

CAPITAL IMPROVEMENTS ADVISORY COMMITTEE

August 21, 2018

**LEWISVILLE CITY HALL COUNCIL CHAMBERS
151 W. CHURCH STREET
LEWISVILLE, TEXAS**

6:35 P.M.

AGENDA

1. CALL MEETING TO ORDER – CIAC CHAIRMAN.
2. APPROVE MINUTES OF THE SEPTEMBER 5, 2017 CIAC MEETING.
3. PRESENTATION OF THE SEMI-ANNUAL REPORT FOR THE PERIOD OF APRIL 1, 2017 THROUGH SEPTEMBER 30, 2017 AND OCTOBER 1, 2017 THROUGH MARCH 31, 2018.
4. PRESENTATION OF THE LAND USE ASSUMPTION UPDATE, WATER AND SEWER MASTER PLAN, AND CAPITAL RECOVERY (IMPACT) FEES TO THE CIAC BY KEITH MARVIN.
5. RECEIVE COMMENTS FROM CIAC AND FORWARD TO THE CITY COUNCIL FOR APPROVAL.
6. ADJOURNMENT.

THE CAPITAL IMPROVEMENTS ADVISORY COMMITTEE MEETING WILL BE CONDUCTED IMMEDIATELY FOLLOWING THE PLANNING AND ZONING COMMISSION MEETING.

NOTICE OF ASSISTANCE AT THE PUBLIC MEETINGS

The Lewisville City Hall and Council Chambers are wheelchair accessible. Access to the building is available at the primary south entrance (front entrance) facing Church Street. Special parking spaces are available at either the southeast or southwest parking lot areas. Persons with disabilities who plan to attend this meeting and who may need auxiliary aids or services such as interpreters for persons who are deaf or hearing impaired, readers, or large print, are requested to contact the Department of Public Services at 972-219-3504 or at fax number 972-219-3508 at least two (2) working days prior to the meeting so that appropriate arrangements can be made.

Minutes

Capital Improvements Advisory Committee

Date: September 5, 2017
6:35 p.m.

Committee Members Present:

Alvin Turner
James Davis
John Lyng
Karen Locke

Committee Members Absent:

William Meridith
Maryellen Miksa
Kristin Green

Staff Members Present:

Keith Marvin
Roseann Davis
Richard Luedke

Call Meeting to Order

(Item 1)

With a quorum of members present, the Capital Improvements Advisory Committee meeting was called to order by James Davis at 8:06 p.m. on Tuesday, September 5, 2017, in the Lewisville City Hall Council Chambers, 151 W. Church, Lewisville, Texas.

Approve Minutes of the January 3, 2017 CIAC Meeting

(Item 2)

MOTION: A motion to approve the Minutes of the January 3, 2017 CIAC Meeting was made by James Davis. The motion was seconded by Alvin Turner. The committee voted 4-0 to approve the Minutes.

Selection of a CIAC Chairman and Vice-Chairman

(Item 3)

A motion was made by James Davis and seconded by Alvin Turner to elect Kristin Green as Chairman. A motion was made by Karen Locke and seconded by Alvin Turner to elect James Davis as Vice-Chairman. The committee voted 4-0 to approve the elections.

Review CIAC Responsibilities for New Members

(Item 4)

Keith Marvin gave a brief background of the purpose and responsibilities of the CIAC members.

John Lyng asked about Old Town area plans and if the City is equipped for high density projects. Keith Marvin responded that we are equipped for the development and that the City's Land Use Assumption Plan will have a density increase over the next ten years with a build out population projection, and those numbers will go into our master plan update for water and wastewater. Mr. Marvin stated the biggest change will be in the eastern section of Lewisville.

Mr. Lyng asked if the City has the resources to cover the expenses for this development. Mr. Marvin stated the City Council will be proposing a 6% increase on our water/wastewater fees which will help cover capital expenses for building out capacity at both plants and in our distribution collection system.

Presentation of the Land Use Assumption Update to the CIAC by Consultant, Freese & Nichols
(Item 5)

Dan Sefko, Freese & Nichols, presented the Land Use Assumption update to the CIAC.

James Davis asked where does Castle Hills sewer treatment go down to. Keith Marvin responded that the City of Lewisville treats all the wastewater from Castle Hills. We provide water to about half of Castle Hills and the other half comes from Upper Trinity Regional Water District.

