

Water and Wastewater Impact Fee Study

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Prepared for:

**Benbrook Water
Authority**

BWA06262



Freese and Nichols, Inc.
4055 International Plaza
Suite 200
Fort Worth, TX 76109
817/735-7300

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1-1

 1.1 GENERAL BACKGROUND..... 1-1

 1.2 MAXIMUM ALLOWABLE WATER IMPACT FEE 1-3

 1.3 MAXIMUM ALLOWABLE WASTEWATER IMPACT FEE 1-3

2.0 LAND USE ASSUMPTIONS..... 2-1

 2.1 PURPOSE 2-1

 2.2 ELEMENTS OF THE LAND USE ASSUMPTIONS 2-1

 2.3 METHODOLOGY 2-3

 2.4 HISTORICAL DATA 2-3

 2.5 BASE DATA (YEAR 2006) 2-5

 2.6 GROWTH ASSUMPTIONS 2-5

 2.7 10-YEAR PROJECTIONS (YEAR 2016)..... 2-6

 2.8 SUMMARY 2-6

3.0 WATER AND WASTEWATER IMPACT FEE ANALYSIS 3-1

 3.1 POPULATIONS..... 3-1

 3.2 WATER DEMANDS..... 3-1

 3.3 WASTEWATER FLOWS 3-2

 3.4 WATER AND WASTEWATER SYSTEM CAPITAL IMPROVEMENTS 3-2

 3.5 SERVICE UNITS 3-7

 3.6 MAXIMUM IMPACT FEE CALCULATION 3-10

LIST OF TABLES

TABLE 2.1 HISTORICAL POPULATION AND WATER USAGE DATA.....2-4

TABLE 2.2 HISTORICAL POPULATION AND WASTEWATER FLOW DATA2-4

TABLE 2.3 2006 LAND USE AND POPULATION2-5

TABLE 2.4 2016 LAND USE ASSUMPTIONS2-6

TABLE 3.1 PROJECTED WATER DEMANDS3-1

TABLE 3.2 PROJECTED WASTEWATER FLOWS BY SUB-BASIN.....3-2

TABLE 3.3 COST ALLOCATION FOR WATER IMPACT FEE CALCULATIONS3-3

**TABLE 3.4 COST ALLOCATION FOR WASTEWATER IMPACT FEE
CALCULATIONS3-4**

TABLE 3.5 SERVICE UNIT EQUIVALENCY TABLE3-8

TABLE 3.6 PROJECTED WATER SERVICE UNITS FOR 2006-2016.....3-9

TABLE 3.7 PROJECTED WASTEWATER SERVICE UNITS FOR 2006-20163-9

LIST OF FIGURES

FIGURE 2.1 BUILDOUT LAND USE PLAN.....2-2

FIGURE 3.1 WATER SYSTEM IMPACT FEE CAPITAL IMPROVEMENTS PLAN.....3-5

**FIGURE 3.2 WASTEWATER SYSTEM IMPACT FEE CAPITAL IMPROVEMENTS
PLAN.....3-6**

APPENDICES

APPENDIX A CAPITAL IMPROVEMENT COST TABLES.....A-1

APPENDIX B CREDIT ANALYSIS FOR IMPACT FEE CALCULATION.....B-1

1.0 EXECUTIVE SUMMARY

1.1 General Background

Texas Local Government Code Section 395 requires an impact fee analysis before impact fees are set. Section 395 requires that land use assumptions and capital improvement plans be updated at least every five years. The Benbrook Water Authority last performed an impact fee analysis in 2003.

The purpose of this report is to address the methodology used in the development and calculation of water and wastewater impact fees for the Benbrook Water Authority. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment of water and wastewater impact fees. The statutory authority for Impact Fees was established by the Texas Legislature in 1987 and is currently codified in Chapter 395, of the Texas Local Government Code as a means to allow Cities to reduce the impact growth has on its existing customer base and to allow a mechanism to place some of the burden of this growth to future new development. Below is a summary of the key components of an impact fee under the current Chapter 395 regulations.

- The time period that the impact fee and land use assumptions must be updated is a minimum of 5 years.
- The impact fee is based on capital improvements necessary for growth during the 10 year time period.
- One public hearing is required to discuss changes to the land use assumptions and capital improvements plan for entities with an existing impact fee.
- A 50% credit is applied to the total cost of growth per service unit during the 10 year time period to account for revenue generated by water sales for the service provider. The 50% credit is the maximum allowable fee that can be collected from new development unless the water service provider performs a credit analysis to determine if a higher than 50% credit is applicable.

Chapter 395 also identifies the items that impact fees can be used to pay for. They are:

- Construction contract price
- Surveying and Engineering fees

- Land acquisition costs
- Fees paid to the consultant preparing or updating the capital improvements plan (CIP)
- Projected interest charges and other finance costs for facilities expansions identified in the CIP

The fee can not be used to pay for:

- Construction, acquisition, or expansion of public facilities or assets other than those identified on the capital improvements plan
- Repair, operation, or maintenance of existing or new capital improvements
- Upgrading, updating, expanding, or replacing existing capital improvements to serve existing development in order to meet stricter safety, efficiency, environmental, or regulatory standards
- Upgrading, updating, expanding, or replacing existing capital improvements to provide better service to existing development
- Administrative and operating costs of the political subdivision
- Principal payments and interest or other finance charges on bonds or other indebtedness, except as allowed above

In June 2006, the Benbrook Water Authority, Texas, authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the City's water and wastewater systems. The impact fee analysis follows the general set of procedures in Subchapter B of Chapter 395, Authorization of Impact Fee.

The impact fee analysis involves determining the utilization of existing and proposed projects required as defined by the capital improvement plan to serve new development over the next 10-year time period. Once the utilization of a project by 2006-2016 development is determined, a portion of a project's cost can be assigned as impact fees. For existing or proposed projects, the impact fee is calculated as a percentage of the project cost, based upon the percentage of the project's capacity needed to serve development projected to occur between 2006 and 2016. Costs associated with capacity

serving existing development and development projected for more than 10 years in the future are not included in the impact fee calculation.

