & FRANCES M PORTER
C2986_1	47	17	17	IRRLAMP	LAMPASAS	IRRIGATION	JAMES BUFORD BRIGGS
C2987_1	2	2	2	IRRLAMP	LAMPASAS	IRRIGATION	ROBERT C HALLMARK ET AL
C2988_1	3	3	3	IRRLAMP	LAMPASAS	IRRIGATION	JOE T & CAROLINE PARKS
C2996_3	100	0	0	IRRBELL	BELL	IRRIGATION	0
C2997_1	64	6	7	IRRBELL	BELL	IRRIGATION	WINTHROP ALDRICH ET UX
C2998_1	157	157	157	IRRBELL	BELL	IRRIGATION	GRA'DELLE DUNCAN
C2999_1	3	1	1	IRRBELL	BELL	IRRIGATION	LAVALLA R BLUM
C3000_1	105	13	16	IRRBELL	BELL	IRRIGATION	JAMES L SHEPHERD

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3001_1	12	0	0	IRRBELL	BELL	IRRIGATION	EDD MELTON
C3002_1	150	14	16	IRRBELL	BELL	IRRIGATION	GENE & NELDA FAY RAY
C3003_1	32	0	0	IRRBELL	BELL	IRRIGATION	BENNIE M GIBBS
C3004_1	50	1	1	IRRBELL	BELL	IRRIGATION	ESTATE OF DR JAMIE W BARTON
C3005_1	5	0	0	IRRBELL	BELL	IRRIGATION	VAIL E & BETTY LOGSDON
C3006_1	48	1	1	IRRBELL	BELL	IRRIGATION	KARL B WAGNER ESTATE
C3007_1	48	7	7	IRRBELL	BELL	IRRIGATION	RIVER FARM LTD
C3007_2	192	2	3	IRRBELL	BELL	IRRIGATION	RIVER FARM LTD
C3008_1	61	11	11	IRRBELL	BELL	IRRIGATION	ELEANOR B TUTTLE
C3009_1	81	7	8	IRRBELL	BELL	IRRIGATION	JOSEPH LEWIS ET UX
C3010_1	10	1	1	IRRBELL	BELL	IRRIGATION	CLIFFORD D JONES
C3011_1	17	2	2	IRRBELL	BELL	IRRIGATION	W J RAY ET UX
C3011_2	47	4	5	IRRBELL	BELL	IRRIGATION	LAWANA ELLIS ET VIR
C3011_3	1	0	0	IRRBELL	BELL	IRRIGATION	MIKEL DUPES ET AL
C3013_1	168	11	12	IRRBELL	BELL	IRRIGATION	MILL CREEK GOLF & COUNTRY CLUB
C3014_1	63	11	11	IRRBELL	BELL	IRRIGATION	EDWIN A BAILEY ESTATE
C3015_1	36	1	1	IRRBELL	BELL	IRRIGATION	PAUL T BOSTON
C3413_1	182	0	0	IRRKNOX	KNOX	IRRIGATION	SAMUEL E CLONTS, ET AL
C3414_1	34	34	34	MUNKNOX	KNOX	MUNICIPAL	KNOX COUNTY-OTHER
C3440_1	2,000	174	0	IRRKNOX	KNOX	IRRIGATION	LEAGUE RANCH
C3440_2	31	46	31	IRRKNOX	KNOX	IRRIGATION	LEAGUE RANCH
C3446_1	9	9	9	IRRTHRO	OCKMORTON	IRRIGATION	J J KEETER TRUST & CLYDE STUTEVILLE
C3447_1	45	0	0	IRRYOUN	YOUNG	IRRIGATION	R T WELLS JR
C3448_1	45	0	0	IRRYOUN	YOUNG	IRRIGATION	GEORGE W WILKINSON
C3450_1	600	200	200	MUNTHRO	OCKMORTON	MUNICIPAL	THROCKMORTON
C3451_1	26	0	0	IRRYOUN	YOUNG	IRRIGATION	GEORGE W WILKINSON
C3451_2	27	0	0	INDYOUN	YOUNG	INDUSTRIAL	GEORGE W WILKINSON
C3452_1	250	54	54	MUNYOUN	YOUNG	MUNICIPAL	NEWCASTLE
C3453_1	100	0	0	MINYOUN	YOUNG	MINING	PITCOCK BROTHERS READY-MIX
C3454_1	64	0	0	IRRYOUN	YOUNG	IRRIGATION	ROBERT O ANDREWS FAMILY TRUST
C3455_1	76	0	0	INDYOUN	YOUNG	INDUSTRIAL	CHARLES D CROW & WANDA L CROW
C3455_2	6	0	0	INDYOUN	YOUNG	INDUSTRIAL	CHARLES D CROW & WANDA L CROW
C3456_1	59	0	0	IRRYOUN	YOUNG	IRRIGATION	RONALD D STEPHENS
C3457_1	60	0	0	IRRYOUN	YOUNG	IRRIGATION	LOUIS PITCOCK JR ET AL
C3458_1	4,000	3,935	3,215	MUNYOUN	YOUNG	MUNICIPAL	GRAHAM
C3458_2	1,000	0	0	INDYOUN	YOUNG	INDUSTRIAL	CITY OF GRAHAM
C3458_3	7,000	0	0	MUNYOUN	YOUNG	MUNICIPAL	GRAHAM
C3458_4	7,400	0	0	INDYOUN	YOUNG	INDUSTRIAL	CITY OF GRAHAM
C3458_5	100	0	0	IRRYOUN	YOUNG	IRRIGATION	CITY OF GRAHAM
C3458_6	500	0	0	MINYOUN	YOUNG	MINING	CITY OF GRAHAM
C3459_1	12	0	0	IRRYOUN	YOUNG	IRRIGATION	ZACK BURKETT
C3460_1	76	13	13	IRRYOUN	YOUNG	IRRIGATION	EAFCO LIMITED PARTNERSHIP
C3461_1	27	0	0	IRRYOUN	YOUNG	IRRIGATION	MRS T T CAMPBELL
C3465_1	450	225	225	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3465_2	50	23	23	INDEAST	EASTLAND	INDUSTRIAL	CITY OF EASTLAND
C3465_3	100	32	32	IRREAST	EASTLAND	IRRIGATION	CITY OF EASTLAND
C3467_1	12	0	0	IRREAST	EASTLAND	IRRIGATION	WAYNE HARGRAVE, ET UX
C3468_1	1,607	745	745	MINEAST	EASTLAND	MINING	EASTLAND INDUSTRIAL FOUNDATION
C3469_1	21	0	0	IRREAST	EASTLAND	IRRIGATION	LARRY MORROW
C3470_1	810	747	650	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3470_2	455	389	365	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_3	1,560	1,563	1,691	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_4	878	842	912	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_5	1,118	1,073	1,127	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_6	630	604	584	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_7	350	339	323	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3470_8	500	393	223	MUNEAST	EASTLAND	MUNICIPAL	EASTLAND CO WSD
C3473_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	RONNIE LOVE
C3474_1	30	0	0	IRREAST	EASTLAND	IRRIGATION	JERRY P MEHAFFEY
C3475_1	8	0	0	IRREAST	EASTLAND	IRRIGATION	C M PIPPIN JR
C3476_1	51	6	8	IRRCOMA	COMANCHE	IRRIGATION	GARTH PETTIT
C3479_1	30	0	0	IRREAST	EASTLAND	IRRIGATION	TEDDY J SNIDER ET UX
C3481_1	25	0	0	IRREAST	EASTLAND	IRRIGATION	WILL D BROWN ET UX
C3482_1	13	0	0	IRREAST	EASTLAND	IRRIGATION	JOHNNY W & MARY C EAVES
C3483_1	90	0	0	IRREAST	EASTLAND	IRRIGATION	D B WARREN
C3484_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	MURTICE C RODGERS
C3487_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	D B WARREN
C3488_1	30	0	0	IRREAST	EASTLAND	IRRIGATION	HELEN L DICKSON
C3489_1	140	0	0	IRREAST	EASTLAND	IRRIGATION	THOMAS H BIRDSONG, III
C3490_1	60	0	0	IRRCOMA	COMANCHE	IRRIGATION	JOHN J HOLLAND
C3492_1	52	0	0	IRRCOMA	COMANCHE	IRRIGATION	G D LINDLEY
C3493_1	35	0	0	IRRCOMA	COMANCHE	IRRIGATION	EDDIE LINDLEY
C3494_1	140	0	0	IRRCOMA	COMANCHE	IRRIGATION	MOODY B KOONCE
C3495_1	94	0	0	IRRCOMA	COMANCHE	IRRIGATION	MOODY B KOONCE
C3496_1	21	0	0	IRRCOMA	COMANCHE	IRRIGATION	NANNIE LEE THOMPSON
C3497_1	50	0	0	IRRCOMA	COMANCHE	IRRIGATION	HERRALD ABELS
C3498_1	100	0	0	IRRCOMA	COMANCHE	IRRIGATION	RAYMOND L GILDER
C3499_1	3	1	1	IRRCOMA	COMANCHE	IRRIGATION	N L BOX
C3500_1	24	0	0	IRRCOMA	COMANCHE	IRRIGATION	OBBCO RANCH CORPORATION
C3501_1	65	0	0	IRRCOMA	COMANCHE	IRRIGATION	HAROLD D HIGGINBOTTOM
C3504_1	20	0	0	IRRCOMA	COMANCHE	IRRIGATION	ELMER RAY JOINER
C3505_1	36	0	0	IRRCOMA	COMANCHE	IRRIGATION	WAYNE MOORE ET UX
C3506_1	3	3	3	IRRERAT	ERATH	IRRIGATION	J V STEWART
C3511_1	73	0	0	IRRCOMA	COMANCHE	IRRIGATION	A D MCCLELLAN
C3512_1	6	0	0	IRRCOMA	COMANCHE	IRRIGATION	JIMMY DALE JOHNSON
C3514_1	7	0	0	IRRERAT	ERATH	IRRIGATION	GAINES OIL COMPANY
C3517_1	250	0	0	IRRERAT	ERATH	IRRIGATION	MERLE JO PARKS TRUSTEE
C3518_1	110	0	0	IRRERAT	ERATH	IRRIGATION	KELLER-HYDEN INC
C3519_1	25	0	0	IRRERAT	ERATH	IRRIGATION	GARY D BEARD ET AL
C3520_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	BEN HAMNER
C3521_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	TRUETT & PATSY S PRUILL
C3522_1	7	0	0	IRREAST	EASTLAND	IRRIGATION	JAMES L HUGHES
C3523_1	20	0	0	IRREAST	EASTLAND	IRRIGATION	ROBERT M & IMOGENE BURNS
C3525_1	10	0	0	IRREAST	EASTLAND	IRRIGATION	THOMAS H BIRDSONG III
C3528_1	121	0	0	IRRCOMA	COMANCHE	IRRIGATION	MARGRETTE JEAN MOON
C3528_2	60	0	0	IRRCOMA	COMANCHE	IRRIGATION	MARGRETTE JEAN MOON
C3530_1	14	0	0	IRRCOMA	COMANCHE	IRRIGATION	LOUIS SCHKADE ET AL
C3530_2	7	0	0	IRRCOMA	COMANCHE	IRRIGATION	LOUIS SCHKADE ET AL
C3530_3	46	0	0	IRRCOMA	COMANCHE	IRRIGATION	LOUIS SCHKADE ET AL
C3530_4	27	0	0	IRRCOMA	COMANCHE	IRRIGATION	LOUIS SCHKADE ET AL

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3532_1	29	0	0	IRRCOMA	COMANCHE	IRRIGATION	JIMMY L BINGHAM ET AL
C3533_1	25	0	0	IRRCOMA	COMANCHE	IRRIGATION	BOBBY L SKAGGS & GENE E SKAGGS
C3534_1	24	0	0	IRRCOMA	COMANCHE	IRRIGATION	JUNE M.ROUNTRE E, TRUSTEE
C3535_1	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	JACK & THELMA LOU RILEY
C3536_1	31	0	0	IRRCOMA	COMANCHE	IRRIGATION	LYNDELL F COAN
C3539_1	75	0	0	IRRCOMA	COMANCHE	IRRIGATION	ED GLOVER JR
C3540_1	90	0	0	IRRCOMA	COMANCHE	IRRIGATION	SPRUILL BROTHERS DRILLING CO
C3540_2	45	0	0	IRRCOMA	COMANCHE	IRRIGATION	SPRUILL BROTHERS DRILLING CO
C3540_3	37	0	0	IRRCOMA	COMANCHE	IRRIGATION	SPRUILL BROTHERS DRILLING CO
C3541_1	45	0	0	IRRCOMA	COMANCHE	IRRIGATION	SAM D & MARTHA L UPSHAW
C3543_1	28	0	0	IRRCOMA	COMANCHE	IRRIGATION	HELEN SUE WILSON
C3544_1	17	0	0	IRRCOMA	COMANCHE	IRRIGATION	JIM LAMPMAN ET AL
C3546_1	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	E A WALKER
C3546_2	2	0	0	IRRCOMA	COMANCHE	IRRIGATION	E A WALKER
C3547_1	70	0	0	IRRCOMA	COMANCHE	IRRIGATION	A G LEE
C3548_1	166	0	0	IRRCOMA	COMANCHE	IRRIGATION	SEBORN E GOLDEN
C3549_1	42	0	0	IRRCOMA	COMANCHE	IRRIGATION	T A NOWLIN
C3550_1	60	0	0	IRRCOMA	COMANCHE	IRRIGATION	THOMAS A LEE JR ET UX
C3552_1	80	0	0	IRRCOMA	COMANCHE	IRRIGATION	J V SKAGGS
C3553_1	53	0	0	IRRCOMA	COMANCHE	IRRIGATION	LEE ROY COTTON
C3554_1	25	0	0	IRRCOMA	COMANCHE	IRRIGATION	E J TERRY
C3556_1	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	GAYLE MCGINNIS
C3557_1	98	0	0	IRRCOMA	COMANCHE	IRRIGATION	LAKE PROCTOR IRR AUTH
C3558_1	12	1	1	IRRCOMA	COMANCHE	IRRIGATION	STEVEN MARK BIGGS ET AL
C3568_1	50	0	0	IRRCOMA	COMANCHE	IRRIGATION	ALICE MAE JONES
C3569_1	10	0	0	IRRCOMA	COMANCHE	IRRIGATION	HEARSHEL JANES
C3572_1	140	0	0	IRRCOMA	COMANCHE	IRRIGATION	A T GILCHREST
C3575_1	16	1	1	IRRCOMA	COMANCHE	IRRIGATION	BOBBY N HUDDLESTON
C3579_1	32	0	0	IRRCOMA	COMANCHE	IRRIGATION	T.A. NOWLIN COPP
C3581_1	65	0	0	IRRCOMA	COMANCHE	IRRIGATION	ELDON WADE BUTLER
C3584_1	93	9	15	IRRCOMA	COMANCHE	IRRIGATION	JULIA JO BAXTER MART
C3585_1	23	0	0	IRRCOMA	COMANCHE	IRRIGATION	WAYNE D GILLIAM
C3586_1	154	0	0	IRRCOMA	COMANCHE	IRRIGATION	DON P CHESTER ET UX
C3587_1	195	0	0	IRRCOMA	COMANCHE	IRRIGATION	GEORGE E BINGHAM ET AL
C3588_1	29	0	0	IRRCOMA	COMANCHE	IRRIGATION	BILLY J. GRESSETT, ET AL
C3589_1	185	0	0	IRRCOMA	COMANCHE	IRRIGATION	LOUIS G & BETTY HARELIK
C3590_1	322	0	0	IRRCOMA	COMANCHE	IRRIGATION	CLIFTON D & FRANKIE GEYE
C3592_1	109	0	0	IRRCOMA	COMANCHE	IRRIGATION	LEON Y NICHOLS
C3593_1	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	VERA MULL
C3593_2	17	0	0	IRRCOMA	COMANCHE	IRRIGATION	VERA MULL
C3594_1	16	0	0	IRRCOMA	COMANCHE	IRRIGATION	WOLFE PECANLANDS INC
C3595_1	10	4	4	IRRCOMA	COMANCHE	IRRIGATION	REX MCGINNIS
C3596_1	280	0	0	IRRCOMA	COMANCHE	IRRIGATION	R C PINKARD
C3606_1	3	0	0	IRRCOMA	COMANCHE	IRRIGATION	BOBBIE G WILSON
C3608_1	21	0	0	IRRCOMA	COMANCHE	IRRIGATION	NORMAN MOORE ET UX
C3609_1	50	0	0	IRRCOMA	COMANCHE	IRRIGATION	JOHN M HATHCOCK
C3610_1	143	0	0	IRRCOMA	COMANCHE	IRRIGATION	JOHN O SIMPSON
C3611_1	38	0	0	IRRCOMA	COMANCHE	IRRIGATION	HUGH MONSELLE O'BRIEN
C3612_1	93	1	2	IRRCOMA	COMANCHE	IRRIGATION	FRED S DAVIS
C3613_1	95	0	0	IRRCOMA	COMANCHE	IRRIGATION	HUGH MONSELLE O'BRIEN

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3614_1	10	0	0	IRRCOMA	COMANCHE	IRRIGATION	DON P CHESTER
C3615_1	48	0	0	IRRCOMA	COMANCHE	IRRIGATION	A E VINEYARD
C3616_1	12	0	0	IRRCOMA	COMANCHE	IRRIGATION	B J VINEYARD
C3617_1	3	0	0	IRRCOMA	COMANCHE	IRRIGATION	WALTER MAZUREK
C3618_1	47	0	0	IRRCOMA	COMANCHE	IRRIGATION	OBBCO RANCH CORPORATION
C3618_2	78	0	0	IRRCOMA	COMANCHE	IRRIGATION	OBBCO RANCH CORPORATION
C3618_3	9	0	0	IRRCOMA	COMANCHE	IRRIGATION	OBBCO RANCH CORPORATION
C3618_4	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	OBBCO RANCH CORPORATION
C3619_1	20	0	0	IRRCOMA	COMANCHE	IRRIGATION	JFB FARMS A PARTNERSHIP
C3620_1	25	0	0	IRRCOMA	COMANCHE	IRRIGATION	E J ALDERMAN
C3620_2	72	0	0	IRRCOMA	COMANCHE	IRRIGATION	E J ALDERMAN
C3623_1	26	0	0	IRRCOMA	COMANCHE	IRRIGATION	MRS MERLE MATTHEWS
C3623_2	17	0	0	IRRCOMA	COMANCHE	IRRIGATION	MRS MERLE MATTHEWS
C3624_1	14	0	0	IRRCOMA	COMANCHE	IRRIGATION	PAULINE HALL
C3624_2	10	0	0	IRRCOMA	COMANCHE	IRRIGATION	PAULINE HALL
C3626_1	160	8	13	IRRCOMA	COMANCHE	IRRIGATION	WOLFE PECANLANDS INC
C3627_1	13	0	0	IRRCOMA	COMANCHE	IRRIGATION	DINAH KAY DENSMAN ET AL
C3629_1	48	0	0	IRRERAT	ERATH	IRRIGATION	BOBBY & LINDA SIKES
C3630_1	30	5	5	IRRCOMA	COMANCHE	IRRIGATION	J H VAN ZANT
C3631_1	50	0	0	IRRCOMA	COMANCHE	IRRIGATION	J Z STARK
C3632_1	3	0	0	IRRCOMA	COMANCHE	IRRIGATION	RANDLE JOE EVANS
C3633_1	61	0	0	IRRCOMA	COMANCHE	IRRIGATION	DONALD DEE SALTER ET AL
C3634_1	31	0	0	IRRCOMA	COMANCHE	IRRIGATION	BEATRICE LOGGINS
C3635_1	84	11	13	IRRCOMA	COMANCHE	IRRIGATION	JOE RILEY
C3636_1	40	5	6	IRRCOMA	COMANCHE	IRRIGATION	GAYLAND STEPHENS ET UX
C3637_1	450	50	50	IRRCOMA	COMANCHE	IRRIGATION	GORES INCORPORATED
C3637_2	171	0	0	IRRCOMA	COMANCHE	IRRIGATION	GORES INCORPORATED
C3638_1	40	17	24	IRRCOMA	COMANCHE	IRRIGATION	J B GUNTER & P D GUNTER
C3639_1	35	0	0	IRRCOMA	COMANCHE	IRRIGATION	GAIL W & MARY L YORK
C3640_1	23	0	0	IRRCOMA	COMANCHE	IRRIGATION	SCOTT G. SALTER
C3642_1	9	1	1	IRRCOMA	COMANCHE	IRRIGATION	CARL DWAIN HALL
C3643_1	69	7	7	IRRCOMA	COMANCHE	IRRIGATION	JOHN PAUL MCCULLOUGH ET UX
C3644_1	15	0	0	IRRCOMA	COMANCHE	IRRIGATION	BILL BLUE
C3645_1	18	0	0	IRRCOMA	COMANCHE	IRRIGATION	MARK & SHERRI GUNTER
C3646_1	7	0	0	IRRCOMA	COMANCHE	IRRIGATION	THOMAS E LUKER
C3647_1	41	41	41	IRRCOMA	COMANCHE	IRRIGATION	DONALD W MOORE
C3648_1	49	5	7	IRRCOMA	COMANCHE	IRRIGATION	EVA F MOORE
C3648_2	21	0	0	IRRCOMA	COMANCHE	IRRIGATION	EVA F MOORE
C3649_1	130	20	21	IRRCOMA	COMANCHE	IRRIGATION	CULLEN STEPHENS
C3650_1	34	0	0	IRRCOMA	COMANCHE	IRRIGATION	GUY E MOORE
C3651_1	107	6	9	IRRCOMA	COMANCHE	IRRIGATION	JOHN R MOORE ET UX
C3651_2	15	1	1	IRRCOMA	COMANCHE	IRRIGATION	JOE D MOORE
C3652_1	8	0	0	IRRCOMA	COMANCHE	IRRIGATION	O A DICKEY
C3653_1	12	1	1	IRRCOMA	COMANCHE	IRRIGATION	LARRY WAYNE ADAMS
C3653_2	700	57	84	IRRCOMA	COMANCHE	IRRIGATION	ESTATE OF WAYNE ADAMS; GRACE OLENA
C3653_3	258	0	0	IRRCOMA	COMANCHE	IRRIGATION	GRACE OLENA ADAMS
C3654_1	65	4	5	IRRCOMA	COMANCHE	IRRIGATION	CAROLYN HAYES TRUSTEE
C3654_2	33	2	3	IRRCOMA	COMANCHE	IRRIGATION	CAROLYN RINEHART HAYES
C3655_1	22	1	2	IRRCOMA	COMANCHE	IRRIGATION	ARBIE N BOYD ET UX & GARY K BOYD
C3656_1	36	0	0	IRRCOMA	COMANCHE	IRRIGATION	MARTIN W & JUANITA SEIDER

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3657_1	56	0	0	IRRCOMA	COMANCHE	IRRIGATION	LEO C HAGGARD ET UX
C3658_1	7	0	1	IRRCOMA	COMANCHE	IRRIGATION	H L WILLINGHAM ESTATE
C3659_1	200	200	200	MUNCOMA	COMANCHE	MUNICIPAL	COMANCHE COUNTY-OTHER
C3659_2	200	200	200	IRRCOMA	COMANCHE	IRRIGATION	ERW INC ET AL
C3660_1	58	0	0	IRRCOMA	COMANCHE	IRRIGATION	BELVE BEAN
C3660_2	11	0	0	INDCOMA	COMANCHE	INDUSTRIAL	BELVE BEAN
C3661_1	187	0	0	IRRCOMA	COMANCHE	IRRIGATION	C H MCCALL ET UX
C3662_1	600	600	600	IRRCOMA	COMANCHE	IRRIGATION	"JIMMY E GORE, ET AL"
C3663_1	67	48	48	IRRCOMA	COMANCHE	IRRIGATION	R E BASHAM JR
C3716_1	134	0	0	IRRKENT	KENT	IRRIGATION	CAROL SUE REED
C3717_1	420	0	0	IRRKENT	KENT	IRRIGATION	BALDRIDGE FAMILY LAND TX PARTN
C3718_1	3,525	0	0	MINKENT	KENT	MINING	TEXACO INC
C3718_2	2,375	0	0	MINKENT	KENT	MINING	TEXACO INC
C3719_1	165	0	0	MINFISH	FISHER	MINING	SUN EXPLORATION&PROD CO ET AL
C3720_1	44	0	0	IRRFISH	FISHER	IRRIGATION	BILLIE JOE MCCOMBS
C3721_1	100	0	0	IRRFISH	FISHER	IRRIGATION	BRUCE & PATSY K COX
C3721_2	26	0	0	INDFISH	FISHER	INDUSTRIAL	BRUCE & PATSY K COX
C3722_1	565	0	0	MINSTON	STONEWALL	MINING	SUN EXPLORATION&PRODUCTION CO
C3724_1	1,016	0	0	IRRHASK	HASKELL	IRRIGATION	DON W DAVIS
C3726_1	5	4	4	IRRBELL	BELL	IRRIGATION	MOLLIE H BROOKS ET AL
C3726_2	5	3	3	IRRBELL	BELL	IRRIGATION	MOLLIE H BROOKS ET AL
C3727_1	72	54	56	IRRMILA	MILAM	IRRIGATION	"B R LAUTERBORN, HERMAN NEUSCH"
C3729_1	100	4	5	INDMILA	MILAM	INDUSTRIAL	JOE GLASER
C3730_1	21	1	1	IRRWILL	WILLIAMSON	IRRIGATION	JOE P (JR) & HENRIETTA CALLAN
C3731_1	29	3	3	IRRWILL	WILLIAMSON	IRRIGATION	REUBEN FLOYD CLARK
C3734_1	45	17	17	IRRWILL	WILLIAMSON	IRRIGATION	GEORGETOWN COUNTRY CLUB
C3736_1	1	0	0	IRRWILL	WILLIAMSON	IRRIGATION	HENRY GRADY RYLANDER
C3739_1	240	39	39	MINWILL	WILLIAMSON	MINING	GENE H BINGHAM ET AL
C3740_1	20	2	2	IRRWILL	WILLIAMSON	IRRIGATION	WENDELL F. GIBSON
C3741_1	11	0	0	IRRWILL	WILLIAMSON	IRRIGATION	LINDA ANN SMITH
C3741_2	17	0	0	IRRWILL	WILLIAMSON	IRRIGATION	TED KALLUS ET UX
C3742_1	17	0	0	IRRWILL	WILLIAMSON	IRRIGATION	MAXINE HARRIS
C3742_2	7	0	0	IRRWILL	WILLIAMSON	IRRIGATION	R SCOTT POPE ET UX
C3743_1	32	3	5	IRRWILL	WILLIAMSON	IRRIGATION	JL ENTERPRISES LLP
C3744_1	110	11	17	IRRWILL	WILLIAMSON	IRRIGATION	T. D. VAUGHAN
C3745_1	33	1	1	IRRWILL	WILLIAMSON	IRRIGATION	BEN W KURIO (BWK PARTNERSHIP)
C3746_1	12	1	1	IRRWILL	WILLIAMSON	IRRIGATION	CHARLENE M SEFCIK
C3747_1	284	4	4	IRRWILL	WILLIAMSON	IRRIGATION	JIMMY F. BYERS
C3748_1	203	103	103	INDWILL	WILLIAMSON	INDUSTRIAL	A C STEARNS ESTATE
C3749_1	110	2	2	IRRMILA	MILAM	IRRIGATION	W T PEARSON JR
C3750_1	125	19	19	IRRMILA	MILAM	IRRIGATION	T.R. COFFIELD
C3751_1	30	30	30	IRRWILL	WILLIAMSON	IRRIGATION	BERTHA S. JOHNSON
C3753_1	1	1	1	IRRWILL	WILLIAMSON	IRRIGATION	THE ESTATE OF JOHN V STILES
C3754_1	60	45	46	MUNWILL	WILLIAMSON	MUNICIPAL	THORNDALE
C3755_1	29	22	23	IRRWILL	WILLIAMSON	IRRIGATION	W.A. & JACK WINTERROWD
C3755_2	21	21	21	IRRWILL	WILLIAMSON	IRRIGATION	W.A. & JACK WINTERROWD
C3756_1	3	0	0	IRRWILL	WILLIAMSON	IRRIGATION	LESTER W. STILES
C3757_1	100	100	100	MUNWILL	WILLIAMSON	MUNICIPAL	THORNDALE
C3759_1	300	44	44	IRRMILA	MILAM	IRRIGATION	DONNY LINDNER ET UX
C3759_2	138	0	0	IRRMILA	MILAM	IRRIGATION	DONNY LINDNER ET UX

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C3760_1	42	42	42	IRRMILA	MILAM	IRRIGATION	CLIFFORD L GUSTAFSON ET UX
C3761_1	2,792	2,792	2,792	MUNMILA	MILAM	MUNICIPAL	CAMERON
C3763_1	40	4	6	IRRMILA	MILAM	IRRIGATION	ESTATE OF HUBERT L MCCLAREN
C3764_1	45	5	7	IRRMILA	MILAM	IRRIGATION	HAROLD B & OPAL B FISHER
C3765_1	148	15	15	IRRMILA	MILAM	IRRIGATION	LARRY WAYNE MCCLAREN ET AL
C3766_1	90	11	16	IRRMILA	MILAM	IRRIGATION	LINDA ETHRIDGE GROTHE
C3767_1	120	11	11	IRRBELL	BELL	IRRIGATION	FIVE WELLS RANCH COMPANY
C3768_1	13	1	1	IRRMILA	MILAM	IRRIGATION	MICHAEL LLOYD ET UX
C3768_2	112	2	2	INDMILA	MILAM	INDUSTRIAL	MICHAEL LLOYD ET UX
C3769_1	150	15	15	IRRMILA	MILAM	IRRIGATION	LARRY WAYNE MCCLAREN
C3770_1	149	15	15	IRRMILA	MILAM	IRRIGATION	JANE SMOOT
C3771_1	15	1	2	IRRMILA	MILAM	IRRIGATION	"ELLIOTT W. ATKINSON, ET AL"
C3772_1	8	1	1	IRRMILA	MILAM	IRRIGATION	V.T. WHITE
C3773_1	1,300	130	130	IRRMILA	MILAM	IRRIGATION	ARLEDGE & SHANAHAN LP
C3773_2	316	0	0	IRRMILA	MILAM	IRRIGATION	ARLEDGE & SHANAHAN LP
C3774_1	30	3	3	IRRMILA	MILAM	IRRIGATION	JANE SMOOT
C3775_1	578	52	58	IRRMILA	MILAM	IRRIGATION	LLOYD E LEIFESTE ET UX
C3775_2	623	56	62	IRRMILA	MILAM	IRRIGATION	VERONICA ROESSLER ET AL
C3775_3	67	6	7	IRRMILA	MILAM	IRRIGATION	Robertson (Fee)
C3775_4	500	0	0	IRRMILA	MILAM	IRRIGATION	LLOYD E LEIFESTE ET UX
C3999_1	25	4	4	IRRPALO	PALO PINTO	IRRIGATION	MARVIN H MCMURREY JR ETAL
C4000_1	31	2	2	IRRPALO	PALO PINTO	IRRIGATION	CURTIS MITCHELL
C4001_1	40	4	4	IRRPALO	PALO PINTO	IRRIGATION	JENNIE M & M F EWTON
C4003_1	41	1	1	IRRPALO	PALO PINTO	IRRIGATION	MRS G C MOORE
C4004_1	5	2	2	MUNPALO	PALO PINTO	MUNICIPAL	GRAFORD
C4004_2	50	46	46	MUNPALO	PALO PINTO	MUNICIPAL	GRAFORD
C4005_1	781	34	34	IRRPALO	PALO PINTO	IRRIGATION	W. J. RHODES ETAL
C4006_1	63	8	7	IRRPALO	PALO PINTO	IRRIGATION	"SAN ROC, LLC"
C4007_1	50	0	0	IRRPALO	PALO PINTO	IRRIGATION	MARY E. RIPPETOE
C4008_1	110	18	19	IRRPALO	PALO PINTO	IRRIGATION	W. A. CAREY
C4009_1	24	2	2	IRRPALO	PALO PINTO	IRRIGATION	ERNEST E. AMMONS
C4010_1	33	3	3	IRRPALO	PALO PINTO	IRRIGATION	CHARLES W. & JEAN WELCH
C4011_1	8	0	0	IRRPALO	PALO PINTO	IRRIGATION	"JACKIE LEE CHASTAIN, ET AL"
C4012_8	236	0	0	IRRPALO	PALO PINTO	IRRIGATION	EARL W. & ANITA GARDNER
C4013_2	215	0	0	IRRPALO	PALO PINTO	IRRIGATION	ROCKING W RANCH LP
C4013_3	212	0	0	IRRPALO	PALO PINTO	IRRIGATION	ROCKING W RANCH LP
C4013_4	205	0	0	IRRPALO	PALO PINTO	IRRIGATION	ROCKING W RANCH LP
C4014_1	500	280	280	IRREAST	EASTLAND	IRRIGATION	FRED HAGAMAN ET AL
C4014_2	100	60	60	INDEAST	EASTLAND	INDUSTRIAL	FRED HAGAMAN ET AL
C4015_1	27	0	0	IRREAST	EASTLAND	IRRIGATION	FRED HAGAMAN ET AL
C4016_1	22	0	0	IRREAST	EASTLAND	IRRIGATION	HUBERT H CAPPS
C4017_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	LYNDAL D GARNER JR ET UX
C4018_1	40	0	0	IRREAST	EASTLAND	IRRIGATION	ROSS HODGES
C4019_1	160	160	160	MUNPALO	PALO PINTO	MUNICIPAL	STRAWN
C4020_1	362	0	0	IRRPALO	PALO PINTO	IRRIGATION	PERRY R. HORTON ETAL
C4021_1	30	0	0	IRRPALO	PALO PINTO	IRRIGATION	R. J. CARAWAY
C4021_2	41	0	0	MINPALO	PALO PINTO	MINING	R. J. CARAWAY
C4022_1	60	0	0	IRRPALO	PALO PINTO	IRRIGATION	PENNY SPARKS
C4023_1	30	0	0	IRREAST	EASTLAND	IRRIGATION	A. D. CRAWFORD
C4024_1	115	3	3	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4024_2	45	0	0	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C4024_3	245	0	0	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C4025_1	60	0	0	MUNERAT	ERATH	MUNICIPAL	ERATH COUNTY-OTHER
C4025_2	30	0	0	MINERAT	ERATH	MINING	TARRANT INVESTMENT CO INC
C4026_1	20	0	0	MUNERAT	ERATH	MUNICIPAL	ERATH COUNTY-OTHER
C4027_1	80	0	0	IRRPALO	PALO PINTO	IRRIGATION	JACK R DAUGHERTY
C4028_1	38	1	1	IRRERAT	ERATH	IRRIGATION	J L MCDANIEL
C4029_1	2	0	0	IRRPALO	PALO PINTO	IRRIGATION	"EARL WADDELL, INC."
C4031_1	5,200	3,318	2,473	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO CO MWD 1
C4031_2	2,800	1,786	1,188	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO CO MWD 1
C4031_3	1,300	829	540	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO CO MWD 1
C4031_4	700	447	291	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO CO MWD 1
C4031_5	3,480	2,220	1,458	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO CO MWD 1
C4032_1	16	0	0	IRRPALO	PALO PINTO	IRRIGATION	CHARLIE RAY COCKBURN
C4034_1	30	4	4	IRRERAT	ERATH	IRRIGATION	J L MCDANIEL
C4035_1	5	0	0	IRRPALO	PALO PINTO	IRRIGATION	J. E. MCDANIEL
C4036_1	55	0	0	IRRPALO	PALO PINTO	IRRIGATION	"EARL WADDELL, INC."
C4037_1	100	0	0	IRRPALO	PALO PINTO	IRRIGATION	ROY E SQUYRES ET AL
C4038_1	150	0	0	IRRPALO	PALO PINTO	IRRIGATION	HERMAN PETTY
C4048_1	25	2	2	IRRHOOD	HOOD	IRRIGATION	H D HOWARD
C4048_2	35	8	8	MUNHOOD	HOOD	MUNICIPAL	HOOD COUNTY-OTHER
C4049_1	12	0	0	IRRHOOD	HOOD	IRRIGATION	FRED L THORMANN
C4050_1	23	0	0	IRRHOOD	HOOD	IRRIGATION	FRED L THORMANN
C4054_1	12	1	1	IRRHOOD	HOOD	IRRIGATION	JESSE T CROWDER JR TRUST
C4054_2	27	2	2	IRRHOOD	HOOD	IRRIGATION	JOHN WESSLER ET AL
C4055_1	42	6	6	IRRHOOD	HOOD	IRRIGATION	MCI LAND COMPANY
C4056_1	144	113	116	IRRHOOD	HOOD	IRRIGATION	"BANK ONE TEXAS NA, TRUSTEE"
C4057_1	109	10	10	IRRHOOD	HOOD	IRRIGATION	MARY L & C W KILLOUGH
C4059_1	35	3	3	IRRHOOD	HOOD	IRRIGATION	HELEN T DURHAM ESTATE
C4060_1	616	112	112	IRRHOOD	HOOD	IRRIGATION	LORENE DURHAM ESTATE ET AL
C4061_1	65	11	11	IRRHOOD	HOOD	IRRIGATION	BURTON S BURKS SR ET AL
C4062_1	383	62	65	IRRHOOD	HOOD	IRRIGATION	THOMAS FAMILY TRUST
C4063_1	348	26	26	IRRHOOD	HOOD	IRRIGATION	FRED GRIMES ET AL
C4064_1	25	2	2	IRRHOOD	HOOD	IRRIGATION	BURTON S BURKS JR
C4065_1	84	6	6	IRRHOOD	HOOD	IRRIGATION	ROBERT & C J WHITEHEAD
C4067_1	63	10	11	IRRHOOD	HOOD	IRRIGATION	COURTS K CLEVELAND JR
C4068_1	72	0	0	IRRHOOD	HOOD	IRRIGATION	COLLIE W OLIVER
C4069_1	120	5	5	IRRHOOD	HOOD	IRRIGATION	WALKER MURRAY RANDLE
C4070_1	141	23	24	IRRHOOD	HOOD	IRRIGATION	LESLIE L. MABERY
C4071_1	83	14	14	IRRHOOD	HOOD	IRRIGATION	R E MABERY
C4072_1	308	52	54	IRRHOOD	HOOD	IRRIGATION	JAMES E ANTHONY ET AL
C4072_2	172	13	13	IRRHOOD	HOOD	IRRIGATION	JAMES E ANTHONY ET AL
C4072_3	117	11	11	IRRHOOD	HOOD	IRRIGATION	JAMES E ANTHONY ET AL
C4073_1	42	7	7	IRRHOOD	HOOD	IRRIGATION	JAMES R. ROBINSON
C4074_1	26	4	4	IRRHOOD	HOOD	IRRIGATION	E. F. ALLISON
C4076_1	16	1	1	IRRHOOD	HOOD	IRRIGATION	D. J. VAUGHN
C4076_2	24	1	1	IRRHOOD	HOOD	IRRIGATION	ROBIN K SNIDER ET AL
C4077_1	30	1	1	IRRHOOD	HOOD	IRRIGATION	D. J. BROWN
C4078_1	54	9	9	IRRHOOD	HOOD	IRRIGATION	ROBERT & MARGARET KING INV INC
C4079_1	92	3	3	IRRHOOD	HOOD	IRRIGATION	JAMES ROBERT HILL

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4080_1	112	4	4	IRRSOME	SOMERVELL	IRRIGATION	J V & M G DURANT
C4081_1	160	5	5	IRRSOME	SOMERVELL	IRRIGATION	F. L. VAUGHN
C4082_1	203	36	36	IRRSOME	SOMERVELL	IRRIGATION	S. B. GRISSOM
C4083_1	45	3	3	IRRHOOD	HOOD	IRRIGATION	ROBERT L FOREE JR
C4084_1	25	4	4	IRRERAT	ERATH	IRRIGATION	EARL R ALLISON
C4084_2	1	0	0	NIFERAT	ERATH	NIF	EARL R ALLISON
C4085_1	10	1	1	IRRERAT	ERATH	IRRIGATION	EARL R ALLISON
C4085_2	18	10	10	IRRERAT	ERATH	IRRIGATION	DANE ALLISON ET UX
C4086_1	15	0	0	IRRERAT	ERATH	IRRIGATION	GARY & BEVERLY LEWELLEN
C4087_1	81	56	56	IRRHOOD	HOOD	IRRIGATION	LELAND A HODGES ET AL
C4088_1	55	9	9	IRRHOOD	HOOD	IRRIGATION	MILTON C. & VIVIAN YOUNG
C4089_1	31	3	4	IRRERAT	ERATH	IRRIGATION	JACOB T. & LAURA DAMERON
C4090_1	197	27	27	IRRERAT	ERATH	IRRIGATION	RICHARD T. LIETZ ESTATE
C4091_1	360	67	67	IRRERAT	ERATH	IRRIGATION	KENNETH LESLEY
C4092_1	6	1	1	IRRERAT	ERATH	IRRIGATION	"ROBERT D. ADAMS, SR."
C4093_1	94	9	11	IRRHOOD	HOOD	IRRIGATION	ERNEST H CANNON
C4094_1	16	6	8	IRRSOME	SOMERVELL	IRRIGATION	J B SANDERSON ET AL
C4095_1	10	5	5	IRRSOME	SOMERVELL	IRRIGATION	J. C. MCFALL
C4097_1	23,180	9,200	9,425	SEUSOME	SOMERVELL	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C4098_1	258	42	44	IRRSOME	SOMERVELL	IRRIGATION	BOB HARRIS OIL CO
C4099_1	5	2	3	IRRSOME	SOMERVELL	IRRIGATION	DOROTHY W. LITTLE ETAL
C4100_1	125	51	62	MINJOHN	JOHNSON	MINING	LAFARGE CORPORATION
C4102_1	77	6	6	IRRJOHN	JOHNSON	IRRIGATION	STANDARD INVESTMENT CO.
C4103_1	186	30	32	IRRBOSQ	BOSQUE	IRRIGATION	"CYRIL WAGNER, JR., ETAL"
C4104_1	3,811	270	297	IRRBOSQ	BOSQUE	IRRIGATION	PERRY R BASS INC
C4105_1	8	0	0	IRRJOHN	JOHNSON	IRRIGATION	WESLEY RAY CARSON
C4105_2	4	0	0	IRRJOHN	JOHNSON	IRRIGATION	CREPE MYRTLE OF TEXAS INC
C4106_1	5,760	4,912	4,581	MUNJOHN	JOHNSON	MUNICIPAL	CLEBURNE
C4106_3	240	238	119	IRRJOHN	JOHNSON	IRRIGATION	CITY OF CLEBURNE
C4107_1	231	16	16	IRRJOHN	JOHNSON	IRRIGATION	RIVERVIEW INC
C4107_2	101	0	0	IRRJOHN	JOHNSON	IRRIGATION	RIVERVIEW INC
C4108_1	27	2	2	IRRBOSQ	BOSQUE	IRRIGATION	HARRY V DULICK
C4108_2	5	1	1	INDBOSQ	BOSQUE	INDUSTRIAL	HARRY V DULICK
C4109_1	10	7	7	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS & VIRGINIA GREGORY
C4110_1	20	1	1	IRRBOSQ	BOSQUE	IRRIGATION	LUCILLE C BUTLER
C4111_1	6	3	4	IRRBOSQ	BOSQUE	IRRIGATION	"PAUL C. MURPHY, JR."
C4112_1	12	4	4	IRRBOSQ	BOSQUE	IRRIGATION	LOUIS & VIRGINIA GREGORY
C4113_1	43	43	43	IRRBOSQ	BOSQUE	IRRIGATION	JAMES M. WALKER
C4114_1	300	49	51	IRRHOOD	HOOD	IRRIGATION	THOMAS BROTHERS GRASS LTD
C4115_1	45	0	0	INDNOLA	NOLAN	INDUSTRIAL	H & H FEEDLOT INC
C4116_1	2	1	1	IRRFISH	FISHER	IRRIGATION	MARJORIE HAMBRIGHT
C4117_1	1	0	0	IRRFISH	FISHER	IRRIGATION	DR HELEN F YEATS
C4118_1	8	0	0	IRRFISH	FISHER	IRRIGATION	ZANNA H ANDERSON
C4119_1	5	0	0	IRRFISH	FISHER	IRRIGATION	ALFRED L. CAREY ET UX
C4120_1	74	53	53	IRRFISH	FISHER	IRRIGATION	MAX D. CARRIKER ESTATE ETAL
C4121_1	263	164	164	IRRFISH	FISHER	IRRIGATION	WILLARD L. BURK
C4122_1	60	0	0	IRRFISH	FISHER	IRRIGATION	MAX D. CARRIKER ESTATE
C4123_1	17	17	17	IRRFISH	FISHER	IRRIGATION	FREDDIE MAC STUART
C4124_1	55	37	37	IRRFISH	FISHER	IRRIGATION	"ALFRED S. WALDROP, ETAL"
C4126_1	55	0	0	IRRFISH	FISHER	IRRIGATION	BOYD H. LAKEY

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4127_1	120	0	0	IRRJONE	JONES	IRRIGATION	JAMES RANDOLPH SCOTT
C4128_1	2,000	540	540	MUNNOLA	NOLAN	MUNICIPAL	SWEETWATER
C4128_2	7,000	0	0	MUNNOLA	NOLAN	MUNICIPAL	SWEETWATER
C4129_1	40	40	40	IRRNOLA	NOLAN	IRRIGATION	"SWEETWATER COUNTRY CLUB, INC"
C4130_1	2,730	1,055	1,030	MUNNOLA	NOLAN	MUNICIPAL	SWEETWATER
C4130_2	960	0	0	INDNOLA	NOLAN	INDUSTRIAL	CITY OF SWEETWATER
C4130_3	50	0	0	IRRNOLA	NOLAN	IRRIGATION	CITY OF SWEETWATER
C4132_1	212	0	0	IRRJONE	JONES	IRRIGATION	HARRY C. REAUGH & WIFE
C4133_1	225	0	0	IRRJONE	JONES	IRRIGATION	JAMES FARRINGTON ET AL
C4134_1	45	0	0	IRRTAYL	TAYLOR	IRRIGATION	BILLY DOAN
C4135_1	28	0	0	IRRTAYL	TAYLOR	IRRIGATION	HUGH T. LILLY
C4136_1	338	0	0	MINJONE	JONES	MINING	NELSON PUETT
C4136_2	7	0	0	INDJONE	JONES	INDUSTRIAL	NELSON PUETT
C4137_1	54	32	32	IRRJONE	JONES	IRRIGATION	ROSS S BRADFORD ET UX
C4138_1	2	0	0	IRRJONE	JONES	IRRIGATION	THOMAS J MARSHALL & WIFE
C4140_1	165	0	0	IRRJONE	JONES	IRRIGATION	RALPH BRIDWELL ET UX
C4141_1	69	0	0	IRRJONE	JONES	IRRIGATION	DOLLY KEESEE
C4142_1	1,675	0	0	MUNTAYL	TAYLOR	MUNICIPAL	ABILENE
C4144_1	73	0	0	INDTAYL	TAYLOR	INDUSTRIAL	BILL JAY ET AL
C4145_1	168	0	0	INDTAYL	TAYLOR	INDUSTRIAL	"BILL JAY, ET AL"
C4146_1	4	0	0	IRRTAYL	TAYLOR	IRRIGATION	J H TAYLOR GAS COMPANY
C4147_1	14	0	0	IRRTAYL	TAYLOR	IRRIGATION	LEE ARTHUR PRESSWOOD
C4148_1	5	0	0	IRRTAYL	TAYLOR	IRRIGATION	RILEY G MAXWELL CO ET AL
C4149_1	42	0	0	IRRJONE	JONES	IRRIGATION	NOEL W. PETRE
C4150_1	3,765	0	0	MUNTAYL	TAYLOR	MUNICIPAL	ABILENE
C4150_2	115	0	0	IRRTAYL	TAYLOR	IRRIGATION	CITY OF ABILENE
C4151_1	2,500	2,500	2,500	SEUJONE	JONES	STEAM-ELECTRIC	WEST TEXAS UTILITIES CO.
C4152_1	230	0	0	MUNTAYL	TAYLOR	MUNICIPAL	TAYLOR COUNTY-OTHER
C4155_1	6	0	0	IRRTAYL	TAYLOR	IRRIGATION	RAYMOND MCNUTT
C4156_1	5	0	0	IRRTAYL	TAYLOR	IRRIGATION	ROY ELTON ROBBINS & WIFE
C4157_1	70	0	0	IRRTAYL	TAYLOR	IRRIGATION	H C WELCH
C4158_1	75	0	0	IRRTAYL	TAYLOR	IRRIGATION	ROY J. GRIFFITH
C4159_1	42	0	0	IRRTAYL	TAYLOR	IRRIGATION	J. C. GRIFFITH
C4161_1	25,690	9,550	8,145	MUNJONE	JONES	MUNICIPAL	ABILENE
C4161_2	4,849	0	0	MUNJONE	JONES	MUNICIPAL	ABILENE
C4161_3	2,023	0	0	IRRJONE	JONES	IRRIGATION	CITY OF ABILENE
C4162_1	179	0	0	IRRJONE	JONES	IRRIGATION	JAMES H. ICE
C4163_1	44	0	0	IRRJONE	JONES	IRRIGATION	BILLY MAC COOK
C4164_1	32	0	0	IRRJONE	JONES	IRRIGATION	J. N. MONTGOMERY & WIFE
C4166_1	32	0	0	IRRJONE	JONES	IRRIGATION	IRLENE M SMITH ET AL
C4167_1	40	0	0	MINJONE	JONES	MINING	GEOCHEMICAL SURVEYS
C4168_1	15	0	0	IRRYOUN	YOUNG	IRRIGATION	ZOHN MILAM
C4169_1	62	0	0	IRRSHAC	HACKELFORD	IRRIGATION	RICHARD SCHKADE
C4169_2	5	0	0	MINSHAC	HACKELFORD	MINING	RICHARD SCHKADE
C4170_1	200	0	0	IRRJONE	JONES	IRRIGATION	J M ALEXANDER RANCH CO LTD
C4171_1	310	188	188	IRRJONE	JONES	IRRIGATION	MARY LOIS WILSON
C4172_1	92	0	0	IRRJONE	JONES	IRRIGATION	VIOLET H FRAZIER
C4173_1	40	0	0	IRRJONE	JONES	IRRIGATION	VIOLET H FRAZIER
C4175_1	21	12	12	D&LSHAC	HACKELFORD	D&L	H R STASNEY & SONS LTD
C4175_2	2	0	0	D&LSHAC	HACKELFORD	D&L	H R STASNEY & SONS LTD

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4175_3	63	37	37	MINSHAC	HACKELFORD	MINING	H R STASNEY & SONS LTD
C4175_4	5	0	0	MINSHAC	HACKELFORD	MINING	H R STASNEY & SONS LTD
C4176_1	120	0	0	IRRHASK	HASKELL	IRRIGATION	JOSEPH ELMER COX
C4177_1	95	0	0	IRRHASK	HASKELL	IRRIGATION	W. B. GRIFFITH ETAL
C4178_1	78	0	0	IRRHASK	HASKELL	IRRIGATION	EMILEE G. GOFF ETAL
C4179_1	10,000	5,740	5,300	MUNHASK	HASKELL	MUNICIPAL	STAMFORD
C4180_1	300	80	80	MUNJONE	JONES	MUNICIPAL	HAMLIN
C4181_1	542	65	65	MUNJONE	JONES	MUNICIPAL	ANSON
C4184_1	7	0	0	IRRHASK	HASKELL	IRRIGATION	HASKELL COUNTY COUNTRY CLUB
C4185_1	10	0	0	IRRSHAC	HACKELFORD	IRRIGATION	ERNEST D. FINCHER
C4186_1	20	0	0	IRRSHAC	HACKELFORD	IRRIGATION	RAYMOND C TAYLOR ET AL
C4186_2	4	0	0	IRRSHAC	HACKELFORD	IRRIGATION	RAYMOND C TAYLOR ET AL
C4187_1	300	0	0	IRRSTEP	STEPHENS	IRRIGATION	BRECKENRIDGE PARTNERSHIP LTD
C4188_1	40	18	18	IRRSTEP	STEPHENS	IRRIGATION	T C HARRIS JR
C4189_1	69	0	0	IRRSTEP	STEPHENS	IRRIGATION	BRECKENRIDGE PARTNERSHIP LTD
C4190_1	70	0	0	IRRSTEP	STEPHENS	IRRIGATION	BRECKENRIDGE PARTNERSHIP LTD
C4191_1	99	0	0	IRRSTEP	STEPHENS	IRRIGATION	M RAY PUCKETT EST ET AL
C4191_2	96	0	0	IRRSTEP	STEPHENS	IRRIGATION	M RAY PUCKETT EST ET AL
C4192_1	30	13	13	IRRSTEP	STEPHENS	IRRIGATION	MRS. W. R. POWERS ESTATE
C4194_1	60	30	30	MUNTHRO	OCKMORTON	MUNICIPAL	THROCKMORTON COUNTY-OTHER
C4195_1	22	0	0	IRRSTEP	STEPHENS	IRRIGATION	GILBERT E BRANDENBERGER ET UX
C4196_1	18	0	0	IRRSTEP	STEPHENS	IRRIGATION	JOE DAVIS
C4197_1	20	0	0	IRRSTEP	STEPHENS	IRRIGATION	J W SULLIVAN
C4199_1	98	16	16	IRRSTEP	STEPHENS	IRRIGATION	OWEN D WOODWARD
C4199_2	70	28	28	IRRSTEP	STEPHENS	IRRIGATION	OWEN D WOODWARD
C4202_1	550	60	60	MUNCALL	CALLAHAN	MUNICIPAL	BAIRD
C4203_1	24	0	0	IRRCALL	CALLAHAN	IRRIGATION	"A. E. DYER, JR."
C4204_1	16	0	0	IRRCALL	CALLAHAN	IRRIGATION	KENNETH M GEORGE & WIFE
C4205_1	50	0	0	IRRCALL	CALLAHAN	IRRIGATION	EUGENE LEE FINLEY
C4206_1	40	32	32	IRRFISH	FISHER	IRRIGATION	TERRY T POSEY ET UX
C4207_1	90	70	70	MUNSHAC	HACKELFORD	MUNICIPAL	SHACKELFORD COUNTY-OTHER
C4208_1	600	120	120	MUNSHAC	HACKELFORD	MUNICIPAL	ALBANY
C4209_1	50	50	50	INDSHAC	HACKELFORD	INDUSTRIAL	DAMSON OIL CORP ET AL
C4210_1	35	0	0	IRRSHAC	HACKELFORD	IRRIGATION	JAMES R. GREEN
C4211_1	1,971	1,140	1,130	MUNEAST	EASTLAND	MUNICIPAL	CISCO
C4211_3	56	0	0	INDEAST	EASTLAND	INDUSTRIAL	CITY OF CISCO
C4212_1	1,000	0	0	MUNEAST	EASTLAND	MUNICIPAL	CISCO
C4213_1	21,008	12,494	7,000	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_2	17,362	10,326	10,107	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_3	1,882	1,119	1,096	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_4	2,061	1,226	1,200	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_5	2,487	1,479	1,448	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_6	2,000	1,189	1,164	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_7	1,200	714	699	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_8	6,000	3,568	3,493	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4213_9	2,000	1,189	1,164	MUNSTEP	STEPHENS	MUNICIPAL	WEST CENTRAL TEXAS MWD
C4214_1	2,100	235	205	MUNSTEP	STEPHENS	MUNICIPAL	BRECKENRIDGE
C4215_1	6	0	0	IRRSTEP	STEPHENS	IRRIGATION	T. C. FAMBRO & SONS
C4216_1	30	0	0	IRRSTEP	STEPHENS	IRRIGATION	SARAH SATTERWHITE
C4217_1	218	0	0	MINSTEP	STEPHENS	MINING	SWANSON MULESHOE RANCH LTD

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4218_1	32	0	0	IRRSTEP	STEPHENS	IRRIGATION	JACK T ROBERTSON JR
C4219_1	22	0	0	IRRSTEP	STEPHENS	IRRIGATION	ELLA PEARL ROBERTSON
C4220_1	39	0	0	IRRSTEP	STEPHENS	IRRIGATION	ELLA PEARL ROBERTSON
C4221_1	42	0	0	IRRSTEP	STEPHENS	IRRIGATION	ELLA PEARL ROBERTSON
C4222_1	45	0	0	IRRSTEP	STEPHENS	IRRIGATION	ELLA PEARL ROBERTSON
C4223_1	97	61	61	INDSTEP	STEPHENS	INDUSTRIAL	BRECKENRIDGE GASOLINE CO
C4225_1	30	0	0	IRRYOUN	YOUNG	IRRIGATION	E E RILEY
C4226_1	628	0	0	IRRYOUN	YOUNG	IRRIGATION	SAMUEL JOHN ROACH
C4227_1	181	0	0	IRRYOUN	YOUNG	IRRIGATION	"C. R. BALDWIN, JR."
C4315_1	30	3	4	IRRHILL	HILL	IRRIGATION	CHESLEY J AUTEN
C4316_1	75	8	9	IRRHILL	HILL	IRRIGATION	B W & SARA J. BOWERS
C4317_1	243	23	30	IRRBOSQ	BOSQUE	IRRIGATION	MARY ANN JENKINS ET AL
C4318_1	647	495	647	IRRBOSQ	BOSQUE	IRRIGATION	JOHN MCPHERSON ET AL
C4318_2	2,820	2,338	2,662	IRRBOSQ	BOSQUE	IRRIGATION	ED HUDDLESTON & JOHN MCPHERSON ET
C4318_4	20	2	2	IRRBOSQ	BOSQUE	IRRIGATION	0
C4319_1	34	2	2	IRRHILL	HILL	IRRIGATION	BIRCH WILFONG
C4320_1	84	8	9	IRRHILL	HILL	IRRIGATION	HERMAN L HORN
C4321_1	337	36	41	IRRHILL	HILL	IRRIGATION	WALTON K BALLEW
C4322_1	175	16	19	IRRHILL	HILL	IRRIGATION	ALTHIA B G BURNETTE
C4323_1	173	22	22	IRRHILL	HILL	IRRIGATION	DOCK L BURNETTE
C4324_1	305	29	32	IRRHILL	HILL	IRRIGATION	VANESSA A GILPIN
C4325_1	48	5	5	IRRMCLE	MCLENNAN	IRRIGATION	NELDA KATHRYN CARGILL
C4326_1	6	1	1	IRRMCLE	MCLENNAN	IRRIGATION	DAN WELDON WILLIAMS
C4327_1	4	1	1	IRRMCLE	MCLENNAN	IRRIGATION	DAN WELDON WILLIAMS
C4328_1	40	4	4	IRRMCLE	MCLENNAN	IRRIGATION	GEORGE L MOORE
C4329_1	74	16	16	INDMCLE	MCLENNAN	INDUSTRIAL	THOMAS BOTHERS GRASS LTD
C4329_2	856	80	91	IRRMCLE	MCLENNAN	IRRIGATION	THOMAS BOTHERS GRASS LTD
C4330_1	16	6	6	IRRMCLE	MCLENNAN	IRRIGATION	KARL LEE & ELSIE MAE REDDELL
C4331_1	44	17	17	IRRMCLE	MCLENNAN	IRRIGATION	DIANA M WELLBORN ET AL
C4332_1	32	12	12	IRRMCLE	MCLENNAN	IRRIGATION	KARL LEE REDDELL ET AL
C4333_1	8	8	8	IRRHILL	HILL	IRRIGATION	HILLSBORO COUNTRY CLUB
C4334_1	1	1	1	IRRHILL	HILL	IRRIGATION	"GEORGE W. MCNIEL, ET AL"
C4335_1	40	4	4	IRRHILL	HILL	IRRIGATION	ALPHONS D URBANOVSKY
C4336_1	55	7	3	IRRMCLE	MCLENNAN	IRRIGATION	FAYE SMITH ROMINE
C4336_2	55	7	3	IRRMCLE	MCLENNAN	IRRIGATION	KAYE SMITH BOYD
C4337_1	58	3	3	IRRMCLE	MCLENNAN	IRRIGATION	DONALD RISINGER PENSION PLAN
C4338_1	130	14	16	IRRMCLE	MCLENNAN	IRRIGATION	"JIM G DOLLINS, SR"
C4339_1	100	9	10	IRRMCLE	MCLENNAN	IRRIGATION	B.T. GEORGE, C. WALKER, & J&B ENGLISH
C4340_1	5,600	5,600	5,600	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
C4342_1	12,000	4,483	4,519	SEUMCLE	MCLENNAN	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C4342_2	15,000	467	481	SEUMCLE	MCLENNAN	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C4344_1	400	400	400	IRRMCLE	MCLENNAN	IRRIGATION	LOLA ROBINSON
C4344_2	660	292	292	IRRMCLE	MCLENNAN	IRRIGATION	LOLA ROBINSON
C4345_1	10,000	10,000	9,950	SEUMCLE	MCLENNAN	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C4345_2	11	0	0	SEUMCLE	MCLENNAN	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C4346_1	200	139	139	IRRFALL	FALLS	IRRIGATION	W J DUBE
C4347_1	12	12	12	IRRMCLE	MCLENNAN	IRRIGATION	VANCE DUNNAM JR
C4348_1	70	51	53	IRRMCLE	MCLENNAN	IRRIGATION	"JOE RAY HATTER, SR"
C4349_1	199	13	13	IRRMCLE	MCLENNAN	IRRIGATION	RDS LAND CO LLC
C4349_2	75	0	0	IRRMCLE	MCLENNAN	IRRIGATION	RDS LAND CO LLC

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C4349_3	23	0	0	IRRMCLE	MCLENNAN	IRRIGATION	RDS LAND CO LLC
C4350_1	20	20	20	IRRMCLE	MCLENNAN	IRRIGATION	JOHN P ESTES ESTATE TRUST ETAL
C4351_1	160	12	12	IRRFALL	FALLS	IRRIGATION	MONT HAMM
C4353_1	40	40	40	IRRFALL	FALLS	IRRIGATION	DENNIS L BIRKES ETAL
C4354_1	50	50	50	IRRFALL	FALLS	IRRIGATION	JEAN W EPPERSON
C4355_1	1,500	0	0	MUNFALL	FALLS	MUNICIPAL	MARLIN
C4355_2	2,000	0	0	MUNFALL	FALLS	MUNICIPAL	MARLIN
C4355_3	1,500	0	0	MUNFALL	FALLS	MUNICIPAL	MARLIN
C4355_4	2,000	0	0	INDFALL	FALLS	INDUSTRIAL	CITY OF MARLIN
C4355_7	1,000	0	0	MUNFALL	FALLS	MUNICIPAL	MARLIN
C4356_1	84	84	84	IRRFALL	FALLS	IRRIGATION	DAVID L. ROBERTS & WIFE
C4358_1	991	67	67	IRRFALL	FALLS	IRRIGATION	JOHN C ISAACS ET AL
C4359_1	496	345	345	IRRFALL	FALLS	IRRIGATION	JOHN C ISAACS ET AL
C4359_2	495	34	34	IRRFALL	FALLS	IRRIGATION	JOHN C ISAACS ET AL
C4360_1	124	54	54	MUNFALL	FALLS	MUNICIPAL	ROSEBUD
C4360_2	15	0	0	MUNFALL	FALLS	MUNICIPAL	ROSEBUD
C4360_3	100	39	39	MUNFALL	FALLS	MUNICIPAL	ROSEBUD
C4361_1	184	17	18	IRRROBE	ROBERTSON	IRRIGATION	AGNES FIELD ELIOT
C4362_1	363	36	36	IRRROBE	ROBERTSON	IRRIGATION	DOUGLAS A MCCRARY
C4363_1	384	38	59	IRRROBE	ROBERTSON	IRRIGATION	JOE REISTINO ESTATE
C4363_2	1,068	73	73	IRRROBE	ROBERTSON	IRRIGATION	JOE REISTINO ESTATE
C4363_3	48	5	7	IRRROBE	ROBERTSON	IRRIGATION	JOE REISTINO ESTATE
C4364_1	724	72	72	IRRROBE	ROBERTSON	IRRIGATION	CLIFF A SKILES JR
C4364_2	188	0	0	IRRROBE	ROBERTSON	IRRIGATION	CLIFF A SKILES JR
C4365_1	976	98	149	IRRROBE	ROBERTSON	IRRIGATION	WESLEY E ANDERSON ET AL
C4366_1	275	28	28	IRRROBE	ROBERTSON	IRRIGATION	ELLEN WIESE BRIEN ET AL
C4366_2	125	9	9	IRRROBE	ROBERTSON	IRRIGATION	ELLEN WIESE BRIEN ET AL
C4367_1	145	16	16	IRRROBE	ROBERTSON	IRRIGATION	GERTRUD PAPP ETAL
C4368_1	76	8	8	IRRMILA	MILAM	IRRIGATION	GLORIA ELY HOLDEN
C4369_1	4	3	3	IRRMILA	MILAM	IRRIGATION	GENE W BONORDEN
C4370_1	297	30	30	IRRROBE	ROBERTSON	IRRIGATION	ONAH B PENN ETAL
C4371_1	410	41	41	IRRROBE	ROBERTSON	IRRIGATION	SAM F DESTEFANO
C4371_2	290	20	20	IRRROBE	ROBERTSON	IRRIGATION	SAM F DESTEFANO
C4372_1	235	5	6	IRRBRAZ	BRAZOS	IRRIGATION	FORBIN INVESTMENTS N V
C4372_2	626	136	136	IRRBRAZ	BRAZOS	IRRIGATION	FORBIN INVESTMENTS N V
C4375_1	4	3	3	IRRROBE	ROBERTSON	IRRIGATION	FLOYD KEMPENSKI
C4376_1	74	7	7	IRRROBE	ROBERTSON	IRRIGATION	NELSON FAMILY FARMING TRUST
C4377_1	20	20	20	IRRROBE	ROBERTSON	IRRIGATION	GEORGE C GASSEN
C4767_1	60	0	0	IRRJONE	JONES	IRRIGATION	FIRST NATL BK ABILENE ET AL
C5155_21	3,600	3,600	3,600	HYDPALO	PALO PINTO	HYD	BRAZOS RIVER AUTHORITY
C5155_DSC	50	50	50	IRRPALO	PALO PINTO	IRRIGATION	CARR-THOMAS RANCH
C5155_DSC	3,600	3,600	3,600	SEUPALO	PALO PINTO	STEAM-ELECTRIC	BRAZOS ELECTRIC POWER COOP.
C5155_DSC	4,000	4,000	4,000	MUNHOOD	HOOD	MUNICIPAL	ACTON MUD
C5155_LSC	1,000	1,000	1,000	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C5155_LSC	235	235	235	MINPALO	PALO PINTO	MINING	NORTH RIDGE CORPORATION
C5155_LSC	73	73	73	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C5155_LSC	250	250	250	IRRPALO	PALO PINTO	IRRIGATION	HILL COUNTRY HARBOR, L.P.
C5155_LSC	250	250	250	IRRPALO	PALO PINTO	IRRIGATION	RANCH OWNER'S ASSOCIATION
C5155_LSC	800	800	800	MUNSTEP	STEPHENS	MUNICIPAL	STEPHENS COUNTY RURAL WSC
C5155_LSC	1,000	1,000	1,000	MINSTEP	STEPHENS	MINING	BASA RESOURCES, INC.

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C5155_LSC	750	750	750	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C5155_LSC	125	125	125	MUNPALO	PALO PINTO	MUNICIPAL	PALO PINTO COUNTY-OTHER
C5155_LSC	1,200	1,200	1,200	INDPALO	PALO PINTO	INDUSTRIAL	Texas Parks and Wildlife
C5155_LSC	1,000	1,000	1,000	MUNPALO	PALO PINTO	MUNICIPAL	GRAHAM
C5155_LSC	14,000	14,000	14,000	SEUYOUN	YOUNG	STEAM-ELECTRIC	TXU ELECTRIC COMPANY
C5155_LSC	50	0	0	MUNPALO	PALO PINTO	MUNICIPAL	ABILENE
C5155_LSC	175	175	175	MINSTON	STONEWALL	MINING	CITATION OIL & GAS CORP.
C5155_SYS	10,000	10,000	10,000	INDHOOD	HOOD	INDUSTRIAL	WOLF HOLLOW I, L.P.
C5155_SYS	100	100	100	IRRHOOD	HOOD	IRRIGATION	Decordova Bend Estates Owners Ass.
C5155_SYS	150	150	150	IRRBRAZ	BRAZOS	IRRIGATION	Horizon Turf Grass, Inc.
C5155_SYS	300	300	300	IRRHOOD	HOOD	IRRIGATION	Decordova Bend Estates Owners Ass.
C5155_SYS	16,000	14,720	#REF!	INDBRAZ	BRAZOS	INDUSTRIAL	DOW
C5155_SYS	6,500	6,500	6,500	SEUBOSQ	BOSQUE	STEAM-ELECTRIC	BOSQUE GENERATING, L.P.
C5155_SYS	8,000	8,000	6,700	SEUPALO	PALO PINTO	STEAM-ELECTRIC	BRAZOS ELECTRIC POWER COOP.
C5155_SYS	1,000	848	#REF!	MUNBELL	BELL	MUNICIPAL	CENTRAL TEXAS WSC
C5155_SYS	4,750	4,750	4,750	MUNHILL	HILL	MUNICIPAL	CLEBURNE
C5155_SYS	1,500	1,500	1,500	MUNBELL	BELL	MUNICIPAL	DOG RIDGE WSC
C5155_SYS	139	254	#REF!	MUNBELL	BELL	MUNICIPAL	HARKER HEIGHTS
C5155_SYS	13,210	13,210	13,210	MUNHOOD	HOOD	MUNICIPAL	JOHNSON COUNTY SUD
C5155_SYS	1,493	2,743	2,743	MUNBELL	BELL	MUNICIPAL	HARKER HEIGHTS
C5155_SYS	200	200	200	IRRBRAZ	BRAZOS	IRRIGATION	HORIZON TURF GRASS, INC.
C5155_SYS	20	20	20	IRRMCLE	MCLENNAN	IRRIGATION	ISLAND CONDOMINIUM OWNER'S
C5155_SYS	2,000	1,696	1,696	MUNBELL	BELL	MUNICIPAL	KEMPNER WSC
C5155_SYS	167	1,696	1,696	MUNBELL	BELL	MUNICIPAL	LAMPASAS
C5155_SYS	353	353	353	MUNSHAC	HACKELFORD	MUNICIPAL	SHACKELFORD COUNTY-OTHER
C5155_SYS	2,040	2,040	2,040	MUNHOOD	HOOD	MUNICIPAL	KEENE
C5155_SYS	300	300	300	MINHOOD	HOOD	MINING	TEXAS H20, LLC
C5155_SYS	1,200	1,200	1,200	MUNJOHN	JOHNSON	MUNICIPAL	JOHNSON COUNTY-OTHER
C5155_SYS	600	600	600	MUNJOHN	JOHNSON	MUNICIPAL	JOHNSON COUNTY-OTHER
C5155_SYS	300	300	300	INDSOME	SOMERVELL	INDUSTRIAL	TEXAS H20, LLC
C5155_SYS	300	300	300	IRRJOHN	JOHNSON	IRRIGATION	TEXAS H20, LLC
C5155_SYS	600	600	600	MINPALO	PALO PINTO	MINING	VULCAN CONST. MATERIALS, L.P.
C5155_SYS	1,000	1,000	1,000	MINHILL	HILL	MINING	WESTERN COMPANY OF TEXAS INC.
C5155_SYS	25,000	25,000	25,000	SEUSOME	SOMERVELL	STEAM-ELECTRIC	TXU Electric, GB
C5155_SYS	15,000	15,000	15,000	SEUSOME	SOMERVELL	STEAM-ELECTRIC	TXU Electric, GB
C5155_SYS	43,447	43,447	43,447	SEUHOOD	HOOD	STEAM-ELECTRIC	TXU Electric, PK
C5155_SYS	1,000	1,000	1,000	IRRHILL	HILL	IRRIGATION	Double Diamond, Inc.
C5155_SYS	250	250	250	INDHILL	HILL	INDUSTRIAL	CLEBURNE, CITY OF
C5156_LSC	1,000	1,000	1,000	MUNHOOD	HOOD	MUNICIPAL	ACTON MUD
C5156_LSC	600	600	600	MUNHOOD	HOOD	MUNICIPAL	HOOD COUNTY-OTHER
C5156_LSC	2,000	2,000	2,000	MUNHOOD	HOOD	MUNICIPAL	ACTON MUD
C5156_LSC	300	300	300	IRRHOOD	HOOD	IRRIGATION	Rex R Worrell
C5156_LSC	2,000	2,000	2,000	IRRHOOD	HOOD	IRRIGATION	LENMO, Inc.
C5156_LSC	10,800	10,800	10,800	MUNHOOD	HOOD	MUNICIPAL	GRANBURY
C5156_LSC	200	200	200	IRRHOOD	HOOD	IRRIGATION	BLUEGREEN SOUTHWEST ONE, L.P.
C5156_LSC	1,300	1,300	1,300	IRRHOOD	HOOD	IRRIGATION	KING RANCH TURFGRASS, LP
C5156_LSC	251	251	251	MUNHOOD	HOOD	MUNICIPAL	HOOD COUNTY-OTHER
C5156_LSC	90	90	90	MUNHOOD	HOOD	MUNICIPAL	HOOD COUNTY-OTHER
C5156_SYS	50	50	50	IRRHOOD	HOOD	IRRIGATION	Granbury Recreational Ass., Inc.
C5156_SYS	500	500	500	IRRHOOD	HOOD	IRRIGATION	Pecan Plantation Owners Ass.

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C5156_SYS	250	250	250	IRRHOOD	HOOD	IRRIGATION	Pecan Plantation Owners Ass.
C5156_SYS	100	100	100	MUNFALL	FALLS	MUNICIPAL	ROSEBUD
C5156_SYS	1,000	1,000	1,000	MUNMCLE	MCLENNAN	MUNICIPAL	LORENA
C5156_SYS	800	800	800	MUNFALL	FALLS	MUNICIPAL	MARLIN
C5156_SYS	400	400	400	IRRFALL	FALLS	IRRIGATION	CITY OF MARLIN
C5157_3	409	0	0	NIFHILL	HILL	NIF	BRAZOS RIVER AUTHORITY
C5157_LSC	4,700	4,700	4,700	MUNJOHN	JOHNSON	MUNICIPAL	CLEBURNE
C5157_LSC	15	15	15	MUNHILL	HILL	MUNICIPAL	HILL COUNTY-OTHER
C5157_LSC	60	60	60	MUNHILL	HILL	MUNICIPAL	HILL COUNTY-OTHER
C5157_LSC	750	750	750	MUNHILL	HILL	MUNICIPAL	WHITNEY
C5158_LSC	150	150	125	MUNHILL	HILL	MUNICIPAL	LAKE WHITNEY WATER COMPANY
C5158_LSC	5,953	5,953	4,954	MUNHILL	HILL	MUNICIPAL	AQUILLA WATER SUPPLY
C5158_LSC	5,300	5,300	4,411	MUNJOHN	JOHNSON	MUNICIPAL	CLEBURNE
C5159_LSC	2,518	2,707	2,707	MUNCOMA	COMANCHE	MUNICIPAL	UPPER LEON MWD
C5159_LSC	202	217	217	MUNCOMA	COMANCHE	MUNICIPAL	UPPER LEON MWD
C5159_LSC	2,888	3,105	3,105	MUNCOMA	COMANCHE	MUNICIPAL	UPPER LEON MWD
C5159_LSC	3,909	3,661	3,661	IRRCOMA	COMANCHE	IRRIGATION	North Leon River Irrigation Corp
C5159_LSC	2,743	2,569	2,569	IRRCOMA	COMANCHE	IRRIGATION	Lake Proctor Irrigation Authority
C5159_LSC	1	1	1	MUNCOMA	COMANCHE	MUNICIPAL	COMANCHE COUNTY-OTHER
C5160_DSC	7,397	8,014	8,014	MUNBELL	BELL	MUNICIPAL	TEMPLE
C5160_DSC	14,475	18,500	18,500	MUNBELL	BELL	MUNICIPAL	TEMPLE
C5160_DSC	200	170	170	IRRBELL	BELL	IRRIGATION	WILDFLOWER COUNTRY CLUB, INC.
C5160_DSC	1,000	848	848	MUNBELL	BELL	MUNICIPAL	JARRELL-SCHWERTNER WSC
C5160_DSC	1,956	2,119	2,119	MUNBELL	BELL	MUNICIPAL	TEMPLE
C5160_LSC	261	481	481	MUNBELL	BELL	MUNICIPAL	BLUEBONNET WSC
C5160_LSC	810	687	687	MUNBELL	BELL	MUNICIPAL	MCGREGOR
C5160_LSC	611	720	720	MUNBELL	BELL	MUNICIPAL	439 WSC
C5160_LSC	450	381	381	MUNBELL	BELL	MUNICIPAL	GATESVILLE
C5160_LSC	13,000	11,256	11,256	MUNBELL	BELL	MUNICIPAL	BELL COUNTY WCID #1
C5160_LSC	200	170	170	MUNBELL	BELL	MUNICIPAL	FORT GATES WSC
C5160_LSC	766	1,696	1,696	MUNBELL	BELL	MUNICIPAL	KEMPNER WSC
C5160_LSC	4,000	3,391	3,391	MUNBELL	BELL	MUNICIPAL	GATESVILLE
C5160_LSC	25	21	21	MUNBELL	BELL	MUNICIPAL	BELL COUNTY-OTHER
C5160_LSC	355	424	424	MUNBELL	BELL	MUNICIPAL	MOFFAT WSC
C5160_LSC	400	339	339	MUNBELL	BELL	MUNICIPAL	BELL COUNTY-OTHER
C5160_LSC	248	210	210	MUNBELL	BELL	MUNICIPAL	GATESVILLE
C5160_LSC	1,200	1,017	1,017	MUNBELL	BELL	MUNICIPAL	GATESVILLE
C5160_LSC	49,509	42,172	42,172	MUNBELL	BELL	MUNICIPAL	BELL COUNTY WCID #1
C5160_LSC	737	1,356	1,356	MUNBELL	BELL	MUNICIPAL	BLUEBONNET WSC
C5160_LSC	2,157	3,971	3,971	MUNBELL	BELL	MUNICIPAL	BLUEBONNET WSC
C5160_LSC	668	1,229	1,229	MUNBELL	BELL	MUNICIPAL	BLUEBONNET WSC
C5160_SYS	300	254	254	MUNBELL	BELL	MUNICIPAL	BELL COUNTY-OTHER
C5160_SYS	403	475	475	MUNBELL	BELL	MUNICIPAL	439 WSC
C5161_DSC	8	7	7	IRRBELL	BELL	IRRIGATION	Country Harvest
C5161_LSC	192	424	424	MUNBELL	BELL	MUNICIPAL	KEMPNER WSC
C5161_LSC	1,016	2,247	2,247	MUNBELL	BELL	MUNICIPAL	KEMPNER WSC
C5161_LSC	1,200	1,017	1,017	MUNBELL	BELL	MUNICIPAL	JONAH WATER SUD
C5161_LSC	310	263	263	MUNBELL	BELL	MUNICIPAL	BELL COUNTY-OTHER
C5161_LSC	87	3,391	3,391	MUNBELL	BELL	MUNICIPAL	BRUSHY CREEK MUD
C5161_LSC	2	1	1	MUNBELL	BELL	MUNICIPAL	BELL COUNTY-OTHER

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C5161_LSC	800	1,600	1,600	MUNBELL	BELL	MUNICIPAL	SALADO WSC
C5161_LSC	6,950	5,892	5,892	MUNBELL	BELL	MUNICIPAL	CENTRAL TEXAS WSC
C5161_LSC	3,100	2,628	2,628	MUNBELL	BELL	MUNICIPAL	CENTRAL TEXAS WSC
C5161_LSC	100	85	85	MUNBELL	BELL	MUNICIPAL	CENTRAL TEXAS WSC
C5161_LSC	2,645	2,242	2,242	MUNBELL	BELL	MUNICIPAL	CENTRAL TEXAS WSC
C5161_LSC	84	848	848	MUNBELL	BELL	MUNICIPAL	LAMPASAS
C5161_LSC	42	424	424	MUNBELL	BELL	MUNICIPAL	LAMPASAS
C5161_LSC	418	0	0	MUNBELL	BELL	MUNICIPAL	SALADO WSC
C5161_SYS	18,134	15,374	15,374	MUNWILL	WILLIAMSON	MUNICIPAL	ROUND ROCK
C5161_SYS	10,000	13,096	13,096	MUNWILL	WILLIAMSON	MUNICIPAL	GEORGETOWN
C5161_SYS	6,720	5,697	5,697	MUNWILL	WILLIAMSON	MUNICIPAL	GEORGETOWN
C5162_DSC	2,200	5,375	5,375	MUNWILL	WILLIAMSON	MUNICIPAL	CHISHOLM TRAIL SUD
C5162_DSC	10,000	8,478	8,478	MUNWILL	WILLIAMSON	MUNICIPAL	GEORGETOWN
C5162_SYS	1,239	1,050	1,050	MUNWILL	WILLIAMSON	MUNICIPAL	JONAH WATER SUD
C5162_SYS	4,760	4,035	4,035	MUNWILL	WILLIAMSON	MUNICIPAL	CHISHOLM TRAIL SUD
C5162_SYS	6,720	5,697	5,697	MUNWILL	WILLIAMSON	MUNICIPAL	ROUND ROCK
C5163_LSC	15	13	13	IRRWILL	WILLIAMSON	IRRIGATION	Del Webb Sun City Georgetown
C5163_LSC	13,000	7,304	7,304	MUNWILL	WILLIAMSON	MUNICIPAL	TAYLOR
C5163_SYS	5,000	4,239	4,239	INDMILA	MILAM	INDUSTRIAL	ALCOA
C5164_LSC	4,200	4,200	4,200	MUNWASH	WASHINGTON	MUNICIPAL	BRENHAM
C5164_LSC	0	0	0	MUNBURL	BURLESON	MUNICIPAL	NOT A WUG
C5165_DSC	4,000	4,000	4,000	MUNBRAZ	BRAZOS	MUNICIPAL	WELLBORN SUD
C5165_DSC	3,600	3,600	3,600	EUBRAZ	BRAZOS	EUB	Texas Municipal Power Agency NA
C5165_LSC	200	200	200	MUNLIME	LIMESTONE	MUNICIPAL	LIMESTONE COUNTY-OTHER
C5165_LSC	25,000	25,000	25,000	SEUROBE	ROBERTSON	STEAM-ELECTRIC	TXU Electric Company
C5165_LSC	14,000	14,000	14,000	SEULIME	LIMESTONE	STEAM-ELECTRIC	NRG Texas, LLC
C5165_LSC	4,000	4,000	4,000	SEULIME	LIMESTONE	STEAM-ELECTRIC	NRG Texas, LLC
C5165_LSC	3,837	3,837	3,837	SEULIME	LIMESTONE	STEAM-ELECTRIC	NRG Texas, LLC
C5165_LSC	3,838	3,838	3,000	SEULIME	LIMESTONE	STEAM-ELECTRIC	OAK GROVE MANAGEMENT, LLC
C5165_LSC	60	60	60	MUNLIME	LIMESTONE	MUNICIPAL	LIMESTONE COUNTY-OTHER
C5268_1	85	85	85	SEUBRAZ	BRAZOS	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C5269_1	535	8	8	IRRBRAZ	BRAZOS	IRRIGATION	THE TRAVELERS INSURANCE CO
C5269_2	400	8	8	IRRBRAZ	BRAZOS	IRRIGATION	R O LAWRENCE III ET UX
C5271_1	500	77	77	IRRBURL	BURLESON	IRRIGATION	TEXAS A&M UNIVERSITY
C5271_2	68	0	0	IRRBURL	BURLESON	IRRIGATION	TEXAS A&M UNIVERSITY
C5271_3	700	58	58	IRRBURL	BURLESON	IRRIGATION	TEXAS A&M UNIVERSITY
C5271_4	160	0	0	IRRBURL	BURLESON	IRRIGATION	TEXAS A&M UNIVERSITY
C5271_5	420	95	95	INDBURL	BURLESON	INDUSTRIAL	TEXAS A&M UNIVERSITY
C5272_1	14,000	14,000	14,000	SEUMILA	MILAM	STEAM-ELECTRIC	ALUMINUM CO OF AMERICA
C5273_1	1	0	0	IRRMILA	MILAM	IRRIGATION	ROCKDALE COUNTRY CLUB
C5276_1	2	0	0	IRRWASH	WASHINGTON	IRRIGATION	GEORGE W SPRANKLE
C5284_1	30	14	15	IRRBURL	BURLESON	IRRIGATION	SEALY & ROBERT HUTCHINGS
C5285_1	752	95	95	IRRWASH	WASHINGTON	IRRIGATION	WILLIAM J TERRELL ET AL
C5286_1	218	33	33	IRRGRIM	GRIMES	IRRIGATION	JOYCE ANN FREDE
C5286_2	232	4	4	IRRGRIM	GRIMES	IRRIGATION	JOYCE ANN FREDE
C5286_3	259	23	23	IRRBRAZ	BRAZOS	IRRIGATION	JOYCE ANN FREDE
C5286_4	259	23	23	IRRBRAZ	BRAZOS	IRRIGATION	WILLIE BALDOBINO ET UX
C5287_1	2,165	1,216	150	MUNLIME	LIMESTONE	MUNICIPAL	BISTONE MWSD
C5287_2	722	327	50	MUNLIME	LIMESTONE	MUNICIPAL	BISTONE MWSD
C5287_3	65	36	3	INDLIME	LIMESTONE	INDUSTRIAL	BISTONE MUNICIPAL WSD

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
C5288_1	6	6	6	IRRLIME	LIMESTONE	IRRIGATION	TEXAS PARKS & WILDLIFE DEPT
C5289_1	2,500	1,142	1,142	MUNLIME	LIMESTONE	MUNICIPAL	GROESBECK
C5290_1	8	8	8	IRRLIME	LIMESTONE	IRRIGATION	ERNI LUNA ET AL
C5298_1	13,200	2,900	2,850	SEUROBE	ROBERTSON	STEAM-ELECTRIC	TEXAS UTILITIES ELECTRIC CO
C5308_1	12	0	1	IRRBRAZ	BRAZOS	IRRIGATION	BRIARCREST COUNTRY CLUB INC
C5311_1	9,740	9,740	9,740	SEUGRIM	GRIMES	STEAM-ELECTRIC	TEXAS MUNICIPAL POWER AGENCY
C5312_1	200	78	85	MINGRIM	GRIMES	MINING	TEXAS MUNICIPAL POWER AGENCY
C5470_1	514	514	514	IRRROBE	ROBERTSON	IRRIGATION	CLIFFORD A SKILES JR ET UX
P3761_1	400	5	8	IRRMILA	MILAM	IRRIGATION	ROBERT W NORRIS
P3762_1	100	1	2	IRRBELL	BELL	IRRIGATION	ELLIS G & JEAN M MARSHALL
P3763_1	361	22	23	IRRBELL	BELL	IRRIGATION	PAUL J MEYER ET AL
P3809_4	230	0	0	IRRBOSQ	BOSQUE	IRRIGATION	0
P3851_1	17	0	0	IRRHOOD	HOOD	IRRIGATION	WALNUT CR FARMS OF GRANBURY
P3936_1	2,600	177	177	IRRMCLE	MCLENNAN	IRRIGATION	HOLY LAND & CATTLE
P3939_1	98	98	98	IRRERAT	ERATH	IRRIGATION	KENNETH & BETTY YVON LESLEY
P4000_1	40	0	0	IRRPALO	PALO PINTO	IRRIGATION	THOMAS E LOVELACE ET AL
P4003_1	30	0	0	IRRPALO	PALO PINTO	IRRIGATION	MIKE & ITHA LYNNE BERRY
P4011_1	905	114	114	IRRWASH	WASHINGTON	IRRIGATION	ROBERT HARRY MOORE
P4011_2	498	63	63	IRRWASH	WASHINGTON	IRRIGATION	MELANIE MOORE KOLBY ET AL
P4012_1	440	3	6	IRRBELL	BELL	IRRIGATION	BILLY G. CURRY ET AL
P4013_1	1,200	82	82	IRRFALL	FALLS	IRRIGATION	ROBERT L MACHA ET AL
P4014_1	1,851	126	126	IRRFALL	FALLS	IRRIGATION	MARY D WALSH
P4015_1	350	3	5	IRRMILA	MILAM	IRRIGATION	CALVIN KRAEMER ET AL
P4015_2	350	3	5	IRRMILA	MILAM	IRRIGATION	CHAMBERLIN FAMILY TRUST
P4016_1	38	0	0	IRRBRAZ	BRAZOS	IRRIGATION	0
P4016_2	4,450	561	561	IRRBRAZ	BRAZOS	IRRIGATION	TOM J. MOORE FARMS
P4016_3	990	113	113	IRRBRAZ	BRAZOS	IRRIGATION	TOM J. MOORE FARMS
P4017_1	962	87	87	IRRBRAZ	BRAZOS	IRRIGATION	ROBERT T & GERALDINE MOORE
P4023_1	600	0	0	IRREAST	EASTLAND	IRRIGATION	DON WEINACHT ET AL
P4024_1	300	0	0	IRRBELL	BELL	IRRIGATION	LVGC INC
P4042_1	700	48	48	IRRFALL	FALLS	IRRIGATION	T W WHALEY JR
P4063_1	270	2	2	IRRFALL	FALLS	IRRIGATION	N S WATERMAN JR ET UX
P4063_2	179	0	0	IRRFALL	FALLS	IRRIGATION	N S WATERMAN JR ET UX
P4076_1	250	8	8	IRRHOOD	HOOD	IRRIGATION	JAMES H JONES ET UX
P4078_1	825	27	27	IRRHOOD	HOOD	IRRIGATION	JOHN R WOODALL ET AL
P4080_1	1,500	102	102	IRRROBE	ROBERTSON	IRRIGATION	GATHAN REISTINO
P4095_1	240	2	4	IRRBELL	BELL	IRRIGATION	SIDNEY KACIR
P4095_2	308	3	3	IRRBELL	BELL	IRRIGATION	SIDNEY KACIR
P4109_1	400	3	6	IRRMILA	MILAM	IRRIGATION	BETTY KACIR WHEELER
P4124_1	225	0	0	IRRERAT	ERATH	IRRIGATION	BRUCE E TODD
P4124_2	42	0	0	IRRERAT	ERATH	IRRIGATION	BRUCE E TODD
P4128_1	102	0	0	IRRNOLA	NOLAN	IRRIGATION	FLOYD GUNN
P4135_1	55	1	1	MUNMCLE	MCLENNAN	MUNICIPAL	CRAWFORD
P4145_1	448	0	0	IRRTAYL	TAYLOR	IRRIGATION	JOHN W & JANIE NIGLIAZZO
P4166_1	120	1	2	IRRWILL	WILLIAMSON	IRRIGATION	SAMUEL W & MARGARET JONES
P4212_1	300	0	0	IRREAST	EASTLAND	IRRIGATION	CARL MOODY ET AL
P4218_1	172	1	2	IRRBELL	BELL	IRRIGATION	THE SILVER QUAIL COMPANY
P4258_1	720	12	12	MUNJOHN	JOHNSON	MUNICIPAL	CLEBURNE
P4266_1	4,330	0	0	IRRJONE	JONES	IRRIGATION	CITY OF ABILENE
P4279_1	600	5	9	IRRMILA	MILAM	IRRIGATION	HILLIARD RANCHES INC

TABLE G-2. Summary of Surface Water Availability

Water_Right	Authorized Permitted Diversion	2010 Minimum Annual Diversion / Supply Reliability	2060 Minimum Annual Diversion / Supply Reliability	Use/County	County	Use	Owner
P4279_2	150	2	3	IRRMILA	MILAM	IRRIGATION	WARRENS TURF NURSERY INC
P5000_1	500	0	0	MUNMCLE	MCLENNAN	MUNICIPAL	MART
P5076_1	25	0	0	IRRBELL	BELL	IRRIGATION	HAYNES CORPORATION
P5077_1	600	41	41	IRRMILA	MILAM	IRRIGATION	DAVID B & AUDREY HATCHER
P5085_1	6,021	2,995	2,995	MUNMCLE	MCLENNAN	MUNICIPAL	ROBINSON
P5094_1	20,089	19,681	15,004	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
P5094_2	688	0	0	MUNMCLE	MCLENNAN	MUNICIPAL	WACO
P5094_4	140	0	0	MCLE	MCLENNAN	MCL	CITY OF WACO
P5148_1	458	1	1	SEUROBE	ROBERTSON	STEAM-ELECTRIC	TEXAS-NEW MEXICO POWER CO
P5162_1	8	8	8	IRRSTON	STONEWALL	IRRIGATION	CITY OF ASPERMONT
P5242_1	1,552	0	0	MINSTON	STONEWALL	MINING	PHILLIPS PETROLEUM CO
P5256_1	979	31	31	IRRBRAZ	BRAZOS	IRRIGATION	JOHN D VIEMAN ET AL
P5282_1	235	0	0	MINSTON	STONEWALL	MINING	CITATION 1994 INVEST LTD PART
P5290_1	250	1	1	IRRGRIM	GRIMES	IRRIGATION	TEXAS DEPT OF CRIMINAL JUSTICE
P5290_2	598	252	268	IRRGRIM	GRIMES	IRRIGATION	TEXAS DEPT OF CRIMINAL JUSTICE
P5329_1	325	2	2	IRRBRAZ	BRAZOS	IRRIGATION	PEBBLE CREEK COUNTRY CLUB INC
P5329_2	270	0	0	IRRBRAZ	BRAZOS	IRRIGATION	PEBBLE CREEK COUNTRY CLUB INC
P5330_1	187	20	21	IRRBELL	BELL	IRRIGATION	CITY OF TEMPLE
P5354_1	200	8	8	INDGRIM	GRIMES	INDUSTRIAL	TEXAS MUNICIPAL POWER AGENCY
P5385_1	140	95	95	D&LBRAZ	BRAZOS	D&L	NANTUCKET LTD
P5435_1	235	0	0	MINKNOX	KNOX	MINING	PLAINS PETROLEUM OPERATING CO
P5458_1	100	100	100	INDGRIM	GRIMES	INDUSTRIAL	TEXAS MUNICIPAL POWER AGENCY
P5473_1	10	4	4	INDGRIM	GRIMES	INDUSTRIAL	TEXAS MUNICIPAL POWER AGENCY
P5533_2	26	0	0	IRRWILL	WILLIAMSON	IRRIGATION	DEL WEBB TEXAS L P
P5551_4	2,004	802	843	MUNBOSQ	BOSQUE	MUNICIPAL	CLIFTON
P5566_1	250	10	10	IRRGRIM	GRIMES	IRRIGATION	STEWART & MARY THOMPSON &TRUST
P5570_1	365	3	3	IRRBRAZ	BRAZOS	IRRIGATION	DAVID MOODY TRUSTEE ET AL
P5692_1	67	0	0	MINSTON	STONEWALL	MINING	WALTER EXPLORATION INC
P5744_1	7,217	0	0	MUNSOME	SOMERVELL	MUNICIPAL	SOMERVELL COUNTY-OTHER
P5744_2	2,000	1,380	1,380	MUNSOME	SOMERVELL	MUNICIPAL	SOMERVELL COUNTY-OTHER
P5752_1	1,200	0	0	MINBURL	BURLESON	MINING	0
P5770_1	53	9	9	MINROBE	ROBERTSON	MINING	0
P5803_1	650	650	650	INDMILA	MILAM	INDUSTRIAL	0
P5899_2	1,336	434	434	MUNBOSQ	BOSQUE	MUNICIPAL	NOT A WUG

(This page intentionally left blank.)

Appendix H
Consensus Criteria for Environmental Flow Needs

ENVIRONMENTAL WATER NEEDS CRITERIA OF THE CONSENSUS PLANNING PROCESS

In pursuit of the goals of reducing conflict among competing water interests, providing consistent State water policy, and increasing planning and regulatory clarity to State water managers, the draft consensus planning methods reached among the three State water agencies for providing water needs involve trade-offs where neither human nor environmental needs unacceptably "prevail" over the other. The proposed methodology is based on the concept of retaining target flows for environmental purposes and allowing human use of flows greater than the target flows. Each of the new project environmental criteria described below provides for the priority of human needs during dry conditions, but also provides for some sharing of the adverse impact of drought by humans and the environment.

Specific data or project features identified in the final design and permitting process of water supply projects may require consideration of detailed criteria, based on site-specific field studies, which were not applied during the longer-range planning process. The environmental provisions specified below are representative of the basic approach to apportion surface water subject to regulatory actions in the entire water development process (i.e., planning through permitting), but only approximating what may be required for environmental needs in the final permit decision. In addition to passage of environmental flows, adequate flows will be passed through for protection of downstream water rights. In lieu of site-specific studies in the permitting process, the criteria will have the rebuttable presumption of validity. When the results of intensive freshwater inflow or instream flow studies are available and criteria have been established, those criteria will be used in the Water Plan rather than any generic rule.

NEW PROJECT ON-CHANNEL RESERVOIRS

The conservation storage of new, on-channel water supply reservoirs would be divided into three zones with provisions for varying levels of instream flows downstream of on-channel reservoir projects. Zone 1 occurs when reservoir water levels are greater than 80% of storage capacity, and inflows will be passed up to the monthly medians, calculated with naturalized daily stream flow estimates. Also, inflows will be passed to provide one channel flushing flow per season to provide for channel and habitat maintenance. Zone 2 occurs as dry conditions drop reservoir levels to between 50 and 80% of storage capacity. In this zone, inflows would be passed only up to the monthly 25th percentile flow values, calculated with naturalized daily stream flow estimates. In Zone 3, drought conditions worsen, dropping reservoir levels below 50% storage capacity. Inflows would be passed up to the established water quality standard (or 7Q2 value published by the TNRCC) for the downstream segment.

In all zones, instream flow pass-throughs would be targeted to reach the associated estuary system. Flows necessary for the protection of downstream water rights will be added to the appropriate instream flow value determined by the above method. In all cases, no releases will be made from water supply storage to provide environmental flows.

NEW DIRECT DIVERSIONS

Criteria governing direct diversions from a river or stream recommended in the State Water Plan would be based on stream flow conditions just upstream of the diversion point after providing for downstream water rights, and would also be divided into three zones based on hydrologic conditions. Zone 1 occurs when flow is greater than monthly medians; minimum flows passed will be the monthly medians, calculated with naturalized daily stream flow estimates. Zone 2 occurs when flows are greater than the monthly 25th percentile and less than or equal to medians. Minimum flows passed will be the monthly 25th percentile, calculated with naturalized daily stream flow estimates. Zone 3 occurs when stream flow is less than or equal to monthly 25th percentile values. Minimum flows passed will be the larger of: (1) the value necessary to maintain downstream water quality, or (2) a continuous flow threshold to be determined by consensus planning staff (e.g., 15th percentile), that would not allow the diversion by itself to dry up the stream.

NEW DIRECT DIVERSION PROJECTS INTO OFF-CHANNEL STORAGE

In those cases where a recommended water supply project would divert its water from a river or stream into off-channel storage, a combination of the direct diversion and reservoir criteria would apply. The direct diversion criteria will govern the ability to divert water into the off-channel reservoir. The reservoir criteria will address the ability of the project to capture water, as well as define the reservoir's operations to pass environmental flows from its own watershed.

BAY AND ESTUARY CONSIDERATIONS

For most planning purposes, the Zone 1 environmental flow requirements previously described will also provide the target inflows to bays and estuaries (B&E). However, where inflow values that are adequate to meet the beneficial inflow needs as described in Texas Water Code §11.147 have been established, those inflow volumes will be used as the basis for calculating the contributing portions of required water during Zone 1 conditions in new reservoirs or direct diversions for projects located within 200 river miles of the coast, to commence at the mouth of the river. No other special B&E provisions would be made in Zone 2 or Zone 3. These inflow values may be determined by TPWD until that agency and the TNRCC jointly make the determination in accordance with Texas Water Code §11.1491.

AMENDMENTS TO EXISTING PERMITS

Once water supply projects are specifically designed and submitted for permit consideration, a more detailed environmental assessment of its features may be performed. The scope of environmental review and permit consideration of an amendment to an existing water right is limited by law. Because of the many varied conditions around the State, the TNRCC can only provide general guidance as to how the Commission would evaluate applications for water rights and amendments to existing permits. In general, evaluation of impacts to instream or estuarine ecosystems will occur when there is a *significant* change in the point of diversion from downstream to upstream, to an adjoining tributary, to endangered species habitat, or if there is a change of purpose of use from non-consumptive to consumptive. Other changes in place or type of use may have limited or no further environmental review. For further details, refer to <u>A Regulatory Guidance Document for Applications to Divert, Store or Use State Water</u> (June, 1995), published by the TNRCC.

For planning purposes, proposed amendments, such as conversion from non-consumptive to consumptive use (having the effect of a new appropriation) would have the appropriate environmental considerations described for new projects. For other types of amendments where only the intervening river or stream would be affected, the appropriate reservoir or direct diversion instream flow criteria would be applied. Where applicable, environmental flow criteria would only affect that portion of the existing water right subject to change.

ENVIRONMENTAL WATER NEEDS CRITERIA OF THE CONSENSUS PLANNING PROCESS

OVERVIEW

In pursuit of the goals of reducing conflict among competing water interests, providing consistent State water policy, and increasing planning and regulatory clarity to State water managers, the draft consensus proposals reached among the Texas Water Development Board, the Texas Natural Resource Conservation Commission, and the Texas Parks and Wildlife Department on planning methods for providing water needs necessarily involve trade-offs where neither human nor environmental needs unacceptably "prevail" over the other. The challenge facing the technical and policy staff of the three agencies was to craft methods that seek to optimize the provision of environmental flows while minimizing impact on water supply capability.

A guiding desire was to develop a procedure for the Water Plan process that would improve the current method of providing instream flows for environmental purposes with one that will ensure the long-term maintenance of the water-based environment that is so important to Texans, realizing that dry conditions are a natural part of Texas. This process leaves water in the rivers up to an environmental target flow amount and allows human use of flows larger than the target rate. The agencies sought the advice of national experts on how to quantify instream environmental flow targets in a planning process. Their recommendation was that site specific studies should be required, but the instream environment that developed over time should be maintained if river flow rates are normal. The procedure developed uses median flows calculated from naturalized daily streamflow estimates. These estimates are calculated by removing human impacts on the measured flows to represent normal flows, with different operating procedures as river flow conditions change from normal to dry and finally to drought to balance human and environmental uses.

Inter-agency staff have modeled and evaluated well over 100 different scenarios with a variety of alternative management options and in diverse locations and site conditions around the State. We feel the draft proposals listed below produce an acceptable balance between human and environmental needs, and employing straightforward policy considerations and planning methods that are intuitive, consistent, and equitable in their approach. Each of the new project criteria described below provides for the priority of human needs during dry and drought conditions, but at the same time provides for some sharing of the adverse impact of drought by humans and the environment.

It should be emphasized that specific features that are identified in the final project design may require application of detailed criteria during the permitting process which were not applied during the long-range planning process. The environmental provisions specified below are representative of the basic approach to apportion surface water subject to regulatory action in the water planning process, and only approximating what may be required for environmental needs in the ultimate regulatory decision. In lieu of site-specific studies in the permitting process, the criteria will have the rebuttable presumption of validity.

For planning purposes, the environmental pass-through requirements for all zones will be added to flows that provide for downstream water rights. The protection of downstream water rights will be presented by using the full recorded amount of the existing water right and the higher of current reported use or future projected consumptive use (never larger than the full recorded amount of the right) for each downstream right. This range of available water will be noted so that sponsors of surface water development projects will be aware that certain actions on their part may be needed to produce the projected water supply. This approach will ensure that the full permitted rights are recognized during the planning process while identifying areas where significant amounts of appropriated water are presently not being used and potentially available to meet future water needs through marketing, subordination agreements, or other regulatory means.

NEW PROJECT ON-CHANNEL RESERVOIRS

As illustrated in Figure 1, the conservation storage of new-project, on-channel water supply reservoirs would be divided into three zones for environmental instream flow provision as follows:

Zone 1

In Zone 1 of the reservoir, when the reservoir water level is greater than 80% of storage capacity, inflows will be passed up to the monthly medians that are calculated with naturalized daily streamflow estimates.*

Also when the reservoir level is within Zone 1, inflows will be passed to provide one channel flushing flow event per three-month calendar season to provide for channel and habitat maintenance. The default planning criteria allow for a flushing flow event with a 72-hour duration and a peak discharge equal to the site's daily maximum flow with a 1.5-year recurrence interval calculated using an annual historical series of naturalized daily streamflow estimates. During these events, the reservoir will pass-through the higher of: (a) peak flow values, or (b) the sum of environmental pass-throughs, plus flows for protection of downstream water rights. Thus, the flushing flow is not to be stacked on other flow requirements. These environmental criteria should not and are not intended to provide any increase in flooding or cause over-banking below a new reservoir.

* Naturalized streamflow is the estimated amount of water that would have been present in a watercourse with no direct man-made impacts in the watershed. It is calculated by taking values of historically measured streamflow, adding amounts of estimated man-made losses from the upstream watershed caused by diversion and lake evaporation, then subtracting amounts of estimated man-made gains to the upstream watershed caused by return flows.

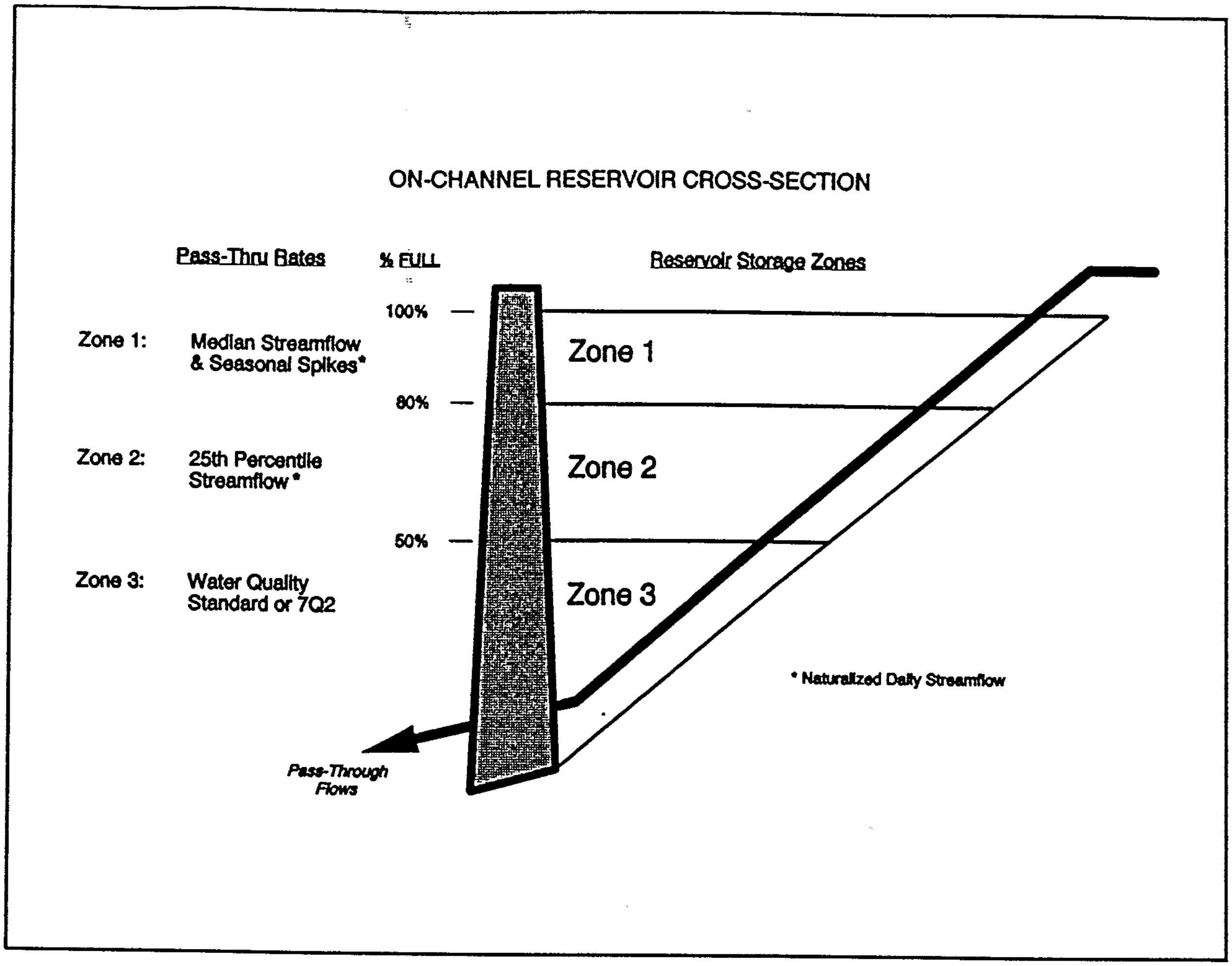


FIGURE 1
NEW PROJECT, ON-CHANNEL RESERVOIR CRITERIA
FOR PASSING ENVIRONMENTAL FLOWS

Zone 2

As dry conditions develop and the reservoir water level declines into Zone 2 between 50 and 80% storage capacity, inflows passed would be reduced and provided only up to the monthly 25th percentile flow values that are calculated with naturalized daily streamflow estimates.

Zone 3

As more severe drought conditions develop and the reservoir level declines into Zone 3 below 50% storage capacity, environmental pass-throughs would be reduced, and flows would be passed up to a target of the established water quality standard for the downstream segment. In lieu of any established water quality standard, the 7Q2 low flow value, as published in the TNRCC's Water Quality Standards, would be used as the default criterion for Zone 3 pass-throughs. If in Zones 1 and 2, the value necessary to maintain downstream water quality is higher than the medians or 25th percentiles then the value necessary to maintain downstream water quality will be used instead of the other target flow values.

All Reservoir Zones

In all zones, it is the intent of these planning criteria that flows passed for instream purposes would also reflect the needs of the associated bay and estuary system. In addition to passage of environmental flows, adequate flows will be passed through for protection of downstream water rights. In all zones, water that can be captured by reservoirs in excess of the environmental provisions is available for water supply storage, and no water will be released from storage to meet environmental targets when inflows are below these limits. However, most future reservoir projects and direct diversions are anticipated to be designed solely for water supply rather than flood control, meaning that most floods can't be captured by the reservoir, but will spill downstream. These spills increase the amount of water available for instream flow maintenance and estuarine needs than would be provided by the environmental criteria alone.

NEW PROJECT DIRECT DIVERSIONS

As illustrated in Figure 2, the criteria for direct diversions from a river or stream that are recommended in the Water Plan, would be based on streamflow conditions just upstream of the diversion point, and would also be divided into three zones as follows:

Zone 1

Zone 1 occurs when actual streamflow is greater than monthly medians calculated with naturalized daily streamflow estimates. When streamflow is within Zone 1, minimum flows passed will be the monthly medians that are calculated with naturalized daily streamflow estimates.

Zone 2

Zone 2 occurs when actual streamflow is less than or equal to medians, but greater than monthly 25th percentile values. When streamflow is within Zone 2, minimum flows passed will be the monthly 25th percentile values that are calculated with naturalized daily streamflow estimates.

Zone 3

Zone 3 occurs when actual streamflow is less than or equal to monthly 25th percentile values. When streamflow is within Zone 3, minimum flows passed will be the larger of: (1) the value necessary to maintain downstream water quality or (2) a continuous flow threshold to be determined by consensus planning staff (e.g., 15th percentile flow) that will not allow the diversion by itself, to dry up the stream.

For perennial river/stream segments where a water quality standard has been established for a stream segment, that value will be used as the pass-by target. Where such a standard has not yet been established, the default planning criterion is the 7Q2 value as published in the TNRCC's Water Quality Standards. For Zones 1 and 2, if the value necessary to maintain downstream water quality is higher than the medians or 25th percentiles, this value necessary to maintain downstream water quality will be used instead of the other values.

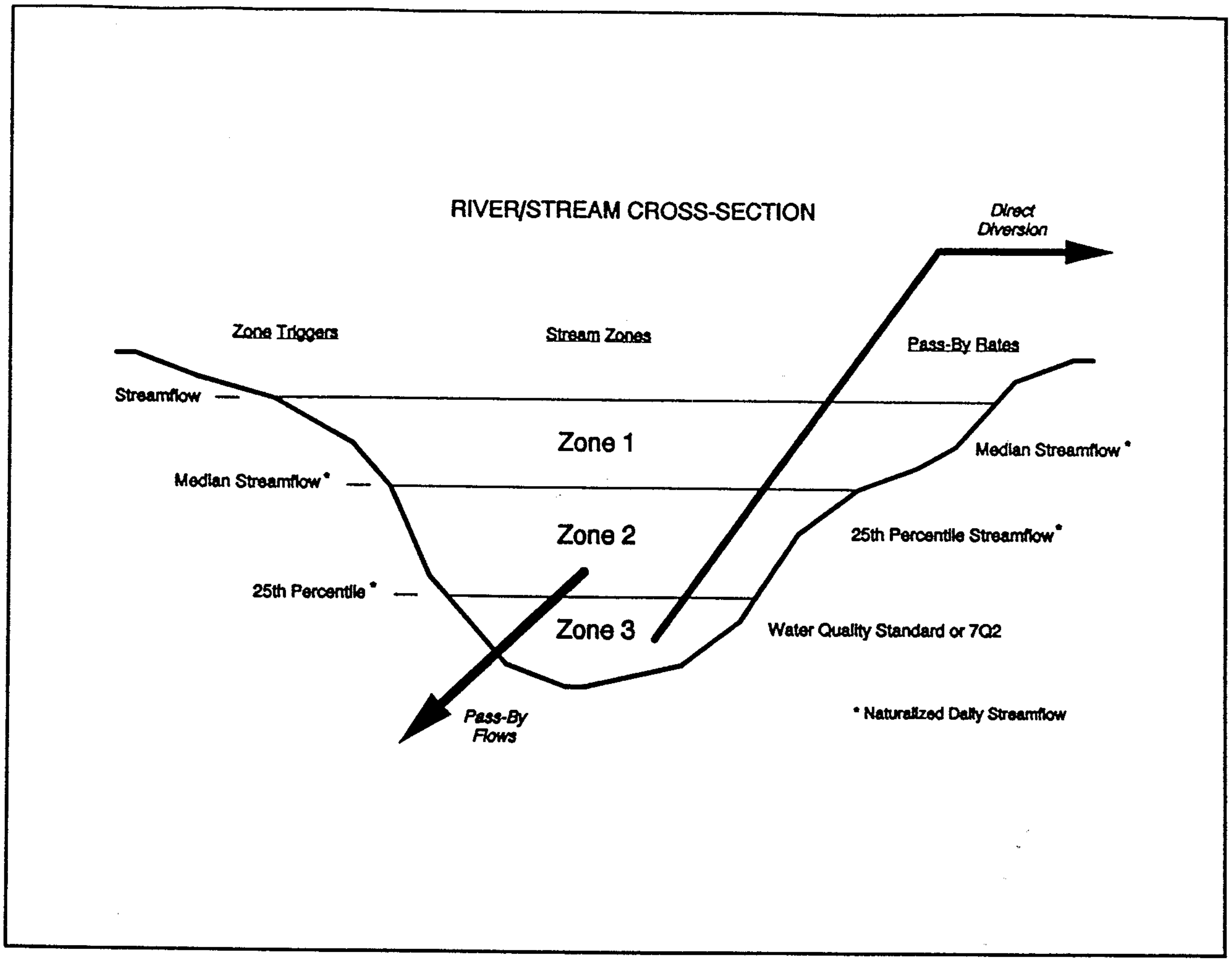


FIGURE 2
NEW PROJECT, DIRECT DIVERSION CRITERIA
FOR PASSING ENVIRONMENTAL FLOWS

All Zones

The trigger values above are calculated with naturalized daily streamflow estimates. In addition to passage of environmental flows, adequate flows will be passed through for protection of downstream water rights. The above procedure, because it provides a specific quantity of flow for environmental use for each zone, does not have smooth transitions between zones for diversion restrictions, and the agencies agree that the procedure should be investigated to see if it is possible to make smoother transitions.

NEW DIRECT DIVERSIONS INTO LARGE OFF-CHANNEL STORAGE

As illustrated in Figure 3, in those cases where a large water supply project would divert its water from a river or stream into off-channel storage, a combination of the direct diversion and reservoir criteria would apply.

The direct diversion criteria will govern the ability to divert water into the off-channel project. The reservoir criteria will address the ability of the reservoir to capture water from its own watershed, as well as define the reservoir's multi-stage operations to pass-through environmental flows, as well as flows for protection of downstream water rights.

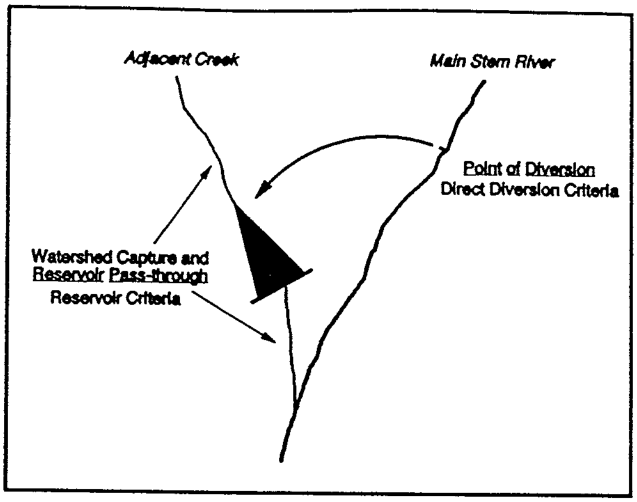


FIGURE 3
COMBINED CRITERIA FOR DIVERSION INTO OFF-CHANNEL RESERVOIR

BAY AND ESTUARY CONSIDERATIONS

As a planning place-holder value, the Zone 1 reservoir pass-throughs or direct diversion pass-bys described previously will also provide freshwater inflow to the bays and estuaries. However where inflow values adequate to meet the beneficial inflow needs as described in Texas Water Code §11.147 have been established, those inflow volumes will be used for projects within 200 river miles of the coast, commencing from the mouth of the river, as the basis for calculating the relative contributions of fresh water from the associated rivers and coastal basins during times of Zone 1 conditions. No other special provisions would be made for B&E purposes in Zone 2 or 3 conditions for either new reservoirs or large direct diversions. These inflow values may be determined by TPWD until that agency and the TNRCC jointly make the determination in accordance with Texas Water Code §11.1491.

The target flows in Zone 1 of the reservoir operating procedure should be established to provide the beneficial flows as defined in §11.147(a) of the Texas Water Code, i.e. the "salinity, nutrient, and sediment loading regime adequate to maintain an ecologically sound environment in the receiving bay and estuary system that is necessary for the maintenance of productivity of economically important and ecologically characteristic sport or commercial fish and shellfish species and estuarine life upon which such fish and shellfish are dependent."

In practical terms, that means it is not necessarily MinQ or MaxQ produced by the optimization model, but a point along that curve between these values that provides some margin of safety (comfort) in providing sufficient flows in Zone 1 to maintain average historic productivity on the fisheries. The fresh water inflow target is one that has been validated by comparing the seasonal distribution of salinity regimes with the density distribution of selected estuarine flora and fauna.

B&E pass-through requirements for a new water development project will be based on a pro-rata share of that location's contribution of flow to the estuary in question. Once the target amount of water reaches an estuary during a month, no additional flows need to be provided for bay and estuary purposes during that month. For the remainder of the month, environmental flows revert to the instream criteria.

RESULTS OF INFLOW AND INSTREAM STUDIES - USE OF STATE DETERMINATIONS

When the results of intensive fresh water inflow or instream flow studies are available and criteria have been established in the regulatory process, those criteria will be used in the Water Plan rather than any generic rule. The instream flow requirements for the Colorado River have been approved by TNRCC through the regulatory process. When established criteria are available and agreed to by TPWD and TNRCC, bay and estuary inflow requirements would be apportioned to each new project identified in the plan according to its proportional share (based on contribution hydrology), and as provided for by TNRCC's A Regulatory Guidance Document for Applications to Divert, Store or Use State Water (June, 1995). Where possible, this process seeks to restore seasonal flow patterns and minimize cumulative impacts from water development projects.

In order to facilitate the timely completion of the (joint) determination of the inflow conditions necessary for the (remaining) bays and estuaries, TPWD and TNRCC, per §11.1491 of the Texas Water Code, will each designate an employee to share equally in the oversight of the program to review the studies prepared by the TWDB and TPWD under Section 16.058 (bay and estuary inflow studies) to determine inflow conditions necessary for the bays and estuaries. The three agencies will continue to work together as they have in development of the Guadalupe Estuary (San Antonio Bay system) target flows to meet the bay and estuary studies completion deadlines, and that provides a salinity, nutrient, and sediment loading regime at or above the identified needs.

AMENDMENTS TO EXISTING PERMITS

Once projects are specifically designed and submitted for permit consideration, a more straightforward and factual environmental assessment of its features may then be performed. The scope of environmental review and corresponding permit considerations relating to an amendment of an existing water right is limited by law, and is set forth in more detail in the TNRCC's A Regulatory Guidance Document for Application to Divert, Store or Use State Water (June, 1995).

An environmental assessment and any corresponding permit conditions relating to an application for an amendment are limited to addressing any new or additional environmental impacts which may result from granting the amendment, and where such impacts would be beyond that which are possible under the full, legal operation of the existing water right prior to its amendment. Because of the many varied conditions around the State, the TNRCC Regulatory Guidance Document can only provide general procedures in many instances as to how the Commission would evaluate applications for water rights permits and amendments to existing permits. A summarization and categorization of the TNRCC's general guidance for determining potential adverse impact to the environment is as follows for types of possible water right amendments likely to be considered in the consensus planning process:

Type of Amendment	Scope of Environmental Review	Basis for Environmental Reservation
Interbasin Transfer with no change in *permitted* purpose of use, appropriative amount, point of diversion, and rate of diversion.	No additional environmental impacts considered with respect to the originating basin. Consideration of potential changes in water quality and/or migration of nuisance species, and excessive freshwater inflows to maintain proper salinity levels for B&E's may be made for receiving basin. A social, economic, and environmental impact statement may be required to be submitted.	Not applicable for originating basin.
Significant change in point of diversion from downstream to upstream, to adjoining tributary, or to endangered species habitat	Evaluation of impacts to intervening instream or site-affected environmental resources.	Case-by-case basis where level of significance evaluated as per Regulatory Guidance Document.
Change of purpose of use from non-consumptive to consumptive use	Evaluation of impacts to instream and B&E environmental resources.	Three-zone planning criteria described previously.
Change in purpose of use where there is no increase in the consumption of water from that legally authorized in the existing water right.	No environmental review.	not applicable.

For consensus planning purposes, possible water rights amendments, such as conversion from non-consumptive to consumptive use (having the effect of a new appropriation) would have the appropriate *instream and B&E* considerations described above for new projects applied in our planning assessment. For other types of amendments where only the intervening river or stream segment would be affected, the appropriate reservoir or direct diversion *instream* criteria would then be applied, in lieu of a detailed, site-specific study.

Where applicable, the "environmental planning criteria" would only affect that portion of the existing water right subject to change. Also, where regional or local planning efforts may specify higher environmental goals than that provided for by existing minimum legal or regulatory requirements, such alternate goals can be requested by the applicant and can be ultimately provided for in the permit language.

Appendix I
Social and Economic Impacts of Not Meeting Projected Water Needs

May 17, 2010

Mr. Dale Spurgin
Chairman, Brazos G Regional Water Planning Group
c/o Jones County
P.O. Box 148
Anson, Texas 79501

Re: Socioeconomic Impact Analysis of Not Meeting Water Needs for the 2011 Brazos G Regional Water Plan

Dear Chairman Spurgin:

We have received your request for technical assistance to complete the socioeconomic impact analysis of not meeting water needs. In response, enclosed is a report that describes our methodology and presents the results. Section 1 provides an overview of the methodology, and Section 2 presents results at the regional level, and Appendix 2 show results for individual water user groups.

If you have any questions or comments, please feel free to contact me at (512) 463-7928 or by email at stuart.norvell@twdb.state.tx.us.

Sincerely,

Stuart D. Norvell
Manager, Water Planning Research and Analysis
Water Resources Planning Division

SN/ao

Enclosure

c: David Dunn, HDR
Lann Bookout, TWDB
S. Doug Shaw, TWDB

(This page intentionally left blank.)

Socioeconomic Impacts of Projected Water Shortages for the Brazos G Regional Water Planning Area (Region G)

Prepared in Support of the 2011 Brazos G Regional Water Plan

Stuart D. Norvell, Managing Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

S. Doug Shaw, Agricultural Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

May 2010

Table of Contents

Tables

(This page intentionally left blank.)

Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Brazos G Regional Water Planning Group (Region G).

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200

acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands, and people would experience a shortage of 100 acre-feet assuming drought of record conditions. Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

as “output” in an IO model. Thus, total sales double-count or overstate the true economic value of goods and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in

[2] Royal, W. “*High And Dry - Industrial Centers Face Water Shortages*.” in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;

- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;

- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and

- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$D_{i,t} = Q_{i,t} *_{,} S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct “what if” scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under “normal” or “most likely” future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as “final sales,” multipliers for the ranching sector do fully account for all losses to a region’s economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on ”fixed-proportion production functions,” which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). Table 3 displays average (2003-2007) gross revenues per acre for IMPLAN crop categories.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors	
IMPLAN Category	**TWDB Category**
Oilseeds	Soybeans and “other oil crops”
Grains	Grain sorghum, corn, wheat and “other grain crops”
Vegetable and melons	“Vegetables” and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All “other” crops	“Forage crops”, peanuts, alfalfa, hay and pasture, rice and “all other crops”

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Brazos G Regional Water Planning Area (average 2003-2007)

Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Oilseeds	3.4	2%	3.4	1%
Grains	62.4	30%	58.6	27%
Vegetable and melons	5.7	3%	5.1	2%
Tree nuts	13.2	6%	18.7	9%
Fruits	<1	<1%	<1	<1%
Cotton	71.7	35%	78.4	36%
Sugarcane and sugar beets	50.6	24%	54.7	25%
Total	206.9	100%	219.0	100%

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB’s annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as “failed acres,” “golf course” or “waste water.”

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Brazos G Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
Oilseeds	$268	Based on five-year (2003-2007) average weighted by acreage for “irrigated soybeans” and “irrigated other oil crops.”
Grains	$256	Based on five-year (2003-2007) average weighted by acreage for “irrigated grain sorghum,” “irrigated corn”, “irrigated wheat” and “irrigated ‘other’ grain crops.”
Vegetable and melons	$6,151	Based on five-year (2003-2007) average weighted by acreage for “irrigated shallow and deep root vegetables”, “irrigated Irish potatoes” and “irrigated melons.”
Tree nuts	$3,420	Based on five-year (2003-2007) average weighted by acreage for “irrigated pecans.”
Fruits	$2,175	Based on five-year (2003-2007) average weighted by acreage for “irrigated citrus”, “irrigated vineyards” and “irrigated ‘other’ orchard.”
Cotton	$499	Based on five-year (2003-2007) average weighted by acreage for “irrigated cotton.”
All Other Crops	$582	Irrigated figure is based on five-year (2003-2007) average weighted by acreage for “irrigated ‘forage’ crops”, “irrigated peanuts”, “irrigated alfalfa”, “irrigated ‘hay’ and pasture” and “irrigated ‘all other’ crops.”

*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.

An important consideration when estimating impacts to irrigation was determining which crops are affected by water shortages. One approach is the so-called rationing model, which assumes that farmers respond to water supply cutbacks by fallowing the lowest value crops in the region first and the highest valued crops last until the amount of water saved equals the shortage.[5] For example, if farmer A grows vegetables (higher value) and farmer B grows wheat (lower value) and they both face a proportionate cutback in irrigation water, then farmer B will sell water to farmer A. Farmer B will fallow her irrigated acreage before farmer A fallows anything. Of course, this assumes that farmers can and do transfer enough water to allow this to happen. A different approach involves constructing farm-level profit maximization models that conform to widely-accepted economic theory that farmers make decisions based on marginal net returns. Such models have good predictive capability, but data requirements and complexity are high. Given that a detailed analysis for each region would require a substantial amount of farm-level data and analysis, the following investigation assumes that projected shortages are distributed equally across predominant crops in the region. Predominant in this case are crops that comprise at least one percent of total acreage in the region.

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of "other" is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk

[5] The rationing model was initially proposed by researchers at the University of California at Berkeley, and was then modified for use in a study conducted by the U.S. Environmental Protection Agency that evaluated how proposed water supply cutbacks recommended to protect water quality in the Bay/Delta complex in California would affect farmers in the Central Valley. See, Zilberman, D., Howitt, R. and Sunding, D. "*Economic Impacts of Water Quality Regulations in the San Francisco Bay and Delt*a." Western Consortium for Public Health. May 1993.

manufacturers) would likely have little to process. This is not an unreasonable premise. Since the 1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[6] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[7]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching and farming	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[8] For example, if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows

[6] Ferreira, W.N. "*Analysis of the Meat Processing Industry in the United States*." Clemson University Extension Economics Report ER211, January 2003.

[7] Ward, C.E. "*Summary of Results from USDA's Meatpacking Concentration Study*." Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[8] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: "*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*," Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, "*Evaluation of Water Conservation for Municipal and Industrial Water Supply*." U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as “county-other.” Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[9] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average

[9] Bell, D.R. and Griffin, R.C. “*Community Water Demand in Texas as a Century is Turned*.” Research contract report prepared for the Texas Water Development Board. May 2006.

use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[10]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions (average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total monthly cost	Avg. monthly use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[11] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was

[10] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[11] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

40 percent.[12] Earlier findings of the U.S. Water Resources Council showed a national average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[13] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[14] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[15] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[16]

---

[12] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

[13] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[14] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[15] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[16] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people				
Water shortages as a percentage of total monthly household demands	**No. of gallons remaining per household per day**	**No of gallons remaining per person per day**	**Economic loss (per acre-foot)**	**Economic loss (per gallon)**
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for “water intensive” commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate” the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the “*Water and Wastewater Rate Survey*” published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as “county-other” were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or “unaccountable” water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the “miscellaneous gross receipts tax, “which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[17] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[18]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

---

[17] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[18] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

> 1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.
>
> 2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[19] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

---

[19] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[20] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[21]

[20] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[21] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2.0 Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economic impacts of water shortages for water user groups with reported deficits. According to the 2011 *Brazos G Regional Water Plan*, during severe drought irrigation, municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Region G economy generates slightly more than $46 billion in gross state product for Texas ($43 billion in income and $3 billion in business taxes) and supports 744,230 jobs (Table 8). Generating about $10 billion worth of income per year, agriculture, manufacturing, and mining are the primary base economic sectors in the region.[22] Municipal sectors also generate substantial amounts of income, nearly $32 billion per year, and are major employers in the region. While municipal sectors are the largest employer and source of wealth, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing, agriculture and mining. In other words, without base industries such agriculture, many municipal jobs in the region would not exist.