James Davis asked if the 1.5% growth rate is in the eastern part of the city limits towards The Colony. Dan Sefko responded we do have little to go inside the city limits because of the special planning areas. The city is at 103,000-104,000 population now and in about 10 years will be at approximately 117,000.

Alvin Turner asked if this includes multi-family. Richard Luedke responded yes, and the population growth is in the northern gateway, southern gateway, and the Old Town area has the larger portion of growth. The growth surrounding Castle Hills, in the north western and north eastern portions, will develop quickly.

John Lyng asked if the 1.25% is compounded to get the rate. Dan Sefko confirmed that yes, it is the average annualized compounded growth rate.

Presentation of Semi-Annual Report for the Period of October 1, 2016 through March 31, 2017
(Item 6)

Keith Marvin presented the Semi-Annual Report to the CIAC.

Receive Comments from CIAC and Forward Report to the City Council for Approval
(Item 7)

No comments

MOTION: James Davis made the motion to accept the report and forward it to the City Council for approval; the motion was seconded by Karen Locke. The CIAC voted 4-0 to accept the Semi-Annual Report for the period of October 1, 2016 through March 31, 2017 and forward to the Lewisville City Council for approval.

Adjournment
(Item 8)

MOTION: With no other items for discussion, a motion was made by Alvin Turner and seconded by Karen Locke to adjourn the meeting. The committee voted 4-0 for adjournment at 8:36 p.m.

Respectfully Submitted,

Approved,

Keith Marvin, P.E.
Public Services Director
City of Lewisville

Kristin Green, P.E.
Chairman
CIAC

SEMI-ANNUAL REPORT
to the
CAPITAL IMPROVEMENTS ADVISORY COMMITTEE
for
THE CITY OF LEWISVILLE, TEXAS
APRIL 1, 2017 – SEPTEMBER 30, 2017 AND
OCTOBER 1, 2017 – MARCH 31, 2018

CIAC MEMBERS:

- ◆ **WILLIAM MERIDITH**
- ◆ **JOHN LYNG**
- ◆ **MARYELLEN MIKSA**
- ◆ **ALVIN TURNER**
- ◆ **KAREN LOCKE**
- ◆ **KRISTIN GREEN**
- ◆ **JAMES DAVIS**

SEMI-ANNUAL REPORT OF THE CAPITAL IMPROVEMENTS ADVISORY COMMITTEE

The April 1, 2017 - September 30, 2017 and October 1, 2017 - March 31, 2018 Semi-Annual Report to the Capital Improvements Advisory Committee (CIAC) for the City of Lewisville, Texas, has been prepared in accordance with the Texas Local Government Code, Chapter 395. This report will evaluate the progress of the existing program.

◆ Purpose of the Report

As required in Subsection 395.058 (c) of the Texas Local Government Code, the Capital Improvements Advisory Committee is charged with the following functions:

- Advise and assist the City in adopting land use assumptions;
- Periodic review of the impact fee/capital improvement plans;
- Monitor and evaluate implementation of the Capital Improvement Plan;
- Prepare Semi-Annual Reports evaluating the progress of the Capital Improvements Plan and impact fees; and
- Advise the City of the need to update or revise the Land Use Assumption Plan, the Capital Improvements Plan, and the impact fees.

◆ Background

In 1986, the City of Lewisville adopted the Capital Recovery Fee Program. In 1987, the Texas Legislature adopted Senate Bill 336, which established the necessary legislation to expand the impact fee requirements for Texas cities.

In 1988, the Impact Fee Program was modified to comply with the recently adopted Senate Bill 336. The study and the revised program were approved by the City Council on January 22, 1990. Included in the legislation and the Texas Local Government Code, Section 395, is the provision to review the Capital Improvements Plan, Land Use Assumptions, and impact fee schedules every fifth year.

Freese and Nichols provided a briefing on the update of the Land Use Assumptions (LUA) at the last CIAC meeting. A final version of that report was submitted to the City on July 31, 2018, and a copy has been provided in the agenda packet.

The engineering firm of Birkhoff, Hendricks, and Carter used the LUA, and the population projections contained within it to update the Capital Improvements Plan (Water and Wastewater). The projects identified in this plan are then used along with the population projections to calculate a revised Capital Recovery (Impact) fee. A final report for these documents is included in the agenda packet as well.