Chapter 395 of the Texas Local Government Code states that the maximum impact fee may not exceed the eligible capital improvement costs divided by the total number of service units attributed to new development during the Impact Fee eligibility period less a credit to account for water and wastewater revenues and property taxes used to finance capital improvement plans.

1.2 Maximum Allowable Water Impact Fee

The cost of water capital improvements eligible to serve development projected to occur between 2006 and 2016 is \$21,034,095. Finance costs are based on 5.0% interest for capital improvement projects with a return of 3% on an impact fee escrow account. The increase in the number of service units due to growth over the next ten years is projected as 5,709 service units. The maximum allowable water impact fee calculation is summarized as follows:

Total Capital Improvement Costs	\$21,034,095
Financing Costs	<u>\$6,694,014</u>
Total Eligible Costs	\$27,728,109
Total 10-year Projected Growth in Service Units	5,709
Base Maximum Calculated Water Impact Fee Per Service Unit Without Credit Analysis	\$4,857
Base Maximum Calculated Water Impact Fee Per Service Unit With 50% Credit	<u>\$2,428</u>

1.3 Maximum Allowable Wastewater Impact Fee

The cost of wastewater system capital improvements eligible to serve development projected to occur between 2006 and 2016 is \$4,557,027. Finance costs are based on 5.0% interest for capital improvement projects with a return of 3% on an impact fee escrow account. The increase in the number of service units due to growth over the next

ten years is projected as 5,709 service units. The maximum allowable wastewater impact fee calculation is summarized as follows:

Total Capital Improvement Costs	\$4,557,027
Financing Costs	<u>\$1,450,255</u>
Total Eligible Costs	\$6,007,282
Total 10-year Projected Growth in Service Units	5,709
Base Maximum Calculated Wastewater Impact Fee Per Service Unit Without Credit	\$1,052
Base Maximum Calculated Wastewater Impact Fee Per Service Unit With 50% Credit	<u>\$526</u>

2.0 LAND USE ASSUMPTIONS

2.1 Purpose

Chapter 395 of the Texas Local Government Code describes the process by which cities in Texas must formulate the development of impact fees. To assist the Benbrook Water Authority in determining the need and timing of capital improvements to serve future development, a reasonable estimation of future growth is required. For the purposes of determining an impact fee structure, growth and development projections were formulated based on assumptions pertaining to the type, location, quantity, and timing of various future land uses in the community. The purpose of this section of the report is to establish and document the methodology used for preparing the growth and land use assumptions for the Benbrook Water Authority. These land use assumptions, which include population projections, will become the basis for the preparation of impact fees for the Benbrook Water Authority water and wastewater systems. The buildout land use plan is shown in Figure 2.1.

2.2 Elements of the Land Use Assumptions

This section contains:

- A. Explanation of the general methodology used to prepare the land use assumptions
- B. Historical Data Analysis
- C. Base Year Data – Information on population and land use for the Benbrook Water Authority as of June 2006
- D. Future 10-Year Data - Information on population and land use for the Benbrook Water Authority in the year 2016
- E. Land Use Maps – Maps of land use for years 2006 and 2016 of the Benbrook Water Authority

Figure 2.1 Buildout Land Use Plan

2.3 Methodology

The Land Use Assumptions and future growth projections take into account several factors influencing development patterns, including:

- The character, type, density, and quantity of existing development
- Existing zoning patterns
- Current growth trends in the City of Benbrook
- Location and configuration of vacant land
- Availability of land for residential growth

The data to compile these land use assumptions was obtained from the City of Benbrook and the Benbrook Water Authority. The 10-year growth projections were calculated based upon reasonable growth rates using past absorption rates and development proposals known or approved by the City of Benbrook and the Benbrook Water Authority. Based on the growth assumptions and capital improvements needed to support growth, it is possible to develop an impact fee structure that fairly allocates improvement costs to growth areas in relationship to their impact on the entire infrastructure system.

2.4 Historical Data

The Benbrook Water Authority provided the following data:

- Wastewater flow data for the years 2001-2005,
- Water usage data for the years 2001-2005, and
- Year 2006 and buildout land use assumptions.

For purposes of this report, the land uses were grouped into residential and commercial for final analysis. Population data for the years 2000 through 2005 were obtained from the City of Benbrook planning department. Water usage for commercial users was developed using historical billing data with a typical percentage being assumed to be

returned wastewater flow. A historical average to maximum day water usage peaking factor of 2.2 was established using this data. The historical water and wastewater flow data for the years 2001 through 2005 are presented in **Tables 2.1** and **2.2**.

Table 2.1 Historical Population and Water Usage Data

Year	Population	Avg. Day Water Usage ¹ (MGD)	Avg. Day Water Usage (gpcd)	Maximum Day Water Usage (MGD)
2001	20,350	3.77	185	8.92
2002	20,550	3.57	174	8.38
2003	20,700	3.69	178	9.26
2004	21,100	3.38	160	6.60
2005	21,470	4.22	197	7.80

Notes: ¹ Average day water usage includes residential, commercial and industrial water demands.

Table 2.2 Historical Population and Wastewater Flow Data

Year	Population	Annual Average Daily Flow ¹ (MGD) ³	Avg. Day Wastewater Usage (gpcd) ³	Peak Wet Weather Flow ² (MGD)
2001	20,350	2.29	113	8.02
2002	20,550	2.33	114	8.17
2003	20,700	2.22	107	7.77
2004	21,100	2.38	113	8.32
2005	21,470	2.29	107	8.03

Notes: ¹ Annual average daily flow includes residential, commercial and industrial wastewater flows.

² An average daily flow to peak wet weather flow peaking factor of 4.0 was used to calculate peak wet weather flows.

³MGD = Million Gallons per Day and gpcd = gallons per capita day

2.5 Base Data (Year 2006)

In any evaluation and projection of future land use patterns, a documentation of existing conditions is essential. A documentation of existing land use patterns and population was made from staff input and from analysis of historical data. This documentation will serve as a base line for future growth. **Table 2.3** indicates a summary of existing land use and population for the Benbrook Water Authority service area.

Table 2.3 2006 Land Use and Population

Land Use	Acreage	Served Population
Developed Commercial	246	
Residential		21,628

2.6 Growth Assumptions

The growth was characterized based on population. A series of assumptions were made to arrive at a reasonable growth rate. The following assumptions have been made as a basis from which ten-year projections could be initiated.