[22] Base industries are those that supply markets outside of the region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Region G Economy by Water User Group ($millions)*						
Water Use Category	Total sales	Intermediate sales	Final sales	Jobs	Income	Business taxes
Irrigation	$159.73	$40.30	$119.46	2,784	$90.47	$2.64
Livestock	$2,659.43	$1,522.98	$1,136.45	34,292	$307.13	$42.31
Manufacturing	$19,735.61	$3,175.38	$16,560.23	96,518	$6,587.75	$141.50
Mining	$5,585.21	$3,026.40	$2,558.82	15,034	$3,128.40	$288.10
Steam-electric	$1,680.28	$472.70	$1,207.58	3,229	$1,166.79	$199.10
Municipal	$49,735.51	$10,714.82	$39,020.69	592,373	$31,871.14	$2,292.58
Regional total	$79,555.78	$18,952.58	$60,603.23	744,230	$43,151.68	$2,966.22

*Appendix 1 displays data for individual IMPLAN sectors that make up each water use category. Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Agricultural Water Shortages

According to the 2011 *Brazos G Regional Water Plan*, during severe drought several counties in the region would experiences shortages of irrigation water. In 2010, shortages range from about 34 to 100 percent of annual irrigation demands, and farmers would be short nearly 59,700 acre-feet in 2010 and about 47,180 acre-feet in 2060. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by about $26 million in 2010 and $20 million in 2060 with potential job losses ranging from 463 to 360.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	Lost income from reduced crop production [a]	Lost state and local tax revenues from reduced crop production	Lost jobs from reduced crop production
2010	$24.80	$1.32	463
2020	$23.59	$1.26	441
2030	$22.42	$1.20	420
2040	$21.27	$1.14	400
2050	$20.16	$1.08	380
2060	$19.07	$1.02	360

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities in the region. Deficits range from approximately 14 to 100 percent of total annual water use. At the regional level, the estimated economic value of domestic water shortages totals $238 million in 2010 and $2,722 million in 2060 (Table 10). Municipal shortages would reduce gross state product (income plus taxes) by an estimated $58 million in 2010 and $1,868 million in 2060.

Table 10: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)

Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$238.10	$51.38	$6.93	1,652	$50.63
2020	$751.61	$614.12	$58.25	14,766	$120.77
2030	$1,041.76	$748.99	$73.96	17,326	$167.54
2040	$1,446.38	$1,088.72	$114.32	23,734	$236.80
2050	$2,028.11	$1,364.62	$146.91	29,429	$310.27
2060	$2,722.65	$1,684.30	$184.81	35,840	$390.48

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in Johnson, Lampasas, Limestone, Nolan and Williamson counties. In 2010, the Brazos G planning group estimates that these manufacturers would be short about 5,855 acre-feet; and by 2060, this figure increases to 12,236 acre-feet. Shortages of these magnitudes would reduce gross state product (income plus taxes) by an estimated $691 million in 2010 and $1,521 million in 2060 (Table 11).

Table 11: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	**Lost income due to reduced manufacturing output**	**Lost state and local business tax revenues due to reduced manufacturing output**	**Lost jobs due to reduced manufacturing output**
2010	$644.37	$46.61	8,577
2020	$797.15	$57.15	10,566
2030	$958.35	$68.56	12,683
2040	$1,121.77	$80.13	14,829
2050	$1,268.72	$90.54	16,759
2060	$1,419.33	$101.24	18,716

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.5 Impacts of Mining Water Shortages

Ming water shortages in the region are projected to occur in Milam, Nolan, Stephens, and Williamson counties, and would primarily affect the oil and gas and aggregates operations. In total, shortages would reduce gross state product by $153 million in 2010 and $198 in 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)			
Decade	**Lost income due to reduced mining output**	**Lost state and local business tax revenues due to reduced mining output**	**Lost jobs due to reduced mining output**
2010	$140.88	$11.96	682
2020	$154.49	$13.21	760
2030	$161.48	$13.90	807
2040	$168.13	$14.55	852
2050	$174.88	$15.22	897
2060	$181.91	$15.86	937

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.6 Impacts of Steam-electric Water Shortages

Water shortages for steam-electric water user groups are projected to occur in Bell, Bosque, Grimes, Johnson, Limestone, Milam, Nolan, Robertson, and Somervell counties, and would reduce gross state product by $1,176 million dollars in 2010, and $5,624 million 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)

Decade	Lost income due to reduced electrical generation	Lost state and local business tax revenues due to reduced electrical generation	Lost jobs due to reduced electrical generation
2010	$1,028.57	$147.64	3,325
2020	$2,785.64	$400.29	7,127
2030	$3,729.69	$535.87	8,497
2040	$3,897.52	$567.53	9,081
2050	$4,354.88	$639.09	10,967
2060	$4,899.18	$724.41	17,264

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.7 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment. In 2010, estimated population losses total 15,801 with corresponding reductions in school enrollment of 4,457 students (Table 14). In 2060, population in the region would decline by 71,604 people and school enrollment would fall by 20,314 students.

Table 14: Social Impacts of Water Shortages (2010-2060)

Year	Population Losses	Declines in School Enrollment
2010	15,801	4,457
2020	35,645	10,112
2030	41,465	11,764
2040	51,910	14,727
2050	61,309	17,393
2060	71,604	20,314

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 14 displays the results for the Brazos G planning area.

Table 15: Distribution of Impacts by Major River Basin (2010-2060)

Water Use	2010	2020	2030	2040	2050	2060
Irrigation						
Brazos	97%	98%	98%	98%	98%	98%
Colorado	3%	2%	2%	2%	2%	2%
Manufacturing						
Brazos	99%	99%	99%	99%	99%	99%
Trinity	1%	1%	1%	1%	1%	1%
Mining						
Brazos	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Colorado	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Municipal						
Brazos	99%	97%	95%	94%	93%	92%
Trinity	1%	3%	5%	6%	7%	8%
Steam-electric						
Brazos	100%	100%	100%	100%	100%	100%

Appendix: Economic Data for Individual IMPLAN Sectors for Brazos G Regional Water Planning Area

Economic Data for Agricultural Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Irrigation	Tree nut farming	44	$45.08	$9.24	$35.84	630	$31.08	$1.10
Irrigation	Cotton farming	8	$34.75	$0.49	$34.26	559	$12.80	$0.32
Irrigation	Vegetable and melon farming	3	$31.88	$1.01	$30.87	453	$23.41	$0.30
Irrigation	All “other” crop farming	10	$29.44	$27.38	$2.06	300	$14.39	$0.57
Irrigation	Grain farming	2	$16.10	$1.97	$14.13	784	$7.40	$0.29
Irrigation	Fruit farming	5	$1.72	$0.18	$1.54	33	$0.98	$0.04
Irrigation	Oilseed farming	1	$0.76	$0.03	$0.76	25	$0.41	$0.02
	Total irrigation	NA	$159.73	$40.30	$119.46	2,784	$90.47	$2.64
Livestock	Cattle ranching and farming	11	$1,642.54	$1,138.93	$503.61	27,902	$129.76	$34.53
Livestock	Poultry and egg production	12	$97.67	$76.55	$21.12	454	$32.89	$0.33
Livestock	Animal production- except cattle and poultry	13	$54.61	$46.30	$8.31	2,687	$5.31	$0.84
Livestock	Poultry processing	70	$685.51	$218.11	$467.40	2,946	$120.12	$5.48
Livestock	Fluid milk processing	62	$179.11	$43.09	$136.02	303	$19.06	$1.13
	Total livestock	NA	$2,659.43	$1,522.98	$1,136.45	34,292	$307.13	$42.31
	Total agriculture	NA	$2,819.16	$1,563.28	$1,255.91	37,076	$397.60	$44.95

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Mining and Steam-electric Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Mining	Oil and gas extraction	19	$3,065.31	$2,846.72	$218.59	6,597	$1,758.18	$190.89
Mining	Drilling oil and gas wells	27	$1,306.48	$6.52	$1,299.95	2,153	$364.29	$48.04
Mining	Support activities for oil and gas operations	28	$949.28	$131.85	$817.43	5,036	$860.13	$39.53
Mining	Sand- gravel- clay- and refractory mining	25	$146.56	$15.47	$131.09	884	$86.24	$4.06
Mining	Coal mining	20	$53.10	$19.90	$33.20	91	$24.77	$4.69
Mining	Stone mining and quarrying	24	$43.11	$4.44	$38.67	158	$25.18	$0.38
Mining	Other nonmetallic mineral mining	26	$13.94	$1.39	$12.54	77	$5.95	$0.33
Mining	Support activities for other mining	29	$7.44	$0.11	$7.33	38	$3.65	$0.18
Total Mining	NA	$5,585.21	$3,026.40	$2,558.82	15,034	$3,128.40	$288.10	$5,585.21
Steam-electric	Power generation and supply	30	$1,680.28	$472.70	$1,207.58	3,229	$1,166.79	$199.10
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)									
Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	New residential 1-unit structures-	33	$1,938.61	$0.00	$1,938.60	13,479	$608.94	$9.59
Manufacturing	Commercial and institutional buildings	38	$1,067.61	$0.00	$1,067.61	11,752	$521.30	$6.44
Manufacturing	Soft drink and ice manufacturing	85	$953.48	$53.26	$900.23	1,517	$138.54	$6.14
Manufacturing	Pharmaceutical and medicine manufacturing	160	$670.87	$122.60	$548.27	756	$178.23	$4.00
Manufacturing	Aircraft engine and engine parts manufacturing	352	$505.00	$138.38	$366.63	1,144	$155.51	$2.19
Manufacturing	Other new construction	41	$464.14	$0.00	$464.14	5,391	$241.85	$1.90
Manufacturing	Petroleum refineries	142	$449.32	$167.01	$282.31	11	$321.34	$11.68
Manufacturing	Laminated plastics plate- sheet- and shapes	174	$358.44	$180.38	$178.07	1,303	$143.41	$2.63
Manufacturing	Paperboard container manufacturing	126	$315.28	$3.34	$311.94	1,075	$67.50	$2.62
Manufacturing	Manufactured home- mobile home- manufacturing	121	$286.88	$0.00	$286.87	1,802	$113.27	$1.42
Manufacturing	Institutional furniture manufacturing	366	$282.70	$13.55	$269.15	1,819	$146.95	$0.89
Manufacturing	Other animal food manufacturing	47	$278.92	$33.64	$245.28	403	$18.71	$1.45
Manufacturing	New residential additions and alterations-all	35	$273.63	$0.00	$273.63	1,609	$96.47	$1.36
Manufacturing	Ice cream and frozen dessert manufacturing	66	$272.84	$142.98	$129.86	595	$46.16	$1.59
Manufacturing	Oil and gas field machinery and equipment	261	$270.10	$10.06	$260.04	773	$60.15	$1.23
Manufacturing	Confectionery manufacturing	58	$268.00	$13.65	$254.35	652	$92.17	$2.18
Manufacturing	Plastics pipe- fittings- and profile shapes	173	$230.93	$142.04	$88.89	606	$72.18	$1.63
Manufacturing	Fabricated pipe and pipe fitting manufacturing	252	$230.40	$26.03	$204.37	998	$100.01	$1.38
Manufacturing	Highway- street- bridge- and tunnel construct	39	$229.18	$0.00	$229.19	2,277	$111.64	$1.42
Manufacturing	Other concrete product manufacturing	195	$223.66	$2.92	$220.73	1,251	$98.92	$2.11
Manufacturing	Gypsum product manufacturing	197	$222.63	$0.78	$221.85	397	$70.12	$2.10
Manufacturing	New multifamily housing structures- all	34	$208.13	$0.00	$208.13	1,960	$94.13	$0.54
Manufacturing	Plastics plumbing fixtures and all other plastics	177	$201.49	$145.97	$55.52	1,099	$69.11	$1.19
Manufacturing	Foam product manufacturing	178	$200.29	$152.51	$47.79	717	$69.63	$1.40
Manufacturing	Fluid power cylinder and actuator manufacturing	299	$192.20	$4.05	$188.15	887	$63.31	$0.95
Manufacturing	Motor vehicle parts manufacturing	350	$180.51	$14.52	$166.00	361	$76.28	$1.49
Manufacturing	Ready-mix concrete manufacturing	192	$179.97	$0.87	$179.10	677	$55.33	$1.37
Manufacturing	Truck trailer manufacturing	347	$179.08	$3.94	$175.14	686	$35.58	$0.63
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)								
Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Machine shops	243	$178.17	$43.00	$135.17	1,450	$73.93	$1.18
Manufacturing	Cement manufacturing	191	$177.51	$0.47	$177.04	302	$78.53	$1.60
Manufacturing	Aircraft manufacturing	351	$177.32	$9.02	$168.30	354	$29.60	$0.62
Manufacturing	Dog and cat food manufacturing	46	$177.23	$17.11	$160.13	179	$14.13	$0.77
Manufacturing	Mineral wool manufacturing	201	$171.01	$2.08	$168.93	498	$73.34	$1.58
Manufacturing	Water- sewer- and pipeline construction	40	$168.28	$0.00	$168.28	1,492	$71.63	$1.04
Manufacturing	Fabricated structural metal manufacturing	233	$167.91	$8.69	$159.21	648	$59.84	$0.96
Manufacturing	Ferrous metal foundaries	221	$163.40	$0.16	$163.23	881	$56.62	$1.12
Manufacturing	Iron and steel forging	224	$156.55	$9.77	$146.78	608	$61.55	$0.88
Manufacturing	Wood kitchen cabinet and countertop manufacturing	362	$154.50	$120.36	$34.15	1,163	$71.67	$1.18
Manufacturing	Aluminum extruded product manufacturing	212	$148.03	$3.76	$144.28	474	$25.55	$0.90
Manufacturing	Natural gas distribution	31	$145.64	$58.37	$87.27	297	$32.11	$10.55
Manufacturing	Agriculture and forestry support activities	18	$141.23	$80.28	$60.95	5,149	$96.62	$1.35
Manufacturing	Nonwoven fabric mills	95	$137.43	$26.57	$110.85	442	$29.52	$0.84
Manufacturing	All other electronic component manufacturing	312	$135.26	$77.51	$57.75	460	$62.88	$1.06
Manufacturing	Sanitary paper product manufacturing	134	$134.83	$1.16	$133.67	224	$34.85	$1.62
Manufacturing	Conveyor and conveying equipment manufacturing	292	$132.03	$54.26	$77.77	456	$35.47	$0.66
Manufacturing	Motor vehicle body manufacturing	346	$127.68	$7.42	$120.27	485	$15.21	$0.33
Manufacturing	Metal window and door manufacturing	235	$125.60	$9.32	$116.28	691	$47.89	$0.74
Manufacturing	Lime manufacturing	196	$124.51	$1.24	$123.27	345	$40.71	$1.11
Manufacturing	Explosives manufacturing	168	$121.55	$35.55	$86.00	429	$61.11	$1.07
Manufacturing	Turned product and screw- nut- and bolts	244	$119.76	$24.67	$95.09	585	$58.27	$0.71
Manufacturing	Other computer peripheral equipments	305	$117.00	$36.29	$80.71	295	$12.65	$0.32
Manufacturing	Electric housewares and household fans	327	$115.53	$10.22	$105.32	378	$31.76	$0.86
Manufacturing	Scales- balances- and miscellaneous general	301	$115.50	$24.86	$90.65	400	$44.90	$0.75
Manufacturing	Animal- except poultry- slaughtering	67	$114.88	$30.71	$84.16	295	$14.16	$0.77
Manufacturing	Construction machinery manufacturing	259	$107.09	$14.61	$92.47	162	$14.09	$0.42
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Manufacturing	Abrasive product manufacturing	198	$104.59	$4.96	$99.62	446	$41.09	$0.91
Manufacturing	Broadcast and wireless communications equipment	307	$103.44	$24.52	$78.92	197	$13.17	$0.33
Manufacturing	Adhesive manufacturing	162	$102.18	$78.61	$23.56	203	$22.49	$0.46
Manufacturing	Farm machinery and equipment manufacturing	257	$100.66	$16.52	$84.14	254	$19.72	$0.20
	All other manufacturing	NA	$4,229.20	$944.73	$3,284.47	19,645	$1,335.56	$30.51
	Total manufacturing		**$19,735.61**	**$3,175.38**	**$16,560.23**	**96,518**	**$6,587.75**	**$141.50**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Federal Military	505	$5,398.96	-$0.01	$5,398.97	53,214	$5,398.96	$0.00
Municipal	Owner-occupied dwellings	509	$4,134.25	$0.00	$4,134.25	0	$3,202.67	$488.85
Municipal	State & Local Education	503	$3,638.62	$0.00	$3,638.61	93,621	$3,638.61	$0.00
Municipal	Wholesale trade	390	$2,684.16	$1,285.08	$1,399.08	20,099	$1,413.16	$397.00
Municipal	Food services and drinking places	481	$1,957.68	$249.99	$1,707.69	43,555	$758.49	$88.58
Municipal	Hospitals	467	$1,794.52	$0.00	$1,794.52	17,190	$899.96	$11.46
Municipal	Offices of physicians- dentists- and other he	465	$1,619.05	$0.00	$1,619.05	13,206	$1,152.85	$10.09
Municipal	Monetary authorities and depository credit in	430	$1,541.19	$507.60	$1,033.59	8,384	$1,082.25	$19.72
Municipal	State & Local Non-Education	504	$1,381.88	$0.00	$1,381.88	26,162	$1,381.87	$0.00
Municipal	Real estate	431	$1,343.73	$531.92	$811.81	7,944	$777.97	$165.04
Municipal	Telecommunications	422	$1,126.04	$386.77	$739.27	3,225	$460.43	$76.79
Municipal	Motor vehicle and parts dealers	401	$1,083.96	$117.87	$966.09	10,920	$555.67	$157.20
Municipal	General merchandise stores	410	$910.18	$95.93	$814.25	16,811	$408.49	$130.14
Municipal	Truck transportation	394	$908.42	$491.89	$416.54	7,254	$402.26	$9.13
Municipal	Other State and local government enterprises	499	$808.24	$263.19	$545.05	3,938	$288.25	$0.10
Municipal	Insurance carriers	427	$798.12	$232.73	$565.39	3,688	$237.92	$29.54
Municipal	Funds- trusts- and other financial vehicles	429	$734.00	$13.92	$720.08	1,505	$328.88	$17.92
Municipal	Architectural and engineering services	439	$640.46	$403.72	$236.74	5,597	$329.22	$2.73
Municipal	Nursing and residential care facilities	468	$613.22	$0.00	$613.22	14,217	$366.76	$8.63
Municipal	Food and beverage stores	405	$596.17	$79.71	$516.46	11,153	$298.63	$65.31
Municipal	Building material and garden supply stores	404	$551.74	$85.56	$466.17	6,730	$257.85	$78.43
Municipal	Automotive repair and maintenance- except car	483	$540.93	$128.49	$412.43	7,077	$205.09	$40.49
Municipal	Federal Non-Military	506	$526.97	$0.00	$526.97	3,389	$526.97	$0.00
Municipal	Colleges- universities- and junior colleges	462	$524.71	$27.84	$496.88	8,303	$304.44	$0.00
Municipal	Lessors of nonfinancial intangible assets	436	$520.11	$283.63	$236.47	322	$245.70	$22.19
Municipal	Gasoline stations	407	$455.86	$69.23	$386.62	6,499	$245.67	$66.27
Municipal	Civic- social- professional and similar organ	493	$451.97	$158.80	$293.17	13,738	$214.63	$1.35

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Insurance agencies- brokerages- and related	428	$396.68	$232.78	$163.90	3,720	$336.42	$2.13
Municipal	Legal services	437	$380.70	$241.61	$139.09	3,998	$228.66	$7.17
Municipal	Securities- commodity contracts- investments	426	$373.97	$248.35	$125.62	3,428	$115.10	$3.43
Municipal	Services to buildings and dwellings	458	$348.92	$257.45	$91.47	6,799	$165.03	$6.04
Municipal	Maintenance and repair of nonresidential buil	43	$346.36	$229.49	$116.87	3,013	$128.35	$2.39
Municipal	Home health care services	464	$340.03	$0.00	$340.03	10,658	$198.20	$1.17
Municipal	Other ambulatory health care services	466	$334.74	$21.77	$312.97	2,343	$163.77	$2.43
Municipal	Postal service	398	$323.35	$220.14	$103.21	4,794	$258.16	$0.00
Municipal	Waste management and remediation services	460	$313.69	$176.32	$137.37	2,049	$143.32	$11.88
Municipal	Accounting and bookkeeping services	438	$297.34	$241.47	$55.87	3,781	$134.93	$1.10
Municipal	Scenic and sightseeing transportation and sup	397	$272.80	$102.34	$170.46	2,595	$185.57	$31.11
Municipal	Clothing and clothing accessories stores	408	$268.86	$33.66	$235.20	5,074	$137.77	$39.09
Municipal	Rail transportation	392	$263.26	$127.28	$135.98	763	$160.72	$5.09
Municipal	Machinery and equipment rental and leasing	434	$257.22	$139.89	$117.33	877	$100.03	$3.53
Municipal	Pipeline transportation	396	$242.55	$106.08	$136.48	207	$95.39	$20.52
Municipal	Office administrative services	452	$242.50	$107.88	$134.62	1,671	$122.73	$2.11
Municipal	State and local government electric utilities	498	$240.16	$64.88	$175.28	645	$121.70	$0.63
Municipal	Health and personal care stores	406	$232.40	$37.09	$195.31	3,698	$113.41	$32.99
Municipal	Hotels and motels- including casino hotels	479	$219.35	$113.00	$106.34	4,018	$116.71	$20.03
Municipal	Miscellaneous store retailers	411	$216.60	$26.88	$189.72	7,834	$131.02	$31.60
Municipal	Employment services	454	$211.33	$174.90	$36.43	8,252	$177.10	$1.01
Municipal	Radio and television broadcasting	420	$206.75	$164.12	$42.62	1,153	$64.87	$0.82
Municipal	Other maintenance and repair construction	45	$191.86	$66.87	$124.99	3,134	$117.97	$1.14
Municipal	Nonstore retailers	412	$190.20	$29.38	$160.82	4,700	$119.69	$21.57
Municipal	Management of companies and enterprises	451	$186.67	$175.54	$11.12	1,303	$89.11	$1.42
Municipal	Commercial machinery repair and maintenance	485	$184.15	$96.95	$87.20	1,665	$81.04	$5.86
Municipal	Management consulting services	444	$170.27	$131.07	$39.20	1,329	$84.59	$0.66
Municipal	Business support services	455	$169.08	$79.13	$89.95	3,436	$85.76	$3.25
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Municipal Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Newpaper publishers	413	$167.04	$110.84	$56.20	1,601	$89.41	$1.19
Municipal	Furniture and home furnishings stores	402	$150.41	$23.00	$127.41	1,935	$72.68	$21.44
Municipal	Child day care services	469	$149.61	$0.00	$149.61	4,282	$90.78	$1.08
Municipal	Couriers and messengers	399	$147.97	$134.53	$13.44	3,171	$82.25	$1.91
Municipal	Advertising and related services	447	$147.95	$137.92	$10.03	1,158	$62.59	$1.04
Municipal	Social assistance- except child day care serv	470	$145.99	$0.03	$145.96	3,883	$88.56	$0.61
Municipal	Motion picture and video industries	418	$144.35	$103.29	$41.06	877	$36.25	$1.28
Municipal	Veterinary services	449	$140.51	$18.65	$121.86	2,165	$48.24	$2.88
Municipal	Personal care services	487	$134.56	$3.79	$130.77	2,812	$64.14	$4.80
Municipal	Other amusement- gambling- and recreation ind	478	$134.38	$7.31	$127.07	2,446	$64.12	$9.56
Municipal	Custom computer programming services	441	$128.28	$10.69	$117.58	1,800	$108.54	$0.67
Municipal	Religious organizations	491	$122.59	$0.00	$122.59	549	$70.18	$0.00
Municipal	Private households	494	$120.83	$0.00	$120.83	13,378	$120.83	$0.00
Municipal	Data processing services	424	$109.98	$22.57	$87.42	460	$57.49	$0.74
Municipal	Other personal services	490	$108.95	$9.20	$99.75	749	$37.40	$4.26
Municipal	Computer systems design services	442	$107.99	$65.73	$42.27	1,517	$91.60	$2.31
Municipal	Other educational services	463	$107.82	$9.10	$98.72	2,196	$55.82	$3.18
Municipal	Sporting goods- hobby- book and music stores	409	$104.82	$14.79	$90.03	2,734	$47.97	$14.74
Municipal	Facilities support services	453	$104.43	$24.58	$79.86	1,906	$68.50	$0.33
Municipal	Drycleaning and laundry services	489	$101.61	$25.86	$75.75	2,905	$49.70	$5.81
Municipal	All other miscellaneous professional and tech	450	$96.63	$86.27	$10.36	151	$41.31	$0.83
Municipal	Maintenance and repair of farm and nonfarm re	42	$95.19	$31.89	$63.31	716	$29.28	$0.42
Municipal	Automotive equipment rental and leasing	432	$91.44	$37.39	$54.04	609	$32.23	$1.77
Municipal	Other Federal Government enterprises	496	$90.63	$38.41	$52.22	5,235	$49.86	$0.00
Municipal	Scientific research and development services	446	$88.95	$68.36	$20.60	824	$41.92	$0.34
	All other municipal sectors	NA	$1,588.75	$427.42	$1,161.33	24,225	$692.53	$47.71
	Total municipal	**NA**	**$49,735.51**	**$10,714.82**	**$39,020.69**	**592,373**	**$31,871.14**	**$2,292.58**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Appendix 2: Impacts by County for the Brazos G Regional Water Planning Area

Bell County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Bartlett						
Monetary value of domestic water shortages	$0.12	$0.58	$0.72	$0.77	$0.81	$0.85
Lost utility revenues	$0.11	$0.14	$0.16	$0.17	$0.18	$0.19
Bell Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.09	$0.38	$0.54
Lost utility revenues	$0.00	$0.04	$0.09	$0.13	$0.15	$0.17
Jarrell-Schwertner WSC						
Monetary value of domestic water shortages	$0.00	$0.11	$0.88	$1.89	$1.76	$2.39
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.17	$0.27	$0.41
Lost jobs due to reduced commercial business activity	0	0	0	5	8	13
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.02	$0.04	$0.06
Lost utility revenues	$0.00	$0.08	$0.14	$0.18	$0.20	$0.28
Little River Academy						
Monetary value of domestic water shortages	$0.012	$0.019	$0.024	$0.028	$0.033	$0.012
Lost utility revenues	$0.00	$0.02	$0.04	$0.04	$0.05	$0.05
Morgan's Point Resort						
Monetary value of domestic water shortages	$2.53	$5.20	$6.53	$5.99	$6.35	$6.72
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.71	$0.77	$0.84
Lost jobs due to reduced commercial business activity	0	0	0	22	24	26
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.10	$0.11	$0.12
Lost utility revenues	$0.36	$0.45	$0.54	$0.59	$0.63	$0.66
Temple						
Monetary value of domestic water shortages	$6.09	$10.90	$46.90	$61.17	$72.20	$100.80
Lost utility revenues	$9.38	$13.31	$17.58	$20.99	$24.77	$28.35
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$55.47	$64.86	$76.29	$90.24	$107.23
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$8.41	$9.84	$11.57	$13.69	$16.26
Lost jobs due to reduced electrical generation	0	255	298	351	415	493

Bosque County ($millions)						
	2010	2020	2030	2040	2050	2060
Valley Mills						
Monetary value of domestic water shortages	$0.000	$0.000	$0.002	$0.005	$0.009	$0.013
Lost utility revenues	$0.000	$0.000	$0.004	$0.010	$0.016	$0.024
Cross Country WSC						
Monetary value of domestic water shortages	$0.000	$0.000	$0.000	$0.033	$0.035	$0.029
Lost utility revenues	$0.000	$0.000	$0.000	$0.032	$0.034	$0.036
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$19.07	$52.15	$92.50	$141.69
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$2.74	$14.97	$26.55	$40.68
Lost jobs due to reduced electrical generation	0	0	65	177	629	963

Brazos County ($millions)						
	2010	2020	2030	2040	2050	2060
Bryan						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.26
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.62
College Station						
Monetary value of domestic water shortages	$0.00	$0.00	$0.06	$2.18	$5.41	$7.24
Lost utility revenues	$0.00	$0.00	$0.13	$4.22	$9.35	$11.15
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.04	$2.05	$4.26	$12.26	$16.05	$20.69
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.14	$3.17	$3.57
Lost jobs due to reduced commercial business activity	0	0	0	67	100	113
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.30	$0.45	$0.51
Lost utility revenues	$0.06	$0.70	$1.20	$1.64	$2.20	$2.39

Burleson County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.009	$0.01	$0.02	$0.03	$0.04
Lost utility revenues	$0.000	$0.008	$0.02	$0.03	$0.03	$0.04

Callahan County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Baird						
Monetary value of domestic water shortages	$4.48	$4.39	$4.30	$4.22	$4.15	$4.15
Lost income from reduced commercial business activity	$0.78	$0.76	$0.74	$0.72	$0.70	$0.70
Lost jobs due to reduced commercial business activity	25	24	23	23	22	22
Lost state and local taxes from reduced commercial business activity	$0.11	$0.11	$0.11	$0.10	$0.10	$0.10
Lost utility revenues	$0.50	$0.49	$0.48	$0.47	$0.46	$0.46

Coryell County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Gatesville						
Monetary value of domestic water shortages	$0.00	$0.00	$0.06	$0.61	$1.35	$2.09
Lost utility revenues	$0.00	$0.00	$0.14	$1.19	$2.09	$2.87
Kempner WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.03	$0.38
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.07	$0.74

Eastland County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
County-other						
Monetary value of domestic water shortages	$1.46	$1.37	$0.37	$0.31	$0.23	$0.17
Irrigation						
Reduced income from reduced crop production	$2.77	$2.78	$2.78	$2.79	$2.79	$2.79
Reduced business taxes from reduced crop production	$0.16	$0.16	$0.16	$0.16	$0.16	$0.11
Reduced jobs from reduced crop production	36	36	36	36	36	36

Falls County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Bell-Milam Falls WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.07	$0.10	$0.39	$0.48
Lost utility revenues	$0.03	$0.13	$0.24	$0.33	$0.40	$0.49
Marlin						
Monetary value of domestic water shortages	$35.14	$36.72	$38.31	$39.62	$40.87	$42.52
Lost income from reduced commercial business activity	$5.99	$6.35	$6.70	$6.99	$7.27	$7.64
Lost jobs due to reduced commercial business activity	219	232	245	256	266	280
Lost state and local taxes from reduced commercial business activity	$0.85	$0.90	$0.95	$0.99	$1.03	$1.08
Lost utility revenues	$3.68	$3.86	$4.04	$4.18	$4.32	$4.51
West Brazos WSC						
Monetary value of domestic water shortages	$1.22	$3.21	$5.33	$4.26	$4.78	$5.61
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.35	$0.42	$0.53
Lost jobs due to reduced commercial business activity	0	0	0	13	15	19
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.05	$0.06	$0.08
Lost utility revenues	$0.12	$0.20	$0.28	$0.35	$0.40	$0.48

Grimes County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.38	$3.16	$5.02	$12.50	$13.81	$18.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.18	$2.73	$3.16
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	69	86	100
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.31	$0.39	$0.45
Lost utility revenues	$0.58	$1.08	$1.41	$1.67	$1.89	$2.11
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$264.45	$288.65	$314.58	$349.15	$401.00
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$37.96	$41.43	$45.15	$50.11	$57.56
Lost jobs due to reduced electrical generation	0	899	981	1,069	1,187	1,363

Haskell County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Haskell						
Monetary value of domestic water shortages	$12.94	$12.53	$11.86	$9.99	$9.74	$9.52
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$3.98	$3.90	$3.82
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$0.57	$0.56	$0.54
Lost state and local taxes from reduced commercial business activity	0	0	0	126	123	121
Lost utility revenues	$1.07	$1.03	$1.00	$0.98	$0.96	$0.93
Irrigation						
Reduced income from reduced crop production	$12.93	$12.28	$11.65	$11.04	$10.45	$9.87
Reduced business taxes from reduced crop production	$0.66	$0.63	$0.60	$0.56	$0.53	$0.51
Reduced jobs from reduced crop production	290	275	261	247	234	221

Hill County ($millions)						
	2010	2020	2030	2040	2050	2060
Files Valley WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.98	$0.27
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.10	$0.30
White Bluff Community WSC						
Monetary value of domestic water shortages	$0.09	$1.51	$4.42	$4.45	$6.63	$8.41
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.79	$1.23	$1.70
Lost jobs due to reduced commercial business activity	0	0	0	25	39	54
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.11	$0.17	$0.24
Lost utility revenues	$0.10	$0.27	$0.47	$0.66	$0.87	$1.10
Woodrow-Osceola						
Monetary value of domestic water shortages	$0.17	$0.17	$0.16	$0.17	$0.19	$0.96
Lost utility revenues	$0.16	$0.16	$0.16	$0.17	$0.19	$0.23

Hood County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Oak Hill Trails Subdivision						
Monetary value of domestic water shortages	$6.32	$6.21	$6.02	$5.89	$5.82	$5.82
Lost income from reduced commercial business activity	$4.03	$3.94	$3.78	$3.67	$3.61	$3.61
Lost jobs due to reduced commercial business activity	117	114	109	106	105	105
Lost state and local taxes from reduced commercial business activity	$0.48	$0.47	$0.45	$0.43	$0.43	$0.43
Lost utility revenues	$0.72	$0.71	$0.68	$0.67	$0.66	$0.66
Granbury						
Monetary value of domestic water shortages	$20.69	$43.98	$56.53	$68.36	$85.05	$113.91
Lost income from reduced commercial business activity	$9.25	$27.35	$36.18	$45.65	$56.57	$69.44
Lost jobs due to reduced commercial business activity	268	792	1047	1321	1637	2010

	2010	2020	2030	2040	2050	2060
Lost state and local taxes from reduced commercial business activity	$1.09	$3.23	$4.28	$5.39	$6.69	$8.21
Lost utility revenues	$3.58	$4.89	$6.16	$7.52	$9.14	$11.04
Lipan						
Monetary value of domestic water shortages	$0.00	$0.00	$0.80	$2.72	$6.14	$12.76
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.42	$2.10	$7.77

Johnson County ($millions)

	2010	2020	2030	2040	2050	2060
Alvarado						
Monetary value of domestic water shortages	$0.00	$0.00	$0.02	$0.08	$0.19	$1.46
Monetary value of domestic water shortages	$3.46	$4.76	$6.81	$8.23	$6.30	$7.59
Lost utility revenues	$0.00	$0.00	$0.04	$0.10	$0.19	$0.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$1.44	$1.95
Lost jobs due to reduced commercial business activity	0	0	0	0	42	57

Johnson County (continued from previous page)						
Keene						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.03
Monetary value of domestic water shortages	$0.00	$0.00	$0.12	$0.20	$0.34	$2.20
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.09
Lost utility revenues	$0.00	$0.00	$0.14	$0.29	$0.33	$0.48
Parker WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.02	$0.18
Monetary value of domestic water shortages	$0.00	$0.00	$0.65	$8.16	$29.40	$47.33
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.07	$0.27
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$12.12
Lost jobs due to reduced commercial business activity	0	0	0	0	0	357
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.34
Lost utility revenues	$0.00	$0.00	$0.99	$2.54	$4.81	$7.25
Cleburne						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.49	$2.51
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$1.05	$3.87
Godley						
Monetary value of domestic water shortages	$1.39	$2.32	$3.14	$4.09	$5.44	$7.14
Lost income from reduced commercial business activity	$0.32	$0.54	$1.57	$2.07	$2.73	$3.55
Lost jobs due to reduced commercial business activity	10	16	46	61	80	105
Lost state and local taxes from reduced commercial business activity	$0.04	$0.06	$0.17	$0.23	$0.30	$0.39
Lost utility revenues	$0.18	$0.26	$0.34	$0.43	$0.55	$0.70
Johnson County SUD						
Monetary value of domestic water shortages	$0.00	$11.20	$43.29	$194.02	$118.69	$297.92
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$48.68	$74.01
Lost jobs due to reduced commercial business activity	0	0	0	0	1433	2179
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$5.37	$8.16
Lost utility revenues	$0.00	$4.20	$9.59	$16.01	$24.18	$33.08
Table continued on next page						

Manufacturing						
Reduced income from reduced manufacturing output	$455.93	$588.35	$717.75	$849.17	$966.84	$1,083.50
Reduced business taxes from reduced manufacturing output	$32.06	$41.38	$50.48	$59.72	$67.99	$76.20
Reduced jobs from reduced manufacturing output	5,820	7,511	9,163	10,840	12,342	13,831
Steam-electric						
Lost income due to reduced electrical generation	$221.37	$580.75	$580.75	$580.75	$580.75	$580.75
Lost state and local business tax revenues due to reduced electrical generation	$31.77	$83.36	$83.36	$83.36	$83.36	$83.36
Lost jobs due to reduced electrical generation	753	1,974	1,974	1,974	1,974	1,974

Jones County ($millions)						
	2010	2020	2030	2040	2050	2060
Abilene						
Monetary value of domestic water shortages	$0.000	$0.156	$0.131	$0.077	$0.041	$0.001
Lost utility revenues	$0.00	$0.25	$0.21	$0.14	$0.08	$0.001
County-other						
Monetary value of domestic water shortages	$0.47	$0.45	$0.41	$0.06	$0.07	$0.06
Stamford						
Monetary value of domestic water shortages	$12.84	$12.90	$12.62	$12.18	$11.73	$11.29
Lost income from reduced commercial business activity	$2.24	$2.25	$2.21	$2.13	$2.05	$1.97
Lost jobs due to reduced commercial business activity	81	81	79	77	74	71
Lost state and local taxes from reduced commercial business activity	$0.26	$0.26	$0.25	$0.25	$0.24	$0.23
Lost utility revenues	$1.24	$1.25	$1.22	$1.18	$1.13	$1.09

Kent County ($millions)						
	2010	2020	2030	2040	2050	2060
Jayton						
Monetary value of domestic water shortages	$2.26	$2.18	$1.92	$1.51	$1.33	$1.15
Lost income from reduced commercial business activity	$0.31	$0.30	$0.26	$0.21	$0.18	$0.16
Lost jobs due to reduced commercial business activity	23	22	19	15	13	12
Lost state and local taxes from reduced commercial business activity	$0.04	$0.04	$0.03	$0.03	$0.02	$0.02
Lost utility revenues	$0.22	$0.21	$0.19	$0.15	$0.13	$0.11

Knox County ($millions)						
	2010	2020	2030	2040	2050	2060
Knox City						
Monetary value of domestic water shortages	$0.09	$0.17	$0.22	$0.26	$0.30	$0.33
Lost income from reduced commercial business activity	$0.38	$3.16	$5.02	$12.50	$13.81	$18.29
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$2.18	$2.73	$3.16
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$68.79	$86.10	$99.58
Lost utility revenues	$0.43	$0.44	$0.44	$0.43	$0.43	$0.43
Munday						
Monetary value of domestic water shortages	$9.53	$9.50	$9.18	$5.09	$5.02	$5.04
Lost income from reduced commercial business activity	$1.06	$1.05	$1.02	$1.04	$1.03	$1.03
Lost jobs due to reduced commercial business activity	35	35	33	34	34	34
Lost state and local taxes from reduced commercial business activity	$0.14	$0.14	$0.14	$0.14	$0.14	$0.14
Lost utility revenues	$0.51	$0.51	$0.50	$0.50	$0.49	$0.50
Irrigation						
Reduced income from reduced crop production	$7.58	$7.07	$6.57	$6.08	$5.61	$5.15
Reduced business taxes from reduced crop production	$0.39	$0.37	$0.34	$0.31	$0.29	$0.27
Reduced jobs from reduced crop production	97	91	84	78	72	66

Lee County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Aqua WSC						
Monetary value of domestic water shortages	$0.00	$0.06	$0.12	$0.22	$0.31	$1.48
Lost utility revenues	$0.00	$0.10	$0.17	$0.24	$0.30	$0.35
Lee County WSC						
Monetary value of domestic water shortages	$1.56	$3.98	$7.20	$7.41	$12.74	$7.93
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.46
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.21
Lost state and local taxes from reduced commercial business activity	0	0	0	0	0	46
Lost utility revenues	$0.34	$0.57	$0.76	$0.92	$1.05	$1.18
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.02	$0.03	$0.04	$0.05
Lost utility revenues	$0.00	$0.01	$0.02	$0.03	$0.04	$0.05

Limestone County ($millions)						
	2010	2020	2030	2040	2050	2060
Biston MWSD						
Monetary value of domestic water shortages	$2.98	$2.94	$2.90	$2.86	$2.84	$2.84
Lost income from reduced commercial business activity	$0.46	$0.45	$0.45	$0.44	$0.44	$0.44
Lost jobs due to reduced commercial business activity	$0.07	$0.07	$0.07	$0.07	$0.07	$0.07
Lost state and local taxes from reduced commercial business activity	19	18	18	18	18	18
Lost utility revenues	$0.29	$0.29	$0.29	$0.28	$0.28	$0.28
Coolidge						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.01	$0.02	$0.07
Lost utility revenues	$0.00	$0.00	$0.00	$0.01	$0.04	$0.07
Groesbeck						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.01	$0.11
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.03	$0.22
Kosse						
Monetary value of domestic water shortages	$1.51	$1.51	$1.49	$1.47	$1.47	$1.49
Lost income from reduced commercial business activity	$0.11	$0.11	$0.10	$0.10	$0.10	$0.10
Lost jobs due to reduced commercial business activity	4	4	3	3	3	3
Lost state and local taxes from reduced commercial business activity	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Lost utility revenues	$0.15	$0.15	$0.15	$0.14	$0.14	$0.15
Manufacturing						
Reduced income from reduced manufacturing output	$16.49	$4.54	$4.95	$5.36	$6.08	$7.11
Reduced business taxes from reduced manufacturing output	$1.56	$0.43	$0.47	$0.51	$0.57	$0.67
Reduced jobs from reduced manufacturing output	241	66	72	78	89	104
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$72.95	$163.34	$546.15
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$10.47	$23.44	$78.39
Lost jobs due to reduced electrical generation	0.00	0.00	0.00	247	555	1,856

McLennan County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Chalk Bluff WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.08	$0.16	$0.34
Lost utility revenues	$0.00	$0.00	$0.00	$0.13	$0.23	$0.38
Cross Country WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.24	$0.30	$1.76
Lost utility revenues	$0.00	$0.00	$0.00	$0.24	$0.29	$0.39
Hallsburg						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.04	$0.06	$0.08
Lost utility revenues	$0.00	$0.03	$0.04	$0.06	$0.07	$0.09
Lacy-Lakeview						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.14	$0.25	$0.51
Lost utility revenues	$0.00	$0.00	$0.00	$0.27	$0.43	$0.71
Mart						
Monetary value of domestic water shortages	$1.73	$1.90	$2.22	$1.26	$1.30	$2.61
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.66
Lost jobs due to reduced commercial business activity	0	0	0	0	0	26
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.10
Lost utility revenues	$0.38	$0.42	$0.44	$0.48	$0.50	$0.54
North Bosque WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.09	$0.20	$0.41
Lost utility revenues	$0.00	$0.00	$0.00	$0.15	$0.25	$0.39
Riesel						
Monetary value of domestic water shortages	$0.00	$0.01	$0.02	$0.03	$0.04	$0.06
Lost utility revenues	$0.01	$0.02	$0.03	$0.04	$0.05	$0.06
Robinson						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.12
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.22
Table cont. on n ext page.						

McLennan County cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
West Brazos Hills WSC						
Monetary value of domestic water shortages	$0.53	$1.28	$1.97	$1.55	$1.69	$1.97
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.13	$0.15	$0.19
Lost jobs due to reduced commercial business activity	0	0	0	5	5	7
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.02	$0.02	$0.03
Lost utility revenues	$0.10	$0.13	$0.16	$0.20	$0.22	$0.26
Western Hills WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.07	$0.15	$0.29
Lost utility revenues	$0.00	$0.00	$0.00	$0.11	$0.19	$0.32

Milam County						
Bell Milam Falls WSC						
Monetary value of domestic water shortages	$0.02	$0.08	$0.17	$0.27	$1.06	$1.42
Lost utility revenues	$0.01	$0.10	$0.15	$0.19	$0.20	$0.22
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.17	$0.55	$0.83	$0.93	$0.99	$4.19
Lost utility revenues	$0.28	$0.61	$0.81	$0.91	$0.96	$1.01
Mining						
Reduced income from reduced mining output	$0.18	$0.18	$0.18	$0.00	$0.00	$0.00
Reduced business taxes from reduced mining output	$0.03	$0.03	$0.03	$0.00	$0.00	$0.00
Reduced jobs from reduced mining output	0.716	0.716	0.716	0.000	0.000	0.000
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$18.36	$18.36
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$2.63	$2.63
Lost jobs due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	62	62

Nolan County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Sweetwater						
Monetary value of domestic water shortages	$60.74	$61.93	$62.11	$61.06	$58.46	$55.70
Lost income from reduced commercial business activity	$24.40	$24.87	$24.95	$24.52	$23.48	$22.37
Lost jobs due to reduced commercial business activity	769	784	787	773	740	705
Lost state and local taxes from reduced commercial business activity	$3.48	$3.54	$3.56	$3.50	$3.35	$3.19
Lost utility revenues	$5.97	$6.08	$6.10	$6.00	$5.74	$5.47
Irrigation						
Reduced income from reduced crop production	$0.59	$0.55	$0.50	$0.46	$0.42	$0.37
Reduced business taxes from reduced crop production	$0.03	$0.03	$0.03	$0.02	$0.02	$0.02
Reduced jobs from reduced crop production	7	6	6	5	5	4
Mining						
Reduced income from reduced mining output	$1.06	$1.06	$1.06	$1.06	$1.06	$1.06
Reduced business taxes from reduced mining output	$0.07	$0.07	$0.07	$0.07	$0.07	$0.07
Reduced jobs from reduced mining output	5	5	5	5	5	5
Manufacturing						
Reduced income from reduced manufacturing output	$0.00	$0.00	$0.00	$0.00	$0.00	$4.74
Reduced business taxes from reduced manufacturing output	$0.00	$0.00	$0.00	$0.00	$0.00	$0.32
Reduced jobs from reduced manufacturing output	0	0	0	0	0	40
Steam-electric						
Lost income due to reduced electrical generation	$82.86	$1,161.39	$2,053.56	$2,053.56	$2,053.56	$2,053.56
Lost state and local business tax revenues due to reduced electrical generation	$4.64	$64.98	$114.90	$114.90	$114.90	$114.90
Lost jobs due to reduced electrical generation	110	1,539	2,721	2,721	2,721	2,721

Palo Pinto ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Mineral Wells						
Monetary value of domestic water shortages	$0.00	$15.52	$37.99	$18.20	$25.16	$29.71
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$7.71	$10.22	$13.02
Lost jobs due to reduced commercial business activity	0	0	0	231	306	389
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.95	$1.25	$1.60
Lost utility revenues	$0.00	$2.54	$3.13	$3.69	$4.34	$5.08
Strawn						
Monetary value of domestic water shortages	$0.00	$0.00	$0.01	$0.01	$0.02	$0.03
Lost utility revenues	$0.00	$0.01	$0.01	$0.02	$0.03	$0.05

Robertson County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.01	$0.12	$0.18	$0.44	$0.43	$0.52
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.08	$0.09	$0.09
Lost jobs due to reduced commercial business activity	0	0	0	2	3	3
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01
Lost utility revenues	$0.02	$0.04	$0.05	$0.06	$0.06	$0.06
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$25.20	$285.71	$329.92
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$3.62	$41.01	$47.36
Lost jobs due to reduced electrical generation	0	0	0	86	971	1,122

Somervell County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Glen Rose						
Monetary value of domestic water shortages	$0.00	$0.00	$0.29	$0.07	$0.09	$0.09
Lost utility revenues	$0.00	$0.00	$0.05	$0.11	$0.14	$0.15
Steam-electric						
Lost income due to reduced electrical generation	$724.34	$723.58	$722.81	$722.06	$721.28	$720.53
Lost state and local business tax revenues due to reduced electrical generation	$103.97	$103.86	$103.75	$103.64	$103.53	$103.42
Lost jobs due to reduced electrical generation	2,462	2,460	2,457	2,455	2,452	2,449

Stephens County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Mining						
Reduced income from reduced mining output	$99.44	$107.44	$110.55	$113.57	$116.52	$120.73
Reduced business taxes from reduced mining output	$6.95	$7.51	$7.73	$7.94	$8.15	$8.44
Reduced jobs from reduced mining output	285	308	317	326	334	346

Taylor County ($millions)						
	2010	2020	2030	2040	2050	2060
Abilene						
Monetary value of domestic water shortages	$18.11	$336.31	$338.02	$333.79	$324.83	$314.38
Lost income from reduced commercial business activity	$0.00	$539.58	$544.59	$538.51	$523.38	$506.13
Lost jobs due to reduced commercial business activity	0	12426	12542	12402	12053	11656
Lost state and local taxes from reduced commercial business activity	$0.00	$48.47	$48.92	$48.37	$47.01	$45.47
Lost utility revenues	$9.38	$37.44	$37.72	$37.33	$36.38	$35.27
Merkel						
Monetary value of domestic water shortages	$0.17	$0.21	$0.21	$0.98	$0.15	$0.13
Lost utility revenues	$0.21	$0.23	$0.23	$0.22	$0.19	$0.16
Potosi WSC						
Monetary value of domestic water shortages	$0.23	$0.25	$0.25	$0.22	$0.18	$0.14
Lost utility revenues	$0.23	$0.24	$0.24	$0.21	$0.19	$0.16
Steamboat Mountain WSC						
Monetary value of domestic water shortages	$0.05	$0.05	$0.05	$0.03	$0.01	$0.00
Lost utility revenues	$0.08	$0.07	$0.07	$0.05	$0.03	$0.01

Throckmorton County ($millions)						
	2010	2020	2030	2040	2050	2060
Irrigation						
Reduced income from reduced crop production	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78
Reduced business taxes from reduced crop production	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11
Reduced jobs from reduced crop production	32	32	32	32	32	32

Williamson County ($millions)						
	2010	2020	2030	2040	2050	2060
Aqua WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.41	$0.63	$0.93
Lost utility revenues	$0.00	$0.02	$0.05	$0.09	$0.13	$0.17
Bartlett						
Monetary value of domestic water shortages	$0.08	$0.10	$0.11	$0.13	$0.60	$0.77
Lost utility revenues	$0.09	$0.10	$0.11	$0.12	$0.14	$0.17
Bell-Milam Falls WSC						
Monetary value of domestic water shortages	$0.01	$0.05	$0.11	$0.16	$0.54	$0.63
Lost utility revenues	$0.01	$0.04	$0.07	$0.10	$0.14	$0.19
Blockhouse MUD						
Monetary value of domestic water shortages	$0.00	$0.00	$2.41	$5.59	$11.84	$20.00
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.69	$3.62	$6.02
Lost jobs due to reduced commercial business activity	0	0	0	22	114	190
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.10	$0.52	$0.86
Lost utility revenues	$0.00	$0.00	$0.83	$1.80	$2.90	$4.08

Table cont. on next page.

Williamson County cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brushy Creek MUD						
Monetary value of domestic water shortages	$0.00	$0.19	$0.49	$0.49	$0.49	$0.49
Lost utility revenues	$0.00	$0.41	$0.95	$0.95	$0.95	$0.95
Cedar Park						
Monetary value of domestic water shortages	$1.20	$7.57	$32.23	$63.28	$64.06	$64.47
Lost utility revenues	$2.32	$9.24	$12.08	$19.74	$19.98	$20.11
Chisholm Trail SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$1.83	$6.47
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$2.75	$7.50
Florence						
Monetary value of domestic water shortages	$0.78	$1.79	$3.86	$3.28	$4.15	$5.23
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.22	$0.32	$0.84
Lost jobs due to reduced commercial business activity	0	0	0	9	13	34
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.03	$0.05	$0.13
Lost utility revenues	$0.14	$0.22	$0.32	$0.43	$0.55	$0.68
Georgetown						
Monetary value of domestic water shortages	$0.00	$0.00	$0.70	$7.79	$60.92	$113.22
Lost utility revenues	$0.00	$0.00	$1.51	$10.70	$20.90	$31.85
Jarrell						
Monetary value of domestic water shortages	$3.96	$4.01	$4.06	$3.37	$3.42	$3.20
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.48	$0.49	$0.45
Lost jobs due to reduced commercial business activity	0	0	0	19	20	18
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.07	$0.08	$0.07
Lost utility revenues	$0.33	$0.33	$0.33	$0.34	$0.35	$0.32
Jarrell-Schwertner WSC						
Monetary value of domestic water shortages	$0.00	$0.14	$4.08	$8.23	$15.51	$20.43
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$1.29	$2.64	$4.02
Lost jobs due to reduced commercial business activity	$0.00	0	0	41	83	127
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.18	$0.38	$0.57
Lost utility revenues	$0.00	$0.17	$0.74	$1.33	$2.01	$2.69

Table cont. on next page.

Williamson County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Jonah Water SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.31	$1.48	$9.19	$16.51
Lost utility revenues	$0.00	$0.00	$0.60	$1.81	$3.15	$4.64
Leander						
Monetary value of domestic water shortages	$0.00	$0.00	$0.92	$18.50	$57.60	$106.32
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$34.51
Lost jobs due to reduced commercial business activity	0	0	0	0	0	601
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$4.02
Lost utility revenues	$0.00	$0.00	$1.42	$5.20	$9.42	$13.94
Liberty Hill						
Monetary value of domestic water shortages	$4.95	$12.14	$17.52	$23.23	$29.56	$36.35
Lost income from reduced commercial business activity	$0.73	$4.56	$6.72	$9.01	$11.55	$14.28
Lost jobs due to reduced commercial business activity	23	144	212	284	364	450
Lost state and local taxes from reduced commercial business activity	$0.10	$0.65	$0.96	$1.28	$1.65	$2.04
Lost utility revenues	$0.52	$1.18	$1.71	$2.27	$2.89	$3.56
Round Rock						
Monetary value of domestic water shortages	$3.73	$105.31	$220.03	$384.75	$834.12	$1,084.19
Lost utility revenues	$0.00	$0.00	$115.43	$422.03	$634.36	$861.87
Monetary value of domestic water shortages	0	0	2011	7353	11052	15016
Lost utility revenues	$0.00	$0.00	$13.44	$49.14	$73.87	$100.36
Monetary value of domestic water shortages	$5.75	$23.32	$44.10	$66.82	$92.05	$119.08
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.05	$0.21	$1.45	$2.8	$4.38
Lost utility revenues	$0.00	$0.07	$0.21	$0.35	$0.52	$0.71
Thrall						
Monetary value of domestic water shortages	$4.71	$5.63	$6.78	$4.39	$5.10	$5.92
Lost income from reduced commercial business activity	$0.39	$0.47	$0.56	$0.66	$0.77	$0.90
Lost jobs due to reduced commercial business activity	16	19	23	27	31	36
Lost state and local taxes from reduced commercial business activity	$0.06	$0.07	$0.09	$0.10	$0.12	$0.14
Lost utility revenues	$0.26	$0.30	$0.37	$0.43	$0.50	$0.58
Table cont. on next page.						

Williamson County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Weir						
Monetary value of domestic water shortages	$2.90	$4.25	$5.83	$7.54	$9.44	$11.47
Lost income from reduced commercial business activity	$0.43	$0.64	$0.88	$1.14	$1.44	$1.75
Lost jobs due to reduced commercial business activity	17	26	35	46	58	70
Lost state and local taxes from reduced commercial business activity	$0.07	$0.10	$0.14	$0.18	$0.22	$0.27
Lost utility revenues	$0.28	$0.42	$0.57	$0.74	$0.92	$1.12
Williamson-Travis County MUD #1						
Monetary value of domestic water shortages	$0.00	$2.37	$10.23	$14.01	$31.01	$42.02
Lost income from reduced commercial business activity	$0.00	$0.00	$2.00	$7.73	$11.97	$16.48
Lost jobs due to reduced commercial business activity	0	0	63	244	378	520
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.28	$1.10	$1.71	$2.35
Lost utility revenues	$0.00	$0.67	$1.55	$2.43	$3.43	$4.49
Manufacturing						
Reduced income from reduced manufacturing output	$126.18	$153.14	$179.99	$207.04	$231.47	$254.28
Reduced business taxes from reduced manufacturing output	$8.67	$10.52	$12.36	$14.22	$15.90	$17.46
Reduced jobs from reduced manufacturing output	1,847	2,241	2,634	3,030	3,388	3,722
Mining						
Reduced income from reduced crop production	$40.20	$45.82	$49.69	$53.50	$57.31	$60.12
Reduced business taxes from reduced crop production	$4.91	$5.60	$6.07	$6.54	$7.00	$7.35
Reduced jobs from reduced crop production	392	446	484	521	558	586

(This page intentionally left blank.)

Appendix J
City of Abilene
Water Conservation and
Drought Contingency Plan

Enprotec / Hibbs & Todd

April 28, 2009

Via Certified Mail #
Return Receipt Requested

TCEQ Resource Protection Team
P.O. Box 13087-MC160
Austin, TX 78711-3087

Re: City of Abilene, Texas; PWS ID No. 2210001
2009 Water Conservation and Drought Contingency Plans and
2009 Water Conservation Implementation Report

Dear Sirs:

Enclosed for your use please find copies of the current Water Conservation and Drought Contingency Plans for the City of Abilene. The plans contain all required elements as described in 30 Texas Administrative Code Chapter 288. The plans are being submitted to the Brazos Region G Water Planning Group, the Texas Water Development Board and the Texas Commission on Environmental Quality.

Enclosures consist of:

- Attachment 1: City of Abilene Water Conservation Plan and Drought Contingency Plan (includes utility profiles for retail and wholesale users)
- Attachment 2: City of Abilene Agricultural Water Conservation Plan (includes utility profile for agricultural users)
- Attachment 3: City of Abilene Industrial Water Conservation Plan (includes utility profile for industrial users)
- Attachment 4: City of Abilene 2009 Water Conservation Implementation Report

Based on a detailed review of the plans and utility profile information current through December 2008, the water conservation plans adopted by the City of Abilene (City) in 2005 and 2007 remain accurate and up-to-date regarding conservation policies and practices implemented by the City. As the enclosed implementation report points out, the conservation goals described in the enclosed plans are expected to be achieved in the years 2010 and 2015.

Should you have questions regarding the enclosed plans please contact me at 325.698.5560.

Sincerely

Enprotec/Hibbs & Todd, Inc.

Scott F. Hibbs, P.E.

Encl:

c: Tommy O'Brien, P.E, City of Abilene
Trey Buzbee, Brazos Region G Water Planning Group; P.O. Box 7555; Waco, TX 76714
Ethan Ham, Texas Water Development Board; P.O. Box 13231; Austin, TX 78711-3231
Project File 4652 P:\Projects\Abilene, City of\4652 09 WCP DCP\Abilene WCP DCP Transmittal to TCEQ (04 15 09).docx

CITY OF ABILENE, TEXAS

WATER CONSERVATION PLAN
AND
DROUGHT CONTINGENCY PLAN
("WATER CONSERVATION ORDINANCE")

Public Water System #2210001

Revised - April, 2005

Reviewed - April 2009

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

CITY OF ABILENE, TEXAS
WATER CONSERVATION PLAN

Section I. Declaration of Policy, Purpose and Intent

The purpose of the Water Conservation Plan (the Plan) is to: promote the wise and responsible use of water by implementing structural programs that result in quantifiable water conservation results; develop, maintain, and enforce water conservation policies and ordinances; and support public education programs that educate customers about water and wastewater facilities operations, water quantity and quality, water conservation and non-point source protection.

Section II. Utility Profile

The City of Abilene supplies treated water to municipal use customers and wholesale purchasers. The City of Abilene holds Certificate of Convenience and Necessity (CCN) Number 11823. Abilene's municipal use customers are located within Abilene's CCN area encompassing approximately 108 square miles and is depicted in the service area map in Appendix A.

Abilene's wholesale service area encompasses approximately 874 square miles situated outside of Abilene's CCN. Maps of the wholesale service area have been included in Appendix A. Since the City serves municipal use and wholesale customers, both Municipal Use and Wholesale Use Profiles were completed for the Abilene system. The Municipal Use Utility Profile can be found in its entirety in Appendix B while the Wholesale Use Utility Profile has been included in Appendix C. Both profiles are summarized as follows.

A. Population

Abilene's population in the year 2005 as determined by information supplied by the Region G Water Planning Group is estimated to be 120,334, and is projected to be 124,607 by the year 2010. Abilene supplies treated water to wholesale purchasers who in turn resell that water to their system users. Total population of wholesale users in the year 2005 was estimated to be 34,938, and is projected to reach 35,413 persons by the year 2010. Table 1 provides population figures for City of Abilene and Abilene's wholesale users for the previous five years.

Table 1: Population for City of Abilene and Wholesalers For Preceding Five Years		
Year	Abilene Population	Wholesale Population
2000	115,930	34,458
2001	116,798	34,554
2002	117,672	34,649
2003	118,553	34,745
2004	119,440	34,842

Source: Region G Planning Group

Table 2 depicts projected population figures for Abilene and Abilene's wholesale users through the year 2050.

Table 2: Projected Population for City of Abilene and Wholesalers		
Year	Abilene Population	Wholesale Population
2010	124,607	35,413
2020	130,220	36,147
2030	132,820	35,616
2040	133,514	35,617
2050	130,943	35,028

Source: Region G Planning Group

B. Customer Data and Water Use Data

Abilene's water customers consist of a mixture of residential, commercial, industrial, wholesale, institutional and irrigation users. City of Abilene residential customers are supplied through approximately 34,000 connections with approximately 200 connections added each year. Abilene serves approximately 4,700 commercial connections with a net average gain of approximately three new commercial connections added each year. Wholesale customers are those entities that purchase water from Abilene for resale, and are summarized in Table 3.

Table 3: City of Abilene Wholesale Purchasers	
Wholesale Customer	**Contracted Amount (ac-ft/yr)**
City of Baird	77
City of Merkel	353
City of Tye	184
City Clyde	307
Blair WSC	77
Hamby WSC	308
Hawley WSC	307
S.U.N. WSC	230
Eula WSC	61
Potosi WSC	307
Steamboat Mountain WSC	307
View-Caps WSC	199
Dyess AFB	491
Total	**3,208**
Source: City of Abilene Records	

On average, Abilene customers use approximately 88% of the total water delivered from the City's potable water treatment works while wholesale customers consume approximately12% of the total water delivered from the City's treatment works. Table 4 summarizes the expected water use figures for Abilene users and wholesale users over the next decade.

Table 4: Projected Water Demand for the Coming Decade

Year	Abilene Population	Wholesale Population	Abilene Demand (ac-ft/yr)	Wholesale Demand (ac-ft/yr)	Total Demand (ac-ft/yr)
2006	121,235	35,035	22,469	3,257	25,725
2007	122,142	35,132	22,579	3,260	25,840
2008	123,056	35,229	22,691	3,263	25,954
2009	123,977	35,327	22,803	3,267	26,070
2010	124,607	35,413	22,891	3,270	26,161
2011	125,168	35,486	22,951	3,270	26,221
2012	125,732	35,560	23,012	3,270	26,282
2013	126,298	35,634	23,072	3,270	26,342
2014	126,867	35,708	23,133	3,270	26,403
2015	127,439	35,782	23,194	3,270	26,464

Source: Region G Planning Group and TCEQ Water Utility Database (WUD)

C. Water Supply System

1. Water Sources

Raw surface water is supplied to Abilene's treatment works from several sources. The City of Abilene owns and holds surface water rights to 30,690 acre feet per year (ac-ft/yr) from Lake Fort Phantom Hill, of which 25,690 ac-ft/yr are for municipal purposes, 4,000 ac-ft/yr are for industrial purposes, and 1,000 ac-ft/yr are for irrigation. The City operates Lake Ft. Phantom pursuant to policies and guidelines found in the Reservoir Operation Plan which has been included in Appendix F. Hubbard Creek Reservoir, owned and operated by the West Central Texas Municipal Water District provides by contract up to 25,500 ac-ft/yr (125% of Abilene's portion of the allocated safe yield of Hubbard Creek Reservoir, depending on the lake level) of raw surface water for use by the City. Abilene may utilize by contract up to 16.54% of the safe yield of Lake O.H. Ivie, not to exceed 15,000 ac-ft/yr. The City owns and is allocated use of 1,675 ac-ft/yr of water for municipal purposes from Lake Abilene.

The City holds surface water rights to 1,120 ac-ft/yr from Lake Kirby, also owned by Abilene, for irrigation purposes and for storage/diversion of reclaimed water also used for irrigation purposes. The Clear Fork Diversion, owned and operated by Abilene, allows a maximum of 30,000 ac-ft/yr to be diverted from the Clear Fork of the Brazos River to Lake Fort Phantom. The

City's Deadman Creek Diversion serves to allow 3,000 ac-ft/yr through a diversion channel into Lake Fort Phantom Hill.

2. Water Treatment

A pump station located on the eastern bank of Lake Ft. Phantom pumps raw water from Lake Ft. Phantom to the Northeast Treatment Plant and the Grimes Treatment Plant. A raw water delivery system consisting of two parallel pipelines can provide up to 30 million gallons per day (MGD) from Hubbard Creek Reservoir to the Ft. Phantom delivery system. Raw water is pumped approximately 50 miles from Lake O.H. Ivie to the Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola. Water flows through a 21-mile long gravity pipeline from Lake Abilene to the small Abilene Treatment Plant (currently not in use) located near Buffalo Gap Road and FM 707. A pump station on the banks of the Clear Fork of the Brazos River, near Lake Ft. Phantom provides diversion pumping for up to 30,000 ac-ft/yr into Lake Ft. Phantom under selected volume and quality conditions.

The City's Water Treatment System consists of three treatment plants having the maximum treatment capacity of 51 MGD and combined treated water storage of 11.95 million gallons (MG). Upon completion of improvements currently under construction, the Northeast Water Treatment Plant on East Lake Road will have a capacity of 25 MGD and treats raw water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Grimes Water Treatment Plant on East Highway 80 has a treatment capacity of 20 MGD and treats water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola has a micro-filtration capacity of 8.95 MGD, and a reverse osmosis/ blended capacity of 6.0 MGD, and treats raw water drawn from Lake O.H. Ivie.

3. Water Distribution

The City of Abilene's water distribution system provides economical and compatible facilities that are capable of furnishing sufficient water at suitable pressures to both Abilene retail and wholesale purchasers. The system consists of nearly 750 miles of underground water mains, five pumping stations, three ground storage tanks, six elevated storage tanks, over 12,000 valves, over 2,700 fire hydrants, and over 38,000 meters.

After the water is processed at the treatment plants, it is pumped into the distribution system and stored in ground and elevated storage tanks with a combined volume of 39.55 million gallons. The distribution network is laid out in a continuous looped system to circulate water and maintain constant system pressure. Pumping stations are located strategically throughout the system to pump water, maintain uniform pressure and maintain storage tank levels.

Treated water from the Abilene treatment plants enters the wholesalers' systems through metered interconnections. Production capacity of the wholesale purchasers' systems amount to 13.4 MGD. Ground storage capacity within the wholesalers' systems is approximately 4.3 million gallons while total elevated storage volume is approximately 3.3 million gallons.

D. Wastewater System

1. Wastewater Collection

Abilene's wastewater collection system consists of a network of approximately 550 miles of sewer lines, 10 lift stations, and 5,100 manholes serving the cities of Abilene and Tye. Sewage flows by gravity, aided when necessary by lift stations, through the collection system into the Buck Creek Pump Station, which has a rated pumping capacity of approximately 24 MGD. An emergency storage basin at this facility has a capacity of approximately 23 million gallons. Sewage is metered at Buck Creek and then pumped five miles to the wastewater treatment plant. Wastewater collected is treated at the City of Abilene's Hamby Wastewater Treatment Plant.

Raw sewage undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment Program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the City reuse some of the treated effluent, while the remainder is discharged to Deadman Creek by way of Free Water Creek. Sewage biosolids are disposed of in a sludge disposal unit.

2. Wastewater Treatment

When wastewater reaches the Hamby treatment facilities northeast of town, it undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. The Hamby plant's rated treatment capacity is 22 MGD. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment Program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the city reuse some of the treated effluent, while the remainder is discharged to the designated receiving stream. Sewage biosolids are disposed of in a sludge disposal unit.

Section III. Water Conservation Goals

Water users (all City of Abilene water users such as residential, commercial, and industrial) located within the City of Abilene's Certificate of Convenience and Necessity (CCN) coverage area historically use (when not under water use restrictions) approximately 166 gallons of water per capita per day (gpcd). The 5-year goal for water use reduction by City of Abilene users is to reduce per capita use by 2 gallons per day per user to 164 gpcd by the end of 2010. The 10-year goal is to reduce per capita use by 4 gallons per day per user from present levels to 162 gpcd by the end of 2015. These goals are set in accordance with Region G Planning Group projections.

Wholesale water users served by the City of Abilene, located outside the City of Abilene's CCN coverage area, historically use (when not under water use restrictions) approximately 83 gpcd of water supplied by Abilene. The 5 and 10-year goals for wholesale users supplied by the City of Abilene is to reduce per capita use by 1 gallon per day per user to 82 gpcd by the end of 2010 and 2015. These goals are set in accordance with Region G Planning Group projections.

Section IV. Metering Devices

It is Abilene's policy to purchase meters that meet at least the minimum standards developed by the American Water Works Association. All metering devices used to meter water diverted from the source of supply are accurate to within plus or minus 5% to measure and account for water diverted from the source of supply. All service connections in the distribution system are metered. Aged meters are systematically replaced to assure reliability of meter performance. The City has established the following meter maintenance and replacement programs:

Meter Type	Calibration Period and Replacement
Master Meters	Annually and replaced as needed
1-1/2 inch and larger	Annually and replaced as needed
1-1/2 inch and smaller	Every 10 years and replaced as needed

The wholesale water purchasers are responsible for metering device installation, maintenance and calibration for meters located within their service areas.

Section V. Universal Metering

It is Abilene's policy to individually meter all water usage, except for fire protection, including all new construction within the City's CCN coverage area. Combined with an aggressive leak detection and repair program, electronic data collection devices, and a computerized billing system, Abilene's universal metering program has resulted in a water delivery accuracy rate well within industry operating standards.

Section VI. Measures to Determine and Control Unaccounted-For Uses of Water

The record management system utilized by the City of Abilene segregates water sales and users into user classes of residential, commercial, public/institutional, and industrial. It is Abilene's policy to investigate customer complaints of low pressure and possible leaks. Abilene visually inspects suspected leaks and makes quick and timely repairs to those leaks when detected. Abilene utilizes a record management system which records water pumped, water delivered, water sales and water losses to track water transmission, distribution, and delivery to customers. This information is used to evaluate the integrity of the water delivery system from source to end user to control and minimize unaccounted-for uses of water.

Section VII. Water Conservation Program

The City of Abilene's Water Conservation Program utilizes Supply Management Methods and Demand Management Methods to work towards optimizing use of Abilene's water resources.

A. Supply Management Program Elements consist of:

1. Coordinated use of water supplies to ensure the City withdraws water from its water supply reservoirs in a manner that ensures maximum dependable yield and efficiency of operation.
2. Watershed management to ensure diversion channels to Lake Ft. Phantom are clean, relatively straight, and obstruction-free to increase captured water flow while minimizing flooding potential in populated areas.
3. Metering all service connections to ensure maximum return for delivered water while minimizing unaccounted-for water loss.
4. Leak detection and repair to minimize unaccounted-for water loss.
5. Treated wastewater reuse and recycling to lessen the demand for raw water used to produce potable water, and for raw water pumping for irrigation uses.

B. Demand Management Program Elements consist of:

1. Water pricing as a mechanism for encouraging water customers to conserve.
2. Regulations for conserving water via the Water Conservation Plan and Drought Contingency Plan adopted by the City.
3. Plumbing Code for the City of Abilene requires maximum standard plumbing fixture capacities not be exceeded. Abilene supports a Low-Income Housing Retrofit Program and City Building Retrofit program to determine the feasibility of retrofitting fixtures in selected structures.
4. Continuing education programs to increase public awareness of supply, treatment and conveyance systems in Abilene, to increase public awareness of the benefits and need for conservation, and to make information about practical cost-effective methods and technologies to achieve conservation readily available.

Section VIII. Public Involvement

Public involvement in the formation of Abilene's Water Conservation Plan formally began in February 1985 with the appointment of a Water Conservation Advisory Committee to assist the Water Utilities staff in the preparation of the Water Conservation (Management) Plan. Since that time public involement has been an ongoing and integral part of the Abilene Water Management Plan. A public information and education program developed and implemented by the City is an important component in the City's water conservation strategy. Water Utilities education programs have three principal objects including:

A. Increase public awareness of supply, treatment, and conveyance systems in Abilene.
B. Increase public awareness of the needs for and benefits of conservation.
C. Make available information about practical cost effective methods and technologies to achieve conservation.

A variety of communication and marketing techniques are being utilized including: printed marketing materials; electronic information and marketing materials via Abilene's internet website; billboard advertising; newspaper supplements; presentations at neighborhood, civic, social, and professional organizations; public service announcements; special promotions sponsored by local media; and public school programs.

A. <u>Schools</u>

Water and conservation curriculum has been introduced into area public schools. City of Abilene staff have conducted workshops to train area educators in teaching methods and provide materials relating to water issues. Presentations are made directly to classes of all ages, including university level. Presentations are supported by a variety of printed materials. Tours of the water treatment plants are often used by area teachers as an education tool.

B. <u>Landscaping</u>

Implementation of the Xeriscape Program began in 1986 with the creation of a Xeriscape Advisory Committee composed of representatives of the landscape industry, business and residential communities. The committee assisted in the development of an informational brochure and plant list.

An aggressive ongoing public information campaign called "Project Xeriscape" which began in 1989, has included public service announcements, workshops, displays, landscape competition, a coloring contest for children, and distribution of materials. The campaign received state-wide recognition at the State Conference of the Texas Section American Water Works Association in 1990. The City's website offers extensive and useful information regarding xeriscaping and water conservation landscaping measures.

C. <u>Commercial/Industrial Conservation</u>

The Water Utilities Department works with area businesses to keep water bills as low as possible by conserving water use. Seasonal written contracts, industrial inspections, and individual responses to public inquiries about water and waste help to focus conservation efforts towards the commercial sector needs.

Section IX. Water Rate Structure

In 1984, the City of Abilene adopted a non-promotional, inverted rate structure. Under this rate structure the billing rate increases as individual water consumption increases. This rate structure promotes conservation and shifts the cost of supplying water to those consumers using it most.

Section X. Means of Implementation and Enforcement

This Water Conservation Plan has been adopted by the City. A copy of the resolution adopting this Plan is included in Appendix D.

A. Enforcement Within Abilene's CCN Area

The Plan is enforced within the Abilene CCN coverage area by providing service taps only to customers complying with adopted ordinances, maintaining a non-declining rate structure, discontinuing service to those customers who do not pay their water bills until payment is made, and certifying new construction only after verifying if conforms to adopted ordinances and plumbing codes.

B. Enforcement for Abilene's Wholesale Purchasers

Wholesale customers will receive written notification of Plan adoption and any subsequent Amendments. Adoption of this Plan by the City of Abilene per 30 Texas Administrative Code (TAC) Rule §288.5 obligates wholesale customers as defined in 30 TAC Rule §288.1 to implement water conservation measures. A copy of the notification letter to wholesale users has been included in Appendix E.

Section XI. Additional Wholesale Water Contract Requirements

It is Abilene's policy to include in every wholesale water supply contract entered into or renewed after official adoption of the Plan, including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using applicable elements in 30 TAC 288, Subchapter A. If the wholesale customer intends to resell the water, then the contract between Abilene and the wholesale customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with 30 TAC 288, Subchapter A.

Section XII. Coordination with Region G Planning Group

All of the customers served by the City of Abilene are located within the Region G Planning Area. Abilene has provided a copy of this Plan to the Region G Planning Group.

Section XIII. Revisions to the Water Conservation Plan

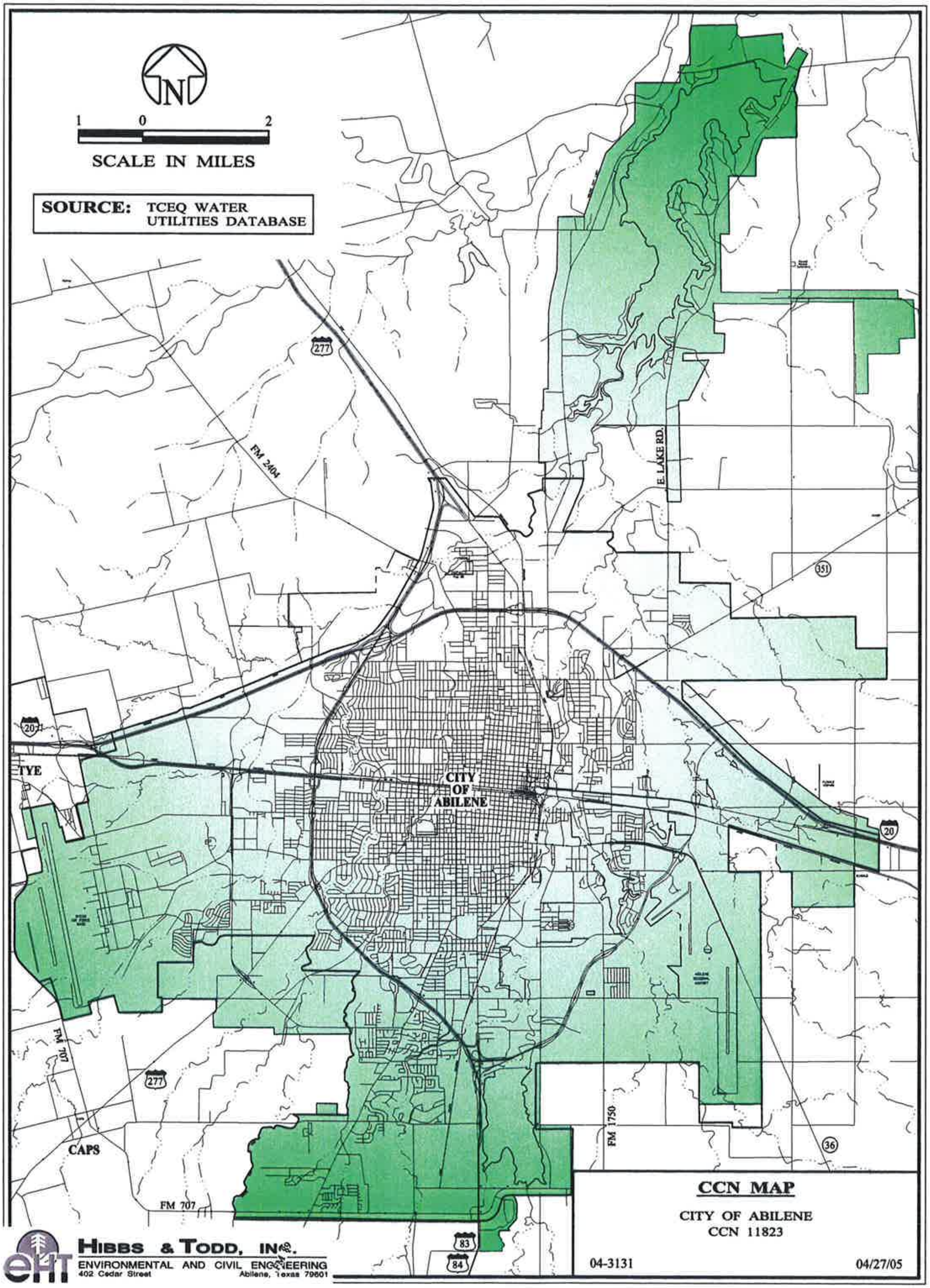
The City of Abilene will review and update this water conservation plan, as appropriate, based on new or updated information, such as the adoption or revision of the regional water plan. As a minimum the Plan will be updated again before May 1, 2009 and every five (5) years thereafter.

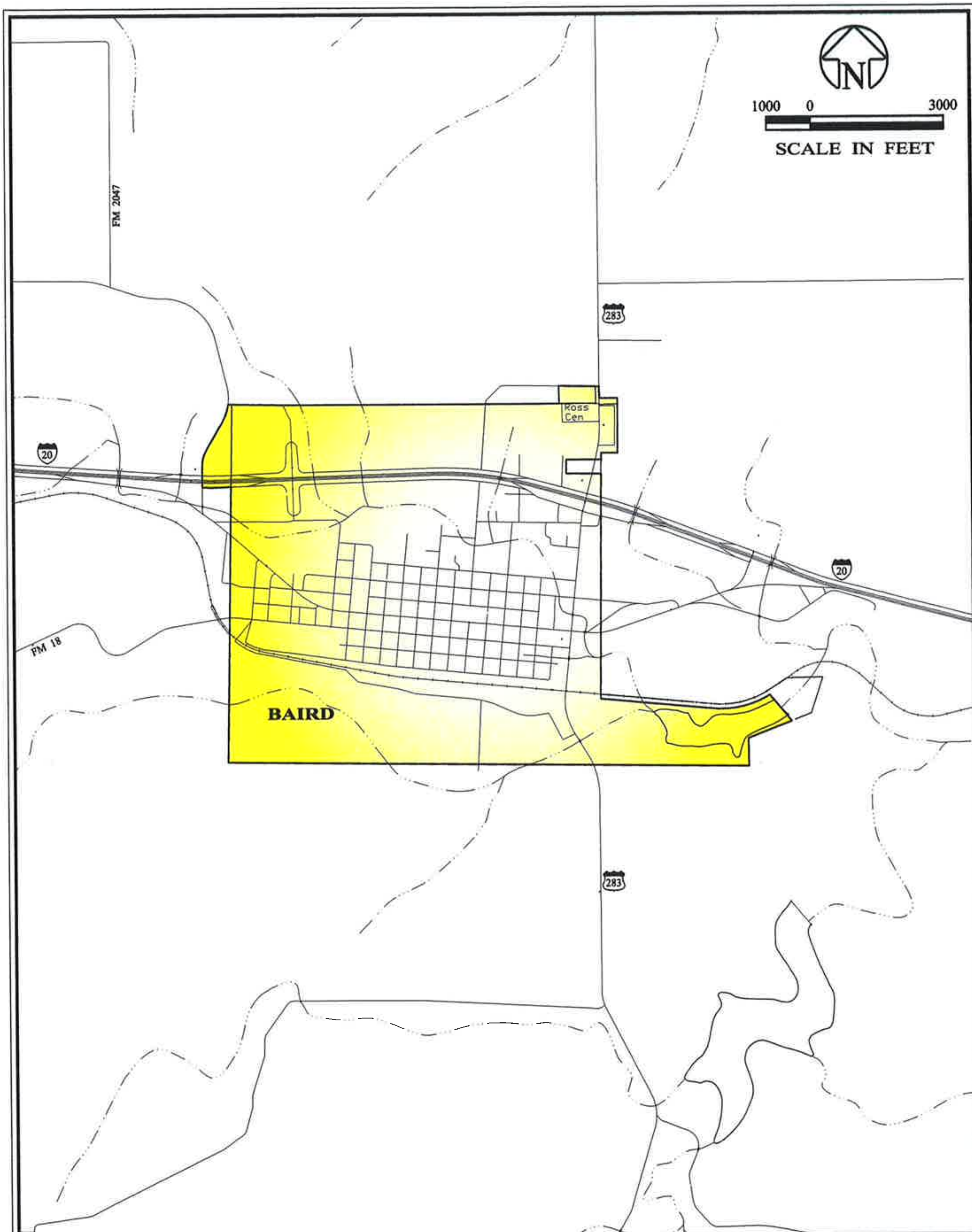
Section XIV. Severability

It is hereby to be the intention of Abilene that the sections, paragraphs, sentences, clauses, and phrases of this Plan are severable and if, any phrase, clause, sentence, paragraph or section shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not effect any of the remaining phrases, clauses, sentences, paragraphs or sections of this Plan, since the same would not have been enacted by Abilene without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph or section.

Appendix A

Service Area Maps


N
1 0 2
SCALE IN MILES
SOURCE: TCEQ WATER UTILITIES DATABASE
277
FM 2404
E. LAKE RD.
351
20
TYE
CITY OF ABILENE
20
FM 707
277
FM 1750
36
CAPS
FM 707
83
84
CCN MAP
CITY OF ABILENE
CCN 11823
04-3131
04/27/05
HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

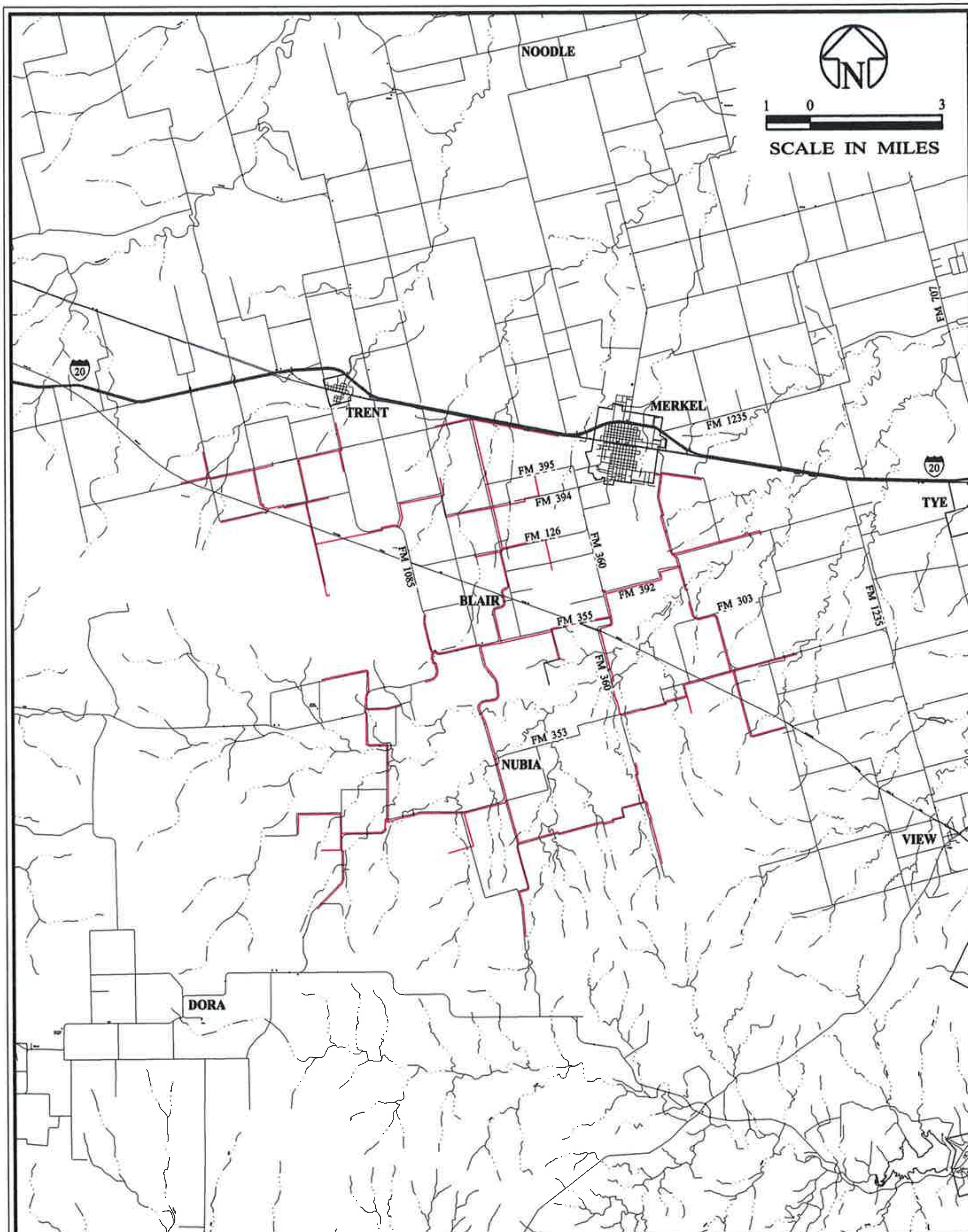
CCN MAP

CITY OF BAIRD
CCN 11068

04-3131

04/27/05

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

LEGEND

FACILITIES CCN

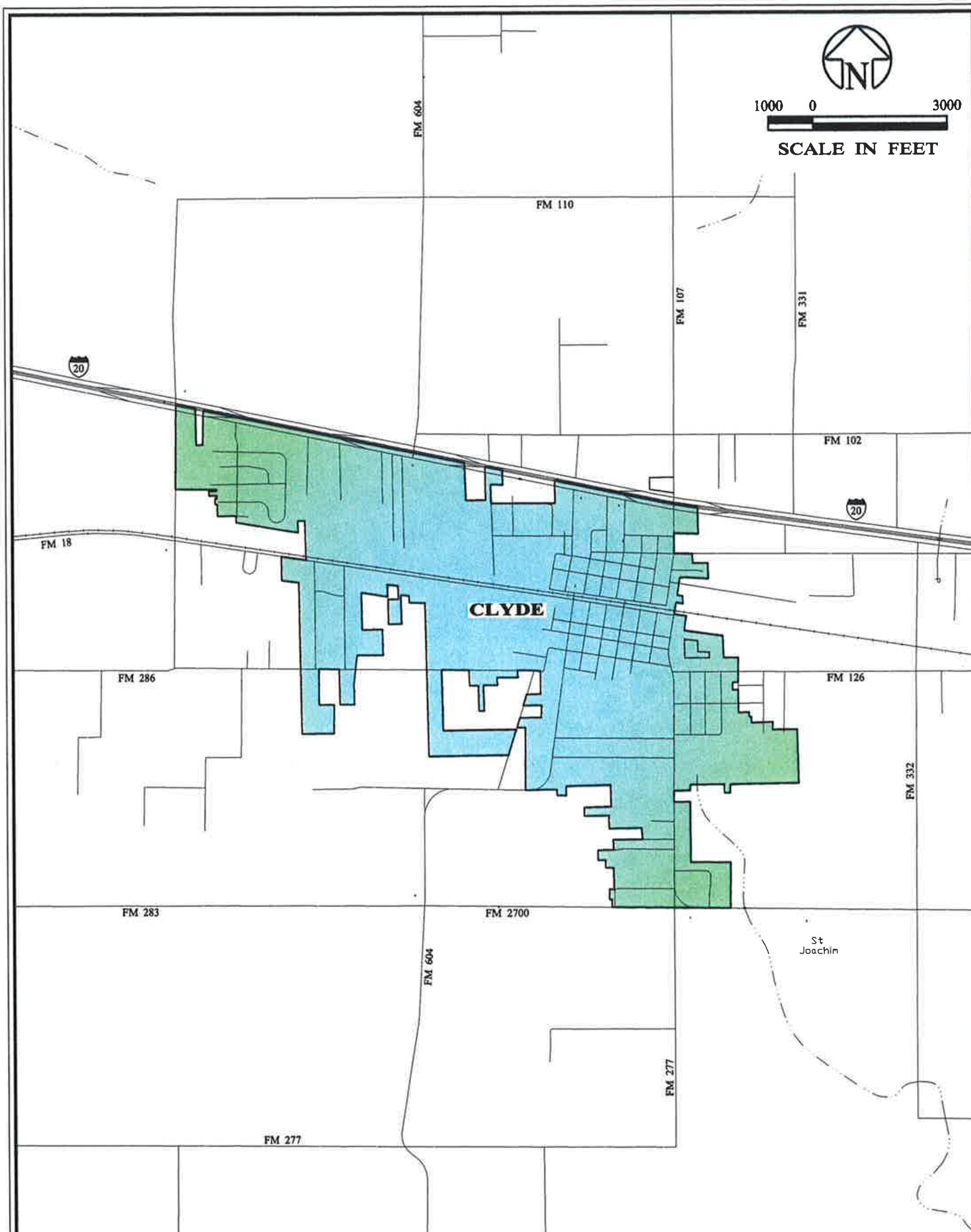
CCN MAP

BLAIR
WATER SUPPLY CORPORATION
CCN 11532

04-3131

04/27/05

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

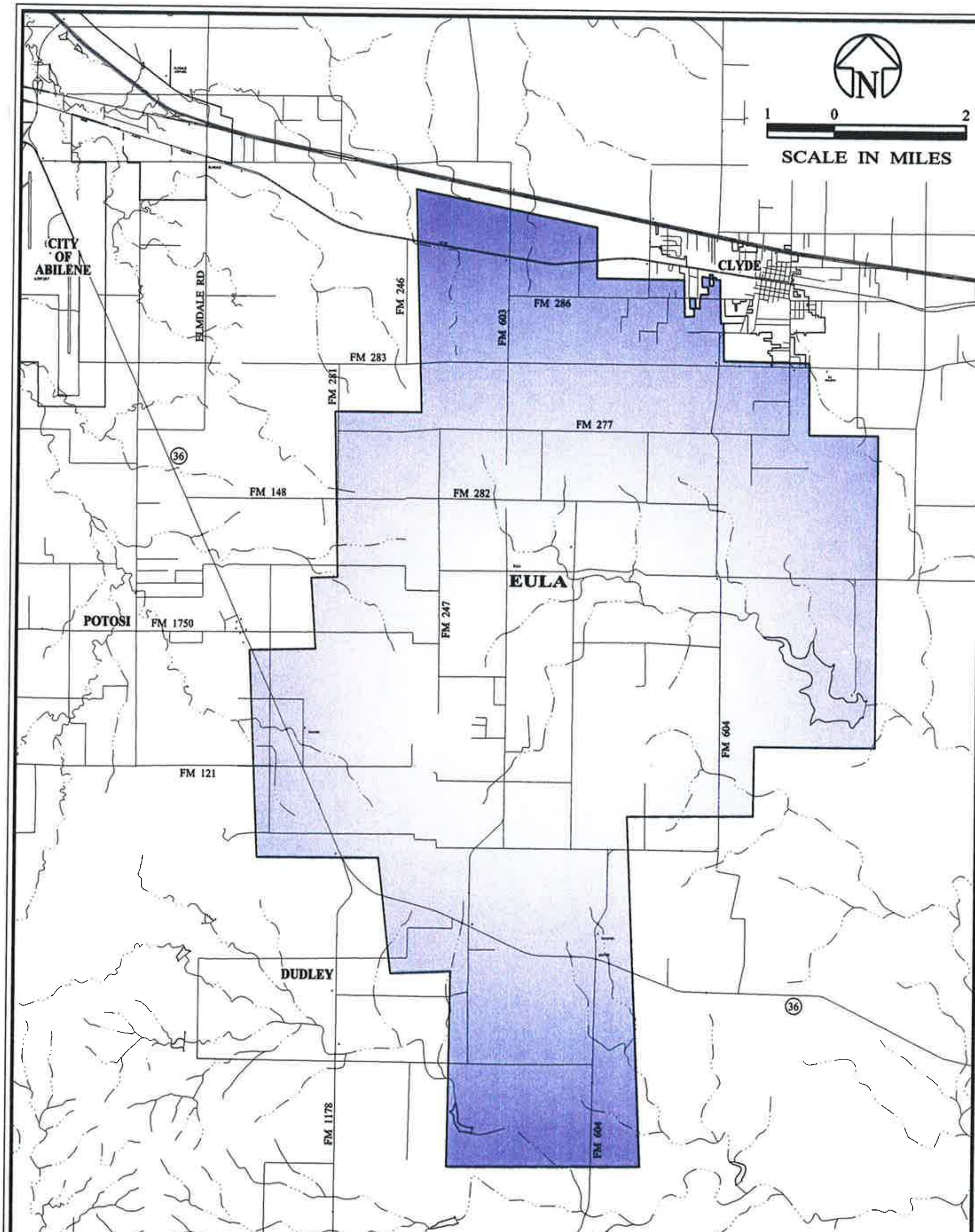
HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

CCN MAP

CITY OF CLYDE
CCN P0595

04-3131

04/27/05



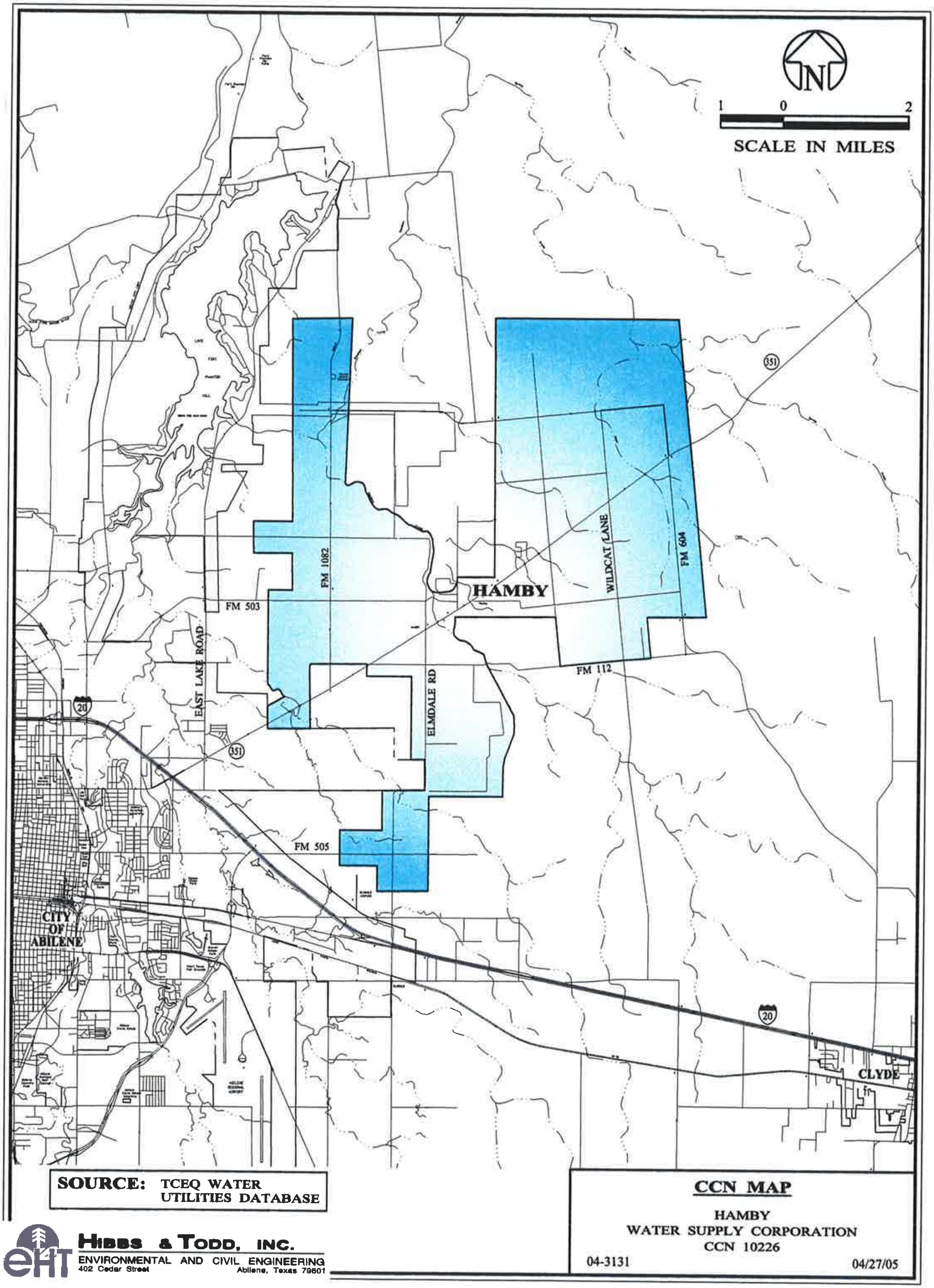
SOURCE: TCEQ WATER UTILITIES DATABASE

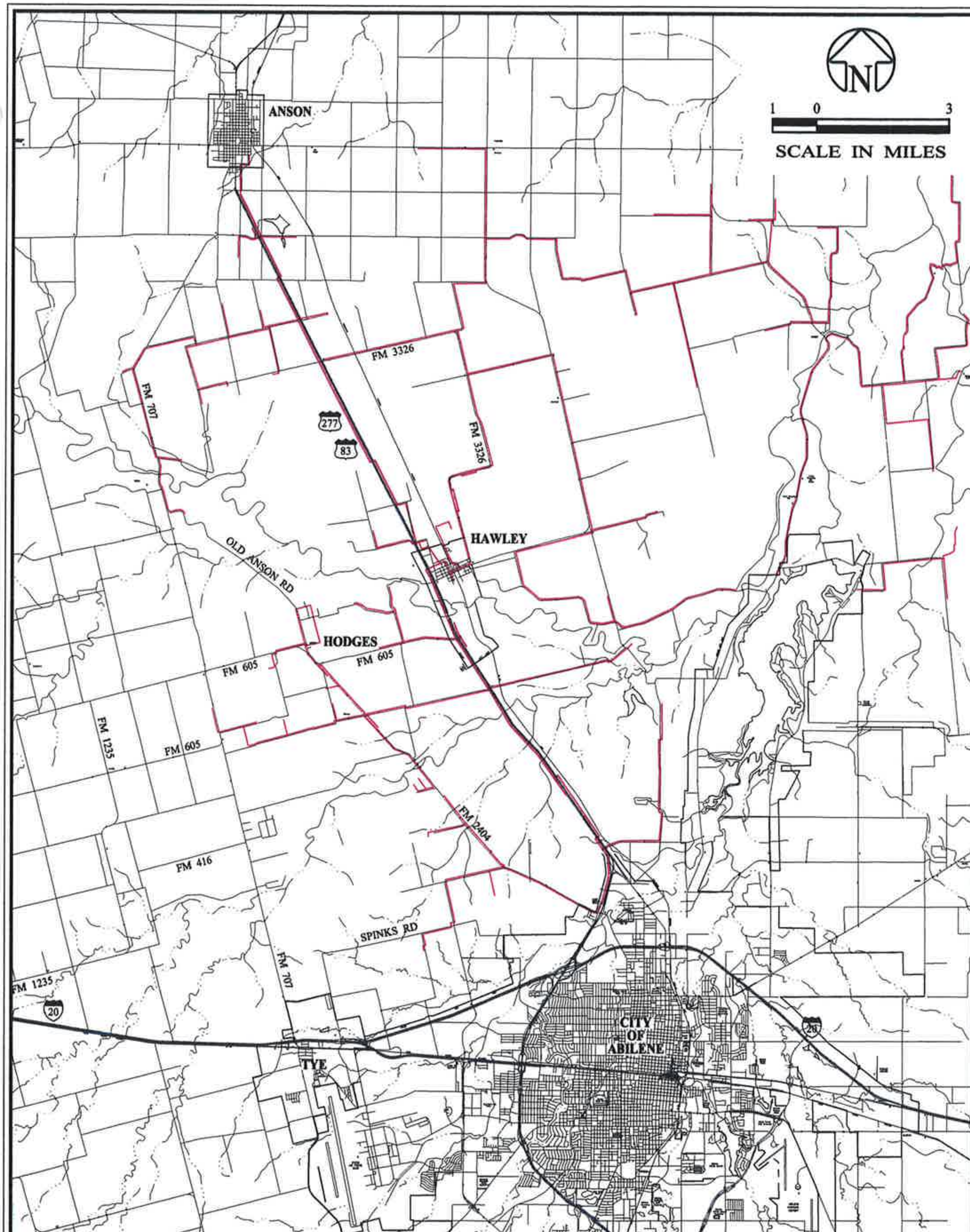
HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

CCN MAP

EULA
WATER SUPPLY CORPORATION
CCN 10443

04-3131 04/27/05


SCALE IN MILES
1
0
2
N
HAMBY
FM 1082
WILDCAT LANE
FM 604
FM 503
EAST LAKE ROAD
FM 112
ELMDALE RD
351
20
FM 505
CITY OF ABILENE
CLYDE
SOURCE: TCEQ WATER UTILITIES DATABASE
CCN MAP
HAMBY
WATER SUPPLY CORPORATION
CCN 10226
04-3131
04/27/05
HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

LEGEND

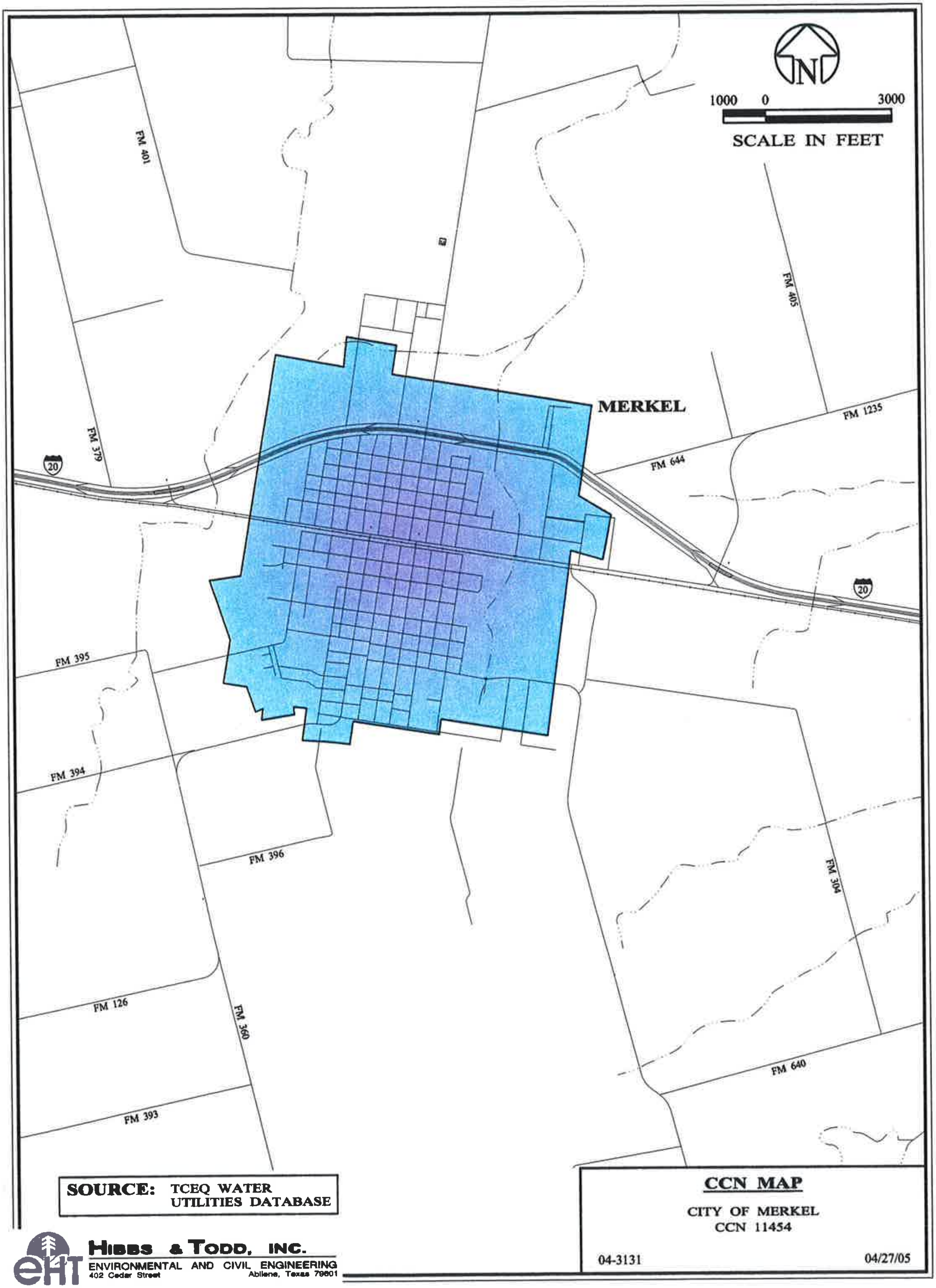
FACILITIES CCN

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

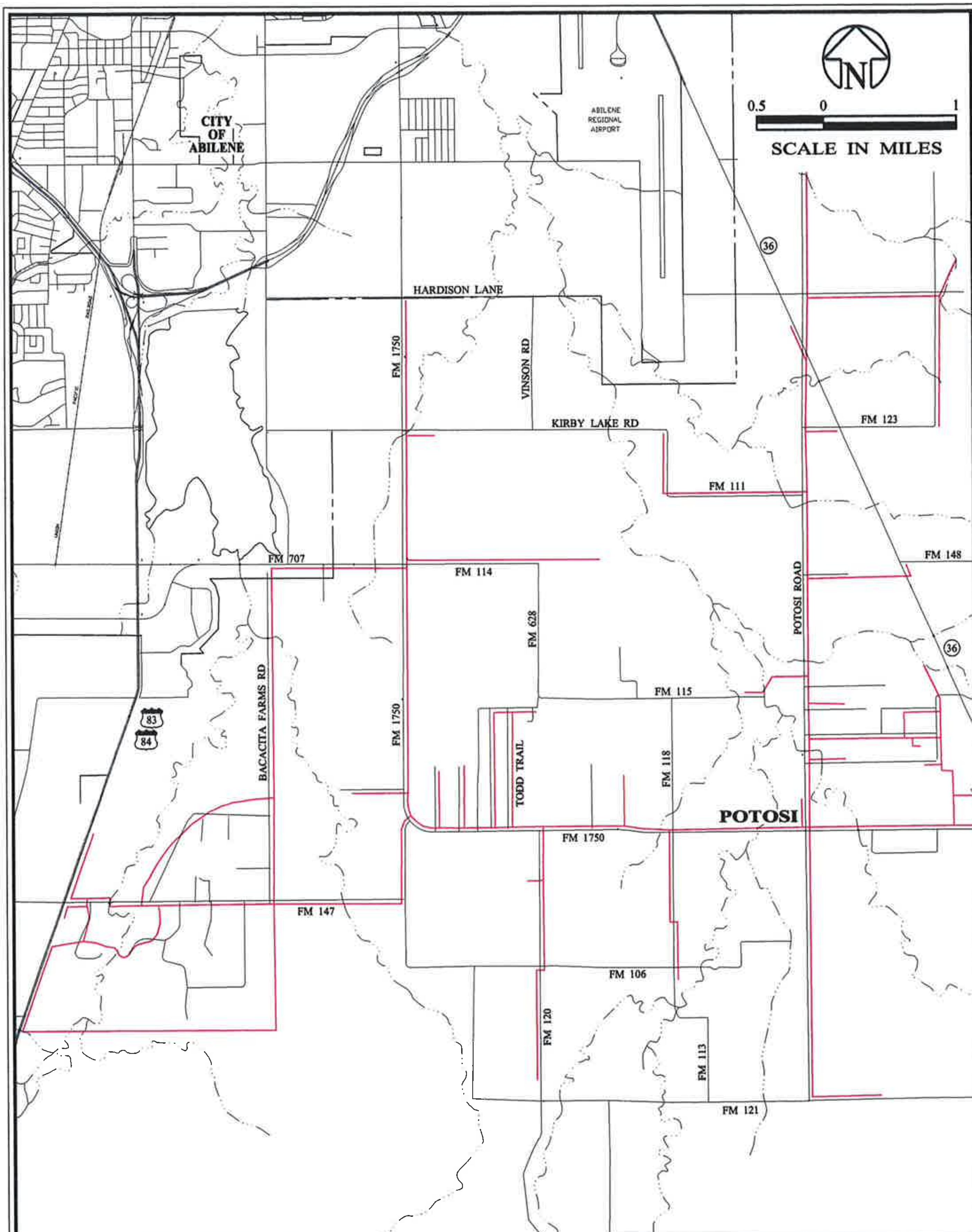
CCN MAP

HAWLEY
WATER SUPPLY CORPORATION
CCN 10952

04-3131 04/27/05



HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

LEGEND

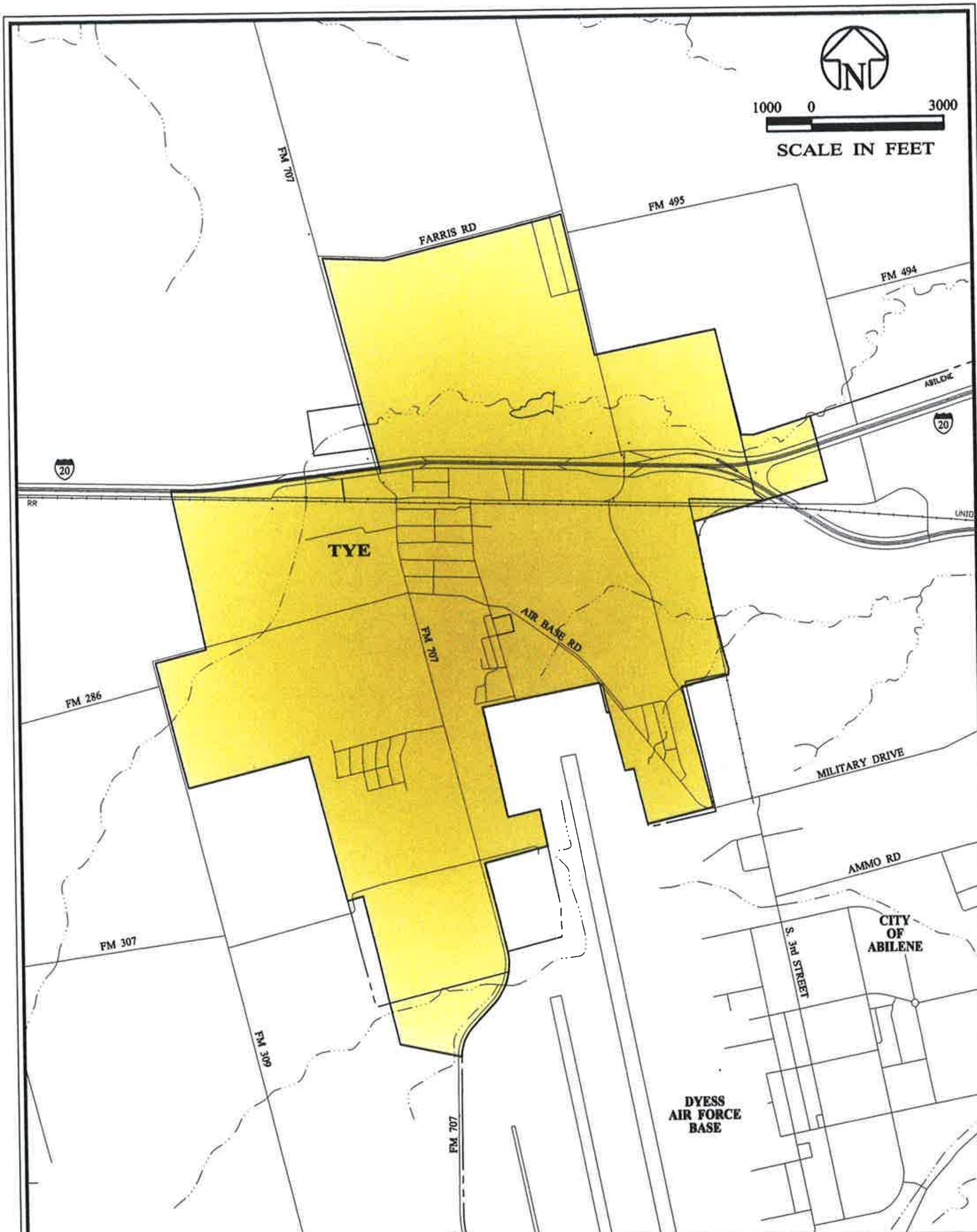
FACILITIES CCN

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

CCN MAP

POTOSI
WATER SUPPLY CORPORATION
CCN 10738

04-3131 04/27/05



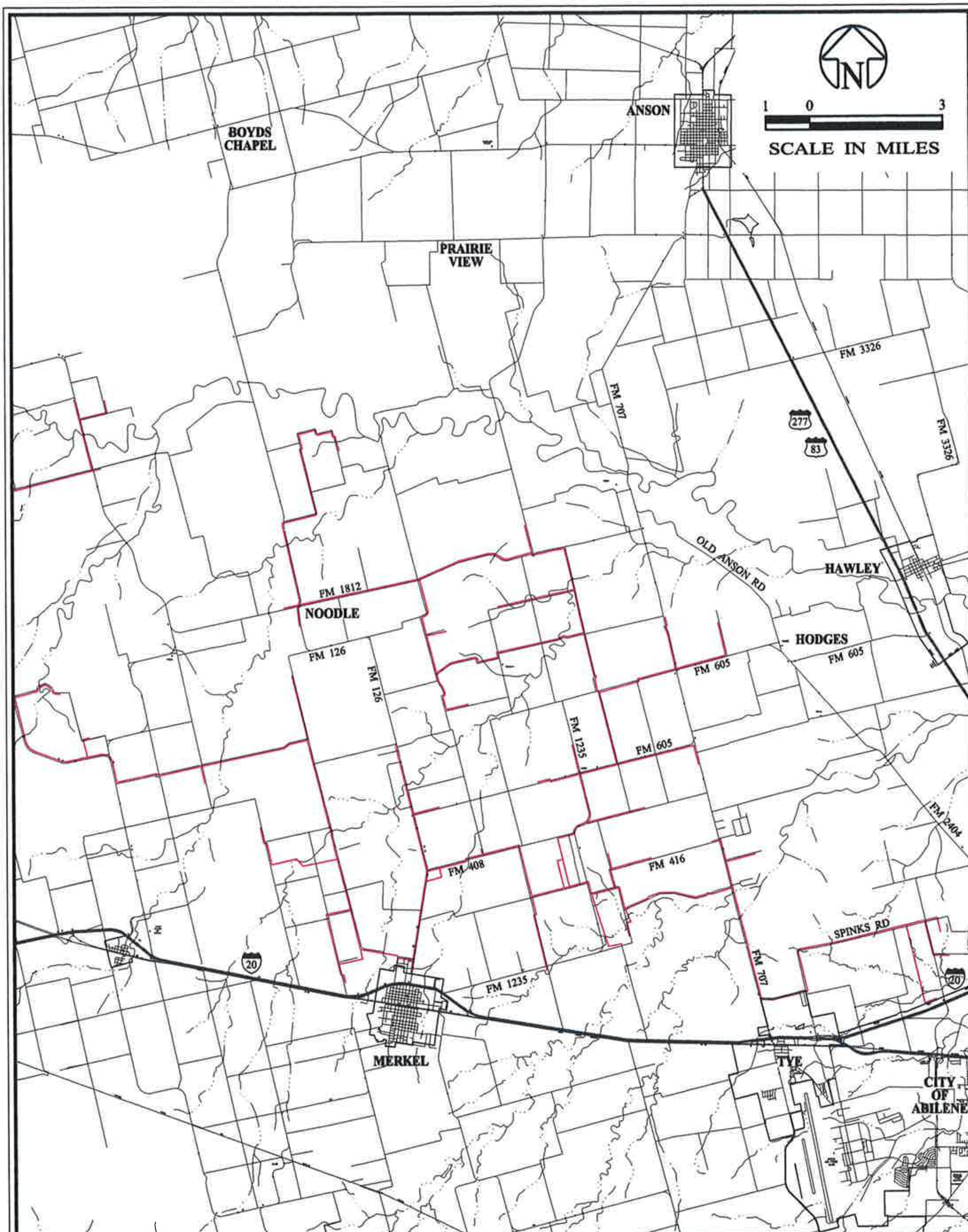
SOURCE: TCEQ WATER UTILITIES DATABASE

CCN MAP

CITY OF TYE
CCN P0841

04-3131 04/27/05

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601



SOURCE: TCEQ WATER UTILITIES DATABASE

LEGEND

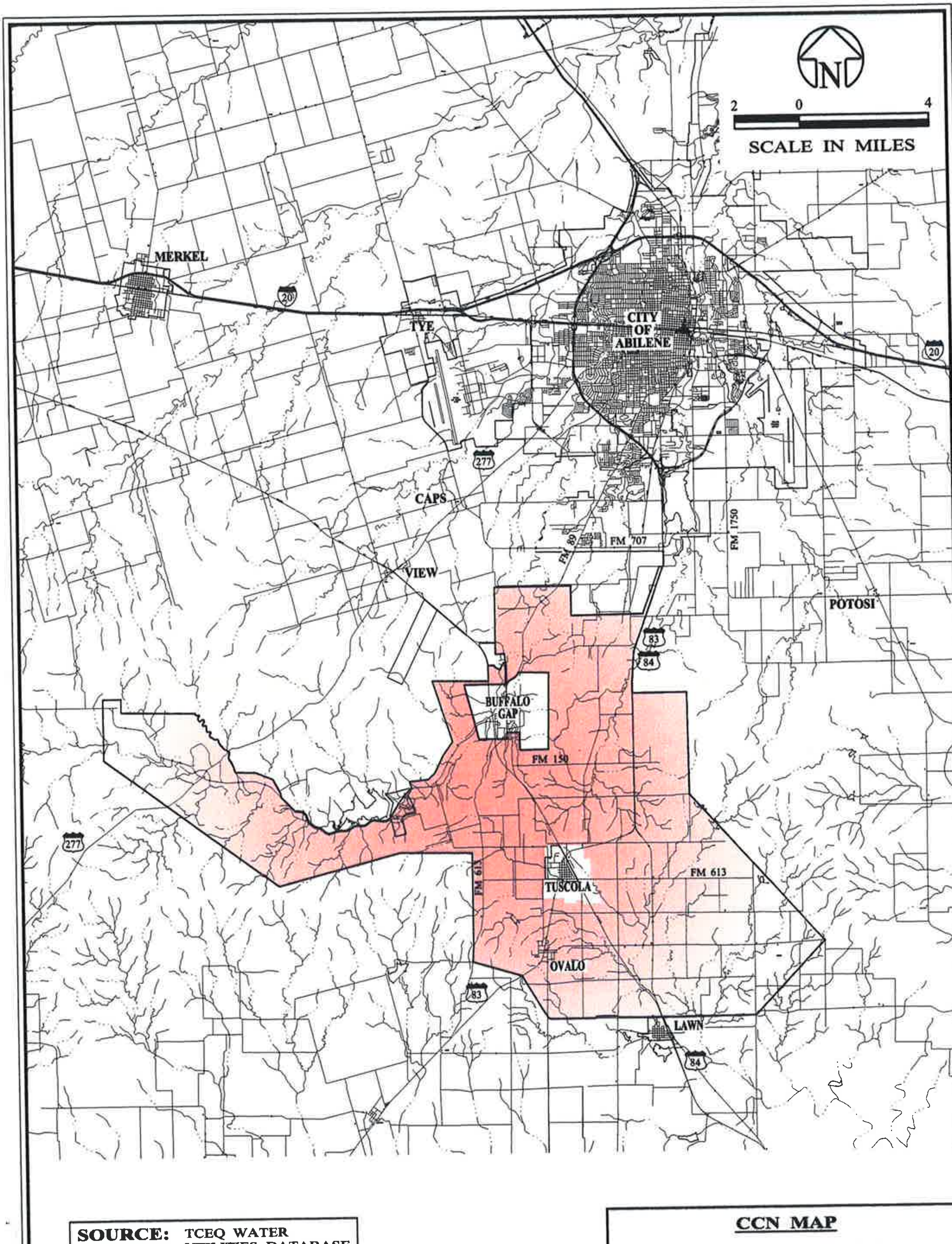
FACILITIES CCN

CCN MAP

S.U.N.
WATER SUPPLY CORPORATION
CCN 11139

04-3131 04/27/05

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601



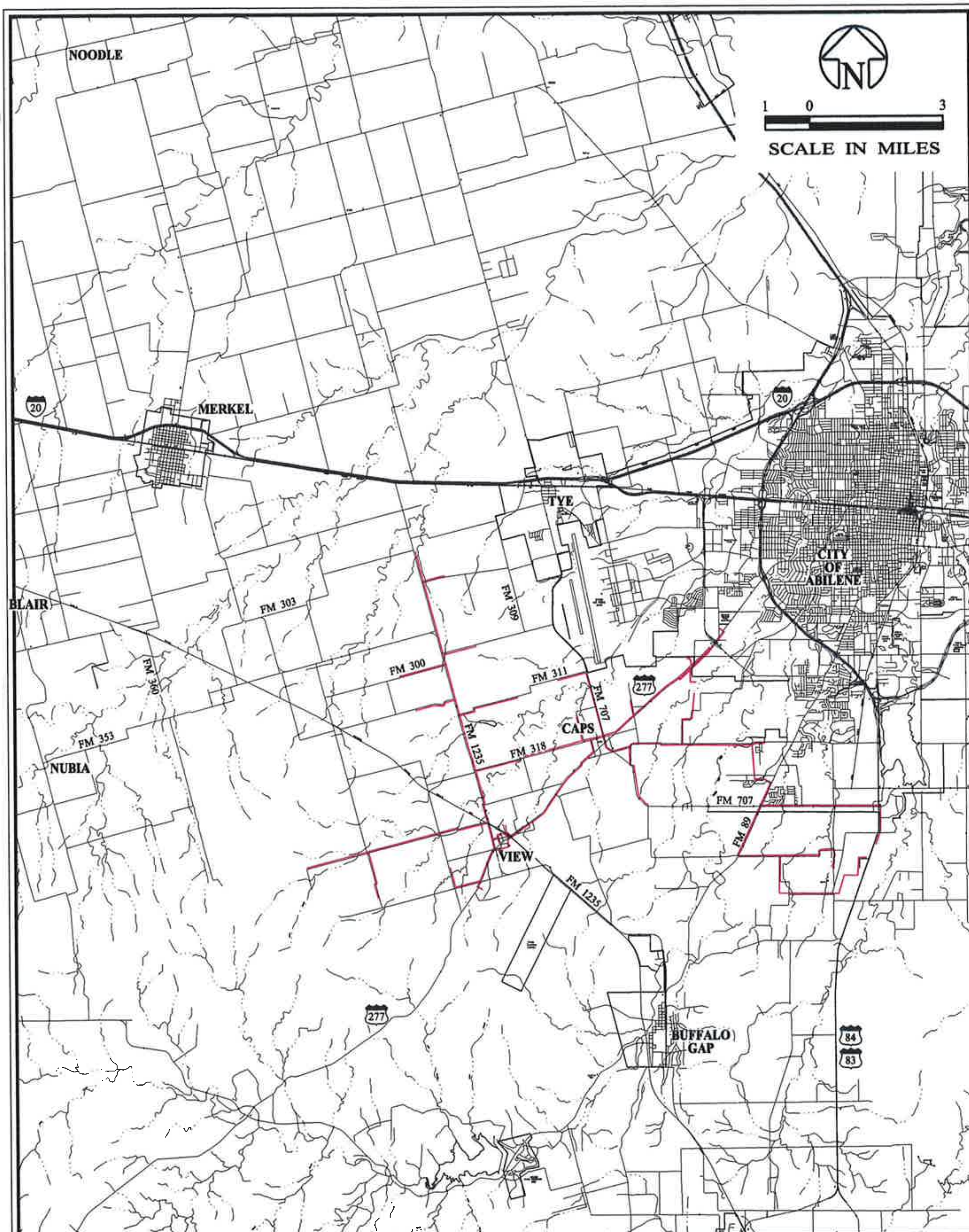
SOURCE: TCEQ WATER UTILITIES DATABASE

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

CCN MAP

STEAMBOAT MOUNTAIN
WATER SUPPLY CORPORATION
CCN 11370

04-3131 04/27/05



SOURCE: TCEQ WATER UTILITIES DATABASE

LEGEND

FACILITIES CCN

CCN MAP

VIEW CAPS
WATER SUPPLY CORPORATION
CCN 10241

04-3131

04/27/05

HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street Abilene, Texas 79601

Appendix B

Municipal Use Utility Profile

Texas Commission on Environmental Quality

UTILITY PROFILE & WATER CONSERVATION PLAN REQUIREMENTS FOR MUNICIPAL WATER USE BY PUBLIC WATER SUPPLIERS

This form is provided to assist entities in water conservation plan development for municipal water use by a retail public water supplier. Information from this form should be included within a water conservation plan for municipal use. If you need assistance in completing this form or in developing your plan, please contact the conservation staff of the Resource Protection Team in the Water Supply Division at (512) 239-4691.

STATE OF TEXAS
SCOTT F. HIBBS
63462
REGISTERED
PROFESSIONAL ENGINEER

Date: April 2005

Name of Entity: City of Abilene

Address & Zip: PO Box 60; Abilene, TX 79604-0060

Telephone Number: 325.676.6000 **Fax:** 325.676.6229

Form Completed By: Scott F. Hibbs, P.E.

Title: Principal Engineer, Hibbs & Todd; Inc.

Signature: ______________ **Date:** 4/28/05

Verified By: Tommy O'Brien, P.E.

Title: Director of Abilene Water Utilities

Signature: ______________ **Date:** 4-27-05

Name and Phone Number of Person/Department responsible for implementing a water conservation program: Tommy O'Brien, P.E., 325.676.6000

UTILITY PROFILE

I. POPULATION AND CUSTOMER DATA

A. Population and Service Area Data

1. Attach a copy of your service-area map and, if applicable, a copy of your Certificate of Convenience and Necessity (CCN). *Attached as Appendix A (service area maps)*

2. Service area size:

   Approximately 108 square miles within Abilene's CCN coverage area

3. Current population of service area:

   120,334 persons within Abilene's CCN coverage area in 2005.

