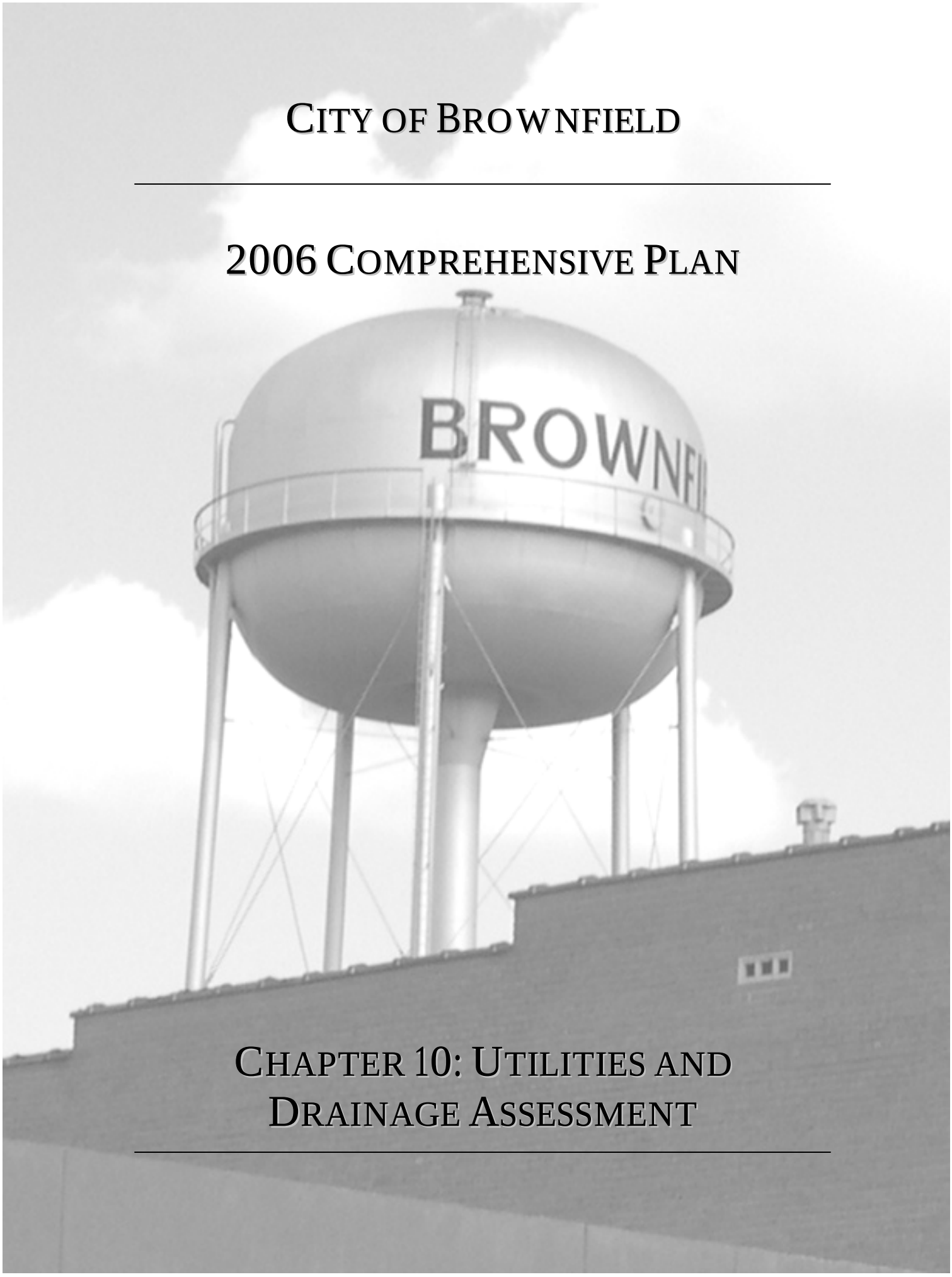
CITY OF BROWNFIELD

2006 COMPREHENSIVE PLAN



CHAPTER 10: UTILITIES AND DRAINAGE ASSESSMENT

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Introduction

Planning for and providing infrastructure (i.e., water, wastewater, and drainage systems) is perhaps one of the most important things a city does. Citizens should be secure in the knowledge that they can rely on their local government to ensure that there is adequate water and wastewater capacity for the current population, as well as for future growth. Furthermore, an adequate drainage system that prevents stormwater from posing major problems to citizens and their homes should be provided. This Utilities and Drainage Assessment is intended to provide an overview of Brownfield's infrastructure system and the capacity of that system in relation to the current population and to the future projected population.