- A. Future land uses were developed from reviewing historical and current development patterns and input from Benbrook Water Authority staff on new proposed developments.
- B. Land use assumptions are based on the adopted zoning regulations and current market trends. The land use assumptions were reviewed by FNI and Benbrook Water Authority.
- C. City of Benbrook residential population presently is approximately 66% of the buildout available capacity for residential growth based on land area.
- D. Benbrook Water Authority will be able to finance the necessary improvements to accommodate growth.
- E. School facilities will accommodate increases in population.

2.7 10-Year Projections (Year 2016)

The 10-year projections of land use assumptions are based upon current growth trends, information on upcoming developments and densities for each residential land use type. This population growth from 21,628 in 2006 to 30,873 in 2016 represents an annual average growth rate of 3.6% for the 10 year time period.

The land use assumptions are shown in **Table 2.4**.

Table 2.4 2016 Land Use Assumptions

Land Use	Acreage	Served Population
Developed Commercial	337	
Residential		30,873

Industrial growth will continue to occur north of Interstate 20 over the next 10 year time period. The historical information used to project this growth for the impact fee time period includes recent water usage information and information on buildout developable acres for the City of Benbrook, and were provided to FNI by the Benbrook Water Authority.

2.8 Summary

- Existing estimated population of Benbrook Water Authority service area in the year 2006 is 21,628 persons.
- The 10-year population projection for the year 2016 in the Benbrook Water Authority is 30,873 persons representing a 3.6% annual average growth rate.
- The served water system population for the next ten years (to 2016) is based on the projected population within the Benbrook Water Authority's water service area.
- The served wastewater system population for the next ten years (to 2016) is based on the projected wastewater service population within the Benbrook Water Authority's wastewater service area.
- Demand and flow projections are based on growth within the water and wastewater service areas respectively.
- Buildout is anticipated to occur beyond the year 2016.

3.0 WATER AND WASTEWATER IMPACT FEE ANALYSIS

Water and wastewater impact fees are based on the capital costs that the Benbrook Water Authority incurs to provide the water distribution system and wastewater system to serve development in the next ten years and the service units added during the same time period. The impact fee analysis for the water distribution and wastewater system is based on the capital improvement plans developed in this report.

3.1 Populations

Population and land use projections were prepared using land use data and population data from the City of Benbrook and Benbrook Water Authority. The Benbrook Water Authority total population in 2006 is estimated as 21,848, with a water and wastewater service area population of 21,628. The total population in 2016 is projected as 31,155 with a water and wastewater service area population of 30,873. These water system and wastewater system populations were used to establish water demands and wastewater flows, which are used to size proposed water and wastewater system improvements.

3.2 Water Demands

The water system population data was used to develop future water demands based on a projected average day per capita usage of 190 gallons per capita day (gpcd) and a maximum day to average day peaking factor of 2.2. The average day per capita of 190 gpcd accounts for residential and commercial development. The industrial demand for new growth was calculated using 3,200 gallons per acre per day (gpac). The average day and maximum day water demands for 2006, 2011 and 2016 were projected using the information developed in this document as summarized in Section 2.4 (Historical Data). These water demands are shown in **Table 3.1**.

Table 3.1 Projected Water Demands

Year	Served Population	Avg. Day Water Usage (MGD)	Maximum Day Water Usage (MGD)	Peak Hour Water Usage (MGD)
2006	21,628	4.9	10.8	20.7
2011	27,455	6.2	13.7	26.3
2016	30,873	7.0	15.3	29.4

3.3 Wastewater Flows

The population data was used to develop future wastewater flows based on historical data, projected average day per capita wastewater flow and peaking factors for dry weather and peak 2 - hour flows. Peaking factors for peak 2 - hour flows were taken as 3.50 for existing 2006 and 4.0 for future years. Average day dry weather flows for 2006, 2011 and 2016 were calculated using 90 gpcd, 110 gpcd, and 110 gpcd, respectively, for residential and 2,000 gpad for developable commercial acres. The projected wastewater flows for 2006, 2011 and 2016 are shown in **Table 3.2**.

Table 3.2 Projected Wastewater Flows by Sub-Basin

Year	Served Population	Average Day Dry Weather Flow (MGD)	Peak Wet Weather Flow ¹ (MGD)
2006	21,628	2.44	8.53
2011	27,455	3.64	14.55
2016	30,873	4.07	16.28

Notes: ¹ Peak wet weather flows were calculated with a 3.50 peaking factor for 2006 and 4.0 peaking factor for future planning periods.

3.4 Water and Wastewater System Capital Improvements

Proposed water and wastewater system projects were developed as part of the Capital Improvement Plan. The Capital Improvement Plan outlines the water facilities needed to provide water service based on the projected water demands within the water service area. Fire flows were also modeled to ensure adequate system pressures. Similarly, the Capital Improvement Plan also outlines the wastewater facilities needed to provide wastewater service based on the projected wastewater flows within the wastewater service area. A summary of the costs for each of the projects needed for the 10-year growth period used in the impact fee analysis for both the water and wastewater systems are shown in **Tables 3.3** and **3.4**, respectively. These proposed water system Capital Improvement Projects are shown on **Figure 3.1**. Proposed wastewater projects are shown on **Figure 3.2**. The probable construction costs for each project shown on **Figures 3.1** and **3.2** are provided in **Appendix A**.