   Source: Region G Planning Group

4. Current population served:

   a. water *120,334 persons within CCN coverage area*

   b. wastewater *113,939 persons within CCN coverage area*

   Source: Region G Planning Group and City of Abilene Records

5. Population served by water utility for the previous five years:

Year	*Population Served w/in CCN*
2000	*115,930*
2001	*116,798*
2002	*117,672*
2003	*118,553*
2004	*119,440*

6. Projected population for service area in the following decades:

Year	*Population Served w/in CCN*
2010	*124,607*
2020	*130,220*
2030	*132,820*
2040	*133,514*
2050	*130,943*

Source: Region G Planning Group

7. List source/method for the calculation of current and projected population:

Source: *Region G Planning Group*

B. Active Connections

1. Current number of active connections. Check whether multi-family service is counted as Residential _____ or Commercial __X__

Current Number of Active Connections

Treated water users:	***Metered***	***Not-metered***	***Total***
Abilene Residential	*33,104*	*0*	*33,104*
Abilene Commercial	*4,662*	*0*	*4,662*
Abilene Industrial	*24*	*0*	*24*
Other	*0*	*0*	*0*

Source: *City of Abilene Records*

2. List the net number of new connections per year for most recent three years:

New Service Connections for Abilene Users

Year:	***2002***	***2003***	***2004***
Abilene Residential	*282*	*18*	*125*
Abilene Commercial	*100*	*0*	*93*
Abilene Industrial	*0*	*1*	*0*
Other	*0*	*0*	*0*

Source: *City of Abilene Records*

C. High Volume Customers

List annual water use for the five highest volume customers (indicate if treated or raw water delivery)

Abilene's Five Highest Volume Customers

	Customer	*Use (1,000gal./yr.)*	*Treated/Raw Water*
1.	*Dyess AFB*	*186,113*	*Treated*
2.	*TDCJ Robertson*	*160,109*	*Treated*
3.	*Potosi WSC*	*140,022*	*Treated*
4.	*Steamboat WSC*	*129,655*	*Treated*
5.	*City of Merkel*	*121,462*	*Treated*

Source: *City of Abilene Records*

II. WATER USE DATA FOR SERVICE AREA

A. Water Accounting Data

1. Amount of water use for previous five years (in 1,000 gal.):
Please indicate: Diverted Water: ___X___
Treated Water: ___X___

Water Diverted for Treatment [1] (1,000 gal/month)

Year	*2000*	*2001*	*2002*	*2003*	*2004*
January	528,302	497,765	501,193	492,151	517,936
February	508,721	432,141	455,341	462,499	460,014
March	550,773	482,325	528,041	528,377	503,529
April	628,211	549,596	551,929	666,042	562,099
May	777,683	668,382	625,646	711,315	633,324
June	588,29	780,139	703,645	595,650	673,055
July	858,152	925,544	635,762	899,507	760,180
August	975,881	841,519	760,823	880,549	671,108
September	737,59	619,212	633,741	622,334	665,896
October	550,748	624,571	515,945	580,978	550,632
November	455,895	532,855	472,448	527,860	484,921
December	500,002	504,678	458,437	520,928	509,935
Total Water Diverted	7,660,248	7,458,727	6,842,951	7,488,190	6,992,629

1: The five year period depicted here reflects water usage during drought response conditions and represents abnormally low use rates due to effective drought contingency response efforts.

Source: City of Abilene Records

Treated Water [2] ***(1,000 gal/month)***

Year	**2000**	**2001**	**2002**	**2003**	**2004**
January	506,686	491,841	497,629	491,213	508,203
February	491,737	428,043	448,588	454,264	458,378
March	526,040	471,407	523,087	519,694	498,822
April	602,107	546,829	545,856	656,548	547,404
May	719,321	661,088	618,439	705,463	624,986
June	552,457	775,300	691,737	587,824	653,142
July	798,582	917,681	629,863	888,442	742,731
August	896,353	827,283	748,062	860,437	649,870
September	726,672	609,980	627,498	606,996	640,873
October	543,963	614,688	510,438	562,178	531,170
November	457,091	527,711	462,485	505,965	473,181
December	484,140	495,279	463,320	512,470	493,500
Total Water Treated	7,305,149	7,367,130	6,767,002	7,351,494	6,822,260

2: *The five year period depicted here reflects water usage during drought response conditions and represents abnormally low use rates due to effective drought contingency response efforts.*

Source: *City of Abilene Records*

2. Amount of water (in 1,000 gallons) delivered (sold) as recorded by the following account types for the past five years.

Amount of Water Sold (1,000 gal)

Year	*Residential (Added Value)*	*Commercial (Added Value)*	*Industrial (Added Value)*	*Wholesale (Added Value)*	*Total Water Sold* [3]	*Raw Water and Wastewater Reuse for Irrigation*
2000	3,477,801	2,062,392	366,103	801,667	6,707,963	467,467
2001	3,238,029	2,724,502	423,353	875,882	7,261,766	461,640
2002	2,990,152	2,486,193	386,328	772,941	6,635,614	374,602
2003	3,220,008	2,842,246	387,834	835,005	7,285,093	444,690
2004	2,775,018	2,691,085	384,156	872,167	6,722,426	362,539

Source: *City of Abilene Records*

3: 'Total Water Sold' is equal to the sum of 'Residential', 'Commercial', 'Industrial' and 'Wholesale' usage. 'Raw Water and Wastewater Reuse for Irrigation' figures are neither added to nor subtracted from 'Total Water Sold' but are offered for information only.

3. List previous five years records for water loss.

Water Loss [4] for Previous 5-Years

Year	*Amount (1,000 gal.)*	*%*
2000	597,186	8.2
2001	105,364	1.4
2002	131,388	1.9
2003	66,401	0.9
2004	99,834	1.5

4: Water loss represents difference between 'Total Water Treated' (from 1. above) and 'Total Water Sold' (from 2. above).

4. Municipal water use for previous five years:

Municipal Water Use for Previous 5-Years (1,000 gal)

Year	*Population*	*Total Water Diverted (1,000 gal.)*	*Total Water Diverted for Abilene Users (~88% of Total Diverted) (1,000 gal)*
2000	*115,930*	*7,660,248*	*6,744,774*
2001	*116,798*	*7,458,727*	*6,559,088*
2002	*117,672*	*6,842,951*	*6,045,859*
2003	*118,553*	*7,488,190*	*6,629,906*
2004	*119,440*	*6,992,629*	*6,085,406*

Source: *Population from Region G Planning Group; Usage Figures from City of Abilene Records*

B. Projected Water Demands

If applicable, attach projected water supply demands for the next ten years using information such as population trends, historical water use[5], and economic growth in the service area over the next ten years and any additional water supply requirement from such growth.

Year	*Abilene Population*	*Wholesale Population*	*Abilene Demand (ac-ft/yr)*	*Wholesale Demand (ac-ft/yr)*	*Total Water Demand (ac-ft/yr)*
2006	*121,235*	*35,035*	*22,469*	*3,257*	*25,725*
2007	*122,142*	*35,132*	*22,579*	*3,260*	*25,840*
2008	*123,056*	*35,229*	*22,691*	*3,263*	*25,954*
2009	*123,977*	*35,327*	*22,803*	*3,267*	*26,070*
2010	*124,607*	*35,413*	*22,891*	*3,270*	*26,161*
2011	*125,168*	*35,486*	*22,951*	*3,270*	*26,221*
2012	*125,732*	*35,560*	*23,012*	*3,270*	*26,282*
2013	*126,298*	*35,634*	*23,072*	*3,270*	*26,342*
2014	*126,867*	*35,708*	*23,133*	*3,270*	*26,403*
2015	*127,439*	*35,782*	*23,194*	*3,270*	*26,464*

5: *The five year water use figures depicted in Section II. A. 1 reflect water usage during drought response conditions and represent abnormally low use rates due to effective drought contingency response efforts. The Region G population and water use projections were used to formulate the 'Projected Total Water Demand' figures projected above.*

III. WATER SUPPLY SYSTEM DATA

A. Water Supply Sources

List all current water supply sources and the amounts authorized with each:

Surface Water:

SOURCE	*AUTHORIZED USE (ac-ft/yr)*
Lake Ft. Phantom	*30,690*
Lake Abilene [6]	*0*
Lake Kirby	*1,120*
Total Authorized Use	*31,810*

Ground Water: *None*

Contracts:

SOURCE	*AUTHORIZED USE (ac-ft/yr)*
Hubbard Creek Reservoir	*25,500*
Lake O.H. Ivie	*15,000*
Total Contracted Use	*40,500*

6: *As a result of prolonged drought conditions and size of Abilene WTP, Lake Abilene currently is not used as a raw water source.*

B. Treatment and Distribution System

1. Rated daily capacity of Abilene system: *51 MGD*

   Source: City of Abilene Records

2. Abilene Storage Capacity: Elevated *6.7 MG*
   Ground *32.9 MG*

   Source: City of Abilene Records

3. If surface water, do you recycle filter backwash to the head of the plant?
   Yes __X__ Approximately *0.4 MGD*

   Source: City of Abilene Records

4. Please attach a description of the water system. Include the number of treatment plants, wells, and storage tanks. If possible, include a sketch of the system layout.

A pump station located on the eastern bank of Lake Ft. Phantom pumps raw surface water from Lake Ft. Phantom to the Northeast Treatment Plant and the Grimes Treatment Plant. A raw water delivery system consisting of two parallel pipelines can provide up to 30 million gallons per day (MGD) from Hubbard Creek Reservoir to the Ft. Phantom delivery system. Raw water is pumped approximately 50 miles from Lake O.H. Ivie to the Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola. A pump station on the banks of the Clear Fork of the Brazos River, near Lake Ft. Phantom provides diversion pumping for up to 30,000 ac-ft/yr into Lake Ft. Phantom under selected volume and quality conditions.

The City's Water Treatment System consists of three treatment plants having a maximum treatment capacity of 51 MGD and combined treated water storage of 11.95 million gallons (MG). The Northeast Water Treatment Plant on East Lake Road has a capacity of 25 MGD and treats raw water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Grimes Water Treatment Plant on East Highway 80 has a treatment capacity of 20 MGD and treats water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola has a micro-filtration capacity of 8.95 MGD, and a reverse osmosis/ blended capacity of 6.0 MGD, and treats raw water drawn from Lake O.H. Ivie.

The City of Abilene's water distribution system provides economical and compatible facilities that are capable of furnishing sufficient water at suitable pressures to both Abilene retail and wholesale purchasers. The system consists of nearly 750 miles of underground water mains, five pumping stations, three ground storage tanks, six elevated storage tanks, over 12,000 valves, over 2,700 fire hydrants, and over 38,000 meters.

After the water is processed at the treatment plants, it is pumped into the distribution system and stored in ground and elevated storage tanks with a combined volume of 39.55 million gallons. The distribution network is laid out in a continuous looped system to circulate water and maintain constant system pressure. Pumping stations are located strategically throughout the system to pump water, maintain uniform pressure and maintain storage tank levels.

Treated water from the Abilene treatment plants enters the wholesalers' systems through metered interconnections. Production capacity of the wholesale purchasers' systems amount to 13.4 MGD. Ground storage capacity within the wholesalers' systems is approximately 4.3 million gallons while total elevated storage volume is approximately 3.3 million gallons.

IV. WASTEWATER SYSTEM DATA

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s): *22 MGD*

   Source: City of Abilene Records

2. Is treated effluent used for irrigation on-site__X__, off-site __X__, plant washdown _X_ , or chlorination/dechlorination _X_? If yes, approximately __*35 million*__ gallons per month.

   Source: *City of Abilene Records*

3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed of. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and, if wastewater is discharged, the receiving stream. If possible, attach a sketch or map which locates the plant(s) and discharge points or disposal sites.

   Abilene's wastewater collection system consists of a network of approximately 550 miles of sewer lines, 10 lift stations, and 5,100 manholes serving the cities of Abilene and Tye. Sewage flows by gravity, aided when necessary by lift stations, through the collection system into the Buck Creek Pump Station, which has a rated pumping capacity of approximately 24 MGD. An emergency storage basin at this facility has a capacity of approximately 23 million gallons. Sewage is metered at Buck Creek and then pumped five miles to the wastewater treatment plant. Collected wastewater is treated at the City of Abilene's Hamby Wastewater Reclamation Plant which is operated under permit number 10334004. The operator in responsible charge of the Hamby Plant is employed by the City of Abilene

   Raw sewage undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment Program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the City reuse some of the treated effluent, while the remainder is discharged to Deadman Creek by way of Free Water Creek. Sewage biosolids are disposed of in a sludge disposal unit.

   Source: *City of Abilene Records*

B. Wastewater Data for Service Area

1. Percent of water service area served by wastewater system: *96%*

2. Monthly volume treated for previous three years (in 1,000 gallons)

Total Treated at Wastewater Plant (1,000 gal/month)

Year	*2002*	*2003*	*2004*
January	*379,035*	*410,425*	*399,466*
February	*358,061*	*376,620*	*396,321*
March	*403,955*	*406,240*	*419,865*
April	*397,578*	*374,413*	*452,094*
May	*397,813*	*386,732*	*414,204*
June	*361,779*	*422,019*	*365,069*
July	*446,808*	*354,986*	*335,519*
August	*388,366*	*391,377*	*377,734*
September	*372,863*	*390,189*	*416,099*
October	*416,162*	*402,245*	*464,629*
November	*401,641*	*389,403*	*564,672*
December	*410,944*	*384,037*	*482,178*
Total	*4,735,005*	*4,688,686*	*5,087,850*

Source: *City of Abilene Records*

Total Treated at WWTP for Abilene Users (99% of Total)[7] (1,000 gal/month)

Year	2002	2003	2004
January	375,416	406,507	395,692
February	354,643	373,024	392,537
March	400,098	402,362	415,857
April	393,782	370,838	447,778
May	394,015	383,040	410,250
June	358,325	417,990	361,584
July	442,542	351,597	332,316
August	384,658	387,641	374,128
September	369,303	386,464	412,127
October	412,189	398,405	460,193
November	397,807	385,685	559,281
December	407,021	380,371	477,575
Total	4,689,800	4,643,923	5,039,277

Source: *City of Abilene Records*

7: *99% of total wastewater system users are located within City of Abilene CCN service area while 1% of the total wastewater system users (City of Tye) are located within the wholesale service area.*

Appendix C

Wholesale Public Water Supplier Utility Profile

Texas Commission on Environmental Quality

TCEQ

PROFILE & WATER CONSERVATION PLAN REQUIREMENTS FOR WHOLESALE PUBLIC WATER SUPPLIERS

This form is provided to assist wholesale public water suppliers in water conservation plan development. Information from this form should be included within a wholesale public water supplier water conservation plan. If you need assistance in completing this form or in developing your plan, please contact the conservation staff of the Resource Protection Team in the Water Supply Division at (512) 239-4691.

STATE OF TEXAS
SCOTT F. HIBBS
63462
REGISTERED PROFESSIONAL ENGINEER

Date: April 2005

Name of Entity: City of Abilene

Address & Zip: PO Box 60; Abilene, TX 79604-0060

Telephone Number: 325.676.6000 **Fax:** 325.676.6229

Form Completed By: Scott F. Hibbs, P.E.

Title: Principal Engineer, Hibbs & Todd; Inc.

Signature: Scott F Hibbs **Date:** 4/28/05

Verified By: Tommy O'Brien, P.E.

Title: Director of Abilene Water Utilities

Signature: Tommy O'Brien **Date:** 4-27-05

Name and Phone Number of Person/Department responsible for implementing a water conservation program: Tommy O'Brien, P.E., 325.676.6000

PROFILE

I. WHOLESALE SERVICE AREA POPULATION AND CUSTOMER DATA

A. Population and Service Area Data

1. Service area size:

   874 square miles of wholesale service area outside of Abilene's CCN coverage area

2. Current population of service area:

   34,938 persons reside in the wholesale service area outside of Abilene's CCN coverage area

   Source: Region G Planning Group and TCEQ Water Utility Database (WUD)

3. Current population served:

a. water	*34,938 wholesale customers outside of Abilene CCN coverage area*
b. wastewater	*1,100 wholesale customers outside of Abilene's CCN coverage area (City of Tye customers)*

   Source: Region G Planning Group and City of Abilene Records

4. Population served for previous five years:

Year	*Population Served Outside CCN*
2000	*34,458*
2001	*34,554*
2002	*34,649*
2003	*34,745*
2004	*34,842*

5. Projected population for service area in the following decades:

Year	*Population Served Outside CCN*
2010	*35,413*
2020	*36,147*
2030	*35,616*
2040	*35,617*
2050	*35,028*

6. List source or method for the calculation of current and projected population:

Region G Planning Group and TCEQ's Water Utility Database for those systems not listed as Water User Groups in Region G projections. Projections include wholesale customers served by City of Baird, City of Merkel, and City of Clyde.

B. Customers Data

List (or attach) the names of all wholesale customers, amount of annual contract, and amount of the annual use for each for the previous year.

Wholesale Customer	***Contracted Amount (ac-ft/yr)***	***Amount of Water Delivered in 2004 (ac-ft)***
City of Baird	*77*	*66*
City of Merkel	*353*	*373*
City of Tye	*184*	*260*
City Clyde	*307*	*285*
Blair WSC	*77*	*48*
Hamby WSC	*308*	*135*
Hawley WSC	*307*	*275*
S.U.N. WSC	*230*	*202*
Eula WSC	*61*	*128*
Potosi WSC	*307*	*430*
Steamboat Mountain WSC	*307*	*398*
View-Caps WSC	*199*	*168*
Total	***2,717***	***2,768***
Dyess AFB[1]	*491*	*608*

1: Dyess AFB users are treated as City of Abilene users in the 'Municipal Use Profile'.

Source: City of Abilene Records

II. WATER USE DATA FOR SERVICE AREA

A. Water Delivery

Indicated if the water provided under wholesale contracts is treated or raw water and the annual amount for each for previous year:

	Total amount delivered or sold for previous year (acre-feet)
Treated	*2,768 ac-ft sold to wholesale customers*
Raw	*0*

Source: *City of Abilene Records*

B. Water Accounting Data

1. Total amount of water diverted at point of diversion(s) for previous five years (in acre-feet) for all water uses:

Total Water Diverted for Treatment [2] ***(ac-ft /month)***

Year	*2000*	*2001*	*2002*	*2003*	*2004*
January	*1,621*	*1,528*	*1,538*	*1,510*	*1,589*
February	*1,561*	*1,326*	*1,397*	*1,419*	*1,412*
March	*1,690*	*1,480*	*1,620*	*1,622*	*1,545*
April	*1,928*	*1,687*	*1,694*	*2,044*	*1,725*
May	*2,387*	*2,051*	*1,920*	*2,183*	*1,944*
June	*1,805*	*2,394*	*2,159*	*1,828*	*2,066*
July	*2,634*	*2,840*	*1,951*	*2,760*	*2,333*
August	*2,995*	*2,583*	*2,335*	*2,702*	*2,060*
September	*2,264*	*1,900*	*1,945*	*1,910*	*2,044*
October	*1,690*	*1,917*	*1,583*	*1,783*	*1,690*
November	*1,399*	*1,635*	*1,450*	*1,620*	*1,488*
December	*1,534*	*1,549*	*1,407*	*1,599*	*1,565*
Total	*23,508*	*22,890*	*21,000*	*22,980*	*21,460*

2: *The five year period depicted here reflects water usage during drought response conditions and represents abnormally low use rates due to effective drought contingency response efforts.*

Source: *City of Abilene Records*

2. Wholesale population served and total amount of water diverted for **wholesale municipal use** for previous five years:

Abilene is both a retailer and wholesaler. The figures in this data set represent that portion (approximately 12%) of total water diverted for all uses that was used for wholesale water sales. Wholesale population figures are from Region G Water Planning Group and TCEQ's WUD.

Year	***Wholesale Population Outside CCN***	***Total Water Diverted For Wholesale Use (Ac-Ft)***
2000	*34,458*	*2,809*
2001	*34,554*	*2,761*
2002	*34,649*	*2,446*
2003	*34,745*	*2,634*
2004	*34,842*	*2,784*

Source: City of Abilene Records

C. Projected Water Demands

If applicable, project and attach water supply demands for the next ten years using information such as population trends, historical water use, and economic growth in the service area over the next ten years and any additional water supply requirement from such growth.

Year	***Wholesale Population Outside CCN***	***Projected Water Diverted For Wholesale Use (Ac-Ft)***
2006	*35,035*	*3,257*
2007	*35,132*	*3,260*
2008	*35,229*	*3,263*
2009	*35,327*	*3,267*
2010	*35,413*	*3,270*
2011	*35,486*	*3,270*
2012	*35,560*	*3,270*
2013	*35,634*	*3,270*
2014	*35,708*	*3,270*
2015	*35,782*	*3,270*

Source: Region G Water Planning Group

III. WATER SUPPLY SYSTEM DATA

A. Water Supply Sources

List all current water supply sources and the amounts authorized with each:

Surface Water:

SOURCE	*AUTHORIZED USE (ac-ft/yr)*
Lake Ft. Phantom	*30,690*
Lake Abilene [3]	*0*
Lake Kirby	*1,120*
Total Authorized Use	*31,810*

Ground Water: *None*

Contracts:

SOURCE	*AUTHORIZED USE (ac-ft/yr)*
Hubbard Creek Reservoir	*25,500*
Lake O.H. Ivie	*15,000*
Total Contracted Use	*40,500*

3: As a result of prolonged drought conditions and size of Abilene WTP, Lake Abilene currently is not used as a raw water source.

B. Treatment and Distribution System (if provide treated water)

1. Daily design capacity of the wholesale purshasers' systems is *13.4 MGD*

2. Elevated storage capacity is 3.3 MG and ground storage capacity is *4.3 MG*

3. Please describe the water system and attach. Include the number of treatment plants, wells, and storage tanks. If possible, attach a sketch of the system layout.

   A pump station located on the eastern bank of Lake Ft. Phantom pumps raw surface water from Lake Ft. Phantom to the Northeast Treatment Plant and the Grimes Treatment Plant. A raw water delivery system consisting of two parallel pipelines can provide up to 30 million gallons per day (MGD) from Hubbard Creek Reservoir to the Ft. Phantom delivery system. Raw water is pumped approximately 50 miles from Lake O.H. Ivie to the Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola. A pump station on the banks of the Clear Fork of the Brazos River, near Lake Ft. Phantom provides diversion pumping for up to 30,000 ac-ft/yr into Lake Ft. Phantom under selected volume and quality conditions.

The City's Water Treatment System consists of three treatment plants having a maximum treatment capacity of 51 MGD and combined treated water storage of 11.95 million gallons (MG). The Northeast Water Treatment Plant on East Lake Road has a capacity of 25 MGD and treats raw water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Grimes Water Treatment Plant on East Highway 80 has a treatment capacity of 20 MGD and treats water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola has a micro-filtration capacity of 8.95 MGD, and a reverse osmosis/ blended capacity of 6.0 MGD, and treats raw water drawn from Lake O.H. Ivie.

The City of Abilene's water distribution system provides economical and compatible facilities that are capable of furnishing sufficient water at suitable pressures to both Abilene retail and wholesale purchasers. The system consists of nearly 750 miles of underground water mains, five pumping stations, three ground storage tanks, six elevated storage tanks, over 12,000 valves, over 2,700 fire hydrants, and over 38,000 meters.

After the water is processed at the treatment plants, it is pumped into the distribution system and stored in ground and elevated storage tanks with a combined volume of 39.55 million gallons. The distribution network is laid out in a continuous looped system to circulate water and maintain constant system pressure. Pumping stations are located strategically throughout the system to pump water, maintain uniform pressure and maintain storage tank levels.

Treated water from the Abilene treatment plants enters the wholesalers' systems through metered interconnections. Production capacity of the wholesale purchasers' systems amount to 13.4 MGD. Ground storage capacity within the wholesalers' systems is approximately 4.3 million gallons while total elevated storage volume is approximately 3.3 million gallons.

IV. WASTEWATER SYSTEM DATA

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s): *22 MGD*

   Source: City of Abilene Records

2. Is treated effluent used for irrigation on-site __X__, off-site __X__, plant washdown __X__ , or chlorination/dechlorination __X__?
   If yes, approximately *35 million* gallons per month.

   Source: City of Abilene Records

3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed of. Where applicable, identify treatment plant(s) with the TCEQ name and number, the operator, owner, and, if wastewater is discharged, the receiving stream. If possible, attach a sketch or map which locates the plant(s) and discharge points or disposal sites.

Abilene's wastewater collection system consists of a network of approximately 550 miles of sewer lines, 10 lift stations, and 5,100 manholes serving the cities of Abilene and Tye. Sewage flows by gravity, aided when necessary by lift stations, through the collection system into the Buck Creek Pump Station, which has a rated pumping capacity of approximately 24 MGD. An emergency storage basin at this facility has a capacity of approximately 23 million gallons. Sewage is metered at Buck Creek and then pumped five miles to the wastewater treatment plant. Collected wastewater is treated at the City of Abilene's Hamby Wastewater Reclamation Plant which is operated under permit number 10334004. The operator in responsible charge of the Hamby Plant is employed by the City of Abilene

Raw sewage undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment Program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the City reuse some of the treated effluent, while the remainder is discharged to Deadman Creek by way of Free Water Creek. Sewage biosolids are disposed of in a sludge disposal unit.

Source: *City of Abilene Records*

B. Wastewater Data for Service Area (if applicable)

1. Percent of *wholesale* water service area served by *City of Abilene* wastewater system: *1%*

2. Monthly volume treated for wholesale service area for previous three years (in 1,000 gallons):

Total Treated at WWTP for Wholesale Wastewater System Users (1% of Total)[4] (1,000 gal/month)

Year	***2002***	***2003***	***2004***
January	*3,619*	*3,918*	*3,814*
February	*3,418*	*3,596*	*3,784*
March	*3,857*	*3,878*	*4,008*
April	*3,796*	*3,575*	*4,316*
May	*3,798*	*3,692*	*3,954*
June	*3,454*	*4,029*	*3,485*
July	*4,266*	*3,389*	*3,203*
August	*3,708*	*3,736*	*3,606*
September	*3,560*	*3,725*	*3,972*
October	*3,973*	*3,840*	*4,436*
November	*3,834*	*3,718*	*5,391*
December	*3,923*	*3,666*	*4,603*
Total	*45,205*	*44,763*	*48,573*

4: *Wholesale wastewater accounts lying outside the Abilene CCN (City of Tye) coverage area constitute 1% of the total sewer accounts served by the Abilene system. The figures presented here represent 1% of total wastewater treated at the Hamby Wastewater Treatment Plant.*

Appendix D

Resolution Adopting Water Conservation Plan

RESOLUTION NO. 8-2005

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS, AFFIRMING THE CITY'S WATER MANAGEMENT PLAN AS UPDATED AND AMENDED, APPROVING NEW AMENDMENTS TO THE PLAN AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, the City of Abilene ("City") has practiced effective water conservation efforts since the early 1980's; and,

WHEREAS, the City officially adopted a water conservation plan called the "City of Abilene Water Management Plan" (WMP) on June 12, 1986, presented an update to the City Council in September 1996, and last amended the WMP in April 2001;and,

WHEREAS, the WMP provides for the orderly development, management, conservation and protection of Abilene's water resources; and,

WHEREAS, the Texas Commission on Environmental Quality (TCEQ) requires certain data be a part of WMP plans; and,

WHEREAS, the City now desires to amend the WMP to include and update the TCEQ required data as well as affirm the original WMP as updated and amended through 2001; now, therefore,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS:

PART 1: That the City of Abilene officially affirms the June 12, 1986 adoption of the WMP with the 1996 update and 2001 amendments; and

PART 2: That the document labeled "Water Conservation Plan Summary" attached as Exhibit A, incorporating current utility data and addressing current requirements of the TCEQ for acceptable water conservation plans, is hereby adopted to supplement Part VII of the City's WMP, entitled "Water Conservation: Demand Management Practices: Regulation" and is hereby incorporated into the WMP.

ADOPTED and EFFECTIVE this 24th day of March, A.D., 2005.

ATTEST:

Jo Moore
Jo Moore
City Secretary

Norm Archibald
Norm Archibald
Mayor

APPROVED:

Sharon Hicks
City Attorney

Exhibit A

City of Abilene
Water Conservation Plan Summary

Section I: Declaration of Policy, Purpose and Intent

The purpose of the Water Conservation Plan (the Plan) is to: promote the wise and responsible use of water by implementing structural programs that result in quantifiable water conservation results; develop, maintain, and enforce water conservation policies and ordinances; and support public education programs that educate customers about water and wastewater facilities operations, water quantity and quality, water conservation and non-point source protection.

Section II: Utility Profile

Population

Abilene's population in the year 2005 as determined by the Texas Water Development Board Region G Planning Group was estimated to be 120,334, and is projected to be 124,607 by the year 2010. Abilene supplies treated water to wholesale purchasers who in turn resell that water to their system users. Total population of wholesale users in the year 2005 was estimated to be 34,938, and is projected to reach 35,413 persons by the year 2010.

Customer Data and Water Use Data

Abilene's water customers consist of a mixture of residential, commercial, industrial, wholesale, institutional and irrigation users. City of Abilene residential customers are supplied through approximately 34,000 connections with approximately 400 connections added each year. Abilene serves approximately 4,700 commercial connections with a net average gain of approximately three new commercial connections added each year.

Water Supply System Data

Water Sources

Raw surface water is supplied to Abilene's treatment works from several sources. The City of Abilene owns and holds surface water rights to 30,650 acre feet per year (ac-ft/yr) from Lake Fort Phantom Hill, of which 25,650 ac-ft/yr are for municipal purposes, 4,000 ac-ft/yr are for industrial purposes, and 1,000 ac-ft/yr are for irrigation. Hubbard Creek Reservoir, owned and operated by the West Central Texas Municipal Water District provides by contract up to 25,500 ac-ft/yr (of the safe yield of Hubbard Creek Reservoir, depending on the lake level) of raw surface water for use by the City. Abilene may utilize by contract up to 16.54% of the safe yield of Lake O.H. Ivie, not to exceed 15,001 ac-ft/yr. The City owns and is allocated use of 1,675 ac-ft/yr of water for municipal

purposes from Lake Abilene.
Lake Kirby, also owned by Abilene, can be used for irrigation purposes and for storage/diversion of reclaimed water also used for irrigation purposes. The Clear Fork Diversion owned and operated by Abilene allows excess water, not to exceed 30,000 ac-ft/yr, from the Clear Fork of the Brazos River to be stored in and diverted from Lake Fort Phantom. The City's Deadman Creek Diversion serves to allow 3,000 ac-ft/yr through a diversion channel into Lake Fort Phantom Hill.

Water Treatment

A pump station located on the eastern bank of Lake Ft. Phantom pumps water from Lake Ft. Phantom to the Northeast Treatment Plant and the Grimes Treatment Plant. A delivery system consisting of two parallel pipelines can provide up to 30 million gallons per day (MGD) from Hubbard Creek Reservoir to the Ft. Phantom delivery system. Water flows through a 21-mile long gravity pipeline from Lake Abilene to the small Abilene Treatment Plant (currently not in use) located near Buffalo Gap Road and FM 707. A pump station on the banks of the Clear Fork of the Brazos River, near Lake Ft. Phantom allows up to 1,995 ac-ft/day to be diverted into Lake Ft. Phantom under selected volume and quality conditions.

The City's Water Treatment System consists of three treatment plants having the maximum treatment capacity of 51 MGD and combined treated water storage of 11.95 million gallons (MG). Upon completion of improvements currently under construction, the Northeast Water Treatment Plant on East Lake Road will have a capacity of 25 MGD and treats raw water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Grimes Water Treatment Plant on East Highway 80 has a treatment capacity of 20 MGD and treats water drawn from Lake Ft. Phantom and Hubbard Creek Reservoir. The Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola has a micro-filtration capacity of 8.95 MGD, and a reverse osmosis/ blended capacity of 6.0 MGD, and treats raw water drawn from Lake O.H. Ivie. At these plants, raw water undergoes complete treatment including coagulation, sedimentation, filtration, and disinfection.

Water Distribution

The City of Abilene's water distribution system provides economical and compatible facilities that are capable of furnishing sufficient water at suitable pressures to both Abilene retail and wholesale purchasers. The system consists of nearly 750 miles of underground water mains, five pumping stations, three ground storage tanks, six elevated storage tanks, over 12,000 valves, over 2,700 fire hydrants, and over 38,000 meters.

After the water is processed at the treatment plants, it is pumped into the distribution system and stored in ground and elevated storage tanks with a combined volume of 39.55 million gallons. The distribution network is laid out in a continuous looped system to circulate water and maintain constant system pressure. Pumping stations are located strategically throughout the system to pump water, maintain uniform pressure and maintain storage tank levels.

Treated water from the Abilene treatment plants enters the wholesalers' systems through metered interconnections. Production capacity of the wholesale purchaser's systems amount to 13.4 MGD. Ground storage capacity within the wholesalers' systems is approximately 4.3 million gallons while total elevated storage volume is approximately 3.3 million gallons.

Wastewater System Data

Wastewater Collection

Abilene's wastewater collection system consists of a network of approximately 550 miles of sewer lines, 10 lift stations, and 5,100 manholes serving the cities of Abilene and Tye. Sewage flows by gravity, aided when necessary by lift stations, through the collection system into the Buck Creek Pump Station, which has a rated pumping capacity of approximately 24 MGD. An emergency storage basin at this facility has a capacity of approximately 23 million gallons. Sewage is metered at Buck Creek and then pumped five miles to the wastewater treatment plant. Wastewater collected is treated at the City of Abilene's Hamby Wastewater Treatment Plant.

Treated sewage undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the City reuse some of the treated effluent, while the remainder is discharged to Deadman Creek by way of Free Water Creek. Sewage biosolids are disposed of in a sludge disposal unit.

Wastewater Treatment

When wastewater reaches the Hamby treatment facilities northwest of town, it undergoes full biological treatment that includes grit removal, sedimentation, activated sludge process, filtration, chlorine disinfection, and disinfectant removal. The Hamby plant's rated treatment capacity is 22 MGD. Wastewater quality is protected against industrial pollution through an Industrial Pre-Treatment program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system. Irrigators in and around the city reuse some of the treated effluent, while the remainder is discharged to the designated receiving stream. Sewage biosolids are disposed of in a sludge disposal unit.

Section III: Water Conservation Goals

Water users located within the City of Abilene's Certificate of Convenience and Necessity (CCN) coverage area currently use approximately 166 gallons of treated water per capita per day (gpcd). The 5-year goal for water use reduction by City of Abilene users is to reduce per capita use by 2 gallons per day per user to 164 gpcd by the end of 2010. The 10-year goal is to reduce per capita use by 4 gallons per day per user from present levels to 162 gpcd by the end of 2015. These goals are set in accordance with Region G Planning Group projections.

Wholesale water users served by the City of Abilene, located outside the City of Abilene's CCN coverage area, currently use approximately 83 gpcd of treated water supplied by Abilene. The 5 and 10-year goals for wholesale users supplied by the City of Abilene is to reduce per capita use by 1 gallon per day per user to 82 gpcd by the end of 2010 and 2015. These goals are set in accordance with Region G Planning Group projections.

Section IV: Metering Devices

It is Abilene's policy to purchase meters that meet at least the minimum standards developed by the American Water Works Association. All metering devices used to meter water diverted from the source of supply are accurate to within plus or minus 5% to measure and account for water diverted from the source of supply. All service connections in the distribution system are metered. Aged meters are systematically replaced to assure reliability of meter performance. The wholesale water purchasers are responsible for metering device installation, maintenance and calibration for meters located within their service areas.

Section V: Universal Metering

It is Abilene's policy to individually meter all water usage, except for fire protection, including all new construction within the City's CCN coverage area. Combined with an aggressive leak detection and repair program, electronic data collection devices, and a computerized billing system, Abilene's universal metering program has resulted in a water delivery accuracy rate well within industry operating standards.

Section VI: Measures to Determine and Control Unaccounted-For Uses of Water

The record management system utilized by the City of Abilene segregates water sales and users into user classes of residential, commercial, public/institutional, and industrial. It is Abilene's policy to investigate customer complaints of low pressure and possible leaks. Abilene visually inspects suspected leaks and makes quick and timely repairs to those leaks when detected. Abilene utilizes a record management system which records water pumped, water delivered, water sales and water losses to track water transmission, distribution, and delivery to customers. This information is used to evaluate the integrity of the water delivery system from source to end user to control and minimize unaccounted-for uses of water.

Section VII: Water Conservation Program

The City of Abilene's Water Conservation Program utilizes Supply Management Methods and Demand Management Methods to work towards optimizing use of Abilene's water resources.

Supply Management Program Elements consist of:

- Coordinated use of water supplies to ensure the City withdraws water from its water supply reservoirs in a manner that ensures maximum dependable yield and efficiency of operation.
- Watershed management to ensure diversion channels to Lake Ft. Phantom are clean, relatively straight, and obstruction-free to increase captured water flow while minimizing flooding potential in populated areas.
- Metering all service connections to ensure maximum return for delivered water while minimizing unaccounted-for water loss.
- Leak detection and repair to minimize unaccounted-for water loss.
- Treated wastewater reuse and recycling to lessen the demand for raw water used to produce potable water, and for raw water pumping for irrigation uses.

Demand Management Program Elements consist of:

- Water pricing as a mechanism for encouraging water customers to conserve.
- Regulations for conserving water via the Water Conservation Plan and Drought Contingency Plan adopted by the City.
- Plumbing Code for the City of Abilene requires maximum standard plumbing fixture capacities not be exceeded. Abilene supports a Low-Income Housing Retrofit Program and City Building Retrofit program to determine the feasibility of retrofitting fixtures in selected structures.
- Continuing education programs to increase public awareness of supply, treatment and conveyance systems in Abilene, to increase public awareness of the benefits and need for conservation, and to make information about practical cost-effective methods and technologies to achieve conservation readily available.

Section VIII: Non-Promotional Water Rate Structure

In 1984, the City of Abilene adopted a non-promotional, inverted rate structure. Under this rate structure the billing rate increases as individual water consumption increases. This rate structure promotes conservation and shifts the cost of supplying water to those consumers using it most.

Section IX: Means of Implementation and Enforcement

The Plan will be enforced within the Abilene CCN coverage area by (1) providing service taps only to customers complying with adopted ordinances, (2) maintaining a non-declining rate structure, (3) discontinuing service to those customers who do not pay their water bills until payment is made, and (4) certifying only new construction that conforms to adopted ordinances.

Wholesale customers will receive written notification of Plan adoption. Adoption of this Plan by City of Abilene in accordance with 30 Texas Administrative Code (TAC) §288.5 obligates wholesale customers as defined in 30 TAC §288.1 to implement water conservation measures.

Section X: Coordination with Regional Planning Group

The service area of Abilene is located within the Region G Planning Area. Abilene has provided a copy of this Plan to the Region G Planning Group.

Section XI: Additional Water Contract Requirements

Wholesale Water Supply Contracts

It is Abilene's policy to include in every wholesale water supply contract entered into or renewed after official adoption of the Plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using applicable elements in 30 TAC 288, Subchapter A. If the wholesale customer intends to resell the water, then the contract between Abilene and the wholesale customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with 30 TAC 288, Subchapter A.

Section XII: Revisions to the Water Conservation Plan

The City of Abilene shall review and update, as appropriate, the Plan, based on new or updated information, such as the adoption or revision of the Regional Water Plan, in 2009 and every five (5) years thereafter.

Section XIII: Severability

It is hereby to be the intention of Abilene that the sections, paragraphs, sentences, clauses, and phrases of this Plan are severable and if, any phrase, clause, sentence, paragraph or section shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not effect any of the remaining phrases, clauses, sentences, paragraphs or sections of this Plan, since the same would not have been enacted by Abilene without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph or section.

Appendix E

Notification to Wholesale Purchasers

Enprotec / Hibbs & Todd

April 28, 2005

Mayor Hardwick
City of Baird
328 Market St.
Baird, TX 79504-6410

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mayor Hardwick;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

Enprotec / Hibbs & Todd

April 28, 2005

Mayor Cannon
City of Merkel
100 Kent St.
Merkel, TX 79536

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mayor Cannon;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

Enprotec / Hibbs & Todd

April 28, 2005

Mayor Childers
City of Tye
PO Box 369
Tye, TX 79563-0369

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mayor Childers;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Enprotec / Hibbs & Todd

April 28, 2005

Mayor Livingston
City of Clyde
PO Box 1155
Clyde, TX 79510-1155

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mayor Livingston;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Enprotec / Hibbs & Todd

April 28, 2005

Mr. John Helmer
Blair WSC
PO Box 386
Merkel, TX 79536

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Helmer;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

Enprotec / Hibbs & Todd

April 28, 2005

Mr. Wade Anthony
Hamby WSC
4043 State Hwy 351
Abilene, TX 79601

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Anthony;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

eHT

Enprotec / Hibbs & Todd

April 28, 2005

Mr. George Malone
Hawley WSC
PO Box 296
Hawley, TX 79525

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Malone;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

eHT

Enprotec / Hibbs & Todd

April 28, 2005

Mr. Mike Walla
S.U.N. WSC
PO Box 217
Merkel, TX 79536

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Walla;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

Enprotec / Hibbs & Todd

April 28, 2005

Mr. Lloyd Barr
Eula WSC
5744 FM 603
Clyde, TX 79510

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Barr;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

April 28, 2005

Mr. Dale Hollingshead
Potosi WSC
734 FM 1750
Abilene, TX 79602

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Hollingshead;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Enprotec / Hibbs & Todd

April 28, 2005

Mr. Bruce Harris
Steamboat Mountain Water Supply Company
PO Box 367
Tuscola, TX 79562

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Harris;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Environmental, Civil & Geotechnical Engineers

Abilene Office
402 Cedar
Abilene, Texas 79601
P.O. Box 3097
Abilene, Texas 79604
325.698.5560 | 325.691.0058 fax

Lubbock Office
6310 Genoa Avenue, Suite E
Lubbock, Texas 79424
806.794.1100 | 806.794.0778 fax

www.e-ht.com

Granbury Office
Avalon Town Center
1030 East Highway 377, Suite 200
Granbury, Texas 76048
817.579.6791 | 817.579.6114 fax

Enprotec / Hibbs & Todd

April 28, 2005

Mr. Will Rawlins
View-Caps WSC
PO Box 6227
Abilene, TX 79608

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Mr. Rawlins;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

April 28, 2005

Ms. Teresa Clouse
7 CES/CEVC (Water)
710 Third Street
Abilene, TX 79607-1670

Subject: Revisions to City of Abilene Water Conservation Plan

Dear Ms. Clouse;

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of Abilene (City) is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). The City's existing Plan, in place since the mid 1980's, recently underwent revisions. While the Plan remains substantially the same, we take this opportunity to remind you (on behalf of the City of Abilene) of the requirements for your water system.

As a wholesale water customer of the City of Abilene your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC §288.5 (G). We request that at the time you submit your system's plan to the State, you furnish a copy to the City of Abilene as well. Providing a copy of your plan to the City of Abilene ensures a higher degree of accuracy as Abilene updates their Plan on a regular and prescribed basis. Please call me at 325.698.5560 if I may be of assistance to you on this matter.

Sincerely;
HIBBS & TODD, INC

Scott F. Hibbs, P.E.
Principal Engineer

cc: Tommy O'Brien, P.E. City of Abilene

Appendix F

Reservoir Operation Plan

CITY OF ABILENE
RESERVOIR OPERATION PLAN

In accordance with 30 Texas Administrative Code §288.5(1)(H), the City of Abilene operates Lake Ft. Phantom Hill and Hubbard Creek Reservoir as generally outlined in the 1980 Study of Coordinated Operation of Existing Raw Water Supply Sources and the 1989 Report on Economy of System Operation. A copy of each document is available for review during normal business hours.

The City is updating the previous operation plans to incorporate current hydrology data and operating practices. Additionally, Lake O.H. Ivie will be added to the City's Reservoir Operation Plan. Once complete, the updated Reservoir Operation Plan will be available for review during normal business hours.

CITY OF ABILENE, TEXAS

DROUGHT CONTINGENCY PLAN

("WATER CONSERVATION ORDINANCE")

Public Water System #2210001

Revised - April, 2005

TABLE OF CONTENTS

CODE OF THE CITY OF ABILENE
ARTICLE VI. WATER CONSERVATION PLAN

DIVISION 1 GENERALLY

Sec. 32-140. Declaration of Policy

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire prevention and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the City of Abilene hereby adopts the following regulations and restrictions on the delivery and consumption of water.

Water uses regulated or prohibited under this Water Conservation Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply conditions are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Sections 32-147 through 32-155 of this Plan.

No person shall make, cause, use or permit the use of water from the City of Abilene Water Utility System for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to provisions of this Plan or in an amount in excess of that use permitted by the plan in effect pursuant to action taken by the mayor or his/her designee in accordance with the provisions of this Plan.

Sec. 32-141. Authorization

The Mayor, Mayor Pro Tempore, or the City Manager, if so designated, is hereby authorized, consistent with the Charter of the City of Abilene, Sections 21 and 22, to exercise those powers considered to be reasonable or necessary for the protection of persons or property in assessing the current state of our water supply and directing the City Manager to implement or terminate any stage, phase, or portion of the Water Conservation Plan. Implementation and termination of any stage may occur, but is not mandated to occur, when conditions warrant.

Sec. 32-142. Application

The provisions of this Plan shall apply to persons, customers, and property utilizing the Abilene Water Utility System wherever situated, including customers such as water supply corporations, and any others that receive water from the City of Abilene on a contract basis. If a shortage of water in the City's water supply occurs, the water to be distributed shall be divided among all users pro rata, according to the amount each may be entitled to, so that preference is given to no one and everyone suffers alike.

These water use restrictions do not apply to the use of alternate water sources, including non-potable water and well water. Customers using water from private wells on days other than those designated in this Plan, or those watering from private wells during the hours of 10:00 am and 6:00 pm, must post a sign stating "WELL WATER". The sign must be properly sized and posted so it is visible from the street. The City of Abilene strongly encourages the use of alternative water sources for landscape purposes.

Sec. 32-143. Regional Water Planning Groups and Public Involvement and Education

Sec. 32-143.1 Coordination with Regional Planning Groups

The service area of the City of Abilene is currently located within the Region G water planning area. The City of Abilene will cooperate and provide information regarding the Plan as needed to all Regional planning area groups.

Sec. 32-143.2 Public Involvement

The adoption of this Plan and any amendments will provide for public input at a public hearing held in conjunction with one of the readings of said ordinance enacting the Plan or amendments thereto.

Sec. 32-143.3 Public Education

The initial implementation of the Plan and any subsequent stage shall be made public via announcement at a media conference. Year Round Water Use Management and any subsequent Water Conservation Stages shall be publicized and shall become effective immediately upon such announcement. All implementation and termination of Water Conservation Stages shall likewise occur via media conference.

DIVISION 2 WATER CONSERVATION PLAN PROCEDURES

Sec. 32-144. Year Round Water Use Management

To conserve water supplies available to the City of Abilene, Year Round Water Use Management shall be implemented to restrict certain potable water use activities by all customers of the City of Abilene Water Utility System.

When conditions warrant, pursuant to Sec 32-141, the Water Conservation Plan will be implemented in accordance with the applicable provisions of this Plan.

1. Year Round Water Use Management. The following year round provisions shall apply to all potable water customers of the City of Abilene Water Utility System:

   a. Watering Days: Customers are encouraged to conserve water by watering their lawn areas only once every seven (7) days on one of their designated watering days.

   A customer's watering day is determined by the last digit of the house number or property address. Multi-unit properties will use the lowest address number. Customers on rural routes will use the last number of their post office box number or their route number if they do not have a post office box number. Customers at Ft. Phantom Lake will use the last number of their lake lot. Customers in trailer parks will use the last number of their lot number.

   When Ft. Phantom Reservoir is above 1630.9 feet elevation (less than five (5) feet below the spillway) the following three (3) day a week watering schedule applies:

   <u>Designated Watering Days</u>:

Wednesday, Friday, Sunday	Odd numbered addresses
Tuesday, Thursday, Saturday	Even numbered addresses
Monday, Wednesday, Friday	Industrial, commercial, government customers, public and private schools and universities

   When Ft. Phantom Reservoir is between 1630.9 feet and 1625.9 feet elevation (between five (5) and ten (10) feet below the spillway), the following two (2) day a week watering schedule applies:

Designated Watering Days:

Thursday, Sunday	Odd numbered addresses
Tuesday, Saturday	Even numbered addresses
Monday, Friday	Industrial, commercial, government customers, public and private schools and universities

b. Watering Times:

Watering by all commercial, industrial, and residential customers utilizing individual sprinklers, or sprinkler systems, on lawns, gardens, landscaped areas, trees, shrubs or other plants is prohibited except on designated day(s) and then only during the hours of 12:00 midnight to 10:00 am and from 6:00 pm until 12:00 midnight.

c. Watering of gardens, flowerbeds, trees and shrubs is permitted at any time of any day if:

i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
ii. A faucet-filled container of five (5) gallons or less is used, or
iii. A drip irrigation system such as a soaker hose, deep root water system, or bubbler is used. For the purpose of this section a drip irrigation system is defined as an irrigation device or system designed to emit water at low volumes and low pressures directly onto soil surface or below soil surface without airborne streams or droplets.

d. Irrigation of LAWNS is permitted at any time on any day if:

i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
ii. A faucet-filled container of five (5) gallons or less is used.

A Drip Irrigation System SHALL NOT be used to irrigate LAWNS except on designated days and at designated times.

e. New lawns that have been seeded (not to include re-seeding or overseeding existing turf), sodded or mulched may be watered daily for eight (8) minutes once during each of the following periods: 11:00 a.m. to 1:00 p.m.; 2:00 p.m. to 4:00 p.m.; 5:00 p.m. to 7:00 p.m.; and at regular intervals between 9:00

p.m. and 10:00 a.m. for a maximum of three (3) weeks. To qualify under this section, new lawns are those installed in conjunction with the construction of a new residence and for a period six (6) months thereafter or the re-tilling of an area equaling at least fifty (50) percent of an existing yard.

f. Water Wasting. The following uses of water are defined as "waste of water" and are absolutely prohibited:

   i. Allowing water to run off a property through the street, gutter, ditch, alley, or drain for more than seventy-five (75) feet from the downgrade of the property line;
   ii. Failure to repair a controllable leak, including a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet.
   iii. Operating a permanently installed irrigation system with a broken sprinkler head; a sprinkler head that is spraying over a street or parking lot because it is out of adjustment; or a sprinkler head that is misting due to high pressure.

g. Use of water from fire hydrants shall be limited to firefighting activities or other activities necessary to maintain public health, safety, and welfare. The Director of Water Utilities will review written requests on a case-by-case basis for the purchase and withdrawal of fire hydrants for land development and building construction processes.

h. Ornamental fountains are allowed if the fountain is equipped with a device for recycling water and water may be added to sustain appropriate maintenance levels only on the customer's regularly designated watering days.

i. Water may be added to swimming pools to sustain appropriate maintenance levels only on the customer's regularly designated watering days.

j. The operation of charity car washes must:

   i. Not allow water to run-off more than seventy-five (75) feet, and
   ii. Use hoses with on/off nozzles and buckets.

k. Large-scale recreational development, such as, but not limited to, water parks, shall submit a plan to the Director of Water Utilities that detail expected water consumption and maintenance requirements. Any deviation from the requirements of this ordinance will be resolved on a case-by-case method.

2. Administrative Enforcement, Presumption of Ownership & Control; Hearing Officers; Administration of Hearings, Hearings, Appeals, Payment, Subsequent Violations, Fees, and Requests for Variances as pertaining to Year Round Water Use Management are addressed in Sections 32-147 – 32-156.

Sec. 32- 145. Water Conservation Stages

WATERING DAYS

1. During Water Conservation Stages, a customer's watering day is determined by the last digit of the house number or property address. Multi-unit properties will use the lowest address number. Customers on rural routes will use the last number of their post office box number or their route number if they do not have a post office box number. Customers at Ft. Phantom Lake will use the last number of their lake lot. Customers in trailer parks will use the last number of their lot number.

If a residential customer's last number is:	Customer's watering day is:
7 or 8	Sunday
9	Monday
0	Tuesday
1	Wednesday
2	Thursday
3 or 4	Friday
5 or 6	Saturday

For example: If an address is 555 Walnut Street, the last number is five (5) and the watering day is Saturday.

For purposes of this section only, residential usage includes single-family residences, multi-family residences and apartment complexes. Non-residential customers shall follow the above schedule with the exception of the following changes:

7 or 8	Wednesday
5 or 6	Tuesday

2. Bi-weekly watering as prescribed in Stage 2 will occur according to location in East or West sides of the City, bounded on the north side of the City by Grape St. and then Pine St. to the north City Limits (north of Grape St.) and on the south side of the City by Sayles Blvd. to Buffalo Gap Road and then Buffalo Gap Road to the south City Limits.

3. Entities with large, open spaces (e.g., schools, universities, city parks, golf courses) using potable water may submit alternate watering schedules to the Director of Water Utilities except as otherwise prohibited in this ordinance. Upon his/her written approval acknowledged by the entity in question, these entities may follow the approved schedule rather than the calendar system, and will be held responsible for all the provisions of this article, based on the approved schedule.

STAGE 1 WATER ALERT

Implementation Criteria:

Combined treatment plant pumpage in excess of 49.5 MGD for two (2) consecutive days; or, continually falling water storage facility levels which do not refill above fifty (50) percent overnight; or, depletion of the Ft. Phantom Reservoir to the elevation 1625.9 (ten (10) feet below spillway) if Hubbard Creek Reservoir is at sixty (60) percent capacity or less or 1624.9 (eleven (11) feet below spillway) if Hubbard Creek Reservoir is at greater than sixty (60) percent of capacity, or any unforeseen conditions that may occur that cause the City Manager to recommend implementation to the Mayor.

Upon announcement and implementation by the City, the following restrictions shall apply to all persons:

1. Landscape Irrigation

   a. Irrigation by all commercial, industrial, (including agricultural irrigation), and residential customers utilizing individual sprinklers, or sprinkler systems, of lawns, gardens, landscaped areas, trees, shrubs or other plants is prohibited except on a designated day which shall be once every seven (7) days and then only during the hours of 12:00 midnight to 10:00 a.m. and from 6:00 p.m. until 12:00 midnight.

      Provided, however, irrigation of gardens, flowerbeds, trees and shrubs is permitted at any time of day if:

      i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
      ii. A faucet-filled container of five (5) gallons or less is used, or
      iii. A drip irrigation system such as soaker hose, deep root water system, or bubbler is used. For the purpose of this section a drip irrigation system is defined as an irrigation device or system designed to emit

water at low volumes and low pressures directly onto soil surface or below soil surface without airborne streams or droplets.

Irrigation of LAWNS is permitted at any time on any day if:

i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
ii. A faucet-filled container of five (5) gallons or less is used.

A Drip Irrigation System SHALL NOT be used to irrigate LAWNS except on designated days and at designated times.

b. New lawns that have been seeded (not to include re-seeding or overseeding existing turf), sodded or mulched may be watered daily for eight (8) minutes once during each of the following periods: 11:00 a.m. to 1:00 p.m.; 2:00 p.m. to 4:00 p.m.; 5:00 p.m. to 7:00 p.m.; and at regular intervals between 9:00 p.m. and 10:00 a.m. for a maximum of three (3) weeks. To qualify under this section, new lawns are those installed in conjunction with the construction of a new residence and for a period six (6) months thereafter. Re-tilling or any replanting or reseeding of existing lawns shall NOT qualify for new lawn status in this section.

2. Vehicle Washing

a. It is permissible to wash automobiles, trucks, trailers, boats, and other types of mobile equipment at any time on the immediate premises of a commercial car wash or commercial service station or at any location including a residence by using a five (5) gallon container and/or a hand held hose equipped with a quick shut-off nozzle for quick rinses.

b. If the health, safety and welfare of the public depends upon frequent vehicle cleaning, as determined by the Director of Water Utilities or his/her designee, then washing of vehicles such as emergency vehicles, aircraft, garbage trucks, and vehicles used to transport food and perishables will be allowed.

c. Charity car washes are prohibited.

3. Water may be added to swimming pools to sustain appropriate maintenance levels only on designated irrigation days.

4. Ornamental fountains are allowed if the fountain is equipped with a device for recycling water and water may be added to sustain appropriate maintenance levels

only on the customer's regularly designated watering day.

5. Use of water from fire hydrants shall be limited to firefighting activities or other activities necessary to maintain public health, safety and welfare. By written approval from the Director of Water Utilities, businesses may purchase and draw water from fire hydrants for land development and building construction processes.

6. The following uses of water are defined as "waste of water" and are absolutely prohibited:

   a. Allowing water to run off a property through the street, gutter, ditch, alley, or drain for more than seventy-five (75) feet from the downgrade of the property line;

   b. Failure to repair a controllable leak; including a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet.

   c. Operating a permanently installed irrigation system with:
      i. A broken sprinkler head;
      ii. A sprinkler head that is spraying over a street or parking lot because it is out of adjustment; or
      iii. A sprinkler head that is misting due to high pressure

   d. Washing sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire, health and safety hazards, or to prepare an area for pavement repair or application.

7. Commercial and Industrial Users

   a. Commercial and industrial users of water shall, in addition to complying with other applicable articles in this ordinance, reduce their monthly consumption of water by a minimum of fifteen (15) percent compared to use during the same month of the previous year.

   b. Industrial users may, in order to justify water use, present a conservation plan for approval by the Director of Water Utilities.

   c. Golf courses will submit a conservation plan for approval by the Director of Water Utilities if potable irrigation water is to be used.

STAGE 2 WATER WARNING

Implementation Criteria:

Combined treatment plant pumpage in excess of 49.5 MGD for two (2) days; or, continually falling water storage facility levels which do not refill above fifty (50) percent overnight or, depletion of the Ft. Phantom Reservoir to the elevation 1618.9 (seventeen (17) feet below spillway); or, major line breaks, or pump system failure which causes unprecedented loss of capability to provide service, or any unforeseen conditions that may occur that cause the City Manager to recommend implementation to the Mayor.

Upon announcement and implementation by the City, the following restrictions shall apply to all persons:

1. Landscape Irrigation

   a. Irrigation by all commercial, industrial and residential customers utilizing individual sprinklers, or sprinkler systems, of lawns, gardens, landscaped areas, trees, shrubs or other plants is prohibited except on a designated day which shall be once every two (2) weeks and then only during the hours of 12:00 midnight to 10:00 a.m. and from 6:00 p.m. until 12:00 midnight. Provided, however, irrigation of gardens, flowerbeds, trees and shrubs is permitted at any time of day if:

      i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
      ii. A faucet-filled container of five (5) gallons or less is used, or
      iii. A drip irrigation system such as soaker hose, deep root water system, or bubbler is used. For the purpose of this section a drip irrigation system is defined as an irrigation device or system designed to emit water at low volumes and low pressures directly onto soil surface or below soil surface without airborne streams or droplets.

   Irrigation of LAWNS is permitted at any time on any day if:

      i. A garden hose is used and is held in the hand during the duration of the irrigation event, or
      ii. A faucet-filled container of five (5) gallons or less is used.

   A Drip Irrigation System SHALL NOT be used to irrigate LAWNS except on designated days and at designated times.

b. New lawns may be watered daily for eight minutes once during each of the following periods: 11:00 a.m. to 1:00 p.m.; 2:00 p.m. to 4:00 p.m.; 5:00 p.m. to 7:00 p.m.; and at regular intervals between 9:00 p.m. and 10:00 a.m. for a maximum of three (3) weeks. To qualify under this section, new lawns are those installed in conjunction with the construction of a new residence and for a period of six (6) months thereafter. Re-tilling or any replanting or reseeding of existing lawns shall NOT qualify for new lawn status in this section.

2. Vehicle Washing

a. It is permissible to wash automobiles, trucks, trailers, boats, and other types of mobile equipment at any time on the immediate premises of a commercial car wash or commercial service station or at any location including a residence by using a five (5) gallon container and/or a hand held hose equipped with a quick shut-off nozzle for quick rinses.

b. If the health, safety and welfare of the public depends upon frequent vehicle cleaning, as determined by the Director of Water Utilities or his/her designee, then washing of vehicles such as emergency vehicles, aircraft, garbage trucks, and vehicles used to transport food and perishables will be allowed.

c. Charity car washes are prohibited.

3. Water may be added to swimming pools to sustain appropriate maintenance levels weekly, on the customer's regularly designated irrigation days.

4. Ornamental fountains are allowed if the fountain is equipped with a device for recycling water and water may be added to sustain appropriate maintenance levels only on the customer's regularly designated watering day.

5. Use of water from fire hydrants shall be limited to firefighting activities or other activities necessary to maintain public health, safety and welfare. By written approval from the Director of Water Utilities, businesses may purchase and draw water from fire hydrants for land development and building construction processes.

6. The following uses of water are defined as "waste of water" and are absolutely prohibited:

a. Allowing water to run off a property through the street, gutter, ditch, alley, or drain for more than seventy-five (75) feet from the downgrade of the property line;

b. Failure to repair a controllable leak; including a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet;

c. Operating a permanently installed irrigation system with:

   i. A broken sprinkler head;
   ii. A sprinkler head that is spraying over a street or parking lot because it is out of adjustment; or
   iii. A sprinkler head that is misting due to high pressure.

d. Washing sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire, health or safety hazards, or to prepare an area for pavement repair or application.

7. Commercial and Industrial Users

   a. Commercial and industrial users of water shall continue to maintain at least a fifteen (15) percent monthly reduction of water use compared to use during the same month of the previous year.

      Individual allotments may be adjusted by the Director based on historical water usage conservation practices of customer. The other restrictions of Stage 2 still apply to commercial and industrial users.

   b. Industrial users may present a conservation plan for approval by the Director of Water Utilities.c. Golf courses using potable water will reduce consumption by thirty (30) percent of contracted amount.

STAGE 3 WATER EMERGENCY

Implementation Criteria:

Combined treatment plant pumpage in excess of 30 MGD for three (3) days and depletion of the Ft. Phantom Reservoir to the elevation 1614.9 (twenty-one (21) feet below spillway); or major line breaks, or pump system failure which causes unprecedented loss of capability to provide service, or any unforeseen conditions that may occur that cause the City Manager to recommend implementation to the Mayor. Upon announcement and implementation by the City, the following restrictions shall apply to all persons:

1. Landscape Irrigation

Irrigation of gardens, flowerbeds, trees and shrubs (Not Lawns) by all commercial, industrial, and residential customers is permitted at any time on any day only if:

a. A garden hose is used and is held in the hand during the duration of the irrigation event, or

b. A faucet-filled container of five (5) gallons or less is used, or

c. A drip irrigation system such as soaker hose, deep root water system, or bubbler is used. For the purpose of this section a drip irrigation system is defined as an irrigation device or system designed to emit water at low volumes and low pressures directly onto soil surface or below soil surface without airborne streams or droplets.

Watering of Lawns is prohibited at any time. No new lawns may be installed.

2. Vehicle Washing

a. It is permissible to wash automobiles, trucks, trailers, boats, and other types of mobile equipment at any time on the immediate premises of a commercial car wash or commercial service station.

b. If the health, safety and welfare of the public depends upon frequent vehicle cleaning, as determined by the Director of Water Utilities or his/her designee, then washing of vehicles such as emergency vehicles, aircraft, garbage trucks, and vehicles used to transport food and perishables will be allowed.

c. Charity car washes are prohibited.

3. Water may be added to swimming pools to sustain appropriate maintenance levels weekly, on the customer's regularly designated irrigation days. New construction of swimming pools is prohibited.

4. Ornamental fountains are allowed if the fountain is equipped with a device for recycling water and water may be added to sustain appropriate maintenance levels only on the customer's regularly designated watering day. New construction of ornamental fountains is prohibited.

5. Use of water from fire hydrants shall be limited to fire-fighting activities or other activities necessary to maintain public health, safety and welfare. By written approval

from the Director of Water Utilities, businesses may purchase and draw water from fire hydrants for land development and building construction processes.

6. The following uses of water are defined as "waste of water" and are absolutely prohibited:

   a. Allowing water to run off a property through the street, gutter, ditch, alley, or drain for more than seventy-five (75) feet from the downgrade of the property line;

   b. Failure to repair a controllable leak; including a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet;

   c. Operating a permanently installed irrigation system with:

      i. A broken sprinkler head;
      ii. A sprinkler head that is spraying over a street or a parking lot because it is out of adjustment; or
      iii. A sprinkler head that is misting due to high pressure

   d. Washing sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire, health or safety hazards, or to prepare an area for pavement repair or application.

7. Commercial and Industrial Users

   a. Commercial and industrial users of water shall continue to maintain at least a fifteen (15) percent monthly reduction of water use compared to use during the same month of the previous year.

   A surcharge rate will be assessed for any water consumption that does not comply with the required reductions. The surcharge in addition to regular charges is as follows:

	First Occurrence	Subsequent Occurrence(s)
First 5,000 gallons over allowed amount per 1,000 gallons	$5.00	$10.00
Next 5,000 gallons, per 1,000 gallons	$10.00	$20.00
For higher usage, per 1,000 gallons	$20.00	$30.00

Additionally, if a customer uses more than the allowed amount more than once at any time during Stage 3, the customer's water may be turned off and there will be a $250.00 re-connect fee, in addition to the listed fees.

Individual allotments may be adjusted by the Director of Water Utilities based on historical water usage conservation practices of customer. The other restrictions of Stage 3 still apply to commercial and industrial users.

b. Industrial users may present a conservation plan for approval by the Director of Water Utilities.

c. Each golf course using potable water will reduce consumption by fifty (50) percent of contracted amount.

STAGE 4 WATER CRISIS

Implementation Criteria:

Loss of capability to provide water service or contamination of supply source, or any unforeseen/unexpected conditions that may occur that cause the City Manager to recommend implementation to the Mayor.

Upon announcement and implementation by the City, the following restrictions shall apply to all persons:

1. All outdoor irrigation of vegetation including lawns, using potable water is prohibited.

2. Only washing of mobile equipment in the critical interest of the public health or safety shall be allowed.

3. The filling, refilling or adding of water to swimming and/or wading pools is prohibited. The construction of new swimming pools is prohibited.

4. The operation of any ornamental fountain or similar structure is prohibited. The construction of new ornamental fountains is prohibited.

5. Use of water from fire hydrants shall be limited to fire fighting and related activities or other activities necessary to maintain public health, safety and welfare. Water for domestic use only may be purchased from the bulk loading station.

6. The following uses of water are defined as "waste of water" and are absolutely

prohibited:

a. Allowing water to run off a property through the street, gutter, ditch, alley, or drain for more than seventy-five (75) feet from the downgrade of the property line;

b. Failure to repair a controllable leak; including a broken sprinkler head, a leaking valve, leaking or broken pipes, or a leaking faucet;

d. Operating a permanently installed irrigation system with:

i. A broken sprinkler head;

ii. A sprinkler head that is spraying over a street or parking lot because it is out of adjustment; or

iii. A sprinkler head that is misting due to high pressure

d. Washing sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate fire, health or safety hazards.

7. Commercial and Industrial Users

a. Commercial and industrial users of water (for other than drinking water and rest rooms) shall continue to maintain at least a 15 percent reduction of water use compared to use during the same month of the previous year.

A surcharge rate will be assessed for any water consumption that does not comply with the required reductions. The surcharge in addition to regular charges is as follows:

	First Occurrence	Subsequent Occurrence(s)
First 5,000 gallons over allowed amount per 1,000 gallons	$10.00	$20.00
Next 5,000 gallons, per 1,000 gallons	$20.00	$40.00
For higher usage, per 1,000 gallons	$30.00	$60.00

Additionally, if a customer uses more than the allowed amount more than once at any time during Stage 4, then after each such overuse these surcharges will be added and the customer's water may be turned off and there will be a $500.00 re-connect fee, in addition to the listed fees.

Individual allotments may be adjusted by the Director of Water Utilities based on historical water usage and conservation practices of the customer. The other restrictions of Stage 4 still apply to commercial and industrial users.

b. Water used for industrial purposes not in the immediate interest of the public health, safety and welfare will be curtailed to the extent necessary to effectuate the needs and purposes of this plan.

Sec. 32-146. Target Water Use

During Water Conservation Stages, pursuant to Section 32-145, the following target goals for water use are established:

Stage 1 WATER ALERT

Target Water Use Goal:

Combined treatment plant production less than 49.5 million gallons per day (MGD) for all Abilene water treatment facilities.

Stage 2 WATER WARNING

Target Water Use Goal:

Combined treatment plant production less than 49.5 MGD for all Abilene water treatment facilities.

Stage 3 WATER EMERGENCY

Target Water Use Goal:

Combined treatment plant production less than 30 MGD for all Abilene water treatment facilities.

Stage 4 WATER CRISIS

Target Water Use Goal:

Combined treatment plant production less than 30 MGD for all Abilene water treatment facilities.

DIVISION 3 WATER CONSERVATION PLAN ENFORCEMENT

Sec. 32-147. Administrative Enforcement

Violations of this plan are declared to be civil penalties with remedies being fines paid directly to Municipal Court. Non-payment of fines will result in surcharges assessed to the customer's water utility bill. Each violation of a particular component of this Plan shall constitute a separate violation, and each day a violation continues shall be considered a new violation for purposes of enforcement and enhancement.

The surcharge will be in addition to the regular water utility bill amount. The water utility office may discontinue water service to the premises if the surcharge is not paid as required under the Plan. Any person whose service is discontinued for failure to pay the surcharge shall not be restored until payment of a reconnection charge and any other costs incurred by the City in discontinuing service.

The city's authority to seek injunctive or other civil relief available under the law is not limited by this section.

The following procedures shall apply to anyone contesting the penalties for violating the Plan. The hearing process shall be a two-phase hearing process with the final phase being heard before the municipal clerk/administrator or deputy in charge of hearing appeals.

Sec. 32-148. Presumption of Ownership & Control

Presumption of Ownership/Control. Any person, including a person classified as a water customer of City, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation.

All notices shall be issued to the person or entity whose name appears on the water bill.

In any case of a violation of any terms or provisions of this Plan by any corporation, business, partnership, or entity, the officers and/or agents actively in charge of the business or entity shall be subject to the penalty provided herein.

If a customer is irrigating during a time period or on a day when irrigation is not permitted for the street address of that customer and a city worker cannot find any person at that street address to turn off the irrigation system, the city worker may enter the property and turn off the irrigation system and/or the water source.

Sec. 32-149. Hearing Officers

1. There shall be designated a Hearing Officer(s) who shall be appointed by the municipal court clerk/administrator.

2. Hearing Officer(s) shall have the authority to administer oaths and to issue orders compelling the attendance of witnesses and the production of documents.

3. An order compelling the attendance of witnesses or the production of documents may be enforced by the municipal court.

Sec. 32-150. Administration of Hearings

1. The administrative adjudication process for Plan violations shall be initiated by the issuance of a notice which may be issued by a peace officer or other authorized enforcement agent. Authorized enforcement agents shall include any police officer, water utilities worker, city marshal, or other employee of the city designated by the city manager to enforce the provisions of this code in regard to the Plan.

2. The notice may be issued by affixing it to the front door of the property in question, in a conspicuous place.

3. The notice shall provide that the person charged with violation of the Plan shall have the right of hearing to determine the validity for the charged offense. Such right to a hearing shall be exercised by mail or by appearing in person before a hearing officer within ten (10) days from the date of the notice.

4. The original or any copy of the notice or summons is a record kept in the ordinary course of business in the city and is rebuttable proof of the facts it contains.

Sec. 32-151. Hearings

1. At the hearing before the hearing officer, the violator may admit, admit with explanation, or deny the alleged infraction. It is not a defense to the offense that the violator did not intend the alleged infraction, there being no culpable mental state required for the infraction.

2. The issuing officer shall not be required to attend the hearing.

3. It is not required that the city's attorney attend the hearing. Provided, however, that if the defendant is represented by legal counsel at the hearing, the hearing officer shall notify the city attorney who shall have a right to appear on behalf of the city at

said hearing.

4. No formal or sworn complaint shall be necessary. The hearing officer shall examine the contents of the notice and the evidence related to ownership of the property in question and shall hear and review the testimony and evidence presented by the violator. If the hearing officer determines by the preponderance of the evidence that the infraction was committed by the violator, he shall find the violator responsible and assess a fine.

5. At the conclusion of the hearing, the hearing officer shall issue an order stating whether or not the person charged is responsible for the violation of the Plan and the amount of the fine assessed against him. The order shall be filed with the clerk of the municipal court. All such orders shall be kept in a separate index or file by the municipal court clerk using appropriate data processing techniques.

6. Failure of a person charged with the offense to appear at a hearing within the aforesaid ten (10) day period shall be considered an admission of liability for the charged offense.

Sec. 32-152. Appeals

A person determined by the hearing officer to be in violation of any provision of the Plan may appeal this determination to the municipal court clerk or a deputy so designated to hear Plan appeals.

The appeal must be instituted by filing a written petition, not later than the tenth day after the filing of the hearing officer's order, with the clerk of the municipal court along with payment of a nonrefundable administrative appeal filing fee in the amount of ten dollars ($10.00).

After filing a petition for appeal, the municipal clerk shall schedule a hearing and notify all parties of the date, time, and place of the hearing.

The appeal hearing shall be a de novo review. The municipal court clerk shall examine the evidence presented at the appellate hearing and if the court clerk determines by the preponderance of the evidence that the infraction was committed by the violator, the court clerk shall find the violator responsible therefore.

Sec. 32-153. Payment

1. Any person alleged to have violated the Plan who merely desires to make payment shall provide same to the municipal court clerk in charge of water violations within ten (10) days after receiving notice of said violation.

2. Any person alleged to have violated the Plan and who fails to appear within the ten (10) days as reflected in 32.150.3 above shall be assessed a surcharge on their next water bill in the amount of the minimum fine.

3. Any person found to have violated the Plan by the Hearing Officer shall pay the fine within ten (10) days of said hearing or the fee shall be assessed in a surcharge on the violator's next water bill.

Sec. 32-154. Subsequent Violations—Increased Fees—Discontinuation of Service—Injunctive Relief

Subsequent violations of the Plan shall result in increased fine or upon the occurrence of three (3) violations, after notice, the discontinuation of services. Services discontinued under this provision shall be restored only upon payment of a reconnection fee and any other costs incurred by the City in discontinuing service.

Compliance with the Plan may also be sought through injunctive relief in district court.

Sec. 32-155. Fines—Minimum and Maximum

a. Any person, firm, or corporation found to have violated any provision of the Plan, shall be assessed a fine in an amount not to exceed one thousand dollars ($1,000.00) for each offense, the amount to be determined by the hearing officer in his reasonable discretion, subject to review on appeal to the municipal court clerk.

b. Unless higher amounts are required by state law or a lesser amount is determined by the hearing officer or municipal court clerk or so designated deputy, the minimum fines for violating the Plan shall be as follows:

1.	Violation of Year Round Water Use Management, first offense	$50.00
2.	Violation of Year Round Water Use Management, second offense	$75.00
3.	Violation of Year Round Water Use Management, subsequent offenses	$250.00
4.	Violation of Stage 1, first offense	$50.00
5.	Violation of Stage 1, second offense	$75.00
6.	Violation Stage 1, subsequent offenses	$250.00
7.	Violation of Stage 2, first offense	$100.00
8.	Violation of Stage 2, second offense	$150.00
9.	Violation of Stage 2, subsequent offenses	$500.00
10.	Violation of Stage 3 or 4, first offense	$250.00
11.	Violation of Stage 3 or 4, second offense	$500.00
12.	Violation of Stage 3 or 4, subsequent offenses	$1,000.00
13.	Reconnect Fees for failure to pay the surcharge	$250.00
14.	Reconnect Fees for repeated violations of the Plan	$500.00

c. It is an affirmative defense to any violation of this article if the customer proves that the misused wasted water is from an operable water well serving said property.

d. Fraudulent misrepresentation of well water use will result in a $500 fine.

Sec. 32-156. Requests for Variance

Requests for variance should be made in writing to the Director of Water Utilities. Requests must include name of customer, location, type of variance requested, reason for variance request and duration of deviation from this plan. Upon the Director's written approval acknowledged by the entity in question, these entities may follow the requested variance and will be responsible for all other provisions of this article.

Sec. 32-157. Severability

If any provision or any section of this Plan shall be held to be void or unconstitutional, such holding shall in no way affect the validity of the remaining provisions or sections of the Plan, which shall remain in full force and effect.

Appendix A

Ordinance Adopting City of Abilene Drought Contingency Plan ("Water Conservation Plan")

ORDINANCE NO. 9-2005

AN ORDINANCE AMENDING CHAPTER 32, UTILITIES, ARTICLE VI, WATER CONSERVATION PLAN, DIVISION 2, WATER CONSERVATION PLAN PROCEDURES, OF THE CITY OF ABILENE MUNICIPAL CODE, BY ADDING CERTAIN SECTION AS SET OUT BELOW; PROVIDING A SEVERABILITY CLAUSE; PROVIDING FOR ENFORCEMENT; AND CALLING FOR A PUBLIC HEARING.

WHEREAS, drought contingency planning requirements are found in the Texas Administrative Code, (TAC) Chapter 288, Subchapter B and mandate that public water systems implement drought contingency planning; and,

WHEREAS, Abilene's Drought Contingency Plan (Titled "Water Conservation Plan") was last amended in 2003 affirming that limited water resources necessitate a year round water use management plan, and that the general welfare of the customers of the City of Abilene's Water Utility System requires that water resources be put to maximum beneficial use, and that the waste, unreasonable use, or unreasonable method of use of water be prevented; and,

WHEREAS, in October 2004, the TAC was amended to require public water systems to update their Drought Contingency Plans to include target water use reduction goals in each stage of drought contingency response as described in the system's DCP/WCP; now, therefore,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS:

PART 1: That Chapter 32, Utilities, Article VI, Water Conservation Plan, Division 2, Water Conservation Plan Procedures, of the City of Abilene Municipal Code, be amended as set out in EXHIBIT A, attached hereto and made a part of this Ordinance for all purposes.

PART 2: That if any provision or section of this Ordinance is held to be void or unconstitutional, such holding shall in no way affect the validity of the remaining Ordinance provisions or sections, which shall remain in full force and effect.

PART 3: That any person, firm, or corporation, violating any of the Water Conservation Plan provisions of this Ordinance shall be assessed a penalty as set forth by the procedures contained in Division 3, Water Conservation Plan Enforcement.

PART 4: That the provisions of this ordinance become effective April 30, 2005.

PASSED ON FIRST READING this 24 day of March, 2005.

PASSED ON SECOND AND FINAL READING after public hearing this 14th day of April, 2005.

ATTEST:

Jo Moore
City Secretary

Norm Archibald
Mayor

APPROVED:
Sharon Hicks
City Attorney

C:\Water\Ordinance\Chapter32ArticleVIAmendOrdinance2005

ORDINANCE NO. 9-2005

EXHIBIT A

AMEND CHAPTER 32 UTILITIES, ARTICLE VI WATER CONSERVATION PLAN, DIVISION 2, WATER CONSERVATION PLAN PROCEDURES OF THE ABILENE MUNICIPAL CODE BY ADDING:

Section 32-146. Target Water Use Goals.

The following target goals for water usage are established for use during Water Conservation Stages as contained in Section 32-145:

Stage 1. WATER ALERT

Target Water Use Goal:

Combined treatment plant production less than 49.5 million gallons per day (MGD) for all Abilene water treatment facilities.

Stage 2. WATER WARNING

Target Water Use Goal:

Combined treatment plant production less than 49.5 MGD for all Abilene water treatment facilities.

Stage 3. WATER EMERGENCY

Target Water Use Goal:

Combined treatment plant production less than 30 MGD for all Abilene water treatment facilities.

Stage 4. WATER CRISIS

Target Water Use Goal:

Combined treatment plant production less than 30 MGD for all Abilene water treatment facilities.

ATTACHMENT 2

City of Abilene Agricultural Water Conservation Plan
(Includes utility profile for agricultural users)

ATTACHMENT 2

City of Abilene Agricultural Water Conservation Plan
(Includes utility profile for agricultural users)

Texas Commission on Environmental Quality

SYSTEM INVENTORY AND WATER CONSERVATION PLAN FOR AGRICULTURAL WATER SUPPLIERS PROVIDING WATER TO MORE THAN ONE USER

This form is provided to assist entities in conservation plan development for agricultural water suppliers providing water to more than one user individually-operated irrigation systems. If you need assistance in completing this form or in developing your plan, please contact the conservation staff of the Resource Protection Team in the Water Supply Division at (512) 239-4691.

SCOTT F. HIBBS
63462
STATE OF TEXAS
REGISTERED PROFESSIONAL ENGINEER

Date: September 2007

Name of Entity: City of Abilene

Address & Zip: P.O. Box 60; Abilene, TX 79604-0060

Telephone Number: 325.676.6000 **Fax:** 325.676.6458

Form Completed By: Scott F. Hibbs, P.E.

Title: Principal Engineer, Enprotec/Hibbs & Todd, Inc.

Signature: Scott F. Hibbs **Date:** 9/10/07

Verified By: Tommy O'Brien, P.E.

Title: Director of Abilene Water Utilities

NOTE: If the plan does not provide information for each requirement, include an explanation of why the requirement is not applicable.

I. STRUCTURAL FACILITIES

A. Description of service area:

The service area for water supplied for agricultural/irrigation water use is contained within an area encompassing approximately 108 square miles in and around the City of Abilene.

B. Total miles of main canals and pipelines:

The system does not use canals but does have approximately 42 miles of pipeline to deliver agricultural irrigation water to end users.

C. Total miles of lateral canals and pipelines:

The system does not use canals, and lateral pipelines are typically private ownership.

D. Reservoir capacity, if applicable: NA

E. Description of pumps and pumping stations:

The City of Abilene owns and operates a wastewater reuse system through which treated wastewater is sold for irrigation use. The Hamby Wastewater Reclamation Facility (Hamby) with a permitted capacity of 22 million gallons per day (MGD) operates under Texas Pollutant Discharge Elimination System (TPDES) Permit number 10334004. A single water main directs the reclaimed water from the Hamby plant in a southwesterly direction toward the City of Abilene to the first of two reclaimed water pump stations. The first reclaimed water pump station downstream from the Hamby plant is located at the Grimes Water Treatment Plant near the intersection of US Highways 80 and 83. The Grimes plant reclaimed water pump station delivers the reclaimed water to Lake Kirby at a maximum rate of approximately 4 MGD where the reclaimed water is temporarily stored prior to use. A second pump station at Lake Kirby pumps the reclaimed irrigation water to irrigation users in west Abilene at a rate of approximately 1.3 MGD.

Abilene also provides treated effluent (under the City's TPDES permit) from the Hamby plant's secondary (final) clarifiers for agricultural use on privately-owned and City-owned land near the Hamby treatment plant. Treated effluent is supplied by gravity flow through a network of transmission pipelines.

F. Description of meters and/or measuring devices:

Agricultural/irrigation water use by each water user being supplied from the system is individually metered at the service connection to each user.

G. Description of customer gates and measuring devices:

Customer water use is measured via individual service meters on the customer service supply line to each user.

H. Description of canal construction:

1. Miles of unlined canals: Unlined canals are not used in the system.

2. Miles of lined canals: Lined canals are not used in the system.

3. Miles of enclosed pipelines:

Approximately 42 miles of enclosed water pipelines are used to convey treated water from the Hamby plant to the individual users.

4. Other: NA

I. Description of canal conditions and recent or planned improvements: NA

J. Description of any other structural facilities not covered above: NA

II. MANAGEMENT PRACTICES

A. Total water available to City (in acre-feet/year):

110,025 ac-ft/yr (exclusive of direct reuse supplies under 210 authorization)

Surface Water Source	Number	Amount (ac-ft/yr)
Lake Fort Phantom Hill	CA 12-4161B	30,690
Lake Abilene	CA 12-4142	1,675
Lake Kirby	CA 12-4150A	3,880
Clear Fork Scalping	CA 12-4139A	30,000
Deadman Creek	CA 12-4165A	3,000
Wastewater Effluent	Permit No. 4266C	4,330
Hubbard Creek Reservoir	Contract for Purchase	25,500
Lake O.H. Ivie		10,950
	Total	110,025

B. Maximum water rights allocation to City including water rights numbers:

73,575 ac-ft/yr (exclusive of direct reuse supplies under 210 authorization)

Surface Water Source	Number	Amount (ac-ft/yr)
Lake Fort Phantom Hill (Municipal)	CA 12-4161B	25,690
Lake Fort Phantom Hill (Industrial)	CA 12-4161B	4,000
Lake Fort Phantom Hill (Irrigation)	CA 12-4161B	1,000
Lake Abilene (Municipal)	CA 12-4142	1,675
Lake Kirby (Municipal)	CA 12-4150A	3,765
Lake Kirby (Irrigation)	CA 12-4150A	115
Clear Fork Scalping (Municipal/Industrial)	CA 12-4139A	30,000
Deadman Creek (Municipal)	CA 12-4165A	3,000
Wastewater Effluent (Irrigation)	Permit No. 4266C	4,330
	Total	73,575

C. Other water contracted to be delivered by City:

The City Contracts to deliver wholesale water for municipal use to the following wholesale water customers:

Wholesale Customer	Contracted Amount (ac-ft/yr)[2]
City of Baird	77
City of Merkel	353
City of Tye	184
City Clyde	307
City of Lawn	77
Blair WSC	77
Hamby WSC	308
Hawley WSC	307
S.U.N. WSC	230
Eula WSC	61
Potosi WSC	307
Steamboat Mountain WSC	307
View-Caps WSC	199
Dyess AFB	500 [1]
Total	**3,294**

Note 1: The Dyess contract does not indicate a specific contract delivery amount but states only that the City will "provide all of the potable demand for all operations and maintenance as required by Dyess." Dyess has historically used just under 500 ac-ft/yr. For planning purposes a figure of 500 ac-ft/yr is used.

Note 2: The City also contracts to deliver direct reclaimed water (under the City's 210 authorization) and raw water (under Permit No. 4266C) to various customers. Current contracted quantity for direct reuse of reclaimed water and raw water is approximately 3,498 ac-ft/yr.

The City also contracts to deliver reclaimed water discharged from the Hamby Reclamation Plant to Freewater Creek to two (2) customers in the amount of 660 ac-ft/yr.

D. Average annual water diverted by City: Approximately 22,000 ac-ft/yr

E. Average annual water delivered to customers: Approximately 21,500 ac-ft/yr

F. Delivery efficiency (percentage): Approximately 95-99%

G. Historical diversions and deliveries:

Year	Annual Rainfall (in/yr)	Total Annual Water Diverted (acre-feet)[3]	Annual Irrigation Water Delivered (acre-feet)[3]	Annual Municipal Water Delivered (acre-feet)[4]	Annual Industrial Water Delivered (acre-feet)[4]	Total Annual Water Delivered (acre-feet)[3]	Estimated Delivery Efficiency (%)
2004	37.37	21,469	1,307	20,636	1,184	20,640	99%
2003	19.05	22,993	2,060	22,361	1,194	22,370	99%
2002	27.94	21,007	1,468	20,365	1,187	20,371	98%
Avg	28.12	21,823	1,612	21,121	1,188	21,127	99%

Note 3: 'Annual Irrigation Water Delivered' includes reclaimed treated wastewater totals. 'Total Annual Water Diverted' includes residential, commercial, wholesale, raw and treated industrial, public/institutional, and raw agricultural water delivered. 'Total Annual Water Delivered' figures do not include reclaimed treated wastewater.

Note 4: 'Annual Industrial Water Delivered' is contained within 'Annual Municipal Water Delivered'. Prior to 2005, public/institutional use was a subset within industrial sales. Beginning in 2005 public/institutional water use is a separate water use category in the City's record keeping system.

H. Practices and/or devices used to account for water deliveries:

It is Abilene's policy to individually meter all water sold or provided for irrigation. Abilene's universal metering program has resulted in a water delivery accuracy rate as determined systemwide, well within accepted industry operating standards. It is also Abilene's policy to purchase meters that meet at least the minimum standards developed by the American Water Works Association. All metering devices used to meter water diverted from the source of supply are accurate to within plus or minus 5% to measure and account for raw and reclaimed water diverted for irrigation use. Aged meters are systematically replaced to assure reliability of meter performance. The City has established the following meter maintenance and replacement programs:

Meter Type	Calibration Period and Replacement
Master Meters	Annually and replaced as needed
1-1/2 inch and larger	Annually and replaced as needed
Smaller than 1-1/2	Every 10 years and replaced as needed

I. Water pricing policy:

With the exception of reclaimed water provided to users at no cost under terms of legal settlements or easements, the City of Abilene maintains an established water pricing mechanism consistent with the contractual requirements and the City's utility rate structure.

J. Operating rules and policies which encourage water conservation:

The City of Abilene's Water Conservation Program utilizes Supply Management Methods and Demand Management Methods to work towards optimizing use of Abilene's water resources.

1. Supply Management Program Elements consist of:

   a. Coordinated use of water supplies to ensure the City withdraws water from its water supply reservoirs in a manner that ensures maximum dependable yield and efficiency of operation.
   b. Watershed management to ensure diversion structures to Lake Ft. Phantom are clean, relatively straight, and obstruction-free to increase captured water flow while minimizing flooding potential in populated areas.
   c. Metering all service connections to ensure maximum return for delivered water while minimizing unaccounted-for water loss.
   d. Leak detection and repair to minimize unaccounted-for water loss.
   e. Treated wastewater reuse and recycling to lessen the demand for raw water used to produce potable water, and for raw water used for irrigation.

2. Demand Management Program Elements consist of:

   a. Water pricing as a mechanism for encouraging water customers to conserve.
   b. Regulations for conserving water via the Water Conservation Plan and Drought Contingency Plan adopted by the City.
   c. Plumbing Code for the City of Abilene requires maximum standard plumbing fixture capacities not be exceeded. Abilene supports consideration of a Low-Income Housing Retrofit Program and City Building Retrofit program to determine the feasibility of retrofitting fixtures in selected structures.
   d. Continuing education programs to increase public awareness of supply, treatment and conveyance systems in Abilene, to increase public awareness of the benefits and need for conservation, and to make information about practical cost-effective methods and technologies to achieve conservation readily available.

3. Year Round Water Use Management.

   The City of Abilene utilizes year-round water conservation measures to restrict certain potable water use activities by all customers of the City of Abilene Water Utility System. Pursuant to this measure all irrigation by commercial, industrial, and residential customers utilizing individual sprinklers, or sprinkler systems, on lawns, gardens, landscaped areas, trees, shrubs or other plants may water only on designated day(s) and then only during designated hours as outlined in the City's drought contingency plan.

K. Other management practices and services provided by the City:

In order to lessen the demand on the City's raw water sources the City relies on reuse of treated wastewater for supply to irrigators located within the City's service area. It is the City's policy to assist irrigators where feasible and practical to utilize reclaimed wastewater as their irrigation supply water. The City strives to work closely with local irrigation water users to ensure effective use of the City's water resources through improved irrigation systems, promoting healthy vegetation, and improved farming practices.

III. USER PROFILE

A. Total number of acres in service area:

Approximately 69,000 acres.

B. Average number of acres irrigated annually:

Estimated to be 3,430 acres.

C. Projected number of acres to be irrigated in 10 years:

Estimated to be 4,615 acres.

D. Number of active irrigation customers:

Approximately 16 reuse irrigation customers and 10 agricultural irrigators around the Hamby Water Reclamation Plant, including irrigation of the Hamby plant grounds.

E. Total irrigation water delivered annually (in acre-feet):

Approximately 1,600 acre-feet per year.

F. Types of crops grown by customers:

Landscaping foliage, lawns and irrigated grounds are typical crops for users within the Abilene urban area. Cotton, wheat, hay, milo and coastal Bermuda are the typical crops grown around the Hamby Wastewater Reclamation Facility.

G. Types of irrigation systems used by customer:

Commercial sprinkler/drip irrigation systems are typical for urban users. Center pivot and flood irrigation techniques are common for agricultural users around the Hamby Wastewater Reclamation Facility.

H. Types of drainage systems used by customers:

Abilene use policies require tailwater containment and control to prevent unauthorized discharges.

I. Further description of irrigation customers:

Irrigation customers consist of a mixture of landscaping growers, golf courses, schools, universities, detention facilities and private individuals in addition to agricultural users around the Hamby Wastewater Reclamation Facility.

J. List of municipal customers and number of acre-feet allocated annually:

Wholesale Municipal Customer	Contracted Amount (ac-ft/yr)
City of Baird	77
City of Merkel	353
City of Tye	184
City Clyde	307
City of Lawn	77
Blair WSC	77
Hamby WSC	308
Hawley WSC	307
S.U.N. WSC	230
Eula WSC	61
Potosi WSC	307
Steamboat Mountain WSC	307
View-Caps WSC	199
Dyess AFB	500 (1)
Total	**3,294**

Note 1: See Note 1 on page 5

K. List of industrial and other large customers (institutional) and number of acre-feet allocated annually:

Customer	Expected Amount (ac-ft/yr)
Abtex Beverage (Industrial)	219
APANI Southwest (Industrial)	32
Bandag (Industrial)	51
BFI (Industrial)	2.6
Caldwell Products (Industrial)	5
Cintas (Industrial)	58
Coca Cola (Industrial)	342
Crown Cork & Seal (Industrial)	0.2
Fehr Foods (Industrial)	6.6
Frontier Welded Products (Industrial)	0.4
Hirschfeld Steel (Industrial)	3.1
Martin Sprock & Gear (Industrial)	5.4
Mircometals (Industrial)	8
Mrs. Baird (Industrial)	15
Mueller, Inc. (Industrial)	0.2
PWP Industries (Industrial)	4.3
Rentech (Industrial)	4.8
Tige Boats (Industrial)	8
U.S. Brass (Industrial)	0.2
Valley Faucet (Industrial)	0.2
Victor Equipment (Industrial)	0.2
Zoltek (Industrial)	58
Taylor Trucking (Industrial)	2.8
Hendrick Medical Center (Institutional)	120
Abilene Regional Medical Center (Institutional)	85
Abilene State School (Institutional)	128
Total	**1,160**

Source: City of Abilene Records-2004

L. Additional information about water users:

NA

IV. Describe **specific and quantified five-year and ten-year targets for water savings** including maximum allowable losses for the storage and distribution system:

The 5-year and 10-year targets for water savings is to maintain the irrigation requirement at or below the area agronomic standard of 24-inches per acre per year. It should be noted that occasionally the City allows the agronomic standard rate to be exceeded in order to flush the crop root zone to improve plant productivity, livelihood, growth enhancement and overall reduction in crop water demand.

The maximum allowable losses from storage (transmission system storage, not open lakes/ponds) and distribution is targeted at 15%, as calculated by metered water sold or provided and the City's master meter diversion records.

V. Describe the practice(s) and/or device(s) which will be utilized to measure and account for the amount of water diverted from the source(s) of supply:

The City of Abilene utilizes individual meters at each point that water is diverted from the City's facilities to a user. All water delivered by the City for agricultural use is metered by the City including unbilled water delivered to irrigators around the Hamby Water Reclamation Facility. Water discharged to Freewater Creek from the Hamby Water Reclamation Facility is metered using an open-channel Parshall flume and associated flow metering and recording device. The metering device associated with the Parshall Flume at the plant undergoes annual calibration.

VI. Describe the monitoring and record management program for water deliveries, sales, and losses:

Abilene utilizes a record management system which records all water diverted from raw water sources and all raw, treated, and reclaimed water deliveries. The City tracks water deliveries by water type as raw water, treated water, reclaimed water and irrigation water (provided to irrigators around the Hamby Water Reclamation Plant). The City monitors water diversion and water deliveries to track water transmission, distribution, and delivery to customers. This information is used to evaluate the integrity of the water delivery system from source to end user to control and minimize unaccounted-for uses of water. The record management system utilized by the City of Abilene segregates water sales and users into user classes of raw water, reclaimed water, treated residential, treated commercial, treated public/institutional, treated industrial and treated wholesale.

VII. Describe any methods that will be used for water loss control, leak detection, and repair:

Water loss control is practiced through water loss accounting procedures. The City's record keeping system aids in comparing the water sold figures to the water diverted figures to detect unusual use patterns and possible leaks from the system. It is Abilene's policy to investigate complaints associated with potential water leaks on a timely basis. Once alerted to a potential leak, City crews visually inspect suspected leaks, with quick and timely repairs to those leaks when detected.

VIII. Describe any program for customer assistance in the development of on-farm water conservation and pollution prevention measures:

It is the City's policy to assist any water user with water conservation and pollution prevention measures where feasible. It is also the City's policy to refer irrigation users supplied by the City to the Jones County and Taylor County Extension Offices for expert assistance with development of individual on-farm water conservation and pollution prevention measures.

IX. Describe any other water conservation practice, method, or technique which the supplier shows to be appropriate for achieving conservation (if applicable):

The City of Abilene has developed and implemented a wastewater reuse program whereby treated wastewater is supplied to irrigators in the service area thereby lessening the demand for both raw and treated water use for irrigation.

X. Additional Requirements:

It is Abilene's policy to include in every wholesale potable water supply contract entered into or renewed after official adoption of the City's Municipal Water Conservation Plan, including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using applicable elements in 30 TAC 288. If the wholesale customer intends to resell the water, then the contract between Abilene and the wholesale customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with 30 TAC 288.

ATTACHMENT 1

Copy of Resolution Adopting
City of Abilene
Water Conservation Plan for Agricultural Water Use

RESOLUTION NO. 32-2007

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS, APPROVING AMENDMENTS TO THE CITY'S WATER MANAGEMENT PLAN.

WHEREAS, the City of Abilene ("City") has practiced effective water conservation efforts since the early 1980s; and,

WHEREAS, the City officially adopted a water conservation plan called the "City of Abilene Water Management Plan" (the "WMP") on June 12, 1986, and amended the WMP in April 2001 and March 2005; and,

WHEREAS, the WMP provides for the orderly development, management, conservation and protection of Abilene's water resources; and,

WHEREAS, the Texas Commission on Environmental Quality ("TCEQ") now requires certain data be a part of the WMP regarding industrial/mining use and agricultural use; and,

WHEREAS, the City now desires to amend the WMP to include information regarding industrial/mining use and agricultural use.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS:

PART 1: That the document labeled "INDUSTRIAL/MINING WATER CONSERVATION PLAN" attached as Exhibit A, incorporating current utility data and addressing current requirements of the TCEQ for industrial/mining use, is hereby adopted to supplement the City's WMP and is hereby incorporated into the WMP.

PART 2: That the document labeled "SYSTEM INVENTORY AND WATER CONSERVATION PLAN FOR AGRICULTURAL WATER SUPPLIERS PROVIDING WATER TO MORE THAN ONE USER" attached as Exhibit B, incorporating current utility data and addressing current requirements of the TCEQ for agricultural use, is hereby adopted to supplement the City's WMP and is hereby incorporated into the WMP.

ADOPTED and EFFECTIVE this 27 day of September A.D., 2007.

ATTEST:

Danette Dunlap
Interim City Secretary

Norm Archibald
Mayor

APPROVED:

T. Daniel Santee, II
City Attorney

ATTACHMENT 2

Copy of Transmittal Letter of
City of Abilene
Water Conservation Plan for Agricultural Water Use
to Brazos Region G Water Planning Group

CITY OF ABILENE

WATER DEPARTMENT

September 28, 2007

Dr. Scott Mack
Chair Brazos Region G Water Planning Group
c/o, Theresa Clark: Water Conservation/Drought Contingency Plans
P.O. Box 7555
Waco, TX 76714

Dear Dr. Mack:

This letter is to notify you that the City of Abilene recently revised its water conservation planning documents to include Agricultural and Industrial/Mining Water Conservation Plans. This notice is being provided in accordance with Texas Water Development Board and Texas Commission on Environmental Quality rules.

Copies of the Plans are enclosed. Please note that the Plans, consistent with the City's adopted Municipal Water Conservation Plan, use 2004 as the "previous year" and 2005 as the "next year" when presenting data. Coordinated use of the City records and future planning projections promotes consistency between the City's municipal, agricultural and industrial/mining water conservation plans. It is the City's intent to maintain this inter-plan coordination during the 2009 update cycle.

If you have any questions or comment, please contact us.

Sincerely,
City of Abilene

Tommy O'Brien, PE
Director of Water Utilities

Enclosure: Agricultural and Industrial/Mining Water Conservation Plans

cc: David Vela, Assistant City Manager
Theresa James, Assistant City Attorney
Martin Rochelle, Attorney
Scott Hibbs, Enprotec/Hibbs & Todd

ATTACHMENT 3

City of Abilene Industrial Water Conservation Plan
(Includes utility profile for industrial users)

ATTACHMENT 3

City of Abilene Industrial Water Conservation Plan
(Includes utility profile for industrial users)

Texas Commission on Environmental Quality

INDUSTRIAL/MINING WATER CONSERVATION PLAN

This form is provided to assist entities in conservation plan development for industrial/mining water use. If you need assistance in completing this form or in developing your plan, please contact the conservation staff of the Resource Protection Team in the Water Supply Division at (512) 239-4691.

Date: September 2007

Name of Entity: City of Abilene

Address & Zip: PO Box 60; Abilene, TX 79604-0060

Telephone Number: 325.676.6000 **Fax:** 325.676.6458

Form Completed By: Scott F. Hibbs, P.E.

Title: Principal Engineer, Enprotec/Hibbs & Todd, Inc.

Signature: Scott F. Hibbs **Date:** 9/10/07

STATE OF TEXAS
SCOTT F. HIBBS
63462
REGISTERED
PROFESSIONAL ENGINEER

Verified By: Tommy O'Brien, P.E.

Title: Director of Abilene Water Utilities

NOTE: If the plan does not provide information for each requirement, include an explanation of why the requirement is not applicable.

I. BACKGROUND DATA

A. Water use

1. Annual diversion appropriated or requested (in acre-feet):

The City of Abilene diverted (in 2004) approximately 21,469 acre-feet of which approximately 842 acre-feet of surface water diversion was used by industrial users. It should be noted that prior to 2005 the industrial user category included public and institutional users consisting of hospitals and universities. In 2005, the City began tracking public/institutional water sales in a separate category apart from industrial use. Industrial use represented in this plan is exclusive of public/institutional use.

2. Maximum diversion rate (cfs):

The City's potable water treatment works have a combined capacity of 51 million gallons per day (MGD). At 51 MGD the diversion of raw water to the treatment works is 79 cubic feet per second (CFS) of which approximately 4% or 3.2 CFS is diverted for industrial use.

B. Water sources

1. Please indicate the maximum or average annual amounts of water currently used and anticipated to be used (in acre-feet) for industrial/mining purposes:

Projected annual industrial use over the next decade is summarized as follows:

Year	**Industrial Use (acre-feet/year)**
2006	863
2007	872
2008	881
2009	890
2010	900
2011	905
2012	910
2013	916
2014	921
2015	927

Source: Brazos Region G Water Planning Group (Jones & Taylor County Manufacturing) & City of Abilene Records

2. List sources and water right numbers:

Surface Water Source	Number	Amount (ac-ft/yr)
Lake Fort Phantom Hill	CA 12-4161B	30,690
Lake Abilene	CA 12-4142	1,675
Lake Kirby	CA 12-4150A	3,880
Clear Fork Scalping	CA 12-4139A	30,000
Deadman Creek	CA 12-4165A	3,000
Wastewater Effluent	Permit No. 4266C	4,330
Hubbard Creek Reservoir	Contract for Purchase	25,500
Lake O.H. Ivie		10,950
	Total	110,025

3. How was the surface water data provided above (B1) obtained?
Master meter___; Customer meter_X_;

4. Was purchased water raw _X_or treated _X_?
If both, % raw _0.6%_ , % treated raw _99.4%_ .
Supplier(s): The City of Abilene supplies both raw and treated (potable water.

5. How was the groundwater data provided above (B1) obtained? NA
Master meter____; Customer meter____; Estimated ____; Other ____
If other, identify source: __________________________________

6. What is the rate and cost of purchased water?

Current as of August 31st, 2007:

Rate: per 1,000 gallons Cost: $1.58

There is an additional charge of $0.60 per thousand gallons for costs associated with developing the City's Lake Ivie supply.

C. Industrial/Mining Information

1. Major product or service produced by applicant:

Industrial water users receiving water from the City of Abilene utilize water to operate and produce a variety of products and services including:

Industry	SIC	NAICS[1]	# of Employees
Linen and uniform rental supply	7213	812331	50-99
Dry cleaning and laundry services	7216	812332	5-9
Cookie, cracker and pasta mfg.	2052	311821	100-249
Bread and bakery product mfg.	2051	311812	100-249
Soft drink mfg.	2086	312111	300-749
Plate work/fabricated structural product	3443	332312	50-99
Industrial supplies merchant wholesalers	3599	423840	50-99
Metal cans, boxes and other containers	3411	332431	100-249
Plumbing goods merchant wholesalers	3432	423720	100-249
Ship and boat building	3732	336612	100-249
Bottled/bulk water companies	2086	312112	10-19
All other misc manufacturing	3599	339999	20-49
All other fabricated metal products	3441	332999	50-99
All other chemical preparation mfg.	2899	325998	50-99
Other rubber products mfg.	3052	326299	100-249
Solid waste landfill	4953	562212	5-9
Stockyards (i.e., not for fattening or selling livestock), transportation	4789	488999	20-49

Source: Texas Workforce Commission-Labor Market Information

Note 1: 2007 NAICS provided

II. WATER USE AND CONSERVATION PRACTICES

A. Water Use in Industrial or Mining Process:

The City of Abilene provides water to approximately 23 industrial water users. Each user utilizes water in different ways within their industrial facilities. An estimate of industrial water is as follows:

Production Use	% Ground Water	% Raw Surface Water	% Saline Water	% Treated Water	Water Use (ac-ft/yr)
Cooling, condensing, & refrigeration	0	0	0	0	0
Processing, washing, transport	0	1%	0	99%	241
Boiler feed	0	0	0	0	0
Incorporated into product	0	0	0	100%	560
Other	0	0	0	0	0

Facility Use	% Ground Water	% Raw Surface Water	% Saline Water	% Treated Water	Water Use (ac-ft/yr)
Cooling, tower(s)	0	0	0	0	0
Pond(s)	0	0	0	0	0
Once through	0	0	0	0	0
Sanitary and drinking	0	0	0	100%	38
Irrigation and dust control	0	100%	0	0	3

1. Was fresh water recirculated at these facilities?
   ___ Yes _X_ No

2. Was electric power generated at these facilities (for in-plant use or for sale)?
   ___ Yes _X_ No

3. Description of the above use(s) of water (e.g., if water is being used for cooling, indicate the cooling system: tower, pond, etc.):

   The City of Abilene supplies water to approximately 23 industrial users. Approximately 67% of Abilene's current industrial use is water that is incorporated into the product. An additional 29% of Abilene's current industrial use is wash down water to clean equipment and machinery and related production use. The remaining 4% of the current industrial use is water for dust control and domestic drinking, bathing and wash water use at these facilities.

4. Describe or illustrate how surface water is diverted and delivered to the point(s) of use, the location of the diversion(s) and points of use, and how diversions are measured:

Raw surface water is supplied to Abilene's treatment works from several sources. Abilene utilizes master meters at each source of supply to account for the amount of water diverted from each source of supply. A pump station located on the eastern bank of Lake Fort Phantom pumps raw water from Lake Fort Phantom to the Northeast Treatment Plant and the Grimes Treatment Plant. A raw water delivery system consisting of two parallel pipelines can provide up to 30 million gallons per day (MGD) from Hubbard Creek Reservoir to the Fort Phantom delivery system. Raw water is also pumped approximately 50 miles from Lake O.H. Ivie to the Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola. Water flows through a 21-mile long gravity pipeline from Lake Abilene to the small Abilene Treatment Plant (currently not in use) located near Buffalo Gap Road and FM 707. A pump station on the banks of the Clear Fork of the Brazos River, near Lake Fort Phantom provides diversion pumping for up to 30,000 ac-ft/yr into Lake Fort Phantom under selected volume and quality conditions.

The City's Water Treatment System consists of three treatment plants having the maximum treatment capacity of 51 MGD and combined treated water storage of 11.95 million gallons (MG). The Northeast Water Treatment Plant on East Lake Road has a capacity of 25 MGD and treats raw water drawn from Lake Fort Phantom and Hubbard Creek Reservoir. The Grimes Water Treatment Plant on East Highway 80 has a treatment capacity of 20 MGD and treats water drawn from Lake Fort Phantom and Hubbard Creek Reservoir. The Hargesheimer Water Treatment Plant located on Highway 83/84 near Tuscola has a micro-filtration capacity of 8.95 MGD, and a reverse osmosis/ blended capacity of 6.0 MGD, and treats raw water drawn from Lake O.H. Ivie.

Two of the industrial water users supplied by the City utilize raw water diversion totaling approximately 5 acre-feet per year or approximately 0.6% of the total industrial water use. Raw water diverted for industrial use is delivered from the raw water delivery system that supplies water to the Grimes water treatment plant. Each of the two industrial raw water service lines is equipped with a meter that measures water diversion to each industrial raw water user.

5. Monthly water demand for previous year (in acre-feet):

2004	Total Diversion (ac-ft)	Industrial Diversion (ac-ft)	% of Industrial Diversion Returned to WWTP	Net Monthly Industrial Demand (ac-ft)
January	1,589	70.2	29%	49.8
February	1,412	70.2	29%	49.8
March	1,545	70.2	29%	49.8
April	1,725	70.2	29%	49.8
May	1,944	70.2	29%	49.8
June	2,067	70.2	29%	49.8
July	2,333	70.2	29%	49.8
August	2,061	70.2	29%	49.8
September	2,044	70.2	29%	49.8
October	1,690	70.2	29%	49.8
November	1,490	70.2	29%	49.8
December	1,565	70.2	29%	49.8
Total	21,469	842		598

6. Projected monthly water demand for next year (in acre-feet):

2005	Total Diversion (ac-ft)	Industrial Diversion (ac-ft)	% of Industrial Diversion Returned to WWTP	Net Monthly Industrial Demand (ac-ft)
January	1,629	68.9	29%	48.9
February	1,447	68.9	29%	48.9
March	1,584	68.9	29%	48.9
April	1,768	68.9	29%	48.9
May	1,993	68.9	29%	48.9
June	2,119	68.9	29%	48.9
July	2,391	68.9	29%	48.9
August	2,112	68.9	29%	48.9
September	2,095	68.9	29%	48.9
October	1,732	68.9	29%	48.9
November	1,527	68.9	29%	48.9
December	1,604	68.9	29%	48.9
Total	22,000	827		587

B. Specific and Quantified Conservation Goal

Water conservation goals for the industrial and mining sector are generally established either for (1) the amount of water recycled, (2) the amount of water reused, or (3) the amount of water not lost or consumed, and therefore is available for return flow.

1. Water conservation goal (water use efficiency measure):

Type of goal to be used:
____ Percent of water reused
____ Percent of water not consumed, and therefore returned as flow
__X_ Other (specify)

2. Provide the specific and quantified five-year and ten-year targets for water savings and the basis for development of such goals for this water use/facility:

The primary industrial water use by industrial users currently served by the City of Abilene is water incorporated into industrial products. Other industrial production water uses are fixed in direct proportion to these consumptive uses and are not subject to conservation measures. The remaining areas of industrial water facility use subject to water conservation measures currently include: water for wash-down, dust control and sanitary/domestic uses. The City of Abilene delivers approximately 38 acre-feet per year to area industrial users for these facility use needs. Conservation measures appropriate for reduction of industrial water used for wash-down, dust control, and sanitary/domestic uses include: reuse of treated wastewater effluent for wash-down and dust control; implementation of water-efficient practices and technologies; and sanitary/domestic industrial water use conservation strategies.

Based on these industrial water conservation measures the 5-year target for industrial water savings is to reduce source water diversion for wash-down, dust control and sanitary/domestic uses by current industrial users from 38 acre-feet per year to 37 acre-feet per year by the end of 2010. The 10-year target for industrial water savings is to maintain water use at 37 acre-feet per year by the end of 2015. The 5 and 10-year goals represent an annual water savings of 1 acre-foot per year over present industrial water use rates, and were developed considering Abilene's current industrial user base. The City will evaluate and revise industrial water use conservation goals, if warranted, as industrial users are added or subtracted from the current user base. The City encourages new industrial users to include and implement water conservation as a strategic part of their operating program.

3. Describe the methods and/or device within an accuracy of plus or minus 5% used to measure and account for the amount of water diverted from the source of supply:

   It is Abilene's policy to purchase meters that meet at least the minimum standards developed by the American Water Works Association. Metering devices used to meter water diverted from the source of supply are typically accurate to within plus or minus 5% to measure and account for water diverted from the source of supply.

4. Leak-detection, repair, and water-loss accounting measures used:

   It is Abilene's policy to investigate complaints associated with potential water leaks on a timely basis. Once alerted to a potential leak, City crews visually inspect suspected leaks, with quick and timely repairs to those leaks when detected. Water loss control is practiced through water loss accounting procedures and water loss audits. The City's record keeping system aids in comparing the water sold figures to the water diverted figures to detect unusual use patterns and possible leaks from the system.

5. Equipment and/or process modifications used to improve water use efficiency:

   The Water Utilities Department strives to work with area industries to find best methods to conserve water use. Industrial facility inspections and individual responses to public inquiries about water and conservation measures help to focus conservation efforts towards the industrial sector needs.

6. Other conservation techniques used:

   The City of Abilene's Water Conservation Program utilizes Supply Management Methods and Demand Management Methods to work towards optimizing use of Abilene's water resources.

   a. Supply Management Program Elements consist of:
      (1) Coordinated use of water supplies to ensure the City withdraws water from its water supply reservoirs in a manner that ensures maximum dependable yield and efficiency of operation.

(2) Watershed management to ensure diversion channels to Lake Fort Phantom are clean, relatively straight, and obstruction- free to increase captured water flow while minimizing flooding potential in populated areas.
(3) Metering all service connections to ensure maximum return for delivered water while minimizing unaccounted-for water loss.
(4) Leak detection and repair to minimize unaccounted-for water loss.
(5) Treated wastewater reuse and recycling to lessen the demand for raw water used to produce potable water, and for raw water pumping for irrigation uses.

b. Demand Management Program Elements consist of:
(1) Water pricing as a mechanism for encouraging water customers to conserve.
(2) Regulations for conserving water via the various Water Conservation Plans and the Drought Contingency Plan adopted by the City.
(3) Plumbing Code for the City of Abilene requires maximum standard plumbing fixture capacities not be exceeded. Abilene supports a Low-Income Housing Retrofit Program and City Building Retrofit program to determine the feasibility of retrofitting fixtures in selected structures.
(4) Continuing education programs to increase public awareness of supply, treatment and conveyance systems in Abilene, to increase public awareness of the benefits and need for conservation, and to make information about practical cost-effective methods and technologies to achieve conservation readily available.

III. WASTEWATER USE CHARACTERISTICS

A. Check the type(s) of wastewater disposal system(s) used at this facility:

___ On-site wastewater plant
___ Septic tank(s)
___ Injection well(s)
_X_ City or regional wastewater system
___ Other (Please identify)

B. What quantity of fresh water was consumed, and therefore not returned to a wastewater treatment system (public or private), or to a water course (including loss to product, evaporation, injection, etc.)?

During the period of 2002-2004 the systemwide average of wastewater treated at the City's Hamby wastewater treatment plant as a percentage of the total raw water diverted for treatment at the City's potable water treatment facilities averaged 68%. Therefore, 32% of diverted raw water was not returned to the Hamby Plant during the period of 2002-2004. Industrial users return even less with approximately 29% of diverted industrial water being returned to the Hamby plant for treatment, based on industrial facility inspections conducted by the City staff and available City records.

IV. ADDITIONAL COMMENTS/INFORMATION

Please provide any additional information that may indicate the present and future water needs at this facility, and any water problems. NA

ATTACHMENT 1

Copy of Resolution Adopting
City of Abilene
Water Conservation Plan for Industrial Water Use

RESOLUTION NO. 32-2007

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS, APPROVING AMENDMENTS TO THE CITY'S WATER MANAGEMENT PLAN.

WHEREAS, the City of Abilene ("City") has practiced effective water conservation efforts since the early 1980s; and,

WHEREAS, the City officially adopted a water conservation plan called the "City of Abilene Water Management Plan" (the "WMP") on June 12, 1986, and amended the WMP in April 2001 and March 2005; and,

WHEREAS, the WMP provides for the orderly development, management, conservation and protection of Abilene's water resources; and,

WHEREAS, the Texas Commission on Environmental Quality ("TCEQ") now requires certain data be a part of the WMP regarding industrial/mining use and agricultural use; and,

WHEREAS, the City now desires to amend the WMP to include information regarding industrial/mining use and agricultural use.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ABILENE, TEXAS:

PART 1: That the document labeled "INDUSTRIAL/MINING WATER CONSERVATION PLAN" attached as Exhibit A, incorporating current utility data and addressing current requirements of the TCEQ for industrial/mining use, is hereby adopted to supplement the City's WMP and is hereby incorporated into the WMP.

PART 2: That the document labeled "SYSTEM INVENTORY AND WATER CONSERVATION PLAN FOR AGRICULTURAL WATER SUPPLIERS PROVIDING WATER TO MORE THAN ONE USER" attached as Exhibit B, incorporating current utility data and addressing current requirements of the TCEQ for agricultural use, is hereby adopted to supplement the City's WMP and is hereby incorporated into the WMP.

ADOPTED and EFFECTIVE this 27 day of September A.D., 2007.

ATTEST:

Danette Dunlap
Interim City Secretary

Norm Archibald
Mayor

APPROVED:

T. Daniel Santee, II
City Attorney

ATTACHMENT 2

Copy of Transmittal Letter of
City of Abilene
Water Conservation Plan for Industrial Water Use
to Brazos Region G Water Planning Group

CITY OF ABILENE

WATER DEPARTMENT

September 28, 2007

Dr. Scott Mack
Chair Brazos Region G Water Planning Group
c/o, Theresa Clark: Water Conservation/Drought Contingency Plans
P.O. Box 7555
Waco, TX 76714

Dear Dr. Mack:

This letter is to notify you that the City of Abilene recently revised its water conservation planning documents to include Agricultural and Industrial/Mining Water Conservation Plans. This notice is being provided in accordance with Texas Water Development Board and Texas Commission on Environmental Quality rules.

Copies of the Plans are enclosed. Please note that the Plans, consistent with the City's adopted Municipal Water Conservation Plan, use 2004 as the "previous year" and 2005 as the "next year" when presenting data. Coordinated use of the City records and future planning projections promotes consistency between the City's municipal, agricultural and industrial/mining water conservation plans. It is the City's intent to maintain this inter-plan coordination during the 2009 update cycle.

If you have any questions or comment, please contact us.

Sincerely,
City of Abilene

Tommy O'Brien, PE
Director of Water Utilities

Enclosure: Agricultural and Industrial/Mining Water Conservation Plans

cc: David Vela, Assistant City Manager
Theresa James, Assistant City Attorney
Martin Rochelle, Attorney
Scott Hibbs, Enprotec/Hibbs & Todd

ATTACHMENT 4

City of Abilene 2009 Water Conservation Implementation Report

ATTACHMENT 4

City of Abilene 2009 Water Conservation Implementation Report

Texas Commission on Environmental Quality

Water Conservation Implementation Report

TCEQ

This report must be completed by entities that are required to submit a water conservation plan to the TCEQ in accordance with Title 30 Texas Administrative Code, Chapter 288. Please complete this report and submit it to the TCEQ. If you need assistance in completing this form, please contact the Resource Protection Team in the Water Supply Division at (512) 239-4691.

Date: April 24, 2009

Name of Entity: City of Abilene

Address: PO Box 60; Abilene, TX 79604-0060

Telephone Number: (325) 676.6000 **Fax:** (325) 676.6229

Form Completed By: Scott F. Hibbs, P.E.

Title: Principal Engineer; Enprotec/Hibbs & Todd, Inc.

Signature: Scott F. Hibbs **Date:** 4/28/09

STATE OF TEXAS
SCOTT F. HIBBS
63462
REGISTERED
PROFESSIONAL ENGINEER

Verified By: Tommy O'Brien, P.E.

Title: Director of Abilene Water Utilities

Signature: Tommy O'Brien **Date:** 4-28-09

I. WATER USES

Indicate the type(s) of water uses (example: municipal, industrial, or agricultural).

The City of Abilene diverts water for the following uses:

A. Municipal
B. Wholesale
C. Industrial
D. Agricultural

II. WATER CONSERVATION MEASURES IMPLEMENTED

A. Description of Water Conservation Measure #1:

Water Conservation Program: The City of Abilene utilizes a water conservation program consisting of a supply management program and a demand management program to optimize supply of water while at the same time lessening demand imposed on the system by water users. Supply management program elements include:

- Coordinated use of multiple sources to maximizes sustainable yield from all sources.
- Watershed management of the Ft. Phantom watershed to increase captured water flow and decrease flooding potential in populated areas.
- Universal metering of service connections.
- Timely leak detection and repair practices.
- Treated wastewater reuse and recycling to lessen the demand for raw water diversion for potable water and raw water irrigation use.

Demand management program elements include:

- Water pricing as a mechanism for encouraging water customers to conserve.
- Local water conservation regulations consisting of the Water Conservation Plan and drought Contingency Plan adopted by the City.
- A City plumbing code that requires that maximum standard plumbing fixture capacities not be exceeded.
- A continuing education program to increase public awareness of the benefits of and need for conservation as well as make information about practical cost effective conservation methods and technologies available.

Date Water Conservation Measure #1 was implemented: The City's Water Conservation and Drought Contingency Plan which includes the Water Conservation Program outlined above has been in effect for a number of years, but most recently amended by the City in April 2005.

B. Description of Water Conservation Measure #2:

Universal Metering and Accuracy of Metering Devices: It is the City of Abilene's policy to meter all connections to the City water system. It is also City policy to purchases meters that meet minimum American Water Works Association (AWWA) accuracy standards. It is the City's goal to maintain meter accuracy standards to within plus or minus 5%.

Date Water Conservation Measure #2 was implemented: The City's longstanding policy of universal metering and metering accuracy standards is outlined in the City's Water Conservation and Drought Contingency Plan which was most recently amended by the City in April 2005.

C. Description of Water Conservation Measure#3:

Record Management System: The City of Abilene utilizes a record management system that segregates users into residential, commercial, public/institutional, agricultural and industrial user classes. This record management system is used to record water pumped, water delivered, water sales and water losses to track water transmission, distribution and delivery to customers. This information is used to evaluate the integrity of the water delivery system from source to end user to control and minimize unaccounted-for water use. As a result the City has maintained unaccounted-for-use-of-water below 3% for the most recent utility profile period.

Date Water Conservation Measure #3 was implemented: The City's record management system described above continues to evolve to better track, account for, and understand how water moves within the distribution system for delivery to end users.

D. Description of Water Conservation Measure #4:

Non-promotional Water Rate Structure: The City of Abilene utilizes a non-promotional, inverted rate structure. Under this rate structure the billing rate increases as individual water consumption increases. This rate structure promotes conservation and shifts the cost of supplying water to those consumers using it most.

Date Water Conservation Measure #4 was implemented: Non-promotional water rates have been in use by the City for many years. The most recent water rate structure adopted by the City has been in place since September 11, 2008.

E. Description of Water Conservation Measure #5:

Year-Round Water Use Management: The City of Abilene utilizes year-round water conservation measures to restrict certain potable water use activities by all customers of the City of Abilene Water Utility System. Pursuant to this measure all irrigation by commercial, industrial, and residential customers utilizing individual sprinklers, or sprinkler systems, on lawns, gardens, landscaped areas, trees, shrubs or other plants, may water only on designated day(s) and then only during designated hours as outlined in the City's drought contingency plan.

Date Water Conservation Measure #5 was implemented: The most recent version of the City's Water Conservation and Drought Contingency Plan was amended by the City in April 2005.

F. Description of Water Conservation Measure #6:

Additional Wholesale Contract Requirements: It is Abilene's policy to include in every wholesale water supply contract entered into or renewed after official adoption of the Plan, including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using applicable elements in 30 TAC 288, Subchapter A. If the wholesale customer intends to resell the water, then the contract between Abilene and the wholesale customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with 30 TAC 288, Subchapter A.

Date Water Conservation Measure #6 was implemented: The most recent version of the City's Water Conservation and Drought Contingency Plan was amended by the City in April 2005.

G. Description of Water Conservation Measure #7:

Treated Wastewater Reuse Program: In order to lessen the demand on the City's raw water sources the City relies on reuse of treated wastewater for supply to irrigators located within the City's service area. It is the City's policy to assist irrigators where feasible and practical to utilize reclaimed wastewater as their irrigation supply water. The City strives to work closely with local irrigation water users to ensure effective use of the City's water resources through improved irrigation systems, promoting healthy vegetation, and improved farming practices.

Date Water Conservation Measure #7 was implemented: The most recent version of the City's Water Conservation Plan for Agricultural Users which addresses irrigation practices and wastewater reuse policy was adopted by the City in September 2007.

III. TARGETS

A. Provide the specific and quantified five and ten-year targets as listed in water conservation plan for previous planning period.

Goals stated in the City's water conservation plans consist of retail use goals, wholesale use goals, agricultural use goals and industrial use goals as follows:

1. City of Abilene Retail User Goals

5-Year Specific/Quantified Target:	164 gallons per capita per day (gpcd)
Date to achieve target:	December 31, 2010
10-Year Specific/Quantified Target:	162 gpcd
Date to achieve target:	December 31, 2015

2. City of Abilene Wholesale User Goals

5-Year Specific/Quantified Target:	82 gallons per capita per day (gpcd)
Date to achieve target:	December 31, 2010
10-Year Specific/Quantified Target:	82 gpcd
Date to achieve target:	December 31, 2015

3. City of Abilene Agricultural User Goals

5-Year Specific/Quantified Target:	Application rate ≤ 24 inches per acre per year
Date to achieve target:	December 31, 2010
10-Year Specific/Quantified Target:	Application rate ≤ 24 inches per acre per year
Date to achieve target:	December 31, 2015

4. City of Abilene Industrial User Goals

5-Year Specific/Quantified Target:	Source water diversion for purposes of wash-down, dust control and sanitary domestic uses of ≤ 37 acre-feet per year
Date to achieve target:	December 31, 2010
10-Year Specific/Quantified Target:	Source water diversion for purposes of wash-down, dust control and sanitary domestic uses of ≤ 37 acre-feet per year
Date to achieve target:	December 31, 2015

B. State if these targets in the water conservation plan are being met.

The dates for the City's five- and ten-year water conservation goals established for retail, wholesale, agricultural and industrial users are December 31, 2010 and December 31, 2015 respectively. As such, neither date has yet been reached. However, a detailed review of water use by all water users of the Abilene water system show that system users continue to use water at rates within stated goals. Based on a review of current goals and water usage by all system users it is expected that the City will achieve its stated five- and ten-year goals described in the current plans.

C. List the actual amount of water saved.

Two water conservation measures implemented by the City that facilitate quantifying water savings include the City's record management system for water use and the City's treated wastewater reuse program.

During the water conservation utility profile period spanning the years 1995-1999, unaccounted-for-water-use (water loss) averaged 4.68%. During the subsequent utility profile period spanning the years 2000-2004 unaccounted-for-water-use averaged 2.78% or about 1.9% lower than during the previous profile period. A 1.9% reduction in water loss for the Abilene system equates to an annual savings of approximately 450 acre-feet per year.

Additionally, the City promotes reuse of treated wastewater for irrigation of acreage within the City's service area. Water savings resulting from reuse of treated wastewater has averaged 2,055 acre-feet per year for the period of 2000-2008.

On average, over the period of 2000-2008, the City of Abilene diverts approximately 23,150 acre-feet per year of raw water for municipal, wholesale, agricultural and industrial use. The quantifiable water savings related to water conservation practices implemented by the City of Abilene amounts to approximately 2,500 acre-feet per year or a decrease in raw water demand of about 10.6% annually.

D. If the targets are not being met, provide an explanation as to why, including any progress on the targets.

It is expected that stated targets will be met.

Appendix K
City of Waco
Water Conservation and
Drought Contingency Plan

City of Waco
Water Conservation Plan – 2009 Update

Specific, Quantified 5 & 10-Year Targets

The projected reductions are shown at annual increments. If continued indefinitely, the one percent per year reduction will lead Waco to a total gpcd of 140 in 2058, when residential consumption will be 55 gpcd. These targets and goals will be updated whenever the Water Conservation and Drought Contingency Plan is revised.

	Target for 2009	Target for 2010	Target for 2011	Target for 2012	Target for 2013	Target for 2014	Target for 2015	Target for 2016	Target for 2017	Target for 2018	Target for 2019	Target for 2020
Total GCPD	232	230	227	225	223	221	218	216	214	212	210	208
Residential GCPD	89	88	87	86	85	85	84	83	82	81	80	80
Non Residential GCPD	275	272	270	267	264	262	259	256	254	251	249	246

Metering Devices

The City maintains meters to ensure that accurate readings (meters registering at an accuracy of no less than ninety-five percent (95%) or no higher than one hundred five percent (105%) expressed as a percentage of the full scale of the meter and performing to American Water Works Association water metering standards) are being recorded. This ensures fair and equitable billing and reduces unaccounted for water. The most common size meter in the City is 5/8”, which are replaced at 1.5 million gallons of usage.

Universal Metering

The City of Waco requires meters for all connections and bills by volume of use. The City collects and tabulates metered water usage data on Commercial, Industrial, Residential (Single-Family, Multi-Family, and Duplex), Municipal and Wholesale accounts. Further, the City collects data on dedicated irrigation meters for all the above-mentioned classes. The City also measures and collects data on firefighting, construction, and main flushing water uses for water quality.

Unaccounted-For Water Use

The City of Waco performs periodic visual inspections along distribution lines as well as maintaining accurate water leak and repair records. Annual internal audits of water usage are conducted to determine water loss. Additionally, raw water diversions from Lake Waco are metered, calculated, and tracked at least daily as part of the treatment process control and reporting agreement with the U.S. Army Corps of Engineers. A spreadsheet of water use (treated water) is updated on a daily basis.

Continuing Public Education and Information

The City of Waco's water utility will produce written materials in the form of

- Brochures
- Newsletter articles
- Media releases
- Public service announcements.

These are distributed to the customers, the local media, and to nonprofit local organizations such as neighborhood associations, and civic improvement organizations that they may educate their members as well.

The water utility ensures that multimedia materials are also available through the utility's web site, http://www.wacowater.com/ The information is also broadcast over the city public access channel, and in cooperation with local media outlets for the release of information for both television and radio audiences.
Specific efforts include:

- Interactive screens on the city's web site
- Interviews with city experts in irrigation and plant water demand on the local access channel
- Interviews with city water utility management on the local access channel and with local television stations
- Press conferences to promote key educational moments
- Press events, such as giveaways or educational/fund events focused on reducing water use
- Booths at public events sponsored by neighborhood associations, civic organizations, not-for-profit education groups, and other city departments.

The water utility sponsors special conservation events and activities. Specific events include an annual Waterfest, a free event open to the public promoting water conservation with game, trivia, vendors and prizes, promoting water conservation.

The Water Utility participates in numerous radio and television interviews about water conservation tips.

Non-Promotional Water Rate Structure

Waco's conservation rate is an increasing block rate, which increases as the quantity used increases, and is detailed in Appendix A of this plan. Prices per thousand gallons increase at specific "tiers" in consumption. Each tier of the rate structure is designed to send a price signal to consumers as their discretionary consumption of water increases. Dedicated irrigation meters have a separate water rate. The rate increases more rapidly than non-irrigation accounts, thus sending an earlier price signal to outdoor water users.

Waco's rates are designed to recover the cost of providing service; and billing for water service is based on metered water use. The City of Waco supplies water and sewer service. Waco currently has a lifeline rate for low income and low water using customers. The initial 2,000 gallons of consumption are included with the monthly service fee. Both a seasonal rate and an additional high-water use tier shall be evaluated in an effort to reduce summertime peak usage.