A presentation of these documents will be made at the meeting by the Director of Public Services.

◆ Water System Capital Improvements Plan

The following items are included in the calculation for the impact fee for the water system:

- Water Supply Projects
- Water Treatment Projects
- High Service Pump Stations
- Ground Storage Tanks
- Elevated Storage Tanks

Linework required for water distribution and transmission has not previously been included in the calculation of the impact fee, although the cost of the linework is an eligible item under Texas Local Government Code, Section 395. This will be reviewed during the current update.

CAPITAL IMPROVEMENT PROJECTS FOR THE WATER SYSTEM

Approximate Date to be Placed in Service	Water Facility	Capacity of Improvement	Total Capacity After Improvement
2012	Midway Pump Station (completed 2013)	15.0 MGD	15.0 MGD
2012	Midway 3.0 MG GSR (completed 2013)	3.0 MG	3.0 MG
2012	Transmission Lines from Midway Pump Station to SH 121 (completed 2013)	7.5 MGD	15.0 MGD
2013	30" Transmission Lines from Feaster to College St.	15.0 MGD	25.0 MGD
2015	Southside 2.0 MG GSR (delayed TBD)	2.0 MG	4.0 MG
2015	Feaster/Northside 4.0 MG GSR (reduced to 2.0 MG, completed 2015)	2.0 MG	7.0 MG

Upon completion of the impact fee update, the above list will change.

Wastewater System Capital Improvements Plan

The following items are included in the calculation of the impact fee for the wastewater system:

- Wastewater Treatment Facilities
- Lift Stations and Force Mains

The cost of the wastewater collection lines and interceptor mains was not included in the calculation of the impact fee, although the cost of the linework is an eligible item under Texas Local Government Code, Section 395.

CAPITAL IMPROVEMENTS PROJECTS FOR THE WASTEWATER SYSTEM

Approximate Date to be Placed in Service	Facility	Capacity of Improvement (MGD)	Total Capacity After Improvement (MGD)
2012	Timber Creek Lift Station Expansion (completed 2015)	7.0	30.2
2013	Indian Creek Lift Station & Force Main (delayed)	2.5	2.5
2013	Crossroads Lift Station & Force Main (delayed)	0.55	0.55
2015	Midway Branch Lift Station & Force Main (pending)	3.5	3.5
2015	Wastewater Treatment Plant Expansion (completed 2015)	3.0	12.0

Wastewater projects related to Castle Hills are being reviewed as part of the Master Plan update.

Impact Fee Determination

The impact fees are based upon the living unit equivalents (LUE) subject to meter sizes. A 3/4" meter is equivalent to one LUE. As the meter size increases, the equivalent factor also increases. The current impact fee schedule for 2011 - 2016 is set below the maximum allowed, with a gradual increase each January to prevent excess collection. The eligible proposed expenditure for water and sewer capital improvements is \$34,263,886 and \$26,610,689, respectively.

Below is the fee schedule adopted during the previous review.

SCHEDULE OF CAPITAL RECOVERY FEES PER LUE

YEAR	WATER	SEWER
2011	2,830.86	1,780.64
2012	2,896	1,971
2013	2,961	2,161
2014	3,026	2,351
2015	3,091	2,541
2016	3,165	2,724

◆ Report of FY2017 Impact Fee Collection

- The following information is submitted in regards to the amount of water and sewer impact fees collected from April 1, 2017 - September 30, 2017.
1. The impact fees are adjusted on January 1st of each year. The 2017 water and sewer impact fees are \$3,165 and \$2,724, respectively. The combined total of maximum allowable water and wastewater impact fees is \$5,889 per LUE.
 2. The Capital Recovery Fees collected for water totaled \$691,599 plus accrued interest of \$1,764, at an average interest rate of 1.25%.
 3. The Capital Recovery Fees collected for sewer totaled \$480,527 plus accrued interest of \$1,226, at an average interest rate of 1.25%.