The Water System[1]

Brownfield currently receives most of its water from the Canadian River Municipal Water Authority (CRMWA). Brownfield is one of the 11 member cities that make up the CRMWA, which was created in the 1960's to meet the raw water needs of people in the Panhandle and South Plains regions. The CRMWA, using a 322-mile aqueduct system, provides its member cities with raw water from Lake Meredith (located north of Amarillo) and its well field in Roberts County.[2] In 2003 and 2004, the City received 80 to 90 percent of its water from the CRMWA. Brownfield has the rights to approximately 830,000,000 gallons of raw water per year from the CRMWA.

The second source of water for the City is the City owned and operated wells in the Ogallala Aquifer. The water from these 14 wells is capable of supplying the City with all its water needs in cases where water from the CRMWA is not available. City wells can produce in excess of 3,000,000 gallons a day.

With the exception of chlorinators used for disinfection purposes, Brownfield does not own or operate any facilities to treat raw water from the CRMWA and therefore has contracted with the city of Lubbock to treat its raw water through the city of Lubbock's filter plant. (Other Panhandle and South Plains cities have entered into similar agreements.) Brownfield and the other cities that have their water treated at the Lubbock filter plant fund modifications to the filter plant to meet federal guidelines for safe drinking water.

The City has two water storage methods, elevated storage (water towers) and ground storage. Currently the City has 900,000 gallons in elevated storage and 1,750,000 gallons in ground storage. Specifically, the City has the three following water towers:

1) 500,000 Gallon Elevated Water Tank:

[1] The City of Brownfield's website: www.ci.brownfield.tx.us

[2] The Canadian River Municipal Water Authority's website: www.crmwa.com

a. Location: 500 N. Cedar Street
b. Year Built: 1959

2) 250,000 Gallon Elevated Water Tank:
a. Location: 221 S. 4th Street
b. Year Built: 1994

3) 150,000 Gallon Elevated Water Tank :
a. Location: 2502 Lamesa Road
b. Year Built: 1994

Illustration 10-1
Elevated Storage Tanks

CONSIDERATIONS FOR THE FUTURE

In general, the City has enough water rights to meet its current demand. Table 10-1, displays the total usage from the City since 1965. The average consumption of the last five years (2000-2004) is 563,746 gallons a year. The peak year for water usage occurred in 1980 with the City using 721,152 gallons, notably this high consumption occurred during a year when the City had one of it highest population totals. Conversely, the lowest year for water usage occurred in 1992 with the City using 424,494 gallons, notably this low consumption corresponded with a time when the City had a lower population total.

It is noted that the City does not use it full allocation of water from the CRMWA. In order to preserve the limited natural supply of water from the City's wells, the City should consider taking appropriate measures to better or fully utilize it allocation of water from the CRMWA (830,000,000 gallons a year). In order to accomplish this, a review should be conducted to evaluate to best method to utilize CRMWA water. Specially, the City should review alternatives and costs for increasing its water storage capacity to better utilize its full allocation of water from the CRMWA. Many factors such as the ability to have water treated at the Lubbock filter plant will have influences on how much water the City can ultimately receive in a given period of time.

Another consideration is the City's ability to distribute water. Measures should be taken to ensure that the City's water pumping capacity could adequately distribute water throughout the City and to new or developing areas. The existing facilities and improvements should continue to be reviewed and considered in any Capital Improvement Programming (CIP).