Reservoir Systems Operations Plan

The water supply comes from Lake Waco, a man made reservoir constructed and operated by the U.S. Army Corps of Engineers.

Enforcement Procedure and Plan Adoption

The City Manager shall have the authority to designate the enforcement authority for the Emergency Water Management Plan. The City may serve a person or user in violation of this emergency Water Management Plan with a written notice stating the nature of the violation and giving a time limit for compliance. This notice may be in the form of a door hanger. The City may also issue a citation returnable to the Waco Municipal Court for a violation. Penalties may include a monetary fine and disconnection from water service. A copy of the ordinance is attached as Appendix B.

Coordination with the Regional Water Planning Group

The service area of the City of Waco is located within the Brazos G Regional Planning area and the City of Waco has provided a copy of this Water Conservation and Drought Contingency Plan to the Region Planning Group (RPG). A copy of the transmittal letter to the planning groups is provided in Appendix C.

This Plan is consistent with Waco's role as a leader in water supply planning in the RPG, and meets the standards for water conservation planning in TAC Chapter 288. We have coordinated with the RPG through the following measures:

- A City of Waco staff member sits on the planning group,
- City of Waco staff members (in addition to City's RPG Representative) attend Planning Group meetings,
- City of Waco staff has made formal comments (at meetings and in writing) at various times regarding issues with population and water demand projections and with selection of water management strategies,

The City of Waco has held numerous meetings with the RPG consultant to address issues related to Waco and the McLennan County area.

Program for Leak Detection, Repair and Water Loss Accounting

The City of Waco water utility shall annually complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit shall be calculated as follows:

- Determine metered sales;
- Determine other system verifiable uses;
- Determine total supply into the system;
- Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full-scale system audit is indicated.

When indicated, the water utility shall complete a water audit of the distribution system using methodology consistent with that described in AWWA's "Water Audit and Leak Detection Guidebook." The City of Waco shall advise customers whenever it appears possible that leaks exist on the customer's side of the meter; perform distribution system leak detection when warranted and cost-effective; and repair leaks when found. This approach is designed to keep lost water levels below 10 percent on an ongoing basis. The City of Waco's conservation program will update these goals as new water loss methodologies are introduced in the next several years.

Record Management System

The City of Waco uses a record management system to record water pumped, water deliveries, water sales and water losses which allows for the desegregation of water sales and uses the following classes:

Residential
Commercial
Municipal
Industrial
Irrigation
Wholesale

CITY OF WACO

2
0
0
5

Water Conservation & Drought Contingency Plan

CHAPTER 1

INTRODUCTION

The City of Waco 2005 Water Conservation and Drought Contingency Plan is designed to assist in reducing summertime peak demand and improve overall efficiency over the long-term. The City of Waco (City) operates a municipal water supply system with more than 39,000 retail customers serving a population in excess of 116,000. Wholesale customers serve an additional population of more than 29,000. The service area covers more than 100 square miles and seven pressure planes.

One of the focuses of the plan is reduction of outdoor water use as a means to reduce summertime peak consumption. In 2003 the City launched its “Beat the Peak” program designed to educate residential, commercial, industrial and wholesale customers about the importance of reducing summertime water use. The City continues to support the program through public education and has taken leadership in conservation efforts by retrofitting all City Parks irrigation systems with automatic controllers and upgrading irrigation equipment.

The long-term focus of the Plan is to “Conserve for Our Future” by stretching existing and planned expansions to the water systems by reducing per capita water consumption. Long-term conservation programs include conservation pricing, residential and industrial, commercial, and institutional water surveys designed to help customers reduce per capita water use by 15 percent over the next several decades. Increased usage of reuse water and aquifer storage and recovery will also help manage the demand profile and use water more efficiently.

The service area of the City of Waco is located within the Brazos G Regional Planning area and the City of Waco has provided a copy of this Water Conservation and Drought Contingency Plan to the Region Planning Group (RPG). This Plan is consistent with Waco’s role as a leader in water supply planning in the RPG, and meets the standards for water conservation planning in TAC Chapter 288. We have coordinated with the RPG through the following measures:

1. A City of Waco staff member sits on the planning group,
2. The City of Waco presented information on regional water needs in McLennan County at RPG meeting on the October 20, 2004. (Agenda Item 7.5)
3. City of Waco staff members (in addition to City’s RPG Representative) attend Planning Group meetings,
4. City of Waco staff has made formal comments (at meetings and in writing) at various times regarding issues with population and water demand projections and with selection of water management strategies,
5. The City of Waco has held numerous meetings with the RPG consultant to address issues related to Waco and the McLennan County area.

CHAPTER 2

Demand Profile, Targets and Goals

A. Demand Profile

Overall water demand in the year 2004 was 10.4 billion gallons. Residential customers and commercial customers were the two highest demand sectors followed by industrial retail customers (See Figure 1). Including wholesale customers as part of the annual demand profile shows that wholesale customers represented 9.8 percent of demand. Dedicated irrigation accounts represented 8.3 percent of overall consumption followed by city accounts at 0.7 percent of total consumption.

Figure 1

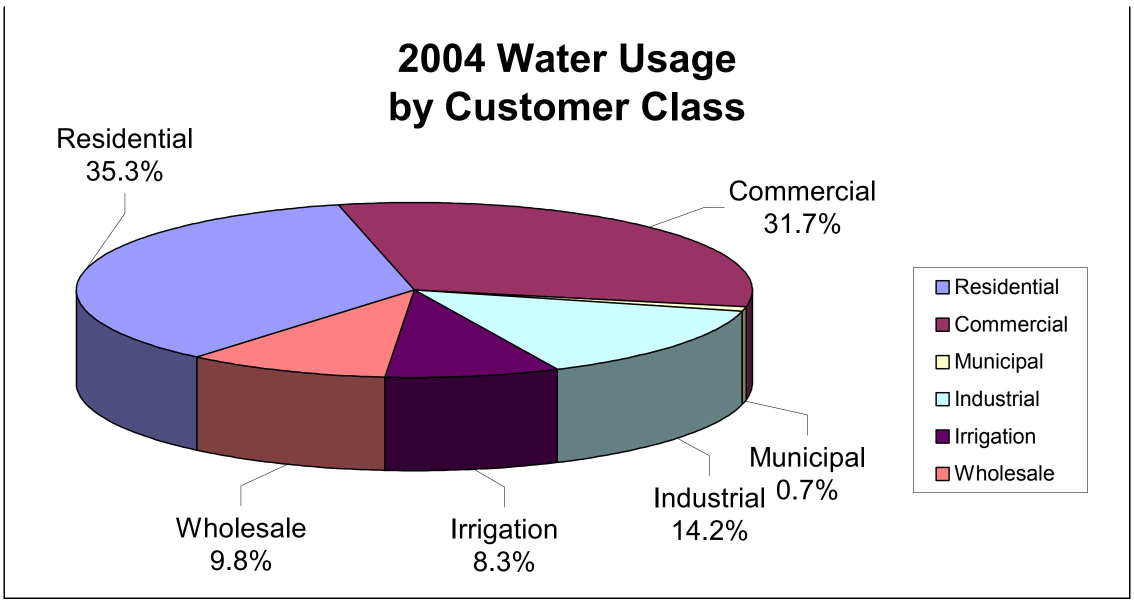
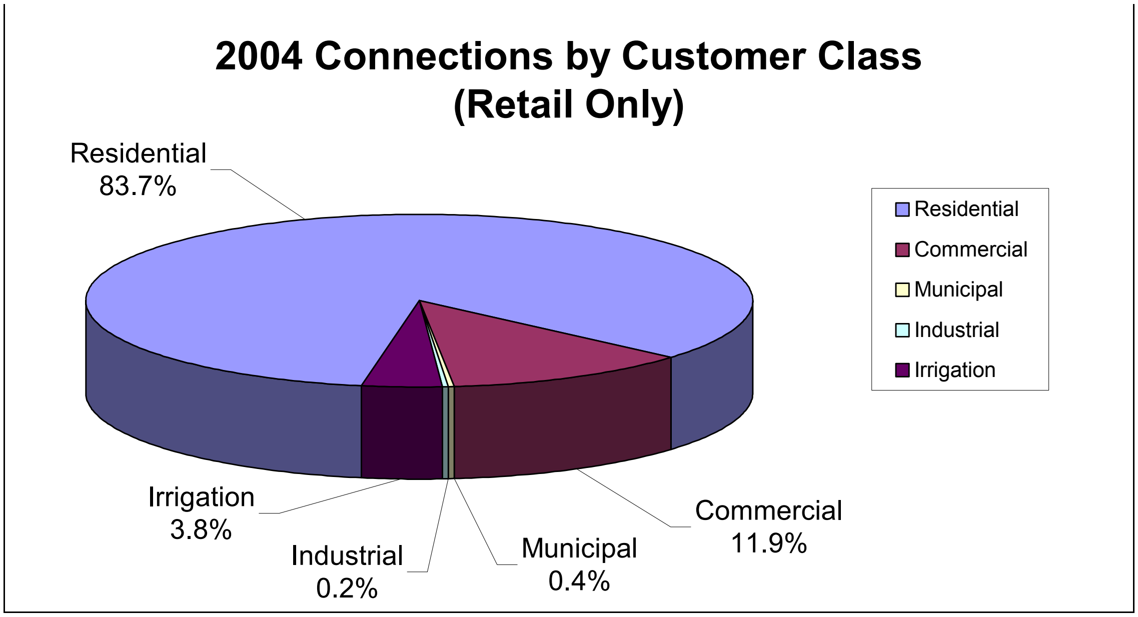


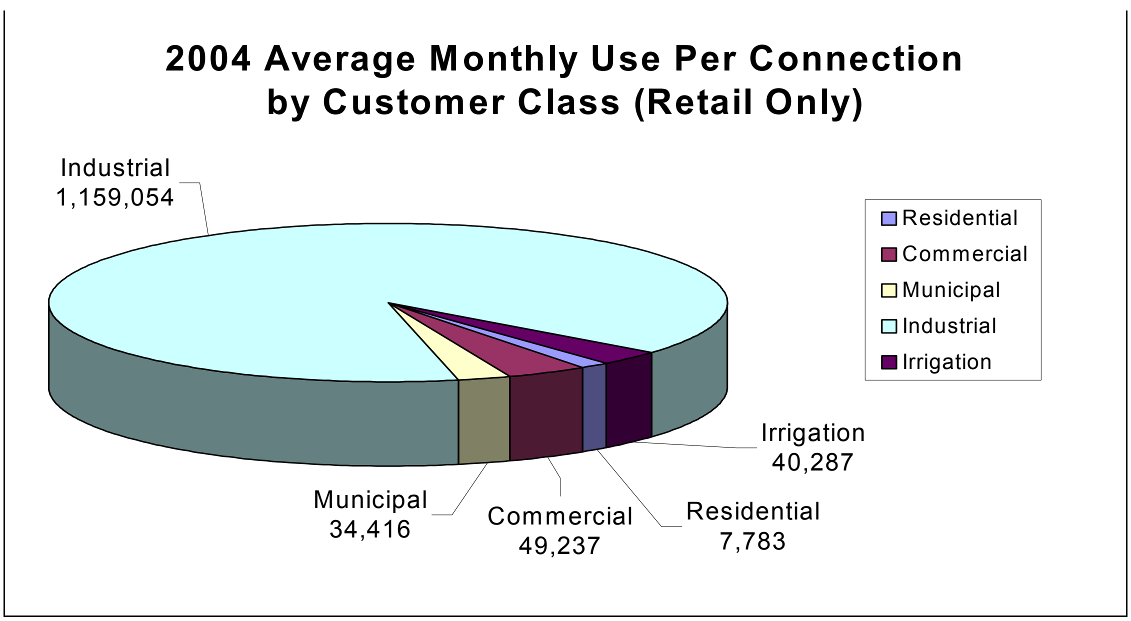
Figure 2 shows the breakdown of retail customers by connection. The chart indicates that residential accounts represent the largest type of account at 83.7 percent of all retail connections. Commercial customers account for the next largest number of customers at 11.9 percent of all accounts. Irrigation accounts represent 3.8 percent of all connections while municipal and industrial accounts were less than one percent each. Wholesale customers represent far less than one percent, and do not appear in this chart.

Figure 2



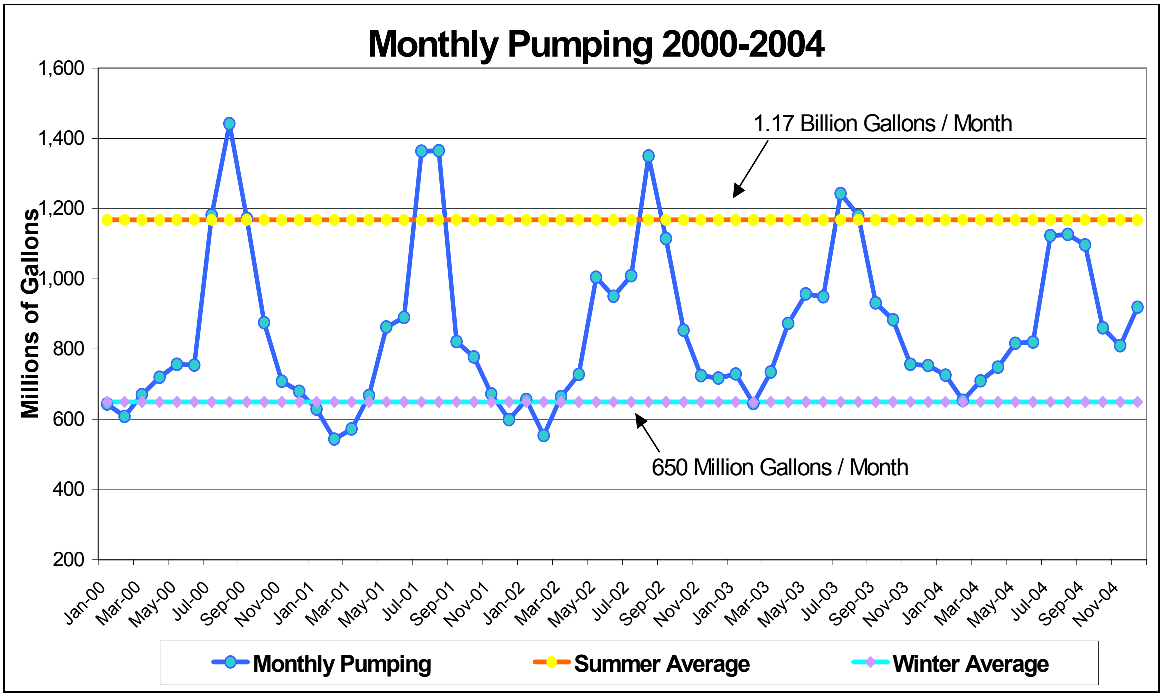
Examining average monthly demand by account gives a different picture. Figure 3 indicates that industrial accounts are the largest average monthly customers of all retail customers. This suggests that industrial customers, followed by commercial, and irrigation accounts can provide the largest water savings per completed water survey, or water conservation measure implemented. The City of Waco showed an unaccounted for water rate of 21.8 percent in 2004, and an average of 16.0 percent over the past four years.

Figure 3



Waco's demand profile shows the summertime peaks typical of Texas cities. The summertime months averaged 1.17 billion gallons per month over the past five years. Over a similar time period the wintertime average was approximately 650 million gallons per month (See Figure 4). Single-family residential customers make up the largest share of summertime pumping followed by commercial retail and wholesale customers. When looked at as a function of the ratio of wintertime average to summertime peak, wholesale customers, irrigation customers, municipal accounts and residential customers cluster at or above 2.0 times the winter average. Industrial and commercial customers have peaking ratio of approximately 1.2 times winter average.

Figure 4



B. Targets and Goals

The City of Waco Water Conservation and Drought Contingency Plan is focused on two efficiency goals. The first and most immediate goal is to reduce summertime peak pumping. The second goal is to reduce overall per capita consumption over the next several decades by 15 percent.

The immediate near term goal is designed to assist the City with challenges to distribution system capacity. Rapid growth in two areas of town, along with the addition of wholesale customers in recent years, has led to higher daily summertime peaks in water use. This has affected water system pressure levels, and thus makes more likely mandatory restrictions on water use. The City goal is to avoid mandatory restrictions by implementing a voluntary conservation program. In order to meet this goal maximum daily consumption needs to be below 66 MGD system wide. Proportional demand for pressure planes 2 and 4 must be maintained below this level as well. Should either the proportional demand or the overall demand exceed these levels; mandatory restrictions will need to be enforced.

Long-term water supply and demand projections for Region G indicate that the City of Waco demand and supply will be approximately equivalent in 50 years. The City of Waco has a long history of progressive water resource planning. In keeping with that tradition, and ensuring that future generations will have adequate water supplies, the City will promote water conservation as an alternative water supply. Conserving existing supplies is less expensive and has less environmental impact than attempting to build new reservoirs. In order to reduce per capita demand over the next several decades, the city has embarked on a water conservation program designed to educate citizens on the benefits of efficiency, and provide incentives for reduced water use through changes in behavior and installation of water saving equipment.

Table 1 shows recent per capita consumption and the goal of one percent reduction per year until achieving the goal of 140 total gpcd recommended by the State Water Conservation Implementation Task Force. The projected reductions are shown at 5 and 10 year increments as required by HB 2660. If continued indefinitely, the one percent per year reduction will lead Waco to a total gpcd of 140 in 2058, when residential consumption will be 55 gpcd. These targets and goals will be updated whenever the Water Conservation and Drought Contingency Plan is revised.

Table 1
Water Consumption Targets and Goals (GPCD)

Year	**2004**	**2009**	**2014**	**2058**
Total GPCD	241	229	218	140
Residential GPCD[1]	94	89	85	55
NonIndustrial GPCD[2]	214	204	194	125

[1] The City of Waco's current billing system does not distinguish between multi-family customers with more than 5 units, and other types of commercial customers. Thus only single-family consumption and 2004 population estimated from 2000 census data for single family homes are used in the residential gpcd calculation.

[2] The City of Waco also tracks non-industrial gpcd, since industrial users play such a significant role in overall water usage in the city, and many of the conservation programs are targeted to outdoors discretionary use, which does not impact industrial water consumption.

In addition to traditional water conservation methods focused on changes in customer consumption patterns, the utility plans to promote demand management techniques that provide the most efficient use of our water resources. Demand management programs that are anticipated to be investigated in the next planning time frame include reuse, aquifer storage and recovery, and conjunctive use of surface and groundwater resources.

Current efforts in reducing water losses focus on a percentage of unaccounted for water, or the difference between billed water consumption and total water production. The City's goal is to keep the water loss rate below ten percent. In 2004, the City's water loss was 21 percent. This represents an increase over recent years. The next step in meeting the City's efficiency goal will be to complete a system audit to determine the cause of the increase, and potential steps to reduce water losses.

Wholesale Customers
In addition to serving retail customers, the City of Waco has five wholesale customers that serve retail customers of their own, including the cities of Lacy Lakeview, West, Woodway, Hewitt and Bellmead. In each of their wholesale contracts, the City of Waco requires the entity to have and maintain a conservation and drought contingency plan, and encourages them to adopt a plan at least as aggressive as the City of Waco's. Each of these wholesale customers is a Municipal Water User Group (WUG) in the Region G Planning area. The Region G Planning Group has placed a high priority on water conservation, and in the current planning process is projecting a decrease in per capita demand of 21 gpcd by 2020 for all entities with a defined water need. The regional planning group will finalize this plan in the summer of 2005, and should the current draft be adopted, the projected target goals for wholesale WUGs served by the City of Waco, will be approximately a 6 gpcd reduction by 2009 and a 13 gpcd reduction by 2014.

D. Utility Survey Data

A detailed summary of the City's water and wastewater system is included in Appendix. A.

CHAPTER 3

WATER CONSERVATION
AND DEMAND MANAGEMENT MEASURES

A. Plan Elements

Conservation is achieved through a variety of measures affecting behavior of end-users and the installation of more efficient equipment. To implement these measures in a cost effective and focused manner they have been organized into a number of conservation programs. This chapter summarizes the various programs that the City will pursue. Following the program descriptions is a section on implementation schedules for each program area. The conservation measures are organized into the following eight program areas:

- Water Accountability Program
- Conservation Pricing
- Public Education and Information Programs
- Large Landscape Conservation Programs And Incentives
- Conservation Program for Industrial, Commercial, and Institutional Accounts
- Water Survey Programs For Single-Family And Multi-Family Residential Customers
- Reuse Water
- Alternative Water Supplies
- Ordinances and Wholesale Customer Agreements

B. Water Accountability Program

City of Waco requires meters for all new connections and bills by volume of use. The City collects and tabulates metered water usage data on Commercial, Industrial, Residential (Single-Family, Multi-Family, and Duplex), Municipal and Wholesale accounts. Further, the City collects data on dedicated irrigation meters for all the above-mentioned classes. The City also measures and collects data on firefighting, construction, and main flushing water uses for water quality.

The City of Waco will identify disincentives or barriers to retrofitting mixed-use commercial accounts with dedicated landscape meters, and will conduct a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters.

B.1 Meter Maintenance

The City maintains meters to ensure that accurate readings (meters registering at an accuracy of no less than ninety-five percent (95%) or no higher than one hundred five percent (105%) expressed as a percentage of the full scale of the meter and performing to American Water Works Association water metering standards) are being recorded. This ensures fair and equitable billing and reduces unaccounted for water. The most common size meter in the City is 5/8", which are replaced at 1 million gallons of usage or 8 years, whichever is sooner.

B.2 System Audit And Leak Detection And Repair

The City of Waco water utility shall annually complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit shall be calculated as follows:

- Determine metered sales;
- Determine other system verifiable uses;
- Determine total supply into the system;
- Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full-scale system audit is indicated.

When indicated, the water utility shall complete a water audit of the distribution system using methodology consistent with that described in AWWA's "Water Audit and Leak Detection Guidebook." The City of Waco shall advise customers whenever it appears possible that leaks exist on the customer's side of the meter; perform distribution system leak detection when warranted and cost-effective; and repair leaks when found. This approach is designed to keep lost water levels below 10 percent on an ongoing basis. The City of Waco's conservation program will update these goals as new water loss methodologies are introduced in the next several years.

C. Conservation Pricing

Conservation pricing provides incentives to customers to reduce average and/or peak use. Waco's conservation rate is an increasing block rate, which increases as the quantity used increases, and is detailed in Appendix A of this plan. Prices per thousand gallons increase at specific "tiers" in consumption. Each tier of the rate structure is designed to send a price signal to consumers as their discretionary consumption of water increases. Dedicated irrigation meters have a separate water rate. The rate increases more rapidly than non-irrigation accounts, thus sending an earlier price signal to outdoor water users.

Waco's rates are designed to recover the cost of providing service; and billing for water service is based on metered water use. The City of Waco supplies water and sewer service. Waco currently has a lifeline rate for low income and low water using customers. The initial 2,000 gallons of consumption are included with the monthly service fee. Both a seasonal rate and an additional high-water use tier shall be evaluated in an effort to reduce summertime peak usage.

D. Public Education and Information Program

The City of Waco's Public Education and Information Program promotes water conservation and water conservation related benefits. The Program includes providing speakers to employees, community groups and the media; using paid and public service advertising; offering public information to promote water conservation practices; and coordinating with other government agencies, industry groups, public interest groups, and the media.

The program also includes a school education program to promote water conservation and water conservation related benefits. Opportunities for learning are designed with Texas state educational goals in mind. Eventual curriculum material shall be available which relates water conservation themes to local water issues, and to all grade levels.

The themes for Waco's conservation education and information program are to:

- **Beat the Peak**
- **Conserve for the Future**

Beat the Peak focuses on summertime water use reductions, while Conserve for the Future promotes wise stewardship of our most precious resource, water.

D.1 Education And Informational Themes

The City of Waco faces conservation challenges on two fronts. In the near term, summertime peaking is the greatest challenge to the City of Waco's ability to distribute water. System expansion will assist with this over the next several years. This near-term conservation effort will be pursued under the theme "Beat The Peak."

The second conservation challenge for the City of Waco is the long-term effort to reduce per capita demand in order to ensure that the city's water supply stretches for the longest period possible. The city is blessed with a water resource that is the result of farsighted planning by City founding fathers. Enabling this resource to stretch far into the future is the most cost-effective means of ensuring the longevity of our supply. It is also the most cost-effective water supply project available, as all alternative supplies will be more expensive than the existing Lake water. The theme for the long-term conservation education effort is "Conserve For Our Future."

It is worth noting the water conservation education goes hand in hand with watershed protection, water quality, and water supply. Numerous opportunities are expected to merge education efforts focused on water conservation with those focused on stormwater, wetlands, water treatment, and other topics. The utility staff will look for opportunities to expand education and distribute information on these interdisciplinary themes.

D.2 Beat The Peak

The Beat The Peak campaign is composed of several elements. The first element is to educate customers about the water supply situation, the challenges to distribution capacity, and the ongoing plans and efforts to upgrade the distribution system. The second element is to educate people about the relationship of summertime water demand to overall demand on the system. Summertime peaks require greater than average capacity in order to deliver water at the time that most people have turned on the faucet or their irrigation system. It is specifically those types of water use that fluctuate seasonally, such as running irrigation systems, which provide the greatest challenge to our water utility. The third element will be to educate customers, especially those with large landscapes, or large summertime irrigation, about the possibilities for reducing their demands, and thus reducing both their bill and distress on the city's water capacity.

All public information and education efforts in the Beat The Peak campaign will start from educating the customers about the capacity issue, and summertime demand. Focused efforts targeted to specific audiences, including professional irrigators, large landscape managers, and residential customers, will stress the water savings potential from specific measures such as:

- Reducing irrigation hours and days;
- Maintaining irrigation systems at their optimum;
- Installing rain sensors;
- Planting low water use landscape materials; and
- Irrigating only when there are signs of plant stress.

Changes in both behavior and equipment can contribute to summertime water savings.
By targeting education efforts to specific high-water use audiences the message about water reductions will heard by the customers who can most help us beat the summertime peak.

D.3 Conserve For Our Future

As a regional water supplier for the Brazos River region, the City of Waco has a responsibility to provide water supply for retail and wholesale customers for the next 60 years. As part of state water planning Region G the City of Waco is projected to have sufficient supply for its needs for the next 50 years. However at that time the water supply and anticipated demand are expected to be equal. Prudent supply planning will include conservation as an integrated part of water resource planning. Water conservation is the least expensive means of expanding our supply over the next 50 years. A successful water conservation program will ensure that at the end of the next five decades Waco can continue to look forward to adequate supplies of freshwater in the future. By conserving now, the water needs of our community, the region, and the environment on which we depend can be protected.

Conserve For Our Future will contain elements of general water supply education, alternative water supply development, and specific measures that residential, commercial, and industrial customers can adopt to reduce their demand. Where possible, to increase the efficiency of our efforts, short-term beat the peak efforts will be integrated with the longer conserve for our future education efforts.

In addition to specific measures that can be adopted to conserve water in the home, in businesses, and in public facilities, an education effort will be promoted to help customers understand the long-term benefits of measures like:

- Rainwater harvesting
- Add an additional rate tier for residential customers on high end users
- Composting
- Conservation awards
- Xeriscape (low-water use) landscaping

D.4 Education and Information Activities

Waco's "Beat The Peak" program will focus on outdoor water use activities. Educational activities will be targeted to several different audiences: professional irrigators, large landscape managers, and residential customers. Educational messages will be delivered in a number of different ways. We anticipate delivering written materials, multimedia releases, special events, and educational forums.

The City of Waco's water utility will produce written materials in the form of

- Brochures
- Newsletter articles
- Media releases
- Public service announcements.

These will be distributed to the customers, the local media, and to nonprofit local organizations such as neighborhood associations, and civic improvement organizations that they may educate their members as well.

The water utility will ensure that multimedia materials are also available. This will be done through use of the utility's web site, broadcast over the city public access channel, in cooperation with local media outlets for the release of information for both television and radio audiences.
Specific efforts will include:

- Interactive screens on the city's web site
- Interviews with city experts in irrigation and plant water demand on the local access channel
- Interviews with city water utility management on the local access channel and with local television stations
- Press conferences to promote the beat the peak campaign, and key educational moments during the hot summer

- Press events, such as giveaways or educational/fund events focused on reducing water use
- Booths at public events sponsored by neighborhood associations, civic organizations, not-for-profit education groups, and other city departments.

The water utility will sponsor special conservation events and activities. Included in these will be promotional events, awards for conservation efforts, and competitions designed to stimulate creative water conservation activities. The utility will explore the potential for cosponsoring a low water use (xeriscape) demonstration garden.

Specific events may include:

- The water conservation day in Waco with music, booths, and activities for children and adults
- Water conservation awards for businesses which show innovative water conservation activities and excellent efficiency in water use
- Water saver landscape awards for local landscapes which use native and adapted materials to reduce outdoor water use
- Water conservation poster contests for grade school or junior high students.

Educational events are an essential component of any water conservation program. To be effective these events must be targeted to specific audiences and have a message which imparts both information and the reasons for change in behavior. Several different kinds of educational forums will be necessary in order to reach those who are most able to assist the city and reducing its peak summertime water use. Target audiences include professional landscapers, large landscape and golf course managers, residents who own automated sprinklers, and athletic field managers. There are number of potential allies in an educational effort of this kind: City parks and water department landscape professionals, local irrigation supply companies, TAES, TCEQ, neighborhood associations, nonprofit groups like Keep Waco Beautiful, and TAMU's turf management program.

Some of the educational events that will be co-sponsored include:

- Workshops for irrigators and irrigation installation companies. These workshops to be jointly offered by city parks, local irrigation companies, TAES, and water utility conservation program.
- Workshops and presentations at local neighborhood associations targeted for homeowners and residents with automated irrigation systems. These workshops to be co-sponsored by TAES, TCEQ, the water utility conservation program, and local neighborhood associations.
- Workshops on locally adapted low water use landscapes. These workshops to be targeted to a number of different audiences such as homeowners are residents, large landscape managers, and local landscape professionals. The workshops to be co-sponsored by Master Gardeners, Native Plant Society, TAES, TAMU, and the water utility.

The City shall promote a School Education Program to encourage water conservation and water conservation related benefits. Programs shall include working with school districts and private schools in the water utility service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the Brazos River region and local watershed. Education materials shall meet the state education framework requirements.

E. Large Landscape Conservation Programs And Incentives

Irrigated landscape represents a large opportunity for conservation savings for the City. The large landscape conservation program will consist of several measures, including retrofit of city irrigation facilities, education of irrigation professionals, and surveys of existing customer systems to improve efficiency.

E.1 Municipal Facilities

The City has installed automatic irrigation controllers at all Parks facilities. Landscapes will be maintained with water conservation in mind, both for the water savings, and to provide an example of good landscape management. The City will consider native or adaptive species water efficient landscaping at water agency facilities.

E.2 Customers

The City will provide non-residential customers with support and incentives to improve their landscape water use efficiency. This support shall include, but not be limited to, the following:

The utility will develop a strategy targeting and marketing large landscape water use surveys to commercial/industrial/institutional (ICI) accounts with dedicated irrigation and mixed-use meters. Each year, directly contact via letter or telephone not less than 10% of ICI accounts and offer water use surveys. (Note: ICI surveys that include both indoor and outdoor components will be credited in both categories.) The City will offer the following measures when cost-effective:

- Landscape water use analysis/surveys
- Voluntary water use budgets
- Installation of dedicated landscape meters
- Rain Sensors
- Training in landscape maintenance, irrigation system maintenance, and irrigation system design.
- Financial incentives to improve irrigation system efficiency such as loans, rebates, and grants for the purchase and/or installation of water efficient irrigation systems.
- Follow-up water use analyses/surveys consisting of a letter, phone call, or site visit where appropriate

Survey elements will include: measurement of landscape area; measurement of total irrigable area; irrigation system check, and distribution uniformity analysis; review or develop irrigation schedules, as appropriate; provision of a customer survey report and information packet. The city will track survey offers, acceptance, findings, devices installed, savings potential, and survey cost.

E.3 New or Change of Service Accounts

The City will provide information on native or climate-adapted landscape design, efficient irrigation equipment/management to new customers and change-of-service customer accounts.

E.4 Water Budgets

The City will evaluate the potential for offering water budgets for all dedicated irrigation accounts. Should this program be pursued, the City will assign water use budgets equal to no more than 100% of reference evapotranspiration (ETo) per square foot of landscape area in accordance with the average monthly ETo for the City of Waco.

Should the water budget be instituted, the City will provide notices each billing cycle to accounts with water use budgets showing the relationship between the budget and actual consumption in accordance with the schedule. The City may choose not to notify customers whose use is less than their water use budget.

The City will also evaluate the potential to provide customer notices prior to the start of the irrigation season alerting them to check their irrigation systems and make repairs as necessary. Provide customer notices at the end of the irrigation season advising them to adjust their irrigation system timers and irrigation schedules.

F. Water Survey Programs For Residential Customers Single-Family And Multi-Family Residential

Water surveys are a principal means of educating customers about the direct effects of behavior and equipment on water use. By collecting information on water flow rates, and leakage inside and outside, the consumer is informed about immediate actions that can be taken to reduce water consumption. Implementation shall consist of at least the following actions, performed by either utility staff or by third party contractors:

- Develop and implement a strategy targeting and marketing water use surveys to single-family residential and multi-family residential customers.
- Directly contact via letter or telephone not less than 10% of single-family residential customers and 10% of multi-family residential customers each year.
- Surveys shall include indoor and outdoor components, and at minimum shall have the following elements:

Indoor

i) Check for leaks, including toilets, faucets, and meter check

ii) Check showerhead flow rates, aerator flow rates, and recommend replacement, as necessary

iii) Check toilet flow rates and recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; recommend replacement of leaking toilet flapper, as necessary

Outdoor

iv) Check irrigation system and timers

v) Review or develop customer irrigation schedule

vi) Measure currently landscaped area

vii) Measure total irrigable area

- Provide customer with evaluation results and water saving recommendations; leave information packet with customer.
- Track surveys offered, surveys completed, survey results, and survey costs.

G. Water Use Survey and Customer Incentives Program for Industrial Commercial, and Institutional Accounts

The City of Waco is able to identify and rank Industrial, Commercial, and Institutional (ICI) customers according to use. The ranking will be used to target and implement an ICI water-use survey and customer incentives program described below. The long-term objective of the ICI program is to reduce water use by industrial, commercial, and institutional accounts by an amount equal to 3% of baseline use of ICI accounts in the City's service area each ten year period for the next 50 years. Baseline use is defined as the use by commercial, industrial, and institutional accounts in 2000.

The Water utility will develop a customer targeting and marketing strategy to provide water use surveys and customer incentives to commercial, industrial, and institutional accounts. The City will directly contact (via letter, telephone, or personal visit) and offer water use surveys and customer incentives to at least 10% of commercial, industrial, and institutional accounts on a repeating basis. Water use surveys will include a site visit, an evaluation of all water-using apparatus and processes, and a customer report identifying recommended efficiency measures, their expected payback, and available agency incentives. Within one year of a completed survey, utility staff will follow-up via phone or site visit with customer regarding facility water use and water saving improvements. This will be coordinated with the Landscape Water Use Survey Program.

H. Reuse Water

Use of treated municipal effluent as regulated by TCEQ under Chapter 210 of the TAC will be considered an alternative source of water, and with less restriction during Emergency Water Shortages. For Water Conservation and Drought Contingency Plan purposes the Reuse water should be clearly related to a decrease in reliance on the City's potable water distribution system. Implementation shall consist of at least the following actions:

- Identify and rank commercial, industrial, and institutional customers according to amount, type and peaking pattern of use.
- Encourage industrial, commercial, and institutional customers who are most likely to benefit to utilize treated effluent to replace potable water use in circumstances appropriate for non-potable water. Such uses could include golf course and landscape irrigation, cooling, and process water.

The City will implement programs in conjunction with the WMARSS owner cities to provide as much treated effluent to approved non-potable uses as is available to the City on an annual firm-yield basis. The potential for package treatment plants near end users with large demands for Reuse water will be examined when feasible.

I. Alternative Water Sources

One means of reducing peak pumping pressure on the City's distribution system is to shift use from potable water to alternative supplies where that is feasible and applicable. Although long-term pumping of the Trinity Aquifer has lowered the potentiometric head in the area of the City, there are productive wells that can be utilized during times of high demand. Likewise for end users near the River, utilization of raw water may reduce the demand for potable water, especially during peak demand periods.

Future demand management programs are envisioned to include Aquifer Storage and Recovery (ASR), to pump treated water into the depleted areas of the Trinity Aquifer during low demand periods, and retrieve the water during times of high demand. ASR is currently being investigated by the water utility. All applicable water quality regulations will be enforced in the use of alternative supplies.

Some of the steps to be taken in developing alternative supplies include:
- Cataloging groundwater wells that are in close proximity to end-users or treatment facilities to augment potable supply.
- Contacting potential wholesale and retail customers who could use alternative water resources instead of potable water
- Listing potential wholesale and retail customers with wells who have excess capacity, and could share water resources with the City
- Completing studies of ASR and pursuing it as an alternative demand management strategy.

J. Ordinance And Wholesale Contract Review

As part of the 2005 Water Conservation Planning Process, contracts with wholesale customers have been reviewed to determine conformance with the water conservation goals of the Plan. The City of Waco Landscaping ordinance, Sec 28-218 will be reviewed. Irrigation system design and installation requirements, such as rain sensors, will be evaluated.

Meetings have been held with wholesale customers most likely to be affected by summertime peaking issues. Communication will be maintained with wholesale customers to ensure that the City's retail and wholesale customers are being treated in an equitable fashion, and for optimum implementation of the Plan. The City will offer wholesale customers the opportunity to cosponsor conservation education and information activities.

L. Implementation

The City of Waco's water utility management is committed to implementing a successful Water Conservation and Drought Contingency Plan that will meet with City goals, and conform to Regional and statewide water plans and applicable regulations and statutes. To ensure that success the water utility has formed a conservation team with management and representatives from the customer service, billing, operations, water resources, public relations and accounting expertise within the utility. The City of Waco water utility management shall reconfirm or update the conservation team membership as needed, but no less than once every five years.

Each of the conservation programs that have been outlined in this plan has an implementation schedule and objectives for successful implementation. The initial schedules and objectives are listed below. As the Plan is implemented and adjusted from year-to-year, these may be modified. Annual reporting measures will serve as indicators of the success of the programs.

L.1 Water Accountability Program

1. The Water Accountability Program was first implemented by City of Waco water utility in 1988.
2. The City of Waco water utility management shall reconfirm or update the Water Accountability Program annually as needed.
3. The City of Waco maintains an active distribution system-auditing program.
4. The City of Waco shall repair identified leaks whenever cost-effective.

L.2 Conservation Pricing

1. City of Waco City Council first passed the City's inverted block rate in 2000.
2. The City of Waco water utility management shall update the conservation pricing as needed through recommendation to and passage by City Council.

L.3 Education and Public Information

1. The Conservation Public Information Program was first implemented by City of Waco water utility in February 2003.
2. These programs are planned to be ongoing, as part of regular customer service and water conservation activities in future years.
3. The City of Waco water utility management shall reconfirm or update the conservation education and implementation plan annually as needed.

L.4 Large Landscape

1. Implementation commenced with retrofits of City facilities in December 2002.
2. Not less than 10% of ICI accounts with dedicated irrigation meters will be contacted and offered landscape water use surveys each year.
3. Irrigation water use surveys completed for not less than 15% of ICI accounts with either mixed-use or dedicated irrigation meters by 2015.
4. Develop ETo-based water use budgets for all accounts with dedicated irrigation meters by December 2004.
5. Develop and implement a customer incentive program by the December 2006.

L.5 Residential

1. Implementation will begin during the Summer 2005.
2. The utility will develop and implement a strategy targeting and marketing water use surveys to single-family residential and multi-family residential customers by Spring 2006.
3. Not less than 15% of single-family residential accounts are to receive water use surveys within 10 years of the implementation date.
4. Not less than 15% of multi-family residential units to receive water use surveys within 10 years of the implementation date.

L.6 Industrial/Commercial/Institutional

1. Water utility management in Spring 2003 initiated the City of Waco's ICI Conservation program.
2. ICI Water Use Survey and Customer Incentives Program: 10% of commercial, industrial, and institutional customers to receive a water use survey within 10 years.

3. ICI Conservation Performance Targets: Reduce water use by commercial, industrial, and institutional customers by an amount equal to 3% of the use of baseline commercial, industrial, and institutional water use within 10 years of the date implementation is to commence, and each ten year period thereafter.

L.7 Reuse

1. Implementation shall commence no later than summer 2005.
2. As the City of Waco grows, more treated effluent will be produced. Reuse water supplies will be evaluated annually to determine the potential as an alternative water source.
3. To the extent that treated effluent is available for reuse, replace the use of potable water on golf courses, in large cooling plants and other industrial or landscape processes identified by the water utility.

CHAPTER 3

EMERGENCY WATER MANAGEMENT PLAN

A. Plan Elements

Emergencies such as drought or other uncontrollable circumstances can disrupt the normal availability of the City's water supply. Even though the City may have an adequate water supply, the supply could become contaminated, or a disaster could destroy the supply.

This chapter summarizes the City's Emergency Water Management Plan. Emergency contingency planning is not the same as management/conservation planning. While water management involves implementing permanent water use efficiencies, an emergency contingency plan establishes temporary methods or techniques designed to be used only as long as the emergency exists.

The City's Emergency Water Management Plan includes the following elements:

- Trigger conditions signaling the start of an emergency period;
- Emergency contingency measures;
- Education and information;
- Initiation procedures;
- Termination notification actions; and
- Implementation.

The Plan was adopted by Ordinance No. 2005-___ and will be codified in Chapter 26 of the Code of Ordinances. A copy is attached as an appendix to this 2005 Water Conservation and Drought Contingency Plan.

B. Procedure – Implementation

By May 1 of each year, the City will forecast water supply and potential water demands for May 1 through September 30 of that year. At this point, citizens are encouraged to practice good water management techniques inside and outside the home, including such practices as cutting back on lawn sprinkler times and developing landscapes that require less water. The City may seek voluntary reductions from water use by citizens.

When, in the opinion of the City Manager, an emergency exists for the immediate preservation of the public safety, the City manager may implement the requirements of a drought or emergency contingency stage (stages 1, 2, or 3 mandatory restrictions) for a period not to exceed sixty (60) days. Thereafter, the City Council may extend the stage for up to ninety (90) days. Criminal penalties do not apply during the time of voluntary conservation.

C. Procedure – Notification

When trigger conditions and potential emergency contingency measures appear to be necessary, the public will be notified about water management restrictions through the news media and the City's TV access channel. If a trigger condition is reached, the public will be kept informed of the status of the drought condition through all available news media.

D. Plan Applicability

The Emergency Water Management Plan applies to all persons and premises receiving retail water from the City of Waco's Water System. Wholesale customers are also subject to the plan as per their contracts with the city. Specific Restrictions based upon trigger levels and types of water use are detailed in the codified ordinance.

E. Enforcement

The City Manager shall have the authority to designate the enforcement authority for the Emergency Water Management Plan. The City may serve a person or user in violation of this emergency Water Management Plan with a written notice stating the nature of the violation and giving a time limit for compliance. This notice may be in the form of a door hanger. The City may also issue a citation returnable to the Waco Municipal Court for a violation. Penalties may include a monetary fine and disconnection from water service.

F. Emergency Criteria

Emergency criteria triggering the implementation of various stages of the Emergency Water Management Plan include, but are not limited to, the following:

A) General or geographical emergency;

B) Water system failures/emergencies (i.e., pressure zone deficiencies, chemical spills, broken water mains, power outages, electrical failures, failures of storage tanks or other equipment, treatment plant breakdown, and water contamination);

C) An inability to recover approximately ninety (90) percent of water stored in all

Storage facilities within a twenty-four hour period;

D) A catastrophic decrease in the Lake reservoir level and/or delivery capabilities resulting in an inability, presently or in the immediate future, to recover resources sufficient to provide services necessary for the public health and welfare.

G. Targets and Goals

The goal of the emergency management measures set forth in the City of Waco's emergency water management plan are to reach the following overall reductions in water use targets. These targets will be measured as a percentage reduction in projected monthly demand, using 2000 as a baseline year.

Stage 1, Level 1	10 percent reduction;
Stage 1, Level 2	20 percent reduction;
Stage 2, Level 1	30 percent reduction; and
Stage 2, Level 2	40 percent reduction.

CITY OF WACO
Water
Utility
Services

Post Office Box 2570 Waco, TX 76702-2570
CCN #: 10039
PWS #: 1550008

Drought Contingency Plan

2009

CITY OF WACO WATER UTILITY SERVICES DROUGHT CONTINGENCY PLAN

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard to domestic water use, to sanitation and fire protection, and to protect and preserve public health, welfare, and safety to minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the City of Waco hereby adopts the following regulations and restrictions on the delivery and consumption of water through Ordinance No. 2009 – 221. A copy is attached as appendix A.

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section IX of this plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Waco by means of a public meeting and by publishing the Plan on the Water Utility Services website (www.wacowater.com). A public notice was provided regarding a public meeting, which was held to accept input on the Plan. Additionally, citizens were invited to send comments electronically after viewing the Plan online.

Section III: Public Education

The City of Waco will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of public events, press releases and/or utility bill inserts.

Section IV: Coordination with Regional Water Planning Groups

The service area of the City of Waco is located within the Brazos G Regional Water Planning Group. The City of Waco has provided a copy of this Plan to the Brazos G Regional Water Planning Group.

Section V: Authorization

The City Manager or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The City Manager or his/her designee shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Waco. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan**,** the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use, which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by the City of Waco.

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Mean Sea Level (msl): the level of the ocean's surface, especially the level halfway between high and low tide, used as a standard in reckoning land elevation or sea depths.

Non-essential water use: water uses that are neither essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;

(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The City Manager or his/her designee shall monitor water supply and/or demand conditions on a daily basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified triggers are reached.

Criteria triggering the implementation of various stages of the Drought Contingency Plan, include, but are not limited to, the following:

1. General, geographical, or weather related condition or emergency, including but not limited to drought conditions resulting in a decrease in the Lake Waco reservoir level

2. Water system failures/emergencies (i.e., pressure zone deficiencies, chemical spills, broken water mains, power outages, electrical failures, failures of storage tanks or other equipment, treatment plant breakdown, and water contamination)

3. An inability to recover approximately ninety (90) percent of water stored in all Storage facilities within a defined period

4. A catastrophic decrease in the Lake Waco reservoir level and/or delivery capabilities resulting in an inability, presently or in the immediate future, to recover resources sufficient to provide services necessary for the public health and welfare

The level of the Lake Waco reservoir shall be determined based on the official reading by the U.S. Army Corps of Engineers and stated as an elevation above mean sea level (msl).

Triggering Stages

Generally. Upon the occurrence of an emergency, the City Manager may exercise his or her discretion to request special voluntary water restrictions and/or to initiate Stages 1 - 6 mandatory restrictions.

Stage 1 Triggers - Water Watch (Voluntary Reductions)

By May 1 of each year, the city will forecast water supply and potential water demands for May 1 through September 30 of that year. At this stage, citizens are encouraged to practice good water management techniques inside and outside the home, including such practices as cutting back on lawn sprinkler times and developing landscapes that require less water. Criminal penalties do not apply to voluntary reductions during the Water Watch stage.

Stage 2 Triggers – MILD Water Shortage

1. Criteria for implementation of Stage 2 – A decrease in the Lake Waco reservoir level to 452 msl (at which the reservoir is at about 60% of its capacity). Upon recommendation of the City Manager, Stage 2 response procedures shall become effective.

2. Criteria for termination - Stage 2 shall be terminated at the discretion of the City Manager.

Stage 2 Responses

Mandatory restrictions – Upon implementation by the city, the following restrictions shall apply unless specifically exempted:

1. The city shall limit use of water for municipal purposes to those activities necessary to maintain the public health, safety and welfare and any computer-controlled irrigation systems that incorporate evapotranspiration data in setting irrigation run times.

2. The city shall monitor "excessive watering" and issue notifications to customers. "Excessive watering" occurs where run-off extends for a distance greater than ten (10) feet from the customer's property or where there is washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking surfaces or other paved surfaces. Criminal penalties do not apply during Stage 2 restrictions.

Stage 3 Triggers – MODERATE Water Shortage

1. Criteria for implementation of Stage 3 – A decrease in the Lake Waco reservoir level to 450 msl (at which the reservoir is at about 55% of its capacity) or inability to recover approximately ninety (90) percent of water

stored in all storage facilities within a twenty-four (24) hour period. Upon recommendation of the City Manager, Stage 3 response procedures shall become effective.

2. Criteria for termination - Stage 3 shall be terminated at the discretion of the City Manager.

Stage 3 Responses

Mandatory restrictions – Upon implementation by the city, the following restrictions shall apply unless specifically exempted:

1. All landscape and other outdoor water usage at each service address shall be limited to two days a week based on the last digit in the meter service address or the type of connection.

Last Digit Address Residential:	Allowed Landscape Water Days
Odd	Tuesday and Saturday
Even	Wednesday and Sunday
All Non-Residential accounts	Monday and Friday

Thursday – No Watering, Storage Recovery day

2. Apartments, office building complexes, or other properties containing multiple addresses, will be identified by the lowest physical street address number. Where there are no numbers, a number will be assigned by the Building Official.

Stage 4 Triggers – SEVERE Water Shortage

1. Criteria for implementation of Stage 4 – A decrease in the Lake Waco reservoir level to 446 msl (at which the reservoir is at about 45% of its capacity) or inability to recover approximately ninety (90) percent of water stored in all storage facilities within a thirty (30) hour period. Upon recommendation of the City Manager, Stage 4 procedures shall become effective.

2. Criteria for Termination – Stage 4 shall be terminated at the discretion of the City Manager.

Stage 4 Responses

Mandatory restrictions – Upon implementation by the city, the following restrictions shall apply unless specifically exempted:

1. All landscape and outdoor water usage at each service address shall continue the allowed landscape water days schedule identified in Stage 3;

however, landscape and outdoor water usage is prohibited from 5:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 7:00 P.M.

2. Newly constructed swimming pools, Jacuzzis, spas, ornamental ponds, and fountains may be filled once.

3. Watering of newly installed landscaping is exempt from Stage 4 restrictions for no more than one (1) month from the date of planting. After the first month, the landscape water day's schedule and hourly restrictions must be followed.

4. Excessive water run-off from any landscaped area onto streets, alleys, or parking lots is prohibited. Run-off is excessive when it extends for a distance greater than ten (10) feet from the customer's property.

5. Washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking areas, or other paved surfaces is prohibited.

6. Refilling after draining private swimming pools, Jacuzzis, spas, ornamental ponds, and fountains is prohibited. Refilling shall mean to replace more than twenty-five (25) percent of the facility's water capacity.

7. Washing or rinsing vehicles on owner's premises must follow the landscape water days schedule as set out above. A hand-held hose equipped with a positive shut-off nozzle and/or hand-held bucket must be used. (This includes boats, trailers, and other mobile vehicles and equipment.)

Exceptions:
(a) Commercial landscape nurseries are exempt from Stage 4 restrictions, but all such nurseries shall cease using water to clean pavement and sidewalk areas except for health and safety reasons.

(b) Commercial full-service or self-service car wash facilities, including those at service stations and automobile dealership facilities, shall cease using water to clean pavement and sidewalk areas except for health and safety reasons and are exempt from Stage 4 restrictions if they meet one or more of the following conditions:

(i) Commercial car wash facilities using conveyorized, touchless, and / or rollover in-bay technology if they reuse a minimum of fifty percent of water from previous vehicle rinses in subsequent washes.

(ii) Commercial car wash facilities using reverse osmosis to produce water rinse with a lower mineral content if they incorporate the unused concentrate in subsequent vehicle washes.

(iii) Self-service spray wands used that emit no more than three gallons of water per minute.

(c) Drip irrigation systems and soaker hoses are exempt from Stage 4 restrictions; however, upon the implementation of Stage 4 restrictions, Stage 3 day and hour restrictions shall apply to such water usage.

(d) Golf course landscape watering is exempt from Stage 4 restrictions so long as golf course irrigation systems are operated with a computer controlled irrigation system that incorporates evapotranspiration data in setting irrigation run times.

Stage 5 Triggers – CRITICAL Water Shortage

1. Criteria for implementation of Stage 5 – A decrease in the Lake Waco reservoir level to 445 msl (at which the reservoir is at about 40% of its capacity) or inability to recover approximately ninety (90) percent in all storage facilities within a forty-eight (48) hour period. Upon recommendation of the City Manager, Stage 5 procedures shall become effective.

2. Criteria for termination - Stage 5 shall be terminated at the discretion of the City Manager.

Stage 5 Responses

Mandatory restrictions – Upon implementation by the city, the following restrictions shall apply unless specifically exempted:

1. The water supply is at the point of a severe water shortage. All landscape and outdoor water usage at each service address shall continue according to the landscape water days schedule identified below; however, landscape and outdoor water usage is prohibited from 5:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 7:00 P.M.

Last Digit Address:	Allowed Landscape Water Day
0, 1	Monday
2, 3	Tuesday
4, 5	Wednesday
6, 7	Thursday
8, 9	Friday

Saturday and Sunday – No Watering, Storage Recovery days

2. Apartments, office building complexes, or other property containing multiple addresses will be identified by the lowest physical address number. Where there are no numbers, a number will be assigned by the Building Official.

3. Existing swimming pools, hot tubs, spas, ornamental ponds and fountains may be replenished with a hand-held hose to maintain operational purposes only.

4. Permitting of new swimming pools, hot tubs, spas, ornamental ponds or fountain construction is **prohibited**, except that those previously permitted or under construction at the time Stage 5 restrictions are initiated may complete construction and may be filled one time only.

5. Filling occurs when an amount of water equal to at least seventy-five (75) percent of the water capacity is placed in the structure or facility.

6. Excessive water run-off from any landscaped area onto streets, alleys, or parking lots is prohibited. Run-off is excessive when it extends for a distance greater than ten (10) feet from the customer's property.

7. Washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking areas, or other paved surfaces is prohibited.

8. Commercial landscape nurseries are subject to Stage 5 and must apply for any variance. Alternative irrigations schedules may be approved under a variance if the variance meets all of the requirements of Section 26-99 Variances.

Stage 6 Triggers – EMERGENCY Water Shortage

1. Requirements for implementation of Stage 6 – A decrease in the Lake Waco reservoir level to 440 msl (at which the reservoir is at about 30% of its capacity) or determination by the City Manager that the existence of catastrophically decreasing Lake reservoir levels and/or delivery capabilities with an inability to recover to provide services necessary for public health, safety, and welfare.

2. Criteria for termination – Stage 6 shall be terminated at the discretion of the City Manager.

Stage 6 Responses

Mandatory restrictions – Upon implementation by the city, the following restrictions shall apply unless specifically exempted:

1. Any and all outdoor/landscaping water usage is prohibited until the emergency is alleviated. This applies to all metered water users using the city's public water supply and includes all residential (single or multi-family), commercial (car wash, nurseries, business), recreational (public/private golf courses, parks, athletic fields), religious, health care, school and municipal entities.

2. Use of water for municipal purposes shall be limited to only those activities necessary to maintain the public health, safety and welfare, as determined by the city.

3. Use of water from fire hydrants is prohibited except for fire fighting and related activities.

Section IX: Enforcement

1. No person shall intentionally, knowingly, or recklessly or with criminal negligence allow the use of water from the city for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Division or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by the city, in accordance with provisions of this Division.

2. Any person, including a person classified as a water customer of the city, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this plan and that the parent could not have reasonably known of the violation. Proof that the notices required under Section 26-94 have been given shall constitute a rebuttal presumption that the person has knowledge of and/or is aware of the declaration of a drought or emergency contingency stage, but such presumption may be rebutted by evidence that the person was out of city at the time of the declaration and could not reasonably have become aware of the declaration since returning to the city.

3. Any person who violates this Division is guilty of a misdemeanor and upon conviction shall be punished by a fine as provided in Section 1-14, General Penalty. Each day that one or more of the provisions in this plan is violated shall constitute a separate offense.

4. If a person is observed violating a Stage 4 or greater, including but not limited to vehicle washing, landscape watering, or construction water use, for a second time, the city shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such

violations occur.

5. If a person is convicted of three (3) or more distinct violations of this Division, the city shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur.

6. Services discontinued under such circumstances shall be restored only upon payment of reconnection charge established by city policy and any other costs incurred by the city in discontinuing service. In addition, suitable assurance must be given to the city that the same action shall not be repeated while the plan is in effect.

7. The City is entitled to pursue all other criminal and civil remedies to which it is entitled under statutes or other ordinances. Compliance with this Division may also be sought through injunctive relief in the district court.

Section X: Variances

1. A customer may file an application for a variance from this plan for the property receiving water service with the City Manager. The City Manager may determine the proper information and require that the applicant provide such information to evaluate the variance request.

2. The City Manager may grant a variance from the Plan upon his/her determination that special circumstances exist that upon strict enforcement of the plan will adversely affect the health, sanitation, or fire protection for the public or the applicant.

3. Variances granted under this section will expire upon escalation of the plan to the next higher phase or termination of the plan.

APPENDIX A

City of Waco Ordinance No. 2009 – 221

DIVISION 2. WATER CONSERVATION AND DROUGHT/EMERGENCY CONTINGENCY PLAN

Sec. 26-91. Declaration of policy.

(a) Emergencies such as drought or other uncontrollable circumstances can disrupt the normal availability of the city's water supply. Even if an adequate water supply exists, the supply could become contaminated, or a disaster could destroy the supply. The purpose of a drought and emergency contingency plan is to establish the city's policy in the event of shortages or delivery restrictions on the city's water supply, or in the case of equipment failure or similar emergency situations.

(b) In making decisions under this division concerning the allocation of water between conflicting interests, highest priority will be given to allocation necessary to support human life and health; i.e., the minimum amount of water necessary for drinking, prevention of disease, and the like. Second highest priority will be given to allocations that will result in the least loss of employment to persons whose income is essential to their families.

(c) The city manager is hereby authorized and directed to implement the applicable provisions of this article upon his/her determination that such implementation is necessary to protect the public welfare and safety.

(Ord. No. 2005-263, § 2, 4-19-05)

Sec. 26-92. Definitions.

The following words and phrases shall have the following meanings:

Aesthetic water use shall mean water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use shall mean water use, which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation shall mean those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer shall mean any person, company, or organization using water supplied by the City of Waco.

Division shall mean Division 2 of Article IV of Chapter 26 of this Code.

Domestic water use shall mean water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even numbered address shall mean street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use shall mean the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use shall mean water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.
Mean sea level (msl) shall mean the level of the ocean's surface, especially the level halfway between high and low tide, used as a standard in reckoning land elevation or sea depths.
Non-essential water use shall mean water uses that are neither essential nor required for the protection of public, health, safety, and welfare, including:
(1) Irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this plan;
(2) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(3) Use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(4) Use of water to wash down buildings or structures for purposes other than immediate fire protection;
(5) Flushing gutters or permitting water to run or accumulate in any gutter or street;
(6) Use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(7) Use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(8) Failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(9) Use of water from hydrants for construction purposes or any other purposes other than fire fighting.
Odd numbered address shall mean street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.
Plan shall mean the 2005 Water Conservation and Drought Contingency Plan, which shall be the water conservation and drought/emergency contingency plan for the city, as adopted above or hereinafter amended.
User shall mean any person connected to the city's water system, including owners and/or occupants of any premises connected to the city's system and wholesale customers.
Water shall mean water taken from any city potable water supply or treated water distribution system.
(Ord. No. 2005-263, § 2, 4-19-05; Ord. No. 2009-221, § 1, 4-21-09)

Sec. 26-93. Plan adoption and application.
(a) By this division, the city approves and adopts the 2005 Water Conservation and Drought Contingency Plan for the City of Waco, Texas. A copy of the Plan adopted by this section is attached to Ord. No. 2005-263 as Exhibit "A" and shall be on file with the director of utilities and city secretary and available for inspection.
(b) It shall be the responsibility of the city manager or his/her designee to review the plan and the provisions within this division at least every five years and make recommendations for any needed changes.
(c) The provisions of the plan and this division shall apply to persons, customers, and property served by the city wherever situated, including customers such as water supply corporations, municipal corporations, and any others that receive water from the city on a contract basis.

(d) Nothing in the plan or this division shall be interpreted to limit the authority of the mayor, the city council, or the city manager to seek emergency relief under the provisions of any state or federal disaster relief regulations.
(Ord. No. 2005-263, § 2, 4-19-05)

Sec. 26-94. Implementation order and notification.
(a) The plan and this division are effective on a year-round basis.
(b) When, in the opinion of the city manager, an emergency exists for the immediate preservation of the public safety, he or she may implement a drought or emergency contingency stage as provided below.
(c) The city manager may upgrade or downgrade the stage of an emergency. The city manager may declare any mandatory restrictions stage specified herein to be effective for a period not to exceed 60 days. Thereafter, the city council may extend the duration of the particular stage for additional periods of time not to exceed 90 days each.
(d) Notification. When trigger conditions and potential emergency contingency measures appear to be necessary, the public will be notified about water conservation methods through the news media and the city's TV access channel. If a trigger condition is reached, the public will be kept informed of the status of the emergency condition through all available news media.
When a trigger condition has been reached, the city manager will order the initiation of a public notification process. This process will include the following items:
(1) A notice of emergency condition will be posted at the city hall, library, post office, major super-markets and shopping centers.
(2) The notice will be distributed to TCEQ, local newspapers, radio and TV stations, and the city's TV access channel.
(e) Termination of the emergency measures will take place when the trigger conditions have subsided for a period of no less than two weeks, if the city manager concludes that the emergency is unlikely to resume. The city will inform the public of the termination.
(Ord. No. 2005-263, § 2, 4-19-05)

Sec. 26-95. Notice of violation.
(a) The city may serve a person or user in violation of this division with a written notice stating the nature of the violation and giving a time limit for compliance. This notice may be in the form of a door hanger.
(b) Any employee of the city, police officer, or other person designated by the city manager, may issue a citation to a person he/she reasonably believes to be in violation of this division. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the municipal court on the date shown on the citation for which the date shall not be less than ten days the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in municipal court to enter a plea of guilty or not guilty for the violation of this plan. If the alleged violator fails to appear in municipal court, a warrant for his/her arrest may be issued. A summons to appear may

be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in municipal court before all other cases.
(Ord. No. 2005-263, § 2, 4-19-05)

Sec. 26-96. Violations and penalty.

(a) No person shall intentionally, knowingly, or recklessly or with criminal negligence allow the use of water from the city for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this division or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by the city, in accordance with provisions of this division.

(b) Any person, including a person classified as a water customer of the city, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this plan and that the parent could not have reasonably known of the violation. Proof that the notices required under section 26-94 have been given shall constitute a rebuttal presumption that the person has knowledge of and/or is aware of the declaration of a drought or emergency contingency stage, but such presumption may be rebutted by evidence that the person was out of city at the time of the declaration and could not reasonably have become aware of the declaration since returning to the city.

(c) Any person who violates this division is guilty of a misdemeanor and upon conviction shall be punished by a fine as provided in section 1-14. Each day that one or more of the provisions in this plan is violated shall constitute a separate offense.

(d) If a person is observed violating a stage 2, level 2 or greater, including but not limited to vehicle washing, landscape watering, or construction water use, for a second time, the city shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur.

(e) If a person is convicted of three or more distinct violations of this division, the city shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur.

(f) Services discontinued under such circumstances shall be restored only upon payment of reconnection charge established by city policy and any other costs incurred by the city in discontinuing service. In addition, suitable assurance must be given to the city that the same action shall not be repeated while the plan is in effect.

(g) The city is entitled to pursue all other criminal and civil remedies to which it is entitled under statutes or other ordinances. Compliance with this division may also be sought through injunctive relief in the district court.
(Ord. No. 2005-263, § 2, 4-19-05; Ord. No. 2007-221, § 1, 4-3-07)

Sec. 26-97. Triggering criteria.

(a) The city manager or his/her designee shall monitor water supply and/or demand conditions on a daily basis and shall determine when conditions warrant initiation or termination of each stage of the plan, that is, when the specified triggers are reached.
(b) Criteria triggering the implementation of various stages of the water conservation plan include, but are not limited to, the following:
(1) General, geographical, or weather related condition or emergency, including but not limited to drought conditions resulting in a decrease in the Lake Waco reservoir level;
(2) Water system failures/emergencies (i.e., pressure zone deficiencies, chemical spills, broken water mains, power outages, electrical failures, failures of storage tanks or other equipment, treatment plant breakdown, and water contamination);
(3) An inability to recover approximately 90 percent of water stored in all storage facilities within a 24-hour period;
(4) A catastrophic decrease in the lake reservoir level and/or delivery capabilities resulting in an inability, presently or in the immediate future, to recover resources sufficient to provide services necessary for the public health and welfare.
(c) The level of the Lake Waco reservoir shall be determined based on the official reading by the U.S. Army Corps of Engineers and stated as an elevation above mean sea level (msl).
(Ord. No. 2005-263, § 2, 4-19-05; Ord. No. 2007-221, § 1, 4-3-07; Ord. No. 2009-221, § 1, 4-21-09)

Sec. 26-98. Drought or emergency contingency stages.
(a) *Generally.* Upon the occurrence of an emergency, the city manager may exercise his or her discretion to request special voluntary water restrictions and/or to initiate stages 1--5 mandatory restrictions.
(b) *Stage 1 triggers--Water watch (voluntary reductions).* By May 1 of each year, the city will forecast water supply and potential water demands for May 1 through September 30 of that year. At this stage, citizens are encouraged to practice good water management techniques inside and outside the home, including such practices as cutting back on lawn sprinkler times and developing landscapes that require less water. Criminal penalties do not apply to voluntary reductions during the water watch stage.
(c) *Stage 2 triggers--Mild water shortage.*
(1) *Criteria for implementation of stage 2.* A decrease in the Lake Waco reservoir level to 452 msl (at which the reservoir is at about 60 percent of its capacity). Upon recommendation of the city manager, stage 2 procedures shall become effective.
(2) *Criteria for termination.* Stage 2 shall be terminated at the discretion of the city manager.
(3) *Stage 2 responses: Mandatory restrictions.* Upon implementation by the city, the following restrictions shall apply unless specifically exempted:
a. The city shall limit use of water for municipal purposes to those activities necessary to maintain the public health, safety and welfare and any computer-controlled irrigation systems that incorporate evapotranspiration data in setting irrigation run times.
b. The city shall monitor "excessive watering" and issue notifications to customers. "Excessive watering" occurs where run-off extends for a distance greater than ten feet from the customer's property or where there is washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking surfaces or other paved surfaces. Criminal penalties do not apply during stage 2 restrictions.

(d) *Stage 3--Moderate water shortage.*
(1) *Criteria for implementation of stage 3.* A decrease in the Lake Waco reservoir level to 450 msl (at which the reservoir is at about 55 percent of its capacity) or inability to recover approximately 90 percent in all storage facilities within a 48-hour period. Upon recommendation of the city manager, stage 3 procedures shall become effective.
(2) Criteria for termination - Stage 3 shall be terminated at the discretion of the City Manager.
(3) *Stage 3 responses: Mandatory restrictions.* Upon implementation by the city, the following restrictions shall apply unless specifically exempted:
a. All landscape and other outdoor water usage and each service address shall be limited to two days a week based on the last digit of the meter service address or the type of connection.
TABLE INSET:

Last Digit Address Residential	Allowed Landscape Water Days
Odd	Tuesday and Saturday
Even	Wednesday and Sunday
All non-residential accounts	Monday and Friday
Thursday	No watering, storage recovery day

Apartments, office building complexes, or other property containing multiple addresses will be identified by the lowest physical address number. Where there are no numbers, a number will be assigned by the Building Official.
(e) *Stage 4 triggers--Severe water shortage.*
(1) *Criteria for implementation of stage 4.* A decrease in the Lake Waco reservoir level to 446 msl (at which the reservoir is at about 45 percent of its capacity) or inability to recover approximately 90 percent of water stored in all storage facilities within a 30-hour period. Upon recommendation of the city manager, stage 4 procedures shall become effective.
(2) *Criteria for termination.* Stage 4 shall be terminated at the discretion of the city manager.
(3) *Stage 4 responses--Mandatory restrictions.* Upon implementation by the city, the following restrictions shall apply unless specifically exempted:
a. All landscape and outdoor water usage at each service address shall continue the allowed landscape water days schedule identified in stage 3; however, landscape and outdoor water usage is prohibited from 5:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.
b. Newly constructed swimming pools, Jacuzzis, spas, ornamental ponds, and fountains may be filled once.
c. Watering of newly installed landscaping is exempt from Stage 3 restrictions for no more than one month from the date of planting. After the first month, the landscape water day's schedule and hourly restrictions must be followed.
d. Excessive water run-off from any landscaped area onto streets, alleys, or parking lots is prohibited. Run-off is excessive when it extends for a distance greater than ten feet from the customer's property.
e. Washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking areas, or other paved surfaces is prohibited.

f. Refilling after draining private swimming pools, Jacuzzis, spas, ornamental ponds, and fountains is prohibited. Refilling shall mean to replace more than 25 percent of the facility's water capacity.
g. Washing or rinsing vehicles on owner's premises must follow the landscape water days schedule as set out above. A hand-held hose equipped with a positive shut-off nozzle and/or hand-held bucket must be used. (This includes boats, trailers, and other mobile vehicles and equipment.)
(4) *Exceptions:*
a. Commercial landscape nurseries are exempt from stage 4 restrictions, but all such nurseries shall cease using water to clean pavement and sidewalk areas except for health and safety reasons.
b. Commercial full-service or self-service car wash facilities, including those at service stations and automobile dealership facilities, shall cease using water to clean pavement and sidewalk areas except for health and safety reasons and are exempt from stage 4 restrictions if they meet one or more of the following conditions:
1. Commercial car wash facilities using conveyorized, touchless, and/or rollover in-bay technology if they reuse a minimum of 50 percent of water from previous vehicle rinses in subsequent washes.
2. Commercial car wash facilities using reverse osmosis to produce water rinse with a lower mineral content if they incorporate the unused concentrate in subsequent vehicle washes.
3. Self-service spray wands used that emit no more than three gallons of water per minute.
c. Drip irrigation systems and soaker hoses are exempt from stage 3 restrictions; however, upon the implementation of stage 4 restrictions, stage 3 day and hour restrictions shall apply to such water usage.
d. Golf course landscape watering is exempt from stage 4 restrictions so long as golf course irrigation systems are operated with a computer controlled irrigation system that incorporates evapotranspiration data in setting irrigation run times.
(f) *Stage 5 triggers--Critical water shortage.*
(1) *Criteria for implementation of stage 5.* A decrease in the Lake Waco reservoir level to 445 msl (at which the reservoir is at about 40 percent of its capacity) or inability to recover approximately 90 percent in all storage facilities within a 48-hour period. Upon recommendation of the city manager, stage 5 procedures shall become effective.
(2) *Criteria for termination.* Stage 5 shall be terminated at the discretion of the city manager.
(3) *Stage 5 responses: Mandatory restrictions.* Upon implementation by the city, the following restrictions shall apply unless specifically exempted:
a. The water supply is at the point of a severe water shortage. All landscape and outdoor water usage at each service address shall continue according to the landscape water days schedule identified below; however, landscape and outdoor water usage is prohibited from 5:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.
TABLE INSET:

Last Digit Address	Allowed Landscape Water Day
0, 1	Monday
2, 3	Tuesday

4, 5	Wednesday
6, 7	Thursday
8, 9	Friday
Saturday and Sunday	No watering, storage recovery days

b. Apartments, office building complexes, or other property containing multiple addresses will be identified by the lowest physical address number. Where there are no numbers, a number will be assigned by the building official.
c. Existing swimming pools, hot tubs, spas, ornamental ponds and fountains may be replenished with a hand-held hose to maintain operational purposes only.
d. Permitting of new swimming pools, hot tubs, spas, ornamental ponds or fountain construction is prohibited, except that those previously permitted or under construction at the time stage 5 restrictions are initiated may complete construction and may be filled one time only.
e. Filling occurs when an amount of water equal to at least 75 percent of the water capacity is placed in the structure or facility.
f. Excessive water run-off from any landscaped area onto streets, alleys, or parking lots is prohibited. Run-off is excessive when it extends for a distance greater than ten feet from the customer's property.
g. Washing or hosing down of buildings, sidewalks, driveways, patios, porches, parking areas, or other paved surfaces is prohibited.
h. Commercial landscape nurseries are subject to stage 5 and must apply for any variance. Alternative irrigations schedules may be approved under a variance if the variance meets all of the requirements of section 26-99 Variances.
(g) *Stage 6 triggers--Emergency water shortage.*
(1) *Requirements for implementation of stage 6.* A decrease in the Lake Waco reservoir level to 440 msl (at which the reservoir is at about 30 percent of its capacity) or determination by the city manager that the existence of catastrophically decreasing lake reservoir levels and/or delivery capabilities with an inability to recover to provide services necessary for public health, safety, and welfare.
(2) *Criteria for termination.* Stage 6 shall be terminated at the discretion of the city manager.
(3) *Stage 6 responses: Mandatory restrictions.* Upon implementation by the city, the following restrictions shall apply unless specifically exempted:
a. Any and all outdoor/landscaping water usage is prohibited until the emergency is alleviated. This applies to all metered water users using the city's public water supply and includes all residential (single or multi-family), commercial (car wash, nurseries, business), recreational (public/private golf courses, parks, athletic fields), religious, health care, school and municipal entities.
b. Use of water for municipal purposes shall be limited to only those activities necessary to maintain the public health, safety and welfare, as determined by the city.
c. Use of water from fire hydrants is prohibited except for fire fighting and related activities.
(Ord. No. 2005-263, § 2, 4-19-05; Ord. No. 2007-221, § 1, 4-3-07; Ord. No. 2009-221, § 1, 4-21-09)

Sec. 26-99. Variances.

(a) A customer may file an application for a variance from this plan for the property receiving water service with the city manager. The city manager may determine the proper information and require that the applicant provide such information to evaluate the variance request.
(b) The city manager may grant a variance from the plan upon his/her determination that special circumstances exist that upon strict enforcement of the plan will adversely affect the health, sanitation, or fire protection for the public or the applicant.
(c) Variances granted under this section will expire upon escalation of the plan to the next higher phase or termination of the plan.
(Ord. No. 2005-263, § 2, 4-19-05; Ord. No. 2009-221, § 1, 4-21-09)

Appendix L
Water Conservation Case Studies

Freese and Nichols

DRAFT TECHNICAL MEMORANDUM

SUBJECT: **Brazos G RWPG Water Conservation Case Studies**

BY: **Kimberly Goodwin, Simone Kiel, P.E.**

DATE: **April 9, 2004 (revised September 2, 2004)**

INTRODUCTION

Water conservation is an important component to water planning. As demands on water resources increase, the ability to reduce water consumption through conservation will become more necessary. In the Brazos G region alone, water demands are projected to increase 110 billion gallons per year (368,600 acre-feet per year) over the planning horizon (2000 to 2060). Approximately 80 percent of this increase is associated with municipal and manufacturing demands.

Previous planning included water conservation in the planning process through assumed reductions in municipal per capita use. The amount of reduction was based on two components: 1) reductions associated with the conversion of high flow plumbing fixtures to low flow fixtures as required by the Texas Plumbing Efficiency Standards (Energy Policy Act of 1992), and 2) reductions due to an "expected level" of additional water conservation. Additional conservation beyond the expected level was evaluated in the 2001 plan to meet municipal and manufacturing water needs, and was a recommended strategy for two cities, Baird and Stamford. The savings due to advanced conservation were estimated at 5 percent of the projected demands at a cost of $574 per acre-foot of water saved.

The second round of water planning modified the approach to water conservation to more clearly document water savings associated with conservation strategies and emphasize the importance of conservation in long-range planning. Municipal demands for this planning cycle include only reductions associated with the adoption of plumbing code requirements. Additional conservation is to be evaluated as a water management strategy. The planning guidelines state that water conservation must be considered for every identified water need. If the RWPG does not recommend a water conservation strategy for a need, it must document the reason (30 TAC §357.7(a)(7)(A)).

Each region is to develop model water conservation plans with management recommendations appropriate for the region. These plans will need to comply with recent legislation that requires 5- and 10-year specific, quantifiable targets for water savings to be included in the water conservation or management plans. In addition, the Texas Legislature authorized the formation of a Water Conservation Implementation Task Force to identify Best Management Practices for water conservation, assist with standardizing reporting data, review recommended conservations strategies in regional water plans and assess the role for state funding. The work of this task force is on-going and will be considered during this round of water planning. Some of the preliminary recommendations being considered by the Task Force include a target total water use of 140 gallons per capita per day for municipal water users and annual 1 percent reductions in per capita water to meet target goals. A final report to the Texas Legislature of the Task Force's recommendations is due by November 1, 2004.

As evidenced by the emphasis placed on water conservation by the Legislature and regional water planning efforts, there has been much discussion on the benefits and quantities of water savings associated with conservation measures. A recent study commissioned by the Texas Water Development Board (TWDB)[1] quantified water savings associated with different efficiency strategies. Representatives of local municipalities debated the realization of these savings in an operating retail distribution system. In response to these concerns, water conservation case studies for two communities were performed, one with an aggressive conservation program and one with a more passive program. The purpose of these studies was to provide supporting data in which to evaluate potential conservation strategies to meet identified needs in the Brazos G region. As part of this task, data were collected on water use, population, economic activity, weather, funding commitments, and other pertinent information necessary to assess the effectiveness of existing water conservation programs. The findings of this study will be part of the evaluations of water management strategies for the Brazos G region.

Two communities were selected for the water conservation case studies: Temple and Austin. The original scope of work proposed that the conservation studies compare two cities located in Williamson or Bell County. However, in an effort to include a city with a more proactive water conservation program, Austin was selected as the second city. While not located in the same planning region (Austin is located in Region K), Temple and Austin have similar geographic locales and climates.

In order to conduct the case study, the water conservation efforts of each community were documented and compared. The effectiveness of each water conservation program was determined based on water use changes after implementation of the program.

MEASUREMENTS AND DEFINITIONS

Gallons per Capita per Day (GPCD)

Water use can be reported in many different ways. The most common method of reporting municipal water use is through an assessment of per capita water use. While this measurement appears to be straightforward, the calculations and meanings of these values are widely debated. The TWDB has historically calculated per capita water use as:

(Total water pumped – wholesale water sales – industrial sales) / population / 365 days

The Conservation Implementation Task Force recently adopted several definitions of per capita water use, one being “total gallons per capita per day” (gpcd) and another being “residential gpcd”. The total gpcd is similar to the TWDB’s definition of gpcd, but does not subtract the industrial sales. The residential gpcd is calculated using only single family and multi-family metered sales. The residential gpcd requires separate tracking of water sales. For many entities, these data are only available for recent years. Most cities have data documenting total water pumped and wholesale sales. Industrial use may be tracked separately or estimated as a percentage of the total use.

---

[1] GDS Associates. *Quantifying the Effectiveness of Various Water Conservation Techniques in Texas*, May 2003.

Since historical data are available from the TWDB (1980 to 2003), and the focus of this study is on municipal conservation efforts, this study uses the TWDB definition of gpcd for long-term municipal comparison purposes. Monthly water usage data were available only for the total amount pumped. Analyses of monthly data were performed using the total water use.

Population

Another issue of debate is the definition of "population." The TWDB reports population for a city based on estimates from the State Data Center, but the TWDB does not report service area populations. Service area populations are estimated by the respective entity, usually based on the number of service connections. In some cases, service area populations reported to the TWDB do not accurately reflect actual populations. To account for the difference in population estimates, the TWDB has historically estimated outside city municipal sales and adjusted total water use accordingly. While this provides a better estimate of the city per capita water use, it assigns all water losses to in-city use. If there are substantial outside city retail sales, this can overestimate in-city gpcd. The city of Austin has considerable outside city sales. Therefore, the service area population is used in this study to calculate the net municipal gpcd. For Temple, the service populations provided by the city were adjusted to better reflect the reported number of connections and census data. The use of service area population will result in different estimates of gpcd than the values reported by the TWDB.

Unaccounted-for Water

Unaccounted for water is the amount of water that the city cannot document through metering or sales. It typically includes leakage, spills or releases from broken pipes or other infrastructure, metering errors, and illegal connections. Depending on the accounting procedures of the city, it may also include fire water, water used for line flushing and other operational procedures that are not metered. It is often expressed as a percentage of the total amount of water pumped. Historically, the TCEQ has considered unaccounted for water of less than 15% as acceptable levels for retail distribution systems. Recent legislation (HB 3338) will require municipalities to perform water audits every five years to help reduce unaccounted for water losses. This legislation is expected to take effect beginning in 2006.

For this study, unaccounted-for water is the amount reported to the TCEQ and TWDB on the city's annual water use form. Typically, these quantities do not equal raw water pumped minus metered sales.

CITY OF TEMPLE WATER CONSERVATION PROGRAM

The city of Temple is located in northeastern Bell County approximately 36 miles south of Waco and 67 miles north of Austin. The city was founded in 1880 as a major junction of the Gulf, Colorado, and Santa Fe Railway by the railroad's chief engineer, Bernard Moore Temple.

The city of Temple receives its water from the Leon River and Lake Belton, which is a 12,300-acre reservoir on the Leon River. Temple has contracts with Brazos River Authority for approximately 22 percent of the water in Lake Belton. Based on the 2001 regional water plan, the city's allocation is projected to meet its expected water needs until at least 2050.

Since the city's current water supply is expected to meet its needs for at least the next 45 years, water conservation in Temple is focused on decreasing lost revenue from unaccounted-for water loss and increasing public awareness of conservation efforts during times of peak use.

Temple's Water Conservation Plan

The city prepared and adopted the City of Temple Drought Contingency and Water Conservation Plan in March 2000. The plan was developed to meet the requirements of Title 30 of the Texas Administrative Code Chapter 288 (30 TAC §288). The plan identifies three goals of the city's conservation program, including:

1. Encourage water conservation through public education. Conservation topics are addressed in mail outs and by the media during peak water use times.
2. Reduce unaccounted-for water loss.
3. Reduce water use (measured in gallons per capita per day) by five to ten percent by 2010.

The goals of the conservation program were developed with the understanding that in order for conservation efforts to be effective, the customers must respond to the public education materials, population growth must compensate for decreases in revenue from decreased water usage, and it must be feasible to reduce unaccounted-for water losses.

There are six major components to Temple's water conservation plan that were either already in place or developed to meet the city's conservation goals. These six components include metering, adoption of a plumbing code that requires water conserving plumbing fixtures, water rates, distribution system leak detection and repair, accounting, and recycling and reuse.

Metering. Temple currently has 21,649 metered service connections that account for all of the city's water use. Raw water is pumped from the Leon River and metered at each of the water treatment plant clarifiers. Residential meters are checked every ten years, and industrial and large commercial meters are calibrated annually.

Plumbing Code. Temple has adopted the Southern Standard Plumbing Code in the city's Code of Ordinances (Ordinance number 98-2583).

Water Rates. Temple has adopted a two-step block rate structure for all metered water services. The rate structure was adopted in the city's Code of Ordinances (Resolution number 99-2300-R). Initial water connection fees are charged based on meter sizes and connection lengths. The city also supplies water to Troy, Morgan's Point Resort, and Little River/Academy. The rate structure for water connections outside the city limits is the same as the rate structure established in the Code of Ordinances for metered services within the city limits.

Distribution System Leak Detection and Repair. Temple's Water Distribution Department is responsible for leak detection and repair. All city employees, customers, police officers, and meter readers take an active role in leak detection.

Accounting. Temple tracks monthly water sales and uses by residential, commercial/industrial, governmental/industrial, fire hydrants, or wholesale customers. Annual water loss is calculated to audit the amount of water pumped into the system and amount of water distributed through metered sales.

Recycling and Reuse. The city has recently implemented a reuse program for landscape irrigation at the Wilson Park ball fields. Approximately 3.795 million gallons of reuse water was used at the park in 2003.

Budgetary Commitment

According to the Water Conservation Plan, Temple's budget was developed to meet the operational and debt service costs of the water distribution system by allocating the revenue from water sales to the water utility budget. The current rate structure was established to meet budgetary and debt repayment needs plus a two and a half month reserve for contingencies.

Program Outlook

City of Temple Water Utility personnel are dedicated to providing a water distribution system that can meet the needs of an increased service population while also developing reuse efforts to minimize the demand on the existing distribution system at peak use times.

Effectiveness of the Water Conservation Plan/Program

In order to evaluate any potential impacts of the water conservation plan on water use and/or unaccounted-for water loss in Temple, water use and conservation data were collected from the city. The data included:

- Monthly water use data (starting in 1990);
- Annual unaccounted-for water loss data (starting in 1995);
- Annual service population data (starting in 1990);
- Annual per capita income data (starting in 1990); and
- Annual total of building permits issued (starting in 1990).

Data from the TWDB on population, water use and industrial and municipal sales from 1980 to 2001 were used to supplement data received from the city and provide a longer history of water use.

The effectiveness or impacts of the water conservation plan was estimated based on water use and changes in unaccounted-for water loss after the implementation of the plan. The relationship of water use to economic development and the service population was also evaluated.

Climatic data were collected for the time period under evaluation to determine if changes in climatic parameters such as average monthly temperature or annual rainfall influenced the changes in water use. Annual rainfall from 1990 to 2003 ranged from 20.3 inches to 47.3 inches per year. Monthly precipitation had greater variability, ranging from 0 inches to 13.5 inches. The average annual temperature over the period of record ranged from 65.3 to 69.0 degrees Fahrenheit, with an average low temperature of 48° F in January and high of 86° F in July. Comparisons of total monthly water use to monthly precipitation and average monthly temperature are shown on Figures 1 and 2 respectively. Comparisons to summer climatic conditions are shown on Figure 3.

Evaluations of the monthly water use data found a notable seasonality of the data, which appears to be primarily associated with rainfall. Years with lower total annual rainfall appear to have a higher average non-summer monthly use, but peak month usage was more directly related to summer precipitation (or lack of precipitation). Comparisons of total water use to annual rainfall did not directly correlate. For example, in year 2000, the total annual rainfall was 44.9 inches (approximately 8.8 inches above the average over the study period). However, the total municipal water used in 2000 was the highest during this same time. One reason is the very high usage in the summer months (most likely due to outside watering) when there was little to no rainfall. Higher rainfall in winter months had little impact on winter water usage. Therefore, it appears that total water usage is a function of monthly precipitation in the summer and less so in the winter months. While temperature varied with the seasons, the average temperatures did not vary significantly from year to year and had little impact on total water use.

Per capita income and building permit data was obtained to compare trends in water consumption to economic development in the Temple area. Per capita income data was obtained for the city of Temple from the U.S. Department of Commerce Bureau of Economic Analysis for 1990 to 2001. Per capita income in the Temple area was approximately $23,415 in 2001. However, since income data was unavailable for 2002 and 2003, income was not used to evaluate the trends in economic development since the water conservation plan was adopted in 2000.

Building permit data was collected from the city’s Planning Department as a second indicator of economic development. As shown on Figure 4, there appears to be an increase in economic development in the mid to late 1990s, with an increase in activity again during the last three years (2001 to 2003). The number of building permits issued reached a peak in 1996, which corresponds to a peak in water use. However, the increased water use may be more related to the drought of 1996 than to building activities. The recent rise in building activities, beginning in 2001 does not correlate to an increase in municipal water use.

Service area population for the city of Temple has increased at a fairly steady rate since 1992, and municipal water use has generally trended upward with service population (see Figure 5). Overall, per capita water use in Temple has decreased since the implementation of the water conservation plan in March 2000, but the time period is too short to assess whether this reduction is associated with the conservation plan or is simply within normal variations. As shown on Figure 6, the average per capita water use prior to year 2000 is 208 gpcd. The average per capita use between 2000 and 2003 is estimated at 191 gpcd, which represents a reduction of 17 gpcd. Much of this reduction appears to be related to improved metering and reduced unaccounted-for water. Unaccounted-for water losses are shown on Figure 7 and range from 15.5% to 27.5 % for years prior to the implementation of the water conservation plan. The city reports significant reductions in unaccounted-for water in years 2002 and 2003, which is attributed to a concerted effort to reduce

Figure 1A
Total Water Usage and Monthly Rainfall
City of Temple, 1990-2003

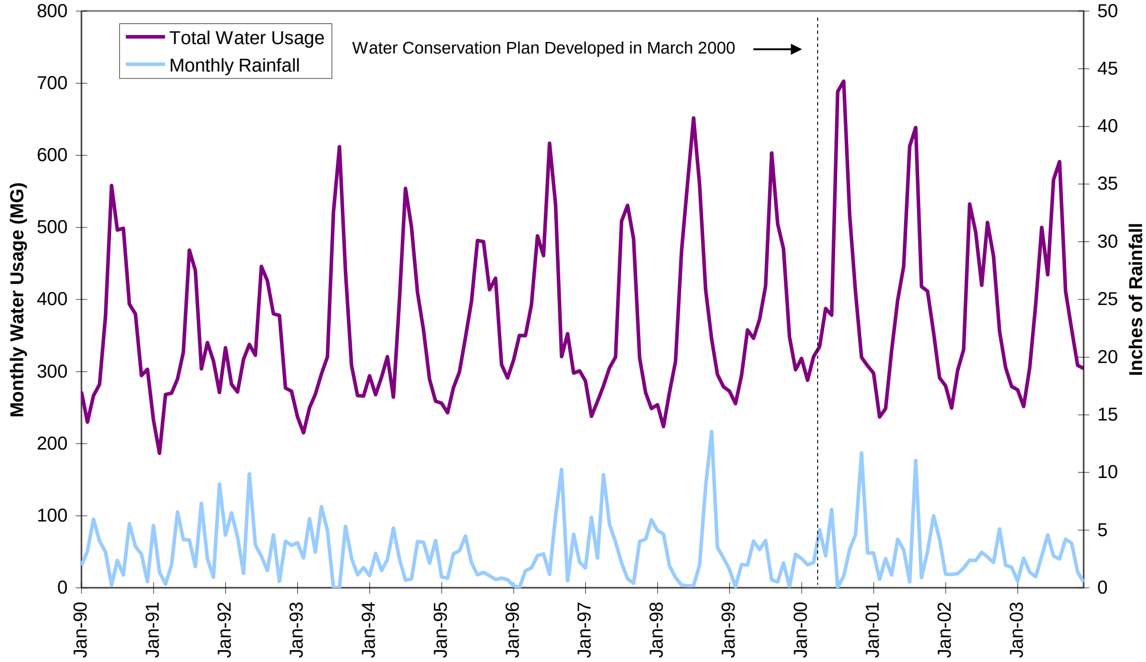


Figure 1B
Monthly Water Use vs. Rainfall
City of Temple, 1990 - 2003

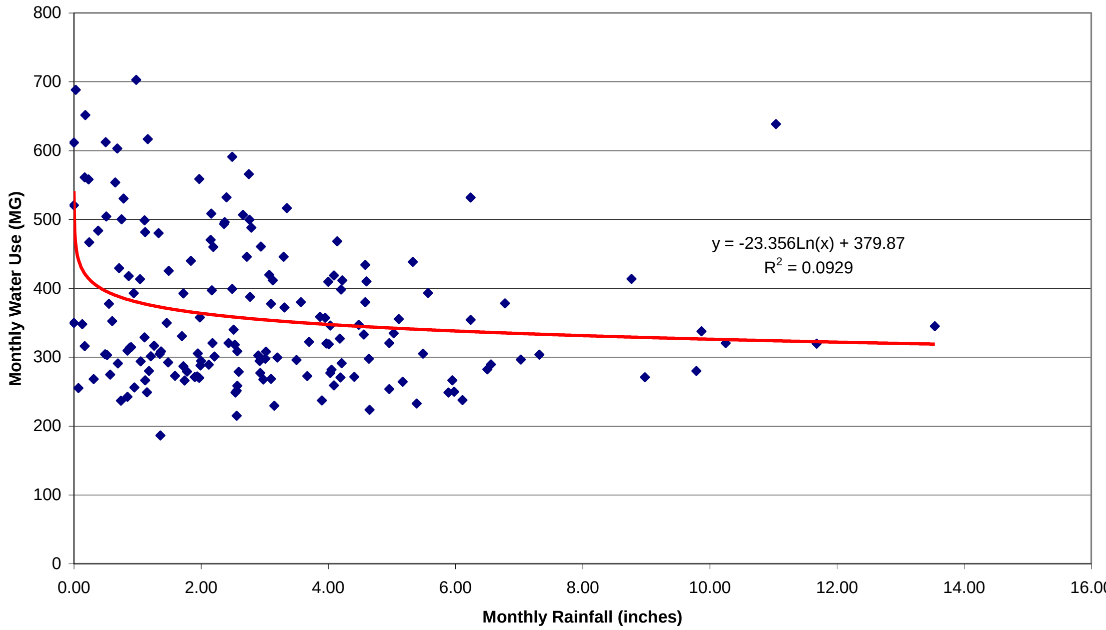


Figure 2A
Total Water Usage and Average Monthly Temperature
City of Temple, 1990-2003

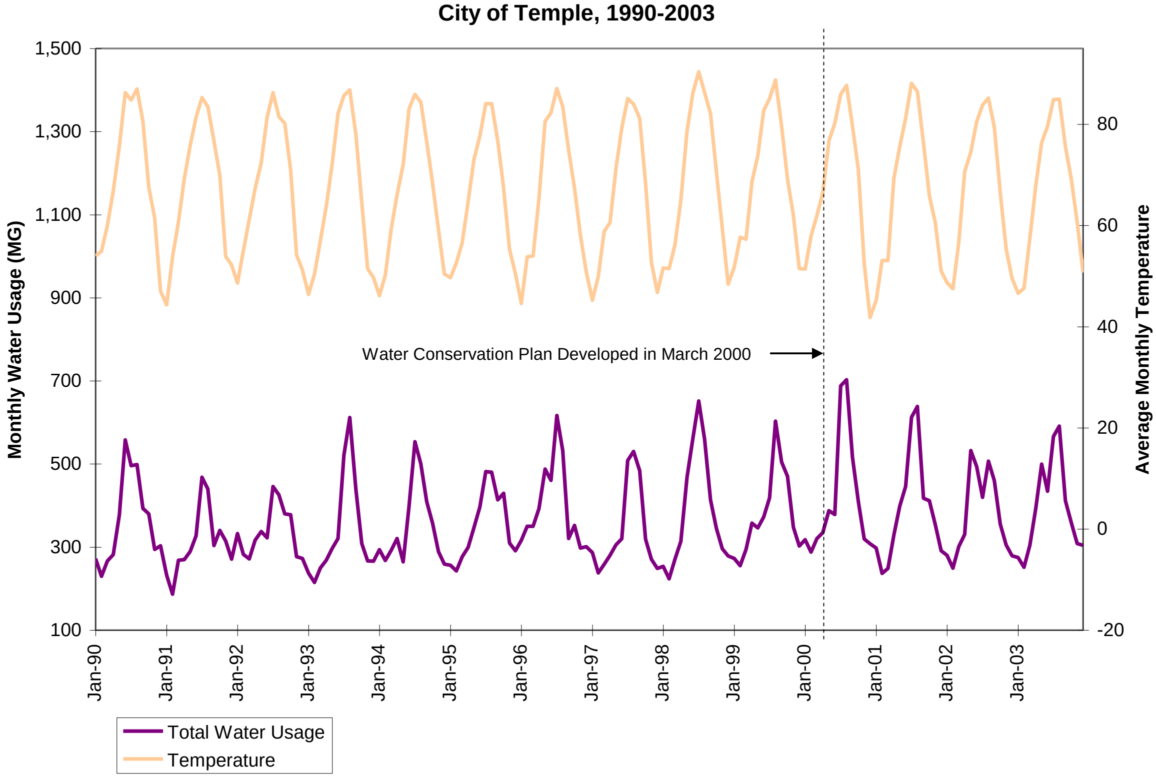
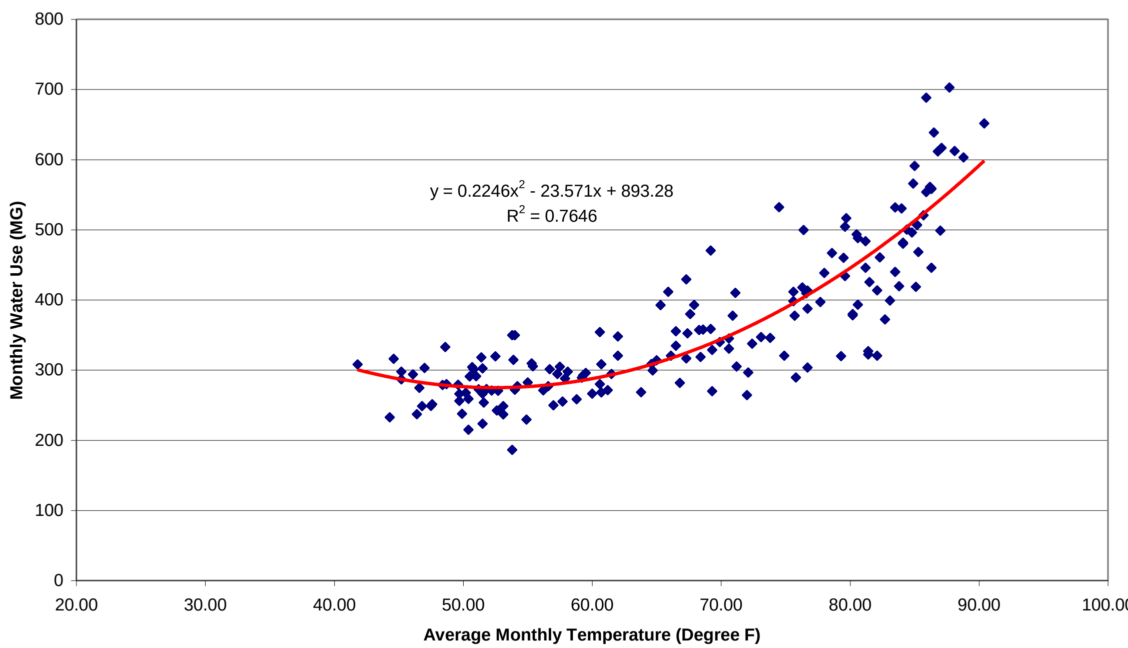


Figure 2B
Monthly Water Use vs. Average Temperature
City of Temple, 1990 - 2003



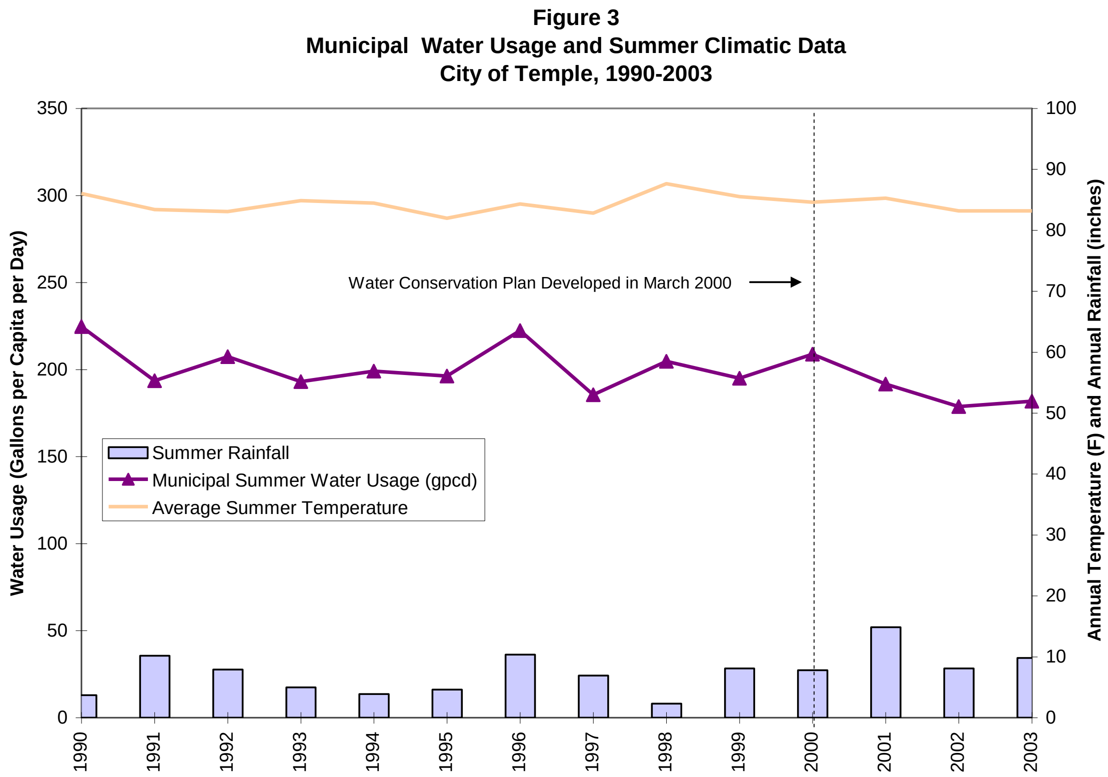


Figure 3
Municipal Water Usage and Summer Climatic Data
City of Temple, 1990-2003
Water Usage (Gallons per Capita per Day)
Annual Temperature (F) and Annual Rainfall (inches)
Water Conservation Plan Developed in March 2000
Summer Rainfall
Municipal Summer Water Usage (gpcd)
Average Summer Temperature
0
50
100
150
200
250
300
350
0
10
20
30
40
50
60
70
80
90
100
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

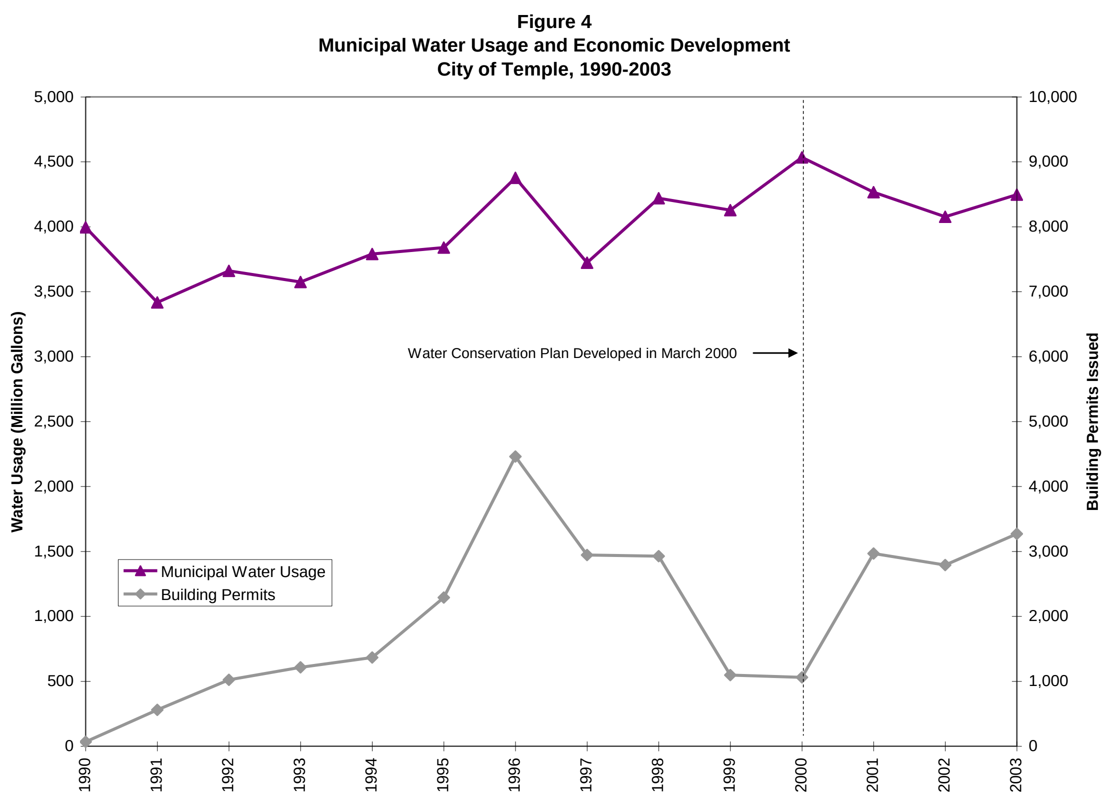


Figure 4
Municipal Water Usage and Economic Development
City of Temple, 1990-2003
Water Usage (Million Gallons)
Building Permits Issued
Water Conservation Plan Developed in March 2000
Municipal Water Usage
Building Permits
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003

Figure 5
Total Water Usage and Service Population
City of Temple, 1990-2003

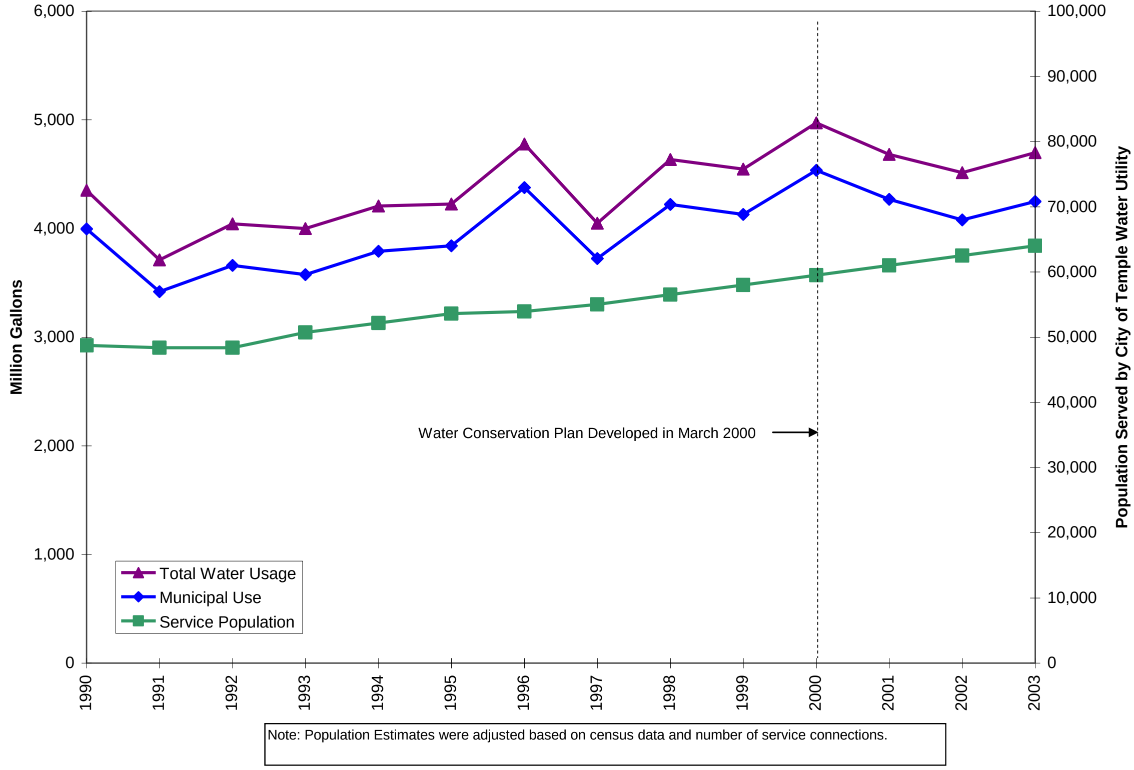
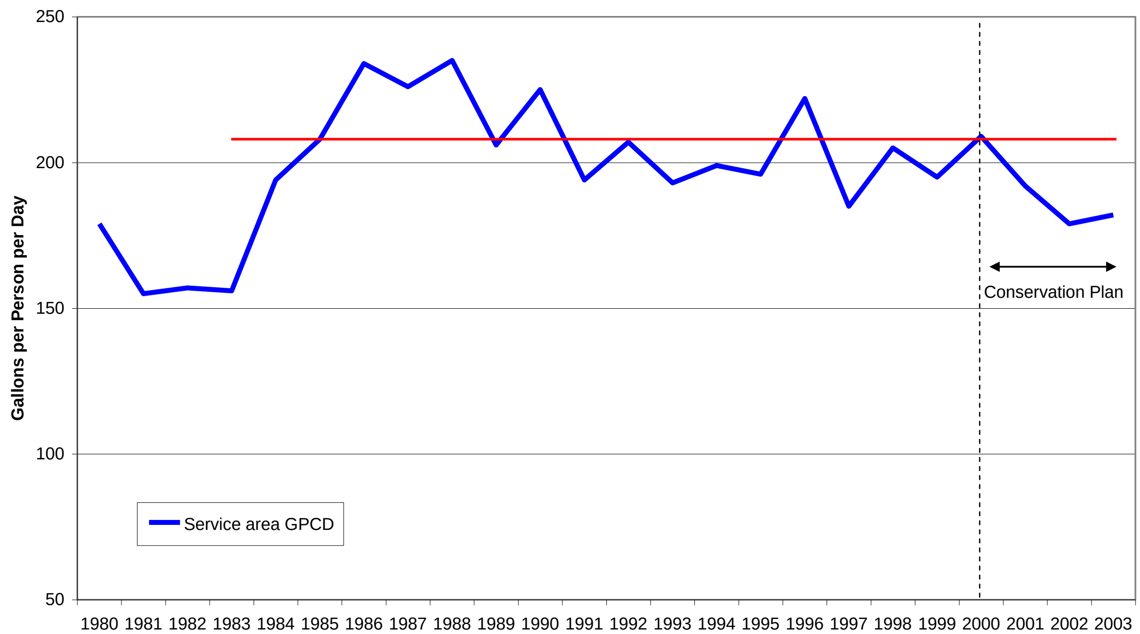
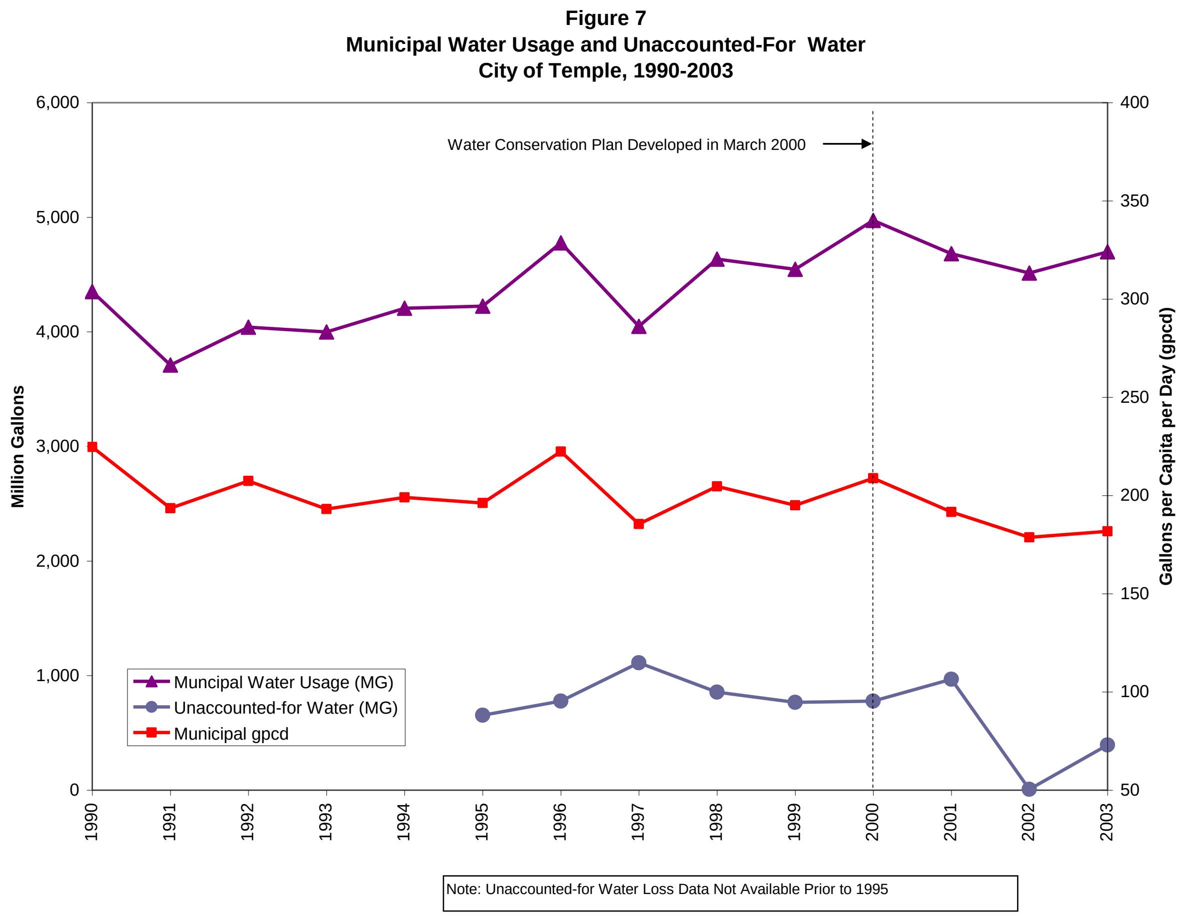


Figure 6
City of Temple Service Area GPCD





losses and the construction and development of a new water treatment plant and distribution system expansion. However, the unaccounted-for water loss reported for year 2002 (less than 0.02%) appears to be in error. Comparisons of total pumpage with sales in 2002 indicate loss rates similar to those in previous years.

Based on the straight comparisons of water use and unaccounted-for water, the implementation of the water conservation plan in Temple appears to have been effective in reducing overall annual water use and unaccounted-for water. Per capita water use has decreased approximately 8 percent (17 gpcd) since the water conservation plan was adopted in March 2000. Unaccounted-for water loss in 2003 was reduced from an average loss rate of 18.4 % to 8.4%, which corresponds to a reduction of approximately 18 gpcd. This indicates that nearly all of the reductions appear to be attributed to reductions in unaccounted-for water. However, it is uncertain whether the unaccounted for water reduction is truly due to reducing water losses or better calibrated meters and accounting of water uses. The lower water use could also be attributed partly to higher summer rainfall. The amount of data after the implementation of the water conservation plan is insufficient to attribute these observed reduced water uses solely to the city's conservation efforts.

CITY OF AUSTIN WATER CONSERVATION PROGRAM

The city of Austin is located in central Travis County and receives its water from the Colorado River and Highland Lakes system. The 2001 Region K Water Plan reported a firm available supply to the city of 371,856 acre-feet per year (including steam electric and 325,000 acre-feet per year for municipal use). These supplies are expected to meet the city's demands through 2030 under drought of record conditions.

In 1982, Austin's water use neared its high water pumpage capacity during the summer months. In response, the city developed an Emergency Water Conservation Ordinance, which initiated the city's water conservation efforts. The water conservation program since that time has expanded to not only focus on emergency needs but also long-term conservation efforts to reduce average day and peak day demands.

Austin's Water Conservation Plan

The city of Austin developed its water conservation program in 1985 as a joint venture of the Planning, Environmental, and Conservation Services Department and the Water and Wastewater Utility. From 1985 to 1987, the city initiated an aggressive door to door program to install water efficient showerheads and faucet aerators. Other activities were identified and incorporated into the program over the years, and the city adopted its first water conservation plan in 1993. The plan was updated in 1999 to meet the requirements of 30 TAC §288.

The 1999 Water Conservation Plan identifies three goals of the city's conservation program, including:

1. Reduce the 1990 projection of year 2005 peak day water use by ten percent.
2. Reduce average per capita daily water use by five percent.
3. Reduce projected year 2050 demand by 25,000 to 50,000 acre-feet per year (approximately 7 to 14%).

Austin's water conservation plan outlines system-wide conservation efforts in the following categories:

- Single-family, Indoor programs
- Single-family, Outdoor programs
- Xeriscaping
- Multi-family, Indoor programs
- Multi-family, Outdoor programs
- Industrial/Commercial/Institutional, Indoor programs
- Industrial/Commercial/Institutional, Outdoor programs
- Children's Education
- Public Education
- Utility Management
- Water Reuse and Recycling

Single-family, Indoor programs. The city offers several incentive programs for residential properties including rebates for low-flush toilets, water efficient clothes washers, and low-flow showerheads.

The city also distributes leak detection kits to residential customers at information fairs and by request.

Single-family, Outdoor programs. The water conservation program also includes incentives and rebates for single-family residential properties that plant water efficient shrubs and trees or install a rainwater harvesting system. In addition, the city offers free irrigation system audits for customers with monthly usage (in the summer months) exceeding 15,000 gallons. Rebates are offered to residents who choose to upgrade existing irrigation systems with new systems that have water conservation features.

Xeriscaping. The city of Austin and Xeriscape Garden Club have a demonstration garden that provides water utility customers with information about water conserving landscaping. The city also offers awards to local landowners who have utilized water-wise landscaping in their yards. A tour of homes and one-day workshop on xeriscaping are also promoted by the city and Xeriscape Garden Club.

Multi-family, Indoor programs. Similar to the programs offered to single-family residential customers, owners and managers of multi-family complexes can also receive incentives from the city for the use of low-flush toilets in each unit. Multi-family complexes are also eligible for rebates from installing water efficient clothes washers in community laundry facilities.

Multi-family, Outdoor programs. All multi-family properties are eligible for a free irrigation system audit and rebates for upgrades to an existing irrigation system. Owners and managers can also receive rebates for the installation of a rainwater harvesting system.

Industrial/Commercial/Institutional, Indoor programs. Commercial and industrial properties can receive rebates and grants for installing equipment or redesigning processes that are more water efficient, such as reusing high quality rinse water or replacing single-pass cooling with recirculating cooling systems. Incentives are available for using low-flush toilets, waterless urinals, and low-flow showerheads. Facilities with community laundry facilities, coin-operated clothes washers, or industrial laundry equipment can receive rebates for installing water efficient equipment.

Industrial/Commercial/Institutional, Outdoor programs. Industrial and commercial facilities are eligible for free irrigation system audits and rebates from irrigation system improvements and rainwater harvesting under the same programs as single-family and multi-family customers. Additionally, the city offers training courses for professional irrigators in the Austin area that focus on water efficient irrigation systems and Austin's water conservation program.

Children's Education. The city of Austin has an elementary school-aged education program, the Dowser Dan Show, that teaches kids the importance of water conservation and how they can conserve water. The program reaches over 30,000 children each school year. The city also has a water-wise curriculum that provides hands-on experiments for fifth grade students to learn more about water conservation.

Public Education. Water conservation materials are provided to customers through bill stuffers and media campaigns. One media campaign, Peak Day Management, focuses on water conservation efforts during the summer months to reduce outdoor water use. A water conservation program website is also available and includes tips on minimizing water use and information about the city's various incentive programs.

Utility Management. The city's water rate structure was developed as an inverted block rate structure to provide single-family residential customers with conservation incentives. The city also has a leak detection program and extensive and comprehensive metering system and maintains records of water distribution, sales, and water accounting, including calculating unaccounted-for water uses.

Water Reuse and Recycling. Austin's Water Reclamation Initiative (WRI) Program is currently supplying water for non-potable water uses including golf course irrigation and uses at the wastewater treatment plants. The reclaimed water systems are being expanded to extend service to additional customers including in the Robert Mueller Municipal Airport (RMMA) redevelop site area and to industrial sites. The City of Austin has conducted master planning for its reclaimed water systems and continues to evaluate and plan for expansions. Reuse is a key component of Austin's long-range water supply and conservation plans.

Budgetary Commitment
The current water conservation program as outlined in the 1999 Water Conservation Plan is incorporated into the city budget for funding through 2005. In 1999, the city was evaluating additional funding through municipal bonds and/or TWDB sources to develop, design, and construct a reuse system and facilities. Austin continues to plan and schedule its Water Reclamation Initiative (WRI) reclaimed water system expansion projects through its annual Capital Improvements Program funding process. Austin is currently conducting a Bureau of Reclamation Title XVI Study in pursuit of securing additional funding through a federal grant funding program.

Program Outlook
City of Austin Planning, Environmental, and Conservation Services Department and Water and Wastewater Utility personnel support the water conservation program. The City estimates that the current water supply will meet the city's water demand through 2050 utilizing conservation and reuse to reduce demand by an estimated 50,000 acre-feet per year by 2050.

Effectiveness of the Water Conservation Plan
In order to evaluate any potential impacts of the water conservation program started in 1985 and the water conservation plans adopted in 1993 and 1999 on water use and/or unaccounted-for water loss, water use and conservation data was collected from the city. The data included:

- Monthly water use data (starting in 1980);
- Annual unaccounted-for water loss data (starting in 1993);
- Annual service population data (starting in 1980); and
- Annual total of building permits issued (starting in 1998).

The effectiveness or impacts of the water conservation plan was estimated based on water use after the implementation of the water conservation program in 1985. The relationship of water use to economic development and the service population was also evaluated.

Total water use for the city of Austin has increased from 28 billion gallons in 1980 to 51 billion gallons in 2003 (see Figure 8). Of these amounts, approximately 6 to 16 percent is associated with wholesale and industrial sales. Most of the water usage is for municipal use within the city's service area. As such, the increase in water usage trends upward with increased service area population, yet per capita water use has decreased approximately 20 gpcd since the initial conservation efforts in 1985. Figure 9 presents the historical municipal gpcd for Austin from 1980 to 2003. As shown on this figure, there appears to be two distinct levels of per capita water use, one prior to 1990 and one after 1990. Prior to conservation efforts in 1985, the per capita water use was 176 gpcd. From 1991 to 2003, the average usage was approximately 156 gpcd. Per capita water use over the last decade has remained fairly constant with some slight fluctuations due to climatic conditions.

As with the city of Temple, comparisons of climatic data to water usage for the city of Austin also found seasonal fluctuations that appear to be related to monthly precipitation. Annual precipitation for Austin is similar to Temple with an average rainfall of 34 inches per year. The difference is that the annual water use for Austin seems to better correlate with the total annual precipitation than for the city of Temple. Slight peaks and dips in annual water use correspond to dry and wet years. The seasonal summer peaks for Austin are approximately 1.6 times the average winter use[2], whereas for the city of Temple, the average summer peaking factor was approximately 1.8. This indicates that a slightly higher impact will be seen in Temple's water use during dry summer months. As with Temple, average annual temperature does not appear to have a significant impact on water usage. The seasonal variations observed with temperature are more likely associated with the seasonal variations of precipitation and outdoor watering. The average annual temperature over the period of record ranged from 66.2 to 71.2 degrees Fahrenheit. (Figures 10 through 12 show monthly and climatic data for Austin.)

Two different data sets were obtained to compare trends in water consumption to economic development in the Austin area, building permits and per capita income. Building permit data were collected from the Planning Department's online database as one indicator of economic development. However, the database only contained data from 1998 to 2003. Sufficient building permit data were not available to be used as an indicator at the time of this study.

The second indicator of economic development used was per capita income. Per capita income data was obtained for the city of Austin from the U.S. Department of Commerce Bureau of Economic Analysis for 1980 to 2001. Per capita income in the Austin metropolitan area has increased from $15,001 in 1985 to $31,511 in 2001, representing a 110 percent increase. As shown in Figure 13, there appears to be a trend upward in average per capita income beginning in 1997. This is most likely associated with the rise of the high-tech industry in the Austin area. Despite increased economic development in the area and higher incomes, the average per capita water use has remained fairly constant.

[2] Winter use is defined as the average use between November and March (inclusive). Summer use is the average use for the three highest summer months (July – September).