Table 3.3
Proposed Water Distribution System Improvements, 2006-2016
Cost Allocation for Impact Fee Calculations
Benbrook Water Authority

No. Existing	Description of Project	Percent Utilization		Eligible Capital Cost	Costs Based on 2006 Dollars		
		2006*	2016		Current Development	10-Year (2006-2016)	Beyond 2016
A	24" Water line south from Sessums Pump Station along US Hwy 377 and east along I-20 to existing 16" water line.	35%	90%	\$1,960,526	\$686,184	\$1,078,289	\$196,053
B	6.0 MGD Treatment Plant Expansion (2001)	75%	100%	\$7,600,000	\$5,700,000	\$1,900,000	\$0
C	2.6 MGD Zollie Allen Pump Station	35%	100%	\$944,877	\$330,707	\$614,170	\$0
D	1.0 MG Zollie Allen Elevated Storage Tank	55%	100%	\$1,044,000	\$574,200	\$469,800	\$0
E	Water Impact Fee Study and Water Master Plan	0%	100%	\$78,000	\$0	\$78,000	\$0
Subtotal Existing Projects				\$11,627,403	\$7,291,091	\$4,140,259	\$196,053
No.	Description of Project	Percent Utilization		Capital Cost	Costs Based on 2006 Prices		
		2006	2016		Current Development	10-Year (2006-2016)	Beyond 2016
Proposed Projects							
1	2.5 MGD Pump Station expansion and 1 MG Ground Storage Tank expansion at Sessums Pump Station.	10%	100%	\$2,898,000	\$289,800	\$2,608,200	\$0
2	Remove existing 100,000 gallon South Elevated Storage Tank and replace it with a 750,000 gallon Elevated Storage Tank.	70%	90%	\$1,849,200	\$1,294,440	\$369,840	\$184,920
4	Expand Hilltop Heights Zollie Allen Pump Station by 2.0 MGD.	0%	80%	\$1,518,000	\$0	\$1,214,400	\$303,600
5	Expand the WTP to 18 MGD of treatment capacity and add 6.0 MGD of pumping capacity. 36" discharge water line from pumping facilities to the distribution system.	0%	75%	\$13,022,784	\$0	\$9,767,088	\$3,255,696
6	16" water line along FM 2871 from Westpark Drive to Rolling Hills Drive.	0%	60%	\$746,856	\$0	\$448,114	\$298,742
7	12" water line running northwest from existing 10" line on Sexton Lane to existing 12" water line on US HWY 377.	0%	80%	\$502,762	\$0	\$402,209	\$100,552
8	20" water line along US HWY 377 from Sessum Pump Station to existing 12" line; 16" water line continues northwest along US HWY 377 from proposed 20" water line to existing parallel 8"/10" lines.	30%	90%	\$676,200	\$202,860	\$405,720	\$67,620
9	1.5 MG Ground Storage Tank expansion at Hilltop Heights Pump Station. 20" water line along US HWY 377 from Westpark Drive to Lochness Lane from the West Park Discharge.	0%	60%	\$1,691,397	\$0	\$1,014,838	\$676,559
10	24" water line running southeast from existing 8" line on I-20 to existing 16" water line.	15%	85%	\$455,400	\$68,310	\$318,780	\$68,310
11	8" water line running east from existing 8" line near Beckman Drive and Benbrook Parkway to proposed 12" line; another 8" water line running south from existing 8" line near Beckman Drive and Benbrook Parkway to proposed 24" water line.	10%	80%	\$247,738	\$24,774	\$173,416	\$49,548
12	8" water line running east from existing 12" line on Timbercrest Drive to proposed 24" water line.	0%	100%	\$171,230	\$0	\$171,230	\$0
Subtotal Proposed Projects				\$23,779,567	\$1,880,184	\$16,893,836	\$5,005,547
Total Capital Improvements Cost (Existing and Proposed)				\$35,406,969	\$9,171,275	\$21,034,095	\$5,201,600

* Utilization in 2006 on proposed projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.

Table 3.4
Proposed Wastewater Distribution System Improvements, 2006-2016
Cost Allocation for Impact Fee Calculations
Benbrook Water Authority

No.	Description of Project	Percent Utilization		Eligible Capital Cost	Costs Based on 2006 Dollars		
		2006*	2016		2006-2016	Current Development	10-Year (2006-2016)
Existing Projects							
A	Impact Fee Study and Wastewater Master Plan	0%	100%	\$78,000	\$0	\$78,000	\$0
Subtotal Existing Projects					\$0	\$78,000	\$0
<hr/>							
No.	Description of Project	Percent Utilization		Capital Cost	Costs Based on Actual Construction		
		2006*	2016		2006-2016	Current Development	10-Year (2006-2016)
Proposed Projects							
1	12"/15" Sewer Line in Basin 1	85%	100%	\$ 489,190	\$415,811	\$73,378	\$0
2	12"/15"/18" Sewer Line in Basin 7	50%	90%	\$ 1,083,718	\$541,859	\$433,487	\$108,372
3	10"/12" Sewer Line in Basin 2	30%	90%	\$ 624,739	\$187,422	\$374,844	\$62,474
4	10"/12"/15" Sewer Line in Basin 3	15%	75%	\$ 594,133	\$89,120	\$356,480	\$148,533
5	36" Sewer Line in Western Portion on Basin 7	15%	70%	\$ 3,999,492	\$599,924	\$2,199,721	\$1,199,848
6	15" Sewer Line in Basin 6	40%	90%	\$ 288,598	\$115,439	\$144,299	\$28,860
7	15"/18" Sewer Line in Basin 4	0%	75%	\$ 817,244	\$0	\$612,933	\$204,311
8	10"/12" Sewer Line in Basin 7	0%	90%	\$ 315,428	\$0	\$283,885	\$31,543
Subtotal Proposed Projects					\$1,949,575	\$4,479,027	\$1,783,940
Total Capital Improvements Cost					\$1,949,575	\$4,557,027	\$1,783,940

* Utilization in 2006 on proposed projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.

Figure 3.1 Water System Impact Fee Capital Improvements Plan

Figure 3.2 Wastewater System Impact Fee Capital Improvements Plan

In **Tables 3.3** and **3.4**, the percent utilization for 2006, 2016 and the 10-year period, 2006 to 2016 are listed. The 2006 percent utilization is the portion of a project's capacity needed to serve existing development. It is not included as part of the impact fee analysis. The 2016 percent utilization is the portion of the project's capacity that will be needed to serve the Benbrook Water Authority in 2016. The 2006 to 2016 percent utilization is the portion of the project's capacity needed to serve development from 2006 to 2016.

The portion of a project's total cost that is used to serve development projected to occur from 2006 through 2016 is calculated as the total actual cost multiplied by the 2006 to 2016 percent utilization. Only this portion of the cost is used in the impact fee analysis.