New construction starts are distributed as follows:

• Single Family	28
• Commercial	37
• Multi-Family	4
• Condominiums / Townhomes	83

4 Multi-Family permits issued for a total of 4 buildings and 238 units.

- The following information is submitted in regards to the amount of water and sewer impact fees collected from October 1, 2017 – March 31, 2018.
4. The impact fees are adjusted on January 1st of each year. The 2017 water and sewer impact fees are \$3,165 and \$2,724, respectively. The combined total of maximum allowable water and wastewater impact fees is \$5,889 per LUE.
 5. The Capital Recovery Fees collected for water totaled \$1,018,497 plus accrued interest of \$3,021, at an average interest rate of 1.68%.
 6. The Capital Recovery Fees collected for sewer totaled \$655,674 plus accrued interest of \$1,945, at an average interest rate of 1.68%.

New construction starts are distributed as follows:

• Single Family	52
• Commercial	12
• Multi-Family	12
• Condominiums / Townhomes	49

12 Multi-Family permits issued for a total of 12 buildings and 96 units.

◆ **Conclusion**

The City of Lewisville, has not reported any written complaints or perceived inequities or inadequacies in regards to the Capital Improvements Plan or the impact fee requirements.

The current Impact Fee Program is in compliance with Chapter 395 of the Texas Local Government Code.

Respectfully submitted,

Chairman



Innovative approaches
Practical results
Outstanding service

TECHNICAL REPORT

Land Use Assumptions



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

City of Lewisville, Texas
July 16, 2018

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1. PURPOSE

Chapter 395 of the Texas Local Government Code prescribes the process by which cities in Texas must formulate impact fees. An initial step in the update process is the establishment of land use assumptions that address growth and development for a ten-year planning period (TLGC Section 395.001(5)) for the years 2017-2027. These land use assumptions, which also include population and employment projections, will become the basis for the preparation of impact fee capital improvement plans for water, wastewater, and roadway facilities.

To assist the City of Lewisville in determining the need and timing of capital improvements to serve future development, a reasonable estimation of future growth is required. The purpose of this report is to formulate growth and development projections based upon assumptions pertaining to the type, location, quantity and timing of various future land uses within the community and to establish and document the methodology used for preparing the growth and land use assumptions.

Land Use Assumptions Report Elements

This report contains the following components:

- **Study Area Analysis** - Explanation of data collection zones (traffic survey zones), and division of the City into impact fee service areas for roadway, water and wastewater facilities.
- **Methodology** - Explanation of the general methodology used to prepare the land use assumptions.
- **Base Year Data Analysis** - Historical population trends for Lewisville and information on population, employment, and land use for Lewisville as of 2017.
- **Ten-Year Growth Assumptions** - Population and employment growth assumptions for ten years by Traffic Survey Zone (TSZ).
- **Build out** – Calculation of ultimate capacity for population and employment
- **Summary** - Brief synopsis of the land use assumptions report.

2. STUDY AREA AND DATA FORMAT

Data collection zones used for land use assumptions are based upon small geographic areas known as traffic survey zones (TSZs). These zones, established by the North Central Texas Council of Governments (NCTCOG), cover the Metropolitan Planning Organization’s planning area and serve as the basis for socio-demographic data used in the regional travel forecast model. The TSZs were originally formulated on the basis of homogeneity and traffic generation potential using major arterials, creeks, railroad lines and other physical boundaries for delineation.