Figure 8.
Total Water Usage, Municipal Water Usage and Service Population
City of Austin, 1980-2003

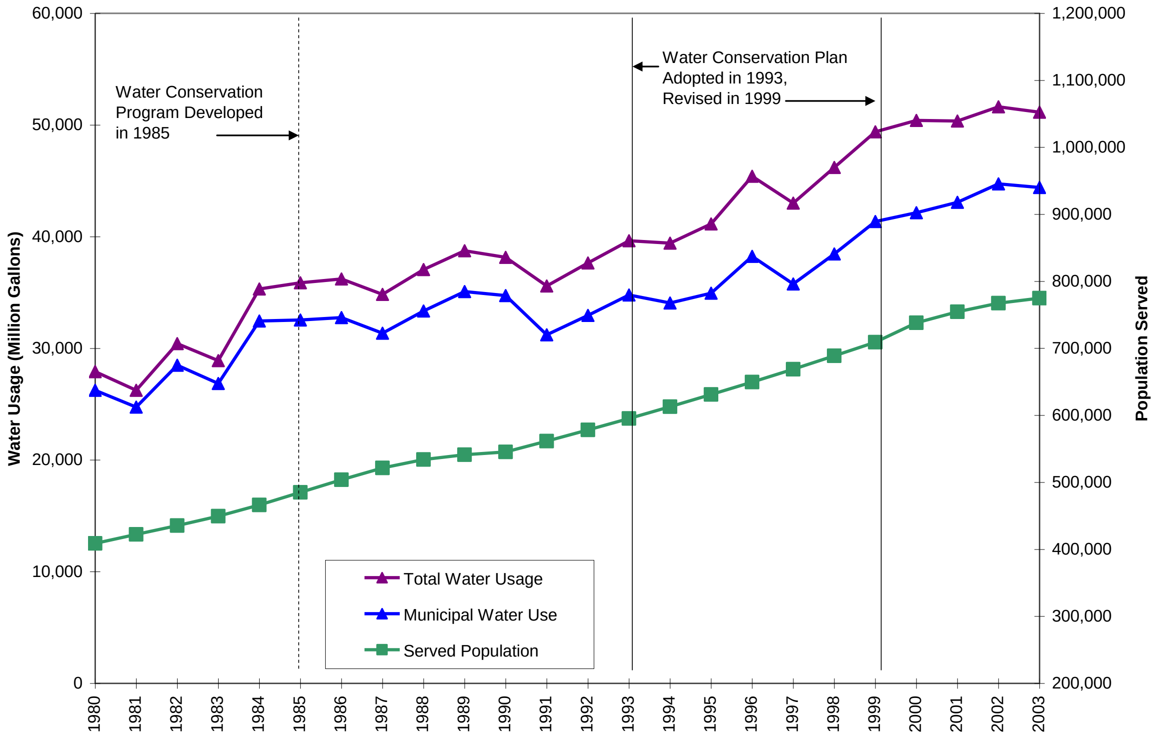


Figure 9
City of Austin Service Area Historical Municipal GPCD

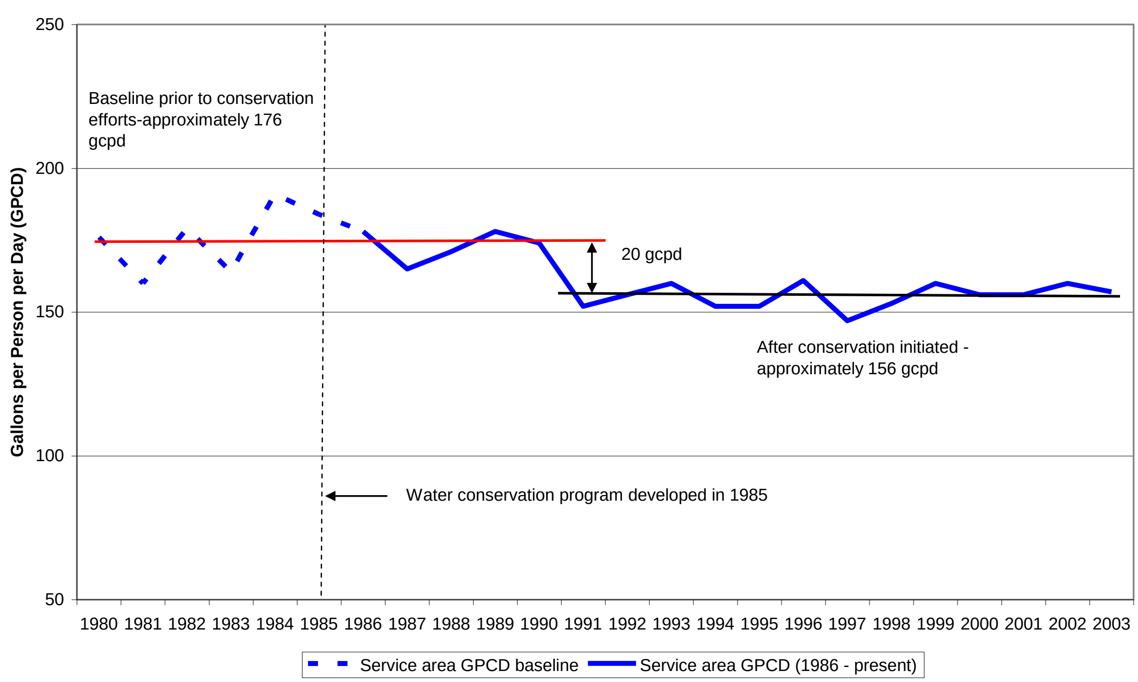


Figure 10A
Total Monthly Water Usage and Monthly Rainfall
City of Austin, 1980-2003

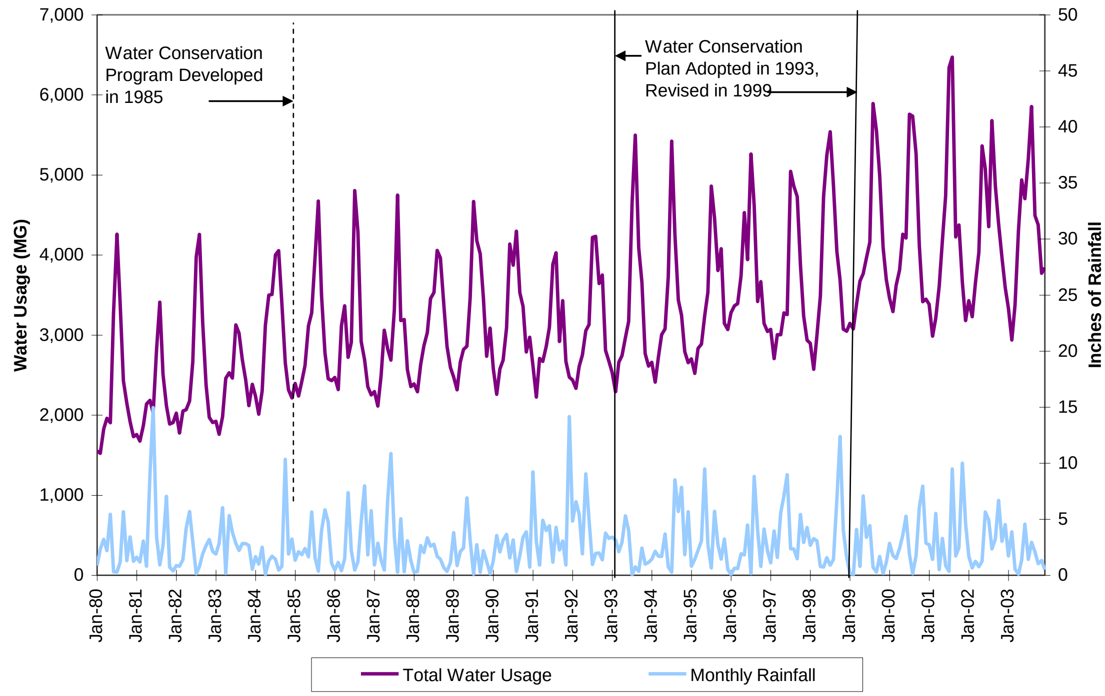


Figure 10B
Monthly Water Use vs Rainfall
City of Austin, 1980 - 2003

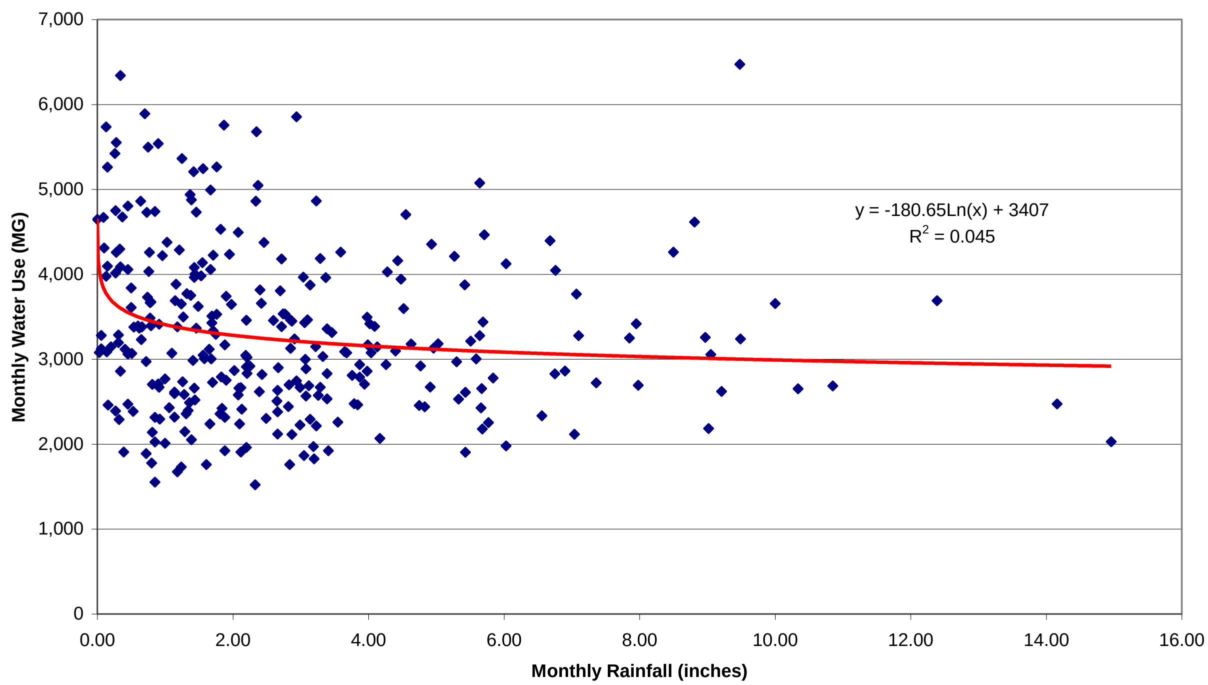


Figure 11A
Total Monthly Water Usage and Average Monthly Temperature
City of Austin, 1980-2003

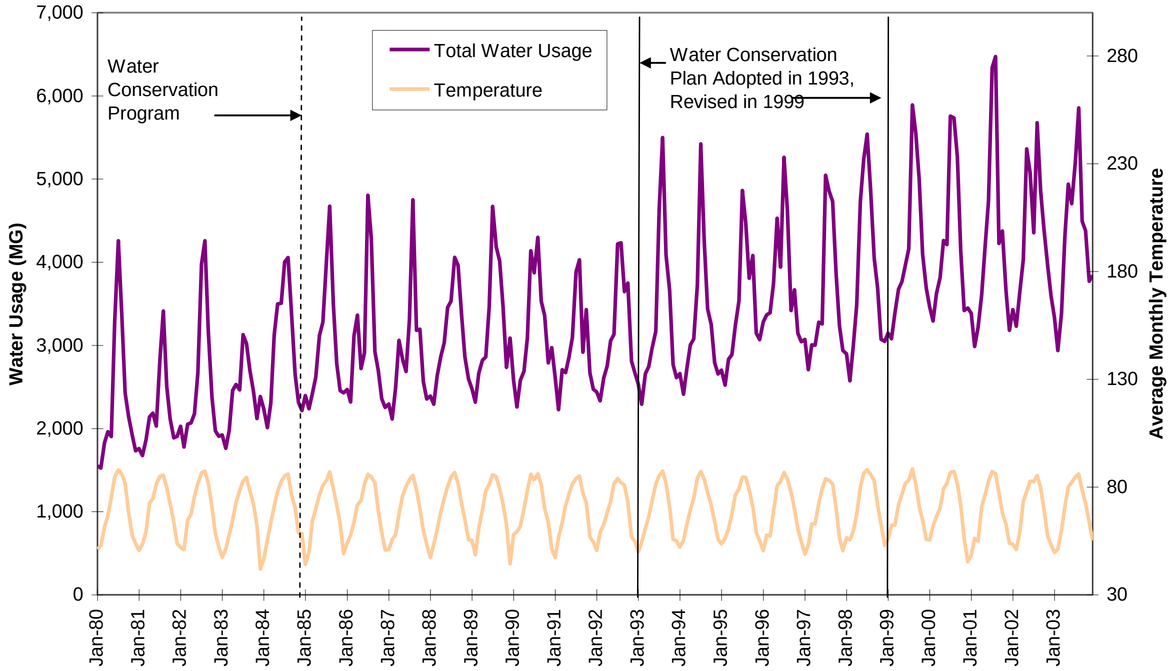


Figure 11B
Monthly Water Use vs Average Temperature
City of Austin, 1980 - 2003

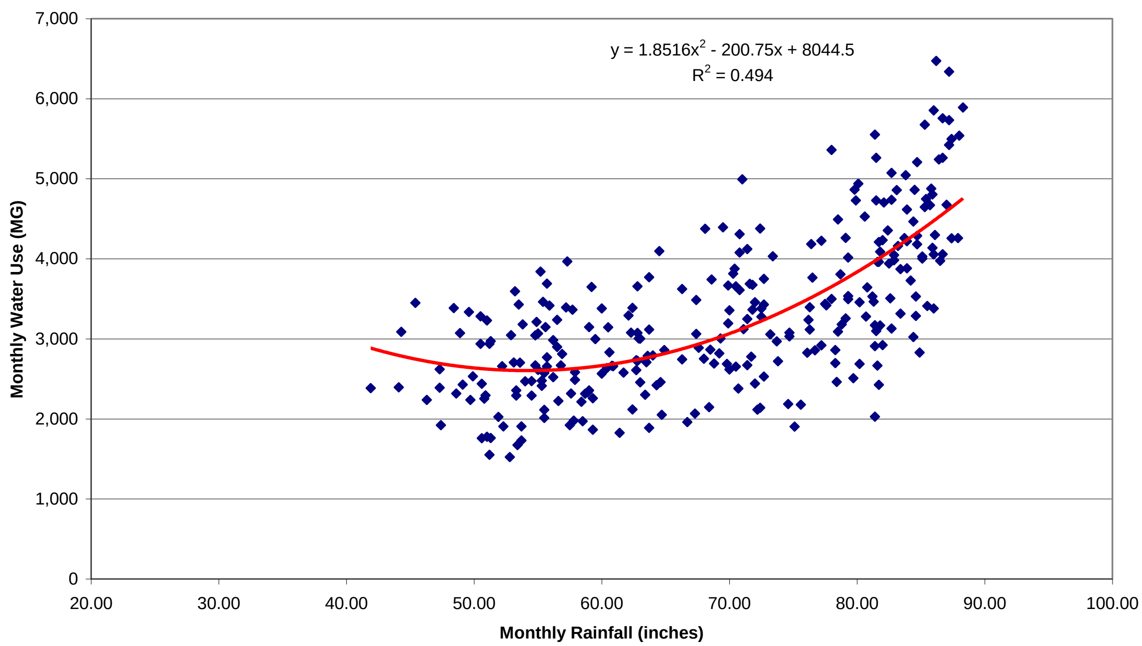


Figure 12
Municipal Water Usage, Average Summer Climatic Data
City of Austin, 1980-2003

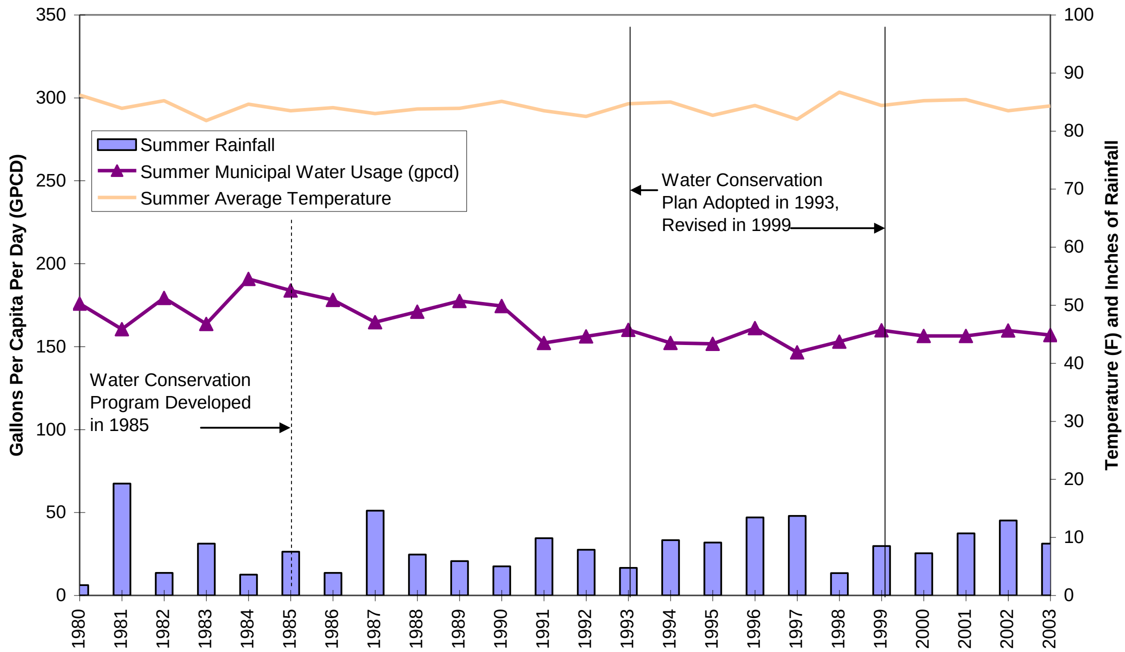
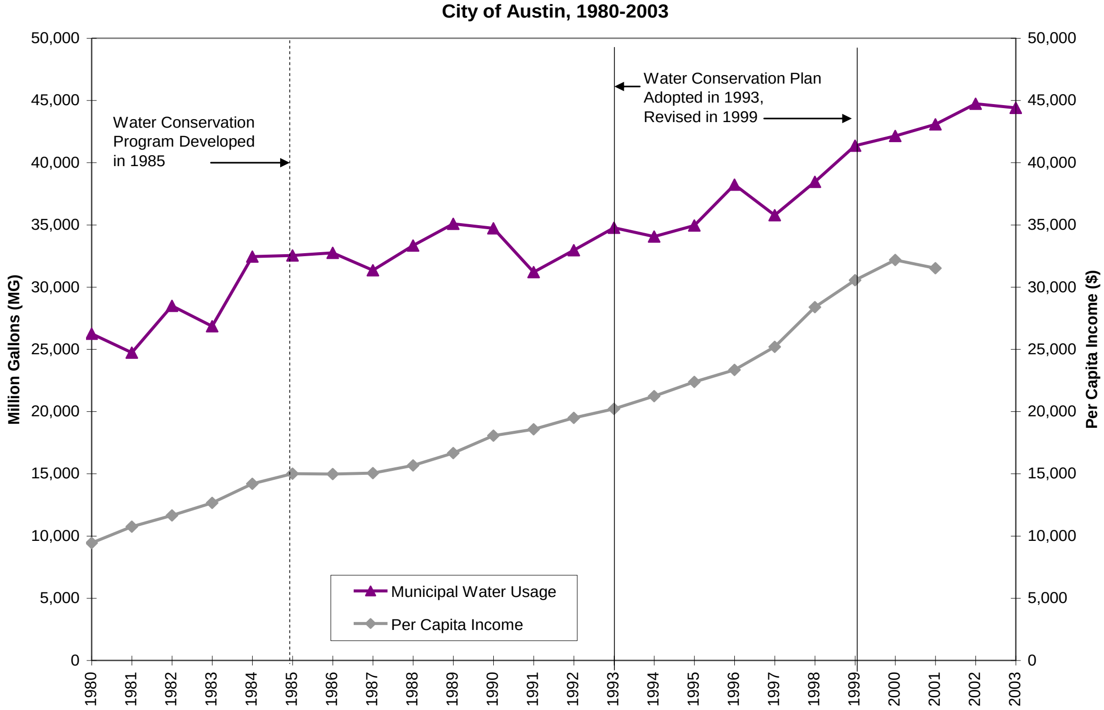
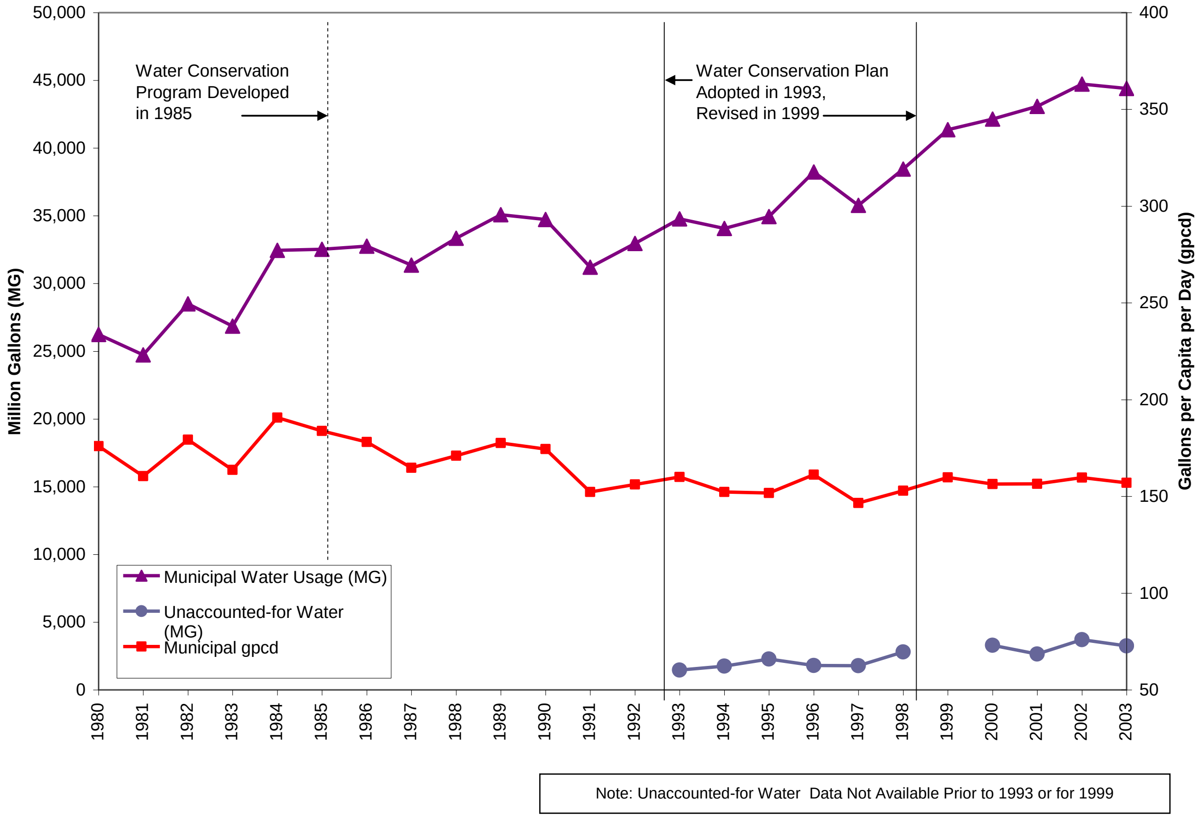


Figure 13
Municipal Water Usage and Economic Development
City of Austin, 1980-2003



Another measure of the effectiveness of a water conservation program may be a reduction in unaccounted-for water. Data for unaccounted-for water was available from 1993 to 2003, with the exception of 1999 where information was not available for August or September. Unaccounted-for water remained fairly constant during that time, as shown in Figure 14, ranging from 4 to 7 percent of the total system pumpage, which is well below the conservation program's goal to keep unaccounted-for water uses lower than 15 percent. A significant reduction in unaccounted-for water use may have occurred prior to 1993 after the initiation of the program in 1985, but data are not available to quantify these savings.

Figure 14
Municipal Water Usage and Unaccounted-for Water
City of Austin, 1980-2003



Based on the straight comparisons of water use, the implementation of the water conservation program in Austin has been effective in reducing overall annual water use and maintaining unaccounted-for water well below typical levels. Average per capita water use has decreased approximately 11.4 percent (20 gpcd) since the water conservation program started in 1985. This decrease is likely attributed to the multitude of conservation programs the city has put in place as well as reductions in unaccounted for water. Estimates of water savings for different types of conservation measures are shown in Table 1.

Accounting for all of Austin's conservation strategies that are currently in place, there is the potential to reduce per capita water use by about 14 gpcd if the target adoption rate is met. Additional per capita reductions due to commercial efficiency strategies are small (approximately 1 gpcd).

Reductions seen to date are approximately 20 gpcd from pre-conservation plan use, and actually may be greater if compared to expected use without conservation. Some of this reduction may be associated with reduced unaccounted for water, but this cannot account for all of the reduction. Continued decline in per capita water use after 1991 is not evident in this study. However, the conservation plan may be keeping per capita use in check when it otherwise would have increased due to higher water uses associated with suburban development with higher income levels.

Table 1
Water Savings Associated with Different Water Strategies

Water Efficiency Strategy	**GPCD Savings**	**Employed by Austin**	**Potential Adoption Rate**	**Austin Savings[1] (GPCD)**
SF Toilet Retrofit	10.5	x	50%	5.25
SF Showerheads	5.5	x	50%	2.75
SF Clothes Washer Rebate	5.6	x	90%	5.04
SF Irrigation Audit	20.3	x	5%	1.02
SF Rainwater Harvesting	8.7	x	5%	0.44
SF Rain Barrels	0.9	x	30%	0.27
MF Toilet Retrofit	10.5	x	60%	6.30
MF Showerheads	5.5	x	60%	3.30
MF Clothes Washer Rebate	1.2	x	80%	0.96
MF Irrigation Audit	1.8	x	50%	0.90
MF Rainwater Harvesting	3.7	x	5%	0.19
POTENTIAL SAVINGS*				**13.72**

SF – single family unit MF- multi-family unit
1. Potential savings for Austin were calculated assuming twice the SF population as MF population

Commercial Water Efficiency Strategy	**Savings**	**Employed by Austin**	**Assumed Number of Measures**	**Austin Savings (GPD)**
Commercial Toilet Retrofit	26 GPD	x	20,000	520,000
Coin-Operated Clothes Washer Rebate	24 gal/washer	x	300	7,200
Irrigation Audit	125 GPD	x	500	62,500
Commercial General Rebate	1 gal/rebate $	-		
Commercial Rainwater Harvesting	35.2 GPD	x	200	7,040

Source: *Quantifying the Effectiveness of Various Water Conservation Techniques in Texas*, prepared for the Texas Water Development Board, GDS Associates, May 2003.

Conclusions Drawn from Case Studies

Both communities evaluated in the water conservation studies recognized a reduction in overall water usage and unaccounted-for water following the adoption of their respective water conservation programs. For Temple it is unknown whether these reductions are associated with the water conservation plan or other factors. For Austin, the data following the implementation of the conservation plans extend over a varied climatic period for more than ten years, which indicate that the observed reductions are related to the implementation of water conservation strategies. Based on limited data it appears that some of the observed reductions in per capita water use are associated with reductions in unaccounted-for water. In fact all or nearly all of Temple's reduction in per capita use appears to be directly due to lower unaccounted-for water, which may or may not be reflective of actual reductions in water losses but rather better accounting methods. Austin's per capita water use has decreased more than what could be attributed to reduced unaccounted-for water. Reductions due to other measures appear to be occurring, but quantified reductions for each conservation strategy could not be assessed.

While both case studies indicate reductions in water use, the differences in each program's life-span and strategies make it difficult to compare the two cities directly.

In Austin, the water conservation program includes several incentive and rebate programs that are not used in Temple, including low-flush toilets, low-flow showerheads, and rainwater harvesting. In addition, the Austin water conservation program was initiated in 1985, nearly 15 years before Temple's water conservation plan was adopted. Austin's prominence as a rapidly growing metropolitan area directed most of its early proactive water conservation strategies.

In Temple, water conservation appears to have been effective, at least in the short-term, to better account for unaccounted-for water and convey conservation messages at peak use times of the year. Further data are needed to confirm that these observed reductions are due to the city's efforts in reducing water uses and losses, or other factors such as summer rainfall. Recent population growth has prompted the city to construct a new water treatment plant and expand its distribution system. This may be contributing to lower water losses associated with older leaking infrastructure. Further reductions are unlikely, and the city may actually see water losses increase as the new system ages.

In general, the results of this study indicate that additional focus on water conservation can be effective in reducing total water use and unaccounted-for water over the short-term. Specifically, efforts to reduce water losses are a pro-active strategy that can be undertaken by the city directly. The impacts of these efforts appear to be realized over a relatively short time period, but require continued efforts to maintain these reductions. Other proactive, incentive-based programs, such as Austin's, prove effective in providing a long-term reduction in water demand. However, the continued impacts of the plans are uncertain. Many of the conservation measures available to municipalities involve customer participation and in some cases, lifestyle changes. These changes often take time and require continual effort to maintain the effectiveness. Due to the short length of time since the Temple water conservation plan was adopted, it remains unclear if limited water conservation strategies like Temple's will provide a sustained reduction in water demand. For Austin, continued reductions in per capita water use may be occurring, but are not readily discernable from the data. Changes in economic characteristics in Austin, including a general increase in affluence and an increase in the installation of automatic irrigation systems, may mask the reductions in water use from other conservation measures. Further study is needed to assess estimated per capita water use that would occur if no conservation strategies were in place.

Appendix M
Summary of Phase 1 Reports

Appendix M
Summaries of Phase 1 Reports

In order to provide information for the development of the 2011 Plan, the Brazos G RWPG completed the following five studies during Phase 1.

Study 1 – Updated Drought of Record and Water Quality Implications for Reservoirs Upstream of Possum Kingdom Reservoir

Study 2 – Groundwater Availability Model of the Edwards-Trinity (Plateau) and Dockum Aquifer in Western Nolan and Eastern Mitchell Counties, Texas

Study 3 – Regionalization Strategies to Assist Small Water Systems in Meeting New SDWA Requirements

Study 4 – Brazos G Activities in Support of Region C's Water Supply Study for Ellis, Johnson, Southern Dallas, and Southern Tarrant Counties (Four County Study)

Study 5 – Updated Water Management Strategies for Water User Groups in McLennan County

The studies, completed in April 2009, are summarized below. The full reports from the studies can be downloaded from the Brazos G and TWDB websites at the following web addresses:

http://www.brazosgwater.org/400.html

http://www.twdb.state.tx.us/wrpi/rwp/rwp_study.htm

Study 1 – Updated Drought of Record and Water Quality Implications for Reservoirs Upstream of Possum Kingdom Reservoir

A subset of the Brazos Basin Water Availability Model (Brazos WAM) was developed that includes the Clear Fork watershed and the area contributing flows from the Brazos River Basin, downstream of the confluence of the Clear Fork with the main stem of the Brazos River, to just below Possum Kingdom Reservoir. This model is referred to as the "Brazos Mini-WAM." Hydrologic data in the Brazos Mini-WAM were updated to reflect the ongoing drought through June, 2008; and reservoir yields for water supply reservoirs were computed to determine supply available to water user groups and wholesale water suppliers in the area.

Reservoir one-year safe yields were computed for 18 water supply reservoirs. For seven of the reservoirs, the critical drought period remains the drought of the 1950s, generally accepted as the "drought of record" in the Brazos River Basin and much of Texas. For the remaining reservoirs, the ongoing drought is more critical than the 1950s drought.

A separate analysis was completed for Millers Creek Reservoir because it is located outside of the area included in the Brazos Mini-WAM. Hydrology data were updated for the Millers Creek watershed, and an analysis outside the Brazos Mini-WAM was used to estimate the reservoir's safe yield. The analysis indicates that the current drought is also more severe than the 1950s drought, and that the large rainfall event in 2007, which provided some temporary relief from the drought conditions, did not benefit Millers Creek Reservoir significantly.

As a reservoir's level lowers during extended drought periods, concentrations of various water quality constituents increase as water is evaporated and not replenished with inflows. During extreme drought periods, under use levels approximating the yield of the reservoir, water quality can be expected to degrade considerably. A preliminary analysis of chloride and total dissolved solids concentrations in three reservoirs – Fort Phantom Hill Reservoir, Lake Graham and Lake Stamford – indicates that treatment costs will be much greater during critical drought periods under use levels that more closely approximate reservoir yields.

The updated Brazos Mini-WAM was used to develop estimates of water supply available in the Brazos Basin upstream of Possum Kingdom Reservoir during the development of the 2011 Plan. Notice is made in the 2011 Plan that degraded water quality at low reservoir levels during a drought may require additional treatment costs. Those additional treatment costs, however, were not considered during the development of the 2011 Plan.

Study 2 – Groundwater Availability Model of the Edwards-Trinity (Plateau) and Dockum Aquifer in Western Nolan and Eastern Mitchell Counties, Texas

Concern has been expressed for the capability of the City of Sweetwater's Champion Wellfield to continue as a long-term water supply. To address those concerns, the Brazos G RWPG conducted a re-evaluation on the City of Sweetwater's Champion Wellfield. The study included the development of a local scale groundwater availability model, which was used to evaluate groundwater supplies in western Nolan and eastern Mitchell Counties, focusing on the Champion Wellfield. The major and minor aquifers in the area are the Edwards-Trinity (Plateau), called Edwards-Trinity in this report, and the Dockum. The wells in the Champion Wellfield are screened in the Dockum.

The assessment of the long-term groundwater supplies for Sweetwater from the Dockum considered the results of the groundwater modeling and the historical performance of Sweetwater's wells. Data from about two-thirds of the wells in the Champion Wellfield for which data are available show that the wells are being used at maximum rates and that these yields would become smaller if the declining trend in water levels continues. On the other hand, distributing the pumping to nearby areas would moderate future groundwater declines and the aquifer's saturated thickness would experience rather modest changes.

Based on these findings, the 2011 Plan includes a recommended water management strategy for the City of Sweetwater to continue to rely on a conjunctive management practice in which the City utilizes water from Oak Creek Reservoir when surface water is available and utilizes groundwater during droughts. This strategy includes an expansion of the Champion Wellfield to reduce the long-term withdrawals from the existing wells and lessen the magnitude of water level declines. The most favorable areas for expansion of the wellfield are to the south-southwest of the existing wellfield. This is attributed to spreading out the wells as much as possible and moving toward an area where the Dockum appears to be thicker and there appears to be more recharge from the overlying Edwards-Trinity.

The City of Sweetwater contributed partial funding for this study.

Study 3 – Regionalization Strategies to Assist Small Water Systems in Meeting New SDWA Requirements

The Brazos G RWPG performed a preliminary investigation of the feasibility for small public water systems (PWSs) to cooperate on a regional basis to help meet ever increasing Safe Drinking Water Act (SDWA) regulations. This study identifies and recommends two candidate groups of small PWSs in the Brazos G Area that may be amenable to using the regionalization of resources to optimize system operation, reduce costs, and maintain compliance with the SDWA.

Small systems with potential SDWA compliance issues were initially identified using compliance records and analytical lab results obtained from the Texas Commission on Environmental Quality (TCEQ). Data analysis in a geographic information system (GIS) indicated five potential regional groups, geographically spread across the Brazos G Area. The groupings were based on the high density of PWSs with multiple compliance risks for human or environmental health. Small systems located within the five regional groups were surveyed (64% response rate) to record the most important compliance-related issues faced by the system and to gauge interest in being evaluated as part of a regionalization strategy.

Two recommended groups were selected based on criteria that evaluated the severity of the issues as it relates to SDWA compliance, the extent to which the issues were shared among neighboring systems, and the engineering, political, and economic feasibility of regionalizing resources in the area. One group of PWSs, located in an area encompassing parts of Falls, Hill, Limestone, and McLennan Counties, is looking for strategies to lower arsenic concentrations. Blending to lower arsenic concentrations was deemed to be the most appropriate strategy, assuming a reliable purchase water source can be identified The other group, located north of Abilene in Knox and Haskell Counties, is looking for strategies to lower nitrate concentrations. Treatment to lower nitrate concentration is probably the most feasible solution.

While no recommended water management strategies arose from this study, future steps in the regionalization process will require an entity to assume a leadership role (a “convener”) to oversee and assist these identified systems in the regionalization process. Results of detailed cost and engineering analyses can be used to recommend a regionalization strategy in a Brazos G plan, and allow participating PWSs to qualify for low-interest loans and grants to implement these strategies.

Study 4 – Brazos G Activities in Support of Region C's Water Supply Study for Ellis, Johnson, Southern Dallas, and Southern Tarrant Counties (Four County Study)

Recent population estimates show that some North Texas counties are growing faster than projected in the 2006 Brazos G and Region C Plans. The Region C RWPG and the Brazos G RWPG completed a study (Four County Study) that considers population and water demand growth for Ellis, Johnson, Southern Dallas, and Southern Tarrant Counties. The majority of the project area is within in Region C, therefore, Region C prepared and submitted the report to guide the development of the 2011 Region C and Brazos G Plans. Brazos G specifically assisted with Johnson County entities located in the Brazos G Area. The purpose of this study was to review recent growth in the study area, make adjustments to population and demand projections to account for growth, and update the current and future water plans of the water user groups and wholesale water providers in the study area. This study included conducting meetings and compiling survey data provided by water suppliers regarding their current and future water plans, determining revisions to population and demand projections, and developing a water supply plan for the study area. This report describes the assistance provided by Brazos G to the study effort and summarizes the information resulting from the study that is pertinent to the Brazos G Area. The full Four County Study report was published by Region C.

The recommended changes from the 2006 Brazos G Plan for Johnson County include:

- Higher projections of population and water demand for water user groups in the study area, including higher projections provided by the City of Mansfield for their Johnson County growth as reallocated from previous Tarrant and Ellis County estimates,
- New water management strategies for Alvarado, Grand Prairie, and Johnson County Special Utility District (JCSUD),
- Consideration for Arlington to become a wholesale water provider, and
- Cost estimate updates for all water management strategies in the study area.

The results of the study were utilized to develop revised population and water demand projections for the 2011 Brazos G Plan. The strategies recommended by the study also form the basis for the recommended water management strategies for water user groups and wholesale water providers in Johnson County in the 2011 Brazos G Plan.

Study 5 – Updated Water Management Strategies for Water User Groups in McLennan County

This study was conducted to identify potential water management strategies for water user groups (WUGs) in McLennan County. The primary focus of the study was to identify strategies other than the City of Waco and the Trinity Aquifer. The study included compiling information including: water demands, primary and secondary water supplies, Trinity Aquifer wells and pumpage from the Trinity Aquifer, and contacting representatives of each WUG regarding their plans for future water supplies.

Of the 20 WUGs contacted, 18 have all or part of their primary water supply coming from the Trinity Aquifer and two have all of their supply coming from the City of Waco. Five of the WUGs have a supplemental supply from Waco; and, seven have a supplemental supply from a surface water source other than Waco. Other water supplies being used by one or more utilities include: the Brazos River, Bluebonnet Water Supply Corporation (WSC) which gets its water from Lake Belton, and Tri-County Special Utility District (SUD).

Based on interviews with representatives of WUGs, most WUGs have relatively short-term plans to continue with their past practices. In general, these practices are to install new Trinity Aquifer wells as needed. Several WUGs have immediate plans to construct new wells, and to rely on or expand interconnects with other neighboring water utilities for emergencies. Three of the 17 WUGs who rely on Trinity Aquifer wells expressed an opinion that they may need to connect to Waco or rely increasingly on Waco for their water supply. Several expressed an interest in either remaining independent of Waco or becoming independent of Waco.

Potential new water supply strategies for McLennan County that do not include the Trinity Aquifer or Waco include: Lake Belton via Bluebonnet WSC, the Brazos River, the Brazos River Alluvium, and reuse of wastewater effluent. Waco's development of wastewater reuse supplies for non-potable uses will free up and extend existing potable supplies. The FHLM WSC and Tri-County SUD may also be able to meet some of the future demands for utilities that are located near their distribution systems.

This study was used to guide the selection of recommended water management strategies for WUGs and wholesale water providers in McLennan County.

The City of Waco contributed partial funding for this study.

Appendix N
Summary of Recommended Water Management Strategies in the 2011 Brazos G Regional Water Plan

COMMON NAME STRATEGY	WUG/WWP using Strategy	1st Decade Average Annual Unit Cost ($/acft)	Supply Developed 2010	2020	2030	2040	2050	2060	2060 Average Annual Unit Cost ($/acft)	Total Capital Cost
Municipal Conservation	39	$475	4,874	13,572	14,379	15,865	18,496	21,346	$475	$0
Irrigation Conservation	5	$263	3,390	5,519	7,550	7,376	7,206	7,041	$263	$0
Industrial Conservation	14	ND	2,594	5,782	9,544	10,517	12,308	13,370	ND	$0
Voluntary Redistribution	2	$877	256	305	350	380	396	413	$877	$0
Purchase Additional Water	22	$1,043	14,545	21,560	23,052	25,234	27,727	30,899	$823	$0
Purchase Additional Water + Infrastructure	19	$2,034	14,617	32,843	44,291	45,518	46,018	46,618	$1,039	$224,540,000
Increase WTP Capacity	13	$661	15,551	42,941	50,781	54,812	66,095	73,200	$311	$282,269,000
Reuse Supply	16	$918	27,955	51,164	53,963	64,554	78,270	83,527	$336	$160,277,000
Brushy Creek Reservoir	1	$485	2,090	2,090	2,090	2,090	2,090	2,090	$67	$18,553,000
Cedar Ridge Reservoir	1	$1,168	0	23,380	23,380	23,380	23,380	23,380	$241	$285,214,000
Coryell County Off-Channel Reservoir	3	$1,007	0	3,365	3,365	3,365	3,365	3,365	$193	$37,489,000
Strategy used by WUG/WWP		*$2,869*	*0*	*0*	*3,365*	*3,365*	*3,365*	*3,365*	*$1,523*	*$51,888,000*
Gibbons Creek Reservoir Expansion	1	$237	0	3,870	3,870	3,870	3,870	3,870	$29	$12,140,600
Groesbeck Off-Channel Reservoir	1	$565	0	0	0	0	1,755	1,755	$565	$10,412,000
Millers Creek Reservoir Augmentation	5	$217	17,582	17,582	17,582	17,582	17,582	17,582	$217	$46,948,000
Strategy used by WUG/WWP		*$0*	*1,010*	*1,016*	*1,016*	*1,027*	*1,033*	*1,041*	*$0*	*$0*
Turkey Peak Reservoir	2	$924	0	7,600	7,600	7,600	7,600	7,600	$440	$50,227,000
Carrizo-Wilcox Groundwater	11	$556	5,918	7,011	7,502	11,192	13,261	13,451	$128	$46,148,500
Trinity Groundwater	9	$824	837	436	636	1,471	1,822	2,139	$387	$19,957,000
Gulf Coast Groundwater	1	$638	0	0	0	5,600	5,600	5,600	$146	$31,630,000
Seymour ASR Project	2	$701	6,208	6,208	6,208	6,208	6,208	6,208	$159	$38,625,000
Phase I Lake Whitney Water Supply Project	1	$2,850	2,128	2,128	2,128	2,128	2,128	2,128	$1,153	$41,453,000
Future Phases of Lake Whitney Water Supply Project	1	$926	0	7,572	7,572	7,572	7,572	7,572	$926	$110,843,000
Reallocation of Supplies	3	$0	0	26,847	26,847	30,947	36,647	43,547	$0	$0
Subordination Agreement	1	ND	1,679	1,671	1,557	1,435	1,301	1,154	ND	$0
Oak Creek Reservoir Conjunctive Management	2	$1,643	1,688	1,755	1,878	1,948	1,953	1,963	ND	$15,015,000
WCBWDS	3	$2,046	843	843	843	843	843	843	$648	$22,461,000
Somervell County WSP	6	$1,994	840	840	1,800	1,800	1,800	1,800	$341	$104,151,400
Run-of-river water right of unappropriated flows	1	ND	ND	ND	ND	ND	ND	ND	ND	$0
EWCRWTS	10	$1,488	4,601	6,260	6,260	6,958	6,958	6,958	$435	$44,706,000
Rehabilitate Existing Wells	1	$30	0	1,100	1,100	1,100	1,100	1,100	$30	$350,000
Brushy Creek RUA Water Supply Project	4	$1,338	0	20,928	40,587	40,587	40,587	40,587	$1,056	$391,533,000
BRA System Operation	7	ND	201,800	201,800	201,800	201,800	201,800	201,800	ND	$0
Strategy used by WUG/WWP		*$2,148*	*77,020*	*77,020*	*82,242*	*84,742*	*84,742*	*84,899*	*$1,014*	*$204,281,000*
Lake Granger Augmentation	8	$1,124	26,505	26,001	25,496	24,990	70,751	70,246	$976	$643,928,000
Strategy used by WUG/WWP		*$852*	*0*	*0*	*0*	*33,814*	*37,839*	*39,710*	*$852*	*$229,822,000*
BRA Reservoir Connection	1	$133	0	30,000	30,000	30,000	30,000	30,000	$45	$36,038,000
Storage Reallocation	3	$406	0	0	0	2,050	2,050	2,050	$406	$11,447,000
Strategy used by WUG/WWP		*$0*	*0*	*0*	*0*	*419*	*481*	*544*	*$0*	*$0*
Chloride Control Project	1	ND	0	0	0	0	0	0	ND	$163,226,000
Restructure Contracts	1	$0	502	470	437	405	372	340	$0	$0

Appendix O
Written Comments Received Concerning the Initially Prepared 2011 Brazos G Regional Water Plan

ADOBE WELLS, INC.
6812 FM 3326 S.
Hawley, Texas 79525

Mr. Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714

Re: Comments concerning the BRA Region G 2011 Water Plan

To the BRA Region G Planning Committee:

I am Rex Bland, owner and operator or a 640 acre irrigated ranch located in Jones County approximately eight miles Northwest of Lake Fort Phantom Hill. I attended the Brazos G hearing in Abilene on January 12, 2010 and found that groundwater of the Seymour Aquifer in Jones County was being totally ignored for planning purposes in spite of ample evidence as a viable source and specific instructions from the Lieutenant Governor. The location and availability of my well field, which produces 2,200 acre feet or more per year from the Seymour Aquifer was again brought to the attention of the Planning Committee by Mr. David Bell, P.E., General Manager of the West Central Texas Municipal Water District and by Mr. Sam Chase attorney and recent member of the Abilene City Council, and myself. Some excuses were given that this well field had been raised for consideration in the 2011 Plan, but, according to the HDR representative leading the meeting, the City of Abilene, and perhaps others, had expressed no interest in pursuing this groundwater source for planning purposes. Therefore, it was not being considered nor included in the Plan.

I have offered to sell water from my well field to the City of Abilene and the West Central Texas Municipal Water District. I have also offered to Abilene, an Aquifer Storage and Recovery (ASR) alternative at the well field for sewer effluent from the Abilene wastewater treatment plant in conjunction with the proposed Cedar Ridge Reservoir or the Tenaska Coal Plant.

The Lieutenant Governor has challenged Groundwater Water Improvement Districts, State and Local Planning Agencies to fully consider fresh or brackish groundwater in their future water use planning. In cooperation with the State in meeting this challenge to utilize groundwater, it seems obvious that the Seymour Aquifer in Jones County should be considered in the Region G Plan as a legitimate water supply source.

Thank you for the opportunity to offer these comments and I trust you will respond to me concerning these Comments and the question they raise about the Plan.

Sincerely,

Rex Bland, President

Rex Bland

From: Alec Pointer [mailto:alecpointer@hotmail.com]
Sent: Monday, April 26, 2010 10:10 AM
To: Trey Buzbee
Subject: RE: Potential Reservoir in Grimes County

Trey,

Yes, please make this part of the formal public comment.

Thank you,

Alec Pointer

Subject: RE: Potential Reservoir in Grimes County
Date: Mon, 26 Apr 2010 09:22:32 -0500
From: tbuzbee@Brazos.org
To: alecpointer@hotmail.com

Mr. Pointer,

If you would like to make our e-mail correspondence part of the public comment on the draft 2011 Brazos G Plan, please let me know. At your request, I can incorporate the following correspondence into the official list of comments we have received to date. Our public comment period will end on June 25, 2010.

Thank you,
Trey Buzbee

From: Alec Pointer [mailto:alecpointer@hotmail.com]
Sent: Thursday, April 22, 2010 10:18 AM
To: Trey Buzbee
Subject: RE: Potential Reservoir in Grimes County

Trey,

I want to register my heartfelt disappointment in your group's operations. The fact that any group formed by the legislature that is tasked with such important issues would fail to do, what ANY reasonable person would consider due diligence before making recommendations, is contemptible. How can a reliable study be so specific as to depth, acreage, amount of water, costs of providing water and project costs without knowing what land would be affected? This is pretty simple topographical information - we put a dam here and it will flood 100 square miles to this depth - these are the acres that will be flooded.

I am pretty certain that my land is not affected and I would have been inclined to support such a plan; however, after hearing the complete lack of information available to decision makers trying to determine if this plan, that will affect thousands of families, should go forward, I will work against this plan.

I will be forwarding our email correspondence to every elected official that I can find and urge those that serve in the legislature to deny any request that may be made to more with this project.

I appreciate your time and your willingness to reply with honest information; however, I am very disappointed in the service of this planning group.

Thank you,

Alec Pointer

Subject: RE: Potential Reservoir in Grimes County
Date: Thu, 22 Apr 2010 09:47:00 -0500
From: tbuzbee@Brazos.org
To: alecpointer@hotmail.com

Mr. Pointer,

Thank you for the follow-up questions. I understand your frustration, but this is the best information I have available for the conceptual project used in this long-term regional water planning process.

More detailed information about the proposed reservoir's exact location & configuration and the areas that would be inundated will be available once more detailed engineering studies are performed. That will happen if a project sponsor decides to implement the proposed reservoir.

I understand that this probably does not answer your question, but the documents provided are the best information that I have at this point.

Thank you,
Trey Buzbee

From: Alec Pointer [mailto:alecpointer@hotmail.com]
Sent: Tuesday, April 20, 2010 10:54 AM
To: Trey Buzbee
Subject: RE: Potential Reservoir in Grimes County

Mr. Buzzbee,

Thank you for sending this information; however, it is pretty useless in answering my questions. The report specifies so many specifics that could occur but doesn't provide an map of the actual affected area. The report indicates that 100 square miles will be flooded but you can't show what those are? There is no way that this information isn't available in the studies, otherwise the studies are useless. I would like to know topographically speaking, if a damn the size proposed is built what will flood.

Again, I understand that no sponsor has been identified for this project (and if this is the information that potential sponsors get, good luck with that); however, I feel that I have a right to know if the home that I am building now could potentially be affected by this project.

Thank you,

Alec Pointer

Subject: RE: Potential Reservoir in Grimes County
Date: Tue, 20 Apr 2010 09:05:07 -0500
From: tbuzbee@Brazos.org
To: alecpointer@hotmail.com

Mr. Pointer,

I've attached an excerpt on the Millican Reservoir – Panther Creek site as per your request.

I would like to point out that what is noted in draft 2011 Brazos G materials is simply a plan at this point; there is no project sponsor committed to implementing the project. In light of this, there is not a lot of detailed information available to answer your question about the exact location/configuration of the proposed project.

Much of the information available is based on studies performed by the U.S. Army Corps of Engineers in the 1980s. That information will have to be updated if/when the project gets a sponsor. There will be no accurate detailed information until a sponsor begins preliminary engineering and survey work; on a project this size, the cost for that will be many millions of dollars. Also note that transportation issues are one of several important considerations with respect to these types of projects.

I can't imagine any of these older proposed reservoir projects in the State Water Plan not going through an extensive site re-evaluation. All of that affects what is in/out of the proposed inundation areas. If this project comes to fruition, there are numerous steps that must be taken by a project sponsor during implementation and just about all will have an element for public participation (several of these steps are noted in the attached summary, see section 4B.12.8.5).

Again, this is a 50-year water supply planning exercise. Hope this helps shed some light on the process.

Region H Contact Information
San Jacinto River Authority serves as the Region H Administrator

Telephone
936.588.1111 Conroe
936.447.5260 Metro

Physical address
1577 Damsite Rd.
Conroe, Texas 77304

Postal address
P.O. Box 329
Conroe, Texas 77305

Thanks,
Trey Buzbee

From: Alec Pointer [mailto:alecpointer@hotmail.com]
Sent: Monday, April 19, 2010 3:22 PM
To: Trey Buzbee
Subject: RE: Potential Reservoir in Grimes County

Mr. Buzbee,

I would appreciate if you could send the information for the Millican Reservoir. Will the information that you send show the area affected by the reservoir? I own property and am building a home in Grimes County now and am interested to see the effect on my situation.

Also, since any reservoir will naturally flood the Navasota river bottoms where Hwy 30 runs, does the information that you have address transportation issues/solutions?

In any case, whatever you can send me will be most appreciated. I would also appreciate the contact information for Region H (although I don't think it will be of concern to me, it is probably better to be safe).

Thank you,

Alec Pointer

Subject: RE: Potential Reservoir in Grimes County
Date: Mon, 19 Apr 2010 15:08:32 -0500
From: tbuzbee@Brazos.org
To: alecpointer@hotmail.com
CC: dale.spurgin@co.jones.tx.us

Mr. Pointer,

There are a couple of potential reservoir sites that are noted in various regional water planning documents.

There is one noted in the draft 2011 Brazos G Regional Water Plan referred to as the Millican Reservoir project. It is located on the Navasota River primarily in Brazos & Grimes Counties. I can send you the information Brazos G has prepared on the proposed Millican Reservoir Project.

Another project referred to as Bedias Reservoir located on Bedias Creek is noted in the draft 2011 Region H Regional Water Plan. This proposed project is located on the Grimes / Madison County line. The Region H Regional Water Planning Group can speak to this project and I can get you their contact information if needed.

Please let me know how I can assist you further.

Trey Buzbee
(254) 761-3168

From: Dale Spurgin [mailto:dale.spurgin@co.jones.tx.us]
Sent: Monday, April 19, 2010 1:57 PM
To: Alec Pointer
Cc: Trey Buzbee
Subject: Re: Potential Resevoir in Grimes County

Mr. Pointer.

Thank you for your email.

I am forwarding your email to Trey Buzbee of the Brazos G Regional Water Planning Group and have him respond to your questions.

Let me know if you need anything else.

Dale Spurgin
Chairman, Brazos G RWPG
----- Original Message -----

From: Alec Pointer
To: dale.spurgin@co.jones.tx.us
Sent: Friday, April 16, 2010 4:34 PM
Subject: Potential Resevoir in Grimes County

Hello,

My name is Alec Pointer and I heard recently that there may be a plan for a resevoir in Grimes County near CR 121. Is this the case? I felt the need to go to the source instead of believing the memories of others.

Thank you,

Alec Pointer

Aquilla Water Supply District
P.O. Box 959
Hillsboro, Texas 76645

June 24, 2010

Mr. Trey Buzbee
Brazos G Administrative Agent
c/o Brazos River Authority
P. O. Box 7555
Waco, Texas 76714-7555

This letter is submitted as a formal comment from the Aquilla Water Supply District ("District") on the 2011 Initially Prepared Brazos G Regional Water Plan ("Plan"). We ask that the comment be included as a part of the Final 2011 Brazos G Regional Water Plan.

The District is a governmental entity with an elected Board of five (5) Directors. It is the wholesale supplier of water to the City of Hillsboro and five (5) rural water supply corporations. All of the water treated by the District and delivered to its customers is taken from Aquilla Lake.

As the supplier of a substantial part of the water needs of Hill County, the District is very interested in the planning for future water needs.

The District does not agree with the data that was used and the conclusions that were drawn in the parts of the Plan that pertain to the District, Hill County and Lake Aquilla. The issues are population projections, the resulting water demand projections and the water supply projections.

In letters to the Brazos G Regional Water Planning Group in 2000, 2004 and 2009, the District expressed its concern about these issues. We continue to do so by this letter.

The Plan (pages 2-5) shows that Hill County experienced a 1.76% compound annual growth rate between 1990 and 2000, but only a 0.45% compound annual growth rate is projected for the period 2000-2060.

We understand that the population projections that are used in the Plan were mandated by the Texas Water Development Board. During the next planning cycle, the District requests that it be given enough notice of the population projections mandated for use in the 2016 Plan to object if we disagree with the projections.

If the Plan's population projections are too low, the resulting water demand projections will also be too low. The result is that the needs of the District's customers will not be accurately shown in the Water Plan. We understand that Texas Water Development Board funding of future projects will be contingent on proposed projects meeting needs that are reflected in the Plan. Funding for needed projects might not be available.

Table 4A-7 on page 4A-16 of the Plan shows projected demands for the customers of the District. The projected demands are exactly the same at the start and at the end of the period 2010-2060. We can only conclude that even the very modest population growth that is projected for Hill County will occur in the areas not served by the District.

We believe that the 2010 census will show population growth in the area served by the District and in other parts of Hill County that is greater than the growth projected in the Plan. If that is the case, we trust that the population and water demand projections in the 2016 Plan will reflect the growth.

The water supply projections on page 4A-16 of the Plan represent a revision of projections contained in an earlier draft. However, the projections are not consistent with the conclusions of a 2006 Brazos River Authority ("BRA") sediment study. We believe the 2006 study that is supported by a March, 2008, Texas Water Development Board Volumetric Study of Lake Aquilla to be a better estimate of the decreasing yield of Aquilla Lake than the estimates used in the Plan. If the 2006 study had been used to project future Aquilla Lake yields, the projected shortages would be substantially higher.

If the Plan does not accurately reflect the decreasing supply of water in Aquilla Lake, the consequences to the region and to the BRA could be severe. As siltation in Aquilla Lake continues and as water use increases, Aquilla Lake may eventually reach a critically low yield that could result in a regional water shortage.

We thank the Brazos G Region Water Planning Group, the staff and the consultants for all of the work that goes into the Plan. We look forward to continuing to work with you in serving the citizens of Region G.

Copies of pages 2-5 and 4A-16 that are referred to herein are attached.

Very truly yours,

Aquilla Water Supply District

Joe R. Cunningham, President of the Board

Enclosures

F:\Docs\Hm\Aquilla WS\BRA\BrazosG.wpd

Table 2-1 (Continued)

City/County	Historical		Projections[1]						Percent Growth[1] 1990-00	Percent Growth 2000-60
	1990	2000	2010	2020	2030	2040	2050	2060		
Hamilton County										
Hamilton	2,937	2,977	2,942	2,933	2,926	2,928	2,919	2,918	0.14%	-0.03%
Hico	1,342	1,341	1,417	1,417	1,417	1,417	1,417	1,417	-0.01%	0.09%
County-Other	3,454	3,911	3,431	3,331	3,253	3,279	3,176	3,169	1.25%	-0.35%
Hamilton County Total	*7,733*	*8,229*	*7,790*	*7,681*	*7,596*	*7,624*	*7,512*	*7,504*	0.62%	-0.15%
Haskell County										
Haskell	3,362	3,106	3,024	2,982	2,925	2,895	2,842	2,752	-0.79%	-0.20%
Rule	783	698	671	657	638	628	610	580	-1.14%	-0.31%
Stamford (P)	36	43	45	46	48	49	50	52	1.79%	0.32%
County-Other	2,639	2,246	2,120	2,056	1,969	1,924	1,843	1,705	-1.60%	-0.46%
Haskell County Total	*6,820*	*6,093*	*5,860*	*5,741*	*5,580*	*5,496*	*5,345*	*5,089*	-1.12%	-0.30%
Hill County										
Brandon-Irene WSC (P)		2,009	2,059	2,128	2,207	2,285	2,369	2,462	NA	0.34%
Fills Valley WSC (P)		1,963	1,997	2,045	2,100	2,154	2,212	2,277	NA	0.25%
Hillsboro	7,072	8,232	8,923	9,284	9,692	10,099	10,534	11,017	1.53%	0.49%
Hubbard	1,589	1,586	1,713	1,713	1,713	1,713	1,713	1,713	-0.02%	0.13%
Itasca	1,523	1,503	1,736	1,729	1,722	1,715	1,707	1,697	-0.13%	0.20%
Johnson County SUD (P)		177	191	211	233	255	278	305	NA	0.91%
Lake Whitney Water Company (P)		5,374	5,396	5,426	5,460	5,494	5,530	5,570	NA	0.06%
Parker WSC (P)		371	391	419	451	483	517	555	NA	0.67%
White Bluff Community WS		1,000	1,211	1,507	1,841	2,175	2,531	2,927	NA	1.81%
Whitney	1,626	1,833	2,157	2,227	2,306	2,385	2,470	2,564	1.21%	0.56%
Woodrow-Osceola WSC		5,396	5,671	6,058	6,491	6,925	7,389	7,904	NA	0.64%
County-Other	15,336	2,877	2,074	2,305	2,566	2,827	3,104	3,411	-15.41%	0.28%
Hill County Total	*27,146*	*32,321*	*33,519*	*35,050*	*36,782*	*38,510*	*40,355*	*42,402*	1.76%	0.46%
Hood County										
Acton MUD (P)		12,222	15,038	18,435	21,599	24,913	29,088	33,909	NA	1.72%
Cresson (P)			295	360	439	536	654	799	NA	2.01%
DeCordova			3,074	3,125	3,177	3,230	3,283	3,337	NA	0.16%
Granbury	4,045	5,718	8,073	10,083	11,954	13,914	16,383	19,234	3.52%	2.04%
Lipan			599	844	1,189	1,675	2,359	3,323	NA	3.49%
Oak Trail Shores Subdivision		2,985	3,512	3,512	3,512	3,512	3,512	3,512	NA	0.27%
Tolar		504	749	958	1,153	1,357	1,614	1,911	NA	2.25%
County-Other	24,936	19,671	17,869	21,047	23,865	26,677	30,166	34,020	-2.34%	0.92%
Hood County Total	*28,981*	*41,100*	*49,207*	*58,364*	*66,888*	*75,814*	*87,059*	*100,045*	3.56%	1.49%
Johnson County										
Acton MUD (P)		101	133	171	211	255	309	376	NA	2.21%
Alvarado	2,918	3,288	4,204	4,627	5,071	5,556	6,158	6,897	1.20%	1.24%
Bethany WSC		3,000	3,373	3,813	4,275	4,760	5,406	6,174	NA	1.21%
Bethesda WSC (P)		14,650	19,035	24,199	29,625	35,552	42,905	51,926	NA	2.13%
Burleson (P)	14,153	17,514	27,208	42,037	52,747	52,747	52,747	52,747	2.15%	1.85%
Cleburne	22,205	26,005	30,572	34,467	38,558	43,027	48,353	52,812	1.59%	1.19%
Cresson (P)			78	95	116	141	172	210	NA	2.00%
Godley		879	1,136	1,439	1,757	2,105	2,536	3,065	NA	2.10%
Grandview	1,245	1,358	1,600	2,000	2,500	2,500	2,500	2,500	0.87%	1.02%
Johnson County SUD (P)		33,656	43,983	56,147	68,926	82,885	100,205	121,454	NA	2.16%
Joshua	3,828	4,528	5,503	6,247	7,028	7,881	8,940	10,239	1.69%	1.37%
Keene	3,944	5,003	5,882	6,917	8,004	9,192	10,666	12,474	2.41%	1.53%

Table 4A-7.
Wholesale Water Provider Summary
Aquilla Water Supply District

Name: **Aquilla Water Supply District**

Description: Aquilla Water Supply District is located in Hill County, and obtains raw water from Lake Aquilla through a contract with the BRA. The district supplies treated water to six wholesale customers. The City of Hillsboro is the district's largest customer, and utilized 3,889 acft in 2000. Total sales for Aquilla Water Supply District in 2000 were 4,844 acft.

Projected Demands:

Major Water Contract Holders	*Year (acft/yr)*					
	2010	***2020***	***2030***	***2040***	***2050***	***2060***
Brandon-Irene WSC	280	280	280	280	280	280
Chatt WSC (Hill C-O)	84	84	84	84	84	84
Files Valley WSC	1,125	1,125	1,125	1,125	1,125	1,125
Hill County WSC (Hill C-O)	336	336	336	336	336	336
Hillsboro	4,200	4,200	4,200	4,200	4,200	4,200
Menlow WSC (Hill C-O)	45	45	45	45	45	45
Total Demand	6,070	6,070	6,070	6,070	6,070	6,070

Supply:

Source	*Year (acft/yr)*					
	2010	***2020***	***2030***	***2040***	***2050***	***2060***
Lake Aquilla (BRA Contract)	5,953	5,953	5,953	5,695	5,325	4,954

Projected Balance:

Source	*Year (acft/yr)*					
	2010	***2020***	***2030***	***2040***	***2050***	***2060***
Balance/(Shortage)	(117)	(117)	(117)	(375)	(745)	(1,116)

BELL COUNTY WATER CONTROL & IMPROVEMENT DISTRICT NO. 1

201 S. 38TH ST.
KILLEEN, TX 76543
(254) 501-9243
(254) 519-4261 FAX
WWW.WCID1.ORG

Hon. Dale Spurgin, Chairman
Brazos G Regional Water Planning Group
C/O Trey Buzbee
Brazos River Authority
4600 Cobbs Drive
Waco, Texas 76710

May 24, 2010

Dear Judge Spurgin,

I would like to congratulate you on a thorough and comprehensive regional water plan that provides critical planning data for the Brazos G Area to meet future water demands. After review of the Initially Prepared 2011 Brazos G Plan, Bell County Water Control and Improvement District No. 1 (District) would like to comment on the contract amounts listed for the District in Table 4A-8 and the strategies in recommended Section 4.C.38.5 to meet the District's future demands.

The District has entered into agreements with the Brazos River Authority (BRA) for a total of 62,509 acft/year, and we have in turn committed these supplies to our customers. The actual contractual demands should be 62,509 acft/yr not 59,509 acft/yr as listed in Table 4A-8. The following contracts should be revised:

- Revise City of Belton to 5,966 acft/yr,
- Revise City of Copperas Cove to 8,824 acft/yr, and
- Add rural customers for 1,000 acft/yr

Based on contractual commitments, it is our opinion that the District is projected to meet demands with the current BRA contract. The available supply from BRA is listed as 53,428 acft/yr, which is 9,081 acft/yr short of the full contract with BRA. The District will fulfill its contractual commitments to its customers; however the recommended strategy of reallocation of supplies is not necessary and should be removed from the Plan. A potential supply strategy to firm up the BRA contractual commitments to the District might include the Lake Granger Augmentation strategy. Any supply deficit on the BRA system should be the responsibility of the BRA.

The District would like to express its concern over apparent deficits within the BRA system while its customers continue to pay for the full contracted amounts. If contracted water is not fully available on a firm basis, customers should not be charged for the full amounts. Additionally, the District requests that several reuse strategies we are pursuing be included in the Plan. We will be submitting materials regarding these reuse strategies for consideration prior to the July 21, 2010 Planning Group meeting.

Thank you for considering our comments.

Sincerely

Jerry Atkinson

Jerry Atkinson
General Manger
Bell County WCID No.1

CITY OF COLLEGE STATION
Office of the Mayor

RECEIVED
2010 MAY -6 AM 10: 3
BRAZOS RIVER AUTHORITY

Mr. Trey Buzbee
Brazos G Water Planning Group
Brazos River Authority
P.O. Box 7555

April 29, 2010

Dear Mr. Buzbee:

The City of College Station requests that our 2011 Regional Water Plan be revised to show the College Station future water deficit being filled with surface water from the BRA System Operations Permit. As it is currently written in the Initially Prepared Plan, the deficit would be met by the Millican Reservoir (Panther Creek) but this reservoir is not sufficiently feasible to be considered a practical alternative.

I request a response to this letter, and certainly appreciate your consideration. If you have any questions, please contact the City's Director of Water Services, Mr. Dave Coleman, at 979.574-6128.

Sincerely,

Ben White
Ben White
Mayor

cc: Judge Mike Sutherland
Mr. Wayne Wilson
Mr. David Dunn, P.E.

P.O. BOX 9960 • 1101 TEXAS AVENUE
COLLEGE STATION • TEXAS • 77842
979.764.3541

www.cstx.gov

RECEIVED
2010 JUN 10 AM 10:54
BRAZOS RIVER AUTHORITY

BETHANY WATER SUPPLY
CORPORATION
133 S. CR 810
ALVARADO, TEXAS 76009

June 7, 2010

Brazos G
%Trey Buzbe
P.O. Box 7555
Waco, Texas 76714-7555

Ref: Bethany Water Supply
Comments on the 2011 IPP

Dear Mr. Buzbe:

On talking with David Dunn with the TWDB it was advised to send update on Capitol Cost which is overstated.

Enclosed is our Engineers Preliminary statement of probable cost.

Please use this as our Base – Do not use the $5,411,000, instead use the Bethany Engineers report.

Please call if I can be of further assistance.

Best regards,

John Daniel
General Manager
Bethany Water Supply Corporation

BETHANY WSC
PLANT NO. 6
SEPTEMBER 18, 2009
PRELIMINARY ENGINEER'S STATEMENT OF PROBABLE COST

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
Construct Site Work, incl. Grading, paving, fencing etc.	1	LS	$10,000.00	$10,000.00
Construct Chlorinator / Meter Building	1	LS	$25,000.00	$25,000.00
Construct Pump Building	1	LS	$30,000.00	$30,000.00
Install Lighting & Electrical	1	LS	$50,000.00	$50,000.00
Install Equipment & Controls	1	LS	$30,000.00	$30,000.00
Install Chlorination Equipment	1	LS	$10,000.00	$10,000.00
Install 700 GPM @ 160' TDH Centrifugal Pumps	2	EA	$4,000.00	$8,000.00
Install Yard Piping	1	LS	$10,000.00	$10,000.00
12" DI Supply Line	90	LF	$50.00	$4,500.00
12" DI Discharge Line	90	LF	$50.00	$4,500.00
Supply Line Meter, Backflow, Rate of Flow Controller, Bypasses & Vaults	1	LS	$50,000.00	$50,000.00
500,000 Gallon Ground Storage Tank	1	LS	$320,000.00	$320,000.00
Construction Subtotal				$552,000.00
Contingency				$55,000.00
Construction Total				$607,000.00
Surveying				$2,500.00
Engineering			10%	$60,700.00
Project Total				$670,200.00

200,000 Gallon Ground Storage Tank	1	LS	$200,000.00	$200,000.00
300,000 Gallon Ground Storage Tank	1	LS	$255,000.00	$255,000.00

STATE OF TEXAS
ROBERT T. CHILDRESS III
79712
REGISTERED
PROFESSIONAL ENGINEER

9/18/09

Bistone Water

At Your Service

Bistone Municipal Water Supply District

April 21, 2010

Trey Busby
Brazos River Authority
PO Box 7555
Waco, Texas 76714

Dear Mr. Busby;

We agree with the draft regional water plan regarding Bistone Municipal Water Supply District. We are submitting additional cost information at this time for your consideration. It is the estimated cost to bring the additional well capacity online and it does include the necessary system improvements. We would request the needed pipelines and treatment plant improvements also be added to our project.

We are submitting this letter and necessary attachments to you via facsimile and mail. If the Regional Planning Committee has the need for additional information, please contact me at 254-562-5922. Thanks to you and the committee for your efforts to provide our region with a quality planning effort.

Sincerely,

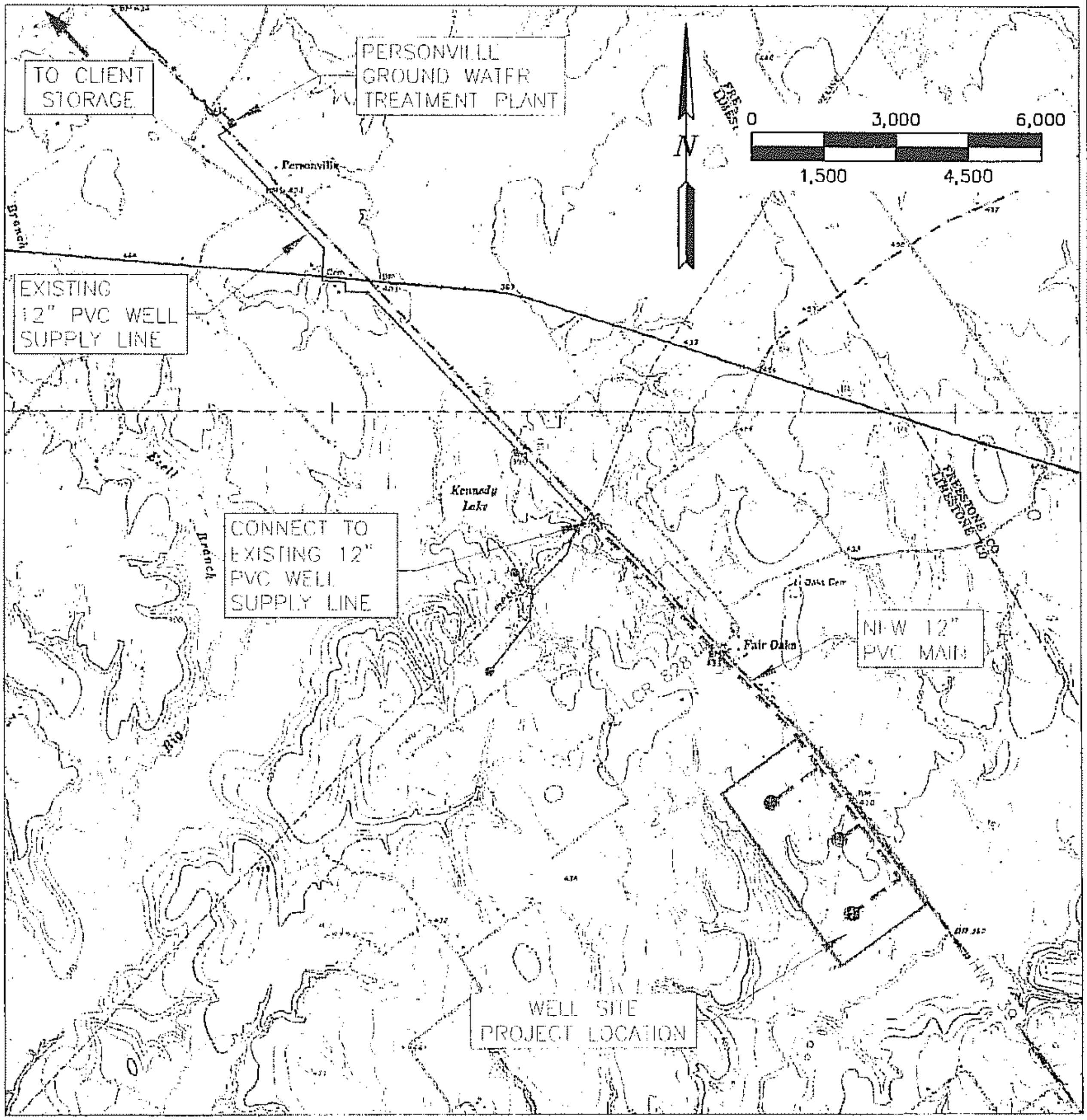
R. Brent Locke

R. Brent Locke
General Manager

343 LCR WHITEROCK • LAKE MEXIA • P.O. BOX 145 • MEXIA, TEXAS 76667 • (254-562-5922) • FAX (254) 562-6648

Bistone Municipal Water Supply District - Ground Water Treatment Plant Improvements
TEIP Application
Opinion of Total Probable Project Cost

Item		Work	Quan	Unit	Unit $	Total $	Subtotal
1		**Personville Ground Water Treatment Plant**					**$3,175,000.00**
	1.01	180,000 Gallon Storage Tank (Install Parallel)	1	EA	$200,000.00	$200,000.00	
	1.02	Storage Tank Foundation, Install, and Contractor Mark-ups	1	LS	$50,000.00	$50,000.00	
	1.03	Replace Existing Tank Bolts with SS Bolts	1	LS	$15,000.00	$15,000.00	
	1.04	2.0 MGD Screened Aerator	3	EA	$150,000.00	$450,000.00	
	1.05	Aerator Install and Contractor Mark-ups	3	EA	$50,000.00	$150,000.00	
	1.06	Pressure Filter, 12' Diameter x 30' Long	2	EA	$680,000.00	$1,360,000.00	
	1.07	Pressure Filter Foundation, Install, and Contractor Mark-ups	2	EA	$240,000.00	$480,000.00	
	1.08	Excavation and Grading for Effluent Pond Enlargement	500	CY	$46.00	$23,000.00	
	1.09	Pressure Filter Piping, Fittings, and Valves	1	EA	$60,000.00	$60,000.00	
	1.10	16" DI Piping	600	LF	$100.00	$60,000.00	
	1.11	16" DI Valve	9	EA	$8,000.00	$72,000.00	
	1.12	Site Grading	1	LS	$15,000.00	$15,000.00	
	1.13	Topsoil, Seeding, and Fertilizer	1	AC	$12,000.00	$12,000.00	
	1.14	Fencing Modification - 8" Chain Link	500	LF	$25.00	$12,500.00	
	1.15	Filter Fabric Fence	450	LF	$3.00	$1,350.00	
	1.16	Erosion Control Measures	1	LS	$4,000.00	$4,000.00	
	1.17	Mobilization/Demobilization/Bonding/Insurance	7%			$210,150.00	
	Subtotal Construction Cost						**$3,175,000.00**
2	**Contingencies**		15%				**$475,000.00**
	Opinion of Total Construction Cost Based on Preliminary Estimate						***$3,650,000.00***
3	**Non-Construction Costs (Survey, Engineering, and Administrative)**						
	3.01	Environmental Assessment	0	L.S.	$0.00	NA	
	3.02	Design Survey	1	L.S.	$6,000.00	$6,000.00	
	3.03	Geotechnical Investigation	1	L.S.	$8,000.00	$8,000.00	
		Engineering Fee Curve % of Estimated Construction Cost + Contingencies			*6.50%*		
	3.04	Engineering - Study/Planning/Preliminary Phase	15.0%	of Total Engineering		$35,587.50	
	3.05	Engineering - Final Design Phase	57.0%	of Total Engineering		$135,232.50	
	3.06	Engineering - Bidding Phase	8.0%	of Total Engineering		$18,980.00	
	3.07	Engineering - Construction Phase	20.0%	of Total Engineering		$47,450.00	
	3.08	Special Engineering Feasibility Study	0	L.S.	$0.00	NA	
	3.09	Printing Plans and Specifications	1	L.S.	$6,000.00	$6,000.00	Estimate - T&E
	3.10	Prepare SWPPP	0	L.S.	$0.00	NA	
	3.11	Inspection (Part Time by KSA as Directed)	450	Hr	$60.00	$27,000.00	Estimate - T&E
	3.12	Construction Survey	1	L.S.	$3,000.00	$3,000.00	Estimate - T&E
	3.13	Material Testing for Construction	1	L.S.	$10,000.00	$10,000.00	Estimate - T&E
	3.14	Easement Preparation	0	EA	$0.00	NA	
	3.15	Land Acquisition Agent	0	EA	$0.00	NA	
	3.16	Acquisition Costs for Easements	0	AC	$0.00	NA	
	3.17	Financial	1	L.S.	$22,000.00	$22,000.00	
	3.18	Legal	1	L.S.	$22,000.00	$22,000.00	
	3.19	Administration	1	L.S.	$8,750.00	$8,750.00	
	Subtotal Non-Construction Cost						***$350,000.00***
	Opinion of Total Probable Project Cost						**$4,000,000.00**



4833 Spicewood Springs Rd.
Suite 204
Austin, Texas 78759
T. 512-342-6863
F. 512-342-6877
www.ksaeng.com

KSA ENGINEERS

Austin-Dallas-Longview-Lufkin-Sugar Land-Tyler

DRAWN BY:	MR
DESIGNED BY:	GC/SPD
LATEST REVISION:	01/13/09
KSA JOB NO.:	BW.016M

EXHIBIT 1
PROJECT LOCATION
TEIP - BISTONE MWSD

SHEET NO. — OF —
SCALE: 1"=3000'
FN: EXBIHIT1

Bistone Municipal Water Supply District - Lightsey Site Wells
TEIP Application
Opinion of Total Probable Project Cost

Item		Work	Quan	Unit	Unit $	Total $	Subtotal
1	BMWSD Wells						$7,140,000.00
	1.01	18'x12' Well, 650' depth, 450 gpm submersible pumps	8	EA	$750,000.00	$6,000,000.00	
	1.02	Test Drilling	8	EA	$100,000.00	$800,000.00	
	1.03	Mobilization/Demobilization/Bonding/Insurance	5.0%			$340,000.00	
2	Well Site Work						$1,730,000.00
	2.01	Well Header, Piping, Valves, and Fittings	8	EA	$30,000.00	$240,000.00	
	2.02	Gravel Access Driveway	8,800	LF	$20.00	$176,000.00	
	2.03	Fencing, 6' Height, 3 Strand Barbed Wire	1,600	LF	$24.00	$38,400.00	
	2.04	Electrical - Per Well	8	EA	$120,000.00	$960,000.00	
	2.05	SCADA - Per Well	8	EA	$13,000.00	$104,000.00	
	2.06	Topsoil, Seeding, and Fertilizer	13	AC	$10,000.00	$130,000.00	
	2.07	Mobilization/Demobilization/Bonding/Insurance	5.0%			$81,600.00	
3	Raw Water Main						$2,000,000.00
	3.01	12" PVC C905, DR18 Water Main	29,000	LF	$50.00	$1,450,000.00	
	3.02	12" Gate Valve	11	EA	$10,000.00	$110,000.00	
	3.03	1" Release Valve Assembly	5	EA	$4,600.00	$23,000.00	
	3.04	6" Blow-Off Assembly	5	EA	$4,200.00	$21,000.00	
	3.05	Filter Fabric Fence (install, maintain, and remove)	2,900	LF	$2.50	$7,250.00	
	3.06	Erosion Control Measures	1	LS	$6,000.00	$6,000.00	
	3.07	Trench Safety for Depths > 5'	2,900	LF	$2.00	$5,800.00	
	3.08	Gravel Repair	1,200	SY	$24.00	$28,800.00	
	3.09	Asphalt Repair	850	SY	$38.00	$32,300.00	
	3.10	Clearing and Grubbing	13,000	LF	$6.00	$78,000.00	
	3.11	Topsoil, Seeding, and Fertilizer	13	AC	$10,000.00	$130,000.00	
	3.12	Traffic Control Plan	1	LS	$6,000.00	$6,000.00	
	3.13	Water Line Testing	2,900	LF	$2.00	$5,800.00	
	3.14	Connect to Existing Main	1	EA	$1,000.00	$1,000.00	
	3.15	Mobilization/Demobilization/Bonding/Insurance	5.0%			$95,050.00	
	Subtotal Construction Cost						$10,870,000.00
4	Contingencies		15%				$1,630,000.00
	Opinion of Total Construction Cost Based on Preliminary Estimate						############
5	Non-Construction Costs (Survey, Engineering, and Administrative)						
	5.00	Engineering - Well Construction Only - Per Well	8	EA	$50,000.00	$400,000.00	
	5.01	Engineering - Test Drilling Only - Per Well	8	EA	$20,000.00	$160,000.00	
	5.02	Environmental Assessment	1	LS	$20,000.00	$20,000.00	
	5.03	Design Survey - Line Only	29,000	LF	$3.00	$87,000.00	
		Engineering Fee % of Estimated Construction Cost + Contingencies			*6.30%*		
	5.04	Engineering - Study/Planning/Preliminary Phase	5.0%	of Item 2 & 3		$13,200.00	
	5.05	Engineering - Final Design Phase	67.0%	of Item 2 & 3		$176,300.00	
	5.06	Engineering - Bidding Phase	8.0%	of Item 2 & 3		$21,000.00	
	5.07	Engineering - Construction Phase	20.0%	of Item 2 & 3		$52,700.00	
	5.08	Special Engineering Feasibility Study	0	LS	$0.00	NA	
	5.09	Printing Plans and Specifications	1	LS	$10,000.00	$10,000.00	Estimate - T&E
	5.10	Prepare SWPPP	1	LS	$3,000.00	$3,000.00	
	5.11	Inspection (Part Time by KSA as Directed)	600	Hr	$60.00	$36,000.00	Estimate - T&E
	5.12	Construction Survey	29000	LF	$1.50	$43,500.00	Estimate - T&E
	5.13	Material Testing for Construction	1	LS	$10,000.00	$10,000.00	Estimate - T&E
	5.14	Easement Preparation	10	EA	$3,000.00	$30,000.00	

Bistone Municipal Water Supply District - Lightsey Site Wells
TEIP Application
Opinion of Total Probable Project Cost

Item		Work	Quan	Unit	Unit $	Total $	Subtotal
	5.15	Land Acquisition Agent (By Owner)	10	EA	$1,500.00	$15,000.00	
	5.16	Acquisition Costs for Easements	10	AC	$5,000.00	$50,000.00	
	5.17	Financial	1	LS	$30,000.00	$30,000.00	
	5.18	Legal	1	LS	$30,000.00	$30,000.00	
	5.19	Administration	1	LS	$12,300.00	$12,300.00	
	Subtotal Non-Construction Cost						***$1,200,000.00***
	Opinion of Total Probable Project Cost						**$13,700,000.00**

RECEIVED

JUN 07 2010

TWDB

Hon. Mark Evans
Chair, RHWPG
c/o San Jacinto River Authority
P.O. Box 329
Conroe, Texas 77305-0329

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

June 2, 2010

Dear Mr. Evans and Mr. Ward,

This letter is to be considered as part of the public comment period for the 2011 Region H Water Plan, which specifically calls for the creation of two new reservoirs – the Millican Reservoir (recommended for designation) and Bedias Reservoir (designated).

It is without hesitation that I oppose the creation of these reservoirs based on review of the Region H analysis and reviewing the presentation material given at the three public meetings held recently. There are severe flaws in calculating the financial costs of these projects and they would come at the expense of current landowners who have extensive investment in land activities within these proposed impacted areas.

I question several aspects of the Region H Planning Group estimated water use in the future, particularly a decline of 2 percent for livestock use by 2060. Texas is the largest beef producing state in the union and it puzzles me how we could have less water demand for livestock production, yet have more beef cattle in production to feed more people 50 years from now? Also, a projected decline of 6.7 percent in irrigated water demand is forecasted by 2060 by Region H. I'm not clear as to what data suggests that food and fiber production will require less water, though our yields and needs for water during drought periods (especially the 2009 Texas drought that rivaled the 1950s) escalate considerably.

Further, to take away oil and gas production tax revenues from property within these reservoir project areas would be a death blow to the counties involved, coupled with our current U.S. economic crisis. At least for the next 10 years, Texas will be attempting to recover from its current economic recession of its own, having not yet sought a solution to balance the state budget heading into the 2011 Legislative Session. This begs the question where will the money come from to build these projects? The answer is simply no one has any money.

In Madison County for example, the widening of Texas 21 is of top priority. The two-lane highway is the only one in the state connecting to an interstate without four lanes of traffic. Madison

County does not have enough tax base to provide contribution in right-of-way purchasing. At the current time, the expansion project plan stops at the Brazos-Madison County line. To take more land out of production in Madison County to fulfill a reservoir project would create more hardship on top of what already exists. The county alone has a delinquent property tax rate between 20 percent and 28 percent. To take away a significant amount of land that does generate tax dollars annually for basic county operating expenses and services doesn't make any sense at all.

It is my view these proposed reservoirs are an easy way out to solving future water needs for our region rather than an extensive review of alternatives and science. Anybody can take a map and see that an easy way to harness water would be from the Navasota River. However, there are better alternatives. For example, desalination would be one option to service the water needs of those needing our water to serve a growing Houston population. The Texas Water Resources Institute, for example, is one of several agencies that have cutting-edge research demonstrating that desalinating water from oil field saltwater production as well as the Gulf of Mexico can be a viable option for drinking water. One solution in using desalinated water would be designated use – desalinated water for bathing and outdoor use, while underground water would be used only for human and agricultural consumption only.

In summary, I urge you and your planning committee to go back to the drawing board and develop a workable plan that will be acceptable to all. I also recommend appointing non-elected officials from Brazos, Madison and other counties to serve on these committees so that everyone has a stake in planning and developing future projects.

As it stands, your current plan does more harm than good in solving our future water needs.

Sincerely,

Blair Fannin,
P.O.Box 6051
Bryan, Texas 77805

BRAZOS COUNTY

BRYAN, TEXAS

RESOLUTION

WHEREAS, Brazos County recognizes the importance of the need to plan for future water requirements to meet the projected growth within Region H and throughout the State of Texas;

WHEREAS, Brazos County recognizes the many factors and challenges involved in developing a comprehensive water plan to provide for future water requirements;

WHEREAS, Brazos County supports many of the recommendations contained in the proposed 2011 Region H Water Plan that if implemented will materially increase the future water supply in the Region;

WHEREAS, the proposed Region H Water Plan includes the proposed Millican Reservoir and recommends it's designation as a unique reservoir site by the Texas Legislature;

WHEREAS, the designation of the Millican Reservoir as a unique reservoir site most likely will have a negative impact on land values, farming/ranching operations, wild life habitat/management, minerals, public facilities, state and county highways and roads, and the tax base of Brazos and surrounding counties;

WHEREAS, the location of the proposed reservoir dam has not been identified, and no in-depth study has been conducted to assess the total impact the designation/construction of the Millican Reservoir would inflict on the affected area;

WHEREAS, the proposed Millican Reservoir would have no positive economic value to Brazos County as under the proposed plan it would act as a holding reservoir to supply projected water requirements for the Gulf Coast Area and not suitable for recreational use;

NOW THEREFORE, BE IT RESOLVED by the Commissioners Court of Brazos County, Texas that it is the opinion of this Court that sufficient information has not been developed to determine the total impact the designation of the proposed Millican Reservoir as a unique site will have on the affected areas; and

BE IT FURTHER RESOLVED THAT by adoption of this resolution the Commissioners Court of Brazos County, Texas opposes the inclusion of a recommendation in the Region H Water Plan that the proposed Millican Reservoir be designated as a unique reservoir site by the Texas Legislature, and asks for that recommendation to be removed from the Region H Water Plan and replaced with an alternate water source recommendation.

ADOPTED AND PASSED THIS 27th **DAY OF** April, **2010.**

Randy Sims
County Judge

Commissioner Lloyd Wassermann
Precinct 1

Commissioner Duane Peters
Precinct 2

Commissioner Kenny Mallard
Precinct 3

Commissioner Irma Cauley
Precinct 4

Resolution #10-008

BRAZOS COUNTY

BRYAN, TEXAS

RESOLUTION

WHEREAS, Brazos County recognizes the importance of the need to plan for future water requirements to meet the projected growth within Region G and throughout the State of Texas;

WHEREAS, Brazos County recognizes the many factors and challenges involved in developing a comprehensive water plan to provide for future water requirements;

WHEREAS, Brazos County supports many of the recommendations contained in the proposed 2011 Region G Water Plan that if implemented will materially increase the future water supply in the Region;

WHEREAS, the proposed Region G Water Plan includes the proposed Millican Reservoir and recommends it's designation as a unique reservoir site by the Texas Legislature;

WHEREAS, the designation of the Millican Reservoir as a unique reservoir site most likely will have a negative impact on land values, farming/ranching operations, wild life habitat/management, minerals, public facilities, state and county highways and roads, and the tax base of Brazos and surrounding counties;

WHEREAS, the location of the proposed reservoir dam has not been identified, and no in-depth study has been conducted to assess the total impact the designation/construction of the Millican Reservoir would inflict on the affected area;

WHEREAS, the proposed Millican Reservoir would have no positive economic value to Brazos County as under the proposed plan it would act as a holding reservoir to supply projected water requirements for the Gulf Coast Area and not suitable for recreational use;

NOW THEREFORE, BE IT RESOLVED by the Commissioners Court of Brazos County, Texas that it is the opinion of this Court that sufficient information has not been developed to determine the total impact of the inclusion of the proposed Millican Reservoir in the Region G Water Plan will have on the affected areas; and

BE IT FURTHER RESOLVED THAT by adoption of this resolution the Commissioners Court of Brazos County, Texas opposes the inclusion of the proposed Millican Reservoir in the Region G Water Plan and asks for that to be replaced with an alternate water source recommendation.

ADOPTED AND PASSED THIS 4th **DAY OF** May**, 2010.**

Randy Sims
County Judge

Lloyd Wassermann
Commissioner Lloyd Wassermann
Precinct 1

Commissioner Duane Peters
Precinct 2

Commissioner Kenny Mallard
Precinct 3

Irma Cauley
Commissioner Irma Cauley
Precinct 4

BRAZOS COUNTY

BRYAN, TEXAS

Randy Sims
Office of the County Judge
200 South Texas Ave., suite 332
Bryan, TX 77803
Phone: (979) 361-4102
Fax: (979) 361-4503
E-mail: rsims@co.brazos.tx.us

19 May 2010

Honorable Judge Mark Evans
Chair, Region H Water Planning Group
c/o San Jacinto River Authority
P.O. Box 329
Conroe, TX 77305-0329

Dear Judge Evans,

Brazos County opposes the construction of the Millican Reservoir (Panther Creek site) and respectfully requests that you remove the request for Unique Reservoir Site designation from your 2011 Regional Water Plan. The effects of this designation, and the potential effects of constructing this reservoir, are very serious and would impact a wide array of Brazos County citizens. These impacts have not been analyzed nor discussed with the various stakeholders, and your plan should be revised until such time that adequate analysis and planning have occurred.

A response to this letter is requested and I appreciate your careful consideration. If you have any questions, please contact me at (979) 361-4102. I look forward to hearing from you.

Sincerely,

Randy Sims
County Judge

RS/dll
Enclosure

xc: J. Kevin Ward, Texas Water Development Board
Senator Steve Ogden
Representative Fred Brown
Mayor Nancy Berry, City of College Station
David Watkins, Bryan City Manager
Betty Shiflett, County Judge, Grimes County
Brazos G Regional Water Planning
Brazos Groundwater Conservation District
Texas Commission on Environmental Quality
Guardians of the Navasota River

Brazos River Authority

June 25, 2010

HAND DELIVERED

The Honorable Dale Spurgin
Chair
Brazos G Regional Water Planning Group
P.O. Box 7555
Waco, Texas 76714-7555

RE: Brazos River Authority's Comments on 2011 Initially Prepared Brazos G Regional Water Plan

Dear Judge Spurgin:

The Brazos River Authority (Authority) appreciates the efforts of the Brazos G Regional Water Planning Group (Brazos G), the Texas Water Development Board (TWDB), and the many others that have contributed their time and resources to develop the 2011 Initially Prepared Brazos G Regional Water Plan (Plan) and the opportunity to provide comments on the Plan. I also want to thank you for your leadership and commitment as Chair of Brazos G and the effort you and the other voting members devoted to this planning process.

As you know, the Authority is committed to working through the regional water planning process with our customers and other Brazos River basin stakeholders to address the challenges of meeting future water needs in the Brazos G region. The Plan we have developed will provide the framework for meeting those needs over the next 50 years.

We have carefully reviewed the planning materials and offer the attached suggestions, comments, and questions for consideration in finalizing the 2011 Plan. Two attachments are enclosed with this letter. Attachment A includes comments previously submitted to the Brazos G's consultant, HDR Engineering, Inc., based on our review of the draft 2011 Plan earlier this year. Attachment B consists of additional comments noted after our review of the final 2011 Plan that was submitted to the TWDB on March 1, 2010.

Thank you again for the opportunity to provide comments. The Authority looks forward to completing the 2011 Plan and continued participation in the regional water planning process. Please contact my office if you have any questions.

Sincerely,

Phil Ford

Phil Ford
General Manager/CEO

PF:kld
Attachments

4600 Cobbs Drive • P.O. Box 7555 • Waco, Texas 76714-7555
254-761-3100 • FAX 254-761-3215

Brazos River Authority Comments

2011 Initially Prepared Brazos G Regional Water Plan

Attachment A

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority Comments - Attachment A
County Water Supply Plans

Call Chris Higgins (254-761-3152) for any clarification needed.

County	Paragraph	WUG	Comment	Addressed in IPP
Bell				
	4C.1.4	Dog Ridge	Need to mention BRA contract as a source of supply.	Yes
	4C.1.8	Harker Heights	Include "and Lake Belton" in first sentence.	Yes
	4C.1.10	Killeen	The future supply from Bell Co. WCID#1 (3,650) should match Table 4C.1-3 (5,365).	Yes
	4C.1.17	Salado	BRA contract water has not yet been used - may need to reword.	Yes
	4C.38.19.1	Temple	3rd bullet - in the first sentence Change "a contract" to "contracts".	Yes
	4C.1.23	Steam Electric	Temple recently purchased 2,500 af from BRA for steam electric and is part of the 30,453 af contract total shown on previous pg.	No
Burleson				
	4C.4.8	Irrigation	Water is also obtained through BRA contract (Horizon Turf Grass).	Yes
Callahan				
	4C.5	Clyde	There are no projected shortages as shown in the table in the comments column.	Yes
Coryell				
	4C.7.3.1	Gatesville	In the Description of Supply 2nd bullet it states that the supply is limited by treatment plant capacity but there is no strategy to expand the treatment plant capacity.	No
	4C.7.3.1	Gatesville	The word "plan" is missing "T" should be plant.	Yes
	4C.7.3.3	Gatesville	Should explain cost for new Coryell Co reservoir as simply being BRA's current system rate. Current rate is $60.50 per af.	No
	4C.7.4.3	Kempner	"same comment as above"	No
	4C.7	Coryell County	Coryell WSD and Grove WSC have 700 af contracted with BRA combined and are not listed as WUGs. They may be in county-other but BRA supply is not listed as source.	Yes
Erath				
	4C.9.3	County-Other	Change projected shortage from 2050 to 2060.	Yes
Falls				
	4C.10.3	Rosebud	Add BRA supply contract (100 af).	Yes
	4C.10.2.2	Marlin	Clarify Marlin's Water Supply Plan. In the recommended strategy Marlin City Lake and New Marlin Reservoir are mentioned but not included in the Cost, however, Brushy Creek Reservoir is mentioned but it is not included as a recommended strategy? Also, it is the BRA's understanding that the existing Brazos mainstem intake and raw water line are in need of repair. Should they also be included, so that they are eligible for TWDB funding?	Yes
	4C.10.2.2	Marlin	It is the BRA's understanding that the existing Brazos mainstem intake and raw water line are in need of repair. Should they also be included, so that they are eligible for TWDB funding?	No
Hill				
	4C.15.6	Lake Whitney Water Co.	Include BRA supply contract (150 af).	Yes
	4C.15.6	Lake Whitney Water Co.	Confirm Whitney Water Co. has run-of-river rights. Not sure it does.	Yes
	4C.15.2.3	Files Valley WSC	Need clarification on cost, it's misleading to assume that a pool rise won't cost our customers anything. If you leave cost at zero add footnote with explanation.	No
Hood				
	4C.16.7.3	Tolar	Inconsistency - the costs section shows Trinity Aquifer Development listed as a strategy and not BRA sys ops but the Table below has BRA sys ops listed and not Trinity Aquifer Development.	Yes
Johnson				
	4C.17.8.2	Johnson Co SUD	BRA SWATS is not included in the bullet list as a recommended strategy but is included in the Tables as such. Need to reconcile.	Yes
Jones	4C.18.5.1	Stamford	need to reference BRA contract (1,820 af).	
McLennan				
	4C.24.17.1	Robinson	Robinson does not have contract with BRA as stated.	Yes
	4C.24.13	McGregor	Please confirm that McGregor has access to run-of-river supplies as stated.	No
	4C.24.21	Woodway	They may receive some water from Lake Belton through Bluebonnet WSC.	No
Milam				
	4C.25.8.1	Steam-Electric	Clarify - does the supply number for the shortage calculation include both the ALCOA Little River water right and BRA contract for 5,000 af?	No
Palo Pinto				
	4C.27.4	County-Other	The BRA customers Double Diamond, PK WSC & Sportsman's World MUD are not listed as WUGs so I assume they are included in County-Other. If this is the case BRA should be listed as a source of supply.	Yes
Robertson				
	4C.28.8.1	Steam-Electric	Change "a contract with BRA" to "contracts with BRA".	Yes
Somervell				
	4C.30.4	Steam_Electric	Confirm that the shortage calculation of 35K af can be reconciled with Luminant's 2006 Brazos G Plan Amendment numbers since shortage is much less than what Luminant is requesting to purchase from BRA.	No
	Tabel 4C.30-4	Steam_Electric	Under the BRA Sys Ops strategy is new required Luminant infrastructure cost included in these cost figures? Need a footnote since cost shown here are different from others in plan with BRA Sys Ops as a strategy.	Yes
	4C.30.4.3	Somervell Plan	Table 4C.30-4 should be 4C.30-3	No
Stephens				
	4C.31.6.2	Mining	Change "short term" to "interruptible".	Yes
	4C.31.2	Stephens Co RWSC	Add BRA supply (800 af contract).	Yes
Taylor				

	4C.38.13.1	Abilene	Add BRA supply (50 af contract).	No
	4C.33.1.1	Abilene	Confirm that Abilene should be listed as a WUG when it is a WWP?	Yes
Washington				
	4C.35.1	Brenham	Change BRA contract amount from 3,535 af to 4,200 af.	Yes
Williamson				
	4C.36.5.1	Chisholm Trail SUD	Change "contract" to "contracts" and change "Georgetown" to Stillhouse Hollow".	Yes
	4C.36.12.1	Jarrell-Schwertner WSC	They also have a contract with BRA for 1,000 af, but no infrastructure is in place currently to access this supply.	Yes
	4C.36.13.1	Jonah Water SUD	Change "a contract" to "contracts" (May need to call and discuss Jonah).	Yes
	4C.36.13.1	Jonah Water SUD	Treatment infrastructure is not currently in place to use the Stillhouse Hollow supply (Clarify that there shouldn't be a WMS for infrastructure).	No
	4C.36.13.3	Jonah Water SUD	Jonah is currently getting water from the EWCRWTS and it doesn't appear to be reflected in the number in the Table. Contract is for "needs-met" quantity.	No
	4C.36.23.2	County-Other	Need to add bullet for the EWCRWTS purchase of water.	Yes
	4C.36.24.2	Manufacturing	Bullet 2 shows the Purchase from the City of Georgetown as a strategy and in the Cost section below Bullet b. shows the Purchase of water from the City of Round Rock as a strategy- Check to see if this is correct.	Yes
	4C.36.24.2	Manufacturing	Shouldn't Bullet 3 "BRA System Operations" also be including in the cost section and table below.	Yes
	Table 4C.36-20	Manufacturing	Verify that the Recommended Plan is for G-town or Round Rock?	Yes
Young				
	4C.37.2	Graham	Add BRA as source of supply (1000 af contract).	Yes

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority Comments - Attachment A
Section 4A - Comparison of Water Demands with Water Supplies to Determine Needs

Comment #	Table	Name	Comment/Question	Addressed in IPP
1	4A-6	Brazos River Authority	Why do Existing Contracts (Region K) under Little River System increase through time?	No
2	4A-6	Brazos River Authority	New Demands (Region H) under Main Stem/Lower Basin appear inconsistent with Region H Plan. Region H allocates WMS supply from both Allens Creek and BRA Sys Ops beginning in 2020.	No
3	4A-6	Brazos River Authority	Can BRA obtain the Little River System projected reservoir yields from 2010 - 2060 by individual reservoir?	No
4	4A-7	Aquilla Water Supply Dist.	Clarify whether "...purchased 3,889 acft..." and "Total sales...were 4,844 acft." in *Description* represent contract totals or actual amounts used. Also document/explain whether the*Projected Demand* numbers are contract amounts or actual projected use. This comment applies to all following WWP *Projected Demand* sections.	No
5	4A-8	Bell County WCID No. 1	*Description* at top references 62,509 acft/yr BRA contracts while*Supply* section below shows 53,428 acft/yr. Is this difference a result of the Little River System contract reductions made by HDR for modeling?	No
6	4A-9	Bluebonnet WSC	Recommend deleting "...however the firm supply of those contracts is 7,037 acft/yr." from *Description*. Also, clarify whether the "943 acft" and "2,848 acft" numbers in *Description* are contract amounts or actual water use. The *Projected Demands* increase through time and look like actual water use projections as opposed to contract amounts. Is this consistent with the way demands are shown for other WWPs such as BRA, Aquilla WSD, Bell Co. WCID#1, and Central Tx WSC?	No
7	4A-10	Cenctral Tx WSC	Recommend editing Description to read "The Central Texas Water Supply Corporation (WSC) provides treated water to a number of water supply corporations and cities in Bell, Williamson, and Lampasas Counties. The Central Texas WSC obtains raw water under contracts with the Brazos River Authority (BRA) from Lake Stillhouse Hollow. The total contracted raw water supply is 13,795 acft/yr, of which a portion is provided through four separate three-party raw water contracts (BRA, Central Texas WSC, and third party) with the third parties being Belton, Lampasas, Kempner WSC, and Rosebud. Lampasas and Kempner WSC have contracted for additional raw supply directly from BRA, which is not shown in this table."	Yes
8	4A-16	City of Abilene	Check Total Raw Water Supply numbers in bottom of*Supplies* Table. Shouldn't OH Ivie component of this number be appx. 15,000 AF instead of 6,720?	No
9	4A-22	City of Temple	Edit first sentence to read "The City of Temple has contracts..." Edit second sentence accordingly.	Yes

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority Comments - Attachment A

Please call Brad Brunett (254-761-3171) regarding any question or clarification on these comments.

Section or Table	Paragraph or Bullet	Comment/Question	Addressed in IPP
Table 4C.38-1	NA	Do BRA shortages include shortages shown for BRA customers in the table that are also WWPs (i.e. Round Rock, Aquilla WSD, etc.)? If so, probably need to footnote table so numbers are not accidentally "double counted" by readers.	No
Section 4C.38.1.2	Bullet 1	Add the following to then end of the last sentence of the Storage Reallocation of Federal Reservoirs bullet: "..., and a detailed feasibility study is currently being conducted by the Corps and BRA."	Yes
Section 4C.38.1.3	Bullet 2	Edit sentence three to read as follows: "If demands in the area increase beyond those currently projected, or if the storage reallocation project is determined to be unfeasible, this project..."	Yes
Section 4C.38.2.1	First paragraph	How are shortage numbers in this paragraph (5,329 acft/yr - 2030, 43,690 acft/yr - 2060, and 31,000 acft/yr - 2040) calculated? They are signficantly different from shortages listed in Table 4C.38-1. Next sentence says they are calculated based on comparison of supplies and current contracts? Need to reconcile these numbers somehow.	Yes
Section 4c.38.2.2	Bullet 1	Note that Lake Granger Augmentation project isn't solely dependent on Sys Ops interruptible supply. Existing System Order provisions allow diversions from Lake Granger in excess of its priority amount. Suggest rewording.	No
Section 4c.38.2.2	Bullet 6	Suggest rewording as follows: "Little River System Reservoirs currently identified as candidates for storage reallocation are Lake Stillhouse Hollow and Lake Granger."	Yes
Table 4C.38-3	a., b., and c.	Comparing water contract amounts (as opposed to actual projected water use under those contracts) to yield creates unrealistic shortages in early decades, which in turn results in strategies being shown much sooner than they are really needed. BRA does not have a real shortage of 31,802 acft/yr in 2010 as shown in Table 4C.38-3. The text and tables are misleading and need to be modified somehow to reflect this.	No
Section 4C.38.3.1		What is the math for calculating these shortages (107,223 in 2030 and 302,926 in 2060)?	No
Section 4C.38.3.2	Bullet 3	BRA is not actively involved in pursing this chloride control strategy. BRA recognizes downstream benefits from upper basin chloride control and is not opposed to the project; however, BRA's long-range financial planning does not currently contemplate large financial participation in 2020 as currently shown for this strategy.	No
Section 4C.38.3.3	Bullet 4	Recommend deleting the third and fourth sentences from the Storage Reallocation strategy description since Phase I of the study has been completed.	Yes
Table 4C.38-4	NA	What is the math for calculating these shortages? Region H Plan shows no BRA shortage in 2010, 83,062 acft/yr of recommended strategies in 2020, increasing to appx. 246,000 acft/yr in 2060. Millican Reservoir is not recommended until 2040 in Region H Plan. Also need to correct footnote 2. It doesn't apply to Millican Reservoir or Chloride Control as shown in the table, and the footnote itself looks like it is from the 2006 plan in that it references a Region H Sys Ops allocation of 120,000 acft/yr.	No
Section 4C.38.5.1	First paragraph	Bell County WCID#1's total contract supply with BRA is 62,509 acft/yr, not 53,428 acft/yr.	Yes
Section 4C.38.6		Correct description to indicate plural contracts "Bluebonnet WSC obtains its water supply through contracts with..."	Yes
Section 4C.38.7.1		Correct description to indicate plural contracts "Central Texas WSC obtains its water supply from BRA contracts..."	Yes
Section 4C.38.7.2		Eliminate or reword first and second to last sentence. BRA will honor its full contract amounts.	No
Section 4C.38.4.2	Bullet 1	Add the following text to the end of the sentence: "...and potentially make additional water available for contracting."	No
Table 4C.38-5		What causes the 117 acft/yr shortage in 2010, 2020, and 2030 decades? Based on updated sedimentation rates, reservoir yield should exceed total of all Lake Aquilla contracts in 2010 and potentially in 2020 and 2030 as well. Also need to address cost that is shown as $0. This is misleading without additional context.	No
Table 4C.38.13-1		How can there be a 7,000 acft/yr surplus of treated water and an 8,154 acft/yr shortage of raw water in 2010?	No
Section 4C.38.19.1		3rd bullet - in the first sentence Change "a contract" to "contracts"	Yes
Section 4C.38.13.1		Add BRA supply (50 af contract)	No

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority Comments - Attachment A
Water Supply Plan Strategies

Strategy	Section	Comments	Addressed in IPP
Desalination	Table 4B.6-1	"fro" should be "for"	Yes
Desalination	4B.6.1	"Water demands in Johnson County are increasing at a very significant rate,while the existing supply from the Surface Water and Treatment System (SWATS) water treatment plant at Lake Granbury is at or near capacity" (Verify this statement is correct)	No
Aquifer Storage and Recovery	4B.8.1.2	Brazos G WAM subordinates PK to Salt Fork and Lake Davis - would like to know what impacts this consideration has to the yield and if it impacts PK yield. And check to see if BRA should be compensated for any loss of yield.	No
Carrizo-Willcox Aquifer Development	4B.15.1.1	First sentence, suggest removing "which is part of the BRA Systems Operations option" to avoid confusion in terminology.	Yes
Augmentation of Millers Creek Reservoir	Table 4B.7.1.3-1	It appears that the subordination of water rights to the BRA has been accommodated inconsistently throughout the variety of strategies. For some, we have agreed to subordination in our Sys Ops settlements or interlocal agreements, but not in others.	No
New Reservoirs	4B.12	Same comment as above	No
Off-Channel Reservoirs	4B.13	Fails to acknowledge current efforts by Stephens Regional SUD to construct their own advanced treatment facility. They have already piloted the technology and acquired a site (and may even be under construction). Having an existing plant within the area would certainly seem to effect implementation of the strategy.	No
Interconnection of Regional and Communtily Systems	4B.14.2	Verify 2060 yield & capacity numbers for Lake Granger. The estimated 2060 reservoir capacity of 20,973 acft, which appears to be associated with an outdated sedimentation rate, seems too low to produce a 2060 yield of 15,987 acft/yr.	No
Groundwater/Surface Water Conjunctive Use	4B.5.2.2	Yield numbers in the first sentence of the first paragraph and the Table below seem too high. Verify the source.	No
Groundwater/Surface Water Conjunctive Use	4B.5.2.2	Footnote that the estimated 2060 volume in the last sentence of the first paragraph does not take into account the 2008 volumetric survey. The updated 2060 storage volume is approx 38,000 acft.	Yes
Groundwater/Surface Water Conjunctive Use	Table 4B.5.2.4-2	Need to clarify under the Total Capitial Cost that land acquisition is included. It's stated in the write-up.	Yes

****

Brazos River Authority Comments

2011 Initially Prepared Brazos G Regional Water Plan

Attachment B

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority - Attachment B
Water Supply Plan Strategies

Strategy	Page/Section/Table	Comments
Groundwater/Surface Water Conjunctive Use	page 4B.5-4	Add this sentence to the end of the second paragraph. "The intake structure and raw water pipeline improvements are already underway by BRA, initially to replace an existing shallow-water intake structure that is subject to failure during both low lake conditions and high river flow events."
Groundwater/Surface Water Conjunctive Use	page 4B.5-4	Add to the last sentence of fourth paragraph. "Customers such as Chisholm Trail Special Utility District, Georgetown or Round Rock would need to build treated water pipelines from the delivery point to their respective retail systems."
Wastewater Reuse	Figure 4B.3-1	In the legend "acre/ft" should be changed to "acre-feet"
Wastewater Reuse	Figure 4B.3-2	In the legend "acre/ft" should be changed to "acre-feet"
Wastewater Reuse	Table 4B.3-2	"BRA WMRSS" should be "WMRSS" Waco reacquired the treatment plant in 04'.
Wastewater Reuse	Section 4B.3.1.5.1	The first paragraph fails to mention that Cleburne has a 3rd contract w/BRA for 5,000 acft from the System with a Lake Whitney diversion point.
Wastewater Reuse	Table 4B.3-63	Include BRA System Operations Permit - It has a indirect reuse component. Also, it looks like this list includes pending applications and issued permits. Should the title be changed to be more reflective of what the list includes?
Interregional Water Management Strategies	Section 4B.11.2.1	Round Rock's contract for 20,928 acft/yr is with BRA, not LCRA.
Interregional Water Management Strategies	Section 4B.11.2.2	First sentence of the 3rd paragraph, only 21,528 af is currently committed of the original 25,000 af.
Interregional Water Management Strategies	Table 4B.11.2.2-1	Revise/Update numbers in table (Round Rock currently has 20,928 and Liberty Hill has 600; 3,472 is uncommitted.
New Reservoirs	Table 4B.12.1.4-1	To be consistent with other cost estimate summaries, add a line item for the purchase of water from the BRA. The write-up states that PK will be subordinated Cedar Ridge however that cost is not included.
New Reservoirs	Section 4B.12.2.2	Expand on how PK was modeled to meet BRA's downstream main stem commitments. Was a constant volume assumed to be met by PK each year, or was PK used dependent on use of other BRA reservoirs also meeting downstream contracts? What downstream contractual commitments are being modeled (excluding Lake Granbury commitments, total downstream main stem commitments of all existing customers is less than 200,000 acft/yr)?
New Reservoirs	Section 4B.12.4.2	Explain why the Brazos Mini-WAM was not used for the yield estimates. The Mini-Wam was used along with the extended hydrology because of the new drought of record experienced in the upper Brazos, so shouldn't all the reservoirs above PK be assess with the Mini-WAM? This is also true for other reservoirs in the Plan including the Throckmorton Reservoir.
Reallocation of Storage in Federal Reservoirs	Section 4B.18.2.2	Footnote that the 2060 estimated storage does not account for the updated TWDB volumetric survey (2008).
System Operation of Brazos River Authority Reservoirs	Section 4B.4.1	Why is 698,440 acft/yr of BRA commitments shown here different from 669,821 on page 4B.4-2? Should they be the same? What do they include with regard to the 13,000 af/year held in reserve at Lake Granger for the EWCRWS?
System Operation of Brazos River Authority Reservoirs	Table 4B.4-1	Suggest further elaboration of footnote 2 to clarify the volume of Allens Creek supply as it relates to numbers in the table.
System Operation of Brazos River Authority Reservoirs	Section 4B.4.2.2	Expand last sentence to note that 125,000 acft/yr remaining at Richmond includes Allens Creek supply.
System Operation of Brazos River Authority Reservoirs	Section 4B.4.6	Range of unit cost shown in paragraph 2 ($286 - $2,909) is different than unit costs in Table 4B.4-3. Should they match?
Miscellaneous Strategies	Section 4B.17.2.10	Should the strategy for Cleburne be associated with Lake Whitney instead of Lake Granbury? Cleburne is currently planning to access its BRA System water from Lake Whitney, excluding that which is being diverted from Lake Aquilla.
Reallocation of Storage in Federal Reservoirs	Table 4B.18.1.2-1	Suggest footnote to table explaining discrepancy between yield values computed for Lake Whitney (i.e. SUPER computes yield from entire lake storage whereas WAM yield is computed using only the relatively small portion of BRA storage in Lake Whitney that currently has a water right.
Reallocation of Storage in Federal Reservoirs	Section 4B.18.2.2	2060 capacity of 20,437 acft reported for Lake Aquilla looks too low compared to 2060 yield estimate of 9,713 acft/yr. BRA estimates 2060 capacity to be 38,495 acft using most recent hydrographic survey data collected in 2008. Check/confirm numbers reported in this section.
Reallocation of Storage in Federal Reservoirs	Section 4B.18.2.5	In paragraph below table 4B.18.2.5-1, change the wording "...will be required." to "...may be required." Also, delete the word (pending) from the statement regarding TCEQ water right permit. No permit application has been filed yet.
BRA Reservoir Connections	Section 4B.20.1.1	Reword language regarding Cleburne contract with BRA - Cleburne has two contracts with a Lake Whitney diversion point that total 9,700 acft/yr.

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority - Attachment B
Long-Term Protetcion of Resources

Page	Section/Paragraph	Comment
7-18	7.2 Paragraph 2	Statement about utilization of Colorado Basin Highland Lakes eliminating need for a major new project is misleading. Major strategies are still needed.

2011 Initially Prepared Brazos G Regional Water Plan
Brazos River Authority Comments - Attachment B
Additional Comments, Volume I & Volume II

Volume	Page/Section/Table	Comments
Volume I	**Section 1**	
	Page 1-20, Table 1-5	Owner column: Should Texas Utilities Electric Co. be changed to Luminant?
	Page 1-22, table 1-7	It is not clear if/how the HB 1437 water is reflected in the amounts noted in the table? Is the 25,000 acft of HB 1437 water a component of the 49,400 acft? What does the 8,524 acft of "Region G contracts only" represent?
	Page 1-45	Define "(BFZ)".
	Page 1-52	Any updates to groundwater conservation district memberships? e.g., Coryell Co. is now part of the Middle Trinity GWCD.
	Section 3	
	Page 3-9	First sentence: insert Brazos before "…river basin…"
	Page 3-53, Table 3.5-1	No reference regarding HB 1437 water.
	Section 4C	
	Bell Co. – Page 4C.1-2	439 WSC: The text is not clear that 439 WSC also has a supply allocation from Bell Co. WCID No. 1.
	Bosque Co. – Page 4C.2-1, Table 4C.2-1	Should read "Lake Whitney Water Company".
	Johnson Co. – Page 4C.17.6.3	Last bullet point on page strike one of the "$".
	McLennan Co. – Page 4C.24-4, 4C.24.5	Second sentence, revise "project" to projected.
	Page 4C.38-24 & Table 4C.39-1, page 4C.39-2	CTSUD has no plans to use the 3,472 acft balance of HB 1437 water.
	Page 4B.4-1	Check footnote font size.
	Page 4B.4-9	Check footnote numbering.
Volume II	Page 4B.6-2, 4B.6.2.2	What water at Lake Granbury is uncommitted and available for sale?
	Page 4B.11-9	HB 1437 conservation surcharge is currently 25% but is subject to adjustment by the LCRA Board of Directors.
	Table 4B.11-5	CTSUD has no plans to use HB 1437 water.
	Page 4B.12-48	Remove bold from font in first paragraph.
	Page 4B.12-165	Little River Reservoir referenced in Millican Reservoir section.
	Section 4B-21	Font consistency on sections prepared by Freese & Nichols.

RECEIVED

2010 MAY 18 AM 9:46

BRAZOS RIVER AUTHORITY

May 15, 2010

Mr. Dale Spurgin, Chair
Region G Water Planning Group
Brazos River Authority
PO Box 7555
Waco, Texas 76714-7555

Re: Panther Creek Millican Dam

Mr. Spurgin:
I am writing to oppose the Panther Creek Millican Dam.

As a property owner in Brazos County, I can attest that such a proposed dam would alter the lives and lively hoods of many of my neighbors. There are many scientific and ecological reasons to oppose such a project and I will leave that to others. My protest arise from the history of the Navasota River land owners and their lineage. The Navasota runs high with the sweat and tears of folks living along the river for many years. The Navasota bottom land is brown with their blood and toil striving for their hopes and dreams for themselves and their progeny. Many of my neighbors are five generation land owners. This kind of commitment to the land binds families, creates communities and memories for generations. It is unconscionable to visit this dam and its destruction to the people of the Navasot River Bottom.

I hope that among the Region H Water Planning Group there are but a handful of members that will hear the cry to seek other alternatives, and there are many, to the water needs of Region H.

Respectfully,

C. Leon Williamson
106 East 26th
Bryan, Texas 77803

RECEIVED

MAY 27 2010

TWDB

Catherine Payne
1800 Holleman Drive, Apt. #1515
College Station, TX 77840

May 25, 2010

Temple McKinnon
Water Resource Planning and Information
Texas Water Development Board, P.O. Box 13231
Capitol Station, Austin, Texas 78711

Dear Ms. McKinnon:

I am 26 years old and own no land that may be condemned by the proposed Millican Reservoir, but I wish to express my fears for the future. I am concerned the following may occur in my lifetime if reservoir creation rates escalate:

1. Displaced ranchers and farmers sell their capital and abandon their trade
2. Land prices and costs increase
3. Ranchers and farmers fragment and sell their property, abandoning their trade
4. Tourism further inflates land values that surround the lake
5. More ranchers and farmers abandon their trade
6. Less food is produced domestically
7. More (unregulated) food is imported
8. National security is compromised via reduced agricultural self-sufficiency

I oppose a plan that reacts to licentious public water use for a city that receives an uncaptured 50 inches of rain annually. Rural producers of city-dweller food and inter-generational stewards of natural resources will unfairly bear the cost of continuous cheap water for Houstonians. Please consider alternative, proactive solutions (rainwater collection, choosing a deep-valleyed river, desalination, education, regulation, taxation for landscaping.....) so that urbanites will pay a truer, fair cost for their water. As you know well, these drowning lands have been purchased with lives, not with the fair market price. Let the legacy of safe and effective food production thrive in the Navasota valley. Do not allow thirst to be irreversibly traded for hunger.

Sincerely Yours,

Catherine Payne

Catherine Payne

May 12, 2010

Honorable Dale Spurgin
P O Box 148
Anson, TX 79501

SUBJECT: MILLICAN RESERVOIR PROJECT & UNIQUE RESERVOIR SITE DESIGNATION

Dear Honorable Spurgin,

I am a resident in the area which Regions G and H are proposing to included in the Millican Reservoir Project, and therefore, to be designated as "unique reservoir site". I strongly oppose any attempt of the two Regions' proposals of a reservoir to be built anywhere along the Navasota River. Also, I believe that Texas Water Development Board's attempt to have the property located in the proposed Millican Reservoir area to be designated as "unique reservoir site" is extremely premature in nature and would only serve to devalue our property that we have worked hard for and paid for! Our property which includes our homes, cattle, deer, owls, hawks, and other wildlife of all kinds is as important to us as someone in Houston's concrete and pollution! Your plans to have our property designated as "unique reservoir site" should stop immediately!

In the opinions of many researchers, including those from Texas A&M University, the proposed Millican Reservoir Project is definitely not the best solution for Harris, Brazoria, Ford Bend, and any other counties future water shortages. Instead of planning for new reservoirs in the future, why not plan to build more seawater desalination plants? Research indicates that seawater desalination is more cost effective than the reservoir route. As for back as 1966, researchers have reported that retaining water in reservoirs and/or lakes cause the acceleration of water evaporation and that the advanced evaporation causes devastating ecological impact to our climate.

An Outraged Citizen,

Cheryl Wells
14120 Starview Ln
North Zulch, TX 77872

RECEIVED

APR 09 2010

TWDB

April 7, 2010

Dear Mr. Ward,

I am a frustrated land owner in Iola, Grimes County, Texas. I recently purchased a lot in the King Oaks community in hopes of building a home for my family. We were in the beginning stages of building but as of last week everything has come to a halt. We were hoping to have the house completed in time for the arrival of our second child but now that won't happen. I cannot get the answers I need to proceed with the building of my home because there is a lack of direction and communication by the Region H Water Planning Group. No one can tell me how the King Oaks community will be affected by the proposed Millican Reservoir. There are no maps that show the exact location of the shoreline, boundaries of no building zones, or any other structural information of where the dam will be built. No one can tell me that if this proposal is shot down this go around, how long it will be before it is brought up again.

I understand Region H is only looking out for the needs of the future and it is no easy task; but there are certainly other ways to supply water to the masses rather than this reservoir project. Can't potable water be obtained from the Gulf through desalination? I understand that type of process is expensive but surely not as expensive as building multiple reservoirs. That will cost billions of dollars!

I am also concerned on the environmental impact this reservoir will pose on the already endangered species that inhabit the Brazos River bottom. I'm not a tree hugger by any means, but I hate to see a species of animal wiped out by this project. I don't like the fact that despite other options of obtaining water in the future, we would rather wipe out a species of animal instead of finding other means of water production. To me, it sounds like Region H is grasping at finding a solution fast, but no one is really taking the time to closely weigh all the options.

There are many people just like me who are frustrated with this proposal. There seems to be a great lack of communication to the public, but a steam rolling effort to get this reservoir built. If the land is taken from me, how will I be compensated? Will I get anything near what I paid for it or will it be stolen from me by the government? There is rumor that the government can step in and deem the area as a future water preserve therefore devaluing my property. I won't be able to sell it for anything near what I paid to build it.

Please stop the proposal for the Millican Reservoir once and for all. Thank you for your time.

Sincerely,

Chris Loup
PO BOX 1542
Montgomery, TX 77356

RECEIVED

Grimes County Sub-Regional Planning Commission (GCSRPC)

MAY 26 2010

P.O. Box 84 **Iola, TX 77861**

TWDB

Christina Stover
Chairperson

John Bertling
Secretary

Lovett Boggess
At-Large-Member

May 24, 2010

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Mr. Ward,

The Grimes County Sub-Regional Planning Commission (GCSRPC), in open meeting, passed a *resolution* requesting Region H Water Planning Group consider GCSRPC role in actions regarding the proposed Millican Reservoir; and GCSRPC does oppose the unique status classification being given to this project. This Resolution states that we wish at least one (1) public hearing to be held in Grimes County, with at least two (2) weeks notice to the public.

We are deeply concerned that we were not contacted in this matter, as we view our role as working with and consulting with any organizations that take action that would have an impact on Grimes County. We look forward to being a part of your process.

Respectfully yours,

Signed,

Christina Stover Christina Stover, Chairperson

CITY OF ABILENE
OFFICE OF CITY MANAGER

June 25, 2010

Via email and facsimile; original to follow

Honorable Dale Spurgin, Chairman
Brazos G Regional Water Planning Group
c/o Trey Buzbee
Brazos River Authority
4600 Cobbs Drive
Waco, Texas 76710

RE: Initially Prepared 2011 Brazos G Regional Water Plan

Dear Judge Spurgin:

The City of Abilene appreciates the leadership you and members of the Regional Water Planning Group have provided in developing the Initially Prepared 2011 Brazos G Regional Water Plan (2011 IPP). The 2011 IPP provides a detailed assessment of the water needs facing our region, and a comprehensive path forward for the development, management and conservation of water resources within the Brazos Region G Water Planning Area.

As a Municipal Water User Group and a Wholesale Water Provider, the City of Abilene supports the water supply plan developed for Abilene and presented in Paragraph 4C.38.13.2 of the 2011 IPP. Identified strategies (conservation, Cedar Ridge Reservoir, City of Abilene indirect reuse system, water treatment plant expansion, and the alternate strategy of purchased Possum Kingdom Lake water from the Brazos River Authority) will position the City to meet projected water demands over the planning period. As identified in the 2011 IPP, Cedar Ridge Reservoir remains the City's primary water management strategy to meet future water supply needs.

Abilene remains committed to supporting statewide water planning processes and the Brazos G Regional Water Planning Group during the regional planning cycles. Considering the uncertainties associated with developing estimates of future water needs for the next 50 years in a region of the State as diverse as the Abilene region, and with implementing recommended water management strategies in a timely manner, the City will continue to investigate alternative water management strategies available to increase its water supplies. Should further studies and evaluations support a viable alternative strategy, the City will work with the Brazos G Regional Water Planning Group to incorporate the strategy into the appropriate future regional plan.

P.O. BOX 60 • 555 WALNUT STREET • ABILENE, TEXAS 79604-0060 • 325-676-6206

Based on its review of the 2011 IPP, the City of Abilene respectfully submits suggested edits for consideration in the final 2011 Brazos G Regional Water Plan. In addition, the City respectfully requests the Regional Water Planning Group's consideration of the responses provided herein to comments received during the public hearing and the public comment period for the 2011 IPP. The Attachment to this letter provides the suggested edits and the responses to public comments.

If additional information or further clarification is needed, please do not hesitate to contact me, Mr. Tommy O'Brien (Director of Water Utilities) or our consultant, Mr. Scott Hibbs (Enprotec/Hibbs and Todd).

Sincerely,

Larry D. Gilley

Larry D. Gilley
City Manger

Attachment

cc: David Vela, Assistant City Manager
Tommy O'Brien, Director of Water Utilities
Scott Hibbs, Enprotec/Hibbs and Todd

ATTACHMENT

SUGGESTED EDITS TO THE 2011 IPP
AND
RESPONSE TO COMMENTS RECEIVED ON THE 2011 IPP

I. EDITS TO CONSIDER FOR FINAL 2011 BRAZOS G REGIONAL WATER PLAN

The following are provided for consideration as edits to information presented in the Initially Prepared 2011 Brazos G Regional Water Plan (2011 IPP). Suggested edits to the 2011 IPP were prepared by the City of Abilene and its consulting engineer Enprotec/Hibbs and Todd.

Volume I – Page 4A-25: There appears to be a print error in the Total Demand line at the bottom of Table 4A-16.

Volume I – Page 4A-25: The major contract holder identified as West Texas Utilities in Table 4A-16 should be changed to reflect the acquisition of the contract by Eagle Construction and Environmental Services, L.P.

Volume I – Page 4C.38-20: The City's Alternate Strategy, purchase of Possum Kingdom Lake water from the Brazos River Authority, should be added as a new Paragraph e. with associated summary bullets.

Volume I – Page 4C.38-21: The Raw Surplus/(Shortage) Plan Element (3rd row in Table 4C.38-11) appears to be off by 4,200 acre-feet. Corrected, the Raw Surplus/(Shortage) information in Table 4C.38-11 will match the Projected Balances section in Table 4A-16, Page 4A-26.

Volume I – Page 4C.38-21: Consider adding a footnote to Table 4C.38-11 addressing purchase of Possum Kingdom Lake water from the Brazos River Authority as an alternate water management strategy for the City of Abilene.

Volume II – Page 4B.14-40: Should the Debt Service shown in Table 4B.14.5-6 as (6 percent, 30 years) actually be shown as (6 percent, 20 years)?

Volume II – Page 4B.14-40: In Table 4B.14.5-6, the cost estimate is missing interest during construction.

II. RESPONSE TO PUBLIC COMMENTS RECEIVED ON THE 2011 IPP

The City of Abilene and its consulting engineer, Enprotec/Hibbs & Todd, have reviewed the transcript developed from the oral comments presented during the April 21, 2010 Public Hearing and the written correspondence posted on the Region G website for comments related to the City of Abilene and its future water management strategies. In support of the 2011 IPP Water Supply Plan developed for the City of Abilene, the following responses are provided to these oral and written comments received by the Region G Water Planning Group.

Public comments on the 2011 IPP related to the City of Abilene were received during the April 21, 2010 Public Hearing held in Waco. In addition, written comments are being accepted by the Region G Water Planning Group until June 25, 2010. Written comments posted on the Region G website through June 24, 2010 include: The Water Broker (April 19, 2010 – 2 letters); Sam Chase (April 20, 2010); Eric Swenson (April 22, 2010); and Adobe Wells, Inc. (May 13, 2010). Issues raised at the Public Hearing and during the public comment period can be summarized as follows:

- Variances between the 2011 IPP prepared by the Region G Water Planning Group and planning documents prepared by the City of Abilene.
- Seymour Aquifer groundwater not being included in the 2011 IPP as a water management strategy for Abilene. Comments include the use of the Seymour Aquifer for Aquifer Storage and Recovery, focusing on treated wastewater as the source for injection and recovery.
- Projected water demands for Abilene, including: steam-electric demand for Nolan County; and a contract held by the City for a steam-electric demand.
- Projected water supplies for Abilene, including: water available from Abilene's O.H. Ivie Reservoir contract; water rights in Lake Fort Phantom Hill held by others; and treated wastewater.
- Using a 2-year safe yield for water supply planning.
- Cedar Ridge Reservoir's designation as a Unique Reservoir.

Abilene Planning Documents

As the Brazos G Water Planning Group is aware, the City of Abilene is proceeding with independent, detailed evaluations of Cedar Ridge Reservoir (identified in the 2011 IPP as the primary water management strategy) and raw water from Possum Kingdom Lake (identified in the 2011 IPP as an alternate water management strategy). The regional planning process is governed by specific planning rules and guidelines which are intended to provide consistency among the 16 established regions, facilitating the aggregation of the regional plans into the overall State Water Plan. Planning documents developed by the City of Abilene consider additional available data, refined water availability modeling, and other Abilene-specific information in addition to the general planning rules and guidelines used by the Brazos G Regional Water Planning Group. Consequently, information presented in Abilene's planning documents may differ from similar information presented in the 2011 IPP.

Seymour Aquifer

The 2001 Brazos G Regional Water Plan identified development of the Seymour Aquifer as a long-term (beyond 2030) water management strategy. Aquifer Storage & Recovery (ASR), using precipitation data from 1950 – 1999, was the planning basis for this water management strategy.

In January, 2001, HDR Engineering, Inc. published a final report titled, *"Seymour Aquifer Hydrogeologic Investigation Report, Jones County, Texas"* (2001 Seymour Report). The 2001 Seymour Report investigated the potential of the groundwater resources of the Seymour Aquifer in general, with specific analyses conducted on a section of land (640 acres) in Jones County owned by Mr. Rex Bland (aka Adobe Wells, Inc.). The work conducted by HDR Engineering was jointly funded by the Texas Water Development Board and the City of Abilene. The 2001 Seymour Report estimated that 1,000 – 2,000 acre-feet per year could be developed from the Bland property. HDR's 2001 Seymour Report also stated *"...future groundwater use by others in the vicinity of the property would dictate the actual success of* *such development."* Jones County is not included in any current Groundwater Conservation District. Additionally, the 2001 Seymour Report identified water quality below the Bland tract as exceeding regulatory standards for Total Dissolved Solids and chlorides.

In May, 2005, Carter & Burgess, Inc. published a report titled, *"Fort Phantom Hill Reservoir Water Quality Study"* (2005 Study). Funded by the City of Abilene, the 2005 Study evaluated groundwater augmentation of Lake Fort Phantom Hill with groundwater from the Seymour Aquifer below the Bland tract. Carter & Burgess concluded 1,000 acre-feet per year would be the maximum yield under normal water level conditions. This conclusion was based on: 1) during drought conditions, aquifer levels are typically lower than normal; 2) the effects of well inefficiency using a substantial part of the available drawdown within the aquifer; and 3) the aquifer on the Bland property has a limited extent of saturated thickness. The 2005 Study also concluded that water quality standards for Lake Fork Phantom Hill would be impaired as a result of "mixing" Seymour Aquifer groundwater with surface water in the lake.

Insufficient yield and poor quality of the Seymour Aquifer are the primary factors the City considered when determining that groundwater from the Seymour Aquifer should not be included as a water management strategy in the 2006 Brazos G Regional Water Plan. These same factors formed the basis for not recommending the Seymour Aquifer be considered as an Abilene water management strategy in the 2011 IPP. The City is currently considering whether additional evaluations of the Seymour Aquifer are warranted.

Abilene Projected Water Demands

The 2011 IPP presents, and the City of Abilene supports, projected demands through 2060 to be met by Abilene as a Municipal Water User Group and as a Wholesale Water Provider.

Eagle Construction and Environmental Services, L.P. is contracted with Abilene for 11,837 acre-feet per year of raw water. This contract was acquired from AEP Texas North Company, formerly West Texas Utilities. The City of Abilene would present any changes in this contractual obligation to the Region G Water Planning Group during the appropriate regional water planning cycle.

Steam-electric demands increasing from 11,500 acre-feet per year in 2020 to 20,000 acre-feet per year were recommended by the Region G Water Planning Group and are significantly lower than the demands determined by the Bureau of Economic Geology. The region around Abilene continues to be a statewide leader in renewable (wind) energy. The on-going Competitive Renewable Energy Zones (CREZ) initiative will bring the renewable wind energy being generated in the Abilene region to electric customers throughout the State. Traditional electric generating facilities will be needed within the State, as well as the region around Abilene, to support the renewable wind energy industry in providing a consistent supply of energy to electric customers. It should be noted that the steam-electric demand identified in the 2011 IPP to be met by Abilene is not project or location specific (eg, the proposed Tenaska Trailblazer Energy Center sponsored by Tenaska, Inc. in Nolan County); rather, it is a general identified demand projected to be met within the region during the 50-year planning period.

Abilene Projected Water Supplies

The 2011 IPP presents, and the City of Abilene supports, projected supplies through 2060 available to Abilene for meeting identified water demands as a Municipal Water User Group and as a Wholesale Water Provider.