3.5 Service Units

The maximum impact fee may not exceed the amount determined by dividing the cost of capital improvements needed by the total number of service units attributed to new development during the impact fee eligibility period. For the purposes of the water impact fee analysis, a water service unit is defined as service equivalent to a water connection for a single-family residence. The Benbrook Water Authority does not directly meter wastewater flows and bills for wastewater services based on the customer's water consumption. The wastewater service unit is defined in terms of the size of the water meter used. For the purposes of the impact fee analysis, a wastewater service unit is defined as the wastewater service provided to a customer with a water connection for a single-family residence.

The service associated with public, commercial, and industrial connections is converted into service units based upon the capacity of the meter used to provide service. The number of service units needed to represent each meter size is based on the maximum rated capacity of the meters as shown in AWWA Manual 6, Water Meters -- Selection, Installation, Testing, and Maintenance, 3rd edition, 1986. The service unit equivalent for each meter size is listed in **Table 3.5**.

Table 3.5 Service Unit Equivalency Table

Meter Size	Water Service Unit Equivalents
<1 "	1.00
1 1/2"	2.50
2"	4.00
3"	8.75
4"	15.00
6"	31.25
8"	45.00

Table 3.6 shows the water service units for 2006 and the projected service units for 2016. Typically, in the City of Benbrook, existing single-family residences are served with 5/8-inch water meters. However, future-single-family residences will be served by 1-inch water meters. Larger meters represent public, commercial, and industrial water use. The 2006 water residential and commercial meter quantities were provided by the Benbrook Water Authority. The total number of service unit equivalents for 2006 is 8,878. The 2016 projected water meter quantities are based on population, commercial acre growth projections and land use assumptions. The projected total number of service unit equivalents for 2016 is 14,587. The 2016 service unit equivalents also account for additional water meters for sprinkler irrigation system. The growth in service unit equivalents from 2006 to 2016 is 5,709.

Table 3.6 Projected Water Service Units for 2006-2016

Meter Size	2006 Existing Connections	2006 Existing Service Units	2016 Projected Connections	2016 Projected Service Units	2006-2016 Projected Growth in Service Units
<1"	7,732	7,732	12,585	12,584	4,852
1 ½"	62	156	89	223	67
2"	156	625	223	892	267
3"	40	350	58	508	158
4"	1	15	5	75	60
6"	0	0	4	125	125
8"	0	0	4	180	180
Total	7,992	8,878	12,968	14,587	5,709

Table 3.7 shows the wastewater service units for 2006 and the projected service units for 2016. A wastewater service unit for an existing single family residence is represented by a 5/8" water meter. However, future-single-family residences will be served by 1-inch water meters. Larger meters represent public, commercial, and industrial wastewater use. The 2016 projected connections are based on population and commercial acre growth. The total number of wastewater service unit equivalents for 2006 is 8,878. The project total number of service unit equivalents for 2016 is 14,587. The growth in wastewater service unit equivalents from 2006 to 2016 is 5,709.

Table 3.7 Projected Wastewater Service Units for 2006-2016

Meter Size	2006 Existing Connections	2006 Existing Service Units	2016 Projected Connections	2016 Projected Service Units	2006-2016 Projected Growth in Service Units
<1"	7,732	7,732	12,585	12,584	4,852
1 ½"	62	156	89	223	67
2"	156	625	223	892	267
3"	40	350	58	508	158
4"	1	15	5	75	60
6"	0	0	4	125	125
8"	0	0	4	180	180
Total	7,992	8,878	12,968	14,587	5,709

3.6 Maximum Impact Fee Calculation

The maximum impact fee that can be levied is equal to the projected capital cost needed to serve 10-year development divided by the projected 10-year growth in service units less the determined credit.

The total costs include the projected capital improvement costs to serve 10-year development, the projected financing cost for the capital improvements, and the consultant cost for preparing and updating the Capital Improvement Plan.

In accordance with Chapter 395, a credit must be provided for the portion of the utility service revenues generated by development during the program period that is used for payment of improvements, including the payment of debt, that are included in the capital improvements plan. This credit may equal 50% of the total projected cost of implementing the capital improvements program or may be calculated directly. The credit analysis was determined by both methods for the water and wastewater impact fees. The 50% credit is shown in the following calculation. The credit calculation as determined specific for the Benbrook Water Authority is included in **Appendix B**.

A. Maximum Water Impact Fee

The eligible costs for water include the following:

Total Capital Improvement Costs	\$21,034,095
Financing Costs	<u>\$6,694,014</u>
Total Eligible Costs	\$27,728,109
Total Water Impact Fee Credit @ 50%	\$13,864,055

The total eligible cost associated with the existing and proposed water system improvements to meet projected growth over the next ten years is \$27,728,109. The increase in the number of service units due to growth over the next ten years is projected as 5,709 service units.

$$\begin{aligned} \text{Maximum Water Impact Fee} &= \frac{\text{10-year Capital Improvement Cost} - \text{Credit}}{\text{10-year growth in Service Units}} \\ \text{With 50\% Credit} &= \frac{\$27,728,109 - \$13,864,055}{5,709 \text{ Service Units}} \\ &= \$ 2,428/ \text{Service Unit Equivalent} \end{aligned}$$

B. Maximum Wastewater Impact Fee

The eligible costs for wastewater include the following:

Total Capital Improvement Costs	\$4,557,027
Financing Costs	<u>\$1,450,255</u>
Total Eligible Costs	\$6,007,282
Total Wastewater Impact Fee Credit @ 50%	\$3,003,641

The total eligible cost associated with existing and proposed wastewater system improvements to meet projected growth over the next ten years is \$6,007,282. The increase in the number of service units due to growth over the next ten years is projected as 5,709 service units.

$$\begin{aligned} \text{Maximum Wastewater Impact} &= \frac{\text{10-year Capital Improvement Cost} - \text{Credit}}{\text{10-year Growth in Service Units}} \\ \text{Fee With 50\% Credit} &= \frac{\$6,007,282 - \$3,003,641}{5,709 \text{ Service Units}} \\ &= \$ 526/ \text{Service Unit Equivalent} \end{aligned}$$