Table 10-1
Water Usage – 1,000 Gallons
City of Brownfield, Texas

Year	CRMWA (Lake + Wells)	CITY Wells	CITY Total Usage
1965	-	548,569	548,569
1966	-	512,100	512,100
1967	57,898	406,332	464,230
1968	231,771	203,589	435,360
1969	385,157	77,359	462,516
1970	421,124	79,016	500,140
1971	448,874	67,246	516,120
1972	434,673	55,628	490,301
1973	439,814	53,932	493,746
1974	469,150	115,021	584,171
1975	467,092	52,777	519,869
1976	481,763	56,129	537,892
1977	494,430	33,661	528,091
1978	493,744	180,729	674,473
1979	519,994	149,569	669,563
1980	492,844	228,308	721,152
1981	507,333	137,551	644,884
1982	432,797	92,679	525,476
1983	514,951	51,608	566,559
1984	544,249	12,991	557,240
1985	523,255	11,277	534,532
1986	441,511	16,930	458,441
1987	344,448	100,149	444,597
1988	445,921	9,857	455,778
1989	456,114	27,524	483,638
1990	444,975	37,570	482,545
1991	432,914	20,602	453,516
1992	393,602	30,892	424,494
1993	324,419	100,811	425,230
1994	435,505	152,828	588,333
1995	397,639	177,744	575,383
1996	382,204	184,103	566,307
1997	348,215	198,915	547,130
1998	413,849	142,131	555,980
1999	404,099	47,905	452,004
2000	519,268	27,699	546,967
2001	515,448	133,096	648,544
2002	515,121	47,599	562,720
2003	508,435	72,160	580,595
2004	387,655	92,248	479,903

Source: Canadian River Municipal Water Authority's website: www.crmwa.com

The Wastewater System[3]

The Brownfield wastewater treatment plant is located south of Old Lamesa Road on South Ballard Street. In 2003, the wastewater treatment plant was upgraded to a diffuser type system at an estimated cost of $470,146, bringing the total value of the facility to 1.4 million dollars. The treatment plant has a design capacity of 1,250,000 gallons per day and currently handles and average flow of 837,064 gallons per day. In addition to the regular facility, in 2003 the City constructed a 32-day effluent storage pond at an estimated cost $1,113,810. The City's wastewater treatment plant operates under a "no discharge" permit. A "no discharge" permit requires a plant not to discharge effluent (waste matter) into a stream or lake. Therefore, treated water from the plant is used to irrigate 585 acres of farmland. Portions of these 585 acres are owned by the City and leased to a private individual for farming purposes.

In 1996, the City had average daily flows that reached 75 percent of the plant's capacity for three consecutive months (June – August). According to the State law and the Texas Commission on Environmental Quality (TCEQ) [formerly the Texas Natural Resources Conservation Commission (TNRCC)] this fact required the City to begin planning for the replacement or expansion of existing facilities. Since that time, plans have been developed, by the City's engineering firm, to improve the wastewater facility. The TCEQ also requires that when a plant's capacity reaches 90 percent for three straight months that construction must begin on new or improved facilities.

CONSIDERATIONS FOR THE FUTURE

In general, the City should continue its efforts to plan for the improvement of the wastewater system. When appropriate, improvements should be considered for inclusion in the Capital Improvement Programming (CIP). Improvements should be coordinated with the existing plans established by the City and its engineering firm.

The Drainage System

Drainage of stormwater runoff and other surface water is accomplished through conveyance by City streets. The City streets channel water to the numerous playa lakes and the Lost Draw (the main drainage channel for the City). During the comprehensive planning process several Streets were identify that have flooding problems. Sections of the following streets were identified as having drainage issues during heavy rainfalls:

- Ballard Street
- B Street
- Broadway Street
- Buckley Street

[3] The City of Brownfield's website: www.ci.brownfield.tx.us

- Cedar Street
- Cheryl Drive
- Tahoka Road (HWY 380)
- Webb Street

Illustration 10-2
Intersection with Storm Water Runoff

Generally, some areas in the southeast quadrant of the City have issues with storm water runoff overflowing the curb. At times, water from the street has almost reached into the adjacent homes. The City has recently addressed some drainage issues by reconstructing streets with inverted crowns. Typically, streets are designed to have a six-inch crown with water draining to both sides of the street (i.e., the gutter area). Inverted crown streets have a six-inch drop in the middle of the street that allows the water to drain into the middle of the street (away from the curb). Inverted crown streets are a viable low cost option to address the issues of storm water drainage over flowing the gutters and curbs on standard crown street.