Supply from O.H. Ivie Reservoir of 6,720 acre-feet per year is based on the current capacity of the City's Hargesheimer water treatment plant. The treatment capacity is restricted by process waste disposal limitations, and the potential of additional yield reductions for O.H. Ivie Reservoir. Water quality in O.H. Ivie Reservoir does not meet secondary drinking water quality standards, and is treated by Abilene using reverse osmosis. Using this treatment process, about 15 percent of the raw water from Ivie ends up in a waste stream (brine). The City cannot increase the production of potable water at the Hargesheimer treatment plant using reverse osmosis without additional methods of brine disposal. Brine disposal options are limited and expensive (both capital investment, and on-going operations/maintenance costs). Additionally, from 1976 to 2006 the 1-year safe yield of O.H. Ivie Reservoir has been reduced several times. The most recent safe yield study (2006, Freese and Nichols) indicates that the 1-year safe yield is 72.7 percent of the original estimate. The continuing drought could further reduce the safe yield of O.H. Ivie Reservoir.

Eagle Construction and Environmental Services, L.P. holds a Certificate of Adjudication for 2,500 acre-feet per year of water from Lake Fort Phantom Hill. This Certificate of Adjudication was originally issued to West Texas Utilities. The 2011 IPP properly accounts for this obligation from the supply in Lake Fort Phantom Hill available to the City. Any changes in this Certificate of Adjudication would be available to the Region G Water Planning Group during the appropriate regional water planning cycle.

The City of Abilene has an established system for direct reuse of treated wastewater (reclaimed water). In providing reclaimed water to customers, the City has recognized and makes available a valuable resource that has historically been considered an undesirable waste. The 2011 IPP, as a part of Abilene's recommended water supply plan (Section 4C.38.13.2), identifies indirect reuse as a future supply source. The 2011 IPP correctly states, *"The indirect reuse system is anticipated to be used to meet local industrial, steam-electric and irrigation demands, and also as supplementing the yield of Cedar Ridge Reservoir."* Issuance of water rights permit for Abilene's indirect reuse system is pending at the Texas Commission on Environmental Quality.

Two-Year Safe Yield for Future Planning

At the request of the City of Abilene, in August and September of 2009, respectively, the Brazos G Regional Water Planning Group and the Texas Water Development Board approved the use of a 2-year safe yield for water supply planning purposes for the Abilene region. With a new drought of record for the region replacing the 1950's drought, and the unknown impacts of future climate and watershed changes, using 2-year safe yield criteria is prudent when planning for future water supplies for the Abilene region of West Texas.

Unique Reservoir Designation

As part of the Senate Bill 1 statewide water planning process, the 2006 Brazos G Regional Water Plan and the 2007 State Water Plan both included Cedar Ridge Reservoir as a recommended water management strategy for the Abilene region to meet future water demands. Additionally, during the 2007 Texas legislative session, the Legislature designated 19 sites that were previously included in the 2007 State Water Plan, including Cedar Ridge Reservoir, as unique for the construction of reservoirs. The City of Abilene continues to support the designation of Cedar Ridge Reservoir as a unique reservoir site.

CITY OF BRYAN
The Good Life, Texas Style.

April 14, 2010

Trey Buzbee
Regional Government and Customer Relations Manager
Brazos River Authority
P.O. Box 7555
Waco, TX 76714-7555

Subject: Comments on Regional Brazos G Water Plan for City of Bryan

Dear Mr. Buzbee:

This letter serves as the City of Bryan's written comments on the 2011 Initially Prepared Brazos G Regional Water Plan (2011 IPP). The City of Bryan would appreciate the Brazos G committee carefully reviewing these comments and consider incorporating changes into the 2011 plan to address the comments.

Comment 1:

Paragraph 4C.3.1.1; Page 4C.3-1: The current proposed plan shows the City of Bryan's estimated reliable supply as 16,180 acre-feet/year. The City understands that the reliable supply is based on the installed well capacities. The City of Bryan currently has ten (10) Simsboro wells and two (2) Sparta wells. These wells are permitted through the Brazos Valley Groundwater Conservation District for a daily aggregated production of 29,900 gpm or 43.056 MGD. However, the City of Bryan has a permit with the Brazos Valley Groundwater Conservation District to withdraw up to 33,539.86 acre-feet/year from these wells. The City agrees that taking the total well capacity, which is designed for maximum daily flows, and diving by 2 to develop an average daily capacity is reasonable. However, it appears the plan is ignoring the fact the City has a total permitted well volume of 33,539.86 acre-feet/year. This volume should be considered as the total amount of reliable supply for the City of Bryan.

Comment 2:

Population Projections and Projected Water Usage: The City of Bryan would like to propose a change to the future water usage projections proposed in the plan. The City understands the population projections in the plan are determined by the Texas Water Development Board and are based on Census data. The City also understands this population data was used to determine the future water demands for the City. The City would like to propose the projected water use demands shown in Table 1, which takes into account local growth dynamics and recent Certificate of Convenience and Necessity (CCN) changes for the City. The City of Bryan has recently seen significant development activity on the west side of Bryan that coincides with the construction of the Texas A&M University Health Science Center. This development is bringing more commercial and residential growth than may be previously represented by historical census data or population projections based on historical census data. In addition to an increase in amount of residential and commercial growth, the City recently acquired CCN rights for approximately 21,175 acres. This additional acreage increased the current CCN area of 25,450 acres to a total of 46,625 acres. The expanded CCN not only increased our service area for the future, but also included the transfer of 115 commercial and residential customers. Because of these two dynamics, the City would like to have the projected water demands recalculated so these demands can be represented in the 2011 IPP.

Table 1. Future Population Projections and Water Demand

Year	Annual Water Demand (ac-ft/yr)	Population Projection
2010	16,804	73,512
2020	17,364	84,196
2030	18,893	99,959
2040	21,834	118,714
2050	25,302	140,827
2060	29,434	167,176
2070	36,348	211,266
2080	45,813	271,622

Comment 3:

Section 4A.3; Page 4A-13: The 2011 IPP lists Wholesale Water Providers on page 4A-13. The definition of a Wholesale Water Provider (WPP) "is any person or entity, including river authorities and irrigation districts, that has contracts to sell more than 1,000 acre-ft of water wholesale in any one year during the five years immediately preceding the adoption of the last Regional Water Plan." The City of Bryan currently has contracts with Brushy Water Supply Corporation and Wellborn Special Utility District for 500,000 gallons per day each, or 560 acre-feet/year. This combined total is 1,120 acre-feet/year, which is in excess of the 1,000 acre-feet/yr required by definition to be considered a Wholesale Water Provider. In addition to these two existing contracts, the City is in negotiations with Wickson Creek Special Utility District for 1,500 acre-feet/yr for water to help meet their peak demand needs. The City of Bryan is requesting the 2011 IPP be modified to reflect the City of Bryan as a Wholesale Water Provider.

Best Regards,

Jayson Barfknecht

Jayson E. Barfknecht, Ph.D., P.E.
Water Services Director

MUNICIPAL COURT JUDGE
LINDA PIERCE

CHIEF OF POLICE
CECIL FUNDERBURGH

DIRECTOR OF FINANCE
LESLIE ZANDER

City of Eastland

CITY MANAGER
RON HOLLIDAY

CITY SECRETARY
SHIRLEY STUART

June 24, 2010

Mr. Trey Busbee
Brazos G Administrative Agent
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714-7555

Re: Comments on the Initially Prepared 2011 Brazos G Regional Water Plan

Dear Mr. Busbee,

The City of Eastland, objects to the recommendation made in the above mentioned plan regarding satisfaction of the projected 2030 and 2060 shortfalls to the City of Strawn in Palo Pinto County by the Eastland County Water Supply District.

The City of Eastland, Eastland County and the Eastland Water Supply District are on record objecting to any transfer of Eastland County Water Supply District water outside of Eastland County.

I attended the January 12, 2010, presentation of the Initially Prepared Plan in Abilene. In response to my question, Mr. David Dunn said water suppliers were in agreement in the instances they were identified in the plan as sources to satisfy projected shortfalls. I subsequently discovered this is not true in the case of the projected shortfalls for the City of Strawn. The Eastland County Water Supply District has not been contacted in regard to this issue and was taken completely by surprise by the Initially Prepared Plan showing the District as Strawn's future water supplier.

I have attached pertinent pages from the plan which recommends the Strawn connection to the Eastland County Water Supply District be completed by the year 2040 at a cost of $5,158,000.

The City of Eastland has no animosity whatsoever toward Strawn and is empathetic in regard to its need to plan for the future. Our fundamental problem with the Initially Prepared Plan lies in the unilateral recommendation by your contractor to take someone's water to satisfy a projected need elsewhere, without so much as a courtesy notification to the proposed supplier. This seems to be a classic case of a "big brother" attitude.

Sincerely,

Ron Holliday

Ron Holliday
Eastland City Manager

Cc: The Honorable Jim Keffer, State Representative
The Honorable Troy Fraser , State Senator
Eastland City Commission
Eastland Water Supply District
Rex Fields, Eastland County Judge
City of Strawn

4C.27.3 City of Strawn

4C.27.3.1 Description of Supply

Surface water supplies are obtained from Lake Tucker. Supplies will not be sufficient to meet demands through 2060.

4C.27.3.2 Water Supply Plan

Working within the planning criteria established by the Brazos G RWPG, the following water supply plan is recommended to meet the projected shortage of the City of Strawn:

- Conservation
- Water supply from Eastland County WSD.

Water supply from Eastland County WSD is a new supply and would require new infrastructure and transmission facilities to deliver the water to the City. It is assumed that this WMS would be brought online in sufficient quantities to replace the existing supply from Lake Tucker.

4C.27.3.3 Costs

Cost of the Recommended Plan for the City of Strawn.

a. Conservation

- Cost Source: Volume II, Section 4B.2
- Date to be Implemented: 2010
- Annual Cost: maximum of $6,650 in 2020

b. Water Supply from Eastland County WSD:

- Cost Source: Volume II, Section 4B.17
- Date to be Implemented: by 2040
- Total Project Cost: $5,158,000
- Annual Cost: $775,000

Table 4C.27-3.
Recommended Plan Costs by Decade for the City of Strawn

Plan Element	2010	2020	2030	2040	2050	2060
Projected Surplus/(Shortage) (acft/yr)	-	(4)	(7)	(10)	(16)	(23)
Conservation						
Supply From Plan Element (acft/yr)	7	14	11	9	9	9
Annual Cost ($/yr)	$3,325	$6,650	$5,225	$4,275	$4,275	$4,275
Unit Cost ($/acft)	$475	$475	$475	$475	$475	$475
Water Supply from Eastland County WSD						
Supply From Plan Element (acft/yr)	—	—	—	200	200	200
Annual Cost ($/yr)	—	—	—	775,000	775,000	325,400
Unit Cost ($/acft)	—	—	—	$3,875	$3,875	$1,627

Harker Heights
The Bright Star Of Central Texas

The City Of Harker Heights
305 Miller's Crossing
Harker Heights, Texas 76548
Phone 254/953-5600
Fax 254/953-5614

April 20, 2010

Mr. Trey Buzbee
Brazos G Administrative Agent
c/o Brazos River Authority
P.O. Box 7555
Waco, Texas 76714-7555

RE: Initially Prepared 2011 Brazos G Regional Water Plan

Dear Mr. Buzbee:

The Initially Prepared 2011 Brazos G Regional Water Plan indicates the City of Harker Heights will have raw water surpluses for the years 2030 and 2060. The surpluses were projected by the Texas Water Development Board (TWDB).
The City recently obtained additional raw water in Lake Belton from the Brazos River Authority. Prior to April 1, 2006, The City had a total of 8,415 acre-feet of raw water in Lakes Belton and Stillhouse Hollow. After April 1, 2006, the combined raw water total for both lakes increased to 8,800 acre-feet. For the 2011 Regional Water Plan future projections, 8,800 acre-feet will be used.
In 2006, the City of Harker Heights completed a Water Master Plan with population and raw water projections through the year 2060. The 2006 Water Master Plan raw water projections are tracking accurately compared to the TWDB raw water projections. For example: Based on the 2005 Water Municipal Water Demand & Supply By City/County Draft Report, for the year 2010, the City of Harker Heights raw water surplus was projected by the TWDB to be 5,050 acre-feet (8,415 acft – 3,365 acft = 5,050 acft). For calendar year 2009, the City of Harker Heights reported raw water use of 4,575 acre-feet. The actual surplus being 3,840 acre-feet (8,415 acft – 4,575 acft = 3,840 acft). The City's Water Master Plan projected a surplus of 3,882 acre-feet for 2010. For the year 2010, the TWDB projected surplus was 23.9% higher than the actual surplus. The City of Harker Heights projected surplus was 1.1% higher than the actual surplus.
Comparing the projections for 2030 and 2060, using the table on page 2, the TWDB projected surplus for 2030 is 29.5% higher than the Harker Heights Water Master Plan projection.
For 2060, the TWDB projected surplus is 69% higher than the Harker Heights Water Master Plan projection.

Raw Water Projections Based on a Total of 8,800 acre-feet

Texas Water Development Board Projections		**City of Harker Heights 2006 Water Master Plan Projections**	
2030 (acft/yr)	**2060 (acft/yr)**	**2030 (acft/yr)**	**2060 (acft/yr**
2,462 surplus	1,447 surplus	1,735 surplus	443 surplus

The calculations utilized in the City's 2006 Water Master Plan accurately project water usage for the City of Harker Heights demographic. Therefore, the City of Harker Heights requests revising the 2011 Brazos G Regional Water Plan to reflect surpluses for the years 2030 and 2060 based on the City's 2006 Water Master Plan.

Sincerely,

Steve Carpenter
City Manager

KNOWLEDGE • SERVICE • ANSWERS

4833 Spicewood Springs Road, Suite 204
Austin, Texas 78759
T 512.342.6868 F 512.342.6877 www.ksaeng.com

KSA ENGINEERS

June 25, 2010

Mr. Trey Buzbee
Brazos G Administrative Agent
c/o Brazos River Authority
P.O. Box 7555
Waco, Texas 76714
Phone: (254) 761-3168

RE: City of Marlin Comments on Initially Prepared 2011 Brazos G Regional Water Plan

Dear Mr. Buzbee:

At the request of William McDonald, City of Marlin City Manager, KSA Engineers is presenting comments on behalf of the City of Marlin.

After review of the Initially Prepared 2011 Brazos G Regional Water Plan (2011 IPP), the City of Marlin would like to present comments on the cost estimate for the proposed Brushy Creek Reservoir, the available water supply from the Brushy Creek Reservoir, and population estimates for Falls County.

In the 2006 Brazos G Regional Water Plan, the City of Marlin was shown to have adequate water supply up to 2060 from the City's two water supply reservoirs and diversions from the Brazos River. Current modeling in the 2011 IPP indicates the City of Marlin does not have adequate water supply for 2010, with a projected shortage of 1,799 ac-ft. The Brushy Creek Reservoir is justified in the plan because of the apparent water shortage. The City of Marlin concurs with the 2011 IPP that there is potential for a significant water shortage during drought conditions in 2010. Moreover, the City of Marlin concurs that the Brushy Creek Reservoir is the best available water supply strategy to meet projected water demands.

Brushy Creek Reservoir Cost Estimate

The 2011 IPP lists the total costs for the Brushy Creek Reservoir and Pump Station at \$39,690,000. The most recent cost estimate for the Brushy Creek Reservoir was completed for the City in January 2008 as a part of the *TWDB Report 370 Reservoir Site Protection Study*. The City of Marlin has purchased all the land required for the Brushy Creek Reservoir; therefore, \$5,118,900 for the cost of the land can be removed from the project. A cost estimate prepared by TRC in 2008 for the Brushy Creek Reservoir estimated the Environmental Studies and Mitigation at \$918,625. The Brushy Creek Reservoir cost estimate should be revised with the reduced value for Environmental Studies and Mitigation and should not include costs for land purchase.

The cost estimate listed in the 2011 IPP has the costs for the dam split between the City of Marlin and NRCS at a 52%:40% split, with the City covering 52% of the reservoir costs. In reviewing correspondence between the City and NCRS, the correct cost split is a 60%:40% split, with the City covering 40% of the reservoir costs. The cost estimate should be revised to show the City paying 40% of the reservoir costs.

The pump station at Brushy Creek Reservoir is needed to pump water to the existing water treatment plant at the New Marlin City Lake. The 2011 IPP has allocated $16,227,000 for the proposed pump station, a 12-mile long, 14-inch diameter pipeline, and a 3.1 MGD water treatment plant upgrade. A 12-mile pipeline length is much longer than what is needed to reach the existing water treatment plant. The raw water line should be revised to a length of 36,000 feet (6.8 miles) as presented in the 2008 cost estimate prepared by TRC. Also, the 3.1 MGD Water Treatment Plant is not needed because the plant was recently upgraded to a capacity of 5.0 MGD. The cost estimate for the pump station, pipeline, and water plant should be modified to reflect the reduced pipeline length and the omission of the water plant modification.

The annual costs for the Brushy Creek Reservoir and associated improvements are listed in the 2011 IPP at $3,149,000. The annual costs for the City of Marlin will be reduced significantly because of the cost sharing with NRCS. The City requests the annual costs be modified to omit the portion of the project paid for by NRCS.

Available Water Supply from Brushy Creek Reservoir

The 2011 IPP indicates the Brushy Creek Reservoir has an available water supply of 2,090 ac-ft per year. The *TWDB Report 370 Reservoir Site Protection Study* indicated the Brushy Creek Reservoir only has an available water supply of 1,360 ac-ft per year, according to the Brazos River Basin WAM model with Run 3 assumptions. The 2011 IPP should justify the increase in water supply from the Brushy Creek Reservoir from the 2008 TWDB study.

Population Estimates for Falls County

The population projections for Falls County show a 9.09% decrease in population between 1990 and 2000. The reduction in population occurs because residents were removed from the County-Other category in 2000 and placed under a separate category, thus creating an apparent reduction in population. This type of calculation error appears to occur in multiple county projections throughout the 2011 IPP. The Falls County population projections should be revised to show the correct growth rate.

The City of Marlin requests the comments presented in this letter be incorporated into the final 2011 Brazos G Regional Water Plan. The City is available to meet with the Region to discuss any raised issue(s).

Sincerely,

Stephen P. Dorman

Stephen Dorman P.E., Principal, Division Manager
KSA Engineers

Enclosure: *Costs for Multi-Purpose Site 19 and Floodwater Retarding Structures 16, 17 &18*

cc: William McDonald, City Manager, City of Marlin
Brent Bassett, EIT, KSA Engineers
Marlene McMichael, McMichael & Company, LLG
Julie Andress, Brazos River Authority
David Dunn, P.E., HDR Engineering
Matt Nelson, Texas Water Development Board

TRC/BRANDES

Consulting in Water Resources

Costs for Multi-Purpose Site 19 (City of Marlin) and Floodwater Retarding Structures 16, 17 & 18 (Falls County) Big Creek Watershed

Performed by TRC, January 4, 2008

1.0 Introduction

In an effort to provide an alternative source of funding through the Texas Water Development Board (TWDB) for the much needed additional municipal water supply for the City of Marlin as well as three proposed floodwater retarding structures located above the water supply dam, TRC is providing the following approximation of costs for the construction of the four dams located within the Big Creek Watershed. In particular, the following dams are proposed for the City of Marlin and for Falls County Water Conservation and Improvement District (WCID). Site 19 MP is a multi-purpose structure that will provide additional surface water for the City of Marlin and will also function as a floodwater retarding structure. Additionally, Site 19 MP is also intended to function as a recreational reservoir. Sites 16, 17 & 18 will function solely as floodwater retarding structures and are located in the upper portion of the Site 19 MP drainage basin.

All four structures are located on Brushy Creek, a tributary of Big Creek which is a tributary of the Brazos River. These dams are part of a long term basin-wide floodwater control and water supply planning project that is a joint effort between the Natural Resources Conservation Service (NRCS), Falls County WCID and the City of Marlin. Please refer to the NRCS's 1984 report, "Final Watershed Plan and Environmental Impact Statement, Big Creek (Tri-County) Watershed for Falls, Limestone and McLennan Counties, Texas".

The initial design concept for the entire basin was to limit soil erosion and reduce floodwaters in the upper portion of the basin which would thereby allow the larger reservoir to be economically constructed by reducing the peak floods that would have to be safely conveyed through the Site 19 dam.

This cost estimation is based upon materials quantity and cost information provided by the NRCS using Engineering News Record (ENR) and the U.S. Department of Labor's Bureau of Labor Statistics consumer price indices (CPI). The NRCS costs were then updated in 2006 by TRC as part of a state-wide surface water supply study for the Texas Water Development Board (TWDB). That study was performed by TRC, HDR and Freese and Nichols, Inc., under contract with the TWDB. The draft report is entitled, "Reservoir Site Protection Study", December 2006. A portion of that report that concerns the Site 19 MP Dam (Brushy Creek Reservoir) has been reproduced in Section 3, below. The report can be found on the TWDB web site at:
http://www.twdb.state.tx.us/publications/reports/Reservoir/Reservoir.asp

2.0 Summary

The current estimated costs for the completion, through construction, of all four dams are noted below. Detailed cost breakdowns for each proposed dam are provided in the tables included in Section 3 below. It should be noted that these costs also include the final cultural and environmental assessment costs as well as the final engineering design costs.

Costs for Multi-Purpose Site 19 (City of Marlin) and Floodwater Retarding Structures 16, 17 & 18 (Falls County WCID), Big Creek Watershed

1. Site 19 MP - $19.3 million
2. Site 18 - $2.1 million
3. Site 17 - $2.1 million
4. Site 16 - $2.6 million

Land costs were based upon data obtained from the Texas A&M Real Estate Center for rural land costs for Falls County, which was $2009 per acre of raw land at the time of this report. It should be noted that the City of Marlin has obtained all the land needed to construct Site 19 MP and to provide for both flood easements and mitigation for the environmental impact of the construction of the dam. Falls County WCID has obtained some but not all of the land needed for the remaining floodwater retarding structures: Sites 16, 17 & 18.

3.0 Site 19 MP (Brushy Creek Reservoir Dam)

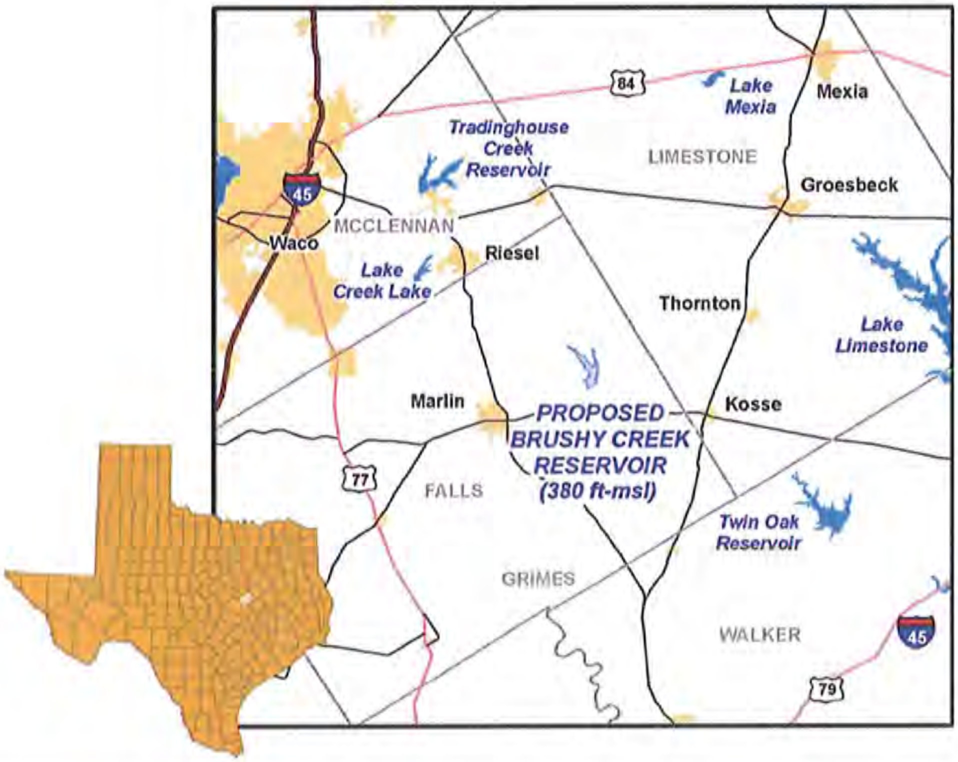
Brushy Creek Reservoir is a proposed reservoir which is part of the long-term plan developed by the City of Marlin and the Natural Resources Conservation Service (NRCS) for water supply and flood control purposes in the Big Creek watershed. Brushy Creek is a tributary of Big Creek, which is a tributary of the Brazos River. The Big Creek watershed, located in Central Texas in Falls, Limestone, and McLennan Counties, encompasses 369.6 square miles.

3.1 Description of Brushy Creek Reservoir

The 1984 NRCS Big Creek Watershed Plan, described in a project report entitled "Final Watershed Plan and Environmental Impact Statement, Big Creek (Tri-County) Watershed for Falls, Limestone and McLennan Counties, Texas", includes three floodwater retarding structures (Sites 16, 17 & 18) located in the upper reaches of Brushy Creek and a larger multi-purpose dam (Site 19 MP) located just above the confluence of Brushy Creek with Big Creek. When constructed, this multi-purpose dam will form the Brushy Creek Reservoir (Figure 3.1.1) and impound runoff from the 44.3 square mile watershed. The projected needs within 50 miles of the proposed reservoir site by 2060 are 246,820 acre-feet per year. The nearest major demand center is the Austin area, which is located approximately 85 miles southwest of the reservoir site.

The purposes of the Brushy Creek Reservoir and the other structures included in the Big Creek Watershed Plan are to provide a dependable water supply for the City of Marlin, reduce channel erosion, reduce sedimentation, reduce downstream flooding, increase the availability of prime farmland soils, and increase the acreage of open water within the watershed. The Brushy Creek Reservoir itself is authorized as part of an existing water right (Certificate of Adjudication No. 12-4355) for water supply purposes for the City of Marlin as well as for flood control and recreation. Since the reservoir is authorized, it has been considered as an existing source of supply for the City of Marlin in the regional planning process. All of the land required for Brushy Creek Reservoir has been purchased by the City of Marlin excluding some land needed for environmental mitigation of stream reaches impacted by the proposed reservoir. The determination of the final amount of mitigation land needed is still under review by the Corps of Engineers.

Figure 3.1.1: Location Map



3.2 Project Firm Yield

The firm yield of Brushy Creek Reservoir was calculated using the Brazos River Basin Water Availability Model (BWAM) with Run 3 assumptions as obtained from the Texas Commission on Environmental Quality (TCEQ). The monthly WAM simulations were performed using the Water Rights Analysis Package (WRAP). This existing BWAM model includes Brushy Creek Reservoir, and this representation of the reservoir has been reviewed and determined to be appropriate for this yield study.

The Brushy Creek Reservoir elevation-area-capacity relationship is presented in Table 3.1.1 and shown in Figure 3.1.2. The elevation-area-capacity data were developed by the Soil Conservation Service of the U.S. Department of Agriculture as part of the original watershed planning study. Figure 3.1.3 shows the area inundated by the reservoir at different water surface elevations.

For purposes of this yield study, Brushy Creek Reservoir is subject to an environmental flow restriction consistent with a special condition stipulated in the Certificate of Adjudication for the reservoir. This special condition requires a continuous release from the reservoir of at least 0.1 cfs.

WAM simulations were made to determine the firm yield of the reservoir for the authorized conservation pool elevation of 380.5 feet-msl, which corresponds to a maximum conservation storage capacity of 6,560 acre-feet. The resulting firm yield is 1,380 acre-feet per year.

Environmental flow requirements reduce the firm yield of the reservoir by approximately 55 acre-feet.

Table 3.1.1: Elevation –Area-Capacity Relationship for Brushy Creek Reservoir

Elevation (feet-msl)	Area (acres)	Capacity (acre-feet)
352	0	0
356	1	1
360	33	68
364	115	363
368	234	1,059
372	341	2,208
376	497	3,884
380	668	6,214
380.5	697	6,560
384	896	9,296
388	1,065	13,119
392	1,310	17,868
394	1,341	20,608

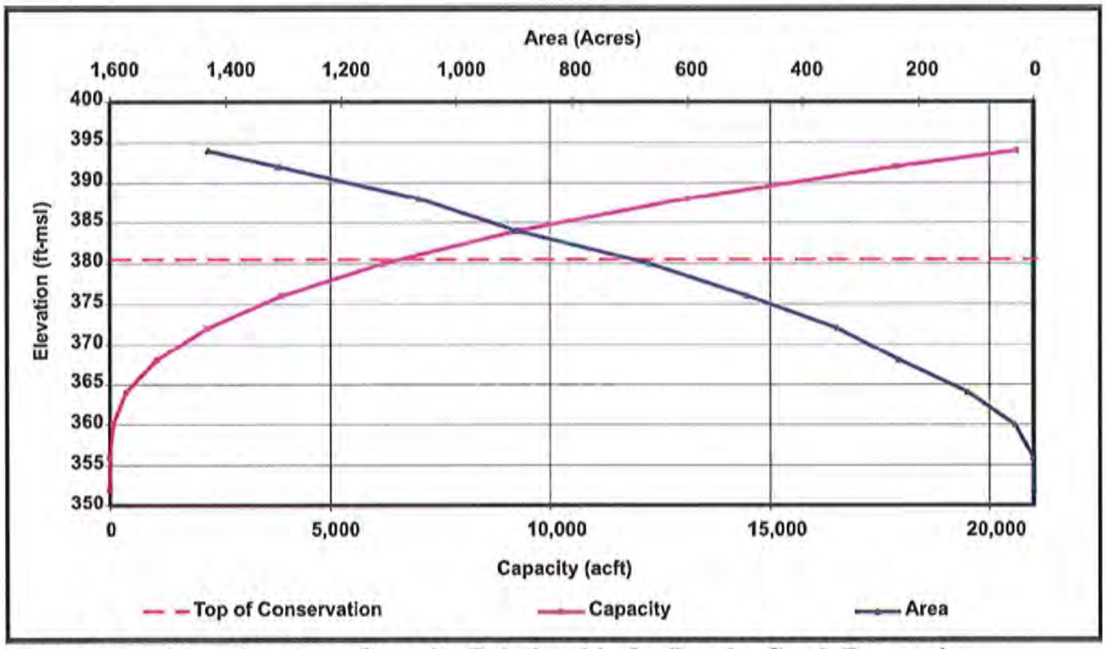


Figure 3.1.2: Elevation-Area-Capacity Relationship for Brushy Creek Reservoir

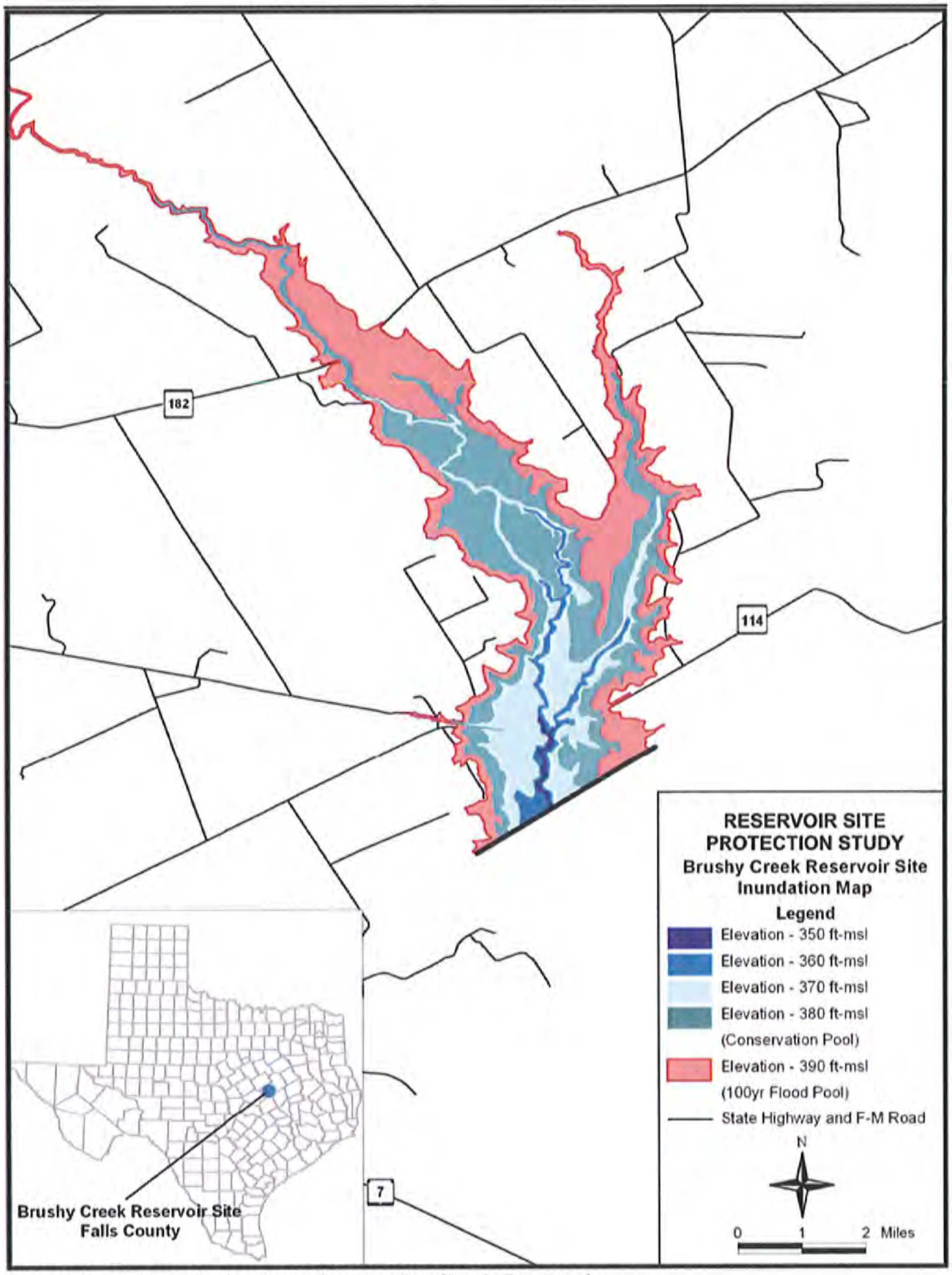


Figure 3.1.3: Inundation Map for Brushy Creek Reservoir

The monthly variation in storage in Brushy Creek Reservoir as simulated with the WAM over the 1940-1997 analysis period under firm yield conditions is shown in Figure 3.1.4.

At the conservation pool elevation of 380.5 ft-msl (6,560 acre-feet of storage capacity), the reservoir would be full about 25 percent of the time and would be below 50 percent of the conservation storage capacity about 12 percent of the time on a monthly basis. A frequency curve for storage content is also shown in Figure 3.1.4.

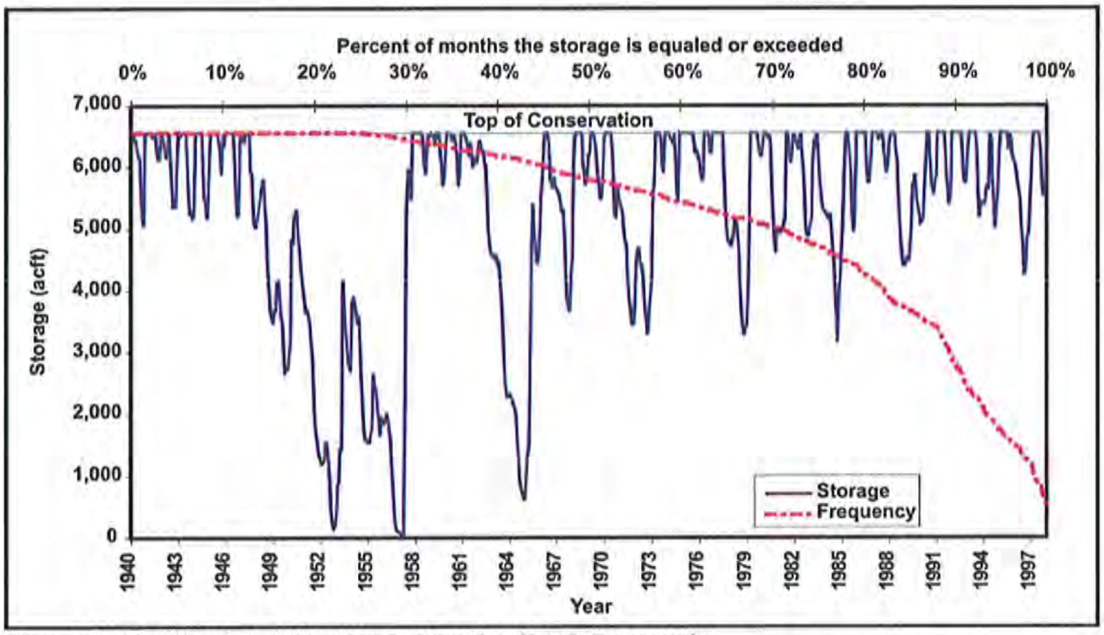


Figure 3.1.4: Simulated Storage in Brushy Creek Reservoir (Conservation Elevation = 380.5 ft-msl, Diversion = 1,380 acre-feet per year)

3.3 Reservoir Costs

The costs for the Brushy Creek Reservoir include a rolled earth embankment with a length of approximately 7,740 feet and a height of 50 feet. A principal spillway, consisting of a reinforced concrete drop inlet structure connected to a 7-foot square box conduit through the dam, will control normal and some smaller flood flows and provide for the passage of environmental flows. The emergency spillway will be an earthen cut spillway with a bottom width of approximately 400 feet. The final design phase for the dam and spillway structures has not been started.

The conflicts identified at the site include water lines, electrical distribution and transmission lines, and county and FM roads. A list of the potential conflicts as identified by TNRIS is provided in Table 3.1.2, and they are shown in Figure 3.1.5. The conflict costs represent less than 17 percent of the total construction cost of the reservoir project.

Table 3.1.4 shows the estimated capital costs for the Brushy Creek Reservoir, including construction costs, engineering, permitting, and mitigation. Unit costs for the dam and reservoir are based on the cost assumptions used in this study. The total estimated cost of the project is $19.6 million (2005 prices). Assuming an annual yield of 1,380 acre-feet per year, raw water from the project will cost approximately $972 per acre-foot ($2.98 per 1,000 gallons) during the debt service period. Without the floodwater component of the project, the unit cost is approximately $505 per acre-foot ($1.55 per 1000 gallons).

(Note: These costs have been updated in 2007 by TRC from the TWDB report to include costs for the raw water main, updated environmental, cultural and conflicts costs.)

Table 3.1.2
List of Potential Conflicts for Brushy Creek Reservoir

Description	Unit	Quantity
Water Lines	Mile	2.5
Electrical Distribution & Transmission	Mile	3.0
County &FM Roads	Mile	1.2

3.4 Environmental Considerations

The Brushy Creek Reservoir site is not located on an ecologically significant stream as identified by the Texas Parks and Wildlife Department (TPWD). The main impacts of this project are significant only in the areas of construction of the dam and inundated areas. The reservoir will experience some sediment loading due to the nature of the soils within the drainage area. Several flood water retarding structures located in the upper part of the basin will act to reduce the loading. Temporary loading will occur immediately after construction of these upstream structures before all disturbed soils are re-vegetated. This effect is expected to greatly diminish as the vegetation matures and the sedimentation and erosion controls are maintained.

No endangered species have been identified in the basin area. Some archeological sites have been identified and ongoing work is scheduled through the sponsors of the project, which are the City of Marlin and the NRCS.

The dam is located on Brushy Creek immediately upstream of its confluence with Big Creek. Big Creek consists of a wide and flat braided stream that has many sloughs and wetlands. Hydraulic and hydrologic analyses of the dam indicate that the reduction of flows caused by storing water behind the dam would not have an adverse impact on these downstream wetlands.

Brushy Creek Reservoir will inundate 697 acres of land at conservation storage capacity. Table 3.1.3 and Figure 3.4.3-6 summarize existing land cover for the Brushy Creek Reservoir site as determined by TPWD using methods described in Appendix C (See TWDB report). Existing land cover within this reservoir site is dominated by upland deciduous forest (44 percent) and agricultural land (39 percent).

Table 3.1.3
Acreage and Percent Land Cover for Brushy Creek Reservoir

Land Cover Classification	Acreage[1]	Percent
Upland Deciduous Forest	269	44.3%
Grassland	58	9.5%
Shrubland	45	7.3%
Agricultural Land	235	38.7%
Total	607	100%

[1]Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship.

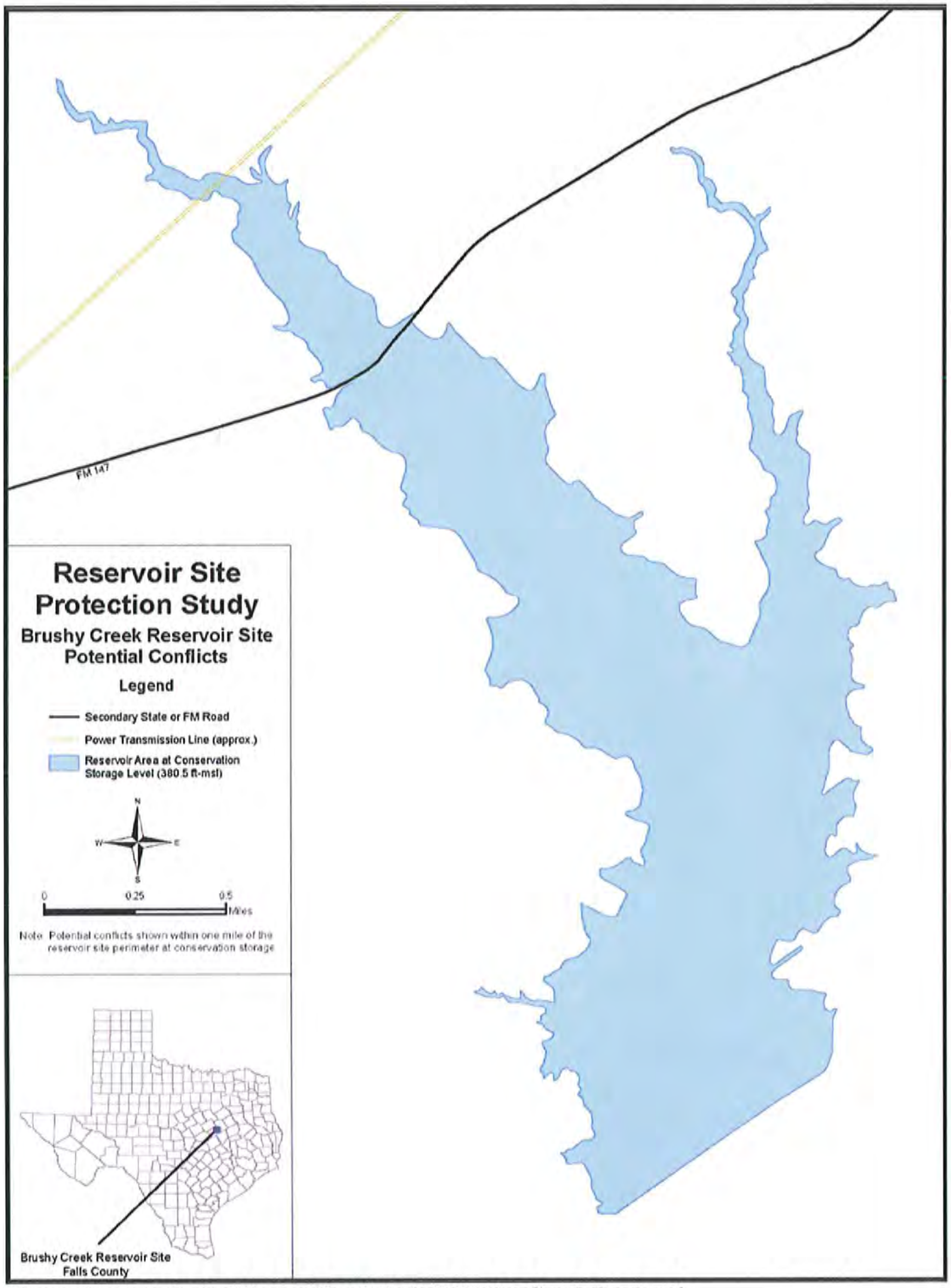


Figure 3.1.5: Potential Major Conflicts for Brushy Creek Reservoir

Costs for Multi-Purpose Site 19 (City of Marlin) and Floodwater Retarding Structures 16, 17 & 18 (Falls County WCID), Big Creek Watershed

TABLE 3.1.4

Cost Estimate — Brushy Creek Reservoir @ Elevation 380.5 ft-msl

	UNIT	QUANTITY	UNIT COST	COST
MOBILIZATION (5%)	L.S.	1		**$183,340**
FOUNDATION:				
CUTOFF EXCAVATION	CY	61,832	$2.50	$154,580
CHANNEL CLEANOUT EXCAVATION & FOUNDATION PREPARATION	CY	29,000	$2.50	$72,500
COMPACTED FILL - CUTOFF TRENCH	CY	61,832	$2.50	$154,580
SUBTOTAL - FOUNDATION CONSTRUCTION				**$381,660**
EMBANKMENT:				
CLEARING AND GRUBBING	AC	40	$2,000.00	$80,000
COMPACTED FILL	CY	579,789	$2.50	$1,449,473
RIP RAP & BEDDING	TON	12,500	$65.00	$812,500
TOPSOIL & GRASSING	AC	50	$4,500.00	$225,000
FENCING	LF	14,190	$4.00	$56,760
SUBTOTAL - EMBANKMENT CONSTRUCTION				**$2,623,733**
EMERGENCY SPILLWAY:				
EXCAVATION -EMERGENCY SPILLWAY	CY	110,000	$2.50	$275,000
SUBTOTAL - EMERGENCY SPILLWAY CONSTRUCTION				**$275,000**
PRINCIPAL SPILLWAY:				
REINFORCED CONCRETE				
7' X 7' BOX CULVERT CONDUIT	CY	290	$400.00	$116,000
ANTI-SEEP COLLARS	CY	39	$400.00	$15,600
RISER	CY	81	$400.00	$32,400
FOOTING	CY	31	$400.00	$12,400
ST. ANTHONY FALLS BASIN	CY	490	$400.00	$196,000
SLIDE GATE	EA	1	$6,000.00	$6,000
TRASH RACK	EA	1	$8,000.00	$8,000
SUBTOTAL - PRINCIPAL SPILLWAY CONSTRUCTION				**$386,400**
SUBTOTAL - DAM CONSTRUCTION				**$3,666,793**
CLEARING RESERVOIR	AC	175	$1,000.00	$175,000
SUBTOTAL - DAM & RESERVOIR CONSTRUCTION				**$4,025,132**
ENGINEERING & CONTINGENCIES (35% DAM & RESERVOIR)				**$1,408,796**
TOTAL - DAM & RESERVOIR CONSTRUCTION				**$5,433,928**
MUNICIPAL OUTLET STRUCTURE				
CONSTRUCTION	LS	1	$2,000,000.00	$2,000,000
RAW WATER MAIN				
PIPELINE	LF	36,000	$90.00	$3,240,000
ROW ACQUISITION	LS	1	$50,000.00	$50,000
SUBTOTAL - RAW WATER MAIN				$3,290,000
SUBTOTAL - OUTLET STRUCTURE & WATER MAIN				**$5,290,000**
ENGINEERING & CONTINGENCIES (35% OUTLET STRUCTURE & WATER MAIN				**$1,851,500**
TOTAL - OUTLET STRUCTURE & RAW WATER MAIN				**$7,141,500**
CONFLICTS (RELOCATIONS):				
12.5 kV DISTRIBUTION LINE	LS	1	$30,000.00	$30,000
69 kV TRANSMISSION LINE	LS	1	$270,000.00	$270,000
CLOSE COUNTY ROADS 182 & 182A	LS	1	$150,000.00	$150,000
WATER LINES	LS	1	$80,000.00	$80,000
TXDOT HIGHWAY 147	LS	1	$2,500,000.00	$2,500,000
SUBTOTAL - CONFLICTS				**$3,030,000**

Costs for Multi-Purpose Site 19 (City of Marlin) and Floodwater Retarding Structures 16, 17 & 18 (Falls County WCID), Big Creek Watershed

TABLE 3.1.4 (cont.)

ENGINEERING & CONTINGENCIES (35% CONFLICTS)				$1,060,500
LAND PURCHASE COSTS	AC	1812	0.0	$0
(Land is already purchased)				
ENVIRONMENTAL STUDIES & MITIGATION COSTS				
CULTURAL RESOURCE STUDY				
Phase II work for Site 19	LS	1	$200,000.00	$200,000
Pipeline	LS	1	$50,000.00	$50,000
BIOLOGICAL				
Completion of I.P.	LS	1	$35,000.00	$35,000
Implement I.P. (mitigation)	LS	1	$262,500.00	$262,500
Pipeline permitting (NWP)	LS	1	$20,000.00	$20,000
MITIGATION PLANTINGS	LS	1	$100,000.00	$100,000
MITIGATION LAND COST	AC	125	$2,009.00	$251,125
TOTAL ENVIRONMENTAL COSTS				$918,625
CONSTRUCTION TOTAL				$17,584,553
INTEREST DURING CONSTRUCTION				$1,683,242
(3- years @ 6%)				
TOTAL COST				$19,267,795
ANNUAL COSTS				
DEBT SERVICE (6% FOR 40 YEARS)				$1,280,567
OPERATION & MAINTENANCE (1.5% OF DAM & SPILLWAY COSTS)				$60,377
TOTAL ANNUAL COSTS				$1,340,944
FIRM YIELD (ACRE-FEET PER ANNUM)				1,380
UNIT COST: INCLUDING CITY SHARE (52%) & NRCS SHARE (48%)				
UNIT COST OF WATER (DURING AMORTIZATION) With NRCS floodwater component				
PER ACRE-FOOT				$971.70
PER 1,000 GALLONS				$2.98
UNIT COST OF WATER (AFTER AMORTIZATION) With NRCS Floodwater component				
PER ACRE-FOOT				$43.75
PER 1,000 GALLONS				$0.13
UNIT COST: FOR CITY OF MARLIN ONLY				
UNIT COST OF WATER (DURING AMORTIZATION) Without NRCS floodwater component				
PER ACRE-FOOT				$505.28
PER 1,000 GALLONS				$1.55
UNIT COST OF WATER (AFTER AMORTIZATION) Without NRCS Floodwater component				
PER ACRE-FOOT				$22.75
PER 1,000 GALLONS				$0.07

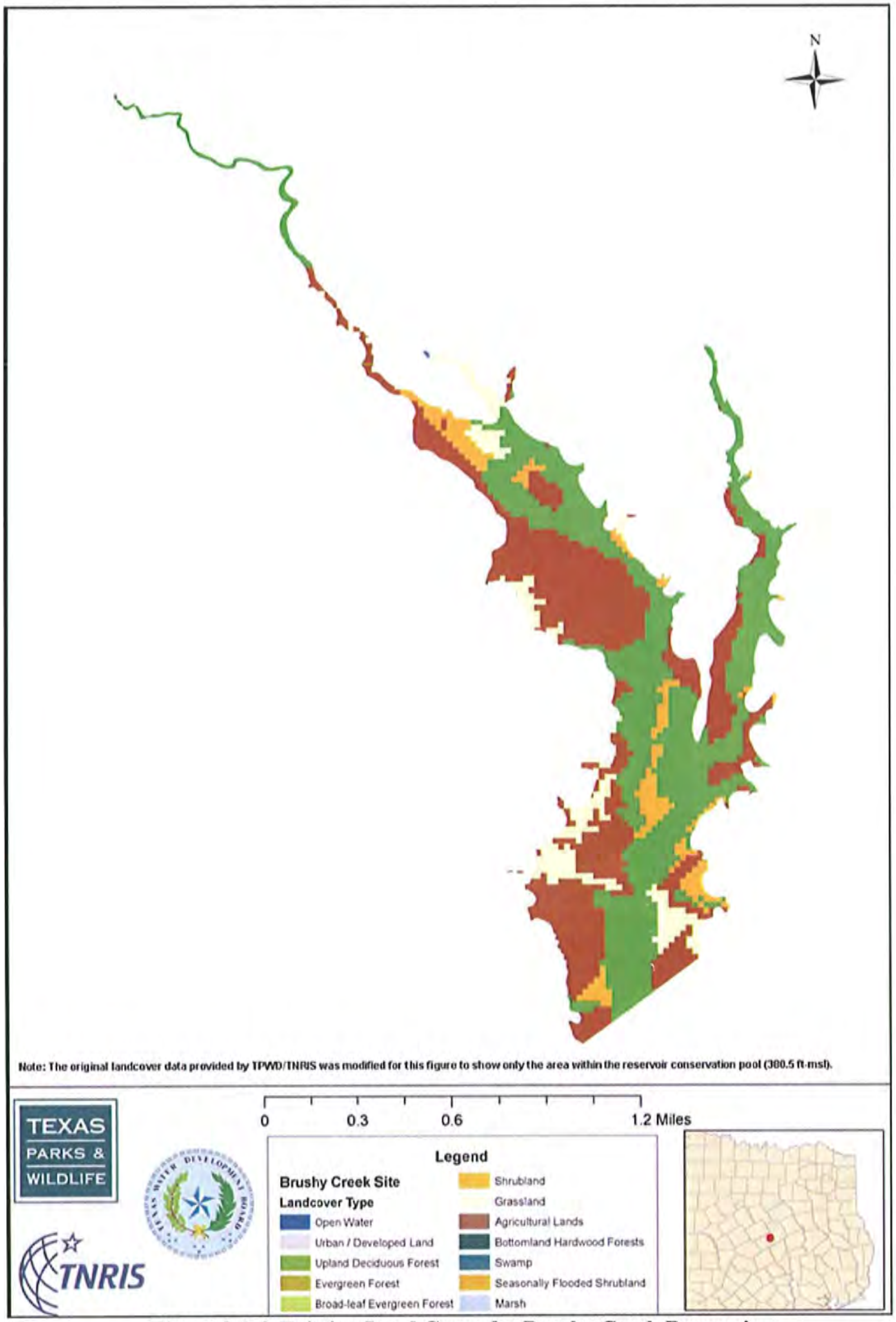


Figure 3.1.6: Existing Land Cover for Brushy Creek Reservoir

4.0 NRCS Floodwater Retarding Structure Site 18

COST OF NRCS FRS Site 18: Brushy Creek Falls County WCID (Note: All quantities taken from work plan estimate of construction cost , revised by the NRCS 11-6-1981)

	UNIT	QUANTITY	UNIT COST	COST
MOBILIZATION (5%)	L.S.	1		$46,502
FOUNDATION:				
CUTOFF EXCAVATION	CY	18,579	$2.50	$46,448
CHANNEL CLEANOUT EXCAVATION & FOUNDATION PREPARATION	CY	10,493	$2.50	$26,233
COMPACTED FILL - CUTOFF TRENCH	CY	18,579	$2.50	$46,448
SUBTOTAL - FOUNDATION CONSTRUCTION				$119,128
EMBANKMENT:				
CLEARING AND GRUBBING	AC	3.7	$2,000.00	$7,400
COMPACTED FILL	CY	202,709	$2.50	$506,773
RIP RAP & BEDDING	TON	450	$65.00	$29,250
TOPSOIL & GRASSING	AC	20.00	$4,500.00	$90,000
FENCING	LF	7,020	$4.00	$28,080
SUBTOTAL - EMBANKMENT CONSTRUCTION				$661,503
EMERGENCY SPILLWAY:				
EXCAVATION -EMERGENCY SPILLWAY	CY	28,256	$2.50	$70,640
SUBTOTAL - EMERGENCY SPILLWAY CONSTRUCTION				$70,640
PRINCIPAL SPILLWAY:				
PRINCIPAL SPILLWAY	LS	1	$78,772.90	$78,773
SUBTOTAL - PRINCIPAL SPILLWAY CONSTRUCTION				$78,773
SUBTOTAL - DAM CONSTRUCTION				$930,043
CLEARING RESERVOIR	AC	4	$1,000.00	$3,700
SUBTOTAL - DAM & RESERVOIR CONSTRUCTION				$980,245
ENGINEERING & CONTINGENCIES (35% DAM & RESERVOIR)				$343,086
TOTAL - DAM & RESERVOIR CONSTRUCTION				$1,323,331
CONFLICTS (RELOCATIONS):				
	LS	1	$0.00	$0
SUBTOTAL - CONFLICTS				$0
ENGINEERING & CONTINGENCIES (35% CONFLICTS)				$0
LAND PURCHASE COSTS	AC	257.3	2,009.0	$516,916
ENVIRONMENTAL STUDIES & MITIGATION COSTS				
CULTURAL RESOURCE STUDY	LS	1	$15,000.00	$15,000
BIOLOGICAL	LS	1	$15,000.00	$15,000
MITIGATION LAND COST	AC	19.9	$2,009.00	$39,979
TOTAL ENVIRONMENTAL COSTS				$69,979
CONSTRUCTION TOTAL				$1,910,226
INTEREST DURING CONSTRUCTION				$182,852
TOTAL COST				$2,093,078

5.0 NRCS Floodwater Retarding Structure Site 17

COST OF NRCS FRS Site 17: Brushy Creek Falls County WCID (Note: All quantities taken from NRCS work plan estimate of construction cost, revised by the NRCS 11-6-1981)

	UNIT	QUANTITY	UNIT COST	COST
MOBILIZATION (5%)	L.S.	1		$37,720
FOUNDATION:				
CUTOFF EXCAVATION	CY	12,428	$2.50	$31,070
CHANNEL CLEANOUT EXCAVATION & FOUNDATION PREPARATION	CY	7,480	$2.50	$18,700
COMPACTED FILL - CUTOFF TRENCH	CY	12,428	$2.50	$31,070
SUBTOTAL - FOUNDATION CONSTRUCTION				$80,840
EMBANKMENT:				
CLEARING AND GRUBBING	AC	7.5	$2,000.00	$15,000
COMPACTED FILL	CY	139,853	$2.50	$349,633
RIP RAP & BEDDING	TON	450	$65.00	$29,250
TOPSOIL & GRASSING	AC	20.00	$4,500.00	$90,000
FENCING	LF	7,020	$4.00	$28,080
SUBTOTAL - EMBANKMENT CONSTRUCTION				$511,963
EMERGENCY SPILLWAY:				
EXCAVATION -EMERGENCY SPILLWAY	CY	34,183	$2.50	$85,458
SUBTOTAL - EMERGENCY SPILLWAY CONSTRUCTION				$85,458
PRINCIPAL SPILLWAY:				
PRINCIPAL SPILLWAY	LS	1	$76,137.13	$76,137
SUBTOTAL - PRINCIPAL SPILLWAY CONSTRUCTION				$76,137
SUBTOTAL - DAM CONSTRUCTION				$754,397
CLEARING RESERVOIR	AC	8	$1,000.00	$7,500
SUBTOTAL - DAM & RESERVOIR CONSTRUCTION				$799,617
ENGINEERING & CONTINGENCIES (35% DAM & RESERVOIR)				$279,866
TOTAL - DAM & RESERVOIR CONSTRUCTION				$1,079,483
CONFLICTS (RELOCATIONS):				
Atmos Energy (1450 LF of both 12" & 20" ga	LS	1	$45,000.00	$45,000
SUBTOTAL - CONFLICTS				$45,000
ENGINEERING & CONTINGENCIES (35% CONFLICTS)				$15,750
LAND PURCHASE COSTS	AC	349.3	2,009.0	$701,744
ENVIRONMENTAL STUDIES & MITIGATION COSTS				
CULTURAL RESOURCE STUDY	LS	1	$15,000.00	$15,000
BIOLOGICAL	LS	1	$15,000.00	$15,000
MITIGATION LAND COST	AC	15.1	$2,009.00	$30,336
TOTAL ENVIRONMENTAL COSTS				$60,336
CONSTRUCTION TOTAL				$1,902,313
INTEREST DURING CONSTRUCTION				$182,095
TOTAL COST				$2,084,407

6.0 NRCS Floodwater Retarding Structure Site 16

COST OF NRCS FRS Site 16: Brushy Creek Falls County WCID (Note: All quantities taken from work plan estimate of construction cost, revised by NRCS 7-7-1987)

	UNIT	QUANTITY	UNIT COST	COST
MOBILIZATION (5%)	L.S.	1		$46,051
FOUNDATION:				
CUTOFF EXCAVATION	CY	21,891	$2.50	$54,728
CHANNEL CLEANOUT EXCAVATION &				
FOUNDATION PREPARATION	CY	9,191	$2.50	$22,978
COMPACTED FILL - CUTOFF TRENCH	CY	21,891	$2.50	$54,728
SUBTOTAL - FOUNDATION CONSTRUCTION				$132,433
EMBANKMENT:				
CLEARING AND GRUBBING	AC	4.1	$2,000.00	$8,200
COMPACTED FILL	CY	169,714	$2.50	$424,285
RIP RAP & BEDDING	TON	450	$65.00	$29,250
TOPSOIL & GRASSING	AC	20.45	$4,500.00	$92,025
FENCING	LF	8,180	$4.00	$32,720
SUBTOTAL - EMBANKMENT CONSTRUCTION				$586,480
EMERGENCY SPILLWAY:				
EXCAVATION -EMERGENCY SPILLWAY	CY	40,602	$2.50	$101,505
SUBTOTAL - EMERGENCY SPILLWAY CONSTRUCTION				$101,505
PRINCIPAL SPILLWAY:				
PRINCIPAL SPILLWAY	LS	1	$100,598.53	$100,599
SUBTOTAL - PRINCIPAL SPILLWAY CONSTRUCTION				$100,599
SUBTOTAL - DAM CONSTRUCTION				$921,016
CLEARING RESERVOIR	AC	20	$1,000.00	$20,000
SUBTOTAL - DAM & RESERVOIR CONSTRUCTION				$987,067
ENGINEERING & CONTINGENCIES (35% DAM & RESERVOIR)				$345,473
TOTAL - DAM & RESERVOIR CONSTRUCTION				$1,332,540
CONFLICTS (RELOCATIONS):				
Atmos Energy (1800 LF of both 12" & 20" ga	LS	1	$55,000.00	$55,000
SUBTOTAL - CONFLICTS				$55,000
ENGINEERING & CONTINGENCIES (35% CONFLICTS)				$19,250
LAND PURCHASE COSTS	AC	458.5	2,009.0	$921,127
(From NRCS Land Rights Work Map - 1986)				
ENVIRONMENTAL STUDIES & MITIGATION COSTS				
CULTURAL RESOURCE STUDY	LS	1	$15,000.00	$15,000
BIOLOGICAL	LS	1	$15,000.00	$15,000
MITIGATION LAND COST	AC	16.9	$2,009.00	$33,952
TOTAL ENVIRONMENTAL COSTS				$63,952
CONSTRUCTION TOTAL				$2,391,869
INTEREST DURING CONSTRUCTION				$228,956
TOTAL COST				$2,620,825

7.0 Recommendations

It is recommended that these costs estimates be used by both the City of Marlin and Falls County WCID to present to the TWDB as a proposal for project funding.

STATE OF TEXAS
RICHARD DEE PURKEYPILE
68027
REGISTERED PROFESSIONAL ENGINEER

Richard Dee Purkeypile 1-4-2008

Richard Dee Purkeypile, P.E., CFM **Date**

City of Temple

Hon. Dale Spurgin, Chairman
Region G Regional Water Planning Group
c/o Trey Busbee
Brazos River Authority
4600 Cobbs Drive
Waco, Texas 76710

May 24, 2010

Dear Judge Spurgin:

We have reviewed the draft Region G report for 2011, and congratulate you and the committee on a very comprehensive and detailed assessment of water needs through the year 2060. Our review has determined that there are some areas which should, in our opinion, be revisited and revised.

1. Treatment Capacity:
The quantity shown for City of Temple treatment capacity in table 4A-22 indicates that the City of Temple can produce 16,800 AF per year. This number was derived by using the capacity of the City of Temple Conventional Treatment Plant which is 30 Million Gallons per day (MGD). The City also has a Membrane Plant which is rated at 11.6 MGD. Apparently this capacity was inadvertently overlooked when the table was created.

We therefore request that the City of Temple Treatment Capacity be adjusted to include the 11.6 MGD available from the Membrane plant. According to our calculations, and using the factors included in the Draft Report, the City of Temple Capacity should be 23,300 AF/Y.

2. Treatment Capacity Calculation:
Regarding the capacity figures, the Draft report utilizes a 50% factor when calculating the potential yield of an entities' water treatment plants. While we agree that utilizing 100% of rated capacity is not a prudent figure, we would submit that the 50% figure is too low to adequately prepare for the future.

My staff has reviewed data from the last 6 years of actual pumped water from our treatment plant and compared the peak day for each of the 6 years to the rated plant capacity of both plants (Conventional= 30 MGD, and Membrane = 11.6 MGD) and we find the data presented in attachment #1. This shows that the City of Temple has averaged operating our plants at 53.96% of our capacity for the last 6 years. If we take the highest 3 years, we find that the city has been operation the plants at 58.92% of capacity.

Based on this analysis, we respectively submit that the City of Temples' rated capacity be adjusted from 50% of rated capacity to 60% of capacity. This will change the figure in table 4A-22 of the draft report from 23,300 AF/Y to 27,960 AF/Y.

Office of the City Manager 2 North Main, Suite 306 Temple, Texas 76501
254.298.5600 (ph) 254.298.5459 (fax)

When using the 27,960 figure in Table 4A-22, the supplies with the existing plant would then be adequate until some time after the year 2040.

3. **Water Availability, short term:**
The Description included in Table 4A-22 begins as follows:

"The City of Temple has contracted with the Brazos River Authority to provide 30,453 acft/yr of raw water and an additional 10,100 acft/yr from a run-of-the-river water right (Certificate of Adjudication C2938). The BRA contract can yield a reliable supply of 28,633 acft/yr ......"

In addition, Paragraph 4C.38.2.1 states "Shortages for the BRA Little River System are based on a comparison of supplies and current contracted commitments."

These comments are very concerning since they clearly show that the City of Temple has, through long range planning, contracted and is paying for adequate raw water to meet the needs of its citizens for a long time into the future; yet, BRA could not deliver all the water contracted for if called upon. The resolution of the issue of paying for current and future water, and how that impacts current and future water planning, is significant and appears to be not adequately addressed in the draft plan. We feel that the resolution of this issue should be discussed in more detail in the 2011 Region G Plan by the BRA. We will be glad to work with the BRA to develop a program to get Temple (and apparently other users) the water which has been contracted for and paid for over many years.

In summary, and based upon our analysis, it would be our position that the City of Temple does not have a shortage of water at least through the 2060 horizon.
We respectfully submit the information contained herein as our comments for the 2011 draft report.

D. Blackburn.
City Manager

Xc: Mayor & City Council
Director of Public Works
Director of Finance
City Attorney
Jerry Atkinson, General Manager, Bell County Water Control & Improvement District #1

From: Eastland Water Supply [mailto:smartin@txbusiness.com]
Sent: Friday, June 25, 2010 2:56 PM
To: Trey Buzbee
Subject: Comments on the Initially Prepared 2011 Brazos G Regional Water Plan

Dear Mr. Buzbee,

Ron Holliday, with the City of Eastland, had recently mentioned to myself and the Eastland County Water Supply District Board that we are the future water supplier for the City of Strawn. I will be very honest in saying that I am not up to date on this issue; however do have several questions.

1. Who would be liable for the projected $5,158,000 cost for being able to supply water to the City of Strawn?

2. If for some reason (the lake level was to low, a break in the raw water line, equipment malfunction at the plant, etc.) would ECWSD be able to shut- off the City of Strawn until the problem was fixed, before they shut-off the City of Eastland or City of Ranger?

3. Would the City of Strawn be held to the same responsibilities as the City of Eastland and the City of Ranger as far as Debt Services?

I appreciate your time in this matter. If you have any question for me you can contact me at 254-647-1320.

Sincerely,

Stephanie Martin
Superintendent
Eastland County Water Supply District

RECEIVED

JUN 02 2010

TWDB

WRITTEN COMMENTS ON THE INITIALLY PREPARED PLAN
SUBMITTED TO THE REGION H WATER PLANNING GROUP

The Region H Water Planning Group welcomes public comment. If you wish to submit written comments, please provide the information requested below and return this form to a consulting team member.

Name: Elaine Sheffield
Affiliation: Iola Cemetery Association
Address: P O Box 374, Iola Texas 77861

713.542.4651 ----- Elaine.sheffield@exterran.com
Telephone Fax E-Mail

Comments: The Iola Cemetery Association held an annual membership meeting on May 1, 2010 and **voted to send a letter of opposition to the proposed Region H. Millican Reservoir.** Enon and Zion Cemeteries have gravesites with tombstones that are dated 1857 forward and many with faded dates are suspected to be dated prior to 1857. This area was populated prior to the 1850's and to erase the memories of loved ones is unforgivable. This area was chosen to be their home through eternity. To move the cemeteries would place an burden on living family members in visiting their loved one's final resting place.

The Iola Cemetery Association opposes the proposed Region H Millican Reservoir.

Date: May 20, 2010 Signed El. Sheffield
Elaine Sheffield
President, Iola Cemetery Association (Zion & Enon Cemeteries)

COMMENT PROVIDED BY:

ERIC SWENSON, WHITE RIVER MWD

2013 APR 22 PM 2: 03
BRAZOS RIVER
AUTHORITY

CEDAR RIDGE RESERVIOR ANALYSIS

We should not spend 285 million dollars, impound 227,000 ac ft of water, and inundate over 6,000 acres of exceptional river bottom unless it is necessary. A review of the facts make it clear that the construction of Cedar Ridge Reservoir is unnecessary.

I. Abilene and Taylor County's Water Balances (See pages 1 and 2.)

A. Raw Water-City of Abilene Balance per Initially Prepared 2011 Brazos G Regional Water Plan

	2010	2020	2030	2040	2050	2060
	(3,954)	(15,430)	(24,320)	(24,331)	(24,051)	(23,694)
Less Nolan County Steam Electric	-1,000	-11,500	-20,000	-20,000	-20,000	-20,000
Abilene Raw Water Balance After Elimination of Nolan County Steam Electric						
New Raw Water Balance	(2,954)	(3,930)	(4,320)	(4,331)	(4,051)	(3,694)

RECEIVED
2013 APR 22 PM 2: 04
BRAZOS RIVER
AUTHORITY

B. Treated Water-City of Abilene Balance per Initially Prepared 2011 Brazos G Regional Water Plan

	2010	2020	2030	2040	2050	2060
	7,033	(7,781)	(7,895)	(7,631)	(7,077)	(6,444)
Restoration of the Grimes Plant Treatment Capacity of 13,440 AC. FT.	0	+13,440	+13,440	+13,440	+13,440	+13,440
Treated Water Surplus Balance	7,033	5,659	5,545	5,809	6,363	6,996

After restoration of the Grimes Plant treatment capacity, there is a significant surplus of treated water for the City of Abilene.

C. Raw Water Taylor County Balance per Initially Prepared 2011 Brazos G Regional Water Plan (See page 3.)

	2010	2020	2030	2040	2050	2060
	(4,059)	(18,271)	(18,411)	(18,180)	(17,656)	(17,055)
Restoration of the Grimes Treatment Capacity of 13,440 AC. FT.	0	+13,440	+13,440	+13,440	+13,440	+13,440
New Raw Water Balance	(4,059)	(4,831)	(4,971)	(4,740)	(4,216)	(3,615)

II. The City of Abilene and Taylor County Water Balances are based on a 2 year safe yield analysis. Without a 2 year safe yield analysis , the City of Abilene and Taylor County would have a raw water surplus.

III. Cedar Ridge Reservoir, according to a report to the City of Abilene prepared by HDR Engineering dated 11/9/09 will, at capacity, impound 227,127 Ac. Ft. of water. (See page 4.) The cost of construction for Cedar Ridge Reservoir will be $285,214,000.00 as per Initially Prepared 2011 Brazos G Regional Water Plan. (See page 5.)

IV. Alternative water sources for the City of Abilene and Taylor County

A. There are large volumes of underground water available near Abilene. The water is of excellent quality and there are willing sellers.

B. The City of Abilene has a contractual right to use 10,900 AC. FT/YR from O.H. Ivie Reservoir. The city can only utilize 6,770 AC FT/YR because of limited treatment facilities. This leaves 4,180 AC FT/YR available for use.

C. The City of Abilene releases approximately 10,000 ACFT/YR of treated effluent down the Clear Fork of the Brazos River. This water can be treated and reused.

D. Eagle Construction Company of Eastland, Texas is the leasehold owner of 11,837 AC FT/YR of water that they acquired with the purchase of the WTU steam powered generation plant located on

Lake Ft. Phantom. (See page 1.) This plant has been "mothballed" for 6 years. They also own senior water rights for an additional 2,500 AC FT, making a total of 14,337 AC FT/YR. Purchase of these water rights by the City of Abilene would provide an abundant supply of water for the City.

E. The City of Abilene has contractual rights to 20,000 AC FT/YR from the Brazos River Authority to remove water from Possum Kingdom Lake. The projected construction cost for the delivery of 12,400 AC FT/YR of treated water from Possum Kingdom Lake to Abilene is $175,876,000.00 according to a report provided to the City of Abilene by HDR Engineering dated 11/9/09. The projected cost of construction for the Cedar Ridge Reservoir, according to the Initially Prepared 2011 Brazos G Regional Water Plan, is $285,214,000.00. The annual cost of operation for the Possum Kingdom treatment and transmission is projected to be $21,969,000.00, according to the City of Abilene report. The annual cost of operation for the Cedar Ridge Reservoir is projected by the Initially Prepared 2011 Brazos G Regional Water Plan is to be $27,297,000.00 (See page 5.).

All of the above alternative water sources are viable options for providing the water demands for Abilene and Taylor County. All of the above options are far more cost effective than the construction of a $285,000,000.00 reservoir.

V. Legitimate Water Needs

A. Population growth for the City of Abilene through 2060 shows a growth rate of 1.8% and a negative growth rate for Sweetwater of -3.6%. (See page 6.)

B. The growth rate for the communities downstream range from a low of 25.8% for Waco to a high of 236% for Round Rock. Bryan appears to be about average with a projected growth rate of 42.2%. (See p.6.)

C. Based on demographics, it is clear that there will be significant water demands made by communities on the Lower Brazos River Basin. It would be a huge disservice and injustice to the residents of Bell, Johnson, Coryell, McLennan, Williamson, Washington, Brazos, Bosque, Burleson, Hill and Robertson Counties to construct an unneeded reservoir. The construction of what will be little more than an evaporation pond containing at capacity 227,000 AC FT of water will potentially deprive these residents of much needed water.

D. Please consider removing Cedar Ridge Reservoir from the Initially Prepared 2011 Brazos G Regional Water Plan.

I realize this is a large amount of information presented in a very short amount of time. If you have any question(s) or if you would like to discuss this matter further with me, please contact me at:

Eric Swenson

Home (806-271-3238) Office (806-271-3301) e-mail (swenson@caprock-spur.com)

Table 4A-16. Wholesale Water Provider Summary City of Abilene

Name/Location: **City of Abilene**

Description: The City of Abilene relies on Fort Phantom Hill Reservoir, and contract water supplies from West Central Texas MWD (Hubbard Creek Reservoir). The City also has a contract with West Central Texas MWD for 16.54 percent (~10,900 acft/yr) of the safe yield of O.H Ivie Reservoir, owned by the Colorado River Municipal Water District. The City currently has facilities to utilize 6,720 acft/yr of the supply from O.H. Ivie.

Projected Demands:

Major Water Contract Holders	*Year (acft/yr)*					
	2010	*2020*	*2030*	*2040*	*2050*	*2060*
City of Abilene	22,891	23,485	23,507	23,181	22,588	21,879
Blair WSC (Taylor C-O)	77	77	77	77	77	77
City of Baird	77	77	77	77	77	77
City of Clyde	307	307	307	307	307	307
City of Lawn (Taylor C-O)	77	77	77	77	77	77
City of Merkel	353	353	353	353	353	353
City of Tye	184	184	184	184	184	184
Eula WSC (Callahan C-O)	61	61	61	61	61	61
Hamby WSC (Taylor C-O)	308	308	308	308	308	308
Hawley WSC	307	307	307	307	307	307
Potosi WSC	307	307	307	307	307	307
Steamboat Mountain WSC	307	307	307	307	307	307
Sun WSC (Taylor C-O)	230	230	230	230	230	230
View Caps WSC (Taylor C-O)	199	199	199	199	199	199
West Texas Utilities	11,837	11,837	11,837	11,837	11,837	11,837
Taylor County Manufacturing	972	1,081	1,177	1,270	1,349	1,462
City of Baird (Recommended Strategy)	260	240	240	240	240	240
Nolan County Steam-Electric (Recommended)	1,000	11,500	20,000	20,000	20,000	20,000
City of Merkel (Recommended Strategy)	128	139	139	132	120	105
City of Potosi (Recommended Strategy)	136	142	141	129	116	104
Steamboat Mountain WSC (Recommended)	55	54	51	43	30	20
City of Tye (Recommended Strategy)	3	6	6	2	0	0
Total Treated Water Demand	27,239	27,941	28,055	27,791	27,237	26,604
Raw Water Only Demand[1]	12,837	23,337	31,837	31,837	31,837	31,837
Total Demand	40,076	51,278	59,892	59,628	59,074	58,441

[1] Raw water demands include West Texas Utilities, Nolan County Steam-Electric.

1.

Table 4A-16 (Concluded)

Name/Location: City of Abilene

Supplies:

Source	Year (acft/yr)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Lake Abilene[1]	0	0	0	0	0	0
Lake Kirby[2]	0	0	0	0	0	0
Lake O H Ivie (Colorado River MWD)[3]	6,720	6,720	6,720	6,720	6,720	6,720
Fort Phantom Hill	9,316	9,082	8,848	8,614	8,380	8,145
West Central Texas MWD (Hubbard)	20,086	20,046	20,004	19,963	19,923	19,882
Treated Supply (Hubbard and Ft. Phantom)[4]	27,552	13,440	13,440	13,440	13,440	13,440
Total Treated Water Supply	34,272	20,160	20,160	20,160	20,160	20,160
Total Raw Water Supply	36,122	35,848	35,572	35,297	35,023	34,747

[1] Lake Abilene is not considered a dependable supply by the City and is currently not used.

[2] Lake Kirby is used primarily to store reuse water for the City's reuse customers. Reuse demands are not included in the water demand projections for the City

[3] Current treatment capacity (desalination) is approximately 6 MGD (6,720 acft/yr).

[4] Supply has been constrained based on average annual capacity of the existing Northeast and Grimes treatment plant for 2010. The average annual capacity is determined as 50% of the normal rated design capacity (49.2 MGD). By 2020, the capacity of the Grimes treatment plant is reduced to zero for a total constrained supply of 13,440 acft/yr.

Projected Balances:

Source	Year (acft/yr)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Treated Water Balance/(Shortage)	7,033	(7,781)	(7,895)	(7,631)	(7,077)	(6,444)
Total Raw Water Balance/(Shortage)	(3,954)	(15,430)	(24,320)	(24,331)	(24,051)	(23,694)

2.

Table C-65
Taylor County
Population, Water Supply, and Water Demand Projections

Population Projection	2000	2010	2020	2030	2040	2050	2060
	126,551	136 370	142 645	145,634	146 529	143 772	139 309

	Supply and Demand by Type of Use	2000 (acft)	2010 (acft)	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)
Municipal	Municipal Demand	39 404	23 731	24 341	24,374	24 037	23 423	22 696
	Contractual Demand	15,492	15 677	15 786	15,882	15,974	16,050	16,161
	Municipal Existing Supply							
	Groundwater	22	22	22	22	22	22	22
	Surface water (Less Contractual Demand)	21,716	19 358	5,772	5,672	5,573	5,488	5 369
	Total Existing Municipal Supply	21 738	19 380	5,794	5,694	5,595	5 510	5,391
	Municipal Balance	(17,666)	(4,351)	(18,547)	(18,680)	(18,442)	(17 913)	(17,305)
Industrial	Manufacturing Demand	789	972	1,081	1,177	1,270	1,349	1,462
	Manufacturing Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	789	972	1,081	1,177	1,270	1,349	1,462
	Total Manufacturing Supply	789	972	1,081	1,177	1,270	1,349	1,462
	Manufacturing Balance	0	0	0	0	0	0	0
	Steam-Electric Demand	31	0	0	0	0	0	0
	Steam-Electric Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	0	0	0	0	0	0	0
	Total Steam-Electric Supply	0	0	0	0	0	0	0
	Steam-Electric Balance	(31)	0	0	0	0	0	0
	Mining Demand	242	285	304	313	322	330	340
	Mining Existing Supply							
	Groundwater	340	340	340	340	340	340	340
	Surface water	0	0	0	0	0	0	0
	Total Mining Supply	340	340	340	340	340	340	340
	Mining Balance	98	55	36	27	18	10	0
Agriculture	Irrigation Demand	174	170	166	162	158	154	150
	Irrigation Existing Supply							
	Groundwater	168	168	168	168	168	168	168
	Surface water	241	239	238	236	235	233	232
	Total Irrigation Supply	409	407	406	404	403	401	400
	Irrigation Balance	235	237	240	242	245	247	250
	Livestock Demand	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Livestock Existing Supply							
	Groundwater	0	0	0	0	0	0	0
	Surface water	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Total Livestock Supply	1,305	1,305	1,305	1,305	1,305	1,305	1,305
	Livestock Balance	0	0	0	0	0	0	0
Total	Municipal & Industrial Demand	40,466	24,988	25,726	25,864	25,629	25,102	24,498
	Existing Municipal & Industrial Supply							
	Groundwater	362	362	362	362	362	362	362
	Surface water	22,505	20,330	6,853	6,849	6,843	6,837	6,831
	Total Municipal & Industrial Supply	22,867	20,692	7,215	7,211	7,205	7 199	7,193
	Municipal & Industrial Balance	(17,599)	(4,296)	(18 511)	(18,653)	(18,424)	(17,903)	(17,305)
	Agriculture Demand	1,479	1,475	1,471	1,467	1 463	1 459	1,455
	Existing Agricultural Supply							
	Groundwater	168	168	168	168	168	168	168
	Surface water	1,546	1,544	1,543	1,541	1 540	1 538	1,537
	Total Agriculture Supply	1,714	1,712	1,711	1,709	1,708	1,706	1,705
	Agriculture Balance	235	237	240	242	245	247	250
	Total Demand	41,945	26,463	27,197	27,331	27,092	26 561	25,953
	Total Supply							
	Groundwater	530	530	530	530	530	530	530
	Surface water	24 051	21 874	8 396	8,390	8,382	8,375	8,368
	Total Supply	24,581	22,404	8,926	8,920	8,912	8 905	8,898
	Total Balance	(17,364)	(4,059)	(18,271)	(18,411)	(18,180)	(17,656)	(17,055)

3.

UPDATED SIZE OF CEDAR RIDGE RESERVOIR

	Conservation Pool Elevation (ft-msl)	Surface Area (acres)	Capacity (ac-ft)	Average Depth (ft)
Original Dam Site	1,430	6,190	310,383	50
New Dam Site	1,489	6,635	227,127	34

- Conservation Pool Elevation at new dam site based on not significantly increasing flood levels in the Lueders area.

4

Table 4B.12-1.
Summary of New Reservoir Yield and Costs[1]

Reservoir	Yield (acft/yr)	Total Project Cost	Total Annual Cost	Unit Cost per acft	Unit Cost per 1,000 gallons
Cedar Ridge	23,380 (safe)	$285,214,000	$27,297,000	$1 168	$3 58
South Bend	64,500	$422,715,000	$31,314,000	$485	$1 49
Throckmorton	1,500 (safe)	$28,254,000	$2,086,000	$1,391	$4.27
Double Mtn. Fork (West)	34,775 (safe)	$151,456,000	$11,611,000	$334	$1.02
Double Mtn. Fork (East)	36,025 (safe)	$211,373,000	$16,132,000	$448	$1 37
Turkey Peak	7,600 (safe)	$50,227,000	$7,019,000	$924	$2.83
Little River (310 ft-msl)	71,275	$331,705,000	$23,349,000	$328	$1.01
Little River (330 ft-msl)	119,940	$556,520,000	$39,293,000	$328	$1.01
Millican-Bundic	36,990	$720,224,000	$52,951,000	$1,431	$4.39
Millican-Panther Creek	194,500	$1,727,482,000	$120,209,000	$618	$1.90
Gibbons Creek	3,870	$12,140,600	$918,723	$237	$0.73
Brushy Creek	2,090	23,463,000	1,630,000	$780	$2.39

[1] Costs shown are for raw water at the reservoir except where noted in the detailed strategy write ups.

5.

Table 1-2.
Population of Major Cities in the Brazos G Area
(Greater than 10,000 People in 2000)

City	County	Population Data[1]			% Change
		2000	2010	2060	(2010 to 2060)
Rolling Plains					
Abilene	Jones, Taylor	115,926	124,607	126,835	1.8
Copperas Cove	Coryell	29,455	34,762	57,765	66.2
Gatesville	Coryell	15,591	19,637	37,177	89.3
Mineral Wells	Palo Pinto	14,770	15,074	19,901	32.0
Stephenville	Erath	14,921	15,959	23,462	47.0
Sweetwater	Nolan	11,415	11,955	11,525	-3.6
IH-35 Corridor					
Belton	Bell	14,623	17,633	26,116	48.1
Burleson[2]	Johnson	17,514	27,206	52,747	93.9
Cedar Park[2]	Williamson	25,508	58,665	108,018	84.1
Cleburne	Johnson	26,005	30,572	52,812	72.7
Fort Hood	Bell, Coryell	33,711	33,711	33,711	0.0
Georgetown	Williamson	28,339	49,112	163,453	232.8
Harker Heights	Bell	17,308	23,869	44,407	86.0
Hewitt	McLennan	11,085	12,667	19,170	51.3
Killeen	Bell	86,911	113,217	184,064	62.6
Round Rock[2]	Williamson	60,060	104,696	351,804	236.0
Taylor	Williamson	13,575	17,935	35,065	95.5
Temple	Bell	54,514	62,382	105,519	69.1
Waco	McLennan	113,726	121,355	152,715	25.8
Lower Basin					
Brenham	Washington	13,507	14,313	16,844	17.7
Bryan	Brazos	65,660	74,650	109,881	47.2
College Station	Brazos	67,890	80,920	131,981	63.1
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]

June 8, 2010

Honorable Mark Evans, Chair
Region H Water Planning Group
c/o Reed Eichelberger
San Jacinto River Authority
P.O. Box 329
Conroe TX 77305-0329

Subject: 2011 Region H Water Plan

Dear Judge Evans:
The Galveston Bay Foundation would like to thank the Region H Water Planning Group for its efforts in seeking solutions to provide water for people and the environment in this region. On behalf of the Galveston Bay Foundation Board of Trustees and members, we are providing comments on the *2011 Initially Prepared Plan*.

The mission of the Galveston Bay Foundation, a 501(c)(3) non-profit organization founded in 1987, is to preserve, protect, and enhance the natural resources of the Galveston Bay estuarine system and its tributaries for present users and for posterity.

Not only does Galveston Bay produce more oysters than any other single water body in the country, as well as a third of the recreational and commercial fishing revenues in the state, it is also important for local jobs and for our quality of life. Our bay provides immense recreational and ecotourism opportunities such as birding, kayaking, and canoeing. Protecting vital freshwater inflows to Galveston Bay, as well as protecting instream flows in its tributaries is key to the continued health and productivity of Galveston Bay. These inflows help produce a range of salinities in the bay that is unique and characteristic to Galveston Bay and provide inputs of beneficial nutrients and sediments. In short, freshwater inflows are the life blood of our estuary.

We acknowledge the planning group's challenging mission to balance future water demands and its efforts to identify major water strategies to meet those demands. We offer the following comments in the spirit of improving the plan's ability to provide for the environmental needs of Galveston Bay and its tributaries while still providing for human needs:

1. The Galveston Bay Foundation commends the efforts of the planning group to preserve freshwater inflows into Galveston Bay by adopting the work of the Galveston Bay Freshwater Inflows Group (GBFIG). However, we believe that the Region H Water Plan should consider taking its freshwater inflow targets from the freshwater inflows standards to be developed by June 2011 by the Texas Commission on Environmental Quality as mandated by Senate Bill 3. The expert science and

stakeholder-driven Senate Bill 3 effort began in 2008 and built upon the work of the GBFIG by using more recent best available science. The Senate Bill 3 environmental flows allocation process may produce more protective standards than the GBFIG recommendations. The effort to develop environmental flows standards for Trinity and San Jacinto Rivers and Galveston Bay is in the end phase and, pending rule-making action by the TCEQ, we feel it would be an opportunity lost to not consider utilization of the Senate Bill 3 process results and instead wait another five years for the next water planning cycle to consider them.

The Galveston Bay Foundation must include the caveat that Region H take this course of action only if the resulting standards are based on the environmental flows developed from the recommendation of the "Regime Group" of the Trinity and San Jacinto Rivers and Galveston Bay Area Stakeholder Committee (BBASC). The Galveston Bay Foundation feels these recommendations meet the minimum requirements of an environmental flow regime as defined by Senate Bill 3.

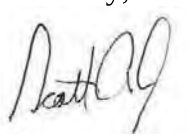
2. Water conservation goals and their implementation should be greatly increased in our region. The Galveston Bay Foundation is particularly concerned that water conservation goals for municipal water use in the Houston and Dallas metropolitan areas are inadequate. Robust municipal water conservation initiatives (more aptly named water efficiency initiatives), such as those that have been successfully implemented in the City of San Antonio – reducing per capita use of water use by 30% from 213 gallons per day in 1984 to 149 gallons per day in 2000 – could postpone or eliminate the need for costly and potentially environmentally damaging strategies such as reservoir construction and interbasin transfers of water.

   Construction of reservoirs results in the destruction of our quickly disappearing riparian habitat. Interbasin transfers harm donor basin environmental flows and results in the destruction of habitat in both donor and recipient basins as a result of conveyance construction. Aggressive water conservation efforts could result in an adequate supply of water for people and environmental flows that maintain a sound ecological environment in Galveston Bay, the Trinity River, and the San Jacinto River.

3. We commend the planning group's efforts to designate eight streams in the region as ecologically significant. We encourage the inclusion of additional appropriate streams and stream segments in the future.

Thank you for the opportunity to provide comments. Please contact me at (281) 332-3381 x209 should you have any questions.

Sincerely,



Scott A. Jones
Environmental Policy and Outreach Specialist
The Galveston Bay Foundation

cc: J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin TX 78711-3231

• 17330 Highway 3, Webster, TX 77598 • Phone 281-332-3381• Fax 281-332-3153•

RECEIVED 4-8-10

APR 09 2010

TWDB

J. Kevin Ward

I Am A 58 year old soon to be Retired Carpenter that has my home And 71 Acres in Walker County, That would be submerged by the Proposed Bedias Reservoir. My land And Family Are my Life. I have worked And saved And worked some more to be Able to live in such A beautiful place. A lot of blood, sweat & tears Not to mention money has been poured into this Land. My children have learned the cycles of life And Nature gardening, hunting, fishing Learning to Appreciate And Respect the Natural world. I was planning on my grandkids having that opportunity someday along Bedias Creek And this 71 Acres.

Surely there is A better way to provide the people of Houston with water than to take peoples Land that they Love And is Home. Please find another way And do not build Bedias Reservoir!

Sincerly,
Glen Roe
97 J.C. Walker Loop
Bedias, TX. 77831

RESOLUTION

WHEREAS, Grimes County recognizes the importance of the need to plan for future water requirements to meet the projected growth within Region H and throughout the State of Texas;

WHEREAS, Grimes County recognizes the many factors and challenges involved in developing a comprehensive water plan to provide for future water requirements;

WHEREAS, Grimes County supports many of the recommendations contained in the proposed 2011 Region H Water plan that if implemented will materially increase the future water supply in the Region;

WHEREAS; the proposed Region H Water Plan includes the proposed Millican Reservoir and recommends it's designation as a unique reservoir site by the Texas Legislature;

WHEREAS; the designation of the Millican Reservoir as a unique reservoir site most likely will have a negative impact on land values, farming/ranching operations, wild life habitat/management, minerals, public facilities, State and County highways and roads and the tax base of Grimes and surrounding counties;

WHERAS; the location of the proposed reservoir dam has not been identified and no in-depth study has been conducted to assess the total impact the designation/construction of Millican Reservoir would inflict on the affected area;

WHEREAS; the proposed Millican Reservoir would have no economic value to Grimes County as under the proposed plan it would act as a holding reservoir to supply projected water requirements for the Gulf Coast Area and not suitable for recreational use;

NOW THEREFORE, BE IT RESOLVED BY THE COMMISSIONERS' COURT OF THE COUNTY OF GRIMES, TEXAS that it is the opinion of the Court that, sufficient information has not been developed to determine the total impact the designation of the proposed Millican Reservoir as a unique site will have on the affected areas and BE IT FURTHER RESOLVED THAT by adoption of this resolution COMMISSIONERS' COURT OF GRIMES COUNTY, TEXAS opposes the inclusion of a recommendation in the Region H Water Plans that the proposed Millican Reservoir be designated as a unique reservoir site by the Texas Legislature and be removed from the Region H Plan and the Brazos G Plan and replaced with an alternative recommendation.

Passed and approved this 27 day of April 2010.

Betty Shiflett
Betty Shiflett
Grimes County Judge

John Bertling
John Bertling, Pct #1

Betty Pendley
Betty Pendley, Pct # 2

Julian Melchor Jr.
Julian Melchor, Pct # 3

Pam Finke
Pam Finke, Pct #4

ATTEST:
David Pasket
David Pasket

RECEIVED 2010 JUN 24 AM 10:28 BRAZOS RIVER AUTHORITY

Guardians of the Navasota River

(281) 703-8205 PO Box 76 ☆ Kurten, Tx 77862

Mark Dudley, President
Dennis Rother, Vice President
Catherine Cox, Secretary
Angie Howard, Treasurer

June 23, 2010

Trey Buzbee
Region G Water Planning Group
c/o Brazos River Authority
PO Box 7555
Waco, TX 76714

Dear Mr. Buzbee,

We have attached a petition of over 1,600 signatures of concerned citizens requesting that you remove the Millican Reservoir projects from the Region G water development plan for 2011. We have signed this petition to let our desires be known to the Region H, Region G, and the Texas Water Development Board.

We, the citizens of Brazos, Grimes, Robertson, Leon, and other counties of Texas, oppose the construction of the Millican Reservoir (Panther Creek and Bundic sites) and respectfully request that you remove all references to the Millican Reservoir project as a recommended water management strategy or unique reservoir sites from the 2011 Regional Water Plan. The effects of designating Millican a unique reservoir site, and the potential effects of constructing this reservoir, are very serious and would impact the wide array of Texas citizens in Brazos, Grimes, Robertson, Leon, and other counties. These impacts have not been analyzed nor discussed with the various stakeholders. Our research shows that there are other methods that could be less costly and would have fewer negative impacts.

Guardians of the Navasota River offers its help in designing a plan that will meet the needs of the people of Regions G and H without the socioeconomic impacts that building Millican would bring to our area. Please feel free to contact us if you have any questions or would like to discuss other ways we can all be successful in building a Texas we can be proud of for the future.

Sincerely,

Mark Dudley

Mark Dudley
President

Petition:

Date:

Subject: Removal from consideration <u>any</u> attempt to place a reservoir <u>anywhere</u> on the Navasota River

Must have by April 20 to take to Waco.

We, the individuals and organizations from Brazos, Grimes, Leon, Madison and other counties listed below, are opposed to the proposed Millican Reservoir because of the environmental and social impacts.

Signature	Printed Name	Address	E-Mail/Phone (optional)
[signature]	John F. DeMille	5002 Singing Breeze Ln Anderson TX	936 873 5027
Rosa L. DeMille	Rosa L. DeMille	5002 Singing Breeze Anderson TX	936-873-5027
[signature]	[signature]	P.O. Box 491 Anderson TX 77830	(979) 220-2539
[signature]	MIKE GRAY	6025 CR 302	(936) 894-3580
Marylin Warren	MARYLIN WARREN	5002 Singing Breeze	979-422-3072
[signature]	Art Morales	1609 N Texas Ave	979 778 2365
Billy Sessions	Billy Sessions	1609 N Texas Ave	979-778-2365
TAMMY BURNS	TAMMY BURNS	10430 County Road 174	979-224-0918
John A DeMille	John A DeMille	5002 Singing Breeze	979 422-0823
VIGUET	VIGUET	College Station TX	979.777.8857
Keri Isbell	Keri Isbell	11141 CR 175 Iola TX 77861	936 394-3812
[signature]	JOE BURNS	10430 CR 174	979 224 0917 TEP4659 @ YAHOO
[signature]	JOHN STOUT	6124 CR 190	JSTOUT@MARINERCONSULT.COM
W.R. Faulk	W. R. Faulk Jr	1873 CR 190 And.	936-873-9940
[signature]	PARSONS JONATHAN C	15230 CR 229 Shiro, TX 77876	
A. Hirsch	A. Hirsch	7904 CR 171 Anderson TX 77830	
CW Braned	CW BRANED	11262 Debbie LN IOLA TX 77861	281-536-8326
Randy Richardson	Randy Richardson	8871 County Rd 174 Anderson, TX	936-873-9989
Theresa Gray	Theresa Gray	6025 CR 302 Navasota TX	936-894-3580
Mark Eth	Mark Ethridge	4541 NE Stallings Dr. Apt #314 Nac TX 75965	
John Olden	John Olden	2088 Olden Ln. College Station TX	

The remainder of the petition signatures are not included in this document,
but can be viewed at:

www.brazosgwater.org

BRAZOS G
WATER PLANNING GROUP

BRAZOS RIVER AUTHORITY, Administrative Agent
P.O. Box 7555 ט Waco, Texas 76714-7555
(254) 761-3100 ט Fax (254) 761-3204

DATE: March 15, 2010

TO: ALL INTERESTED PARTIES AS FOLLOWS:

- Each mayor of a municipality with a population of 1,000 or more or which is a county seat that is located in whole or in part in the Region G Water Planning Area;
- Each county judge of a county located in whole or in part in the Region G Water Planning Area;
- Each special or general law district or river authority with responsibility to manage or supply water in the Region G Water Planning Area based upon lists of such water districts and river authorities obtained from Texas Commission on Environmental Quality;
- Each retail public utility, defined as a community water system, that serves any part of the Region G Water Planning Area or receives water from the Region G Water Planning Area based upon lists of such entities obtained from Texas Commission on Environmental Quality; and
- Each holder of record of a water right for the use of surface water the diversion of which occurs in the Region G Water Planning Area based upon lists of such water rights holders obtained from Texas Commission on Environmental Quality.

FROM: **BRAZOS G REGIONAL WATER PLANNING GROUP**

RE: Public Hearing Notice for the:
Initially Prepared 2011 Brazos G Regional Water Plan

PUBLIC NOTICE

Notice is hereby given that the Brazos G Regional Water Planning Group (BGRWPG) is requesting public review and comments on the ***Initially Prepared 2011 Brazos G Regional Water Plan (2011 IPP)***. The ***2011 IPP*** updates the 2006 Brazos G Regional Water Plan that was included in the 2007 State Water Plan prepared by the Texas Water Development Board (TWDB).

Comments;
How many agency do we really need
- Water district - corp of Engr, - Brazos River
Authority - austin, Texas Bureau ????
Texas Water Commission Lawyer, etc - etc etc.

Hodge Properties

J. Calvin Hodge
H.C. 64 Box 249
Clifton, TX 76634

JO TX 766
RIO GRA E DISTRICT
29 MAR 2010 PM 2 T

Mr. Trey Buzbee
c/o Brazos River Authority
P.O. Box 7555
Waco, Texas

76714-7555

7671447555

RECEIVED
APR 26 2010
TWDB

To: Texas Water Board / Region H.
From: John Crise Knotts.

I am writing in regard to the Millican Reservoir as proposed by Region H and its consultants. On behalf of my extended family of four generations, all other landowners in the flood zone and the businesses in the area

We oppose the Millican Reservoir.

As you have heard at the public meetings on this issue there are thousands of individuals, families, landowners, business owners etc that will be negatively effected by this reservoir. Even though this dam and the flooding of the Navasota River (our west property line) would not happen for some time 20-30 yrs we have enough experience with projects like this one to know that our property value, all future construction plans, & future livelihood's will began to be effected now. We also know there will not be any lake front property to look forward to. Those who have any land left after the water rises to its pool level of approx. 250 ft above sea level will not have direct access to the water for any private development. The flood easement another issue will rob us of lake front property. On an engineering level, the Navasota River is a bad idea. Wide, Flat and silt filled. The reservoir would have a short life and costing too much for too little. I will be writing more on this issue soon.

John C. Knotts.

MEMORANDUM

May 29, 2010

TO: The Honorable Governor Rick Perry, James E. Herring, Jack Hunt, Thomas Weir Labatt III, Joe M. Crutcher, Edward G. Vaughan, Lewis H. McMahan, J. Kevin Ward

FROM: Judy Greer, Citizen of Texas

It is the stated mission of the Texas Water Development Board "to provide leadership, planning, financial assistance, information and education for the conservation and responsible development of water for Texas."

It is my impression that the organization, as it evolved, has become very powerful and is extremely well funded by the taxpayers of Texas.

As an agency of the State Government I am sure that the leadership of the Board places high priority on the interest of the citizens of the State – all citizens – not just the ones who have chosen to live in densely populated cities.

Representation of a diverse and broad electorate is an honorable position. As a citizen I am respectfully requesting that I be provided documentation that will illustrate the range of potential projects that the Board has investigated to provide for the future needs of the densely populated regions of our State. I assume that this documentation will clearly demonstrate why one method has been chosen over another. I would also like to see your documentation of how costs of projects have been projected, including costs to the tax bases of all citizens affected by potential projects.

On the Texas Water Development Board website there is a Biennial Report on Seawater Desalination dated December 2006. Apparently the Honorable Governor, Rick Perry, spearheaded a desalination pilot project. I believe that this initiative began in approximately 2002 and the report mentioned above makes reference to it being a second report. There is, however, no subsequent report. I have also looked at the websites for the cities of Brownsville, Corpus Christi and Freeport that are mentioned as sites in the report. There is **no** evidence to suggest that they are using a desalination process to obtain water or that one is in the works.

Per the documentation from your website: "In response to this directive, TWDB funded $1.5 million for three feasibility studies to assess the technical viability of proposed seawater desalination projects for the Lower Rio Grande Valley—Brownsville, City of Corpus Christi, and Freeport areas. In 2004 TWDB submitted its initial biennial report on seawater desalination to the Texas Legislature. In this report, TWDB recommended continuing the seawater desalination demonstration initiative and identified seawater desalination pilot plant studies as the next step in the development of the proposed Brownsville, Corpus Christi, and Freeport area projects. The 79th Texas Legislature appropriated funds necessary for TWDB to pursue the **pilot plant** study initiative." Therefore, I would appreciate an update on this, also.

You are welcome to e-mail this information to me at scribes02@yahoo.com or mail it to me at 3712 Sunnybrook Lane, Bryan, Texas 77802. I look forward to receiving this in the very near future.

Executive Administrator J. Kevin Ward
TWDB
1700 N. Congress Ave
Austin, TX 78701
Telephone: (512) 463-7847 (512) 463-7847
Fax: (512) 475-2053
E-Mail: info@twdb.state.tx.us

Mailing address:

Mailing Address: Texas Water Development Board
Stephen F. Austin Bldg.
P.O. Box 13231
Austin, Texas 78711-3231

Gov Rick Perry first proposed desalination development in 2002 – first project reportedly (according to documentation on the TWDB website) was to in Brownsville, Texas.
In 2003, the 78th Texas Legislature directed TWDB to undertake necessary steps to further the development of cost-effective water supplies from seawater desalination in the state. In response to this directive, TWDB funded $1.5 million for three feasibility studies to assess the technical viability of proposed seawater desalination projects for the Lower Rio Grande Valley—Brownsville, City of Corpus Christi, and Freeport areas.
In 2004 TWDB submitted its initial biennial report on seawater desalination to the Texas Legislature. In this report, TWDB recommended continuing the seawater desalination demonstration initiative and identified seawater desalination pilot plant studies as the next step in the development of the proposed Brownsville, Corpus Christi, and Freeport area projects. The 79th Texas Legislature appropriated funds necessary for TWDB to pursue the pilot plant study initiative.

The Texas Water Development Board's (TWDB) mission is **To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas.** Our mission is a vital part of Texas' overall vision and its mission and goals which relate to maintaining the viability of the state's natural resources, health and economic development.
To accomplish its goals of planning for the state's water resources and for providing affordable water and wastewater services, the TWDB provides water planning, data collection and dissemination, financial assistance and technical assistance services to the citizens of Texas.
The tremendous population growth that the state has and will continue to experience, and the continual threat of severe drought, only intensify the need for the TWDB to accomplish its goals in an effective and efficient manner. The following links provide more information about the TWDB.

Board Members of the Texas Water Development Board

Office of the Governor
P.O. Box 12428
Austin, Texas 78711-2428

Delivery Address

Office of the Governor
State Insurance Building
1100 San Jacinto
Austin, Texas 78701

Executive Administrator J. Kevin Ward
TWDB
1700 N. Congress Ave
Austin, TX 78701

Texas Water Development Board
Lewis H. McMahan, *Member*
Stephen F. Austin Bldg.
P.O. Box 13231
Austin, Texas 78711-3231

Brownsville Public Utilities Board
John S.. Bruciak, General Manager & CEO
P. O. Box 3270
Brownsville, Texas 78523-3270

Paul Brannon
2103 Truman Street
Bryan, Texas 77801

June 1, 2010

Hon. Mark Evans
Chair, Region H Water Planning Group
c/o San Jacinto River Authority
P.O. Box 329
Conroe, TX 77305-0329

Greetings -

It is absurd that you are even considering designating the Navasota River as a unique site for a reservoir. You continually state that you are just a planning board. In my opinion, you fail miserably in the planning stage.

To plan, one must gather all information available to make an informed recommendation. It seems that you lifted the Millican Reservoir plans from past Brazos G Water Planning Districts' historical documents. What you did not do was look at all of the additional information which negated the designation of the Navasota River as a Unique Reservoir site. Environmental studies, sociological studies, and feasibility studies were apparently ignored in your so called "plan." The "plan" suggests that property be compensated at values from years ago which do not reflect the current prices. The designation of a "Unique Reservoir site" would devastate local economies and ruin peoples' lives. This is all because of a very poor job of planning by the Region H Water Planning Board.

Given the historical significance of the Navasota River, the ecological significance of the Navasota River, and the sociological significance of the Navasota River, your recommendation should have been made for a historical river.

However, the fact that there is no Conservation Board in Region H nullifies the capability for you to "plan" to take water from anyone else. The greater Houston area probably wastes more water than it would be taking anyway. Get your own house in order before you come to take what is not yours.

Paul Brannon

Paul Brannon
Bryan, Texas
979-422-2252

cc: J. Kevin Ward
Executive Administrator
Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

BRAZOS G
WATER PLANNING GROUP

Public Hearing Comments

April 21, 2010

Dale: At this time, we're going to move on to agenda item number three, the public hearing on the initially prepared 2011 Brazos G Water Regional Plan. Trey, do you know if we have anybody in the overflow rooms?

Trey: I'll check.

Dale: At this time, we will open the public hearing and take public comment on the initially prepared 2011 Brazos G Regional Water Plan. Please take note that all oral comments received today will be addressed in the final 2011 plan, and also all written comments received during the public comment period that ends at 5:00 p.m. on Friday, June 25, 2010 will also be addressed in the final 2011 plan. Your oral comments today will be limited to five minutes per person, and preregistration is required. I have received several request to speak forms. If you would like to speak and you have not filled one of those forms out, someone will assist you in preparing that and getting it turned in. Trey will be our official timekeeper. He has a very high tech signaling system up there. I think he will hold up a sign at three minutes and five minutes. We went all out for that today. But we do ask that because this public hearing is being recorded and will be available on the website, that we ask when you come up to the microphone to state your full name, the entity you represent, and the location where you live, and what item in the initially prepared plan you're commenting on. And I may have to stop you and remind you of that, if I don't forget about that portion of it. But we do want to have a way to identify who you are in this process. Because we have a pretty large group here, my plan is to announce who is speaking, and call you up to the microphone, and also announce who will be next in line so that you'll be ready to make your way to the microphone in a timely manner, and we'll move this process along. We have two microphones that are available today. We have the one on the stand that basically is set up for our public comment, but if you have some documents, or something along that line that you need to place on the podium, you can also move over there to the podium and we'll stand that microphone up over there. Whatever you're more comfortable with. So at this time, we're going to open the floor for public comments. And the purpose of this is to receive your public comments. We appreciate you being here today. The planning group will not have the opportunity to ask you any questions or have any discussion about what you say today, but it's very important that we know where you're from, that if there's a follow-up question based upon your comments, that our technical consultants can get in contact with you based on your information. And so at this time, I will go ahead and call State Representative Fred Brown to the front, please. And Joe Cunningham, you will follow the State Representative. And Representative, I'll just remind you of who you are, entity, and all that other good stuff.

Brown: Yes, sir. Mr. Chairman, members, I want to thank you first for your commitment to the state of Texas, and I know that the position you hold isn't always the most comfortable, but I know that you look out for the best for the state of Texas, and I appreciate the time that you put in for that. That being said, Chairman, I sent you a letter, I guess last week, that kind of said what all my constituents are saying in District 14. Oh, I'm State Representative Fred Brown, District 14, which is most of Brazos County. I noticed just a minute ago, when you were showing the plan up there, and you were showing the use of College Station, that this was important to the city of College Station. I just had a phone call two nights ago from the mayor of College Station, and he said that they are definitely against the plan. I think the Brazos County Commissioners are taking that up on their agenda next week. The College Station Chamber of Commerce is against the plan. And let me read, if I could, the letter that I sent you, Mr. Chairman, last week. Please accept this letter of opposition to the proposed damming of the Navasota River. After speaking with my constituents on this issue, I feel it is a land grab that provides no benefits whatsoever to the Bryan-College Station area. As you know, the proposed plan would take 71,000 acres from Madison, Grimes and Brazos Counties. Region H has also proposed designating the lands required for use as unique reservoir sites, meaning no future growth or development of the Bryan-College Station area can take place in these lands. The Bryan-College Station area is one of the fastest growing metropolitan areas within the state of Texas, and restricting the growth of this area will not only hurt the land owners, but it'll hurt future businesses interested in moving into the area. With our economy in its current state, tampering with land in areas that may soon be needed to house growth and development is simply unacceptable. Also, by designating these lands unique, the lands within the affected areas are rendered useless. This essentially craters land values, as no one wants to buy land that is not usable. In addition to the economic effects that would be felt by the residents of the impacted areas, the wildlife that would be lost could never be replaced. The Navasota River Valley is home to an abundance of wildlife, and the destruction of this natural habitat would result in the loss of many of the plant and animal life that make our area so beautiful. While I understand that the projected increase in the Texas population demands an increase in the future water supply, I must object to the destruction and property intrusion that the proposed plans for the Millican Reservoir will create. In addition to that, you know it seems strange to me that this whole thing centers around shipping water to Houston. Now I'm sure we like people in Houston, but we like to take care of our own. We think that's a lot more important. And there's a lot of alternatives to taking care of water needs for the people of the city of Houston. So with that, I request that you take my comments into consideration, and thank you for the time today.

Dale: Thank you very much. At this time, I have Joe Cunningham, and the next person following Joe will be Nancy Bufkin. Mr. Cunningham.

Cunningham: I am Joe Cunningham, the President of the Board of Directors of the Aquila Water Supply District. That's primarily Hill County. I live in Hillsboro. The Aquila Water Supply District is a governmental entity with an elected board of directors. The district is the wholesale supplier of water to the city of Hillsboro and five rural water supply corporations in Hill County. As a supplier of about one-half of the water needs of Hill County, the district is very interested in planning for future water needs. In letters to the Brazos G Regional Water Planning Group in 2000, 2004 and 2009, the district expressed its concern about the population projections for Hill County, and the projections for the future availability of water for the area served by the district. We do not agree with the population projections, and the water supply and use projections in the draft of the initially prepared 2011 water plan. We understand that the population figures used in the plan were mandated by the Texas Water Development Board. And during the next planning cycle, we request that we be given enough notice of the population projections to object, if we disagree with the projections mandated by the Water Development Board. We believe that the projected supply of water in Lake Aquila that is used in the draft plan is too optimistic and that more realistic figures should be used. We appreciate your consideration of our concerns. We hope you understand that we must take every opportunity to have our concerns heard about an issue that is important for the future of all of us. And we plan to submit a written statement for inclusion in the plan that is submitted to the Texas Water Development Board. Thank you very much.

Dale: Thank you, Joe. We appreciate your comments. Has Nancy Bufkin come into the room? I think she was in the overflow room. I'm going to go ahead and move forward to the next speaker, and we'll come back to Nancy. Eric Swenson. Mr. Swenson, I remind you to give us your name, your location, if you represent someone and what you wish to speak about.

Swenson: Thank you, Mr. Chairman. My name is Eric Swenson. I live in Spur, Texas for over 20 years. I have been a member of the White River

Municipal Water District which supplies water for four South Plains communities, and so I am acutely aware of the challenges that face each of us each day in assuring that our communities have an adequate water supply. However, I think it is unwise to construct reservoirs when no need can really be demonstrated. Such a construction is simply a terrible waste of resources. The numbers that you see on this handout that I've given you have been taken largely from your report or from a report prepared by HDR for the city of Abilene. The first thing I would call your attention to is the raw water needs for the city of Abilene. Previously, there was 20,000 acre feet allocated for the Tenaska plant that, as I understand it, has now gone away, so this significantly reduces the raw water need for the city of Abilene. Secondly, on the second page, looking at the treated water need for the city of Abilene, this is kind of a deceiving figure. It's showing a deficit; however, this deficit is being created by the fact that the Grimes Treatment Plant goes off line between 2010 and 2020. This is not a supply problem, this is simply a treatment problem. And by the rebuilding of the Grimes plant, or one similar, actually I think it's very important that we notice that the city of Abilene has an actual surplus of treated water. Lastly, in looking at Taylor County, we have the same situation with the Grimes Treatment Plant. If you add that back in, then you see that the raw water needs for Taylor County are fairly minimal. I think it's very important that we mention here that these needs are based upon a two-year safe yield. I'll not spend time explaining that, but I understand that each of you are familiar with that. And what it basically does is to create some artificial numbers. These are not real needs. One of the city fathers at Abilene said to me about 60 days ago, he said, "We got into this project and we realized the city of Abilene simply has no water need." And so we had Scott Hibbs apply for us, and we were able to obtain a two-year safe yield designation. And much to our dismay, as a practical matter, we still don't have a water need for the city of Abilene. I'm going to get away from my written comments here, because an event occurred yesterday that I want to share with this planning board. As you notice that there are several alternatives for water for the city of Abilene, other than the construction of Cedar Ridge, the city of

Abilene discharges approximately 10,000 acre feet a year of a treated affluent down the Brazos River which certainly could be used, and retreated and used. There is an abundance of ground water – I know, Mr. Chairman, you are familiar with this – that is available. There are willing sellers and this water is of high quality. Yesterday I visited with Mr. Mark Walraven, who is the general council for Eagle Construction Company located in Eastland, Texas. Mr. Walraven asked me to say publicly at this meeting today that they own approximately 14,000 acre feet of water in Fort Phantom Lake. This is associated with the old WTU Mothball Plant there. These water rights are now owned by Eagle Construction Company. And Mr. Walraven has asked me to say publicly at this meeting today that Eagle Construction Company is eager to discuss and negotiate the sale of these water rights to the city of Abilene. And he asked me specifically to relate that to any officials representing the city of Abilene who might be here today. Mr. Chairman, the purchase of these water rights effectively takes care of any potential water needs that the city of Abilene might have. It really eliminates the need for the construction of Cedar Ridge Reservoir. I'd ask you to look at the last page of this handout. It's page six. I probably really don't need to speak to this. It simply demonstrates that the city of Abilene and the city of Sweetwater have very minimal population growth projected through 2060. There are communities downstream who project significant population growth, who will have a legitimate need for this water, and it would simply be an injustice to these people, to the folks in College Station and the folks in Hillsboro, to impound this water in what essentially is going to be nothing more than an evaporation pond, and deprive folks downstream who have legitimate population growth and legitimate needs for this water through the year 2060. I thank you for your time. I thank each of you for your dedication to public service. Thank you.

Dale: Thank you, Mr. Swenson.

Dale: At this time, Nancy Bufkin. Nancy, if you'd just tell us your name, where you live, if you represent a group and what you're here to speak about. And Tom Welfelt will be following Miss Bufkin.

Bufkin: My name is Nancy Bufkin. I only represent myself. I'm a land owner on the Clear Fork of the Brazos. I reside in Killeen, Texas, and I'd like to comment on the lake at South Bend, which was not listed as a lake on the listing that was given; however, it is on the Brazos 2011 plan, which I've looked at on the computer repeatedly. I was just told that that reservoir is not on a recommended list anymore, so I really don't know if you want to listen to what I have to say.

Dale: Well, we'll be glad to listen to whatever you have to say while you're here.

Bufkin: The lake at South Bend was to be built in the 2006 plan with a dam above the confluence of the two Brazos rivers, which would make it a clear lake. In the 2011 plan, they have it built with the dam below the two rivers going together, which would make it a salt lake, even saltier than Possum Kingdom. Now I know that water is needed, and it's needed by a growing population, but I'm very against a salt lake on the Clear Fork of the Brazos. Also in the plan, the 2011 plan, it says that that lake can be – they're planning on running it with Possum Kingdom, and being able to take the water out of that lake by 50 percent, if needed. That would leave salt flats. Now I've been assured that animals can drink the water at Possum Kingdom; however, hikers are told that the water is too salty to drink. Somehow that just doesn't seem to go together. If that salt lake is built, it will ruin miles of the Clear Fork of the Brazos, plus all of the creeks that go into it. A 30,000 acre lake that is salt leaves an awful lot of salt flats when it's drained by 50 percent. And the people that live around there apparently don't know much about it, because I've talked to people this winter, when I've gone up and hauled hay – we had a terrible winter this year – gone up to haul hay and feed cows, and almost no one that I talked to knew about this lake, or that it had been changed to be a salt lake. Apparently the publicity that you all are hoping that you're getting, or the information that you're getting out, isn't getting out to the population, because I talked to people as varied as ranchers who lived along where the lake would be. They didn't know a thing about it. I talked to the vet. He didn't know anything about it. And when I look at the representation here, I see that that portion of north Texas has very little representation. The person in agriculture lives in the same county as Abilene, but there's a very large area that there are no farmers or ranchers that are represented, and I would like to see that. Since I don't live there at the current time, I don't feel that I could represent them, but I would like to see more representation for that area. And I apologize for the fact that I did not know that that lake was taken off of the recommended sites, but the last time I looked at it on a computer, it was still there. Thank you for your time.

Dale: All right, thank you very much. Tom Welfelt, and Randy Rodgers will follow Tom.

Welfelt: My name is Tom Welfelt. Trey, you probably won't have to use one of those signs, because I don't have a lot to request. But I'm from Dallas, Texas, and I have a home on Possum Kingdom Lake. And I've just recently heard about Cedar Ridge and some of the possible negative effects that it will have on water levels, as well as water quality at PK. And I didn't notice in the plan, but maybe somewhere there is an impact study that is available to all of us. And when I say all of us, I unofficially represent thousands of homeowners at PK that would be affected. Their values would be affected if this reservoir is built.

Dale: All right, Tom, thank you very much. At this time I have Randy Rodgers, and then Leon Denena will follow Randy. And so Randy, if you'd tell us who you are and where you live, if you represent somebody and what you wish to speak about.

Rodgers: Okay, I'm Randy Rodgers. I'm from Fort Worth. I'm here today representing myself as a landowner in Shackelford County. The new proposed Cedar Ridge Reservoir will impact my place, and that's why I'm here. I became aware of this issue a year plus ago, when they determined to move the dam location upstream, and began to look in the process and try to understand what this was about, and how you all went through this. The sources of info that I'm going to talk about today came from your 2011 draft, and also the city of Abilene's study on Cedar Ridge. The numbers on the two reports have some significant variances. I hope today to point some of those out, and also express concern that will prompt you to review some of your projections. The population in the upper basin, as you all refer to it, in their 50 year plan, shows very little growth. I think its 1.6 percent, where downstream shows significant growth. Based on your draft, the current supplies for the city of Abilene and the cities they sell to, Hubbard Creek, Fort Phantom and OH Ivie, while they're not totally utilized at this point, for instance, OH Ivie is constrained by a lack of processing capabilities that could be addressed by building an additional or improving the existing processing plants, even with their numbers, and with your projections and their projections on growth, they show, based on a two-year safe yield, having a 23 percent surplus in the year 2060. I'm going to use those numbers based on the following. We heard earlier that both Tenaska, which in one of the plans – and I won't try to identify, but I hope you all will do that – one of your plans, the draft versus Abilene, shows the use of 2,000 acre feet a year. One shows 20,000 acre feet a year. Tenaska has come out and signed an agreement this last week that said we'll use 2,000 or less acre feet per year. It doesn't specify or I didn't see whether it raw or treated, but regardless, it's a significant decrease from what's in the plan. Lastly, the gentleman earlier mentioned the fact that West Texas Utilities, in one of your plans, maybe both, shows 11,800 and some odd feet plus 2,500 acre feet of water that he says he's willing to sell. I sure encourage you to look into that, before we build a lake. So I question the needs based on the above. I'm going to add a number four. You all talked about population supplies and needs. I'm going to add number four. I call it intangibles, downstream impact. Previous, Mr. Welfelt talked about PK. Here's some interesting facts out of your report, and frankly I don't know what to do with them, but I hope you all will look at them, is that 80 percent of the flow into PK comes from the Clear Fork, which is where Cedar Ridge will be built. About 14 to 18 percent comes from the Salt Fork and Double Mountain Fork, and while that's low flow into the PK, it represents 50 percent, approximately, of the dissolved minerals, and 80 percent, approximately, of dissolved salts. That leads me to the golden algae issue, which you all know is an issue in PK and downstream. It's a big enough issue that Texas Parks & Wildlife, I'm told, is building a million dollar-plus facility below the Morris Sheppard Dam at PK to treat this water so they don't have degraded water that impairs their ability to operate their state fish hatchery there. That seems a pretty significant point. And lastly, I would say that I think if PK is affected by water level and water quality, as well as downstream by reducing the flow of fresh water into PK, I would guess that you'd need a bigger room to hold all the people from PK that would be here. I don't think they're aware of that. I don't think they're aware of the issue. I don't know that that's something you consider, but it's something that I call an intangible, and I hope you will. As a point of consideration, I hope that you'll take these points and numbers into it. Forgive me. I'm an amateur. I've just read this and tried to study it as best I can. But it seems that there's some divergence in the numbers from the two different reports. I hope you'll go back and look at it and study it again, and make the best decision for all of us in the state. Thank you.

Dale: Thank you.

Trey: Dale, I've got one announcement to make.

Dale: Yes, Trey.

Trey: For the public comment, we've had some folks ask if people could speak into the microphone a little bit better, to pick up their voices so they can hear.

Dale: All right.

Trey: So just try to speak into the microphone a little closer.

Dale: All right, just a reminder, if you would just please step up to the microphone, if you didn't hear Trey's announcement, so that everybody in the room can hear your public comments. At this time, Leon Denena, I believe is what you…

Denena: Denena, Leon Denena. I'm Leon Denena. I live in Brazos County and own property there, and own land in Robertson County and Falls County.

Dale: All right Leon, if you'll hold on just a second. I just want to let Mark Dudley know that he'll be up next. So Leon, please go ahead.

Denena: I'm sorry. I'm having a hearing problem and I didn't understand everything you said.

Dale: I just announced who was coming up next so they'd be ready. So if you'd go ahead.

Denena: I'm sorry. First of all, I'd like to second everything that Representative Brown said about the Millican Dam site. It is a concern to me that property can be taken away from landowners when they really want to own it. And I understand the need for water. This is something that's very important to me because I am an irrigate farm. And I want to be sure that the actions taken by this board do not take away some of our rights to the water that we've always had. We need it for our livelihood. I know that there are population areas that are going to need it further down the line, but I've seen things happen in other states, particularly in California, where water had been designated, had been captured for the use of irrigation of agriculture, and later on, because of population needs, that water was taken away from those people, and that land was turned back into desert. And I don't want to see that happen to us in Brazos Valley. Thank you very much.

Dale: Thank you. Mark Dudley, and following Mr. Dudley will be Marvin Karsten. So Mark Dudley.

Dudley: I'm Mark Dudley. I'm a property owner in Brazos and Grimes County. I'm President of the Guardians of the Navasota River, a group of people in the area that are clinging to their guns, their religion and their land, but if you get to know us a little bit, you'll find that we're a pretty sharp group of folks, also. I want to thank you for your service. I know you wouldn't be on this board if you didn't care about Texas, so thank you for doing that. I'm here opposing the Millican Dam Reservoir, or any reservoir on the Navasota River. And I appreciate the fact that you guys have not asked for it to be designated as a unique reservoir site. I would like it if you would take it off your plan. We've approached Region H with technical arguments, the technical arguments, and quickly, we think that there are more cost effective, or equally cost effective measures of obtaining that water, be it desalinization or pumping from river water. I'm also a general contractor. My company is building a million gallon per day water treatment facility for the Trinity Water Authority on the Trinity River, a very cost effective means of gathering water. It puts nobody's land under water. Putting in this reservoir will result in a loss of an eco system that doesn't exist anywhere else in Texas. There's not another river in Texas that runs through a hardwood forest. You go east; you're in the piney woods. You go west; you're into cropland or black lands, prairie and then hill country. This is the only river in

Texas that goes through a hardwood forest. Loss of economy, we're talking about somewhere in the neighborhood of 135,000 acres in inundated land and mitigated land. I run cattle on my property, and I run them at a greater than seven and a half cows per acre, seven and a half cows per acre cow/calf unit. But if you took that fairly conservative measure of the amount of cattle that are in that bottom land, we're talking about $9 million in calf sales a year, so a huge economic loss. We feel like the population projections are based on wholesale, illegal immigration, and that this uncontrolled growth of our metroplexes will lead to greater problems. So we feel like the projections are not realistic, and that if they are allowed to happen, it will result in problems. And we feel like the cost to build a reservoir is totally underestimated, that it is more in the lines of five times more expensive than what has been acknowledged so far. But I want to appeal to you guys on an emotional basis, because I read the charge that you have from the state, and it says that you are to protect the agriculture and natural resources of that particular region. And that's what I want you to do. I don't want you to let H take our land. I want you to protect us. Your technical advisor mentioned, showed a slide that you have to coordinate with other regions, and he showed a slide where we're getting water from some other regions. He did not show a slide where we're giving water to other regions. I went on the Gulf Coast Water Authority's website. They're one water district within the Region H water district, and right now, we're selling them 212 million gallons per day from our region. I want to ask that you send a message to H that we're no longer going to sell them our water if they intend to move forward with this dam and reservoir. Now I worry about our federal government. I worry that our leaders in Washington today have lost track of our founding father's; Jefferson, Franklin, Washington. And I'm worried that that same thing is happening here. I want remind you again that you're to protect our agriculture and our natural resources, and I ask you to think what would Travis, what would Houston, what would Boone, what would Crockett do in this case. Thank you.

Dale: Thank you.

Dale: Marvin Karsten, and following Marvin Karsten, we'll have Leonard Cox. And Marvin, I'll just remind you to tell us your name, where you live, your represented group and what you wish to speak about.

Karsten: Okay, I'm Marvin Karsten from Brazos County, and I'm a member of the Guardians of the Navasota River. But Brazos County only has 590 square miles to begin with of square land, and if that Panther Creek Millican Plan, which I'll call Panther Creek, because Wixon Creek runs through there, and that's going to flood acres and acres of Brazos County. Panther Creek, I don't know where that's at, and according to the map of G, I don't even see a Panther Creek being flooded hardly. But on the Discovery Channel the other day, Africa, in the desert area, people get by with four gallons of water a day, and that's equal to one toilet flush here. We went by Veterans Park in College Station the other day, and there's nozzles just spraying gallons, and gallons and gallons of water on the ground, which I don't use that much in a year's time, I'm sure, what they do in a day. And there's got to be other ways of doing it. Recycle the septic water, and run pipes and irrigate things like that, water lawns, run two pipe for new construction, one potable, one non-potable water, flush your toilets with non-potable. There's got to be more ways than flooding land that's going to be under water forever. I mean it's gone. We built our own house, bought our land for the going rate, built our own house or buildings, cleared it, and I've got a lot of sweat equity in it and I don't want to see it under water. My son has a business on the Navasota and it would be totally under water. Lake Limestone is above us, and it's said to not have much holding capacity anymore because it's full of silt. And they keep that about 100 percent full, and as soon as they get a rain, they dump the water. They don't regulate the gate to where the river stays even at a certain rate before flood stage. They'll dump it. Last May, it was record level, 21 or 22 feet, almost flooding the Navasota River at the Highway 21. They were checking the bridge out and making sure it wouldn't flood, about ready to shut Highway 21 down. So I think more regulation could be done at Lake Limestone also to keep the water at a certain level, rather than 100 percent full. They get a rain and they open the gates all the way up. Then it's back down to three feet, up to 15 or 14 feet, back down to three feet. But I appreciate your concern for water, but please don't flood Brazos County. Thank you.

Dale: Thank you. Leonard Cox and he'll be followed by Cathy Cox.