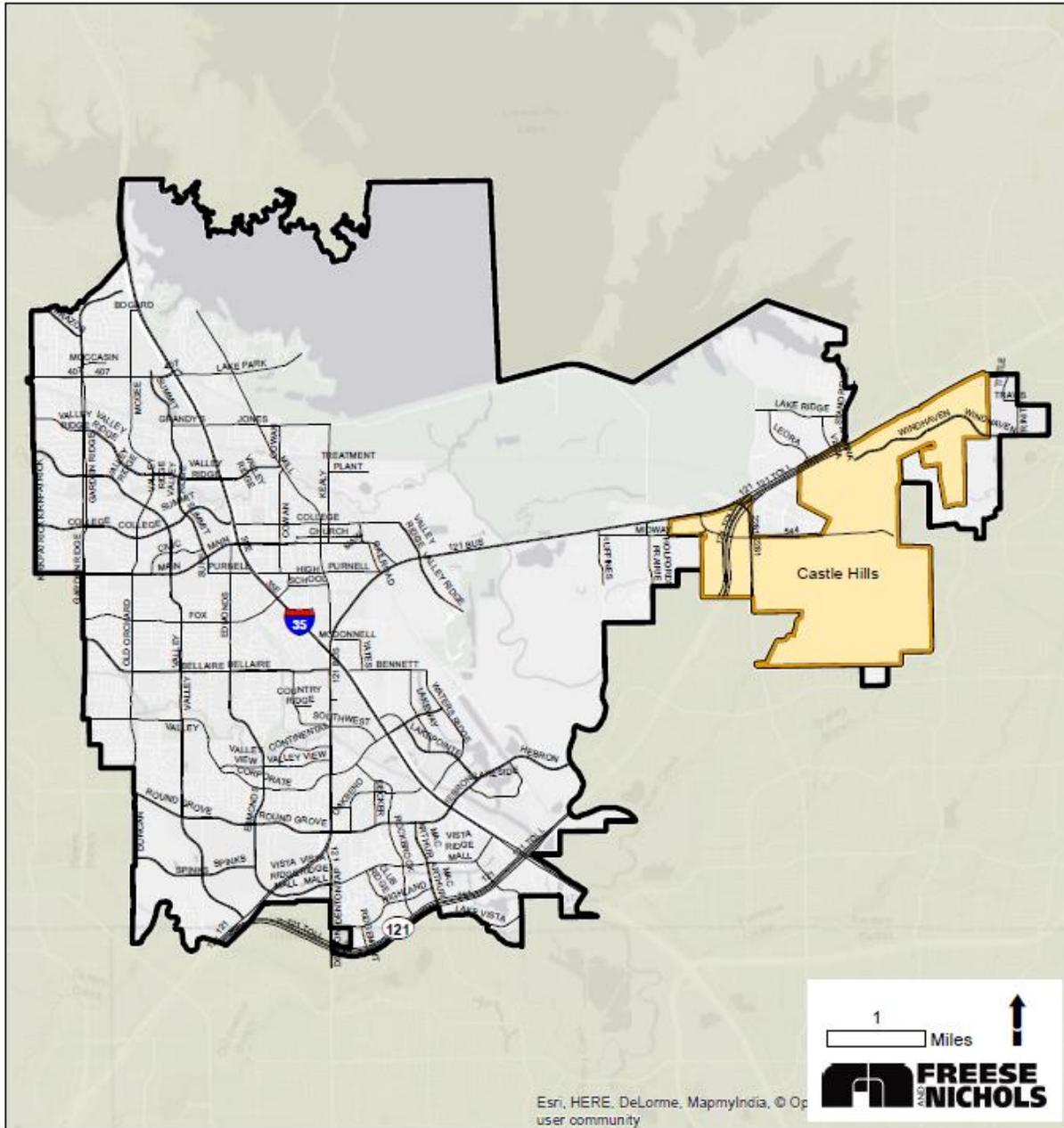
Study Area

The study area for this report covers the City Limits and ETJ. The City Limits is the boundary for both water and wastewater service area. In order to provide greater flexibility of the use of this report, two sets of analyses are conducted here; one for the City Limits and the ETJ, and one for the City Limits only.

Study Area 1	City Limits and ETJ
Study Area 2	City Limits only

Figure 1 illustrates the study areas (City Limits and ETJ) and **Figure 2** illustrates the TSZ boundaries. **Figure 3** and **Figure 4** shows the water and wastewater service area.