CONSIDERATIONS FOR THE FUTURE

Many cities in West Texas rely solely on surface drainage and do not use storm sewers, as seen in Illustration 10-3. Surface drainage is commonly used because the semi-arid environment of West Texas produces low amounts of yearly rainfall. However, rainfall events in West Texas can be severe and several inches of rain can fall within a short amount of time. This situation can cause problems with flooding on City streets. The advantage of not having to install storm sewers is that it is

Illustration 10-3
Examples of Storm Sewers

cheaper to install streets and streets are wider. Specifically, streets without storm sewers are designed to be wider than what is necessary to accommodate traffic in order to provide space for storm water to drain. Illustration 10-4 depicts typical streets in Brownfield that are designed to accommodate storm water via surface drainage and do not use storm sewers.

Illustration 10-4
Examples of Streets in Brownfield that Accommodate Storm Water via Surface Drainage and do not use Storm Sewers.

The disadvantage to the current method is that water must travel over City streets until it reaches a playa lake or empties into the Lost Draw and thus some streets and intersections may be inundated with water, as seen in Illustration 10-2. Storm sewers may be a suitable solution for some of the localized flooding problems in the City. Storm sewers provide a means for water to be removed from the street and conveyed to a playa lake or the Lost Draw. While constructing storm sewers are more expensive than not constructing them, the cost of the sewers can be offset by the fact that less amounts of concrete are necessary to construct a street because streets do not have to be as wide. Cities in West Texas, such as Midland, have begun to move towards having street with storm sewers as a method of handling storm water.

Although storm sewers are not feasible in many parts of the City, the City should evaluate the possibility of building storm sewers to relieve localized flooding. As an incentive to help defray the increased cost, the City could allow for the construction of narrower streets, which would use less concrete or asphalt material. Furthermore, during street improvement and reconstruction projects, storm sewers should be considered for inclusion within projects where flooding is currently a problem.

Conclusion

The water, wastewater, and drainage systems are vital components for life in Brownfield or any other City. Every citizen needs and uses the City's infrastructure system for basic quality of life needs. Therefore, this chapter is important in assessing and planning for future infrastructure needs. The following table, Table 10-2, summaries the recommendation found within this chapter.

Table 10-2
Utilities and Drainage Assessment Recommendations
City of Brownfield, Texas

Water System
Water Preservation In order to preserve the limited natural supply of water from the City-owned wells, the City should consider taking appropriate measures to better or fully utilize it allocation of water from the CRMWA (830,000,000 gallons a year).
Water Utilization A review should be conducted to evaluate to best method to utilize CRMWA water.
Water Storage Capacity The City should review alternatives and costs for increasing its water storage capacity to better utilize its full allocation of water from the CRMWA (830,000,000 gallons a year).
Water Pumping Capacity Measures should be taken to ensure that the City's water pumping capacity could adequately distribute water throughout the City and to new or developing areas.
Existing Facilities The existing facilities and improvements should continue to be reviewed and considered in any Capital Improvement Programming (CIP).
Wastewater System
Wastewater Planning – Continuing Existing Efforts In general, the City should continue its efforts to plan for the improvement of the wastewater system.
Wastewater Planning – Capital Improvement Programming When appropriate, wastewater improvements should be considered for inclusion in the Capital Improvement Programming (CIP). Improvements should be coordinated with the existing plans established by the City and its engineering firm.

Note: Not in any order of priority.
Source: City of Brownfield's Utilities and Drainage Assessment.

Table 10-2 (Continued)
Utilities and Drainage Assessment Recommendations
City of Brownfield, Texas

Drainage System
Relieve Localized Flooding – Storm Sewers Although storm sewers are not feasible in many parts of the City, the City should evaluate the possibility of building storm sewers to relieve localized flooding.
Incentive for Storm Sewers As an incentive to help defray the increased cost, the City could allow for the construction of narrower streets, which would use less concrete or asphalt material.
Street Improvement and Reconstruction Projects Furthermore, during street improvement and reconstruction projects, storm sewers should be considered for inclusion within projects where flooding is currently a problem.

Note: Not in any order of priority.
Source: City of Brownfield's Utilities and Drainage Assessment.