Cox: I want to thank the Water Board for the work that they're doing, and the challenges that they're facing, and their way of pulling it together. My name is Leonard Cox. I'm a member of the Guardians of the Navasota. Today is April 21st. On that day, 174 years ago, there was a battle at San Jacinto. The landowners in the area of Texas stood up and said, hey, enough is enough, and I guess that the result of that battle created the Republic of Texas, created the flag that's behind me here. A lot of meetings start with the Pledge of Allegiance to the United States Flag. We sometimes forget the Texas flag. An outcome of that battle is that the land of Texas was divided up to landowners, and those landowners passed it on to their heirs, and some of those heirs are down in that river bottom. I'd like address the Millican Reservoir, Panther Creek. I've got a couple of references that I'd like to point out. When I look at page ES17 in the Executive Summary, it calls for Millican Panther Creek at a total project cost of $1.159 million. When I look at 4B.12-3, that same Millican Panther Creek Reservoir has now got a total project cost of $1.727 billion, a $600 million discrepancy in the cost of that dam. I would further like to point out that per the definition, the total project cost on other dams included the dam and the pump stations, treatment plants and all the other auxiliary pieces that went in to make that project a viable project. In the Millican Panther Creek, it's only the dam. Millican Panther Creek has got a detailed estimate on page 4B.12-178. The new total project cost is back down to $1.159 billion. It mentions the oil production in the area of being 370,000 barrels of oil a year. And if I speculate that oil is in the range of $100 a barrel, that's $37 million a year that they're taking out of that local economy. The last item I'd like to point out is that Region H, when they were evaluating Millican Dam, the Millican Reservoir, to quote them, it's approximately 47,000 acres would be impacted. That's grossly in error. They set the top conservation elevation at 273 feet mean sea level, which may have been accurate 50 years ago, but since there has been so much development in the College Station area, that number is no longer a valid number. And lastly, when I go to the miscellaneous strategies in Brazos County, and that would be on page 4B-.17-3, there's a project for a 28 mile pipeline to go from the curtain North Zulch area along state Highway 190, and to go down to the city of College Station at a total project cost of $34 million. From everything I've stated, plus the ecological impacts, the social impacts, I'm requesting that the recommendation to make that a unique site be withdrawn by Region H. I would ask that desilicification be looked at as an alternative for them. And I would ask that consideration be given to recommend that part of the Navasota and the Post Oak area that it's in as a unique ecological stream segment. I pledge all my efforts with yours to make Texas safe, secure and prosperous. I believe the way to do this is through combined methods of conservation, reuse and desilicification. Thank you.

Dale: Thank you. Our next speaker will be Cathy Cox, and following Cathy, Samuel Sibley will follow Cathy. Cathy, I remind you to give us your name, your location, if you represent a group and what you wish to speak about.

Cox: My name is Cathy Cox and I am the Secretary of the Guardians of the Navasota River. I represent myself and the Guardians today. And you said that this was so that your people can contact us. My phone number is 281-703-8205. I would love to talk to anybody who would call me and talk to me about this. This is obviously grave on my heart. As my husband said, 174 years ago they were shouting "remember the Alamo." Let's remember those gentlemen who did die to give us the freedoms that we have, and one of those freedoms is to own the land that's on the Navasota River bottom, and it's our responsibility to protect it and to protect our way of life. There's a lot of farmland down there.

There's a lot of cattle production. There's a lot of oil production. There's even coal down there. That's one aspect. There's another. There's over 50 endangered species that you're going to wipe out, the natural hardwoods that you're going to ruin, the wetlands that you're going to destroy, only to go rebuild them somewhere else. Why? That just doesn't make sense to me. There are farms down there that are third, fourth and fifth generation have lived down there on that river bottom and have farmed that land, farms that have earned the heritage of Texas, because they've been in operation for over 100 years. In your plan, the plan is very poorly planned. It's very poorly designed. It's from 50 years ago. Region H in Madisonville said, "we did not do anything to the plan, except for pick it up, dust it off, change the cost and stick it in." We've developed College Station in the last 50 years. Fifty years ago we didn't have the mall, we didn't have Sam's, we didn't have Pebble Creek Elementary. We do today, and all of those would be under water according to y'all's plan. You can't just pick something that's poorly done and stick it in there. You have to research it and find out what the logistics of it is. In one part of your plan you say the water's going to cost you $1.30. In another part of your plan, you say the water's going to cost you $1.90. So which is it? The estimated cost of building the dam is grossly underestimated. The values of our land is grossly underestimated, and the population growth that they're talking about, illegal aliens being a lot of the population growth that you're projecting. Another thing I think that some people didn't take into account is the fact that Houston was inundated with evacuees from Katrina and Rita, and some of them didn't leave, and that was some of the population growth. Do we expect more hurricanes every year that that's going to make that growth like that, or is our growth going to stabilize and level out? There are alternatives to stealing everybody's land and taking our water. There is low flow dams, like Wilburn's doing where they're taking water straight out of the river. They have a dam that's two or three above the natural flow. They can pull all the water that they need. There is desalinization. There is refilling our aquifers. And then like he said with Lake Limestone, the silt has gotten so bad that they're having trouble. Well clean them out. Clean out what we already have instead of trying to build new. If you are projecting population growth – which of course, hopefully, we hope that there would be some population growth, not to the numbers that y'all have described – but where are they going to live if you flood all the land? And who is going to feed them, because you're flooding out all the farmers. These are just some of the things that I'd like you to consider whenever you're looking into this. I think that this river needs to be deemed a unique, ecological stream segment, because I believe it is one of our vast resources that we have here in Texas. Other states like California have realized that dams are not the way to go to, and they're pulling them out and trying to rebuild the land like it was. We have an advantage here; we haven't destroyed it yet. Let's not do that.

Dale: Thank you. Samuel Sibley, and following Samuel will be Janice Bezanson. Mr. Sibley.

Sibley: Hello, my name is Fr. Cassian Sibley. Samuel is my legal name. I was given a new name when I was made priest. I'm a Russian Orthodox priest. I represent my parish in Bryan, Texas, and I represent myself. I am currently writing a book on ecology in the Orthodox Church, and so to some small extent I represent my church, as well. Frankly, I can't believe anybody in their right mind is seriously considering this dam. Dams are unbelievably stupid at the monumental scale that they were talking about with this dam. What it's going to do to the river below and above, what it's going to do to the Riparian Ecological Zone where you have the river going through hardwood forest, where you have all that wildlife, where you have all of that ranching, where you have all of that farming, where you have vineyards, where you have million dollar homes, where you have big mud flats of the junk that's been pulled out of petrochemical drilling that is being farmed responsibly that is going to be inundated with water all through that region, and that somebody thinks that this is a good idea, or a wise use of $1.9 billion, with no clear idea that that's going to be a legitimate price tag for the region. I commend you on the fact that you did not recommend this thing. I understand that you are trying to support your fellow region. Please, don't. Please don't support Region H in this foolishness. My parents moved to Bryan College Station to retire. They live in a suburban neighborhood, a very nice suburban neighborhood in Bryan, whose entire access would be cut off by a 270-foot rise to that region, according to the plat maps. I've got two friends who are professors who have lived in a neighborhood for 40-something years in College Station that will be completely inundated. I have friends who are farmers, friends who are ranchers who live out there. And we're looking at the map. Where would 270 be? Where would 260 be? Oops, I'm gone. I mean it boggles the mind. Really, it does. You take a look at this thing on the map, you take a look at where all that water will be, and you're wiping out this huge section of a county for the sake of water, maybe 10 percent of which will stay in the region, stay in G, and the rest of which is going to go to Houston, which I don't hear a great deal of major conservation effort on the part of the city of Houston. I used to live there. I know people there, a fellow priest there, fellow parishes. They're not being told they can't water their lawns. They're not being told that they have to pay more money. They're talking about a 30 percent rise in water costs, and everybody is so completely upset by this. Water is a natural resource. It is not infinite. And clean water is certainly not an infinite resource. And the fact that people want to live together in massive piles in a place that can't sustain them or support them, and that the rural people should then provide their natural resources for them to solve the problem that they have created is insane. And if we project this out, if we keep doing this, keep making the water cheap for them, keep making sure that they're covered, then 50 years, 80 years, 90 years, sooner or later, it will end. Sooner or later, you will not be able to produce enough water for Houston. And when that happens, there's going to be a huge awakening to the poor people of the city of Houston who never learned along the way that they had to conserve water. Please, please, don't do this. Anyway, thanks. I really appreciate what you're doing. And once again, thank you for not including this directly, but if you could do more to stop it, that would be really, really appreciated. Thank you.

Dale: Thank you very much.

Dale: Janice, and following Janice will be Brad Ayers. And Janice, just tell us where you're from, if you represent a group and what your interests are.

Bezanson: Good morning, Mr. Chairman, members of the Regional Planning Group. Thank you for hearing our comments this morning. We really appreciate it. My name is Janice Bezanson. I'm the Executive Director of Texas Conservation Alliance. The Alliance is a 40 year-old statewide conservation organization with a state affiliate of the National Wildlife Federation, and we've been working on water planning issues for 25-30 years now. We will be doing written comments in more detail on the Region G plan to be submitted later, but this morning I want to focus briefly on two projects; the Cedar Ridge Reservoir and the Millican Creek Reservoir. Neither Cedar Ridge nor Millican Creek should be recommended water management strategies in the Brazos G plan, and Cedar Ridge should not be recommended for unique reservoir status. If you look at the demands for water in Abilene and the counties around Abilene that Cedar Ridge allegedly would supply, you find that the manufacturing and municipal water demands can easily be met by existing supplies. In order to find a shortage there, it's basically on a 20,000 acre foot projection for a steam electric plant in Nolan County. Tenaska, the company that is proposing a coal-fired plant in Nolan County has not only said they're not going to use more than 2,000 acre feet a year, they have signed a contract with the Environmental Defense Fund in return for EDF's withdrawing from a quality permit. So that is a contractual obligation that they will not use that 20,000 acre feet a year. In the report that HDR Engineering sent to the city of Abilene, they included some speculative water uses that will come in in our written comments, but those are not substantive of the substantive things in the Brazos G plan. There is nothing, other than that Nolan County that justifies Cedar Ridge and; therefore, Cedar Ridge should not be in it. Regarding Millican Creek inundating 70,000 acres of farmland that has lignite under it and a lot of oil and gas is a very uneconomical way to supply water to Region H, which is where most of the water is supposed to go. Almost 50 percent of the water demand projected in 2064, Region H is either manufacturing steam electric or irrigation. None of those entities would ever buy $424 an acre foot water from Millican Creek. It would not be economical for the irrigators. They couldn't pay for it. As far as steam electric and manufacturing, there are other ways to get water that are a lot cheaper. They don't need treated water. They don't need perfectly fresh, clear water. They can get water from the Gulf of Mexico. Right now, Region H entities are using a million acre feet from the Gulf of Mexico. They can use a whole lot more than that. The municipal projections for Region H show in 2061 .8 million acre feet a year for municipal. If that happens, then there will be a million acre feet or more of wastewater return flows which could be used for water supply, and certainly be used for cooling water, which is what manufacturing and steam electric need. And that's not even being counted as supply by Region H. The bottom line is that 12 to 15 million acre feet a year go down the Trinity, the Brazos and the San Jacinto Rivers and into Region H, or alongside Region H, and their projected total need is only 3.5 million acre feet in 2060. So they've got a lot of ways. What would be the perfect combination, I can't tell you standing here today, but I can tell you it's not Millican Creek. Millican Creek would be expensive. It would be ecologically devastating. It would be devastating to the landowners, to agriculture, to the economy of the region. The mention was made in the PowerPoint earlier that Region G went along with Region H because they had identified a need in College Station. Well, an official from College Station spoke publicly last week and he said that College Station feels that their existing ground water will be adequate till 2060. He said if they build Millican Creek and we happen to need some water, we might buy some, but we are not supporting it. So for the Region G Planning Group to recommend this in the water plan on the basis of College Station, we're talking this enormous reservoir basis a very, very small or probably nonexistent need for College Station. We very much request that you remove both Cedar Ridge and Millican Creek as recommended water management strategies and that you withdraw your recommendation that Cedar Creek be a unique reservoir site. Thank you very much. We appreciate how hard y'all work, but we need you to look back at this one. I think it needs another round. Thank you.

Dale: Thank you very much. Brad Ayers and following Brad will Robert Averyt.

Ayers: My name is Brad Ayers. I'm a land owner in Brazos County. I am speaking on part of the Guardians of the Navasota, and our land would be affected by the Millican project.

Dale: Brad, would you get a little closer to the microphone, please?

Ayers: Is that a little bit better?

Dale: Yes, sir.

Ayres: Our concern is not only the 71,000 acres, but the 64,000 or more acres that could be flooded around it. Talking with some of the county commissioners last night at their weekly meeting, we feel that there could be a possible impact of $400 to $450 million loss in tax base for the county, not only based on a 2003 study that I believe the G Board did on a Bundic site that in y'all's report said that we would lose $4.3 million and change just on that site alone as a tax base. After having a business, owning the family land since the mid sixties, working 20 years to build my business to put a facility on our property and have it inundated, there's no way we could start over. There's no way my kids could start over if they take the business over. But also, based on Region H's numbers in their projections of proposed elevation levels, pool height, dam heights, something they haven't considered is the growth that the east side of the county has taken in, really over the last 20 years. The population and the growth has exploded in our area. They don't realize that we have one, possibly two, landfills that would be inundated by this, and a wastewater treatment plant that has been in place since the early seventies. In fact, just a few months ago, they had an overflow into one of the creeks that would be taken in by this. It's a city run wastewater treatment plant. It's along the Burton Creek, I believe. And they said there was no contamination or anything. They were checking the water levels, checking the contents. But this is part of what we're talking about. In the late nineties, or mid to late nineties, this project was taken out of Region H, based on a set of minutes from 1990 from Region H. It was taken out. And one of the voting members questioned why it was taken out, and then they started looking at it from that point forward in bringing this back into the plan. Well, one of the comments was made why it was taken out is because it had mineral problems. If there's that many mineral problems, then we request that you take it out of your plan to support H, and keep it from being designated a unique reservoir status. Thank you.

Dale: Thank you. Robert Averyt and following Robert will be Sammy Catalena. And so Robert, tell us your name, where you live, if you represent a group and what you wish to speak about.

Averyt: Good morning. My name is Robert Averyt. I live in College Station, Texas. I live in the bottom of the Navasota River. I'm the lowest man on the totem pole. I'm here today representing myself as a landowner, and I'm representing the Guardians of the Navasota River. I come from a little town a little south of here, as I just said, and we usually start out by saying, hey, I got a story for you. So I've got a story for you. About three weeks ago – well, hang on. This is new to me, guys. My mother-in-law sent me a book. It's titled *Road, River and Ol' Boy Politics.* It's y'all's bible, man. I don't know if y'all have seen it, but if you haven't read it, I highly recommend it. It talked about McLennan County, the building of Granger Lake and Georgetown and all back in the thirties. Like I've mentioned, I've been at this a couple of weeks. You guys have got a little bit of a head start on me. In this book, I've got a map, a drawing of the Brazos River Authority 1935 Master Plan. It's got Millican Reservoir on it, just the footprint as I can best tell as what we're looking at now. It's pretty interesting. So you guys have got a little head start on me here, so bear with me. We feel that we were not treated fairly in Brazos and Grimes County by the Region H. And I know you guys are Region G. Y'all are catching a brunt from your friends to the east. I apologize for that. Y'all are our last chance to give public opinion. I've got a problem with that, and I've confirmed this with Region H. They send out to the media in their region, and you guys probably do the same thing. You send out certain stuff to the media. Brazos and Grimes County are not in Region H. We're in your region. You guys are our guys. Our officials, the way I understand it, were not notified of public meetings. That's one thing I would like you guys to help us achieve with Region H is to open up the public comment again. It's like it was trying to slide under the radar. I don't know why with Region G, this development, proposed reservoir in your region. Here's something I read in the book I was referring to. This goes back to the thirties. This is talking about Williamson County. Bringing dams to Williamson County required a special brand of local abracadabra. Is that what's going on? I'd like to squelch that if that's what's going on. During the local meetings we were able to obtain about four items. I've been talking with John Hofmann a bunch. John, I want to thank you for your input. I learned more in five minutes, standing outside the room in Conroe talking to John than I learned in four hours of public meetings. John, I want to applaud you for your help. And with your permission, I'd like to share some of the information you've communicated to me. During the public meetings, we were able to obtain three numbers, 263, 273 and 284. One of those, we were explained, was probably a typo. The 263 should be 273, or 273 should be 263. I never figured out which one it was. And we were given the information that the dam for Millican Reservoir would be somewhere around Panther Creek, and it is designed to be about four miles long. I graduated from high school, thank you, Lottie. And in junior high school, they taught me in drafting class to take a topo map and a scale and scale off stuff off a map, Map

Reading 101. They taught us that in Boy Scouts. So the night I got home with the four miles long, I got my old topo maps that, before the Internet, you used to be able to get from your engineering and office supply. I scaled out. You know, you take your scale and you put it on there, four miles. There was only one place on the topo map that almost came to four miles, and that's where this infamous map started in for me. Another group did it in the Guardians, totally independent from what I have done. A good friend of mine is on the Region H board, Steve Tyler. I called Steve the next morning. I said, "Steve, you need to be proud that you're on record of being against this project, because what is proposed here, anybody that's for it with the information that we've been able to dig out, they're going to look like absolute fools." John, this is the reason the rumor mill is, as you described, flooding the Post Oak Mall in College Station. It's not going to happen. I think it's crazy. I think the proposal is insane. Last night, I got home from a meeting with the judge in Grimes County; I got an email of a map from Jason Afinowicz. Jason is a project manager with AECOM. They're the consultant for Region H, from what I understand. It shows the dam. John, would you agree? The way I read it, it floods the new Bryan/College Station dump, their proposal. I don't know if you'd seen it. It's not a four-mile long dam. The best I could scale it last night, it's about a nine or ten-mile long dam. So we're confused. We cannot get any facts. We need facts. I'm a problem solver. I own a machine shop. I mean I put problems to bed. Let's take care of a problem. This is aggravating. We can handle anything, put it to bed. So that's my confusion there. The unique status, I think that's extremely unreasonable of you guys and your cohorts used to put on my property. John, with your permission, can I share some comments? John and I have been communicating back and forth on email.

Dale: Hey, Robert.

Averette: Yes.

Dale: Let me just see where you are on time. Trey?

Averette: Can I have one more minute?

Dale: Sure, we'll work with you. You can take one more minute.

Averette: Thank you very much.

Dale: You bet.

Averette: This is something I said to John. I've been working for several weeks to educate myself on this issue, and I am baffled as to how this process could ever go forward. This is what I got from John. John, thank you. As to how this planning process information plays out, you are correct that there is not a lot of detail, and that some of it seems to conflict when you search the web for it. That's because it's dated information, which I am told, is based on studies performed in the eighties. The information will be updated if/when the project gets a sponsor. The project may get a sponsor it actually needed, and on, and on and on. The unique status, let's wait to put unique status on my property that I have to tell a realtor if I want to sell my property. Let's wait to get that till we get a sponsor. But this is what got me. John mentions again – this is my whole deal right here, and this is what I see. Again, this is a 50-year water supply planning exercise. And that's what it is. It's a planning exercise. Keep the unique status off my land till you guys are finished exercising. Thank you very much.

Dale: Thank you, appreciate it. Sammy Catalena. Now this is our last request to speak form. And if anyone has any desire to speak, I'll give you an opportunity to fill one of these out, but this will be our last registered speaker. Thank you, sir.

Catalena: I'm Sammy Catalena from Brazos County. I'm here to speak about the Millican Dam/Panther Creek site. I appreciate the board having us here in this public opinion. We know this is a hard job for y'all and we appreciate the job that you do. I've talked to a lot of people in the last month or so, well really the last month, when this came about, about the new reservoir. I haven't found very many people that say they're for it at all, but two or three have said, well, you know, that's progress, Sammy. Progress has to move on. Well, what's the price of progress? What are we willing to pay for progress? Is progress taking land that's been in families for generations and generations handed down, for people that's worked their entire lives to not only have it, but to hold onto it? Is that progress? Is it progress to completely upset our tax base, the counties and the school system? Is it progress to flood our curtain oil fields, gas fields, lignite reservoirs? Is that progress? Is it progress to take the same only hardwood bottom left in Texas, and what it would do from the eco standpoint, the impact and the wildlife? Is that progress? What will it do to all of the ag businesses that generate income, and have people that work for them, and the jobs for all of the ag businesses, and not only that, but to financial institutions that have loans to all the people in this 71,000 to 120,000 acres, ever how big it's going to be? What will the impact be on them? We, as a country, are supposed to be in the forefront of research and development. We're supposed to be the best. That means, to me, that progress should be for us. Figure out how to use the water in the Gulf. That means progress to me to recharge the aquifers. That means try to collect the runoff, try to conserve water, try to make a plan to reuse our water. That's progress. The majority of the land out of this Millican Reservoir, if it happens, will come out of Brazos County. Brazos County is not getting anything for this land. It's not helping us. We have the water. We have our water. We haven't been there our entire lives and worked our lives off to satisfy the people in Houston, or anybody else. They need to figure out a way to conserve water, do what they need to do, just like we have. In our country, there's a lot of things that's happened in the past year; some things we like, some things we don't like. There's been a lot of things that have been pushed down our throats, and sometimes there comes a time when we say we just need to really take a step back and look at this and see if it's worth it. A lot of people in here have had the chance to live the American dream, and they're living it today. But I can tell you there's some people in this room that not too long ago woke up, and that American dream they were living turned into the American nightmare. And I ask the board once again, I appreciate the job that y'all do, and I know that we all appreciate that. And we ask that you not designate the Millican Reservoir/Panther site as one of your sites for a reservoir. Thank you very much.

Dale: Thank you.

BRAZOS COUNTY

BRYAN, TEXAS

RECEIVED

MAY 26 2010

TWDB

Randy Sims
Office of the County Judge
200 South Texas Ave., suite 332
Bryan, TX 77803
Phone: (979) 361-4102
Fax: (979) 361-4503
E-mail: rsims@co.brazos.tx.us

18 May 2010

Honorable Judge Mark Evans
Chair, Region H Water Planning Group
c/o San Jacinto River Authority
P.O. Box 329
Conroe, TX 77305-0329

Dear Judge Evans,

Brazos County opposes the construction of the Millican Reservoir (Panther Creek site) and respectfully requests that you remove the request for Unique Reservoir Site designation from your 2011 Regional Water Plan. The effects of this designation, and the potential effects of constructing this reservoir, are very serious and would impact a wide array of Brazos County citizens. These impacts have not been analyzed nor discussed with the various stakeholders, and your plan should be revised until such time that adequate analysis and planning have occurred.

A response to this letter is requested and I appreciate your careful consideration. If you have any questions, please contact me at (979) 361-4102. I look forward to hearing from you.

Sincerely,

Randy Sims
County Judge

RS/dll
Enclosure

xc: J. Kevin Ward, Texas Water Development Board
Senator Steve Ogden
Representative Fred Brown
Mayor Ben White, City of College Station
David Watkins, Bryan City Manager
Betty Shiflett, County Judge, Grimes County
Brazos G Regional Water Planning
Brazos Groundwater Conservation District
Texas Commission on Environmental Quality
Guardians of the Navasota River

BRAZOS COUNTY

BRYAN, TEXAS

RESOLUTION

WHEREAS, Brazos County recognizes the importance of the need to plan for future water requirements to meet the projected growth within Region G and throughout the State of Texas;

WHEREAS, Brazos County recognizes the many factors and challenges involved in developing a comprehensive water plan to provide for future water requirements;

WHEREAS, Brazos County supports many of the recommendations contained in the proposed 2011 Region G Water Plan that if implemented will materially increase the future water supply in the Region;

WHEREAS, the proposed Region G Water Plan includes the proposed Millican Reservoir and recommends it's designation as a unique reservoir site by the Texas Legislature;

WHEREAS, the designation of the Millican Reservoir as a unique reservoir site most likely will have a negative impact on land values, farming/ranching operations, wild life habitat/management, minerals, public facilities, state and county highways and roads, and the tax base of Brazos and surrounding counties;

WHEREAS, the location of the proposed reservoir dam has not been identified, and no in-depth study has been conducted to assess the total impact the designation/construction of the Millican Reservoir would inflict on the affected area;

WHEREAS, the proposed Millican Reservoir would have no positive economic value to Brazos County as under the proposed plan it would act as a holding reservoir to supply projected water requirements for the Gulf Coast Area and not suitable for recreational use;

NOW THEREFORE, BE IT RESOLVED by the Commissioners Court of Brazos County, Texas that it is the opinion of this Court that sufficient information has not been developed to determine the total impact of the inclusion of the proposed Millican Reservoir in the Region G Water Plan will have on the affected areas; and

BE IT FURTHER RESOLVED THAT by adoption of this resolution the Commissioners Court of Brazos County, Texas opposes the inclusion of the proposed Millican Reservoir in the Region G Water Plan and asks for that to be replaced with an alternate water source recommendation.

ADOPTED AND PASSED THIS 4th **DAY OF** May, **2010.**

Randy Sims
County Judge

Lloyd Wassermann
Commissioner Lloyd Wassermann
Precinct 1

Commissioner Duane Peters
Precinct 2

Commissioner Kenny Mallard
Precinct 3

Irma Cauley
Commissioner Irma Cauley
Precinct 4

Resolution #10-009

WRITTEN COMMENTS ON THE INITIALLY PREPARED PLAN
SUBMITTED TO THE REGION H WATER PLANNING GROUP

RECEIVED

JUN 02 2010

TWDB

The Region H Water Planning Group welcomes public comment. If you wish to submit written comments, please provide the information requested below and return this form to a consulting team member.

Name: Elaine Sheffield
Affiliation: Homeowner of Historical Farm & Ranch Land
Address: CR 103, Iola Texas 77861

713.542.4651	-----	Elaine.sheffield@exterran.com
Telephone	Fax	E-Mail

Comments: **The Family of Robert & Elaine Sheffield, owners of 50 acres on CR 103, (near intersection of CR 109) oppose the proposed Region H Millican Reservoir.** As the current plan stands our property would be condemned for maintenance use ~ which is a nice way of saying it will be sold to a developer at a later date for water front property – i.e. Lake Conroe, etc.... which would be theft at the state level. This property has been in the family (with documentation of annual property tax receipts from 1850 forward) the log cabin (reported to have been built during the 1840's) still stands. Do we really want to destroy precious Texas history? The land has been held under the Davis – Stover – Hammond – Sheffield names – all family!

The Millican Reservoir would also encompass areas where the endangered wildflower exist in limited quantities – bitter weed and the very endangered Navasota Ladies Tress found at Panther Creek and other areas in the proposed Millican Reservoir...

The Millican Reservoir would encompass existing and aged well heads that would possible lead to leaks into the water supply and endanger – fish, wildlife, wetlands and humans.

The Millican Reservoir would encompass the "dump" as located on Hwy. 30 between Carlos, Panther Creek and Bryan. Can you just image the toxins in the water supply from that source?

The Millican Reservoir would make it difficult to travel ~ if not economically and time wise unfeasible ~ to reach the Bryan College station for work, for shopping, for school and medical assistance. Who will pay for the new roads required after the existing roads are flooded out? How long will it take and how many lives will be lost due to the change?

Quality common sense indicates that existing structures, wildlife, environmental issues and potential injury to humans make the proposed Millican Reservoir economically unfeasible.

Date: May 7, 2010 Signed El. Sheffield
Elaine Sheffield

Date: May 7, 2010 Signed Robert Sheffield
Robert Sheffield

Law Offices of Sam J. Chase, P.C.
Hinds Square 100 Chestnut Street, Suite 208 Abilene, Texas 79602
Post Office Box 726 Abilene, Texas 79604-0726

Sam J. Chase | chaselaw@suddenlinkmail.com | *Telephone (325) 673-3745*
Charles M. ("Mike") Walls | | *Facsimile (325) 676-1408*

April 20, 2010

Mr. Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714

RECEIVED
2010 APR 22 AM 9: 46
BRAZOS RIVER AUTHORITY

Re: Comments concerning BRA Region G 2011 Water Plan

To the BRA Region G Planning Committee:

I am a lifetime resident of the Region G area, and have been practicing law for almost forty (40) years. I am also a keen observer of politics, both state and local, and recently completed two (2) terms as a member of the City Council in Abilene.

My home is on the shore of Lake Fort Phantom Hill. Accordingly, I have been more than a passive observer of water issues in the Region G area for a number of years, which prompted my attendance at the recent Region G Public Meeting in Abilene. For reasons unexplainable to me, common sense, or to the Lt. Governor's charge to the Water Board, the failure to include the ready availability of access to at least 2200 acre feet or more of good tasting ground water via the Rex Bland/Adobe Wells water field and the Seymore Aquifer in Jones County, in the Region G 2011 Plan is absolutely not responsible nor consistent with the best interests of this State's Water Plan.

Please share these comments with each of your board members and ask them to have a truly disinterested water expert explain to your Board, the Lt. Governor, or to me why this proven ground water source is not being included in the Brazos G Plan.

Thank you and your board for their services to the citizens of Texas.

Very truly yours,

Sam J Chase

Sam J. Chase

SJC/ae

June 24, 2010

To: Region G Water Planning Group

From: Sheril Smith
4875 County Road 309
Lexington, Texas 78947
(512)468-2131

I very much appreciate the work of the Region G Water Planning group, along with BRA staff and consultants. I sincerely believe that each board member and staff person is very committed to the process to benefit all citizens and communities of the region. However, I have multiple concerns and suggestions which I have listed here as part of my public comment to the Region G Water Plan 2011 draft. I realize that some of my suggestions are not within the authority of Region G, but included them nonetheless to help explain my overall perspective.

Surface Water Projects

First, there are serious problems with proposing large surface water projects such as dams, impoundments, off-channel reservoirs, etc. The cost of building such a project can be enormous and difficult to finance. Condemning productive land and communities in order to build a new water supply dam has serious implications to local economies and to the lives of many, for example the proposed Cedar Ridge and Millican Reservoirs. There are few places left to build a reservoir that will not seriously impact some community. Reservoirs should be considered only as a last resort.

Environmental impacts are multiple: a) changes and reductions to in-stream flows and flows to bays and estuaries, which impacts economies along the river and along the coast. b) Changes to water quality in streams. c) Channel degradation and soil erosion downstream due to water releases from a dam. d) Impacts to fish and wildlife due to changes in flow, changes in water quality, and changes to riparian habitats.

In addition to the above, large surface water bodies are subject to massive loss of water due to evaporation and to sedimentation over time, reducing their holding capacity for water, making the large investment of building a reservoir somewhat questionable.

Groundwater Projects

Because groundwater is not considered "state water" like surface water, the local planning process for groundwater development (GWCDs and GMAs) appears to be more easily impacted by outside financial interests, with little concern for local communities that will live or die based on their future groundwater supplies.

Because of the interconnectedness of ground and surface water, we must establish a consistent legal structure to manage all water in Texas. Otherwise, as groundwater pumping continues over time, surface water rights will eventually be impacted. Many local springs in western Lee County where I live could go dry with substantial groundwater pumping, as proposed in various groundwater district plans. Some of these springs run year round and contribute to the stream flow of the Yegua creeks, which feed into the Brazos River. Also, a gaining stream, including some major rivers, could experience reductions to stream flow due to localized groundwater pumping. Do we know whether the Brazos River gains water from the Simsboro or Carrizo Wilcox aquifers? What about aquifers further upstream? Ultimately, with increased demand on all water resources, a consistent legal framework that entails both surface and ground water, overseen by the state, must proactively be put into place, rather than reactively dealing with the problem when a water crisis is at hand sometime in the future.

Demand versus Supply Planning

One of the primary problems with the regional water planning process is that the long term focus of meeting a constantly growing demand is not realistic. "Evaluate water management strategies and select strategies to meet water needs" should be changed to "Evaluate sustainable water supplies and select management strategies to provide adequate water supplies to maintain healthy people, communities and ecosystems while reducing demand." Yes, the state water plan sets up this expectation, based on the similar "supply and demand" economic theories. However, both are theories based on unlimited resources and cannot address the challenges presented by scarce and dwindling water resources.

Public Involvement

The expectation that a water planning group can continue to meet ever-growing demands of Texas' population forces the planning group to spend time and resources proposing strategies for expensive projects for which funding may not be available, which may present negative consequences for various communities and the environment, and tends to set one constituency against another, all competing for the same resources. While it is understood that Region G may not have legal authority to change the process as written by the Texas Legislature and the TWDB, Region G Water Planning Group might recommend policy changes to develop a different approach. Rather than spending all resources on water project development upfront, more focus should be on finding ways to involve the general public in the region, educating them on the options, and getting their feedback on possible strategies before any project is considered. The large Region G Water Planning board is a good first step for public input, and this particular board has taken extra steps to hold public hearings around the region; but more citizens need to be engaged earlier in the process. There are multiple collaborative processes being developed to bring more of the public into the decision-making process. Here are some excerpts from one report, "The Deliberative Agency, Opportunities to Deepen Public Participation," full report can be found here: http://www.deliberative-democracy.net/index.php?option=com_docman&Itemid=93

Methods for deliberative citizen engagement emphasize non-adversarial, results-oriented, community-wide decision-making on large issues and are being used with increasing frequency around the world in a range of settings. This emerging field of practice is producing an array of tools and processes...

...Deliberation builds upon what the United States government has called "a basic tenet of Western democratic traditions," namely that "placing citizens closer to the affairs of government strengthens democracy, stability and transparency, and results in more sound government practices."[3] Democratic deliberation seeks to build upon traditional models of "public participation"–opinion polls, public hearings and meetings, and comment periods

Deliberation is, primarily, a discursive (distinct from, say, an aggregative) approach to decision-making in which citizens come together in a non-coercive environment to identify and discuss public problems and possible solutions. During deliberation, participants "consider relevant facts from multiple points of view, converse with one another to think critically about options before them and enlarge their perspectives, opinions, and *understandings."[4] Ultimately such processes of group reflection are used to render a public judgment as to the best course of action.*

Deliberation is often viewed as superior to traditional forms of public involvement through which individuals or organizations state their viewpoints. Deliberation offers a different structure, resulting substance, and civic benefits. Through deliberation, the public is able to come to a better shared understanding of underlying issues, make substantively better policy recommendations, reduce friction, and experience "empowerment" as individual citizens. It is expected (but not known) that the civic benefits of deliberation–education, engagement, and social capital–can smooth implementation and provide lasting benefits for democratic life. Furthermore, decision-makers profit from the experience by acquiring substantial information about the values, aspirations, and specific concerns or recommendations of citizens on an issue, reinforcing their leadership position. At the same time, the likelihood of future conflict over the issues is substantially reduced and the road paved for successful, lasting implementation.er forms of citizen involvement in governance. …

To illustrate the contrast between deliberation and traditional forms of public participation, it is useful to examine a common tool for public participation in policy-making, the public hearing. A traditional public hearing, broadly defined, is designed to facilitate the exchange of information between experts and citizens, policy-makers and the impacted community. The general purpose of a public hearing is to "receive testimony and public comments" on draft policy, during which policymakers may give background information. [6] Typically, such communication stimulates little in the way of community dialogue despite the best intentions of "outreach" efforts.[7]

While representatives of community groups may regularly be present to offer views of their constituents, the public hearing process fails to facilitate the engagement of citizens with one another or to allow an in-depth exchange with policy-makers. According to the findings of one study, "government agencies tend to practice more of the public information model of communication that stresses the one-way dissemination of information to publics, without giving much thought to feedback or symmetry."[8] Any "public comments" rendered at such forums are necessarily constrained by time and information as much as by design: there is generally insufficient opportunity to come to an understanding of the range of personal experiences and points of view that are at play beneath the surface of complex policy issues. Results of the same study showed that respondents, "tended not to be overly satisfied with public meetings as a way of involving them."[9]

Deliberation, by bringing policy-makers and citizens together in discussion, encourages reflection and an understanding of multiple forces and views that surround an issue before citizens render their comments on a potential or draft policy.

Yes, this type of process takes a great deal of time and would require a shift in thinking and a reorganization of the planning process. It makes sense to invest more time and resources upfront to get the public educated and involved, to develop more trust in the system. There is going to be even more competition for water into the future and it is best to get the public mobilized now, and to build a better, more collaborative, less competitive foundation for our work. Then we can talk about the various projects, run the numbers, discuss possible scenarios, costs, etc.

Thank you for this opportunity to comment.

Fred Brown
State Representative
District 14

RECEIVED
2010 APR 19 AM 10:34
BRAZOS RIVER AUTHORITY

STATE CAPITOL
P.O. BOX 2910
AUSTIN, TEXAS 78768-2910
512/463-0698
FAX: 512/463-5109
CELL: 979/492-6073
CAPITOL OFFICE ROOM
GS.06

DISTRICT
1920 WEST VILLA MARIA ROAD
SUITE 303
BRYAN, TEXAS 77807
979/822-9797
FAX: 979/822-7979

April 16, 2010

Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, TX 76714

Dear Mr. Buzbee:

Please accept this letter of opposition to the proposed damming of the Navasota River. After speaking with my constituents on this issue, I feel it is a land grab that provides no benefits whatsoever to the Bryan/College Station area. As you know the proposed plan would take 71,000 acres from Madison, Grimes, and Brazos counties. Region H has also proposed designating the lands required for use as "unique reservoir sites", meaning no future growth or development of the Bryan/College Station area can take place in these lands. The Bryan/College Station area is one of the fastest growing metropolitan areas within the State of Texas, and restricting the growth of this area will not only hurt the landowners, but it will hurt future businesses interested in moving into the area. With our economy in its current state, tampering with land in areas that may soon be needed to house growth and development is simply unacceptable.

Also, by designating these lands "unique", the lands within the affected areas are rendered useless. This essentially craters land values, as no one wants to buy land that is not usable. In addition to the economic effects that would be felt by the residents of the impacted areas, the wildlife that would be lost could never be replaced. The Navasota River Valley is home to an abundance of wildlife, and the destruction of this natural habitat would result in the loss of many of the plant and animal life that make our area so beautiful. While I understand that the projected increase in the Texas population demands an increase in the future water supply, I must object to the destruction and property intrusion that the proposed plans for the Millican Reservoir will create.

I respectfully request that you take my opinion into consideration. If you have any questions or would like to meet, please feel free to call me at my office, 979-822-9797.

Sincerely,

Fred Brown

Fred Brown

RECEIVED

APR 16 2010

TWDB

Steven L. Hanson
4706 Hunington Dr.
Bryan, TX 77802

April 14, 2010

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Dear Mr. J. Kevin Ward;

I am dismayed that the Region H WPG is recommending that the Millican site be designated a unique reservoir site. Please enlighten me on this process. What are the requirements that must be met before this request becomes a reality? Was there any consideration of the economic harm in Brazos County by making this recommendation? Where can I find the assumptions used in determining the appropriateness of including this site in the recommendation?

The reports I have found do not include any consideration for the economic toll placed on this county just by making the recommendation. Making this sort of "premature" recommendation shows a degree of shortsightedness not well suited to those assigned to prepare a long range outlook into the long term water needs of Texas citizens.

Please count me as opposed to this reckless premature recommendation that will hopefully be disregarded by the state legislature.

Sincerely disgusted at the reckless waste,

Steven L. Hanson

Steven L. Hanson

Copy
State Representative Fred Brown
State Senator Steve Ogden
Governor Rick Perry

Steven L. Hanson
4706 Hunington Dr.
Bryan, TX 77802

May 13, 2010

Re: My letter April 14, 2010
Your letter May 5, 2010

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Dear Mr. J. Kevin Ward;

I appreciate that you would like to pass this on to the Regional Authorities, but there is a serious problem with a process that allows a Regional Authority to recommend a site be declared a unique reservoir without any consideration being given to the economic harm the recommendation can cause. This is a condition that your administrative position should address and I would like to know if you have or intend to have any guidelines for all Regional Authorities to remedy this obvious oversight. I understand that the process is long and there is much still to be done, but the economic harm is immediate. They can consider anything all they want, but once the Regional Authority votes to recommend, the economic harm starts. I see nothing to indicate that this economic harm was considered before the recommendation was made.

Please directly address this issue.

Sincerely

Steven L. Hanson

Steven L. Hanson

Copy
State Representative Fred Brown
State Senator Steve Ogden
Governor Rick Perry
Jace Houston, San Jacinto River Authority
Trey Buzbee, Brazos River Authority

Steven L. Hanson
4706 Hunington Dr.
Bryan, TX 77802

May 19, 2010

Re: My letter April 14, 2010
Your letter May 5, 2010
My response May 13, 2010

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Dear Mr. J. Kevin Ward;

In the 2010 recommendation report (below) it states that the TDWB provided detailed guidance for socioeconomic impact of proposed supply sources. Does this guidance include the socioeconomic impact on Brazos County, Bryan/College Station for the Millican Reservoir? Does it require that the board consider the economic harm the recommendation can cause by making the recommendation before they make the recommendation? I have not been able to find anywhere that the report has addressed socioeconomic impact. Have you reviewed the report to see if TDWB guidance was followed? Was this done before the recommendation was made? Any guidance on where I can get answers to these questions before the comment period is closed would be appreciated.

> Chapter 8 – Ecologically Unique Stream Segments, Unique Initially Prepared Plan
> Reservoir Sites and Legislative Recommendations February 2010
> 8-18
> **Quantitative Environmental Analysis**
> **Discussion:** The Regional Water Planning Guidelines require that the evaluation of potentially
> feasible water management strategies include a quantitative analysis of environmental factors
> including effects on environmental water needs, wildlife habitat, cultural resources, and effect of
> upstream development on bays, estuaries, and arms of the Gulf of Mexico (31TAC357.7.(a)(8)(A)).
> **The TWDB has provided detailed guidance on specific study methods to be used in determining population, water demand, socioeconomic impacts and yield from current and proposed supply sources, but it has not provided similar guidance in the area of environmental impacts.** This lack of specificity is resulting in different methods being used in different regions.
> Additionally, it places the planning groups at risk of needing to conduct additional

analysis after state agencies review the Initially Prepared Plans, and add those results to the report after the public review period has closed.

Please include this correspondence in the public comment for proposed recommended Millican reservoir.

Sincerely

Steven L Hanson

Steven L. Hanson

Copy
State Representative Fred Brown
State Senator Steve Ogden
Governor Rick Perry
Jace Houston, San Jacinto River Authority
Trey Buzbee, Brazos River Authority

April 5, 2010

Ms. Temple McKinnon
Texas Water Development Board
Region H
P.O. Box 13231
Austin, Texas 78711

Dear Ms. McKinnon:

In continued opposition to the proposed Millican Dam Project, please consider another adverse impact of the condemnation of the 100 square miles of Hardwood Forest of the Navasota River Bottom. That of the **transfer of wealth** from Brazos, Robertson, Madison, and Grimes counties to the Houston metropolis. The depredation of land values and confiscation of land by the labeling of Brazos, Robertson, Madison, and Grimes county lands as a "Unique Site" for dam construction and water impoundment will result in a huge transfer of wealth. This labeling and the implied confiscation of local lands leaves local landowners of Brazos county with pennies on the dollar for the value of their land while it adds value to the lands of the Houston metropolis by providing the necessary water for suburban developments by developers in the Houston metropolis.

Consequently, many Brazos county landowners will be stripped of their assets and wealth while Houston developers create new wealth at our expense by developing suburbs with our water from the devaluation and confiscation of over one hundred square miles of our land.

Another consideration is the loss of county tax revenues. This confiscated land will be removed from the tax rolls and will no longer provide county and school tax revenues.

Sincerely,

Thomas Barret Lyne, PhD

Thomas Barret Lyne, PhD.

18075 FM 974
Bryan, Texas 77808
cell: 979-255-5237

April 8, 2010

RECEIVED

APR 09 2010

TWDB

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

Dear Mr. Ward:

Thank you for your public service and for serving the Region H Water Planning Group in the Great State of Texas.

Please do not support the Millican Dam (Panther Creek) project. The proposed inundated lands are rich in history and historical heritage. One such asset is the El Camino Real de los Tejas or the Old San Antonio Road. This historical asset is over 300 years old and 1,000 miles long. The trails were first surveyed in 1915 when the state of Texas commissioned Mr. Zivley and the survey was permanently marked with granite monuments provided by Mrs. Ferguson, Governor Ferguson's wife, and the Daughters of the American Revolution (DAR). Some of these historical markers and trails will be obliterated by the Millican Reservoir. In 1982, the Texas Legislature designated the OSR as a Texas Trail and the Texas DOT took over its maintenance. In 2000, Kay Bailey Hutchison toured the entire trail from Louisiana to Mexico for Legislative recommendations. For lack of road, Senator Hutchison had to tour the southernmost part of the OSR through the Dolph Briscoe Ranch on horseback . In 2004 the OSR was designated a National Historical Trail by President George Bush. This national designation placed the El Camino Real de los Tejas in the National Park Service Trails System. This is the only such designated trail in the state of Texas and the southern central United States.

The El CAino Real de los Tejas trails of the National Park Service Trails System is of significant historical importance to all Texans and to the Nation as a whole. It is imperative that we preserve this asset as a commemorative to our nations heritage and rich diversity. Please do not flood any portion of this National Park Service Trail.

Thank you for opposing the Millican Dam (Panther Creek).

Sincerely,

T. Barret Lyne

T. Barret Lyne, PhD
18075 FM 974
Bryan, Texas 77808
979-255-5237

RECEIVED

APR 19 2010

TWDB

April 17, 2010

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

Dear Mr. Ward:

Thank you for your public service on the TWDB and for protecting public health and the environment while serving under the regulatory environment of the multinational North Atlantic Free Trade Agreement (NAFTA).

Please do not support the Millican Dam (Panther Creek) reservoir project in Texas. The proposed inundated lands are used for agricultural, recreational, residential, industrial and commercial activities. All of these activities routinely or have at some time utilized and applied chemicals for a variety of reasons including pesticides, herbicides, janitorial, and industrial or municipal disposal in compliance with the applicable federal, state, and local regulatory requirements for a vegetated terrestrial system.

However, these best management chemical application practices, currently in harmony with the environment, may be threatened by the waters of the Millican Dam (Panther Creek) reservoir. The flooding of this land would drastically change the environmental compartment where these regulated conventional chemical practices have been applied for decades. The waters of the proposed Millican Dam (Panther Creek) reservoir would change the one hundred square mile area from a terrestrial based environmental compartment to a freshwater aquatic environmental compartment. The resulting perturbations to the environmental chemistry and degradation of applied conventional chemicals would inherently affect the harmonization of environmental chemistry and chemical fate requirements defined under the North Atlantic Free Trade Agreement (NAFTA) in *Harmonization of environmental chemistry and fate data requirements under NAFTA* by the U.S. Environmental Protection Agency and the Pest Management Regulatory Agency of Canada in Regulatory Proposal PR02001-2, October 5, 2001 and promulgated January 1, 2003.

Chemicals and chemical applications are researched, developed and applied under very strict environmental and public health regulations. To diligently develop, manufacture, and apply chemicals and waste materials for decades under one set of regulatory requirements for a particular environmental compartment and then to suddenly change the whole environment where the mixture of these conventional chemicals and their metabolites are safely compartmentalized is ludicrous and is a deliberate assault on the environment and public health.

Thank you for opposing the Millican Dam (Panther Creek) reservoir in Texas and for upholding the environmental chemistry, chemical degradation, and chemical fate regulations of NAFTA and other applicable federal, state, and local regulatory agencies for the protection of public health, water and the environment.

Sincerely,

T. Barret Lyne, PhD
18075 FM 974
Bryan, Texas 77808
979-255-5237

TEXAS
PARKS &
WILDLIFE

Life's better outside.®

June 25, 2010

Mr. Trey Buzbee
Brazos G Administrative Agent
c/o Brazos River Authority
P.O. Box 7555
Waco, Texas 76714-7555

Re: 2010 Brazos G Initially Prepared Regional Water Plan

Dear Mr. Buzbee:

Thank you for seeking review and comment from the Texas Parks and Wildlife Department ("TPWD") on the 2010 Initially Prepared Regional Water Plan for the Brazos G Region (IPP).

As you may know, the Texas Parks and Wildlife Commission recently issued a new and updated Land and Water Resources Conservation and Recreation Plan. One of the cornerstones of the Land and Water Plan calls for TPWD to promote and protect healthy aquatic ecosystems, including the establishment of cooperative strategies to incorporate long-term plant, fish and wildlife needs in all statewide, regional and local watershed planning, management and permitting processes. As you will see in this letter, TPWD has some serious questions about the IPP and in particular, new reservoirs that are under active consideration.

TPWD understands that regional water planning groups are required by TAC §357.7(a)(8)(A) to perform quantitative reporting of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effects of upstream development on bays, estuaries and arms of the Gulf of Mexico when evaluating water management strategies. TPWD believes this quantification is a critical step in the process of attempting to plan for future water needs yet at the same time, protecting environmental resources, including fresh water inflows to current reservoirs and the Gulf of Mexico. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy? Reuse?

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

- Does the IPP recommend any stream segments be nominated as ecologically unique?
- If the IPP includes strategies identified in the 2006 regional water plan, does it address concerns raised by TPWD in connection with the 2006 Water Plan.

The Brazos G planning region encompasses 37 counties making it the largest water-planning region in the state. It is also a complex region with 189 municipal water user groups. Since the 2006 Regional Water Plan, population projections were revised upwards by the Texas Water Development Board (TWDB) for 35 municipal water user groups. Twenty-nine counties have projected water shortages for one or more of those groups. All non-municipal water demands used in the IPP are identical to those used in the 2006 RWP, with the exception of steam-electric demands. The IPP identifies potential new water supplies of 587,278 acre feet/year at current projected costs that exceed $3 billion.

An important part of these projected new supplies comes from conservation (39,363 ac-ft/yr) and reuse (69,044 ac-ft/yr). TPWD agrees that conservation and reuse strategies must be a part of future water planning.

The IPP also considers the expansion of current reservoirs and the construction of new reservoirs. The largest of the proposed new reservoirs are Millican Panther Creek on the Navasota River in Grimes, Brazos, Madison and Robertson counties and Cedar Ridge Reservoir on the Clear Fork Brazos River in Haskell, Shackelford and Throckmorton counties.

The proposed Millican Panther Creek Reservoir would inundate approximately 71,032 surface acres at the conservation pool elevation. An approximation of the ecological systems inundated is provided in Figure 1 and Table 1. Millican Panther Creek Reservoir would also result in substantial negative impacts to downstream flows and could potentially impact multiple threatened and endangered species. Such impacts are recognized and discussed in the IPP; however, 7 of the 13 mollusks listed as Species of Concern in Table 4B.12.8-3 are now listed as threatened by the state of Texas.

The proposed Cedar Ridge Reservoir (with a slightly different footprint) was a water management strategy in the 2006 Brazos G Water Plan. The current proposed footprint is slightly upstream of the previous footprint and would inundate 6,635 surface acres at the conservation pool elevation. Detailed vegetation data similar to that shown in Figure 1 for Millican Panther Creek are not yet available for Cedar Ridge Reservoir. The IPP notes this reservoir would likely have substantial negative impacts to downstream flows and could potentially affect up to 28 threatened, endangered, and rare species. The IPP indicates that the City of Abilene believes Cedar Ridge to be necessary in order to meet two principal water demands:

> (1) Steam electric demands predicted for a former West Texas Utilities power plant on Lake Fort Phantom Hill. The plant is currently shut down. TPWD staff is not aware of plans to reopen this power plant; and
>
> (2) Steam electric demands for the proposed Tenaska Trailblazer Power Plant in Nolan County. While the demands in the IPP assume that this power plant will be water-cooled, the project's webpage states that "Tenaska will use dry cooling technology..."[1] This commitment was recently reinforced through an April 19, 2010 agreement with the Environmental Defense Fund.[2]

TPWD has concerns about Cedar Ridge. If constructed, the current plans would permit the impoundment of approximately 230,000 acre feet of fresh water from the Clear Fork of the Brazos, reducing fresh water inflow into Possum Kingdom. Possum Kingdom presently experiences issues arising from golden algae. A number of scientists believe there is a link between high levels of salinity and golden algae. The Clear Fork of the Brazos contains lower levels of dissolved salts and minerals than the Salt Fork and the Double Mountain Fork. Without the current flows from the Clear Fork, TPWD expects concentrations of dissolved salts and minerals in Possum Kingdom and releases from Possum Kingdom to increase. If Cedar Ridge is constructed, it would also appear that lake levels at Possum Kingdom will experience greater fluctuations. The IPP does not address these issues and we believe it should. Finally, the Clear Fork is only 180 miles long with no major dams.

Environmental Water Needs Impacts of Miller's Creek Augmentation (new dam and reservoir option) are described as "moderate impact" even though Miller's Creek is predicted to be dry approximately 85% of the time with the project compared to less than 20% of the time without the project.

Pg 4B.11-7 of the IPP discusses the transfer of uncommitted water from the Highland Lakes to Williamson County. TPWD has concerns regarding environmental flow impacts that could result from increased interbasin transfers from the Colorado River Basin to the Brazos River Basin and recommends an analysis of these potential impacts be undertaken.

TPWD staff recognizes the water supply constraints caused by natural salt brine springs (pg ES-10). These water sources contribute to environmental conditions

[1] http://www.tenaskatrailblazer.com/trailblazer.html
[2] http://www.edf.org/pressrelease.cfm?contentID=11010

in the upper Brazos drainages that support a unique prairie stream ecosystem. Alterations in hydrologic and water quality conditions due to reservoir construction and operation, water diversions, control of brine sources, and consequent effects may disrupt the dynamics of the unique ecosystem and render habitat unsuitable for species adapted to prairie streams, including pupfish, killifish and minnows. Once known from throughout the Brazos River and its major tributaries, two prairie stream minnows, smalleye shiner *Notropis buccula* and sharpnose shiner *Notropis oxyrhynchus*, are now largely restricted to the drainages of the upper Brazos River (upstream of Lake Possum Kingdom) and are now candidates for listing by the U.S. Fish and Wildlife Service.

Regarding water conservation, the 2006 Regional Water Plan and the IPP state, "Targets identified in specific conservation plans for water user groups in the Brazos G Area should be included in future water planning efforts." As a result of the lack of new information, much of the language and decisions related to water conservation in the IPP are identical to those included in the 2006 Regional Water Plan. TPWD encourages Brazos G to make water conservation a priority early in the next planning cycle.

The Brazos G IPP does not recommend nomination of any stream segments as ecologically unique. No explanation is provided for the lack of recommendations. TPWD understands that Salado Creek was initially considered for recommendation and encourages the planning group to consider this creek, and other rivers and streams, in the next planning cycle.

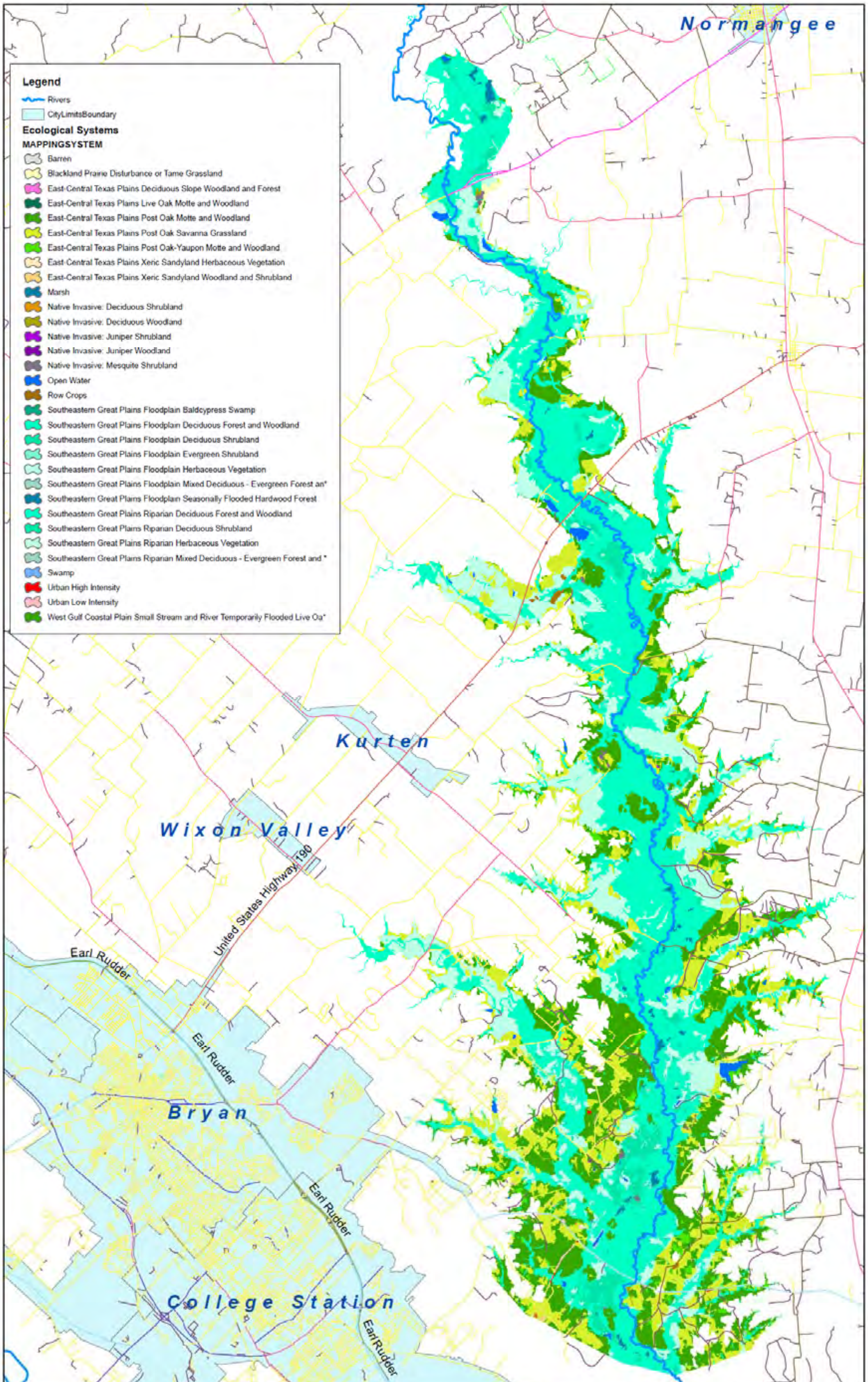
TPWD hopes the Brazos G Regional Water Planning Group will consider and address our questions and concerns before finalizing the IPP. While we value and appreciate the need to meet future water supply demands, we must do so in a thoughtful and sound manner that ensures the ecological health of our state's aquatic and natural resources. We look forward to hearing from you. If you have any questions, or if we can be of any assistance, please feel to contact Cindy Loeffler at 512-389-8715. Thank you.

Sincerely,

Ross Melinchuk
Deputy Executive Director, Natural Resources

RM:CL:ch

Enclosure



Ecological systems in the vicinity of proposed Millican Panther Creek Reservoir.

MAPPINGSYSTEM	Hectares	Acres
East-Central Texas Plains Live Oak Motte and Woodland	2.1	5.2
East-Central Texas Plains Post Oak Motte and Woodland	5,112.2	12,632.4
East-Central Texas Plains Post Oak Savanna Grassland	4,125.1	10,193.2
East-Central Texas Plains Post Oak-Yaupon Motte and Woodland	212.5	525.1
East-Central Texas Plains Deciduous Slope Woodland and Forest	1.3	3.3
Southeastern Great Plains Floodplain Mixed Deciduous - Evergreen Forest and Woodland	15.8	39.0
Southeastern Great Plains Floodplain Deciduous Forest and Woodland	11,023.4	27,239.4
Southeastern Great Plains Floodplain Evergreen Shrubland	0.8	1.9
Southeastern Great Plains Floodplain Deciduous Shrubland	1,017.2	2,513.5
Southeastern Great Plains Floodplain Herbaceous Vegetation	4,228.5	10,448.8
Southeastern Great Plains Floodplain Baldcypress Swamp	6.4	15.7
Southeastern Great Plains Floodplain Seasonally Flooded Hardwood Forest	134.3	331.8
Southeastern Great Plains Riparian Mixed Deciduous - Evergreen Forest and *	5.1	12.5
Southeastern Great Plains Riparian Deciduous Forest and Woodland	122.7	303.1
Southeastern Great Plains Riparian Deciduous Shrubland	19.3	47.6
Southeastern Great Plains Riparian Herbaceous Vegetation	257.1	635.3
West Gulf Coastal Plain Small Stream and River Temporarily Flooded Live Oa*	0.1	0.3
Blackland Prairie Disturbance or Tame Grassland	34.2	84.6
East-Central Texas Plains Xeric Sandyland Woodland and Shrubland	1.5	3.7
East-Central Texas Plains Xeric Sandyland Herbaceous Vegetation	1.8	4.4
Native Invasive: Deciduous Woodland	15.8	39.0
Native Invasive: Juniper Woodland	0.4	0.9
Native Invasive: Juniper Shrubland	2.0	5.0
Native Invasive: Mesquite Shrubland	50.3	124.4
Native Invasive: Deciduous Shrubland	0.1	0.3
Marsh	2.7	6.7
Swamp	0.9	2.1
Barren	7.7	19.0
Open Water	161.1	398.2
Row Crops	23.5	57.9
Urban High Intensity	8.8	21.7
Urban Low Intensity	56.6	139.7

Acreage of ecological systems in the vicinity of proposed Millican Panther Creek Reservoir.

THE WATER BROKER

21 Muirfield Abilene, Texas 79606 325-692-7861

Mr. Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714

Re: Comments concerning the BRA Region G 2011 Water Plan

To the BRA Region G Planning Committee:

I am Billy Jacob, with The Water Broker, LLC. residing in Abilene, Texas. I am a retired Civil Engineer and was in water resource development in Oklahoma and Texas from 1962 until my Retirement in 2007. I have reviewed the BRA Region G 2011 Plan Report and find that it has ignored use of local groundwater located and available in Jones County in the Seymour Aquifer that is within eight miles of Fort Phantom Hill Reservoir. The location of this exiting well field, which has produced about 2,200 acre feet a year since its first production in 1989, was brought to the attention of the Planning Committee by Mr. David Bell, P.E., General Manager of the West Central Texas Municipal Water District and by Mr. Rex Bland owner of the well field and Mr. Sam Chase attorney and recent member of the Abilene City Council, at the last Brazos G hearing in Abilene on January 10, 2010. Some excuses were given that this well field had been raised for consideration in the 2011 Plan, but the City of Abilene, and perhaps others, had vetoed any interest in this groundwater for planning purposes. Therefore, it was not going to be part of the Plan..

As a representative of the Adobe Wells Ranch and owner Rex Bland, we have offered to sell water to the City of Abilene and the WCTMWD and have developed a cost to provide up to 2.4 MGD of groundwater delivered to Fort Phantom Hill at an estimated infrastructure cost of $850,000. We have also offered to Abilene, an Aquifer Storage and Recovery (ASR) alternative at the well field for sewer effluent from the Abilene wastewater treatment plant in the event that Abilene goes to advanced wastewater treatment methods in conjunction with the proposed Cedar Ridge Reservoir or the Tenaska Coal Plant. The available water from the Seymour Aquifer offers a number of advantages to Abilene prior to, and after the full development of the Cedar Ridge Reservoir as listed below.

- Abilene would gain about 8 percent of their average daily water use, perhaps more.
- Abilene would gain 32.69 percent of the 5,100 acre feet of water lost due to the 27.3 percent reduction of the safe yield of Lake Ivie.
- Abilene would gain 5.5 percent of the 30,541 acre feet Abilene lost in Lake Hubbard between the water levels of 1148 and 1155 when the contract with the WCTMWD was changed in 2003.

- Abilene would add about 2,000 acre feet to the 8,226 acre feet cushion of the two year safe yield for year 2060 sedimentation conditions for a total of 10,226 acre feet. This would represent a 24.3 percent increase.

The Lieutenant Governor has challenged Groundwater Improvement Districts, State and Local Planning Agencies to fully consider fresh or brackish groundwater in their future water use planning. In cooperation with the State in meeting this challenge to utilize groundwater, it seems obvious that the Seymour Aquifer in Jones County should be considered in the Region G Plan as a legitimate water supply source for the benefit of all citizens of our State.

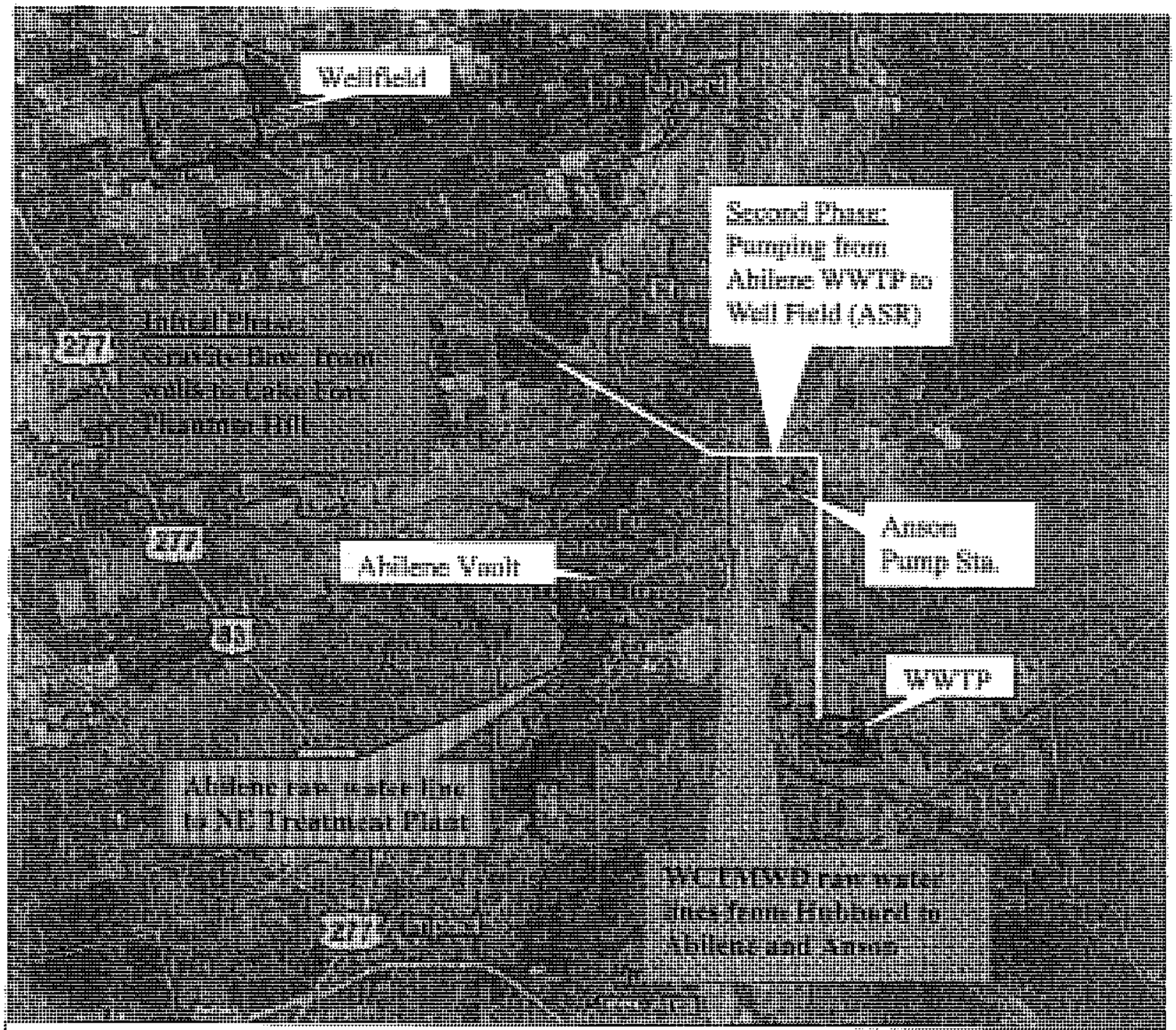
Thank you for the opportunity to offer these comments and I trust you will respond to me concerning these Comments and the questions they have raised about the Plan.

Sincerely,

Billy Jacob

Billy Jacob, P.E., Inactive

Attachment



Points of interest for enhanced utilization of well water and/or treated wastewater

Regional Enhancements:

- Gravity delivery from Seymor well field to Lake Fort Phantom... an initial prove-up concept. Annual supply of 2,000 acre feet per year to Phantom.
  - Pipe/matl $ 300,000
  - Contractor $ 360,000
  - Professional/cont $ 170,000
- Aquifer storage and recovery system (ASR) from Abilene wastewater treatment plant to Seymour well field.
  - Pipe/matl $1,300,000
  - Contractor $1,100,000
  - Professional/cont $ 425,000

THE WATER BROKER

21 Muirfield Abilene, Texas 79606 325-692-7861

Mr. Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714

Re: Comments concerning the BRA Region G 2011 Water Plan

To the BRA Region G Planning Committee:

I am Billy Jacob, with The Water Broker, LLC. residing in Abilene, Texas. I am a retired Civil Engineer and was in water resource development in Oklahoma and Texas from 1962 until my Retirement in 2007. I have reviewed the BRA Region G 2011 Plan Report and find that it has basically ignored use of local ground water located and available in Jones County in the Seymour Aquifer that are within eight miles of Fort Phantom Hill Reservoir. The location of this exiting well field, which has produced about 2,200 acre feet a year since its first production in 1989, was brought to the attention of the Planning Committee by Mr. David Bell, P.E., General Manager of the West Central Texas Municipal Water District and by Mr. Rex Bland owner of the well field and Mr. Sam Chase attorney and recent member of the Abilene City Council, at the last Brazos G hearing in Abilene on January 10, 2010. Some excuses were given that this well field had been raised for consideration in the 2011 Plan, but the City of Abilene, and perhaps others, had vetoed any interest in groundwater for planning purposes.

As a representative of the Adobe Wells Ranch and owner Rex Bland, we have offered to sell water to the City of Abilene and the WCTMWD and have developed a cost to provide up to 2.4 MGD of groundwater delivered to Fort Phantom Hill at an estimated cost of $850,000. We have also offered to Abilene, an Aquifer Storage and Recovery (ASR) alternative at the well field for sewer effluent from the Abilene wastewater treatment plant in the event that Abilene goes to advanced wastewater treatment methods in conjunction with the proposed Cedar Ridge Reservoir or the Tenaska Coal Plant. The available water from the Seymour Aquifer offers a number of advantages to Abilene prior to, and after the full development of the Cedar Ridge Reservoir as listed below.

- Abilene would gain about 8 percent of their average daily water use, perhaps more.
- Abilene would gain 32.69 percent of the 5,100 acre feet of water lost due to the 27.3 percent reduction of the safe yield of Lake Ivie.

- Abilene would gain 5.5 percent of the 30,541 acre feet Abilene lost in Lake Hubbard between the water levels of 1148 and 1155 when the contract with the WCTMWD was changed in 2003.
- Abilene would add about 2,000 acre feet to the 8,226 acre feet cushion of the two year safe yield for year 2060 sedimentation conditions for a total of 10,226 acre feet. This would represent a 24.3 percent increase.

The State has challenged Groundwater Improvement Districts, State and Local Planning Agencies to fully consider fresh or brackish groundwater in their future water use planning. Section 3, Vol. I of the Brazos G Plan identifies the availability of 67,000 acre feet in the Seymour Aquifer, 8,000 acre feet of which are in Jones County. In cooperation with the State in meeting this challenge to utilize groundwater, it seems obvious that the Seymour Aquifer in the area located about eight miles northwest of Phantom reservoir should be considered in the Region G Plan as a legitimate water supply source.

Also, in my further review, The Region G Plan does not specifically indicate that the Cedar Ridge Reservoir is a Wastewater Reclamation Project for the beneficial reuse of sewer effluent for municipal drinking water. The plan alludes to the fact that Abilene proposes Indirect Reuse by Bed and Banks to the Cedar Ridge Reservoir. The Plan does shown that allowing about 12,900 acft/yr of the City of Abilene's return flows to flow down to Cedar Ridge Reservoir increases the one-year safe yield of the reservoir by about 5,500 acft/yr. This statement again does not indicate that the return flow is sewer effluent from the Abilene Wastewater Treatment Plant. The Plan does not include any environmental issues or assessment concerning the sewer effluent capture in Cedar Ridge Reservoir and does not address the use of Advanced Wastewater Treatment Methods or associated costs necessary for TCEQ to approve a permit for reuse of the sewer effluent water for municipal drinking water, nor does the plan consider pharmaceuticals and their effect in the sewer effluent on the proposed reservoir. I live in Abilene and to my knowledge not one of the Public Hearing Notices have indicated that Abilene's Plan for the future is to drink our sewer effluent nor do I recall reading or hearing any Public announcement from the local media indicating that the $285 million dollar option for our future drinking water is going to contain significant amounts of sewer effluent reuse water.

There appears to be something seriously wrong with the math that the Plan used in the Abilene Water projections. The Plan indicates that Abilene has a one year safe yield of 10,900 acre feet available from Lake Ivie, about 23,700 acre feet one year safe yield available from Lake Hubbard and one year safe yield of 15,145 acre feet from Lake Fort Phantom Hill for a total available yield of 49,745 acre feet. Considering an additional 2,000 acre feet from the Seymour Aquifer would make 51,745 acre feet available for Abilene. The Plan Report indicates that by using a two year safe yield of 19,974 acre feet for Lake Hubbard and a two year safe yield of 10,645 acre feet from Lake Phantom the available water to Abilene would be reduced to 43,519 acre feet when considering 2,000 acre feet from the Seymour Aquifer. Currently Abilene has an average annual use of approximately 23,000 acre feet which indicates a current surplus for Abilene of 28,745 acre feet for one year safe yield conditions or a surplus of 20,519 acre feet for two year safe yield conditions for Phantom and Lake Hubbard. This surplus is 125 percent and 89 percent respectively for the two yield conditions greater than Abilene's current use. With this apparent surplus of water for Abilene, why does the Plan indicate in Table 4C.38-11, page 4C.38-21 of Volume II that there is an 8,154 acre feet shortage for 2010 and 28,251 acre feet shortage in 2050. The projected shortage indicates Abilene's 2050 water use would be 51,520 acre feet per year, which incidentally corresponds to about the current one year safe yield availability of 51,745 acre feet if Seymour Aquifer is considered.

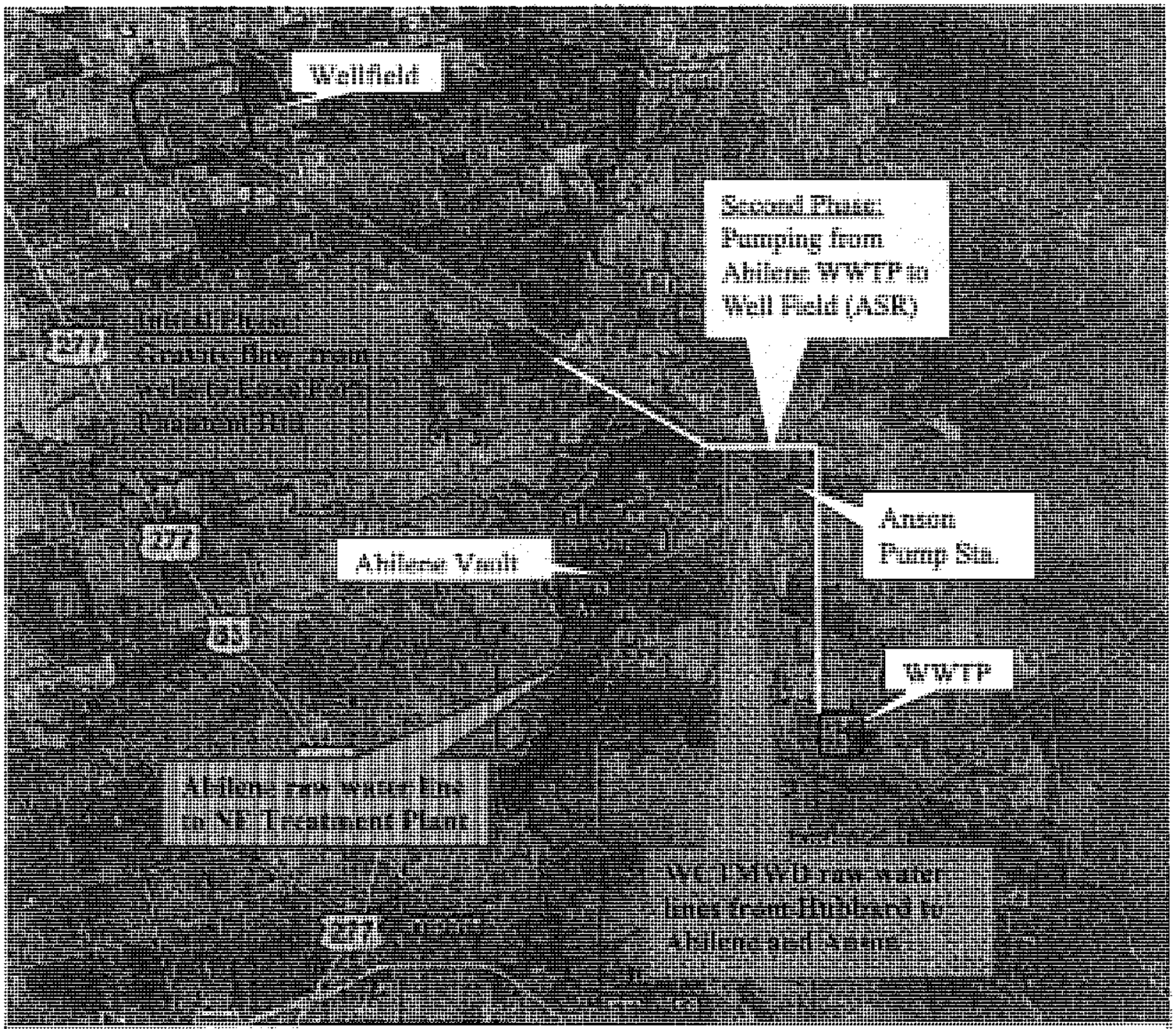
Thank you for the opportunity to offer these comments and I trust you will respond to me concerning these Comments and the questions they have raised to the Plan.

Sincerely,

Billy Jacob

Billy Jacob, P.E., Inactive

Attachment



Points of interest for enhanced utilization of well water and/or treated wastewater

Regional Enhancements:

- Gravity delivery from Seymor well field to Lake Fort Phantom... an initial prove-up concept. Annual supply of 2,000 acre feet per year to Phantom.
    - Pipe/matl $ 300,000
    - Contractor $ 360,000
    - Professional/cont $ 170,000

- Aquifer storage and recovery system (ASR) from Abilene wastewater treatment plant to Seymour well field.
    - Pipe/matl $1,300,000
    - Contractor $1,100,000
    - Professional/cont $ 425,000

RECEIVED
MAY 26 2010
TWDB

May 23, 2010

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

We are writing this letter in protest of the Millican Reservoir Project. The proposed reservoir appears to be an easy choice for Fort Bend and Harris County to look to the North for future water supply. Unfortunately, this property under consideration is fertile ranch/farming land and represents residents' livelihoods. We presently own acreage in Keith, TX, Grimes County that has been in my (Paula Moore) family since the early 1900's (over a hundred years).

Fortunately, Texas is not a land locked State. The Gulf of Mexico is at Fort Bend and Harris County's back door. With the advancement of technology and the Reservoir Project slated for forty years out, the most practical solution would be desalinization of the Gulf of Mexico. Using the Gulf as the water supply, would be a 'win, win' solution for all parties involved.

The Millican Reservoir Project is a bad idea and needs to be withdrawn from consideration immediately. The answer is the Gulf Of Mexico.

Sincerely,

Tom + Paula Moore

Tom and Paula Moore
1714 Serval Lane
College Station, TX 77840
Email: ralphtmoore@yahoo.com

June 28, 2010

The Honorable Dale Spurgin
Jones County Judge
Chairman, Brazos G Regional Water
Planning Group
P.O. Box 148
Anson, Texas 79501

Mr. Phil Ford
Brazos River Authority
P.O. Box 7555
Waco, Texas 76714

Re: Texas Water Development Board Comments for the Brazos (G) Regional Water Planning Group (Region G) Initially Prepared Plan, Contract No. 0904830866

Dear Judge Spurgin and Mr. Ford:

Texas Water Development Board (TWDB) staff completed a review of the Initially Prepared Plan (IPP) submitted by March 1, 2010 on behalf of the Region G Regional Water Planning Group. The attached comments (Attachments A and B) follow this format:

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

Based on the information provided to date by regional water planning groups, TWDB has identified potential interregional conflicts that are summarized in Attachment C. The TWDB's statutory requirement for review of potential interregional conflicts under Title 31, Texas Administrative Code (TAC) §357.14 will not be completed until submittal and review of adopted regional water plans.

Title 31, TAC §357.11(b) requires the regional water planning group to consider timely agency and public comment. Section 357.10(a)(3) of the TAC requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted.

The Honorable Dale Spurgin
Mr. Phil Ford
June 28, 2010
Page 2

Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan.

If you have any questions, please do not hesitate to contact Lann Bookout at (512) 936-9439.

Sincerely,

C L Brittin

Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

Attachments (3)

c w/att: Mr. David Dunn, HDR, Inc.

ATTACHMENT A

TWDB Comments on Initially Prepared 2011 Region G Regional Water Plan

LEVEL 1. Comments and questions must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

Chapter 1

1. Please confirm that plan will not impact any relevant, designated unique stream segments. *[31 TAC §357.8(c)]*

2. Page 1-48; Chapter 4B; Volume II, Sections 4B.1 through 4B.20: Quantitative reporting of impacts to agricultural resources are provided regarding cropland/rangeland/grassland acreage impacts of reservoirs but not for other water management strategies. Please provide numerical basis for quantitative impact discussion on page 1-48 and include similar quantitative reporting of impacts for all potentially feasible water management strategies evaluated. *[Title 31 Texas Administrative Code (TAC) 357.7(a)(8)(A)(iii)]*

3. Pages 1-54 and1-55, Table 1-11.1.9.2: Please update the approval dates for Groundwater District Management Plans. Please update Table 1-11 with the following dates:
   - Clearwater Underground Water Conservation District, approved 3/6/2006
   - Middle Trinity Groundwater Conservation District, approved 5/5/2009
   - Saratoga Underground Water Conservation District, approved 11/30/2009
   - Wes-Tex Groundwater Conservation District, approved 4/7/2010

Chapter 3

4. Pages 3-28 and 3-30, Table 3.2.2: Plan includes water supply estimates using the 75/75 basis as availability for irrigation. Developing a strategy for agricultural needs must reflect availability under drought of record conditions. Please modify analysis based on firm yield or firm diversion and revise table results to reflect drought of record conditions (e.g. firm yield). Please update plan regarding any resulting changes to water needs, if applicable. *[31 TAC §357.7(a)(5); Contract Exhibit "D" Section 3.0]*

5. Page 3-45, Table 3.4-2: The availability value for the Edwards Balcones Fault Zone Aquifer-Northern Segment in Williamson County (3,462 acft/yr) does not match the managed available groundwater value from groundwater availability model Run 08-10 (3,452 acft/yr). Please revise as appropriate throughout the plan.

6. Pages 3-45 thru 3-48, Table 3.4-2: Please update the "Source" column in all instances where table states "Pending final TWDB determination" for the Trinity Aquifer to reflect the appropriate groundwater availability model (GAM) run. TWDB's March 31, 2009 letter provides the managed available groundwater estimates in GAM Run 08-04 based on desired future conditions adopted by the groundwater districts in GMA 8.

7. Pages 3-47 and 48, Tables 3.4-2 and 3.4-3: The 'Western Area' total for Other (Local) aquifer (located in Shackelford County only) of 2,250 acft/yr shown in Table 3.4-3 is not included in the Shackelford County availability of 806 acre-feet in Table 3.4-2. Please revise as appropriate throughout the plan.

8. Page 3-48, Table 3.4-3: Table 3.4-3 Other (Local) Aquifer total of 2,915 acft does not equal the Table 3.4-2 Other (Local) Aquifer total of 3,059 acft. Please reconcile Other (Local) Aquifer totals between Table 3.4-2 and 3.4-3, and, as appropriate, throughout plan.

Chapter 4B

9. Page 4B-8, second paragraph: "…drought management recommendations have not been made by the Brazos G RWPG as a water management strategy for specific WUG needs". Please explain whether drought management strategies were considered for each water user group (WUG) to which Texas Water Code §11.1272 applies in a manner consistent with Texas Water Code §11.1272". *[31 TAC §357.7(a)(7)(B)]*

Chapter 4C

10. The plan does not present categories of water use delineated by counties and river basins. Please present water user group water demands by county and river basin. *[31 TAC §357.7(a)(5)(A)(iv)]*

11. Please indicate whether conservation water management strategies were considered for every water user group with an identified water need and if none were recommended, please explain why in each instance (e.g. Milam County Mining). *[31 TAC §357.7(a)(7)(A)]*

12. Page 4C.12-2 and 3, Section 4C.12.4.3: The references to "cost source" for items "c" and "d" currently show, "4B.17.2.7", which should be "4B.17.3.7." Please revise.

13. Page 4C.30-4 through 4C.30-6: Regarding Somervell County Steam-Electric water needs plan states that "Conservation was not applied to this plan because… (it) is not applicable." Please clarify why conservation was not considered as an applicable strategy where the shortage results from construction of new facilities.

14. Page 4C.39-4: The water management strategy shown as "Groundwater Development" appears to be included in the online planning database as "Additional Carrizo Aquifer Development (includes overdrafting)". Please revise to consistently name water management strategies in both the plan document and online planning database. *[Contract Exhibit "D" Section 3.0]*

Chapter 6

15. Please include a summary of information regarding water loss audits specific to water users located in Region G. *[31 TAC §357.7(a)(1)(M)]*

Appendix C

16. It appears that total county 'balance' surpluses/shortages were calculated incorrectly throughout Appendix C Tables by subtracting 'Total Demand' from 'Total Supply'. Please revise to reflect total subcategory and county-wide water needs as the sum of the individual needs of each water user group in the county; needs that are calculated based on each water user group's own demands and supplies. *[31 TAC§357.7(a)(4)(B)]*

17. Please include a footnote explaining how 'contractual demand' (e.g. Table C-1) is accounted for in calculating net supplies available for each water user group so that current supply numbers can be replicated.

Volume II

18. Chapter 4B: contains two consecutive report sections "4B.17.3", without section 4B.17.2. Please revise the first of these sections to "4B.17.2" if appropriate.

19. *(Attachment B)* Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.

20. *(Attachment C)* Based on the information provided to date by the regional water planning groups, TWDB has also attached a summary, in spreadsheet format, of potential interregional conflicts, apparent water source over allocations, and apparent unmet water needs that were identified during the review of the online planning database and Initially Prepared Regional Water Plan. *[Additional TWDB comments regarding the general conformance of the online planning database (DB12) format and content to the Guidelines for Regional Water Planning Data Deliverables (Contract Exhibit D) are being provided by TWDB staff under separate cover as 'Exception Reports']*

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

General Comment

1. Please consider eliminating one version of section 4B-1 which is duplicated in both Volume I and Volume II.

2. Table of Contents, Page vi, 4B.1.8: Indicates "stage agencies". Please consider correcting to *state* agencies.

Chapter 4

3. Fig 4B.12-1, page 4B.12-2: the legend indicates black dots as representing "off-channel reservoir sites". It appears that these are sites for proposes on-channel reservoirs. Please consider correcting the figures legend.

4. Page 4C.36-21 and 22: There appears to be a mislabeled subsection as there are two sections labeled as "c". Please consider revising as appropriate throughout the plan.

Chapter 5

5. The chapter includes brief discussion of impacts of voluntary redistributions of water and moving water from rural and agricultural areas; however, it does not provide the economic basis for the conclusion regarding increased pumping costs to agricultural and rural areas. Please consider providing additional information on which this conclusion is based.

Appendix B

6. Page B-27, 3rd paragraph: Please consider replacing "GAM-7" with "GMA-8".

7. Page B-32, 1st paragraph: Please consider replacing "GAM-8" with "GMA-8".

8. Page B-39, 3rd paragraph: Groundwater Management Area 8 established desired future conditions for the Hickory Aquifer in Lampasas and Williamson Counties on May 19, 2008. Please consider revising paragraph to reflect this status.

9. Page B-32: The plan states "The preliminary groundwater availability estimates by GAM-8 for the Ellenburger-San Saba Aquifer in Lampasas County is 2,341 acft/yr." The managed available groundwater numbers were officially released by TWDB on December 9, 2009 as 2,593 acft/yr. Please consider revising to reflect this volume.

10. Page B-41, 5th paragraph: Please consider replacing "GAM-8" with "GMA-8".

REGION G

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	City of Abilene reuse supply and cost	ES-16	ES-3							5,500							5,550
G	Round Rock Reuse cost	ES-16	ES-3	6,369,000						7,443	na						na
G	Reuse Waco amount and cost	ES-16	ES-3	N/D						15,765	na						na
G	Palo Pinto MWD No. 1, Turkey Peak Reservoir (off-channel)	ES-16	ES-3							7,600							-
G	Projected Region G Demand	ES-7								1,248,514							1,248,527
G	Combined reliable groundwater supply	ES-10								586,796							589,509
G	Connected total groundwater supply	ES-10			350,728							356,143					
G	Total WMS supplies	ES-12-13		587,278							517,937						
G	Total reuse strategies volumes and costs	ES-16	ES-3	69,044							95,627						
G	Reuse total WMS volume and project cost	ES-16	ES-3	$ 101,314,000						69044	$ 140,442,901						69094
G	Millers Creek Augmentation supply	ES-16	ES-3							17582							17332
G	BRA System Operation (Lake Granger Augmentation) supply	ES-16	ES-3							54279							34405
G	Systems Approaches	ES-16	ES-3	$194,413,000						83929	na						na
G	Water Supply from other Regions	ES-16	ES-3	$470,695,000						66409	na						na
G	Groundwater Development - online database shows ground a	ES-17	ES-3	$119,058,000						21802	na						na
G	City of Sweetwater supply	ES-17	ES-3							1000							864
G	Milam Co. Queen City Availability	3-47	3.4-2		51	51	51	51	51	51		0	0	0	0	0	0
G	Nolan Co. Dockum Availability	3-47	3.4-2		5,750	5,750	5,750	5,750	5,750	5,750		7,775	7,775	7,775	7,775	7,775	7,775
G	Shackelford Co. Other Local Aquifer Availability	3-47	3.4-2		809	809	809	809	809	809		850	850	850	850	850	850
G	Williamson Co. Edwards B-Z Availability	3-48	3.4-2		3,462	3,462	3,462	3,462	3,462	3,462		3,351	3,351	3,351	3,351	3,351	3,351
G	Jarrell-Schwertner WSC needs	4A-6	Table 4A-1							(114)							(140)
G	Killeen's needs	4A-6	Table 4A-1							(4,468)							-
G	Cross Country WSC (Bosque co.) needs	4A-6	Table 4A-1							(52)							(18)
G	Cross Country WSC (Callahan Co.) needs	4A-6	Table 4A-1				(6)			-				-			-
G	Elm Creek WSC (Coryell Co) needs	4A-6	Table 4A-1				(5)			(16)				12			-
G	Kempner WSC needs	4A-6	Table 4A-1				(498)			(1,759)				813			(376)
G	Eastland County-Other needs	4A-6	Table 4A-1				(183)			(80)				(228)			(129)
G	Elm Creek WSC (Falls Co) needs	4A-6	Table 4A-1				(1)			(4)				2			-
G	City of Haskell needs	4A-7	Table 4A-1				(494)							(506)			
G	Johnson Co. SUD (Hill Co) needs	4A-7	Table 4A-1							(6)							-
G	Acton MUD needs	4A-7	Table 4A-1				1,445			(9)				1,885			1
G	Johnson County SUD (Johnson Co) needs	4A-7	Table 4A-1				(4,801)			(16,658)				(4,841)			(16,704)
G	Keene needs	4A-7	Table 4A-1							(97)							(44)
G	Parker WSC needs	4A-7	Table 4A-1							(152)							(134)
G	Hawley WSC needs	4A-7	Table 4A-1				(8)			(5)				5			8
G	Stamford needs	4A-7	Table 4A-1				(2,759)			(2,693)				(616)			(550)
G	Knox County-Other needs	4A-7	Table 4A-1				(7)			2				(9)			-
G	Knox City needs	4A-7	Table 4A-1				(215)							(220)			
G	Munday needs	4A-7	Table 4A-1				(250)							(255)			
G	Aqua WSC needs	4A-8	Table 4A-1				(83)			(176)				(86)			(179)
G	Bistone MWSD needs	4A-8	Table 4A-1				(2,870)			(3,539)				(144)			(141)
G	Cross Country WSC (Mclennan Co.) needs	4A-8	Table 4A-1				(21)			(245)				-			(195)
G	Sweetwater needs	4A-8	Table 4A-1				(3,435)			(3,117)				(3,081)			(2,763)
G	Aqua WSC (Williamson Co) needs	4A-9	Table 4A-1				(30)			(88)				(27)			(85)
G	Chisolm Trail SUD needs	4A-9	Table 4A-1							(3,991)							(3,785)
G	Williamson County-Other needs	4A-9	Table 4A-1							(3,355)							(3,677)
G	Jarrell-Schwertner WSC (Williamson Co) needs	4A-9	Table 4A-1							(1,385)							(1,359)
G	Limestone Co Manufacturing needs	4A-10	Table 4A-2				(39)							(48)			
G	Nolan Co Minng needs	4A-11	Table 4A-4				(108)			(108)				(115)			(115)
G	BRA total supply	4A-15	4A-6		650,477	645,397	640,318	635,238	630,159	625,079		633,006	632,640	632,269	631,407	630,330	629,249
G	BRA Needs	4A-15	Table 4A-6		(103,331)	(140,056)	(145,764)	(334,722)	(376,525)	(382,841)		(40,513)	(58,646)	(88,319)	(99,135)	(150,138)	(181,696)
G	Aquilla Water Supply District total supply	4A-16	4A-7							4,954							4,953
G	Bell Co. WCID 1 Needs	4A-17	Table 4A-8		(6,081)	(6,081)	(6,081)	(6,081)	(6,081)	(6,081)		(32,356)	(24,475)	(20,313)	(16,968)	(14,262)	(11,588)
G	Central Texas WSC 1 Needs	4A-19	Table 4A-10		3,254	3,150	3,020	2,916	2,842	2,754		(100)	(204)	(334)	(438)	(512)	(600)
G	Palo Pinto total supply	4A-22	4A-13		8,158	7,717	7,275	6,833	6,392	5,950		6,605	7,125	6,684	6,267	5,805	5,384
G	Palo Pinto MWD 1 Needs	4A-22	Table 4A-13		(1,038)	(4,628)	(5,196)	(5,718)	(6,302)	(6,930)		(530)	(3,159)	(3,726)	(4,248)	(4,853)	(5,460)
G	North Central Texas MWA total supplies	4A-24	4A-15		50							49					
G	North Central Texas MWA Needs	4A-24	Table 4A-15		(1,599)	(1,609)	(1,619)	(1,629)	(1,639)	(1,649)		(1,350)	(1,359)	(1,369)	(1,379)	(1,389)	(1,399)
G	City of Abilene total supplies	4A-26	4A-16					35,297	35,023						35,296	35,022	

REGION G

		IPP document reference:		Non-matching numbers													
				IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	City of Abilene Needs	4A-26	Table 4A-16		(3,954)	(15,430)	(24,320)	(24,331)	(24,051)	(23,694)		(5,805)	(31,118)	(39,732)	(39,468)	(38,914)	(38,281)
G	Bistone MWSD total supplies	4A-27	4A-17				2,808	2,584		2,136				2,809	2,585		2,137
G	City of Cedar Park total supplies	4A-28	4A-18		14,372	14,270	14,176	14,117	14,054	13,990		14,560	14,560	14,560	14,560	14,560	14,560
G	City of Cedar Park Needs	4A-28	Table 4A-18		(1,174)	(5,017)	(7,400)	(12,278)	(13,341)	(14,556)		(986)	(4,727)	(7,016)	(11,835)	(12,835)	(13,986)
G	Cityof Sweetwater total supplies	4A-31	4A-21		2,000	2,000	2,000	2,000	2,000	2,000		1,715	1,715	1,715	1,715	1,715	1,715
G	City of Sweetwater Needs	4A-31	Table 4A-21		(3,367)	(3,426)	(3,435)	(3,383)	(3,254)	(3,117)		(3,149)	(3,208)	(3,217)	(3,165)	(3,036)	(2,899)
G	City of Temple Total supplies	4A-32	4A-22		-	-	-	-	-	-		16,800	16,800	16,800	16,800	16,800	16,800
G	City of Temple Needs	4A-32	Table 4A-22			(7,029)	(9,226)	(10,978)	(12,906)	(14,732)			(15,436)	(17,633)	(19,385)	(21,313)	(23,139)
G	City of Waco Total supplies	4A-34	4A-23		-	-	-	-	-	-		66,400	66,400	66,400	66,400	66,400	66,400
G	City of Waco Needs	4A-34	Table 4A-23		11,877	9,556	7,595	5,221	3,721	1,505		(9,480)	(11,029)	(11,043)	(11,406)	(11,521)	(11,666)
G	Irrigation BMP costs and savings	6-2			12,359					22,691		3,390	5,519	7,550	7,376	7,206	7,041
G	Groundwater WMS volume	7-17			20,000					70,000		15,277	16,311	16,943	49,554	55,269	56,331
G	Carrizo-Wilcox groundwater pumpage	7-17			9,000					50,300		4,381	5,984	6,584	32,929	38,461	39,374
G	Trinity Aquifer groundwater pumpage	7-17			9,400					9,700		9,558	8,989	9,021	9,687	9,870	10,019
G	Municipal Conservation WMS volume	7-18		19,000							18,952	4,557	12,621	13,101	14,257	16,656	18,952
G	Bell Co Municipal Needs	Appendix C	Table C-1		4,675	2,132	(516)	(2,525)	(4,621)	(6,643)		(4,982)	(7,092)	(9,363)	(11,156)	(13,116)	(15,002)
G	Bell Co Municipal & Industrial Needs	Appendix C	Table C-1		5,185	(1,132)	(4,493)	(7,349)	(10,448)	(13,701)		(4,982)	(10,766)	(13,659)	(16,209)	(19,093)	(22,104)
G	Bell Co Total Needs	Appendix C	Table C-1		9,898	3,648	355	(2,437)	(5,469)	(8,654)		(4,982)	(10,766)	(13,659)	(16,209)	(19,093)	(22,104)
G	439 WSC Needs	Appendix C	Table C-2		392	286	196	138	105	73		1,142	1,036	946	888	855	823
G	Chisolm Trail SUD Needs	Appendix C	Table C-2		279	255	232	215	204	197		74	50	28	11	1	(6)
G	Elm Creek WSC Needs	Appendix C	Table C-2		83	98	112	128	139	157		67	82	96	112	123	141
G	Jarrell-Schwertner WSC Needs	Appendix C	Table C-2							(114)							(140)
G	Kempner WSC Needs	Appendix C	Table C-2		1,117	938	767	651	570	494		667	488	317	201	120	44
G	Moffat WSC Needs	Appendix C	Table C-2		562							569					
G	Bosque Municipal Needs	Appendix C	Table C-3				869	742	730	540				(2)	(21)	(25)	(30)
G	Bosque Municipal & Industrial Needs	Appendix C	Table C-3				670	(858)	(2,553)	(4,748)				(737)	(2,031)	(3,590)	(5,491)
G	Bosque Total Needs	Appendix C	Table C-3				9,401	7,906	6,262	4,077				(737)	(2,031)	(3,590)	(5,491)
G	Clifton Needs	Appendix C	Table C-4		267	203	157	152	149	2		379	315	269	264	261	251
G	Cross Country WSC Needs	Appendix C	Table C-4		48	40	35	(50)	(51)	(52)		27	19	14	(16)	(17)	(18)
G	Brazos Co Municipal Needs	Appendix C	Table C-5		14,113	9,518	5,329	2,168	(1,871)	(3,312)		(30)	(355)	(673)	(2,961)	(5,831)	(7,149)
G	Brazos Co Municipal & Industrial Needs	Appendix C	Table C-5		31,016	26,409	22,265	19,002	15,061	13,487		(30)	(355)	(673)	(2,961)	(5,831)	(7,149)
G	Brazos Co Total Needs	Appendix C	Table C-5		40,944	36,674	32,854	29,899	26,251	24,958		(30)	(355)	(673)	(2,961)	(5,831)	(7,149)
G	Burleson Co Municipal Needs	Appendix C	Table C-7		2,364	2,157	2,017	1,930	1,850	1,755		5	(4)	(10)	(15)	(18)	(22)
G	Burleson Co Municipal & Industrial Needs	Appendix C	Table C-7		2,558	2,315	2,138	2,014	1,901	1,776		5	(4)	(10)	(15)	(18)	(22)
G	Burleson Co Total Needs	Appendix C	Table C-7		3,318	3,806	4,326	4,823	5,400	5,934		5	(4)	(10)	(15)	(18)	(22)
G	Callahan Co Municipal Needs	Appendix C	Table C-9		456	486	548	599	645	663		(253)	(254)	(252)	(237)	(233)	(233)
G	Callahan Co Municipal & Industrial Needs	Appendix C	Table C-9		467	493	553	602	647	663		(253)	(254)	(252)	(237)	(233)	(233)
G	Callahan Co Total Needs	Appendix C	Table C-9		885	924	997	1,059	1,117	1,145		(253)	(254)	(252)	(237)	(233)	(233)
G	Coleman County WSC needs	Appendix C	Table C-10		(9)	(9)	(6)	(4)	(1)	-		-	-	-	-	-	-
G	Potosi WSC Needs	Appendix C	Table C-10		(2)	(2)		-	-	-		(1)	(1)		(1)	(1)	(1)
G	Coryell Municipal Needs	Appendix C	Table C-13				2,116	904	(159)	(1,109)				(72)	(601)	(1,089)	(1,826)
G	Coryell Co Municipal & Industrial Needs	Appendix C	Table C-13				2,131	916	(150)	(1,102)				(72)	(601)	(1,089)	(1,826)
G	Coryell Co Total Needs	Appendix C	Table C-13				22030	22270	22511	22742				(72)	(601)	(1,089)	(1,826)
G	Coppers Cove Needs	Appendix C	Table C-14		-	5	6	9	9	8		4,156	3,655	3,210	2,913	2,622	2,341
G	Elm Creek WSC Needs	Appendix C	Table C-14		11	4	(4)	(9)	(13)	(16		27	20	12	7	3	-
G	Kempner WSC Needs	Appendix C	Table C-14		889	180	(498)	(985)	(1,403)	(1,759)		2,090	1,447	813	362	(35)	(376)
G	Eastland Co Municipal Needs	Appendix C	Table C-15		1,122	1,172	1,278	1,405	1,525	1,634		(292)	(273)	(237)	(196)	(158)	(129)
G	Eastland Co Municipal & Industrial Needs	Appendix C	Table C-15		1,841	1,880	1,980	2,101	2,216	2,317		(292)	(273)	(237)	(196)	(158)	(129)
G	Eastland Co Total Needs	Appendix C	Table C-15		7,495	7,481	7,406	7,303	7,195	7,102		(292)	(273)	(237)	(196)	(158)	(129)
G	Stephens Co. Rural WSC Needs	Appendix C	Table C-16		14	14	14	15	15	15		19	19	19	20	20	20
G	Eastland County-Other Needs	Appendix C	Table C-16		(234)	(217)	(184)	(146)	(110)	(81)		(276)	(260)	(228)	(191)	(157)	(129)
G	Falls Co Municipal Needs	Appendix C	Table C-19		(1,037)	(1,174)	(1,311)	(1,426)	(1,533)	(1,698		(1,940)	(2,120)	(2,299)	(2,456)	(2,588)	(2,763)
G	Falls Co Municipal & Industrial Needs	Appendix C	Table C-19		(972)	(1,103)	(1,236)	(1,348)	(1,452)	(1,615		(1,940)	(2,120)	(2,299)	(2,456)	(2,588)	(2,763)
G	Falls Co Total Needs	Appendix C	Table C-19		9,750	9,667	9,580	9,513	9,451	9,328		(1,940)	(2,120)	(2,299)	(2,456)	(2,588)	(2,763)
G	Elm Creek WSC Needs	Appendix C	Table C-20		1	1	(1)	(1)	(3)	(3)		4	4	2	2	-	-
G	Tri-County SUD Needs	Appendix C	Table C-20		124	97	72	50	30	2		139	112	87	65	45	17
G	Grimes Co Municipal Needs	Appendix C	Table C-23		1,118	809	583	456	309	136		(294)	(547)	(713)	(844)	(955)	(1,065)
G	Grimes Co Municipal & Industrial Needs	Appendix C	Table C-23		5,906	(14,205)	(15,871)	(17,539)	(19,720)	(22,928)		(294)	(15,847)	(17,413)	(19,044)	(21,155)	(24,265)
G	Grimes Co Total Needs	Appendix C	Table C-23		7,658	(12,453)	(14,119)	(15,787)	(17,968)	(21,176)		(294)	(15,847)	(17,413)	(19,044)	(21,155)	(24,265)
G	Haskell Co Municipal Needs	Appendix C	Table C-27		(521)	(488)	(450)	(426)	(401)	(373)		(571)	(541)	(509)	(488)	(465)	(441)
G	Haskell Co Municipal & Industrial Needs	Appendix C	Table C-27		(31)	91	73	28	(30)	(105)		(571)	(541)	(509)	(488)	(465)	(441)

REGION G

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	Haskell Co Total Needs	Appendix C	Table C-27		(29,135)	(27,552)	(26,151)	(24,816)	(23,539)	(22,320)		(29,676)	(28,184)	(26,732)	(25,332)	(23,974)	(22,656)
G	Stamford needs	Appendix C	Table C-28		9	9	9	9	9	9		(1)	(1)	(1)	(1)	(1)	(1)
G	Hill County Municipal Needs	Appendix C	Table C-29		4,114	3,956	3,774	3,328	2,688	1,972		(134)	(220)	(316)	(416)	(586)	(823)
G	Hill County Municipal & Industrial Needs	Appendix C	Table C-29		5,469	5,303	5,112	4,657	4,009	3,283		(134)	(220)	(316)	(416)	(586)	(823)
G	Hill County Total Needs	Appendix C	Table C-29		8,776	8,611	8,420	7,966	7,318	6,593		(134)	(220)	(316)	(416)	(586)	(823)
G	Johnson Co SUD Needs	Appendix C	Table C-30		1	(3)	(8)	(15)	(21)	(27)		22	18	13	6	-	-
G	Hood Co Municipal Needs	Appendix C	Table C-31		3,112	1,421	(185)	(1,941)	(4,122)	(6,762)		(2,170)	(2,824)	(3,566)	(4,414)	(5,458)	(6,739)
G	Hood Co Municipal & Industrial Needs	Appendix C	Table C-31		52,980	49,425	46,827	43,861	40,206	35,768		(2,170)	(2,824)	(3,566)	(4,414)	(5,458)	(6,739)
G	Hood Co Total Needs	Appendix C	Table C-31		62,446	58,957	56,423	53,522	49,931	45,555		(2,170)	(2,824)	(3,566)	(4,414)	(5,458)	(6,739)
G	Acton MUD needs	Appendix C	Table C-32		2,394	1,908	1,458	969	351	(401)		2,833	2,341	1,885	1,390	764	1
G	Johnson Co Municipal Needs	Appendix C	Table C-33		10,696	6,910	2,202	(3,362)	(10,809)	(18,850)		(307)	(2,503)	(5,890)	(10,044)	(16,064)	(23,597)
G	Johnson Co Municipal & Industrial Needs	Appendix C	Table C-33		7,265	(435)	(5,541)	(11,507)	(19,315)	(27,711)		(3,823)	(9,914)	(13,687)	(18,233)	(24,604)	(32,485)
G	Johnson Co Total Needs	Appendix C	Table C-33		8,104	404	(4,702)	(10,668)	(18,477)	(26,873)		(3,823)	(9,914)	(13,687)	(18,233)	(24,604)	(32,485)
G	Johnspn Co SUD Needs	Appendix C	Table C-34		321	(2,099)	(4,820)	(8,063)	(12,188)	(16,677)		300	(2,120)	(4,841)	(8,084)	(12,209)	(16,704)
G	Keene needs	Appendix C	Table C-34							(97)							(44)
G	Parker WSC needs	Appendix C	Table C-34		225	168	110	42	(43)	(152)		253	196	138	70	(36)	(134)
G	Jones Co Municipal Needs	Appendix C	Table C-35		(1,902)	(2,538)	(2,464)	(2,348)	(2,229)	(2,113)		(679)	(808)	(769)	(706)	(644)	(580)
G	Jones Co Municipal & Industrial Needs	Appendix C	Table C-35		12,139	11,526	11,638	11,651	11,801	11,796		(679)	(808)	(769)	(706)	(644)	(580)
G	Jones Co Total Needs	Appendix C	Table C-35		13,720	13,227	13,458	13,585	13,846	13,947		(679)	(808)	(769)	(706)	(644)	(580)
G	Hawley WSC needs	Appendix C	Table C-36		(12)	(11)	(8)	(8)	(6)	(5)		1	3	5	5	7	8
G	Stamford needs	Appendix C	Table C-36		(2,770)	(2,773)	(2,759)	(2,737)	(2,715)	(2,693)		(627)	(630)	(616)	(594)	(572)	(550)
G	Kent Co Municipal Needs	Appendix C	Table C-37		(110)	(104)	(87)	(60)	(47)	(36)		(112)	(108)	(95)	(75)	(66)	(57)
G	Kent Co Municipal & Industrial Needs	Appendix C	Table C-37		327	361	387	423	444	466		(112)	(108)	(95)	(75)	(66)	(57)
G	Kent Co Total Needs	Appendix C	Table C-37		1,541	1,587	1,626	1,673	1,705	1,737		(112)	(108)	(95)	(75)	(66)	(57)
G	Knox Co Municipal Needs	Appendix C	Table C-39		(485)	(493)	(484)	(474)	(468)	(464)		(486)	(492)	(484)	(476)	(469)	(466)
G	Knox Co Municipal & Industrial Needs	Appendix C	Table C-39		(483)	(491)	(482)	(472)	(466)	(462)		(486)	(492)	(484)	(476)	(469)	(466)
G	Knox Co Total Needs	Appendix C	Table C-39		(15,790)	(14,766)	(13,749)	(12,756)	(11,791)	(10,851)		(15,793)	(14,767)	(13,751)	(12,759)	(11,793)	(10,855)
G	Lampassas Co Municipal & Industrial Needs	Appendix C	Table C-41		5,267	4,774	4,431	4,194	4,016	3,923		(111)	(124)	(135)	(146)	(156)	(169)
G	Lampassas Co Total Needs	Appendix C	Table C-41		6,377	5,881	5,536	5,295	5,114	5,018		(111)	(124)	(135)	(146)	(156)	(169)
G	Coppers Cove Needs	Appendix C	Table C-42		-	(5)	(6)	(9)	(9)	(8)		25	17	13	9	7	6
G	Lee Co Municipal Needs	Appendix C	Table C-43		939	587	299	70	(137)	(335)		(173)	(339)	(480)	(599)	(700)	(797)
G	Lee Co Municipal & Industrial Needs	Appendix C	Table C-43		944	591	302	72	(136)	(335)		(173)	(339)	(480)	(599)	(700)	(797)
G	Lee Co Total Needs	Appendix C	Table C-43		1,084	755	491	285	102	(73)		(173)	(339)	(480)	(599)	(700)	(797)
G	Aqua WSC needs	Appendix C	Table C-44		6	(45)	(83)	(118)	(147)	(176)		3	(48)	(86)	(121)	(150)	(179)
G	Limestone Co Municipal Needs	Appendix C	Table C-45		291	(312)	(823)	(1,305)	(1,825)	(2,410)		(223)	(221)	(218)	(220)	(247)	(357)
G	Limestone Co Municipal & Industrial Needs	Appendix C	Table C-45		5,533	4,507	19	(5,277)	(11,629)	(19,291)		(263)	(265)	(266)	(4,967)	(10,819)	(18,002)
G	Limestone Co Total Needs	Appendix C	Table C-45		5,551	4,525	37	(5,259)	(11,611)	(19,272)		(263)	(265)	(266)	(4,967)	(10,819)	(18,002)
G	Limestone Co Manufacturing Needs	Appendix C	Table C-45		(18)	(28)	(39)	(49)	(59)	(69)		(223)	(221)	(218)	(220)	(247)	(357)
G	Limestone Co. Municipal supply	Appendix C	Table C-45		9,138	8,690	8,242	7,795	7,347	6,899		4,396	4,387	4,378	4,369	4,360	4,351
G	Bistone MWSD GW supplies	Appendix C	Table C-46		1,937	1,937	1,937	1,937	1,937	1,937		na	na	na	na	na	na
G	Bistone MWSD SW supplies	Appendix C	Table C-46		1,319	1,095	871	647	423	199		na	na	na	na	na	na
G	Bistone MWSD needs	Appendix C	Table C-46		(2,426)	(2,648)	(2,870)	(3,092)	(3,315)	(3,539)		(148)	(146)	(144)	(142)	(141)	(141)
G	Coolidge needs	Appendix C	Table C-46					32	19	4					(5)	(18)	(33)
G	McLennan Co Municipal Needs	Appendix C	Table C-47		22,945	19,942	17,369	14,586	12,748	9,869		(245)	(302)	(341)	(847)	(1,120)	(1,695)
G	McLennan Co Municipal & Industrial Needs	Appendix C	Table C-47		52,097	41,545	35,746	31,589	27,262	23,141		(245)	(302)	(341)	(847)	(1,120)	(1,695)
G	McLennan Co Total Needs	Appendix C	Table C-47		59,031	48,482	42,684	38,531	34,207	30,090		(245)	(302)	(341)	(847)	(1,120)	(1,695)
G	Cross Country WSC Needs	Appendix C	Table C-48				(21)	(169)	(198)	(245)					(119)	(148)	(195)
G	Milam Co Municipal Needs	Appendix C	Table C-49		2,290	1,979	1,806	1,781	1,780	1,760		(150)	(358)	(485)	(554)	(587)	(617)
G	Milam Co Municipal & Industrial Needs	Appendix C	Table C-49		7,048	5,307	5,134	5,273	222	202		(220)	(428)	(555)	(554)	(2,587)	(2,617)
G	Milam Co Total Needs	Appendix C	Table C-49		13,961	12,245	12,095	12,268	7,239	7,243		(220)	(428)	(555)	(554)	(2,587)	(2,617)
G	Nolan Co Municipal Needs	Appendix C	Table C-51		(3,113)	(3,171)	(3,172)	(3,102)	(2,949)	(2,790)		(3,013)	(3,072)	(3,081)	(3,029)	(2,900)	(2,763)
G	Nolan Co Mining Needs	Appendix C	Table C-51		(108)	(108)	(108)	(108)	(108)	(108)		(115)	(115)	(115)	(115)	(115)	(115)
G	Nolan Co Municipal & Industrial Needs	Appendix C	Table C-51		(3,499)	(14,197)	(23,010)	(23,061)	(23,015)	(22,962)		(3,935)	(14,498)	(23,196)	(23,144)	(23,015)	(22,878)
G	Nolan Co Total Needs	Appendix C	Table C-51		(5,231)	(15,794)	(24,475)	(24,396)	(24,227)	(24,053)		(5,667)	(16,095)	(24,661)	(24,479)	(24,227)	(23,969)
G	Sweetwater needs	Appendix C	Table C-52		(3,367)	(3,426)	(3,435)	(3,383)	(3,254)	(3,117)		(3,013)	(3,072)	(3,081)	(3,029)	(2,900)	(2,763)
G	Palo Pinto Co Municipal Needs	Appendix C	Table C-53			210	(178)	(556)	(1,039)	(1,613)			(1,285)	(1,590)	(1,871)	(2,207)	(2,588)
G	Palo Pinto Co Municipal & Industrial Needs	Appendix C	Table C-53			12,029	11,157	10,314	9,358	8,308			(1,285)	(1,590)	(1,871)	(2,207)	(2,588)
G	Palo Pinto Co Total Needs	Appendix C	Table C-53			14,255	13,394	12,560	11,614	10,575			(1,285)	(1,590)	(1,871)	(2,207)	(2,588)
G	Robertson Co Municipal Needs	Appendix C	Table C-55		2,820	2,715	2,668	2,650	2,673	2,679		(11)	(21)	(26)	(30)	(30)	(30)
G	Robertson Co Municipal & Industrial Needs	Appendix C	Table C-55					172	(11,579)	(13,795)					(2,518)	(14,276)	(16,485)
G	Robertson Co Total Needs	Appendix C	Table C-55		26,330	24,263	11,419	6,566	(4,751)	(6,546)		(11)	(21)	(26)	(2,548)	(14,306)	(16,515)

REGION G

		IPP document reference:		Non-matching numbers													
				IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	Shackelford Co Municipal Needs	Appendix C	Table C-57		442	408	429					(3)	(37)	(15)			
G	Shackelford Co Municipal & Industrial Needs	Appendix C	Table C-57		492	458	480					(3)	(37)	(15)			
G	Shackelford Co Total Needs	Appendix C	Table C-57		389	361	387	454	573	706		(107)	(135)	(109)	(89)	(84)	(80)
G	Somervell Co Municipal Needs	Appendix C	Table C-59				2,031	1,987	1,971	196				(26)	(58)	(71)	(77)
G	Somervell Co Municipal & Industrial Needs	Appendix C	Table C-59		(32,462)	(32,515)	(32,555)	(32,554)	(32,527)	(32,494)		(35,579)	(35,542)	(35,530)	(35,525)	(35,500)	(35,469)
G	Somervell Co Total Needs	Appendix C	Table C-59		(31,866)	(31,909)	(31,939)	(31,930)	(31,892)	(31,850)		(35,579)	(35,542)	(35,530)	(35,525)	(35,500)	(35,469)
G	Stephens Co Municipal & Industrial Needs	Appendix C	Table C-61		(6,470)	(7,084)	(7,310)	(7,498)	(7,645)	(7,918)		(7,621)	(8,234)	(8,473)	(8,704)	(8,930)	(9,253)
G	Stephens Co Total Needs	Appendix C	Table C-61		(3,691)	(4,300)	(4,521)	(4,703)	(4,845)	(5,113)		(7,621)	(8,234)	(8,473)	(8,704)	(8,930)	(9,253)
G	Taylor Co Municipal Needs	Appendix C	Table C-65		(4,351)	(18,547)	(18,680)	(18,442)	(17,913)	(17,305)		(4,992)	(19,182)	(19,317)	(19,092)	(18,576)	(17,981)
G	Taylor Co Municipal & Industrial Needs	Appendix C	Table C-65		(4,296)	(18,511)	(18,653)	(18,424)	(17,903)	(17,305)		(4,992)	(19,182)	(19,317)	(19,092)	(18,576)	(17,981)
G	Taylor Co Total Needs	Appendix C	Table C-65		(4,059)	(18,271)	(18,411)	(18,180)	(17,656)	(17,055)		(4,992)	(19,182)	(19,317)	(19,092)	(18,576)	(17,981)
G	Throckmorton Co Municipal Needs	Appendix C	Table C-67		(15)	1	22	50				(58)	(43)	(23)	(6)		
G	Throckmorton Co Municipal & Industrial Needs	Appendix C	Table C-67		(3)	9	28	54				(58)	(43)	(23)	(6)		
G	Throckmorton Co Total Needs	Appendix C	Table C-67		(3,991)	(3,979)	(3,960)	(3,934)	(3,916)	(3,904)		(4,046)	(4,031)	(4,011)	(3,994)	(3,988)	(3,988)
G	Washington Co Municipal Needs	Appendix C	Table C-71		26,217	1,584	(22,509)	(52,055)	(81,008)	(111,165)		(4,897)	(18,429)	(34,098)	(59,166)	(85,220)	(113,170)
G	Washington Co Municipal & Industrial Needs	Appendix C	Table C-71		23,098	(2,064)	(26,603)	(56,594)	(85,966)	(116,480)		(8,016)	(22,076)	(38,191)	(63,704)	(90,177)	(118,484)
G	Washington Co Total Needs	Appendix C	Table C-71		24,099	(1,061)	(25,599)	(55,589)	(84,959)	(115,473)		(8,016)	(22,076)	(38,191)	(63,704)	(90,177)	(118,484)
G	Aqua WSC needs	Appendix C	Table C-72		(3)	(15)	(30)	(48)	(67)	(88)		-	(12)	(27)	(45)	(64)	(85)
G	Chisolm Trail SUD Needs	Appendix C	Table C-72						(1,596)	(3,991)						(1,390)	(3,785)
G	Jarrell-Schwertner WSC Needs	Appendix C	Table C-72							(1,385)							(1,359)
G	Regional Municipal Needs	Appendix C	Table C-75		113,188	51,337	6,988	(40,811)	(90,523)	(140,955)		(26,015)	(61,424)	(84,940)	(120,586)	(159,442)	(201,029)
G	Regional Manufacturing Needs	Appendix C	Table C-75		32,706	29,780	28,356	27,021	24,195	23,007		(2,761)	(3,440)	(4,107)	(4,782)	(5,392)	(6,053)
G	Regional Steam-Electric Needs	Appendix C	Table C-75		97,996	45,819	12,120	(4,920)	(35,090)	(54,696)		(38,542)	(71,483)	(82,891)	(93,599)	(117,616)	(132,872)
G	Regional Mining Needs	Appendix C	Table C-75		(3,735)	(4,591)	(5,006)	(5,341)	(5,742)	(6,200)		(9,675)	(10,549)	(10,968)	(11,306)	(11,709)	(12,163)
G	Regional Irrigation Needs	Appendix C	Table C-75		48,980	53,829	58,840	63,687	68,496	73,170		(59,571)	(56,961)	(54,422)	(51,942)	(49,527)	(47,181)
G	Regional Municipal & Industrial Needs	Appendix C	Table C-75		240,155	122,345	42,458	(24,052)	(107,160)	(178,844)		(76,993)	(146,896)	(182,906)	(230,273)	(294,159)	(352,117)
G	Regional Agriculture Needs	Appendix C	Table C-75		48,980	53,829	58,840	63,687	68,496	73,170		(59,571)	(56,961)	(54,422)	(51,942)	(49,527)	(47,181)
G	Regional Total Needs	Appendix C	Table C-75		289,135	176,175	101,298	39,635	38,664	105,674		(136,564)	(203,857)	(237,328)	(282,215)	(343,686)	(399,298)
G	Municipal Conservation Roundrock annual costs	na	na	na	na	na	na	na	na	na	-	16,157	30,800	43,423	32,315	17,167	17,672
G	Total Project Cost irrig. Cons. Eastland Co.	4b.2-17, 4B-7	4B.2-10	$7,451,804							$0						
G	Average Annual Cost irrig. Cons. Eastland Co.	4b.2-17, 4B-7	4B.2-10	$649,682								$108,558	$181,152	$254,190	$254,412	$254,412	$254,634
G	Total Project Cost irrig. Cons. Haskell Co.	4b.2-17, 4B-7	4B.2-10	$16,300,068							$0						
G	Average Annual Cost irrig. Cons. Haskell Co.	4b.2-17, 4B-7	4B.2-10	$1,421,114								$300,240	$458,580	$659,750	$640,060	$620,980	$547,690
G	Total Project Cost irrig. Cons. Knox Co.	4b.2-17, 4B-7	4B.2-10	$15,011,028							$0						
G	Average Annual Cost irrig. Cons. Knox Co.	4b.2-17, 4B-7	4B.2-10	$1,308,730								$353,360	$574,560	$784,560	$765,240	$746,480	$728,000
G	Total Project Cost irrig. Cons. Nolan Co.	4b.2-17, 4B-7	4B.2-10	$1,349,300							$0						
G	Average Annual Cost irrig. Cons. Nolan Co.	4b.2-17, 4B-7	4B.2-10	$117,638								$67,140	$109,000	$148,680	$144,760	$140,820	$137,340
G	Total Project Cost irrig. Cons. Shackelford Co.	4b.2-17, 4B-7	4B.2-10	$82,268							$0						
G	Average Annual Cost irrig. Cons. Shackelford Co.	4b.2-17, 4B-7	4B.2-10	$7,172								$2,350	$3,530	$4,700	$4,700	$4,700	$4,310
G	Total Project Cost Reuse College Station	4C.3-3; 4B.3-18	4B.3-15	$4,583,000							$3,291,000						
G	Total Project Cost Reuse S-E Bell Co	4C.1-9; 4B.3-12	4B.3-10	$18,627,335							$17,404,000						
G	Total Project Cost WW Reuse, Roundrock	4B.3-24, 3-26	4B.3-21	$18,102,000							$0						
G	Average Annual Cost WW Reuse, Roundrock	4B.3-24, 3-26	4B.3-21	$2,139,000								$30,240	$0	$0	$2,706,984	$2,606,184	$2,505,384
G	Total Project Cost WW Reuse, Bryan	4B.3-31	4B.3-25	$10,852,000							$6,485,000						
G	Average Annual Cost WW Reuse, Bryan	4B.3-31	4B.3-25	$1,203,000								$0	$0	$0	$0	$576,000	$576,000
G	Total Project Cost WW Reuse, Cleburne	4B.3-37, 3-38	4B.3-29	$10,991,000							na						
G	Average Annual Cost WW Reuse, Cleburne	4B.3-37, 3-38	4B.3-29	$1,201,000								$207,441	$207,441	$42,120	$42,120	$126,120	$342,360
G	Total Project Cost - WMARSS subproject - Waco East – Sandy Creek Project (LS Power Station) and Cities of Hallsburg, Mart, and Riesel Reuse	4B.3-43, 3-46	4B.3-36	$11,992,000							na						
G	Avg Annual Cost - WMARSS subproject - Waco East – Sandy Creek Project (LS Power Station) and Cities of Hallsburg, Mart, and Riesel Reuse	4B.3-43, 3-46	4B.3-36	$1,219,000							na						
G	Total Project Cost WW Reuse, WMARSS subproject	4B.3-57	4B.3-48 & 49	Bull Hide Creek							Hewitt & Lorena						
G	Average Annual Cost WW Reuse, WMARSS subproject	4B.3-57	4B.3-48 & 49	Bull Hide Creek							Hewitt & Lorena						

REGION G

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number							
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	Total Project Cost WW Reuse, WMARSS subproject Flat Creek	4B.3-61	4B.3-53	$11,590,000							na						
G	Average Annual Cost WW Reuse, WMARSS subproject Flat Creek	4B.3-61	4B.3-53	$1,747,000							na						
G	Total Project Cost WW Reuse, WMARSS subproject Waco North – Chalk Bluff WSC and Gholson	4B.3-68	4B.3-59	$14,482,000							na						
G	Average Annual Cost WW Reuse, WMARSS subproject Waco North – Chalk Bluff WSC and Gholson	4B.3-68	4B.3-59	$3,035,000							na						
G	Temple Increase treatment capacity WMS Annual Cost	4C.1-7, 4C.38-1, 4C.38-31	4C.38-1; 4C.38-17	$3,685,000							$3,680,000						
G	Bell County S- Electric - WW Reuse annual cost	4C.1-9	4C1-5			$3,375,000							$337,500				
G	Bosque Co. S-E Conservation annual cost	4C.2-5	4C.2-3	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Carrizo-Wilcox Aquifer Development total project cost	4C.3-3	na	$28,101,000							$24,262,696						
G	College Station - Additional Carrizo Aquifer Development total project cost	4C.3-3, 3-4	4C.3-3	$28,101,000							$7,527,053						
G	Wickson Creek SUD - Additional Carrizo Aquifer Development total project cost	4C.3-3, 3-4	4C.3-3	$28,101,000							$6,021,643						
G	Rising Star, Annual Cost	4C.8-2, 8-3	4C.8-2	$262,000	$262,050							$262,050					
G	Eastland Co. Irrig. Conservation Annual cost	4C.8-5	4C.8-4		$108,560	$181,150		$254,410	$254,410	$254,630		$108,558	$181,152		$254,412	$254,412	$254,634
G	Grimes Co S-Electric Conservation annual cost	4C.12-2, 12-3	4C.12-2	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	City of Haskell - Conservation - annual cost	4C.14-2	4C.14-2			$23,325							$22,325				
G	City of Haskell - ASR - annual costs	4C.14-5	4C.14-4				$2,175,900	$2,175,900	$2,175,900	$2,175,900				$492,000	$492,000	$492,000	$492,000
G	Bethany WSC - annual cost	4C.17-1, 17-3, 17-4			$1,566,000	$1,566,000	$1,093,000	$1,093,000	$1,093,000	$1,093,000	na	na	na	na	na	na	na
G	City of Alvarado, Purchase from Johnson Co SUD annual cost	4C.17-2, 17-3	4C.17-2			$2,078,720	$2,078,720	$2,078,720	$2,078,720	$2,078,720	na	na	na	na	na	na	na
G	Overdraft Trinity Aquifer WMS volume	4C.17-3	4C.17-2		401							410					
G	Cleburne - Water reuse WMSs annual cost	4C.17-7, 17-8	4C.17-5		$1,201,000	$1,201,000						$1,200,321	$1,200,321				
G	Additional reuse/ New W.Loop Reuse WMS volume	4C.17-8	4C.17-5		2,031	2,031	2,031	2,031	2,731	4,533		1,680	1,680	1,680	1,680	1,680	1,680
G	Johnson Co SUD - Infrastructure for Mansfield Supplies Total project and annual costs	4C.17-11; 4C.39-2	4C.17-7; 4C.39-1	$27,182,000	$9,359,000	$9,359,000	$6,989,000	$6,989,000	$6,989,000	$6,989,000	na	na	na	na	na	na	na
G	Johnson Co SUD - Purchase from Grand Prairie Total project and annual costs	4C.17-11	4C.17-7	$35,646,000	$0	$8,017,000	$8,017,000	$4,910,000	$4,910,000	$4,910,000	na	na	na	na	na	na	na
G	Municipal Water Conservation WMS volume	4C.17-11	4C.17-7		486	1,483	2,083	3,005	4,239	5,169		488	1,482	2,082	3,004	4,238	5,168
G	Purchase from Water Provider WMS volume	4C.17-11	4C.17-7		-	6,726	6,726	6,726	6,726	6,726		6,726	13,452	13,452	13,452	13,452	13,452
G	Infrastructure project for City of Mansfield water WMS volume	4C.17-11	4C.17-7		10,080	10,080	10,080	10,080	10,080	10,080		na	na	na	na	na	na
G	BRA Systems Operations Permit WMS volume	4C.17-13	4C.17-8							157							162
G	Trinity Aquifer Development WMS volume	4C.17-14	4C.17-9						160	160						150	150
G	Johnson Co. Mfg Conservation annual costs	4C.17-15, 17-16	4C.17-10	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Johnson Co.Mfg - Purchase from Cleburne annual costs	4C.17-15, 17-16	4C.17-10		$805,503	$1,014,599	$1,208,625	$1,435,332	$1,638,961	$1,840,138		$805,533	$1,014,747	$1,208,595	$1,435,539	$1,638,843	$1,840,374
G	Johnson Co. Steam Electric Conservation annual costs	4C.17-16, 17-17	4C.17-11	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Johnson Co. Steam Electric - Purchase from Cleburne annual cost	4C.17-16, 17-17	4C.17-11	$3,259,956							$1,275,851	$3,302,981	$3,220,241	$3,220,241	$3,220,241	$3,220,241	
G	Knox City: Conservation - annual cost & decade	4C.20-2	4C.20-2							$9,975							$5,525
G	Lampasas Co. Mfg Conservation annual cost	4C.21-2 , 21-3	4C.21-2	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Additional Carrizo-Wilcox Aquifer Development WMS volume	4C.22-2	4C.22-2			403	403	403	403	403			388	373	355	336	315
G	Bistone MWSD WUG , annual costs	4C.23-1	4C.23-1	na	na	na	na	na	na	na	na	$60,976	$60,152	$26,496	$23,288	$23,124	$16,215
G	Limestone Co. Mfg Conservation annual costs	4C.23-5, 23-6	4C.23-6	na	na	na	na	na	na	na	na	$0	$0	$0	$0	$0	$0
G	Limestone Co. Mfg Carrizo Aquifer Dev annual cost	4C.23-5, 23-6	4C.23-6	$41,000								$40,000	$40,000	$10,000	$10,000	$10,000	$10,000
G	Limestone Co. Steam Electric - Conservation annual costs	4C.23-7	4C.23-7	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Limestone Co. Steam Electric - Reallocation annual costs	4C.23-7	4C.23-7	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Chalk Bluff WSC - Trinity Aquifer Dev.- cost	4C.24-4	4C.24-3	$187,000											$287,000	$287,000	$51,000
G	Water Supply from City of Waco WMS volume	4C.24-5	4C.24-4					298	298	298					333	333	333
G	Cross Country WSC - interconnection Waco - annual cost	4C.24-5	4C.24-4	$673,500											$674,000	$674,000	$364,000

REGION G

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	Western Hills WS - Trinity Aquifer Dev.- annual cost	4C.24-15	4C.24-13	$83,500	na	na	na	na	na	na					$129,000	$129,000	$35,000
G	SW Milam WSC - Trinity Aquifer Dev. Annual cost	4C.25-2	4C.25-2	$440,000								$182,000	$182,000	$319,000	$319,000	$135,000	$135,000
G	Additional Carrizo-Wilcox Aquifer Development WMS volume	4C.25-3	4C.25-2		400	400	700	700	966	966		143	308	407	458	484	508
G	Milam Co. Steam Electric - Conservation annual cost	4C.25-4	4C.25-3	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Nolan Co. Mfg - Conservation annual cost	4C.26-2, 26-3	4C.26-2	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Nolan Co. Steam Electric - redistributiuon annual cost	4C.26-3, 26-4	4C.26-3	$91,940,000	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Nolan Co. Mining - Conservation - costs	4C.26-4, 26-5	4C.26-4	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Nolan Co. Irrigation - Conservation -costs	4C.26-6	4C.26-5		$33,570	$54,500	$74,340	$72,380	$70,410	$68,670		$67,140	$109,000	$148,680	$144,760	$140,820	$137,340
G	Mineral Wells - Turkey Peak Res. - total project cost	4C.27-2, 27-3	4C.27-2	$50,227,000							na						
G	Robertson Co. Steam Electric - Conservation costs	4C.28-3	4C.28-2	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Stephens Co. Mining - conservation - costs	4C31-3, 31-4	4C.31-3	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Water Supply from Abilene WMS volume	4C.33-3	4C.33-3		136	142	141	129	116	104		135	141	140	128	115	103
G	Throckmorton Co. Irrigation - purchase water rights annual cost	4C.34-4, 34-5	4C.34-4	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Bartlett - EWCRWTS Lake Granger - total & annual costs	4C.36-2, 36-3	4C.36-2	na	na	na	na	na	na	na	$909,583	$306,836	$225,989	$97,995	$97,995	$80,273	$80,273
G	City of Bartlett Conservation WMS volume	4C.36-3	4C.36-2		12	30	25	19	18	18		-	-	-	-	-	-
G	BRA Supply through EWCRWTS WMS volume	4C.36-3	4C.36-2		180	180	180	180	180	180		90	90	90	90	90	90
G	Chisolm Trail SUD - Lake Granger Conjunctive - annual cost	4C.36-6, 36-7	4C.36-5		na	na	na	na	na	na	$909,583	$306,836	$225,989	$97,995	$97,995	$80,273	$80,273
G	BRA Supply via Granger Augmentation WMS volume	4C.36-7	4C.36-5						1,690	1,690						1,680	1,680
G	Granger - EWCRWTS total & annual costs	4C.36-10	4C.36-8	na	na	na	na	na	na	na	$1,515,972	$0	$376,649	$163,326	$163,326	$133,788	$133,788
G	Hutto - EWCRWTS total & annual costs	4C.36-11	4C.36-9	na	na	na	na	na	na	na	$6,321,601	$2,132,514	$1,570,625	$681,068	$681,068	$557,896	$557,896
G	Jarrell - EWCRWTS total & annual costs	4C.36-11, 36-12	4C.36-10	na	na	na	na	na	na	na	$960,115	$323,883	$238,544	$103,440	$103,440	$84,732	$84,732
G	Jarrell/Schwertner WSC - EWCRWTS total & annual costs	4C.36-13	4C.36-11	na	na	na	na	na	na	na	$6,801,659	$0	$1,705,545	$739,296	$739,296	$606,114	$606,114
G	Jarrell/Schwertner Conservation WMS volume	4C.36-13	4C.36-11		22	84	95	98	118	140		10	10	10	10	10	10
G	BRA Supply through EWCRWTS WMS volume	4C.36-13	4C.36-11			1,346	1,346	1,346	1,346	1,346			1,349	1,349	1,349	1,349	1,349
G	Leander - BCRUAWSP annual costs	4C.36-15, 36-16	4C.36-13	$33,185,000	$0	$0	$0	$0	$9,488,572	$9,488,572		$0	$0	$9,488,572	$9,488,572	$9,488,572	$9,488,572
G	Additional Supply from Lake Travis WMS volume	4C.36-16	4C.36-13				-	-						7,039	7,039		
G	Thrall - EWCRWTS - total & annual costs	4C.36-18, 36-19	4C.36-15	na	na	na	na	na	na	na	$1,515,972	$511,394	$376,649	$163,326	$163,326	$133,788	$133,788
G	Weir - EWCRWTS - total & annual costs	4C.36-19, 36-20	4C.36-16	na	na	na	na	na	na	na	$2,930,878	$988,695	$728,188	$315,763	$315,763	$258,657	$258,657
G	Williamson Co. Manufacturing - Conservation annual cost	4C.36-23	4C.36-19	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Williamson Co. Mining - Conservation annual cost	4C.36-24	4C.36-20	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	Storage Reallocation of Federal Reservoirs WMS volume	4C.38-3	4C.38-2							2,050							2,051
G	GROUNDWATER/SURFACE WATER CONJUNCTIVE USE (LAKE GRANGER AUGMENTATION) WMS volume	4C.38-6	4C.38-3					24,990	70,751	70,246					47,435	62,900	63,475
G	BRA WWP - BRA sys ops - cost	4C.38-8, 38-9	4C.38-4	na	na	na	na	na	na	na	na	na	na	na	na	na	na
G	BRA Systems Operations Permit WMS volume	4C.38-9	4C.38-4		201,800	201,800	201,800	201,800	201,800	201,800		77,020	102,370	107,592	107,592	107,592	107,749
G	Storage Reallocation in Lake Aquilla WMS volume	4C.38-10	4C.38-5							999							998
G	Central TX WSC - Pipeline to EWCRWTS - total project cost	4C.38-12		$44,706,000							$15,169,822						
G	Palo Pinto MWD#1 - Turkey Peak Reservoir - total project & annual costs	4C.38-15	4C.38-8	$50,227,000	$0	$7,019,000	$7,019,000	$5,618,000	$5,618,000	$3,348,000	$46,150,000	$0	$0	$0	$3,401,000	$3,401,000	$3,401,000
G	Palo Pinto MWD#1 - New WTP total & annual cost	4C.38-14, 38-5	4C.38-8	$35,822,000	$0	$5,268,000	$5,268,000	$2,142,000	$2,142,000	$2,142,000	na	na	na	na	na	na	na
G	New Water Treatment Plant WMS volume	4C.38-15	4C.38-8			8,400	8,400	8,400	8,400	8,400		-	-	-	-	-	-
G	Restructure from Plan Element WMS volume	4C.38-16	4C.38-9		502	470	437	405	372	340		501	468	437	406	372	341
G	Millers Creek Reservoir Augmentation WMS volume	4C.38-17	4C.38-10		17,582	17,582	17,582	17,582	17,582	17,582		17,332	17,332	17,332	17,332	17,332	17,332

REGION G

		IPP document reference:		Non-matching numbers													
				IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
G	Bistone MWSD WWP - annual cost	4C.38-22	4C.38-12	$1,483,000								$1,031,000	$1,237,000	$552,000	$590,000	$590,000	$414,000
G	Purchase water from LCRA WMS volume	4C.38-24	4C.38-13			-							12,620				
G	Cedar Park WUG/WWP - purchase from LCRA: total and annual costs	4C.38-23, 38-24	4C.38-13	$61,858,000	$0	$0	$14,952,000	$14,952,000	$14,952,000	$14,952,000	na	na	na	na	na	na	na
G	Round Rock - Conjunctive use - total & annual cost	4C.38-25, 38-26	4C.38-14	$229,822,000	$0	$0	$0	$0	$28,977,500	$28,977,500	na	na	na	na	$14,488,750	$28,977,500	$28,977,500
G	Round Rock - WUG - HB 1437 Williamson Co annual cost	4C.38-25, 38-26	4C.38-14	$0	$0	$0	$0	$0	$0	$0	$0	$21,735	$42,435	$60,203	$73,485	$92,460	$111,263
G	Round Rock - WUG - WW Reuse - cost	4C.38-25, 38-26	4C.38-14	$6,369,000	$772,000	$772,000	$772,000	$3,751,270	$3,751,270	$3,751,270	$0	$30,240	$0	$0	$2,706,984	$2,606,184	$2,505,384
G	BRA System Operation - Lake Granger Augmentation WMS volume	4C.38-26	4C.38-14					-							22,445		
G	Waco - Reuse - annual cost	4C.38-32, 38-33	4C.38-18	$6,355,800							$0	$2,060,930	$2,417,670	$2,718,331	$3,029,985	$3,227,905	$3,515,533
G	Develop Reuse Supplies from WMARSS WMS volume	4C.38-33	4C.38-18		9,242	10,842	12,190	13,587	14,475	15,765		11,770	11,770	12,190	13,587	14,475	15,765
G	Water Supply from other Regions: Johnson County SUD WMS volume	4C.39-2	4C.39-1							16,806							13,452
G	Millers Creek Augmentation: NCTMWD WMS volume	4C.39-3	4C.39-1							17,582							17,332
G	Alternative WMS-Lake Palo Pinto Off-channel Reservoir	4C.38-14	4C.39-12		3,110	3,110	3,110	3,110	3,110	3,110		na	na	na	na	na	na
G	Throckmorton - alternate strategy - purchase from Graham -	4C.34-2	4C.34-2	na	na	na	na	na	na	na	na	na	na	na	na	na	na

REGION G

POTENTIALLY OVER ALLOCATED SOURCES

Source Name	Source Region	Source County	Source Basin	Comments	Over allocated by WUG or WWP?	Interregional?
CARRIZO-WILCOX AQUIFER	G	LEE	BRAZOS	GBRA Simsboro Project	WUG	Yes - G/L

WATER USER GROUPS WITH APPARENT UNMET NEEDS

WUG Name	WUG Region	WUG County	WUG Basin
ABILENE	G	TAYLOR	BRAZOS
CEDAR PARK	G	WILLIAMSON	BRAZOS
IRRIGATION	G	EASTLAND	BRAZOS
IRRIGATION	G	EASTLAND	COLORADO
IRRIGATION	G	HASKELL	BRAZOS
IRRIGATION	G	KNOX	BRAZOS
IRRIGATION	G	NOLAN	BRAZOS
IRRIGATION	G	NOLAN	COLORADO
IRRIGATION	G	SHACKELFORD	BRAZOS
IRRIGATION	G	THROCKMORTON	BRAZOS
MINING	G	WILLIAMSON	BRAZOS
ROUND ROCK	G	WILLIAMSON	BRAZOS
STEAM ELECTRIC POWER	G	NOLAN	BRAZOS
STEAM ELECTRIC POWER	G	SOMERVELL	BRAZOS

June 16, 2010

Blair Fannin
P. O. Box 6051
Bryan, TX 77805

Re: Millican and Bedias Reservoirs

Dear Mr. Fannin,

Thank you for your letters of June 2, 2010, regarding Millican and Bedias Reservoirs.