Appendix A

Capital Improvement Cost Tables

**Table A-1
Benbrook Water Authority
Water System Improvements Year 2006-2011
Opinions Of Probable Project Cost**

Project Number	Project Description	Construction Items	Quantity	Units	Unit Price	Costs	
A	24" Supply Line to Sessums PS 24" Water line running south from Sessums Pump Station along US Hwy 377 and east along I-20 to existing 16" water line.	Total Construction Cost					\$1,704,805
		Engineering, Surveying & Geotech @ 15%					\$255,721
		Total Project Cost					\$1,960,526
1	Expansion of Sessums PS & GST 2.5 MGD Pump Station expansion and 1 MG Ground Storage Tank expansion at Sessums Pump Station.	1.0 MG Ground Tank	1	LS	\$700,000	\$700,000	
		Pump Station - Expans 2.5 MGD	1	LS	\$1,400,000	\$1,400,000	
		Subtotal					\$2,100,000
		Contingency @ 20%					\$420,000
		Total Construction Cost					\$2,520,000
		Engineering, Surveying & Geotech @ 15%					\$378,000
	Total Project Cost					\$2,898,000	
2	New 750,000 Gallon EST Remove existing 100,000 gallon South Elevated Storage Tank and replace it with a 750,000 gallon Elevated Storage Tank.	750,000 Gal Elevated Tank	1	LS	\$1,140,000	\$1,140,000	
		Remove Existing EST	1	EA	\$50,000	\$50,000	
		System Improvements	1	EA	\$150,000	\$150,000	
		Subtotal					\$1,340,000
		Contingency @ 20%					\$268,000
		Total Construction Cost					\$1,608,000
	Engineering, Surveying & Geotech @ 15%					\$241,200	
	Total Project Cost					\$1,849,200	
4	2.0 MGD Hilltop Heights Pump Station Expansion Expand Hilltop Heights Zollie Allen Pump Station by 2.0 MGD.	Pump Station - Expans 2 MGD	1	LF	\$1,100,000	\$1,100,000	
		Subtotal					\$1,100,000
		Contingency @ 20%					\$220,000
		Total Construction Cost					\$1,320,000
		Engineering, Surveying & Geotech @ 15%					\$198,000
	Total Project Cost					\$1,518,000	
5	6.0 MGD Treatment and Pumping Exp. & 36" Discharge Water Line Expand the WTP to 18 MGD of treatment capacity and add 6.0 MGD of pumping capacity. 36" discharge water line from pumping facilities to the distribution system.	Pump Station - Expans 6 MGD	1	LS	\$372,000	\$372,000	
		Water Treatment - Expans 6 MGD	1	LS	\$9,000,000	\$9,000,000	
		36" WL & Appurtenances	300	LF	\$216	\$64,800	
		Subtotal					\$9,436,800
		Contingency @ 20%					\$1,887,360
		Total Construction Cost					\$11,324,160
	Engineering, Surveying & Geotech @ 15%					\$1,698,624	
	Total Project Cost					\$13,022,784	
6	16" FM 2871 Water Line 16" water line along FM 2871 from Westpark Drive to Rolling Hills Drive.	16" WL & Appurtenances	4,950	LF	\$96	\$475,200	
		30" Boring and Casing	200	LF	\$330	\$66,000	
		Subtotal					\$541,200
		Contingency @ 20%					\$108,240
		Total Construction Cost					\$649,440
		Engineering, Surveying & Geotech @ 15%					\$97,416
	Total Project Cost					\$746,856	
BENBROOK WATER AUTHORITY TOTAL WATER SYSTEM COSTS 2011						\$21,995,366	

**Table A-2
Benbrook Water Authority
Water System Improvements Year 2011-2016
Opinions Of Probable Project Cost**

Number	Project Description	Construction Items	Quantity	Units	Price	Costs	
7	12" Water Line in West Park PP 12" water line running northwest from existing 10" line on Sexton Lane to existing 12" water line on US HWY 377.	12" WL & Appurtenances	5,060	LF	\$72	\$364,320	
						Subtotal	\$364,320
						Contingency @ 20%	\$72,864
						Total Construction Cost	\$437,184
						Engineering, Surveying & Geotech @ 15%	\$65,578
						Total Project Cost	\$502,762
8	16"/20" Water Lines along US 377 20" water line along US HWY 377 from Sessum Pump Station to existing 12" line; 16" water line continues northwest along US HWY 377 from proposed 20" water line to existing parallel 8"/10" lines.	16" WL & Appurtenances	3,300	LF	\$96	\$316,800	
		20" WL & Appurtenances	1,210	LF	\$120	\$145,200	
		Pavement Repair	800	LF	\$35	\$28,000	
						Subtotal	\$490,000
						Contingency @ 20%	\$98,000
						Total Construction Cost	\$588,000
				Engineering, Surveying & Geotech @ 15%	\$88,200		
				Total Project Cost	\$676,200		
9	1.5 MG GST Exp & 20" Water Line 1.5 MG Ground Storage Tank expansion at Hilltop Heights Pump Station. 20" water line along US HWY 377 from Westpark Drive to Lochness Lane from the West Park Discharge.	1.5 MG Ground Tank	1	LS	\$1,000,000	\$1,000,000	
		20" WL & Appurtenances	1,320	LS	\$120	\$158,400	
		36" Boring and Casing	150	LS	\$418	\$62,700	
		Pavement Repair	130	LS	\$35	\$4,550	
						Subtotal	\$1,225,650
						Contingency @ 20%	\$245,130
				Total Construction Cost	\$1,470,780		
				Engineering, Surveying & Geotech @ 15%	\$220,617		
				Total Project Cost	\$1,691,397		
10	24" Water Line along I-20 24" water line running southeast from existing 8" line on I-20 to existing 16" water line.	24" WL & Appurtenances	2,640	LF	\$125	\$330,000	
						Subtotal	\$330,000
						Contingency @ 20%	\$66,000
						Total Construction Cost	\$396,000
						Engineering, Surveying & Geotech @ 15%	\$59,400
				Total Project Cost	\$455,400		
11	8" Water Lines North of I-20 8" water line running east from existing 8" line near Beckman Drive and Benbrook Parkway to proposed 12" line; another 8" water line running south from existing 8" line near Beckman Drive and Benbrook Parkway to proposed 24" water line.	8" WL & Appurtenances	3,740	LF	\$48	\$179,520	
						Subtotal	\$179,520
						Contingency @ 20%	\$35,904
						Total Construction Cost	\$215,424
						Engineering, Surveying & Geotech @ 15%	\$32,314
				Total Project Cost	\$247,738		
12	8" Water Line on Timbercrest 8" water line running east from existing 12" line on Timbercrest Drive to proposed 24" water line.	8" WL & Appurtenances	2,585	LF	\$48	\$124,080	
						Subtotal	\$124,080
						Contingency @ 20%	\$24,816
						Total Construction Cost	\$148,896
						Engineering, Surveying & Geotech @ 15%	\$22,334
				Total Project Cost	\$171,230		
BENBROOK WATER AUTHORITY TOTAL WATER SYSTEM COSTS 2016						\$3,744,727	
TOTAL SYSTEM CAPITAL IMPROVEMENT COSTS						\$25,740,092	