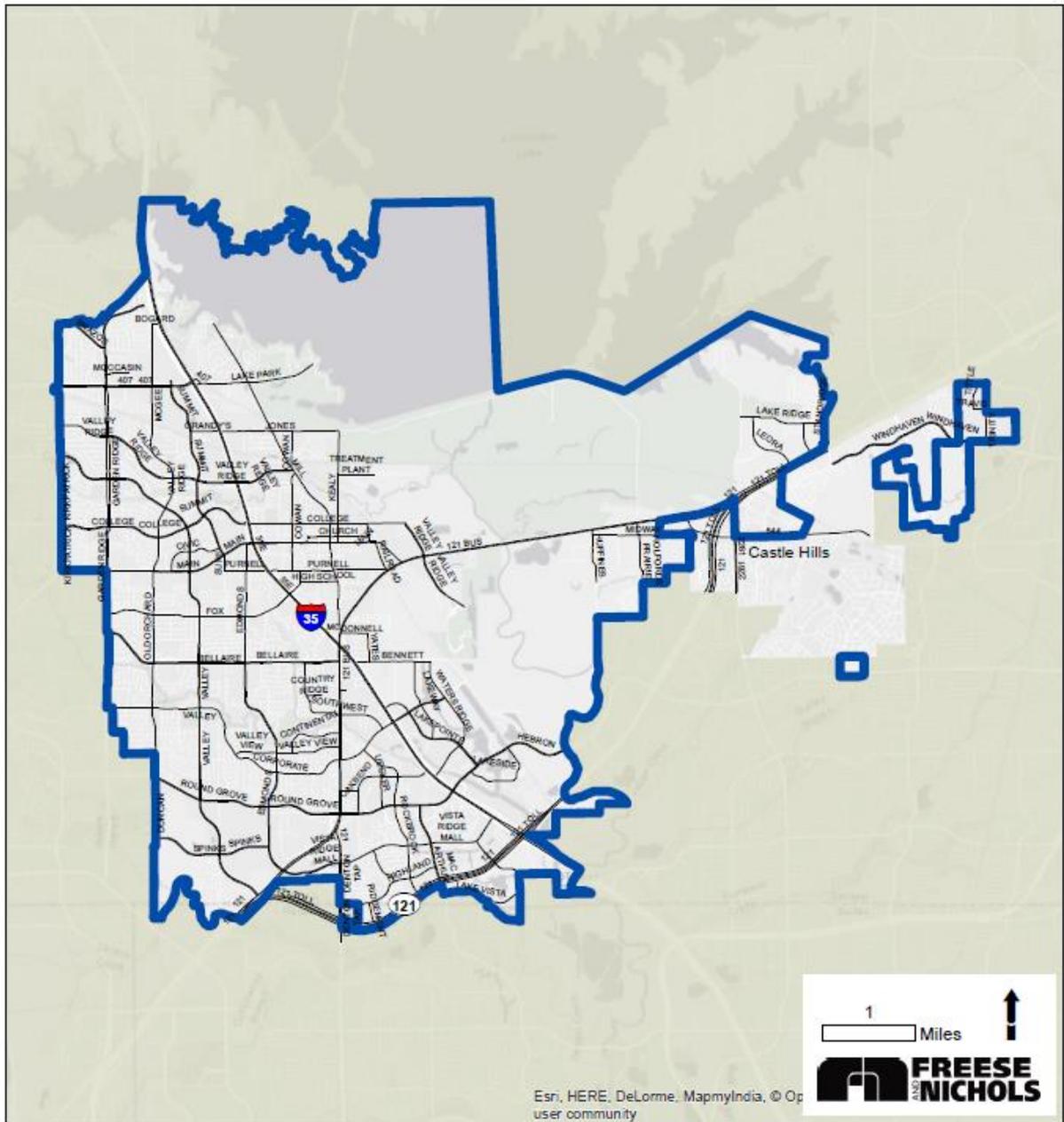
Figure 1: Lewisville City Limits and ETJ