Please note that Bedias Reservoir was listed as an alternative water management strategy in the 2006 Region H Regional Water Plan. Alternative water management strategies are fully evaluated water management strategies that may be substituted into regional water plans, for example, if the initial recommended strategy becomes infeasible. Also note that while Bedias Reservoir was recently evaluated as a potentially feasible water management strategy it was not included as either a recommended water management strategy or as an alternative water management strategy in the more recent 2011 Initially Prepared Region H Regional Water Plan.

While Bedias Reservoir was designated as a site of unique value for the construction of a reservoir by the 80th Texas Legislature, this designation will terminate on September 1, 2015 unless there is an affirmative vote by the project sponsor to make expenditures necessary in order to construct the reservoir or file applications for state or federal permits to authorize its construction.

Millican Reservoir was included as a recommended water management strategy in both the Region G and Region H 2011 initially prepared regional water plans. The 2011 Initially Prepared Region H Regional Water Plan also recommended Millican Reservoir be designated a site of unique value for the construction of a reservoir. While regional water planning groups may recommend unique sites for reservoir construction, these sites must ultimately be designated by the Texas Legislature.

TWDB has already forwarded a copy of your letter, by email, to the Region G regional water planning group. We suggest that you contact the Region G and/or Region H regional water planning groups directly with your concerns. The regional planning group contacts and websites are:

Region H:
Jace Houston
San Jacinto River Authority
P.O. Box 329
Conroe, Texas 77305-0329

http://www.regionhwater.org/

Region G:
Trey Buzbee
Brazos River Authority
P.O. Box 7555
Waco, TX 76714
Office: (254) 761-3168
Fax: (254) 761-3204
http://www.brazosgwater.org/

Please note that there are many planning and development steps and opportunities for public input that must occur before any major reservoir is constructed. These major steps include: obtaining water right and storage permits; environmental impact studies; and obtaining a U.S. Army Corps of Engineers 404 permit for construction of the reservoir.

For your reference, information regarding Bedias Reservoir and the proposed Millican Reservoir can be found in the Region H Initially Prepared Regional Water Plan, which is available online at the Texas Water Development Board website:
http://www.twdb.state.tx.us/wrpi/rwp/3rdRound/2010IPP.htm

If you need any additional information, please contact Matt Nelson, Manager, Regional Water Planning for the Texas Water Development Board at 512-936-3550.

Sincerely,

J Kevin Ward
Executive Administrator

JKW/CB/MN/dc

cc: Jace Houston, Region H
Trey Buzbee, Region G

RECEIVED

JUN 07 2010

TWDB

Hon. Mark Evans
Chair, RHWPG
c/o San Jacinto River Authority
P.O. Box 329
Conroe, Texas 77305-0329

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

June 2, 2010

Dear Mr. Evans and Mr. Ward,

This letter is to be considered as part of the public comment period for the 2011 Region H Water Plan, which specifically calls for the creation of two new reservoirs – the Millican Reservoir (recommended for designation) and Bedias Reservoir (designated).

It is without hesitation that I oppose the creation of these reservoirs based on review of the Region H analysis and reviewing the presentation material given at the three public meetings held recently. There are severe flaws in calculating the financial costs of these projects and they would come at the expense of current landowners who have extensive investment in land activities within these proposed impacted areas.

I question several aspects of the Region H Planning Group estimated water use in the future, particularly a decline of 2 percent for livestock use by 2060. Texas is the largest beef producing state in the union and it puzzles me how we could have less water demand for livestock production, yet have more beef cattle in production to feed more people 50 years from now? Also, a projected decline of 6.7 percent in irrigated water demand is forecasted by 2060 by Region H. I'm not clear as to what data suggests that food and fiber production will require less water, though our yields and needs for water during drought periods (especially the 2009 Texas drought that rivaled the 1950s) escalate considerably.

Further, to take away oil and gas production tax revenues from property within these reservoir project areas would be a death blow to the counties involved, coupled with our current U.S. economic crisis. At least for the next 10 years, Texas will be attempting to recover from its current economic recession of its own, having not yet sought a solution to balance the state budget heading into the 2011 Legislative Session. This begs the question where will the money come from to build these projects? The answer is simply no one has any money.

In Madison County for example, the widening of Texas 21 is of top priority. The two-lane highway is the only one in the state connecting to an interstate without four lanes of traffic. Madison

County does not have enough tax base to provide contribution in right-of-way purchasing. At the current time, the expansion project plan stops at the Brazos-Madison County line. To take more land out of production in Madison County to fulfill a reservoir project would create more hardship on top of what already exists. The county alone has a delinquent property tax rate between 20 percent and 28 percent. To take away a significant amount of land that does generate tax dollars annually for basic county operating expenses and services doesn't make any sense at all.

It is my view these proposed reservoirs are an easy way out to solving future water needs for our region rather than an extensive review of alternatives and science. Anybody can take a map and see that an easy way to harness water would be from the Navasota River. However, there are better alternatives. For example, desalination would be one option to service the water needs of those needing our water to serve a growing Houston population. The Texas Water Resources Institute, for example, is one of several agencies that have cutting-edge research demonstrating that desalinating water from oil field saltwater production as well as the Gulf of Mexico can be a viable option for drinking water. One solution in using desalinated water would be designated use – desalinated water for bathing and outdoor use, while underground water would be used only for human and agricultural consumption only.

In summary, I urge you and your planning committee to go back to the drawing board and develop a workable plan that will be acceptable to all. I also recommend appointing non-elected officials from Brazos, Madison and other counties to serve on these committees so that everyone has a stake in planning and developing future projects.

As it stands, your current plan does more harm than good in solving our future water needs.

Sincerely,

Blair Fannin,
P.O.Box 6051
Bryan, Texas 77805

TEXAS WATER DEVELOPMENT BOARD

May 27, 2010

Steve L. Hanson
4706 Hunington Dr.
Bryan, TX 77802

Re: Millican Reservoir

Dear Mr. Hanson,

Thank you for your letters of May 13 and 19, 2010, regarding Millican Reservoir. While regional water planning groups are aware of the significance of recommending reservoir projects in regional water plans, there is no state or agency requirement to quantify economic impacts of actually presenting planning level recommendations in a regional water plan. Nor is there a requirement that regional water plans include analyses of the socioeconomic impacts of implementing each recommended water management strategy.

The 2011 Region H Initially Prepared Regional Water Plan language to which you referred in your May 19, 2010 letter "...methods to be used in determining...socioeconomic impacts..." (page 8-18) was referring to the socioeconomic impacts of not meeting identified water needs and not to the socioeconomic impacts of recommending or implementing water management strategies (Texas Administrative Code 357.7(a)(4)(A)). The TWDB methodology that the draft Region H plan was referring to is summarized in the *Methodology for Socioeconomic Impact Analyses* document available online at: http://www.twdb.state.tx.us/wrpi/rwp/docu.htm

When considering water management strategies regional water planning groups must consistently evaluate all projects considering a variety of factors including but not limited to; the quantity, reliability and cost of water provided by the strategy; effects on environmental water needs and wildlife habitat; and, impacts on agricultural resources. Regional water planning groups may, at their discretion, evaluate projects based on any other factors deemed relevant by the planning group. If included, any additional factors would have to be considered with regard to all evaluated water management strategies.

To date, no regional water planning groups have evaluated the socioeconomic impacts of implementing each of their recommended water management strategies. That type of extensive analysis is beyond the scope and resources of current state regional water planning activities. As mentioned in my previous letter, there are many planning and development steps and opportunities for public input that must occur before any major reservoir is constructed including obtaining a U.S. Army Corps of Engineers 404 permit for construction of the reservoir. Issuing such a permit, would require National Environmental Policy Act scoping and analyses which would include considerations of socioeconomic impacts of developing the project.

Once again, we encourage you to contact the Region G and/or Region H regional water planning groups directly with these and any additional concerns.

If you need any additional information, please contact Matt Nelson, Manager, Regional Water Planning for the Texas Water Development Board at 512-936-3550.

Sincerely,

J Kevin Ward
Executive Administrator

JKW/CB/MN/dc

cc: Jace Houston, Region H
Trey Buzbee, Region G

FAX COVER

RECEIVED

MAY 19

TWDB

TO: J. Kevin Ward
Fax: 512 475 2053

Date: 9/15/2003

FROM: Steven L. Hanson

#Pages including cover: 2

STEVEN L. HANSON
Cell 979 820 1650
Home/fax 979 774 3044

sgae@verizon.net

From the Region H web page- so please include correspondence in the comments.

The Region H Planning Group is currently taking comments on the
. Written comments can be submitted to either of the following contacts:

Hon. Mark Evans
Chair, Region H Water Planning Group
c/o San Jacinto River Authority
P.O. Box 329
Conroe, TX 77305-0329

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Comments must be received by 5:00 PM on June 8, 2010

RECEIVED
MAY 19 2010
TWDB

FAX COVER

TO: J. Kevin Ward

Fax: 512 475 2053

Date: 5/19/2010

FROM: Steven L. Hanson

#Pages including cover: 3

STEVEN L. HANSON
Cell 979 820 1636
Home/fax 979 774 3044

sgae@verizon.net

analysis after state agencies review the Initially Prepared Plans, and add those results to the report after the public review period has closed.

Please include this correspondence in the public comment for proposed recommended Millican reservoir.

Sincerely

Steven L Hanson

Steven L. Hanson

Copy
State Representative Fred Brown
State Senator Steve Ogden
Governor Rick Perry
Jace Houston, San Jacinto River Authority
Trey Buzbee, Brazos River Authority

Appendix P
Water User Group Demands by County, and by River Basin

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
439 WSC	BELL	BRAZOS	803	909	999	1,057	1,090	1,122
ABILENE	JONES	BRAZOS	1,029	1,035	1,014	979	945	908
ABILENE	TAYLOR	BRAZOS	21,862	22,450	22,493	22,202	21,643	20,971
ACTON MUD	HOOD	BRAZOS	2,425	2,912	3,363	3,851	4,464	5,204
ACTON MUD	JOHNSON	BRAZOS	21	27	33	39	47	58
ALBANY	SHACKELFORD	BRAZOS	665	690	676	635	555	466
ALVARADO	JOHNSON	TRINITY	570	607	654	697	766	858
ANSON	JONES	BRAZOS	415	416	406	391	374	360
AQUA WSC	LEE	BRAZOS	443	494	532	567	596	625
AQUA WSC	WILLIAMSON	BRAZOS	76	88	103	121	140	161
ASPERMONT	STONEWALL	BRAZOS	202	192	179	165	153	143
BAIRD	CALLAHAN	BRAZOS	389	384	378	373	369	369
BARTLETT	BELL	BRAZOS	184	196	206	211	216	220
BARTLETT	WILLIAMSON	BRAZOS	176	181	188	195	205	217
BELLMEAD	MCLENNAN	BRAZOS	2,622	2,751	2,873	2,984	3,065	3,202
BELL-MILAM FALLS WSC	BELL	BRAZOS	342	371	398	415	425	435
BELL-MILAM FALLS WSC	FALLS	BRAZOS	178	229	281	327	362	407
BELL-MILAM FALLS WSC	MILAM	BRAZOS	245	288	316	334	341	347
BELL-MILAM FALLS WSC	WILLIAMSON	BRAZOS	53	66	83	101	120	142
BELTON	BELL	BRAZOS	2,824	3,199	3,542	3,723	3,875	3,920
BETHANY WSC	JOHNSON	TRINITY	363	397	431	471	527	602
BETHESDA WSC	JOHNSON	TRINITY	2,751	3,415	4,115	4,898	5,863	7,096
BEVERLY HILLS	MCLENNAN	BRAZOS	414	416	416	414	416	424
BISTON MWSD	LIMESTONE	BRAZOS	148	146	144	142	141	141
BITTER CREEK WSC	FISHER	BRAZOS	117	114	113	111	110	113
BITTER CREEK WSC	NOLAN	BRAZOS	118	118	116	112	106	101
BITTER CREEK WSC	NOLAN	COLORADO	4	4	4	3	3	3
BLOCKHOUSE MUD	WILLIAMSON	BRAZOS	903	1,288	1,749	2,242	2,796	3,389
BRANDON-IRENE WSC	HILL	TRINITY	251	253	255	256	263	273
BRECKENRIDGE	STEPHENS	BRAZOS	1,214	1,220	1,215	1,190	1,138	1,102
BREMOND	ROBERTSON	BRAZOS	157	154	151	148	146	146
BRENHAM	WASHINGTON	BRAZOS	3,078	3,223	3,303	3,320	3,364	3,415
BRUCEVILLE-EDDY	FALLS	BRAZOS	2	3	4	5	5	6
BRUCEVILLE-EDDY	MCLENNAN	BRAZOS	825	961	1,077	1,195	1,270	1,383
BRUSHY CREEK MUD	WILLIAMSON	BRAZOS	2,643	3,596	3,869	3,869	3,869	3,869
BRYAN	BRAZOS	BRAZOS	11,957	13,179	14,221	15,022	16,096	16,493
BURLESON	JOHNSON	TRINITY	4,449	6,687	8,272	8,153	8,096	8,095
CALDWELL	BURLESON	BRAZOS	807	835	854	865	878	894
CALVERT	ROBERTSON	BRAZOS	327	323	318	313	310	310
CAMERON	MILAM	BRAZOS	1,606	1,756	1,840	1,881	1,880	1,888
CEDAR PARK	WILLIAMSON	BRAZOS	11,961	16,571	17,910	21,779	21,779	21,780
CHALK BLUFF WSC	MCLENNAN	BRAZOS	441	527	599	676	722	798
CHILDRESS CREEK WSC	BOSQUE	BRAZOS	322	361	389	395	396	402
CHISHOLM TRAIL SUD	BELL	BRAZOS	103	127	149	166	176	183
CHISHOLM TRAIL SUD	WILLIAMSON	BRAZOS	3,025	4,595	6,473	8,619	10,954	13,335

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
CISCO	EASTLAND	BRAZOS	731	719	694	663	633	604
CLEBURNE	JOHNSON	BRAZOS	6,027	6,680	7,343	8,097	9,046	9,879
CLIFTON	BOSQUE	BRAZOS	709	773	819	824	827	837
CLYDE	CALLAHAN	BRAZOS	241	235	220	205	194	188
CLYDE	CALLAHAN	COLORADO	64	62	58	54	51	50
COLEMAN COUNTY WSC	CALLAHAN	COLORADO	49	51	44	38	31	26
COLEMAN COUNTY WSC	TAYLOR	COLORADO	19	20	20	19	19	18
COLLEGE STATION	BRAZOS	BRAZOS	20,032	22,977	25,779	27,844	30,432	31,342
COMANCHE	COMANCHE	BRAZOS	634	632	622	605	587	568
COOLIDGE	LIMESTONE	BRAZOS	53	57	60	61	63	67
COOLIDGE	LIMESTONE	TRINITY	42	46	48	49	51	53
COPPERAS COVE	CORYELL	BRAZOS	3,621	4,122	4,567	4,864	5,155	5,436
COPPERAS COVE	LAMPASAS	BRAZOS	22	30	34	38	40	41
COUNTY-OTHER	BELL	BRAZOS	200	187	174	167	161	159
COUNTY-OTHER	BOSQUE	BRAZOS	718	871	968	990	980	981
COUNTY-OTHER	BRAZOS	BRAZOS	808	695	593	510	422	395
COUNTY-OTHER	BURLESON	BRAZOS	1,139	1,263	1,349	1,404	1,450	1,504
COUNTY-OTHER	CALLAHAN	BRAZOS	322	313	296	283	269	263
COUNTY-OTHER	CALLAHAN	COLORADO	205	200	188	180	171	168
COUNTY-OTHER	COMANCHE	BRAZOS	899	903	886	859	825	799
COUNTY-OTHER	COMANCHE	COLORADO	17	17	16	16	15	15
COUNTY-OTHER	CORYELL	BRAZOS	2,485	2,853	3,211	3,460	3,686	3,880
COUNTY-OTHER	EASTLAND	BRAZOS	753	737	705	668	634	606
COUNTY-OTHER	EASTLAND	COLORADO	31	30	29	28	26	25
COUNTY-OTHER	ERATH	BRAZOS	1,705	1,886	2,053	2,211	2,724	3,062
COUNTY-OTHER	FALLS	BRAZOS	360	286	213	146	97	47
COUNTY-OTHER	FISHER	BRAZOS	185	181	155	134	124	97
COUNTY-OTHER	GRIMES	BRAZOS	658	667	682	675	682	700
COUNTY-OTHER	GRIMES	SAN JACINTO	385	391	400	396	400	410
COUNTY-OTHER	GRIMES	TRINITY	226	229	235	232	235	241
COUNTY-OTHER	HAMILTON	BRAZOS	431	407	384	375	356	355
COUNTY-OTHER	HASKELL	BRAZOS	235	221	203	192	180	166
COUNTY-OTHER	HILL	BRAZOS	250	270	296	322	351	386
COUNTY-OTHER	HILL	TRINITY	18	19	21	23	25	27
COUNTY-OTHER	HOOD	BRAZOS	2,854	3,290	3,677	4,081	4,582	5,167
COUNTY-OTHER	HOOD	TRINITY	9	11	12	13	15	17
COUNTY-OTHER	JOHNSON	BRAZOS	173	175	177	180	184	190
COUNTY-OTHER	JOHNSON	TRINITY	2,079	2,112	2,146	2,183	2,243	2,327
COUNTY-OTHER	JONES	BRAZOS	123	121	117	111	105	100
COUNTY-OTHER	KENT	BRAZOS	42	40	36	29	25	23
COUNTY-OTHER	KNOX	BRAZOS	190	192	188	184	181	178
COUNTY-OTHER	KNOX	RED	27	27	27	26	26	25
COUNTY-OTHER	LAMPASAS	BRAZOS	889	904	914	919	923	1,040

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
COUNTY-OTHER	LAMPASAS	COLORADO	61	62	63	63	63	72
COUNTY-OTHER	LEE	BRAZOS	53	51	49	47	46	46
COUNTY-OTHER	LEE	COLORADO	276	265	256	247	241	239
COUNTY-OTHER	LIMESTONE	BRAZOS	725	660	598	539	490	445
COUNTY-OTHER	LIMESTONE	TRINITY	103	105	105	103	104	106
COUNTY-OTHER	MCLENNAN	BRAZOS	6,345	6,332	6,361	6,359	6,384	6,466
COUNTY-OTHER	MILAM	BRAZOS	401	291	211	152	111	82
COUNTY-OTHER	NOLAN	BRAZOS	102	101	99	95	91	86
COUNTY-OTHER	NOLAN	COLORADO	97	96	94	91	86	82
COUNTY-OTHER	PALO PINTO	BRAZOS	1,810	1,905	1,987	2,086	2,230	2,421
COUNTY-OTHER	ROBERTSON	BRAZOS	567	594	609	616	613	611
COUNTY-OTHER	SHACKELFORD	BRAZOS	291	300	292	273	238	200
COUNTY-OTHER	SOMERVELL	BRAZOS	481	519	547	559	562	566
COUNTY-OTHER	STEPHENS	BRAZOS	242	241	238	231	220	213
COUNTY-OTHER	STONEWALL	BRAZOS	90	85	79	72	66	62
COUNTY-OTHER	TAYLOR	BRAZOS	306	308	302	292	283	274
COUNTY-OTHER	TAYLOR	COLORADO	92	92	91	88	85	82
COUNTY-OTHER	THROCKMORTON	BRAZOS	96	91	84	76	70	66
COUNTY-OTHER	WASHINGTON	BRAZOS	2,186	2,322	2,378	2,396	2,430	2,477
COUNTY-OTHER	WASHINGTON	COLORADO	1	1	1	1	1	1
COUNTY-OTHER	WILLIAMSON	BRAZOS	371	267	378	1,729	3,533	4,651
COUNTY-OTHER	YOUNG	BRAZOS	233	234	231	225	219	217
COUNTY-OTHER	YOUNG	TRINITY	68	68	67	66	64	63
CRAWFORD	MCLENNAN	BRAZOS	65	67	68	69	70	73
CRESSON	HOOD	BRAZOS	37	44	53	63	77	94
CRESSON	HOOD	TRINITY	6	8	9	11	13	16
CRESSON	JOHNSON	TRINITY	12	14	17	20	24	29
CROSS COUNTRY WSC	BOSQUE	BRAZOS	36	44	49	50	51	52
CROSS COUNTRY WSC	MCLENNAN	BRAZOS	445	497	541	585	614	661
CROSS PLAINS	CALLAHAN	COLORADO	167	164	160	157	154	154
DE LEON	COMANCHE	BRAZOS	280	280	274	265	256	248
DECORDOVA	HOOD	BRAZOS	593	592	591	592	597	608
DOG RIDGE WSC	BELL	BRAZOS	715	799	876	926	955	982
DUBLIN	ERATH	BRAZOS	485	516	544	576	682	753
EAST BELL COUNTY WSC	BELL	BRAZOS	263	271	276	279	282	286
EAST BELL COUNTY WSC	FALLS	BRAZOS	77	89	101	112	120	132
EASTLAND	EASTLAND	BRAZOS	918	908	878	841	806	769
ELM CREEK WSC	BELL	BRAZOS	184	206	224	236	243	249
ELM CREEK WSC	CORYELL	BRAZOS	47	63	78	89	97	105
ELM CREEK WSC	FALLS	BRAZOS	5	6	8	9	11	12
ELM CREEK WSC	MCLENNAN	BRAZOS	184	227	261	298	320	357
FERN BLUFF MUD	WILLIAMSON	BRAZOS	1,339	2,049	2,882	3,805	4,810	5,888

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
FILES VALLEY WSC	HILL	BRAZOS	338	341	344	347	354	365
FILES VALLEY WSC	HILL	TRINITY	75	76	77	77	79	82
FLORENCE	WILLIAMSON	BRAZOS	242	283	332	386	447	515
FORT BELKNAPP WSC	PALO PINTO	BRAZOS	2	2	3	3	4	5
FORT BELKNAPP WSC	STEPHENS	BRAZOS	4	3	3	3	3	3
FORT BELKNAPP WSC	THROCKMORTON	BRAZOS	10	10	9	8	8	7
FORT BELKNAPP WSC	YOUNG	BRAZOS	327	326	319	308	300	297
FORT BELKNAPP WSC	YOUNG	TRINITY	7	7	6	6	6	6
FORT GATES WSC	CORYELL	BRAZOS	322	358	392	415	437	457
FORT HOOD	BELL	BRAZOS	4,395	4,337	4,279	4,221	4,182	4,182
FORT HOOD	CORYELL	BRAZOS	4,178	4,123	4,068	4,013	3,976	3,976
FRANKLIN	ROBERTSON	BRAZOS	344	373	389	397	396	395
GATESVILLE	CORYELL	BRAZOS	3,409	4,139	4,850	5,356	5,787	6,163
GEORGETOWN	WILLIAMSON	BRAZOS	10,342	13,956	18,187	22,826	27,979	33,506
GHOLSON	MCLENNAN	BRAZOS	150	169	184	202	213	231
GIDDINGS	LEE	BRAZOS	617	702	771	824	873	918
GIDDINGS	LEE	COLORADO	489	556	611	652	691	727
GLEN ROSE	SOMERVELL	BRAZOS	659	728	785	817	830	836
GODLEY	JOHNSON	BRAZOS	167	206	250	295	355	429
GORMAN	EASTLAND	BRAZOS	137	134	127	120	113	108
GRAFORD	PALO PINTO	BRAZOS	65	65	64	64	65	67
GRAHAM	YOUNG	BRAZOS	1,528	1,531	1,503	1,456	1,415	1,402
GRANBURY	HOOD	BRAZOS	2,795	3,456	4,058	4,708	5,524	6,485
GRANDVIEW	JOHNSON	TRINITY	230	281	342	334	331	331
GRANGER	WILLIAMSON	BRAZOS	207	219	234	248	268	293
GROESBECK	LIMESTONE	BRAZOS	760	923	1,006	1,071	1,135	1,229
HALLSBURG	MCLENNAN	BRAZOS	139	150	158	166	172	182
HAMILTON	HAMILTON	BRAZOS	554	542	531	521	513	513
HAMLIN	JONES	BRAZOS	362	363	355	342	327	314
HARKER HEIGHTS	BELL	BRAZOS	3,904	4,959	5,800	6,507	6,698	6,815
HASKELL	HASKELL	BRAZOS	559	538	518	503	487	472
HAWLEY	JONES	BRAZOS	169	170	168	164	158	151
HAWLEY WSC	JONES	BRAZOS	401	393	380	363	347	333
HAWLEY WSC	SHACKELFORD	BRAZOS	5	5	5	4	4	3
HAWLEY WSC	TAYLOR	BRAZOS	57	57	57	55	53	52
HEARNE	ROBERTSON	BRAZOS	1,124	1,108	1,093	1,077	1,066	1,066
HEWITT	MCLENNAN	BRAZOS	2,029	2,237	2,395	2,571	2,684	2,877
HICO	HAMILTON	BRAZOS	302	297	292	288	285	285
HILLSBORO	HILL	BRAZOS	1,819	1,862	1,911	1,957	2,030	2,123
HOLLAND	BELL	BRAZOS	125	121	117	114	111	111
HUBBARD	HILL	TRINITY	194	188	183	177	173	173
HUTTO	WILLIAMSON	BRAZOS	1,689	2,290	3,001	3,766	4,627	5,550

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
IRRIGATION	BELL	BRAZOS	1,656	1,634	1,611	1,591	1,569	1,546
IRRIGATION	BOSQUE	BRAZOS	2,504	2,466	2,427	2,388	2,352	2,316
IRRIGATION	BRAZOS	BRAZOS	6,584	6,267	5,964	5,676	5,403	5,142
IRRIGATION	BURLESON	BRAZOS	17,480	16,749	16,052	15,431	14,741	14,082
IRRIGATION	CALLAHAN	BRAZOS	109	107	106	104	102	101
IRRIGATION	CALLAHAN	COLORADO	697	686	674	663	653	641
IRRIGATION	COMANCHE	BRAZOS	35,598	35,230	34,867	34,507	34,151	33,798
IRRIGATION	EASTLAND	BRAZOS	15,552	15,576	15,599	15,617	15,623	15,631
IRRIGATION	EASTLAND	COLORADO	750	751	753	753	754	754
IRRIGATION	ERATH	BRAZOS	10,658	10,502	10,349	10,197	10,048	9,901
IRRIGATION	FALLS	BRAZOS	1,866	1,806	1,748	1,691	1,637	1,584
IRRIGATION	FISHER	BRAZOS	2,386	2,314	2,245	2,178	2,113	2,049
IRRIGATION	GRIMES	BRAZOS	190	190	190	190	190	190
IRRIGATION	GRIMES	SAN JACINTO	51	51	51	51	51	51
IRRIGATION	HAMILTON	BRAZOS	475	467	464	456	434	413
IRRIGATION	HASKELL	BRAZOS	49,309	47,844	46,422	45,040	43,702	42,405
IRRIGATION	HILL	BRAZOS	43	42	42	42	42	41
IRRIGATION	HOOD	BRAZOS	3,179	3,120	3,062	3,005	2,948	2,893
IRRIGATION	JOHNSON	BRAZOS	240	240	240	240	240	240
IRRIGATION	JONES	BRAZOS	4,250	4,124	4,000	3,881	3,765	3,653
IRRIGATION	KENT	BRAZOS	517	503	488	475	462	449
IRRIGATION	KNOX	BRAZOS	42,065	41,033	40,025	39,041	38,082	37,147
IRRIGATION	LAMPASAS	BRAZOS	34	33	33	32	32	32
IRRIGATION	LAMPASAS	COLORADO	134	133	131	130	128	127
IRRIGATION	LEE	BRAZOS	738	720	700	681	661	643
IRRIGATION	LEE	COLORADO	202	196	191	186	181	175
IRRIGATION	MCLENNAN	BRAZOS	2,816	2,814	2,812	2,809	2,806	2,803
IRRIGATION	MILAM	BRAZOS	2,372	2,352	2,333	2,312	2,294	2,275
IRRIGATION	NOLAN	BRAZOS	1,747	1,701	1,656	1,612	1,570	1,529
IRRIGATION	NOLAN	COLORADO	3,391	3,302	3,215	3,129	3,048	2,968
IRRIGATION	PALO PINTO	BRAZOS	935	923	911	901	889	877
IRRIGATION	ROBERTSON	BRAZOS	16,175	16,019	15,561	15,115	14,682	14,261
IRRIGATION	SHACKELFORD	BRAZOS	189	183	178	173	168	163
IRRIGATION	SOMERVELL	BRAZOS	474	471	468	467	464	461
IRRIGATION	STEPHENS	BRAZOS	791	781	771	760	750	740
IRRIGATION	STONEWALL	BRAZOS	336	326	317	307	298	290
IRRIGATION	TAYLOR	BRAZOS	60	58	57	55	54	53
IRRIGATION	TAYLOR	COLORADO	110	108	105	103	100	97
IRRIGATION	THROCKMORTON	BRAZOS	4,000	4,000	4,000	4,000	4,000	4,000
IRRIGATION	WASHINGTON	BRAZOS	1,724	1,724	1,724	1,724	1,724	1,724
IRRIGATION	WILLIAMSON	BRAZOS	80	80	80	80	80	80
IRRIGATION	YOUNG	BRAZOS	74	71	69	66	64	61

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
ITASCA	HILL	BRAZOS	210	204	197	192	188	187
ITASCA	HILL	TRINITY	15	15	15	14	14	14
JARRELL	WILLIAMSON	BRAZOS	208	210	212	216	219	207
JARRELL-SCHWERTNER WSC	BELL	BRAZOS	308	344	376	395	409	420
JARRELL-SCHWERTNER WSC	WILLIAMSON	BRAZOS	479	722	1,006	1,308	1,651	2,019
JAYTON	KENT	BRAZOS	112	108	95	75	66	57
JOHNSON COUNTY SUD	HILL	BRAZOS	37	41	46	53	59	65
JOHNSON COUNTY SUD	JOHNSON	BRAZOS	3,044	3,875	4,782	5,865	7,236	8,750
JOHNSON COUNTY SUD	JOHNSON	TRINITY	4,992	6,548	8,276	10,336	12,956	15,756
JONAH WATER SUD	WILLIAMSON	BRAZOS	1,676	2,229	2,804	3,415	4,092	4,845
JOSHUA	JOHNSON	BRAZOS	450	495	544	600	675	773
JOSHUA	JOHNSON	TRINITY	351	387	424	468	527	604
KEENE	JOHNSON	BRAZOS	89	101	114	128	147	172
KEENE	JOHNSON	TRINITY	531	604	684	768	881	1,030
KEMPNER	LAMPASAS	BRAZOS	300	366	411	446	467	482
KEMPNER WSC	BELL	BRAZOS	1,142	1,297	1,443	1,535	1,591	1,636
KEMPNER WSC	CORYELL	BRAZOS	1,699	2,311	2,913	3,334	3,698	4,000
KEMPNER WSC	LAMPASAS	BRAZOS	1,293	1,547	1,734	1,870	1,956	2,015
KILLEEN	BELL	BRAZOS	19,530	25,462	27,985	30,141	32,207	34,432
KNOX CITY	KNOX	BRAZOS	225	229	225	222	219	216
KOSSE	LIMESTONE	BRAZOS	75	75	74	73	73	74
LACY-LAKEVIEW	MCLENNAN	BRAZOS	835	989	1,116	1,256	1,338	1,477
LAKE WHITNEY WATER COMPANY	BOSQUE	BRAZOS	389	387	382	373	366	367
LAKE WHITNEY WATER COMPANY	HILL	BRAZOS	623	608	593	578	570	574
LAMPASAS	LAMPASAS	BRAZOS	1,842	2,016	2,119	2,174	2,223	2,082
LEANDER	WILLIAMSON	BRAZOS	3,887	5,380	7,119	9,028	11,156	13,439
LEE COUNTY WSC	LEE	BRAZOS	721	834	931	1,011	1,079	1,143
LEXINGTON	LEE	BRAZOS	270	305	334	357	378	397
LIBERTY HILL	WILLIAMSON	BRAZOS	454	673	940	1,223	1,537	1,874
LIPAN	HOOD	BRAZOS	171	239	333	467	656	924
LITTLE RIVER-ACADEMY	BELL	BRAZOS	275	285	292	294	297	301
LIVESTOCK	BELL	BRAZOS	953	953	953	953	953	953
LIVESTOCK	BOSQUE	BRAZOS	1,048	1,048	1,048	1,048	1,048	1,048
LIVESTOCK	BRAZOS	BRAZOS	1,032	1,032	1,032	1,032	1,032	1,032
LIVESTOCK	BURLESON	BRAZOS	1,422	1,422	1,422	1,422	1,422	1,422
LIVESTOCK	CALLAHAN	BRAZOS	517	517	517	517	517	517
LIVESTOCK	CALLAHAN	COLORADO	459	459	459	459	459	459
LIVESTOCK	COMANCHE	BRAZOS	4,125	4,125	4,125	4,125	4,125	4,125
LIVESTOCK	COMANCHE	COLORADO	128	128	128	128	128	128
LIVESTOCK	CORYELL	BRAZOS	1,339	1,339	1,339	1,339	1,339	1,339
LIVESTOCK	EASTLAND	BRAZOS	1,087	1,087	1,087	1,087	1,087	1,087
LIVESTOCK	EASTLAND	COLORADO	34	34	34	34	34	34
LIVESTOCK	ERATH	BRAZOS	9,321	9,321	9,321	9,321	9,321	9,321

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
LIVESTOCK	FALLS	BRAZOS	1,626	1,626	1,626	1,626	1,626	1,626
LIVESTOCK	FISHER	BRAZOS	585	585	585	585	585	585
LIVESTOCK	GRIMES	BRAZOS	901	901	901	901	901	901
LIVESTOCK	GRIMES	SAN JACINTO	373	373	373	373	373	373
LIVESTOCK	GRIMES	TRINITY	280	280	280	280	280	280
LIVESTOCK	HAMILTON	BRAZOS	1,961	1,961	1,961	1,961	1,961	1,961
LIVESTOCK	HASKELL	BRAZOS	492	492	492	492	492	492
LIVESTOCK	HILL	BRAZOS	981	981	981	981	981	981
LIVESTOCK	HILL	TRINITY	420	420	420	420	420	420
LIVESTOCK	HOOD	BRAZOS	617	617	617	617	617	617
LIVESTOCK	HOOD	TRINITY	6	6	6	6	6	6
LIVESTOCK	JOHNSON	BRAZOS	1,037	1,037	1,037	1,037	1,037	1,037
LIVESTOCK	JOHNSON	TRINITY	1,080	1,080	1,080	1,080	1,080	1,080
LIVESTOCK	JONES	BRAZOS	786	786	786	786	786	786
LIVESTOCK	KENT	BRAZOS	459	459	459	459	459	459
LIVESTOCK	KNOX	BRAZOS	510	510	510	510	510	510
LIVESTOCK	KNOX	RED	530	530	530	530	530	530
LIVESTOCK	LAMPASAS	BRAZOS	537	537	537	537	537	537
LIVESTOCK	LAMPASAS	COLORADO	151	151	151	151	151	151
LIVESTOCK	LEE	BRAZOS	1,299	1,299	1,299	1,299	1,299	1,299
LIVESTOCK	LEE	COLORADO	248	248	248	248	248	248
LIVESTOCK	LIMESTONE	BRAZOS	1,338	1,338	1,338	1,338	1,338	1,338
LIVESTOCK	LIMESTONE	TRINITY	149	149	149	149	149	149
LIVESTOCK	MCLENNAN	BRAZOS	1,151	1,151	1,151	1,151	1,151	1,151
LIVESTOCK	MILAM	BRAZOS	1,779	1,779	1,779	1,779	1,779	1,779
LIVESTOCK	NOLAN	BRAZOS	223	223	223	223	223	223
LIVESTOCK	NOLAN	COLORADO	241	241	241	241	241	241
LIVESTOCK	PALO PINTO	BRAZOS	909	909	909	909	909	909
LIVESTOCK	ROBERTSON	BRAZOS	1,508	1,508	1,508	1,508	1,508	1,508
LIVESTOCK	SHACKELFORD	BRAZOS	760	760	760	760	760	760
LIVESTOCK	SOMERVELL	BRAZOS	166	166	166	166	166	166
LIVESTOCK	STEPHENS	BRAZOS	576	576	576	576	576	576
LIVESTOCK	STONEWALL	BRAZOS	469	469	469	469	469	469
LIVESTOCK	TAYLOR	BRAZOS	874	874	874	874	874	874
LIVESTOCK	TAYLOR	COLORADO	431	431	431	431	431	431
LIVESTOCK	THROCKMORTON	BRAZOS	752	752	752	752	752	752
LIVESTOCK	WASHINGTON	BRAZOS	1,538	1,538	1,538	1,538	1,538	1,538
LIVESTOCK	WASHINGTON	COLORADO	16	16	16	16	16	16
LIVESTOCK	WILLIAMSON	BRAZOS	1,344	1,344	1,344	1,344	1,344	1,344
LIVESTOCK	YOUNG	BRAZOS	887	887	887	887	887	887
LIVESTOCK	YOUNG	TRINITY	121	121	121	121	121	121
LOMETA	LAMPASAS	BRAZOS	52	57	59	61	62	64
LOMETA	LAMPASAS	COLORADO	78	84	88	91	93	95

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
LORENA	MCLENNAN	BRAZOS	369	408	440	475	497	533
LOTT	FALLS	BRAZOS	97	94	92	89	88	88
MANSFIELD	JOHNSON	TRINITY	165	172	172	173	175	178
MANUFACTURING	BELL	BRAZOS	980	1,085	1,180	1,273	1,355	1,463
MANUFACTURING	BOSQUE	BRAZOS	1,005	1,151	1,285	1,417	1,531	1,664
MANUFACTURING	BRAZOS	BRAZOS	316	365	413	462	506	549
MANUFACTURING	BURLESON	BRAZOS	196	233	270	307	340	370
MANUFACTURING	COMANCHE	BRAZOS	31	34	37	39	41	44
MANUFACTURING	CORYELL	BRAZOS	9	10	11	12	13	14
MANUFACTURING	EASTLAND	BRAZOS	43	47	50	53	55	59
MANUFACTURING	ERATH	BRAZOS	73	82	90	98	105	114
MANUFACTURING	FALLS	BRAZOS	2	2	2	2	2	2
MANUFACTURING	FISHER	BRAZOS	192	225	255	284	310	336
MANUFACTURING	GRIMES	BRAZOS	257	297	336	375	410	445
MANUFACTURING	HAMILTON	BRAZOS	4	5	6	7	8	9
MANUFACTURING	HILL	BRAZOS	85	97	108	119	129	140
MANUFACTURING	HOOD	BRAZOS	25	28	30	32	34	37
MANUFACTURING	JOHNSON	BRAZOS	2,106	2,499	2,882	3,272	3,620	3,966
MANUFACTURING	JOHNSON	TRINITY	15	18	21	23	26	28
MANUFACTURING	LAMPASAS	BRAZOS	129	142	153	164	174	187
MANUFACTURING	LEE	COLORADO	13	14	15	16	17	18
MANUFACTURING	LIMESTONE	BRAZOS	7	8	9	10	10	11
MANUFACTURING	LIMESTONE	TRINITY	41	45	49	53	57	61
MANUFACTURING	MCLENNAN	BRAZOS	3,526	4,068	4,577	5,096	5,561	6,022
MANUFACTURING	MILAM	BRAZOS	6,820	8,250	8,250	8,250	9,800	9,800
MANUFACTURING	NOLAN	BRAZOS	779	915	1,038	1,159	1,266	1,372
MANUFACTURING	PALO PINTO	BRAZOS	29	33	36	39	42	46
MANUFACTURING	ROBERTSON	BRAZOS	85	101	117	134	150	163
MANUFACTURING	SOMERVELL	BRAZOS	6	7	8	9	10	11
MANUFACTURING	STEPHENS	BRAZOS	7	8	9	10	11	12
MANUFACTURING	TAYLOR	BRAZOS	972	1,081	1,177	1,270	1,349	1,462
MANUFACTURING	WASHINGTON	BRAZOS	414	461	504	547	585	633
MANUFACTURING	WILLIAMSON	BRAZOS	1,587	1,854	2,120	2,388	2,630	2,856
MANUFACTURING	YOUNG	BRAZOS	33	36	39	42	44	48
MANVILLE WSC	LEE	BRAZOS	19	25	30	34	38	41
MANVILLE WSC	WILLIAMSON	BRAZOS	1,064	1,466	1,933	2,446	3,022	3,640
MARLIN	FALLS	BRAZOS	2,660	2,749	2,839	2,913	2,983	3,076
MART	MCLENNAN	BRAZOS	335	354	367	383	394	415
MCGREGOR	MCLENNAN	BRAZOS	933	923	913	902	894	899
MERIDIAN	BOSQUE	BRAZOS	229	242	249	247	247	250
MERKEL	TAYLOR	BRAZOS	458	469	469	462	450	436
MEXIA	LIMESTONE	BRAZOS	742	831	901	959	1,030	1,122
MEXIA	LIMESTONE	TRINITY	508	458	427	399	378	357

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
MILANO WSC	BURLESON	BRAZOS	177	194	207	216	223	231
MILANO WSC	MILAM	BRAZOS	195	212	224	230	232	235
MINERAL WELLS	PALO PINTO	BRAZOS	2,887	3,049	3,184	3,278	3,425	3,611
MINING	BELL	BRAZOS	155	150	147	144	141	139
MINING	BOSQUE	BRAZOS	210	197	189	182	176	172
MINING	BRAZOS	BRAZOS	27	28	29	30	31	31
MINING	BURLESON	BRAZOS	25	24	24	24	24	24
MINING	CALLAHAN	BRAZOS	70	73	75	77	77	79
MINING	CALLAHAN	COLORADO	22	23	23	23	24	24
MINING	COMANCHE	BRAZOS	54	51	50	49	48	47
MINING	CORYELL	BRAZOS	108	111	113	115	117	118
MINING	EASTLAND	BRAZOS	95	102	105	108	111	115
MINING	FALLS	BRAZOS	101	95	91	88	85	83
MINING	FISHER	BRAZOS	375	359	354	349	344	337
MINING	GRIMES	BRAZOS	128	130	132	134	134	135
MINING	GRIMES	SAN JACINTO	37	38	38	38	39	39
MINING	GRIMES	TRINITY	1	1	1	1	1	1
MINING	HASKELL	BRAZOS	93	91	90	89	88	87
MINING	HILL	TRINITY	100	96	94	92	90	89
MINING	HOOD	BRAZOS	162	161	160	159	158	157
MINING	JOHNSON	BRAZOS	330	348	359	370	381	389
MINING	JOHNSON	TRINITY	40	42	44	45	46	47
MINING	JONES	BRAZOS	300	303	304	305	306	307
MINING	KENT	BRAZOS	464	436	427	418	410	399
MINING	KNOX	BRAZOS	9	9	9	9	9	9
MINING	KNOX	RED	17	17	17	17	17	17
MINING	LAMPASAS	BRAZOS	90	85	82	80	77	76
MINING	LAMPASAS	COLORADO	62	59	57	55	54	52
MINING	LEE	BRAZOS	5,450	5,450	5,450	5,450	13	13
MINING	LIMESTONE	BRAZOS	380	387	392	396	400	403
MINING	MCLENNAN	BRAZOS	416	399	389	380	371	366
MINING	MILAM	BRAZOS	4,000	4,000	4,000	3,000	1,500	1,500
MINING	NOLAN	BRAZOS	253	253	253	253	253	253
MINING	NOLAN	COLORADO	25	25	25	25	25	25
MINING	PALO PINTO	BRAZOS	2	2	2	2	2	2
MINING	ROBERTSON	BRAZOS	10,300	10,300	10,300	78	77	76
MINING	SHACKELFORD	BRAZOS	656	724	752	779	806	845
MINING	SOMERVELL	BRAZOS	304	287	278	270	263	257
MINING	STEPHENS	BRAZOS	8,715	9,328	9,567	9,798	10,024	10,347
MINING	STONEWALL	BRAZOS	15	15	15	15	15	15
MINING	TAYLOR	BRAZOS	273	291	300	309	316	326
MINING	TAYLOR	COLORADO	12	13	13	13	14	14

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
MINING	THROCKMORTON	BRAZOS	49	53	55	57	59	61
MINING	WASHINGTON	BRAZOS	166	178	185	191	198	203
MINING	WASHINGTON	COLORADO	19	20	21	22	22	23
MINING	WILLIAMSON	BRAZOS	2,354	2,615	2,795	2,972	3,149	3,280
MINING	YOUNG	BRAZOS	195	216	225	234	243	254
MINING	YOUNG	TRINITY	5	6	6	6	6	7
MOFFAT WSC	BELL	BRAZOS	402	430	457	468	477	488
MOODY	MCLENNAN	BRAZOS	202	203	203	204	206	212
MORGAN	BOSQUE	BRAZOS	74	86	99	115	133	156
MORGANS POINT RESORT	BELL	BRAZOS	473	520	563	591	607	623
MOUNTAIN PEAK SUD	JOHNSON	TRINITY	313	420	534	653	809	1,001
MUNDAY	KNOX	BRAZOS	267	265	260	255	251	250
NAVASOTA	GRIMES	BRAZOS	1,426	1,464	1,494	1,505	1,526	1,555
NEWCASTLE	YOUNG	BRAZOS	59	57	55	53	51	51
NOLANVILLE	BELL	BRAZOS	349	359	365	365	369	374
NORTH BOSQUE WSC	MCLENNAN	BRAZOS	367	454	530	608	655	730
OAK TRAIL SHORES SUBDIVISION	HOOD	BRAZOS	511	504	492	484	480	480
PARKER WSC	HILL	BRAZOS	45	47	49	52	56	60
PARKER WSC	HILL	TRINITY	6	6	7	7	8	8
PARKER WSC	JOHNSON	BRAZOS	259	311	363	425	502	600
PARKER WSC	JOHNSON	TRINITY	28	33	39	45	53	64
PENDLETON WSC	BELL	BRAZOS	250	265	273	278	282	287
POTOSI WSC	CALLAHAN	BRAZOS	8	8	7	6	6	6
POTOSI WSC	TAYLOR	BRAZOS	414	420	420	409	397	385
RANGER	EASTLAND	BRAZOS	316	308	294	278	263	252
RIESEL	MCLENNAN	BRAZOS	109	116	120	126	129	137
RIO VISTA	JOHNSON	BRAZOS	71	77	85	93	105	122
RISING STAR	EASTLAND	BRAZOS	74	71	67	63	59	56
ROBERTSON COUNTY WSC	ROBERTSON	BRAZOS	258	315	348	370	368	365
ROBINSON	MCLENNAN	BRAZOS	1,268	1,462	1,611	1,756	1,857	2,030
ROBY	FISHER	BRAZOS	76	75	75	74	74	76
ROCKDALE	MILAM	BRAZOS	1,254	1,287	1,310	1,325	1,332	1,337
ROGERS	BELL	BRAZOS	195	191	188	184	181	181
ROSCOE	NOLAN	BRAZOS	189	190	188	182	173	165
ROSEBUD	FALLS	BRAZOS	171	166	161	156	152	152
ROTAN	FISHER	BRAZOS	278	271	249	231	222	203
ROUND ROCK	WILLIAMSON	BRAZOS	23,103	31,146	40,704	51,176	62,801	75,268
RULE	HASKELL	BRAZOS	81	77	72	69	66	62
SALADO WSC	BELL	BRAZOS	1,195	1,334	1,461	1,544	1,594	1,636
SNOOK	BURLESON	BRAZOS	147	160	167	173	178	183
SOMERVILLE	BURLESON	BRAZOS	328	344	353	358	364	372
SOUTHWEST MILAM WSC	BURLESON	BRAZOS	58	67	73	79	82	86
SOUTHWEST MILAM WSC	LEE	BRAZOS	44	52	58	63	67	71

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
SOUTHWEST MILAM WSC	MILAM	BRAZOS	1,086	1,251	1,350	1,422	1,448	1,472
SOUTHWEST MILAM WSC	WILLIAMSON	BRAZOS	259	318	386	465	549	643
STAMFORD	HASKELL	BRAZOS	8	8	8	8	8	8
STAMFORD	JONES	BRAZOS	637	640	626	604	582	560
STEAM ELECTRIC POWER	BELL	BRAZOS	0	3,674	4,296	5,053	5,977	7,102
STEAM ELECTRIC POWER	BOSQUE	BRAZOS	4,323	6,188	7,235	8,510	10,065	11,961
STEAM ELECTRIC POWER	BRAZOS	BRAZOS	526	488	394	446	303	393
STEAM ELECTRIC POWER	GRIMES	BRAZOS	12,000	31,760	33,160	34,660	36,660	39,660
STEAM ELECTRIC POWER	HASKELL	BRAZOS	422	336	393	462	547	650
STEAM ELECTRIC POWER	HOOD	BRAZOS	4,000	5,862	6,853	8,062	9,535	11,331
STEAM ELECTRIC POWER	JOHNSON	BRAZOS	3,500	7,000	7,000	7,000	7,000	7,000
STEAM ELECTRIC POWER	JONES	BRAZOS	359	333	294	396	364	484
STEAM ELECTRIC POWER	LIMESTONE	BRAZOS	22,332	22,598	26,420	31,079	36,758	43,681
STEAM ELECTRIC POWER	MCLENNAN	BRAZOS	3,808	11,217	14,305	15,538	17,901	19,142
STEAM ELECTRIC POWER	MILAM	BRAZOS	12,500	12,500	12,500	12,500	16,000	16,000
STEAM ELECTRIC POWER	NOLAN	BRAZOS	807	11,311	20,000	20,000	20,000	20,000
STEAM ELECTRIC POWER	PALO PINTO	BRAZOS	840	4,000	4,000	4,000	4,000	4,000
STEAM ELECTRIC POWER	ROBERTSON	BRAZOS	15,789	17,882	31,113	36,369	48,118	50,319
STEAM ELECTRIC POWER	SOMERVELL	BRAZOS	84,817	84,817	84,817	84,817	84,817	84,817
STEAM ELECTRIC POWER	YOUNG	BRAZOS	2,170	1,730	2,023	2,379	2,814	3,344
STEAMBOAT MOUNTAIN WSC	TAYLOR	BRAZOS	214	213	211	205	198	192
STEAMBOAT MOUNTAIN WSC	TAYLOR	COLORADO	57	57	56	55	53	51
STEPHENS COUNTY RURAL WSC	EASTLAND	BRAZOS	2	2	2	1	1	1
STEPHENS COUNTY RURAL WSC	PALO PINTO	BRAZOS	2	2	2	1	1	1
STEPHENS COUNTY RURAL WSC	SHACKELFORD	BRAZOS	2	2	2	1	1	1
STEPHENS COUNTY RURAL WSC	STEPHENS	BRAZOS	318	314	308	296	279	271
STEPHENS COUNTY RURAL WSC	THROCKMORTON	BRAZOS	10	9	9	8	7	7
STEPHENS COUNTY RURAL WSC	YOUNG	BRAZOS	2	2	2	1	1	1
STEPHENVILLE	ERATH	BRAZOS	2,717	2,850	2,957	3,058	3,464	3,732
STRAWN	PALO PINTO	BRAZOS	160	164	167	170	176	183
SWEETWATER	NOLAN	BRAZOS	3,013	3,072	3,081	3,029	2,900	2,763
TAYLOR	WILLIAMSON	BRAZOS	2,913	3,279	3,705	4,183	4,727	5,342
TEMPLE	BELL	BRAZOS	21,033	23,018	25,170	26,892	28,804	30,613
THORNDALE	MILAM	BRAZOS	193	206	213	215	216	219
THORNTON	LIMESTONE	BRAZOS	54	52	50	49	48	48
THRALL	WILLIAMSON	BRAZOS	140	165	196	228	263	304
THROCKMORTON	THROCKMORTON	BRAZOS	232	222	209	191	177	168
TOLAR	HOOD	BRAZOS	143	179	213	246	289	342
TRI-COUNTY SUD	FALLS	BRAZOS	253	280	305	327	347	375
TRI-COUNTY SUD	LIMESTONE	BRAZOS	103	115	118	121	125	133
TRI-COUNTY SUD	MCLENNAN	BRAZOS	12	13	14	15	16	18
TRI-COUNTY SUD	ROBERTSON	BRAZOS	77	82	83	84	83	83
TROY	BELL	BRAZOS	185	181	176	171	168	168

WUG Name	County	Basin	Demands (acft)					
			2010	2020	2030	2040	2050	2060
TUSCOLA	TAYLOR	BRAZOS	50	50	50	49	47	46
TUSCOLA	TAYLOR	COLORADO	24	24	24	24	23	22
TYE	TAYLOR	BRAZOS	178	181	181	177	172	167
VALLEY MILLS	BOSQUE	BRAZOS	265	295	313	316	319	323
VALLEY MILLS	MCLENNAN	BRAZOS	1	1	1	1	1	1
VENUS	JOHNSON	TRINITY	363	358	349	344	342	342
WACO	MCLENNAN	BRAZOS	24,876	26,453	27,781	29,159	30,033	31,304
WALNUT SPRINGS	BOSQUE	BRAZOS	97	100	101	100	99	100
WEIR	WILLIAMSON	BRAZOS	156	223	301	386	480	581
WELLBORN SUD	BRAZOS	BRAZOS	1,069	1,285	1,482	1,637	1,820	1,886
WELLS BRANCH MUD	WILLIAMSON	BRAZOS	31	30	30	30	29	29
WEST	MCLENNAN	BRAZOS	459	467	475	482	490	506
WEST BELL COUNTY WSC	BELL	BRAZOS	660	642	623	605	599	599
WEST BRAZOS WSC	FALLS	BRAZOS	190	230	267	304	331	368
WEST BRAZOS WSC	MCLENNAN	BRAZOS	161	181	195	214	224	244
WESTERN HILLS WS	MCLENNAN	BRAZOS	384	458	520	588	627	694
WHITE BLUFF COMMUNITY WS	HILL	TRINITY	369	456	553	650	757	875
WHITNEY	HILL	BRAZOS	365	370	375	380	391	405
WICKSON CREEK SUD	BRAZOS	BRAZOS	1,126	1,451	1,701	1,924	2,206	2,301
WICKSON CREEK SUD	GRIMES	BRAZOS	625	878	1,044	1,175	1,286	1,396
WICKSON CREEK SUD	ROBERTSON	BRAZOS	20	30	35	39	39	39
WILLIAMSON-TRAVIS COUNTY MUD #1	WILLIAMSON	BRAZOS	770	1,085	1,462	1,865	2,320	2,807
WOODROW-OSCEOLA WSC	HILL	BRAZOS	286	285	284	287	298	319
WOODWAY	MCLENNAN	BRAZOS	2,944	2,925	2,903	2,882	2,867	2,874

Appendix Q
Requested Population, Municipal, and Steam-Electric Water Demands

ONE COMPANY
Many Solutions℠

Memo

To:	Brazos G Regional Water Planning Group		
From:	Grady Reed David Dunn, PE Scott Diermann, PE, Brazos G RWPG	Project:	Brazos G 2011 Regional Water Plan
CC:	Trey Buzbee, Brazos River Authority		
Date:	April 7, 2009, Revised June 6, 2009	Job No:	00010478-001

RE: Final Population and Water Demand Projections for Use in the 2011 Brazos G Regional Water Plan

Introduction

This memo summarizes changes to the population and water demand projections contained in the 2006 Brazos G Regional Water Plan (2006 Plan) to be used in the 2011 Plan. There are no changes to the water demand projections for manufacturing, mining, irrigation, or livestock use. Due to the population projection revisions noted below, some changes were made to the municipal water demand projections for certain Water User Groups (WUGs). Finally, based in part on a recent study conducted by the Bureau of Economic Geology titled "Water Demand Projections for Power Generation in Texas," and with additional input from Scott Diermann and HDR, some steam-electric water demand projections have been revised as discussed below.

Population Projection Revisions

As noted in a previous memo dated February 12, 2009, concerning suggested revisions to specific population projections to be used in the 2011 Plan, population revisions were recommended for several WUGs in the Brazos G Area. In early March 2009, Brazos G formally requested that the Texas Water Development Board (TWDB) revise the population projections for certain WUGs, as detailed in Attachment A. The population revisions result in an increased population for four counties (Bell, Johnson, Milam and Williamson). As shown in Figure 1, the total regional population in 2060 increases by 116,779 to a new total of 3,448,879.

Municipal Water Demand Projection Revisions

For those WUGs with a revised population, the water demands must also be revised. The water demand projections were revised by taking the revised population times the per capita use value contained in the 2006 Plan. For the new WUGs (Cresson, deCordova, Jarrell, Kosse, Lipan, Morgan and Tolar) the TWDB determined the per capita use rate to be used for the water demands. A detailed summary of the revised water demand projections is contained in Attachment B. As shown in Figure 2, the total regional municipal demand in 2060 increases by 20,001 acft/yr to a new total of 615,483 acft/yr.

HDR recommends that the Brazos G RWPG request the TWDB to revise the municipal water demand projections for use in the 2011 Plan as shown in Attachment B.

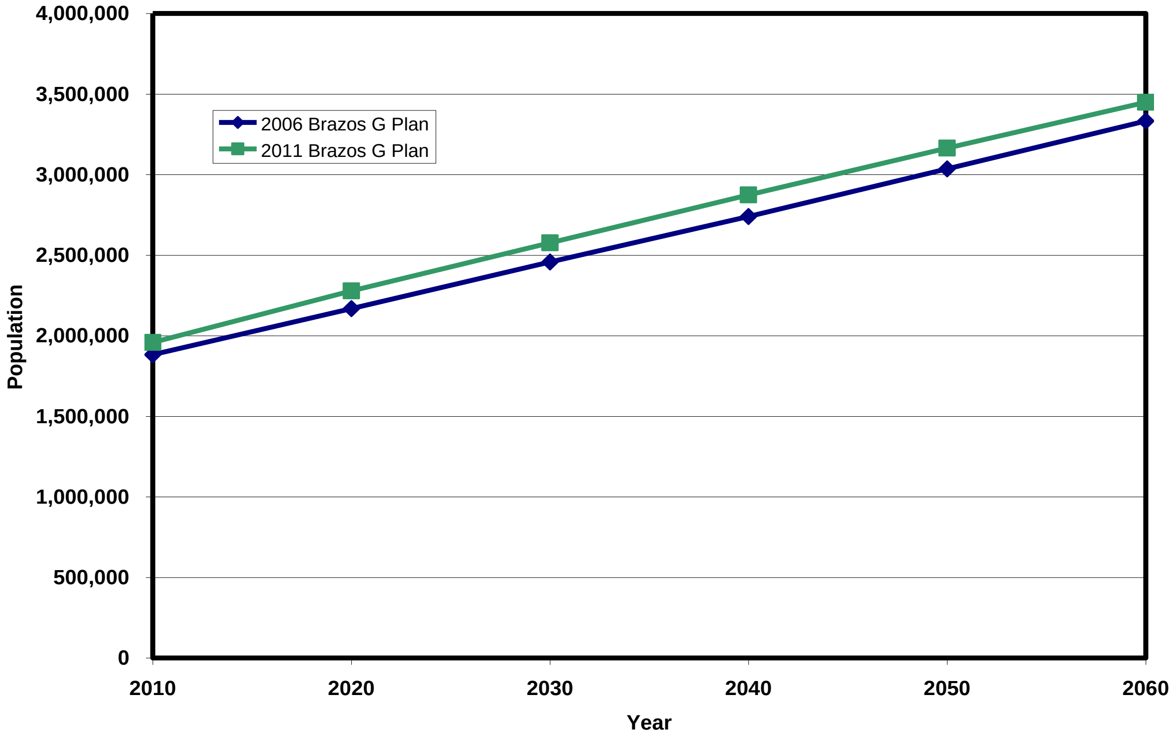


Figure 1.
Brazos G Total Population, 2006 Plan and 2011 Plan

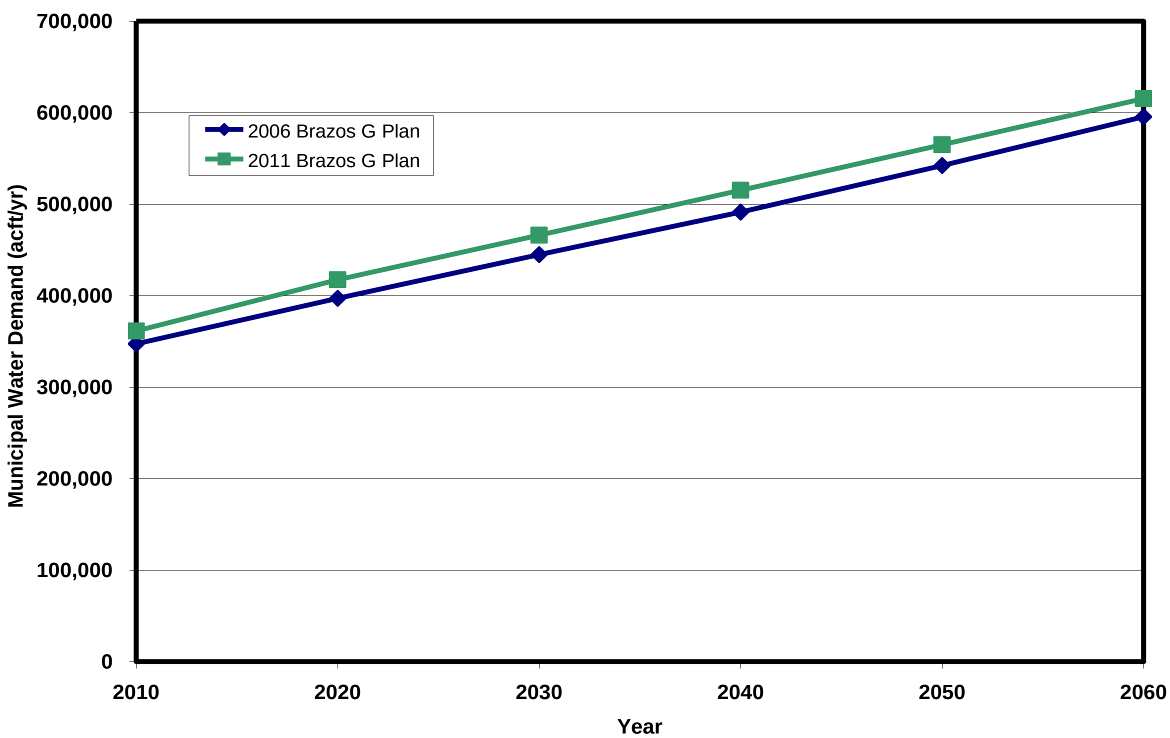


Figure 2.
Brazos G Total Municipal Water Demand, 2006 Plan and 2011 Plan

Steam-Electric Water Demand Projections

Based in part on a recent study conducted by the Bureau of Economic Geology (BEG) entitled "Water Demand Projections for Power Generation in Texas," and with additional input from Scott Diermann (Brazos G RWPG Electric Utilities Representative) and HDR, initially recommended steam-electric water demand projections were presented to the Brazos G RWPG in the first version of this memorandum, dated April 7, 2009, and at the April 15, 2009 meeting of the Brazos G RWPG.

For all but six counties, the initially recommended water demands are either from the 2006 Plan or from the BEG study, depending on which set of projections seemed to best reflect the steam-electric power generating activities in those counties. The steam-electric projections for the six remaining counties (Grimes, Hood, Johnson, Milam, Nolan and Palo Pinto) were developed with information obtained by Scott Diermann and HDR concerning existing and planned facilities, as summarized in Table 1.

At the April meeting, the Brazos G RWPG directed HDR and the Brazos River Authority (BRA) to solicit input from county judges and steam-electric generators in the 11 counties for which the recommended demands differ from those adopted for the 2006 Plan. The BRA sent out letters requesting comment on the initially recommended demands, and received comments back from four entities: Tenaska; Optim Energy, LP; Wolf Hollow and AEP. Those comments are included as Attachment D. Upon review of those comments, the recommended steam-electric demands have been revised for three counties: Jones, Haskel and Hood.

The recommended steam-electric demands, as revised, are shown in Attachment C and summarized in Figure 3. The total regional steam-electric demand in 2060 increases by 13,658 acft/yr over the 2006 Plan demands to a new total of 317,619 acft/yr.

HDR recommends that the Brazos G RWPG request the TWDB to revise the steam-electric water demand projections for use in the 2011 Plan as shown in Attachment C.

Table 1. Alternative Steam-Electric Demand Projections for Six Brazos G Counties

Facility	2010	2020	2030	2040	2050	2060	Comments
Grimes County							
Gibbons Creek Unit 1	6,000	6,000	6,000	6,000	6,000	6,000	Existing use, based on TMPA conversation.
Tenaska Frontier Station	6,000	8,100	9,500	11,000	13,000	16,000	Based on planned expansions of existing facility.
Gibbons Creek Unit 2	0	8,000	8,000	8,000	8,000	8,000	800 MW Unit planned prior to 2020.
Unnamed 1200 MW Unit	0	9,660	9,660	9,660	9,660	9,660	New gas unit planned for May 2011.
Total Grimes County	*12,000*	*31,760*	*33,160*	*34,660*	*36,660*	*39,660*	
Hood County							
DeCordova Station	0	0	0	0	0	0	Planned decommissioning.
Wolf Hollow I	4,000	5,862	6,853	8,062	9,535	11,331	Includes existing Wolf demands plus expansion.
Total Hood County	*4,000*	*5,862*	*6,853*	*8,062*	*9,535*	*11,331*	
Johnson County							
BEPC Cleburne	3,500	3,500	3,500	3,500	3,500	3,500	Existing demands, reflecting both fresh and reuse supplies.
BEPC Cleburne Expansion	0	3,500	3,500	3,500	3,500	3,500	Expansion of Cleburne facility.
Total Johnson County	*3,500*	*7,000*	*7,000*	*7,000*	*7,000*	*7,000*	
Milam County							
Total Milam County	*12,500*	*12,500*	*12,500*	*12,500*	*16,000*	*16,000*	2006 Brazos G projections, except for increase in 2010.
Nolan County							
Total Nolan County	*807*	*11,311*	*20,000*	*20,000*	*20,000*	*20,000*	BEG 2008 projections, limited to 20,000 acft/yr.
Palo Pinto County							
RW Miller Station	840	840	840	840	840	840	Existing demands at RW Miller station.
RW Miller Station Expansion	0	3,160	3,160	3,160	3,160	3,160	Expansion planned for 2018.
Total Palo Pinto County	*840*	*4,000*	*4,000*	*4,000*	*4,000*	*4,000*	

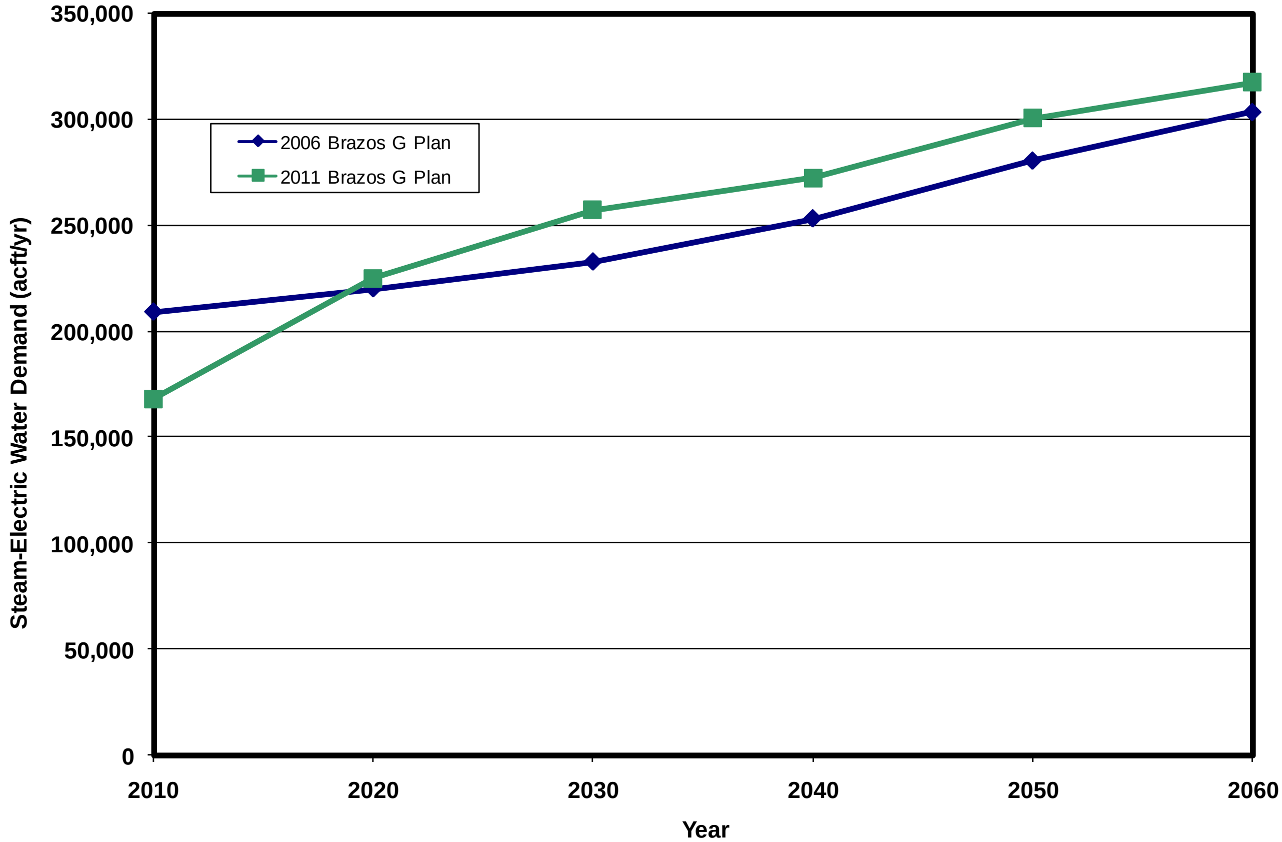


Figure 3.
Brazos G Total Steam-Electric Water Demand, 2006 Plan and 2011 Plan

Attachment A
Summary of Population Changes

Summary of Population Changes

County/City		2010	2020	2030	2040	2050	2060
Bell County							
Harker Heights	(2011 Plan)	23,869	30,952	36,978	42,090	43,640	44,407
Harker Heights	(2006 Plan)	22,477	29,147	34,822	39,636	41,096	41,818
Increase/(Decrease)		*1,392*	*1,805*	*2,156*	*2,454*	*2,544*	*2,589*
Killeen	(2011 Plan)	113,217	126,985	141,148	154,641	169,132	184,064
Killeen	(2006 Plan)	104,528	117,239	130,315	142,772	156,151	169,937
Increase/(Decrease)		*8,689*	*9,746*	*10,833*	*11,869*	*12,981*	*14,127*
Morgans Point Resort	(2011 Plan)	4,219	4,781	5,290	5,617	5,828	5,981
Morgans Point Resort	(2006 Plan)	3,698	4,191	4,637	4,924	5,109	5,243
Increase/(Decrease)		*521*	*590*	*653*	*693*	*719*	*738*
Nolanville	(2011 Plan)	2,611	2,753	2,882	2,965	3,019	3,058
Nolanville	(2006 Plan)	2,333	2,460	2,575	2,649	2,697	2,732
Increase/(Decrease)		*278*	*293*	*307*	*316*	*322*	*326*
County-Other	(2011 Plan)	1,289	1,223	1,157	1,116	1,089	1,071
County-Other	(2006 Plan)	1,810	1,813	1,810	1,809	1,808	1,809
Increase/(Decrease)		*(521)*	*(590)*	*(653)*	*(693)*	*(719)*	*(738)*
Bell County Total	(2011 Plan)	289,672	327,610	364,632	396,478	424,255	449,460
Bell County Total	(2006 Plan)	279,313	315,766	351,336	381,839	408,408	432,418
Increase/(Decrease)		*10,359*	*11,844*	*13,296*	*14,639*	*15,847*	*17,042*
Bosque County							
Morgan	(2011 Plan)	569	668	784	920	1,080	1,268
Morgan	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*569*	*668*	*784*	*920*	*1,080*	*1,268*
Valley Mills	(2011 Plan)	1,279	1,449	1,568	1,613	1,631	1,653
Valley Mills	(2006 Plan)	1,164	1,211	1,244	1,256	1,261	1,267
Increase/(Decrease)		*115*	*238*	*324*	*357*	*370*	*386*
County-Other	(2011 Plan)	5,521	6,877	7,782	8,029	8,025	8,025
County-Other	(2006 Plan)	6,205	7,783	8,890	9,306	9,475	9,679
Increase/(Decrease)		*(684)*	*(906)*	*(1,108)*	*(1,277)*	*(1,450)*	*(1,654)*
Bosque County Total	(2011 Plan)	19,831	22,646	24,622	25,364	25,667	26,032
Bosque County Total	(2006 Plan)	19,831	22,646	24,622	25,364	25,667	26,032
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Callahan County							
Clyde	(2011 Plan)	3,733	3,787	3,706	3,615	3,514	3,430
Clyde	(2006 Plan)	3,320	3,368	3,296	3,215	3,125	3,050
Increase/(Decrease)		*413*	*419*	*410*	*400*	*389*	*380*
County-Other	(2011 Plan)	5,958	6,024	5,922	5,808	5,681	5,575
County-Other	(2006 Plan)	6,371	6,443	6,332	6,208	6,070	5,955
Increase/(Decrease)		*(413)*	*(419)*	*(410)*	*(400)*	*(389)*	*(380)*
Callahan County Total	(2011 Plan)	12,829	12,980	12,750	12,492	12,206	11,968
Callahan County Total	(2006 Plan)	12,829	12,980	12,750	12,492	12,206	11,968
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*

County/City		2010	2020	2030	2040	2050	2060
Eastland County							
Eastland	(2011 Plan)	4,017	4,028	3,957	3,849	3,723	3,555
Eastland	(2006 Plan)	3,777	3,787	3,720	3,618	3,500	3,342
Increase/(Decrease)		*240*	*241*	*237*	*231*	*223*	*213*
County-Other	(2011 Plan)	5,781	5,795	5,695	5,538	5,356	5,116
County-Other	(2006 Plan)	6,021	6,036	5,932	5,769	5,579	5,329
Increase/(Decrease)		*(240)*	*(241)*	*(237)*	*(231)*	*(223)*	*(213)*
Eastland County Total	(2011 Plan)	18,336	18,382	18,061	17,566	16,989	16,226
Eastland County Total	(2006 Plan)	18,336	18,382	18,061	17,566	16,989	16,226
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Hamilton County							
Hico	(2011 Plan)	1,417	1,417	1,417	1,417	1,417	1,417
Hico	(2006 Plan)	1,341	1,341	1,341	1,341	1,341	1,341
Increase/(Decrease)		*76*	*76*	*76*	*76*	*76*	*76*
County-Other	(2011 Plan)	3,431	3,331	3,253	3,279	3,176	3,169
County-Other	(2006 Plan)	3,507	3,407	3,329	3,355	3,252	3,245
Increase/(Decrease)		*(76)*	*(76)*	*(76)*	*(76)*	*(76)*	*(76)*
Hamilton County Total	(2011 Plan)	7,790	7,681	7,596	7,624	7,512	7,504
Hamilton County Total	(2006 Plan)	7,790	7,681	7,596	7,624	7,512	7,504
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Hill County							
Hillsboro	(2011 Plan)	8,923	9,284	9,692	10,099	10,534	11,017
Hillsboro	(2006 Plan)	8,477	8,820	9,208	9,595	10,008	10,467
Increase/(Decrease)		*446*	*464*	*484*	*504*	*526*	*550*
Hubbard	(2011 Plan)	1,713	1,713	1,713	1,713	1,713	1,713
Hubbard	(2006 Plan)	1,586	1,586	1,586	1,586	1,586	1,586
Increase/(Decrease)		*127*	*127*	*127*	*127*	*127*	*127*
Itasca	(2011 Plan)	1,633	1,626	1,619	1,612	1,604	1,595
Itasca	(2006 Plan)	1,499	1,493	1,487	1,481	1,474	1,466
Increase/(Decrease)		*134*	*133*	*132*	*131*	*130*	*129*
Whitney	(2011 Plan)	2,157	2,227	2,306	2,385	2,470	2,564
Whitney	(2006 Plan)	2,046	2,112	2,187	2,262	2,343	2,432
Increase/(Decrease)		*111*	*115*	*119*	*123*	*127*	*132*
County-Other	(2011 Plan)	2,074	2,305	2,566	2,827	3,104	3,411
County-Other	(2006 Plan)	2,892	3,144	3,428	3,712	4,014	4,349
Increase/(Decrease)		*(818)*	*(839)*	*(862)*	*(885)*	*(910)*	*(938)*
Hill County Total	(2011 Plan)	33,416	34,947	36,679	38,407	40,252	42,300
Hill County Total	(2006 Plan)	33,416	34,947	36,679	38,407	40,252	42,300
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*

County/City		2010	2020	2030	2040	2050	2060
Hood County							
Cresson	(2011 Plan)	295	360	439	536	654	799
Cresson	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*295*	*360*	*439*	*536*	*654*	*799*
deCordova	(2011 Plan)	3,074	3,125	3,177	3,230	3,283	3,337
deCordova	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*3,074*	*3,125*	*3,177*	*3,230*	*3,283*	*3,337*
Granbury	(2011 Plan)	8,073	10,083	11,954	13,914	16,383	19,234
Granbury	(2006 Plan)	6,843	8,202	9,467	10,792	12,461	14,388
Increase/(Decrease)		*1,230*	*1,881*	*2,487*	*3,122*	*3,922*	*4,846*
Lipan	(2011 Plan)	599	844	1,189	1,675	2,359	3,323
Lipan	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*599*	*844*	*1,189*	*1,675*	*2,359*	*3,323*
Tolar	(2011 Plan)	749	958	1,153	1,357	1,614	1,911
Tolar	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*749*	*958*	*1,153*	*1,357*	*1,614*	*1,911*
County-Other	(2011 Plan)	17,869	21,047	23,865	26,677	30,166	34,020
County-Other	(2006 Plan)	23,312	27,711	31,806	36,093	41,494	47,732
Increase/(Decrease)		*(5,443)*	*(6,664)*	*(7,941)*	*(9,416)*	*(11,328)*	*(13,712)*
Hood County Total	(2011 Plan)	49,207	58,364	66,888	75,814	87,059	100,045
Hood County Total	(2006 Plan)	49,207	58,364	66,888	75,814	87,059	100,045
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Johnson County							
Alvarado	(2011 Plan)	4,204	4,627	5,071	5,556	6,158	6,897
Alvarado	(2006 Plan)	3,595	3,957	4,337	4,752	5,267	5,899
Increase/(Decrease)		*609*	*670*	*734*	*804*	*891*	*998*
Burleson	(2011 Plan)	27,206	42,037	52,747	52,747	52,747	52,747
Burleson	(2006 Plan)	20,303	23,588	27,039	30,809	35,486	41,224
Increase/(Decrease)		*6,903*	*18,449*	*25,708*	*21,938*	*17,261*	*11,523*
Cleburne	(2011 Plan)	30,572	34,467	38,558	43,027	48,353	52,812
Cleburne	(2006 Plan)	29,158	32,872	36,774	41,036	46,324	52,812
Increase/(Decrease)		*1,414*	*1,595*	*1,784*	*1,991*	*2,029*	*0*
Cresson	(2011 Plan)	78	95	116	141	172	210
Cresson	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*78*	*95*	*116*	*141*	*172*	*210*
Grandview	(2011 Plan)	1,600	2,000	2,500	2,500	2,500	2,500
Grandview	(2006 Plan)	1,452	1,562	1,678	1,805	1,962	2,155
Increase/(Decrease)		*148*	*438*	*822*	*695*	*538*	*345*
Joshua	(2011 Plan)	5,503	6,247	7,028	7,881	8,940	10,239
Joshua	(2006 Plan)	5,114	5,805	6,531	7,324	8,308	9,515
Increase/(Decrease)		*389*	*442*	*497*	*557*	*632*	*724*
Venus	(2011 Plan)	2,435	2,435	2,435	2,435	2,435	2,435
Venus	(2006 Plan)	1,892	1,892	1,892	1,892	1,892	1,892
Increase/(Decrease)		*543*	*543*	*543*	*543*	*543*	*543*

County/City		2010	2020	2030	2040	2050	2060
County-Other	(2011 Plan)	9,014	9,236	9,468	9,717	10,026	10,402
County-Other	(2006 Plan)	11,115	11,596	12,102	12,653	13,338	14,177
Increase/(Decrease)		*(2,101)*	*(2,360)*	*(2,634)*	*(2,936)*	*(3,312)*	*(3,775)*
Johnson County Total	(2011 Plan)	159,451	200,381	238,590	268,082	304,454	346,999
Johnson County Total	(2006 Plan)	151,468	180,509	211,020	244,349	285,700	336,431
Increase/(Decrease)		*7,983*	*19,872*	*27,570*	*23,733*	*18,754*	*10,568*
Lampasas County							
Lampasas	(2011 Plan)	8,222	9,225	9,952	10,491	10,845	10,325
Lampasas	(2006 Plan)	7,010	7,246	7,417	7,544	7,627	7,680
Increase/(Decrease)		*1,212*	*1,979*	*2,535*	*2,947*	*3,218*	*2,645*
County-Other	(2011 Plan)	5,688	5,900	6,054	6,169	6,244	7,036
County-Other	(2006 Plan)	6,900	7,879	8,589	9,116	9,462	9,681
Increase/(Decrease)		*(1,212)*	*(1,979)*	*(2,535)*	*(2,947)*	*(3,218)*	*(2,645)*
Lampasas County Total	(2011 Plan)	20,114	22,596	24,396	25,731	26,606	27,160
Lampasas County Total	(2006 Plan)	20,114	22,596	24,396	25,731	26,606	27,160
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Limestone County							
Kosse	(2011 Plan)	500	503	506	509	512	515
Kosse	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*500*	*503*	*506*	*509*	*512*	*515*
County-Other	(2011 Plan)	7,384	7,034	6,667	6,284	5,881	5,457
County-Other	(2006 Plan)	7,884	7,537	7,173	6,793	6,393	5,972
Increase/(Decrease)		*(500)*	*(503)*	*(506)*	*(509)*	*(512)*	*(515)*
Limestone County Total	(2011 Plan)	23,322	24,944	25,828	26,505	27,177	28,050
Limestone County Total	(2006 Plan)	23,322	24,944	25,828	26,505	27,177	28,050
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
McLennan County							
Robinson	(2011 Plan)	9,592	11,353	12,837	14,375	15,352	16,772
Robinson	(2006 Plan)	8,397	8,954	9,423	9,910	10,219	10,668
Increase/(Decrease)		*1,195*	*2,399*	*3,414*	*4,465*	*5,133*	*6,104*
County-Other	(2011 Plan)	26,101	26,538	26,908	27,293	27,534	27,886
County-Other	(2006 Plan)	27,296	28,937	30,322	31,758	32,667	33,990
Increase/(Decrease)		*(1,195)*	*(2,399)*	*(3,414)*	*(4,465)*	*(5,133)*	*(6,104)*
McLennan County Total	(2011 Plan)	231,882	250,398	266,002	282,177	292,449	307,378
McLennan County Total	(2006 Plan)	231,882	250,398	266,002	282,177	292,449	307,378
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Milam County							
Cameron	(2011 Plan)	6,231	6,900	7,331	7,596	7,663	7,693
Cameron	(2006 Plan)	5,634	5,634	5,634	5,634	5,634	5,634
Increase/(Decrease)		*597*	*1,266*	*1,697*	*1,962*	*2,029*	*2,059*
Milam County Total	(2011 Plan)	26,053	28,086	29,396	30,201	30,405	30,496
Milam County Total	(2006 Plan)	25,456	26,820	27,699	28,239	28,376	28,437
Increase/(Decrease)		*597*	*1,266*	*1,697*	*1,962*	*2,029*	*2,059*

County/City		2010	2020	2030	2040	2050	2060
Somervell County							
Glen Rose	(2011 Plan)	2,672	3,009	3,287	3,469	3,543	3,568
Glen Rose	(2006 Plan)	2,210	2,312	2,396	2,451	2,473	2,481
Increase/(Decrease)		*462*	*697*	*891*	*1,018*	*1,070*	*1,087*
County-Other	(2011 Plan)	4,870	5,384	5,807	6,085	6,197	6,236
County-Other	(2006 Plan)	5,332	6,081	6,698	7,103	7,267	7,323
Increase/(Decrease)		*(462)*	*(697)*	*(891)*	*(1,018)*	*(1,070)*	*(1,087)*
Somervell County Total	(2011 Plan)	7,542	8,393	9,094	9,554	9,740	9,804
Somervell County Total	(2006 Plan)	7,542	8,393	9,094	9,554	9,740	9,804
Increase/(Decrease)		*0*	*0*	*0*	*0*	*0*	*0*
Williamson County							
Cedar Park	(2011 Plan)	58,665	81,731	88,823	108,018	108,018	108,018
Cedar Park	(2006 Plan)	52,700	73,421	102,705	128,373	154,089	187,931
Increase/(Decrease)		*5,965*	*8,310*	*(13,882)*	*(20,355)*	*(46,071)*	*(79,913)*
Florence	(2011 Plan)	1,364	1,632	1,951	2,298	2,675	3,079
Florence	(2006 Plan)	1,263	1,511	1,806	2,127	2,476	2,850
Increase/(Decrease)		*101*	*121*	*145*	*171*	*199*	*229*
Georgetown	(2011 Plan)	49,112	66,987	88,239	111,348	136,489	163,453
Georgetown	(2006 Plan)	40,888	55,770	73,463	92,702	113,633	136,082
Increase/(Decrease)		*8,224*	*11,217*	*14,776*	*18,646*	*22,856*	*27,371*
Granger	(2011 Plan)	1,561	1,695	1,854	2,027	2,215	2,417
Granger	(2006 Plan)	1,400	1,520	1,663	1,818	1,987	2,168
Increase/(Decrease)		*161*	*175*	*191*	*209*	*228*	*249*
Hutto	(2011 Plan)	12,479	17,153	22,709	28,750	35,317	42,363
Hutto	(2006 Plan)	1,826	2,510	3,323	4,207	5,168	6,199
Increase/(Decrease)		*10,653*	*14,643*	*19,386*	*24,543*	*30,149*	*36,164*
Jarrell	(2011 Plan)	1,433	1,474	1,517	1,561	1,606	1,652
Jarrell	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*1,433*	*1,474*	*1,517*	*1,561*	*1,606*	*1,652*
Jarrell-Schwertner WSC	(2011 Plan)	2,362	3,596	5,068	6,672	8,420	10,297
Jarrell-Schwertner WSC	(2006 Plan)	3,795	5,070	6,585	8,233	10,026	11,949
Increase/(Decrease)		*(1,433)*	*(1,474)*	*(1,517)*	*(1,561)*	*(1,606)*	*(1,652)*
Leander	(2011 Plan)	22,675	31,803	42,654	54,454	67,291	81,059
Leander	(2006 Plan)	11,499	16,128	21,631	27,615	34,125	41,107
Increase/(Decrease)		*11,176*	*15,675*	*21,023*	*26,839*	*33,166*	*39,952*
Round Rock	(2011 Plan)	104,696	143,328	189,257	239,199	293,531	351,804
Round Rock	(2006 Plan)	87,187	119,358	157,606	199,196	244,442	292,970
Increase/(Decrease)		*17,509*	*23,970*	*31,651*	*40,003*	*49,089*	*58,834*
Taylor	(2011 Plan)	17,935	20,613	23,797	27,259	31,025	35,065
Taylor	(2006 Plan)	15,530	17,849	20,606	23,604	26,865	30,363
Increase/(Decrease)		*2,405*	*2,764*	*3,191*	*3,655*	*4,160*	*4,702*
Thrall	(2011 Plan)	976	1,176	1,415	1,674	1,956	2,258
Thrall	(2006 Plan)	859	1,035	1,245	1,473	1,721	1,987
Increase/(Decrease)		*117*	*141*	*170*	*201*	*235*	*271*

County/City		2010	2020	2030	2040	2050	2060
County-Other	(2011 Plan)	2,379	1,750	2,551	11,961	24,831	32,693
County-Other	(2006 Plan)	2,758	2,187	3,057	12,542	25,493	33,442
Increase/(Decrease)		*(379)*	*(437)*	*(506)*	*(581)*	*(662)*	*(749)*
Williamson County Total	(2011 Plan)	360,086	492,701	626,291	789,743	949,309	1,114,510
Williamson County Total	(2006 Plan)	304,154	416,122	550,146	696,412	855,960	1,027,400
Increase/(Decrease)		*55,932*	*76,579*	*76,145*	*93,331*	*93,349*	*87,110*
Brazos G Total	(2011 Plan)	1,957,767	2,278,243	2,576,783	2,873,382	3,164,777	3,448,879
Brazos G Total	(2006 Plan)	1,882,896	2,168,682	2,458,075	2,739,717	3,034,798	3,332,100
Increase/(Decrease)		*74,871*	*109,561*	*118,708*	*133,665*	*129,979*	*116,779*

Attachment B
Summary of Municipal Water Demand Changes

Summary of Municipal Water Demand Changes (acft/yr)

County/City		2010	2020	2030	2040	2050	2060
Bell County							
Harker Heights	(2011 Plan)	3,904	4,959	5,800	6,507	6,698	6,815
Harker Heights	(2006 Plan)	3,676	4,669	5,461	6,127	6,307	6,417
Increase/(Decrease)		*228*	*290*	*339*	*380*	*391*	*398*
Killeen	(2011 Plan)	19,530	25,462	27,985	30,141	32,207	34,432
Killeen	(2006 Plan)	18,031	23,507	25,837	27,827	29,735	31,789
Increase/(Decrease)		*1,499*	*1,955*	*2,148*	*2,314*	*2,472*	*2,643*
Morgans Point Resort	(2011 Plan)	473	520	563	591	607	623
Morgans Point Resort	(2006 Plan)	414	455	493	518	532	546
Increase/(Decrease)		*59*	*65*	*70*	*73*	*75*	*77*
Nolanville	(2011 Plan)	349	359	365	365	369	374
Nolanville	(2006 Plan)	311	320	326	326	329	334
Increase/(Decrease)		*38*	*39*	*39*	*39*	*40*	*40*
County-Other	(2011 Plan)	200	187	174	167	161	159
County-Other	(2006 Plan)	280	276	272	270	267	267
Increase/(Decrease)		*(80)*	*(89)*	*(98)*	*(103)*	*(106)*	*(108)*
Bell County Total	(2011 Plan)	60,039	70,010	76,412	81,485	85,999	90,422
Bell County Total	(2006 Plan)	58,295	67,750	73,914	78,782	83,127	87,372
Increase/(Decrease)		*1,744*	*2,260*	*2,498*	*2,703*	*2,872*	*3,050*
Bosque County							
Morgan	(2011 Plan)	74	86	99	115	133	156
Morgan	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*74*	*86*	*99*	*115*	*133*	*156*
Valley Mills	(2011 Plan)	265	295	313	316	319	323
Valley Mills	(2006 Plan)	241	246	248	246	246	247
Increase/(Decrease)		*24*	*49*	*65*	*70*	*73*	*76*
County-Other	(2011 Plan)	718	871	968	990	980	981
County-Other	(2006 Plan)	806	985	1,105	1,147	1,157	1,182
Increase/(Decrease)		*(88)*	*(114)*	*(137)*	*(157)*	*(177)*	*(201)*
Bosque County Total	(2011 Plan)	2,839	3,159	3,369	3,410	3,418	3,468
Bosque County Total	(2006 Plan)	2,829	3,138	3,342	3,382	3,389	3,437
Increase/(Decrease)		*10*	*21*	*27*	*28*	*29*	*31*
Callahan County							
Clyde	(2011 Plan)	305	297	278	259	245	238
Clyde	(2006 Plan)	271	264	247	230	217	211
Increase/(Decrease)		*34*	*33*	*31*	*29*	*28*	*27*
County-Other	(2011 Plan)	527	513	484	463	440	431
County-Other	(2006 Plan)	563	548	517	494	470	460
Increase/(Decrease)		*(36)*	*(35)*	*(33)*	*(31)*	*(30)*	*(29)*
Callahan County Total	(2011 Plan)	1,445	1,417	1,351	1,296	1,245	1,224
Callahan County Total	(2006 Plan)	1,447	1,419	1,353	1,298	1,247	1,226
Increase/(Decrease)		*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*

County/City		2010	2020	2030	2040	2050	2060
Eastland County							
Eastland	(2011 Plan)	918	908	878	841	806	769
Eastland	(2006 Plan)	863	853	825	790	757	722
Increase/(Decrease)		*55*	*55*	*53*	*51*	*49*	*47*
County-Other	(2011 Plan)	784	767	734	696	660	631
County-Other	(2006 Plan)	816	798	764	724	687	657
Increase/(Decrease)		*(32)*	*(31)*	*(30)*	*(28)*	*(27)*	*(26)*
Eastland County Total	(2011 Plan)	2,962	2,909	2,796	2,662	2,535	2,421
Eastland County Total	(2006 Plan)	2,939	2,885	2,773	2,639	2,513	2,400
Increase/(Decrease)		*23*	*24*	*23*	*23*	*22*	*21*
Hamilton County							
Hico	(2011 Plan)	302	297	292	288	285	285
Hico	(2006 Plan)	285	281	276	272	269	269
Increase/(Decrease)		*17*	*16*	*16*	*16*	*16*	*16*
County-Other	(2011 Plan)	431	407	384	375	356	355
County-Other	(2006 Plan)	440	416	392	383	364	363
Increase/(Decrease)		*(9)*	*(9)*	*(8)*	*(8)*	*(8)*	*(8)*
Hamilton County Total	(2011 Plan)	1,287	1,246	1,207	1,184	1,154	1,153
Hamilton County Total	(2006 Plan)	1,279	1,239	1,199	1,176	1,146	1,145
Increase/(Decrease)		*8*	*7*	*8*	*8*	*8*	*8*
Hill County							
Hillsboro	(2011 Plan)	1,819	1,862	1,911	1,957	2,030	2,123
Hillsboro	(2006 Plan)	1,728	1,768	1,815	1,859	1,928	2,017
Increase/(Decrease)		*91*	*94*	*96*	*98*	*102*	*106*
Hubbard	(2011 Plan)	194	188	183	177	173	173
Hubbard	(2006 Plan)	179	174	169	163	160	160
Increase/(Decrease)		*15*	*14*	*14*	*14*	*13*	*13*
Itasca	(2011 Plan)	225	219	212	206	202	201
Itasca	(2006 Plan)	206	201	194	189	185	184
Increase/(Decrease)		*19*	*18*	*18*	*17*	*17*	*17*
Whitney	(2011 Plan)	365	370	375	380	391	405
Whitney	(2006 Plan)	346	350	355	360	370	384
Increase/(Decrease)		*19*	*20*	*20*	*20*	*21*	*21*
County-Other	(2011 Plan)	268	289	317	345	376	413
County-Other	(2006 Plan)	373	394	423	453	486	526
Increase/(Decrease)		*(105)*	*(105)*	*(106)*	*(108)*	*(110)*	*(113)*
Hill County Total	(2011 Plan)	4,901	5,041	5,206	5,372	5,616	5,936
Hill County Total	(2006 Plan)	4,862	5,000	5,164	5,331	5,573	5,892
Increase/(Decrease)		*39*	*41*	*42*	*41*	*43*	*44*

County/City		2010	2020	2030	2040	2050	2060
Hood County							
Cresson	(2011 Plan)	43	52	62	74	90	110
Cresson	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*43*	*52*	*62*	*74*	*90*	*110*
deCordova	(2011 Plan)	593	592	591	592	597	608
deCordova	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*593*	*592*	*591*	*592*	*597*	*608*
Granbury	(2011 Plan)	2,795	3,456	4,058	4,708	5,524	6,485
Granbury	(2006 Plan)	2,369	2,811	3,213	3,651	4,201	4,851
Increase/(Decrease)		*426*	*645*	*845*	*1,057*	*1,323*	*1,634*
Lipan	(2011 Plan)	171	239	333	467	656	924
Lipan	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*171*	*239*	*333*	*467*	*656*	*924*
Tolar	(2011 Plan)	143	179	213	246	289	342
Tolar	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*143*	*179*	*213*	*246*	*289*	*342*
County-Other	(2011 Plan)	2,863	3,301	3,689	4,094	4,597	5,184
County-Other	(2006 Plan)	3,734	4,345	4,916	5,539	6,322	7,272
Increase/(Decrease)		*(871)*	*(1,044)*	*(1,227)*	*(1,445)*	*(1,725)*	*(2,088)*
Hood County Total	(2011 Plan)	9,544	11,235	12,801	14,516	16,697	19,337
Hood County Total	(2006 Plan)	9,135	10,666	12,077	13,616	15,557	17,897
Increase/(Decrease)		*409*	*569*	*724*	*900*	*1,140*	*1,440*
Johnson County							
Alvarado	(2011 Plan)	570	607	654	697	766	858
Alvarado	(2006 Plan)	487	519	559	596	655	733
Increase/(Decrease)		*83*	*88*	*95*	*101*	*111*	*125*
Burleson	(2011 Plan)	4,449	6,687	8,272	8,153	8,096	8,095
Burleson	(2006 Plan)	3,320	3,752	4,240	4,762	5,446	6,326
Increase/(Decrease)		*1,129*	*2,935*	*4,032*	*3,391*	*2,650*	*1,769*
Cleburne	(2011 Plan)	6,027	6,680	7,343	8,097	9,046	9,879
Cleburne	(2006 Plan)	5,748	6,370	7,003	7,722	8,666	9,879
Increase/(Decrease)		*279*	*310*	*340*	*375*	*380*	*0*
Cresson	(2011 Plan)	12	14	17	20	24	29
Cresson	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*12*	*14*	*17*	*20*	*24*	*29*
Grandview	(2011 Plan)	230	281	342	334	331	331
Grandview	(2006 Plan)	208	219	229	241	259	285
Increase/(Decrease)		*22*	*62*	*113*	*93*	*72*	*46*
Joshua	(2011 Plan)	801	882	968	1,068	1,202	1,377
Joshua	(2006 Plan)	744	819	899	992	1,117	1,279
Increase/(Decrease)		*57*	*63*	*69*	*76*	*85*	*98*
Venus	(2011 Plan)	363	358	349	344	342	342
Venus	(2006 Plan)	282	278	271	267	265	265
Increase/(Decrease)		*81*	*80*	*78*	*77*	*77*	*77*

County/City		2010	2020	2030	2040	2050	2060
County-Other	(2011 Plan)	2,252	2,287	2,323	2,363	2,427	2,517
County-Other	(2006 Plan)	2,776	2,871	2,969	3,076	3,228	3,430
Increase/(Decrease)		*(524)*	*(584)*	*(646)*	*(713)*	*(801)*	*(913)*
Johnson County Total	(2011 Plan)	27,498	33,982	40,146	45,265	51,890	59,286
Johnson County Total	(2006 Plan)	26,359	31,014	36,048	41,845	49,292	58,055
Increase/(Decrease)		*1,139*	*2,968*	*4,098*	*3,420*	*2,598*	*1,231*
Lampasas County							
Lampasas	(2011 Plan)	1,842	2,016	2,119	2,174	2,223	2,082
Lampasas	(2006 Plan)	1,570	1,583	1,579	1,563	1,563	1,548
Increase/(Decrease)		*272*	*433*	*540*	*611*	*660*	*534*
County-Other	(2011 Plan)	950	966	977	982	986	1,112
County-Other	(2006 Plan)	1,152	1,289	1,385	1,450	1,494	1,529
Increase/(Decrease)		*(202)*	*(323)*	*(408)*	*(468)*	*(508)*	*(417)*
Lampasas County Total	(2011 Plan)	4,537	5,066	5,422	5,662	5,827	5,891
Lampasas County Total	(2006 Plan)	4,467	4,956	5,290	5,519	5,675	5,774
Increase/(Decrease)		*70*	*110*	*132*	*143*	*152*	*117*
Limestone County							
Kosse	(2011 Plan)	75	75	74	73	73	74
Kosse	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*75*	*75*	*74*	*73*	*73*	*74*
County-Other	(2011 Plan)	828	765	703	642	594	551
County-Other	(2006 Plan)	883	819	756	693	645	602
Increase/(Decrease)		*(55)*	*(54)*	*(53)*	*(51)*	*(51)*	*(51)*
Limestone County Total	(2011 Plan)	3,313	3,468	3,531	3,566	3,638	3,775
Limestone County Total	(2006 Plan)	3,293	3,447	3,510	3,544	3,616	3,752
Increase/(Decrease)		*20*	*21*	*21*	*22*	*22*	*23*
McLennan County							
Robinson	(2011 Plan)	1,268	1,462	1,611	1,756	1,857	2,030
Robinson	(2006 Plan)	1,110	1,153	1,182	1,210	1,236	1,291
Increase/(Decrease)		*158*	*309*	*429*	*546*	*621*	*739*
County-Other	(2011 Plan)	6,345	6,332	6,361	6,359	6,384	6,466
County-Other	(2006 Plan)	6,635	6,904	7,167	7,399	7,574	7,881
Increase/(Decrease)		*(290)*	*(572)*	*(806)*	*(1,040)*	*(1,190)*	*(1,415)*
McLennan County Total	(2011 Plan)	46,914	49,741	52,122	54,570	56,158	58,728
McLennan County Total	(2006 Plan)	47,046	50,004	52,499	55,064	56,727	59,404
Increase/(Decrease)		*(132)*	*(263)*	*(377)*	*(494)*	*(569)*	*(676)*
Milam County							
Cameron	(2011 Plan)	1,606	1,756	1,840	1,881	1,880	1,888
Cameron	(2006 Plan)	1,452	1,433	1,414	1,395	1,382	1,382
Increase/(Decrease)		*154*	*323*	*426*	*486*	*498*	*506*
Milam County Total	(2011 Plan)	4,980	5,291	5,464	5,559	5,560	5,580
Milam County Total	(2006 Plan)	4,826	4,968	5,038	5,073	5,062	5,074
Increase/(Decrease)		*154*	*323*	*426*	*486*	*498*	*506*

County/City		2010	2020	2030	2040	2050	2060
Somervell County							
Glen Rose	(2011 Plan)	659	728	785	817	830	836
Glen Rose	(2006 Plan)	545	559	572	577	579	581
Increase/(Decrease)		*114*	*169*	*213*	*240*	*251*	*255*
County-Other	(2011 Plan)	481	519	547	559	562	566
County-Other	(2006 Plan)	526	586	630	652	659	664
Increase/(Decrease)		*(45)*	*(67)*	*(83)*	*(93)*	*(97)*	*(98)*
Somervell County Total	(2011 Plan)	1,140	1,247	1,332	1,376	1,392	1,402
Somervell County Total	(2006 Plan)	1,071	1,145	1,202	1,229	1,238	1,245
Increase/(Decrease)		*69*	*102*	*130*	*147*	*154*	*157*
Williamson County							
Cedar Park	(2011 Plan)	11,961	16,571	17,910	21,779	21,779	21,780
Cedar Park	(2006 Plan)	10,744	14,886	20,708	25,883	31,068	37,892
Increase/(Decrease)		*1,217*	*1,685*	*(2,798)*	*(4,104)*	*(9,289)*	*(16,112)*
Florence	(2011 Plan)	242	283	332	386	447	515
Florence	(2006 Plan)	224	262	307	357	413	476
Increase/(Decrease)		*18*	*21*	*25*	*29*	*34*	*39*
Georgetown	(2011 Plan)	10,342	13,956	18,187	22,826	27,979	33,506
Georgetown	(2006 Plan)	8,610	11,619	15,141	19,003	23,293	27,895
Increase/(Decrease)		*1,732*	*2,337*	*3,046*	*3,823*	*4,686*	*5,611*
Granger	(2011 Plan)	207	219	234	248	268	293
Granger	(2006 Plan)	185	196	209	222	240	262
Increase/(Decrease)		*22*	*23*	*25*	*26*	*28*	*31*
Hutto	(2011 Plan)	1,689	2,290	3,001	3,766	4,627	5,550
Hutto	(2006 Plan)	247	335	439	551	677	812
Increase/(Decrease)		*1,442*	*1,955*	*2,562*	*3,215*	*3,950*	*4,738*
Jarrell	(2011 Plan)	208	210	212	216	219	207
Jarrell	(2006 Plan)	** Not a WUG in the 2006 Plan					
Increase/(Decrease)		*208*	*210*	*212*	*216*	*219*	*207*
Jarrell-Schwertner WSC	(2011 Plan)	479	722	1,006	1,308	1,651	2,019
Jarrell-Schwertner WSC	(2006 Plan)	769	1,017	1,306	1,614	1,965	2,342
Increase/(Decrease)		*(290)*	*(295)*	*(300)*	*(306)*	*(314)*	*(323)*
Leander	(2011 Plan)	3,887	5,380	7,119	9,028	11,156	13,439
Leander	(2006 Plan)	1,971	2,728	3,610	4,578	5,657	6,815
Increase/(Decrease)		*1,916*	*2,652*	*3,509*	*4,450*	*5,499*	*6,624*
Round Rock	(2011 Plan)	23,103	31,146	40,704	51,176	62,801	72,268
Round Rock	(2006 Plan)	19,239	25,937	33,896	42,617	52,298	62,680
Increase/(Decrease)		*3,864*	*5,209*	*6,808*	*8,559*	*10,503*	*9,588*
Taylor	(2011 Plan)	2,913	3,279	3,705	4,183	4,727	5,342
Taylor	(2006 Plan)	2,522	2,839	3,208	3,622	4,093	4,625
Increase/(Decrease)		*391*	*440*	*497*	*561*	*634*	*717*
Thrall	(2011 Plan)	140	165	196	228	263	304
Thrall	(2006 Plan)	123	145	172	200	231	267
Increase/(Decrease)		*17*	*20*	*24*	*28*	*32*	*37*

County/City		2010	2020	2030	2040	2050	2060
County-Other	(2011 Plan)	371	267	378	1,729	3,533	4,651
County-Other	(2006 Plan)	429	333	452	1,812	3,627	4,757
Increase/(Decrease)		*(58)*	*(66)*	*(74)*	*(83)*	*(94)*	*(106)*
Williamson County Total	(2011 Plan)	68,167	92,375	116,187	145,655	174,373	204,294
Williamson County Total	(2006 Plan)	57,688	78,184	102,651	129,241	158,485	190,243
Increase/(Decrease)		*10,479*	*14,191*	*13,536*	*16,414*	*15,888*	*14,051*
Brazos G Total	(2011 Plan)	361,419	417,462	466,106	515,151	565,027	615,483
Brazos G Total	(2006 Plan)	347,389	397,090	444,820	491,312	542,172	595,482
Increase/(Decrease)		*14,030*	*20,372*	*21,286*	*23,839*	*22,855*	*20,001*

Attachment C
Recommended Steam-Electric Water Demand Projections

Water Demand Projections for Steam-Electric Power Generation in Brazos G (acft/yr)

County	2006 Brazos G Projections	2008 TWDB (BEG) Projections	Diermann/ HDR Projections	Change Based on Comments Received	2010	2020	2030	2040	2050	2060
	Source of Projection									
Bell	✓				**0**	**3,674**	**4,296**	**5,053**	**5,977**	**7,102**
		✓			0	0	0	0	0	0
Bosque	✓				**4,323**	**6,188**	**7,235**	**8,510**	**10,065**	**11,961**
		✓			1,905	1,355	1,323	2,044	2,223	2,991
Brazos	✓				453	361	422	497	588	698
		✓			**526**	**488**	**394**	**446**	**303**	**393**
Burleson	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Callahan	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Comanche	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Coryell	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Eastland	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Erath	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Falls	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Fisher	✓				0	0	0	0	0	0
		✓			0	0	0	0	0	0
Grimes	✓				9,302	11,768	13,758	16,184	19,141	22,746
		✓			25,968	16,516	14,560	11,093	10,687	11,947
			✓		**12,000**	**31,760**	**33,160**	**34,660**	**36,660**	**39,660**
Hamilton	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Haskell	✓				422	336	393	462	547	650
		✓		✓	**0**	**0**	**0**	**0**	**0**	**0**
Hill	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Hood	✓				6,594	8,098	9,467	11,137	13,172	15,653
		✓			2,922	2,107	2,042	3,122	3,361	4,520
			✓		4,000	5,862	6,853	8,062	9,535	11,331
				✓	**5,100**	**10,200**	**10,200**	**10,200**	**10,200**	**10,200**
Johnson	✓				1,200	1,200	1,200	1,200	1,200	1,200
		✓			418	297	290	449	488	656
			✓		**3,500**	**7,000**	**7,000**	**7,000**	**7,000**	**7,000**
Jones	✓				1,255	1,001	1,170	1,376	1,628	1,935
		✓			359	333	294	396	364	484
				✓	**0**	**0**	**0**	**0**	**0**	**0**
Kent	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**

County	Source of Projection: 2006 Brazos G Projections	2008 TWDB (BEG) Projections	Diermann/ HDR Projections	Change Based on Comments Received	2010	2020	2030	2040	2050	2060
Knox	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Lampasas	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Lee	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Limestone	✓				**22,332**	**22,598**	**26,420**	**31,079**	**36,758**	**43,681**
		✓			12,725	11,314	25,507	32,733	44,847	46,899
McLennan	✓				37,098	32,983	35,720	39,056	43,123	48,081
		✓			**3,808**	**11,217**	**14,305**	**15,538**	**17,901**	**19,142**
Milam	✓				8,680	12,500	12,500	12,500	16,000	16,000
		✓			4,057	8,580	16,695	20,401	27,458	28,715
			✓		**12,500**	**12,500**	**12,500**	**12,500**	**16,000**	**16,000**
Nolan	✓				1,315	1,882	2,200	2,588	3,061	3,638
		✓			807	11,311	43,524	63,253	89,903	94,298
			✓		**807**	**11,311**	**20,000**	**20,000**	**20,000**	**20,000**
Palo Pinto	✓				1,365	1,250	1,461	1,719	2,033	2,416
		✓			613	569	501	667	606	805
			✓		**840**	**4,000**	**4,000**	**4,000**	**4,000**	**4,000**
Robertson	✓				28,000	30,000	30,000	35,000	40,000	40,000
		✓			**15,789**	**17,882**	**31,113**	**36,369**	**48,118**	**50,319**
Shackelford	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Somervell	✓				**84,817**	**84,817**	**84,817**	**84,817**	**84,817**	**84,817**
		✓			34,829	76,382	53,861	66,570	96,829	127,089
Stephens	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Stonewall	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Taylor	✓				25	20	24	28	33	39
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Throckmorton	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Washington	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Williamson	✓				0	0	0	0	0	0
		✓			**0**	**0**	**0**	**0**	**0**	**0**
Young	✓				**2,170**	**1,730**	**2,023**	**2,379**	**2,814**	**3,344**
		✓			627	581	515	692	636	846
Total of 2006 Brazos G Projections					209,351	220,406	233,106	253,585	280,957	303,961
Total of 2008 BEG Projections					105,354	158,931	204,925	253,771	343,722	389,104
Total of Projections Recommended for 2011 Plan					**168,512**	**225,365**	**257,462**	**272,550**	**300,613**	**317,619**

Note:

Shaded cells represent the steam-electric demand recommended for use in the 2011 Plan.

Attachment D
Comments Received on Initially Recommended Steam-Electric Water Demand Projections

TENASKA®

1044 N. 115 Street, Suite 400
Omaha, Nebraska 68154-4446
402-691-9500
FAX: 402-691-9526

RECEIVED

2009 MAY 11 AM 10:57

BRAZOS RIVER
AUTHORITY

May 8, 2009

Mr. Trey Buzbee
Project Manager
Brazos G Regional Water Planning Group
P.O. Box 7555
Waco, Texas 76714-7555

Re: Steam-Electric Demands for 2011 Brazos G Regional Water Plan

Dear Mr. Buzbee:

Thank you for your letter dated April 23, 2009, and the opportunity to comment on the above-referenced document. As you know, Tenaska is currently developing the Tenaska Trailblazer Energy Center ("TTEC") in Nolan County. The TTEC will generate approximately 765 megawatts ("MW") gross and 600 MW net, using best available supercritical steam, pulverized coal technology. The plant will be designed to capture 85 to 90 percent of the carbon dioxide produced during combustion and deliver it via pipeline to Permian Basin oil fields for use in enhanced oil recovery ("EOR") and ultimately, geologic storage. We anticipate that the TTEC will be ready for commercial operation in 2015.

Current design calls for the TTEC to use air cooled condenser technology with an anticipated maximum water demand of about 2,000 acre-feet/year. However, the TTEC design could shift to more efficient and less expensive wet cooling if sufficient water supply can be secured consistent with the other needs of the area. Under the wet cooling case, water usage on the order of 12,000 acre-feet/year would be anticipated.

Although Tenaska currently has no plans to expand the TTEC, for planning purposes, it would be reasonable to assume that the TTEC might expand at some point after commercial operations begins. Consequently, the 20,000 acre-feet/year earmarked for steam-electric demand in Nolan County over the Brazos G plan horizon seems reasonable at this time and allows for future growth in this sector.

Sincerely,

TENASKA

M. Fred Strauss

M. Fred Strauss, P.G.
Director, Environmental Programs

WOLF HOLLOW

9201 Wolf Hollow Court
Granbury, TX 76048
817-579-8201
Fax 817-579-1190

May 14, 2009

Trey Buzbee
Project Manager
Brazos G Regional Water Planning Group

Mr. Buzbee,

Wolf Hollow has reviewed the Brazos G Regional Water Planning Group's steam-electric demand projections for Wolf Hollow I. The projection listed in Table 1 (Alternative Steam-Electric Demand Projections for Six Brazos G Counties) for year 2010 currently states the projection of 4,000 acre feet.

Based on previous usage, current and predicted capacity factor for the plant, the projected usage for year 2010 should be 5,100 acre feet.

Based on current plans, the projected usage for 2020, 2030, 2040, 2050 and 2060 should 10,200 acre feet.

Please feel free to contact us if there are other questions.

Sincerely,

Kelly Fleetwood
Plant Manager

Cc: file

Trey Buzbee

From: Young, Eddy [Eddy.Young@optimenergy.com]

Sent: Thursday, May 14, 2009 5:46 AM

To: Trey Buzbee

Cc: Faulkner, George; Rahn, Nick

Subject: Brazos G Water Planning

Trey:

Thanks for taking my call Tuesday concerning the Brazos G water planning information you are working on. As of today (May 14, 2009) Optim Energy nor Twin Oaks is planning any expansion activities that would increase water use in any of the counties mentioned your letter. If we do decide something in the near future I will forward that information to you. Please let me know if you have any questions or need additional information.

Have A Blessed Day
Eddy Young
Environmental Coordinator
Optim Energy LP, Twin Oaks
P.O. Box 37
Bremond, TX 76629
(254) 746-7604 ext. 378 (office)
(254) 746-7159 (fax)
(979) 777-7962 (mobile)
eddy.young@optimenergy.com
OPTIMENERGY

Trey Buzbee

From: wgcarter@aep.com
Sent: Friday, May 15, 2009 12:07 PM
To: Trey Buzbee
Cc: mcmccullough@aep.com; chadami@aep.com; tjslater1@aep.com
Subject: Brazos G Steam Electric Estimates

Trey -

I currently serve on the Region D planning group and am coordinating American Electric Power's response to your request for feedback. Please note that I worked with other utility representatives on the 2003 report contracted by TWDB that was the basis for the 2006 steam electric demand, and I had reviewed and provided comments to the Bureau of Economic Geology regarding their estimates. I had concerns over some of the BEG report assumptions and recently completed my own statewide and regional steam electric estimates which are attached below for Region G and which have been provided to the TWDB's Stuart Norvell as well as a number of steam electric reps on select regions. I also have a revised version of my spreadsheet that attempts to account for the higher water demand due to possible future carbon capture requirements. If you are interested in a copy of my work I will be glad to forward it to you.

That being said - my comments regarding the proposed Brazos G estimates are as follows:

- The AEP (formerly West Texas Utilities) plants in Jones, Haskell and Taylor counties have been retired. If you wish, the steam electric demand for those counties may be set to zero. As you are probably aware, for the past several years, the Abilene area has been the focus of significant growth in wind generation which has minimal water demand.

Brazos G Steam Electric Water Demand - assumes no carbon capture

	2000	2006	2010	2020	2030	2040	2050	2060
BELL	0	0	0	863	2,131	2,547	3,045	3,639
BOSQUE	521	821	1,663	563	1,379	1,648	1,970	2,355
BRAZOS	545	588	127	67	112	134	160	191
BURLESON	0	0	0	0	0	0	0	0
CALLAHAN	0	0	0	0	0	0	0	0
COMANCHE	0	0	0	0	0	0	0	0
CORYELL	0	0	0	0	0	0	0	0
EASTLAND	0	0	0	0	0	0	0	0
ERATH	0	0	0	0	0	0	0	0
FALLS	0	0	0	0	0	0	0	0
FISHER	0	0	0	0	0	0	0	0
GRIMES	4,405	7,149	5,988	11,095	13,763	16,451	19,663	23,504
HAMILTON	0	0	0	0	0	0	0	0
HASKELL	507	0	0	0	0	0	0	0
HILL	0	0	0	0	0	0	0	0
HOOD	2,573	2,746	2,526	1,579	3,671	4,389	5,246	6,270
JOHNSON	0	325	665	223	551	659	788	942
JONES	1,510	0	0	0	0	0	0	0
KENT	0	0	0	0	0	0	0	0
KNOX	0	0	0	0	0	0	0	0
LAMPASAS	0	0	0	0	0	0	0	0
LEE	0	0	0	0	0	0	0	0
LIMESTONE	22,065	23,403	22,211	25,622	25,622	30,626	36,607	43,756
MCLENNAN	24,412	427	1,253	12,459	12,874	15,389	18,394	21,987
MILAM	4,048	4,166	8,741	8,741	8,741	10,448	12,488	14,927
NOLAN	1,093	204	0	7,338	7,338	8,771	10,483	12,531
PALO PINTO	1,378	518	357	179	298	356	425	508
ROBERTSON	4,322	4,330	17,223	17,223	17,223	20,586	24,607	29,412
SHACKELFORD	0	0	0	0	0	0	0	0
SOMERVELL	76,505	45,826	44,136	87,464	87,464	104,546	124,964	149,370
STEPHENS	0	0	0	0	0	0	0	0
STONEWALL	0	0	0	0	0	0	0	0
TAYLOR	31	0	0	0	0	0	0	0
THROCKMORTC	0	0	0	0	0	0	0	0
WASHINGTON	0	0	0	0	0	0	0	0
WILLIAMSON (P)	0	0	0	0	0	0	0	0
YOUNG (P)	2,610	556	717	358	597	714	853	1,020
	146,524	**91,059**	**105,607**	**173,772**	**181,763**	**217,262**	**259,694**	**310,412**

Thanks

W. Greg Carter, P.E.
AEP Region 5 Engineering
e-mail: wgcarter@aep.com Cell Phone: 903-746-4585
Welsh Phone 903-853-4863 Pirkey Phone 903-927-5896