Table A-3
Benbrook Water Authority
Wastewater System Improvements Year 2006-2011
Opinions Of Probable Project Cost

Project Number	Project Name	Construction Items	Quantity	Units	Unit Price	Costs
1	12"/15" Sewer Line in Basin 1	12" Sanitary Sewer	1,735	LF	\$66	\$ 114,533
		15" Sanitary Sewer	1,518	LF	\$80	\$ 121,440
		48" Diameter Manhole	15	EA	\$4,000	\$ 60,000
		30" Boring and Casing	150	LF	\$330	\$ 49,500
		Subtotal				\$ 345,473
		Contingency @ 20%				\$ 69,095
		Total Construction Cost				\$ 414,568
		Engineering, Surveying & Geotech @ 12%				\$ 49,748
		Subtotal				\$ 464,316
		R.O.W.				\$ 24,874
				Total Project Cost	\$ 489,190	
2	12"/15"/18" Sewer Line in Basin 7	12" Sanitary Sewer	2,156	LF	\$66	\$ 142,313
		15" Sanitary Sewer	1,725	LF	\$80	\$ 138,000
		18" Sanitary Sewer	3,795	LF	\$95	\$ 360,525
		30" Boring and Casing	50	LF	\$330	\$ 16,500
		48" Diameter Manhole	27	EA	\$4,000	\$ 108,000
		Subtotal				\$ 765,338
		Contingency @ 20%				\$ 153,068
		Total Construction Cost				\$ 918,405
		Engineering, Surveying & Geotech @ 12%				\$ 110,209
		Subtotal				\$ 1,028,614
				R.O.W.	\$ 55,104	
				Total Project Cost	\$ 1,083,718	
3	10"/12" Sewer Line in Basin 2	10" Sanitary Sewer	3,000	LF	\$50	\$ 150,000
		12" Sanitary Sewer	1,200	LF	\$66	\$ 79,200
		30" Boring and Casing	400	LF	\$330	\$ 132,000
		48" Diameter Manhole	20	EA	\$4,000	\$ 80,000
		Subtotal				\$ 441,200
		Contingency @ 20%				\$ 88,240
		Total Construction Cost				\$ 529,440
		Engineering, Surveying & Geotech @ 12%				\$ 63,533
		Subtotal				\$ 592,973
						R.O.W.
				Total Project Cost	\$ 624,739	

Benbrook Water Authority
TOTAL SYSTEM COSTS 2011

Total Costs **\$ 2,197,647**

**Table A-4
Benbrook Water Authority
Wastewater System Improvements Year 2011-2016
Opinions Of Probable Project Cost**

Project Number	Project Name	Construction Items	Quantity	Units	Unit Price	Costs		
4	10"/12" Sewer Line in Basin 3	10" Sanitary Sewer	1,961	LF	\$50	\$ 98,038		
		12" Sanitary Sewer	2,478	LF	\$66	\$ 163,548		
		30" Boring and Casing	200	LF	\$330	\$ 66,000		
		48" Diameter Manhole	23	EA	\$4,000	\$ 92,000		
		Subtotal				\$ 419,586		
		Contingency @ 20%				\$ 83,917		
		Total Construction Cost				\$ 503,503		
		Engineering, Surveying & Geotech @ 12%				\$ 60,420		
		Subtotal				\$ 563,923		
		R.O.W.				\$ 30,210		
		Total Project Cost				\$ 594,133		
5	36" Sewer Line in Western Portion on Basin 7	36" Sanitary Sewer	14,375	LF	\$180	\$ 2,587,500		
		48" Boring and Casing	100	LF	\$500	\$ 50,000		
		60" Diameter Manhole	34	EA	\$5,500	\$ 187,000		
		Subtotal				\$ 2,824,500		
		Contingency @ 20%				\$ 564,900		
		Total Construction Cost				\$ 3,389,400		
		Engineering, Surveying & Geotech @ 12%				\$ 406,728		
		Subtotal				\$ 3,796,128		
		R.O.W.				\$ 203,364		
		Total Project Cost				\$ 3,999,492		
		6	15" Sewer Line in Basin 6	15" Sanitary Sewer	2,198	LF	\$80	\$ 175,812
48" Diameter Manhole	7			EA	\$4,000	\$ 28,000		
Subtotal						\$ 203,812		
Contingency @ 20%						\$ 40,762		
Total Construction Cost						\$ 244,574		
Engineering, Surveying & Geotech @ 12%						\$ 29,349		
Subtotal						\$ 273,923		
R.O.W.						\$ 14,674		
Total Project Cost						\$ 288,598		
7	15"/18" Sewer Line in Basin 4			15" Sanitary Sewer	1,955	LF	\$80	\$ 156,400
				18" Sanitary Sewer	3,450	LF	\$95	\$ 327,750
		30" Boring and Casing	100	LF	\$330	\$ 33,000		
		48" Diameter Manhole	15	EA	\$4,000	\$ 60,000		
		Subtotal				\$ 577,150		
		Contingency @ 20%				\$ 115,430		
		Total Construction Cost				\$ 692,580		
		Engineering, Surveying & Geotech @ 12%				\$ 83,110		
		Subtotal				\$ 775,690		
		R.O.W.				\$ 41,555		
		Total Project Cost				\$ 817,244		
8	10"/12" Sewer Line in Basin 7	10" Sanitary Sewer	1,610	LF	\$50	\$ 80,500		
		12" Sanitary Sewer	1,610	LF	\$66	\$ 106,260		
		48" Diameter Manhole	9	EA	\$4,000	\$ 36,000		
		Subtotal				\$ 222,760		
		Contingency @ 20%				\$ 44,552		
		Total Construction Cost				\$ 267,312		
		Engineering, Surveying & Geotech @ 12%				\$ 32,077		
		Subtotal				\$ 299,389		
		R.O.W.				\$ 16,039		
		Total Project Cost				\$ 315,428		
		Benbrook Water Authority						
TOTAL SYSTEM COSTS 2016					Total Costs	\$ 6,014,895		
TOTAL SYSTEM CAPITAL IMPROVEMENT COSTS						\$8,212,542		

Appendix B

Credit Analysis for Impact Fee Calculations

Appendix B

IMPACT FEE ALTERNATIVE CREDIT CALCULATION

Texas Government Code Section 395 outlines the procedures and requirements for calculating maximum allowable impact fees to recover costs associated with capital improvement projects needed due to growth over a 10-year period. Section 395 also requires a plan that addresses possible duplication of payments for capital improvements. This plan can either provide a credit for the portion of revenues generated by new development that is used for the payment of eligible improvements, including payment of debt, or reduce the total eligible project costs by 50 percent. The maximum allowable fees under both methods were determined.

Benbrook Water Authority currently collects impact fees for water services. These fees are used to pay for debt service for capital improvement projects. Transfers from the General Fund, which includes service revenues, are also used to pay for capital improvement projects. The Authority currently has five bond issuances outstanding, 1993, 1998, 2000, 2001 and 2004 Series, which were used for improvements to the Authority's water and sewer systems. The interest rate on the bonds varies from 2.97% to 6.75%.

To address the potential duplication of payment for capital expenditures, this analysis assumes that 100 percent of the impact fee eligible debt service is paid through service revenue and fees collected from all customers. This is a conservative assumption because a portion of the debt service is paid from impact fees.

The calculation of the service revenue credit for the water distribution system is shown on Table B-1. The credit was based on financing 100 percent of the eligible capital improvement costs at 5 percent interest over 20 years for existing projects and 5 percent over 20 years for future projects. It was assumed that the future projects would be funded through three new bond issuances over the 10-year eligibility period. The timing of the bond issuances is based on the Capital Improvement Plan. Actual issuances may differ in amounts or timing. A simple annualized payment was assumed for this analysis using only the portion of the capital cost that is eligible for the impact fee. The

total projected annual debt service cost was then divided by the total number of Service Units. The sum of the annual debt service for the eligible capital improvements over the ten-year period is the maximum amount that potentially could be included in the Authority's service rates and/or customer fees. With these assumptions, the rate credit per Service Unit for water is \$1,143.

A similar process was conducted for the wastewater collection system. The rate credit for wastewater is presented in Table B-2. The rate credit per Service Unit for wastewater is \$154.

The maximum allowable impact fees were calculated using the rate credit method and 50 percent credit of eligible projects for water and wastewater as outlined in Table B-3.

Table B-1
Credit Analysis for Water System
Benbrook Water Authority

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Debt Service (projects costs eligible for impact fees)										
Existing Projects (\$4.140 Million)	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225	\$332,225
2008 Bond Issue (\$4.192 Million)	\$0	\$336,412	\$336,412	\$336,412	\$336,412	\$336,412	\$336,412	\$336,412	\$336,412	\$336,412
2009 Bond Issue (\$10.215 Million)	\$0	\$0	\$819,694	\$819,694	\$819,694	\$819,694	\$819,694	\$819,694	\$819,694	\$819,694
2013 Bond Issue (\$2.486 Million)	\$0	\$0	\$0	\$0	\$0	\$0	\$199,499	\$199,499	\$199,499	\$199,499
Total Debt Service - Water	\$332,225	\$668,637	\$1,488,332	\$1,488,332	\$1,488,332	\$1,488,332	\$1,687,830	\$1,687,830	\$1,687,830	\$1,687,830
Total number of Service Units	8,878	9,512	10,146	10,780	11,414	12,048	12,682	13,316	13,950	10,146
Credit for debt service/Service Unit	\$37.42	\$70.29	\$146.69	\$138.06	\$130.40	\$123.53	\$133.09	\$126.75	\$120.99	\$115.71
Credit for Debt Service Reduction through Rates per SUE	\$1,142.94									

SUE – Service Unit Equivalent

Table B-2
Credit Analysis for Wastewater System
Benbrook Water Authority

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Debt Service (projects costs eligible for impact fees)										
Existing Projects (\$78 Thousand)	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259	\$6,259
2008 Bond Issue (\$875 Thousand)	\$0	\$70,208	\$70,208	\$70,208	\$70,208	\$70,208	\$70,208	\$70,208	\$70,208	\$70,208
2012 Bond Issue (\$2,556 Million)	\$0	\$0	\$0	\$0	\$0	\$205,116	\$205,116	\$205,116	\$205,116	\$205,116
2014 Bond Issue (\$1,041 Million)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$83,542	\$83,542	\$83,542
Total Debt Service - Sewer	\$6,259	\$76,467	\$76,467	\$76,467	\$76,467	\$281,583	\$281,583	\$365,125	\$365,125	\$365,125
Total number of Service Units	8,878	9,512	10,146	10,780	11,414	12,048	12,682	13,316	13,950	14,587
Credit for debt service/Service Unit	\$0.70	\$8.04	\$7.54	\$7.09	\$6.70	\$23.37	\$22.20	\$27.42	\$26.17	\$25.03
Credit for Debt Service Reduction through Rates per SUE	\$154.27									

SUE – Service Unit Equivalent

Table B-3
Summary of Impact Fee Calculations
Benbrook Water Authority

Utility	Eligible Project Cost	Interest	Increase in SUE	Cost per SUE	Rate Credit	Maximum Fee	
						Rate Credit	50% Credit
Water	\$21,034,095	\$6,694,014	5,709	\$4,857	\$1,143	\$3,714	\$2,428
Wastewater	\$4,557,027	\$1,450,255	5,709	\$1,052	\$154	\$898	\$526

SUE – Service Unit Equivalent