City Limits and ETJ Map

-  City Limits
-  ETJ

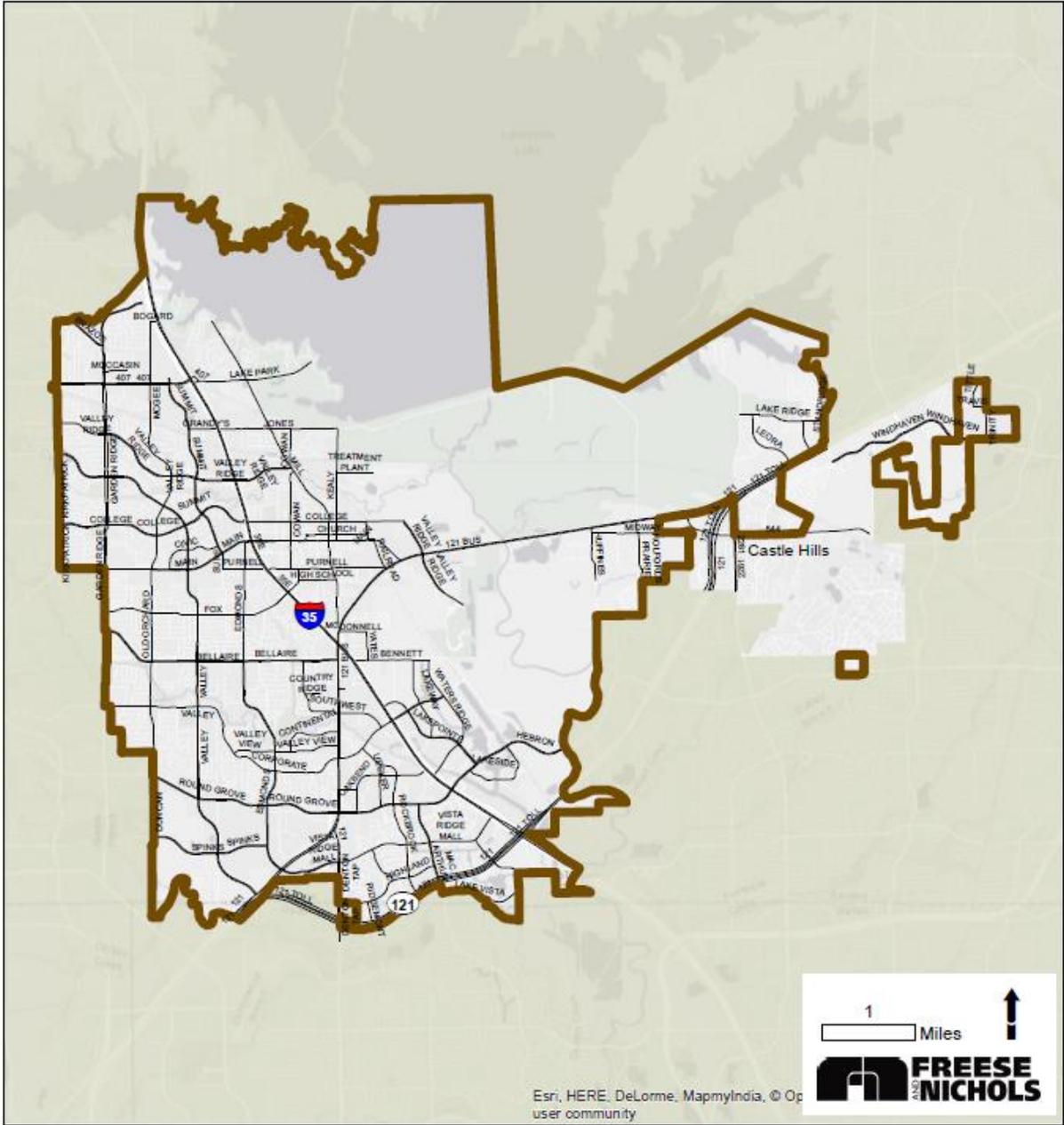
Figure 3: Lewisville Water Service Area



Water Service Area



Figure 4: Lewisville Wastewater Service Area



Wastewater Service Area
 Wastewater Service Area

Data Format

The existing database and the future projections were formulated according to the following format and categories:

Study Area	Correlates to the City Limits and ETJ.
Traffic Survey Zone (TSZ)	Geographic areas established by the NCTCOG Traffic Model that are used for data collection purposes and termed TSZs within this report.
Population (2017)	Existing population for the base year (2017).
Population (2027)	Projected population by service zone for the year 2027 (ten-year growth projections).
Employment (2017, 2027)	<p>Employment data is aggregated to three employment sectors and include: Basic, Retail and Service. The following details which North American Industry Classification System (NAICS) codes fall within each of the three sectors.</p> <ul style="list-style-type: none">▪ <u>Basic</u> (#210000 to #422999) -- Land use activities that produce goods and services such as those that are exported outside the local economy; manufacturing, construction, transportation, wholesale trade, warehousing and other industrial uses.▪ <u>Retail</u> (#440000 to #454390) -- Land use activities which provide for the retail sale of goods that primarily serve households and whose location choice is oriented toward the household sector such as grocery stores, restaurants, etc.▪ <u>Service</u> (#520000 to #928199) -- Land use activities which provide personal and professional services such as financial, insurance, government, and other professional and administrative offices.

The NCTCOG prepares employment estimates at the TSZ level and therefore, minimal adjustments are needed.

3. METHODOLOGY

Based upon the growth assumptions and the capital improvements needed to support growth, it is possible to develop an impact fee structure that fairly allocates improvement costs to growth areas in relation to their impact upon the entire infrastructure system. The data in this report has been formulated using reasonable and generally accepted planning principles for the preparation of impact fee systems in Texas.

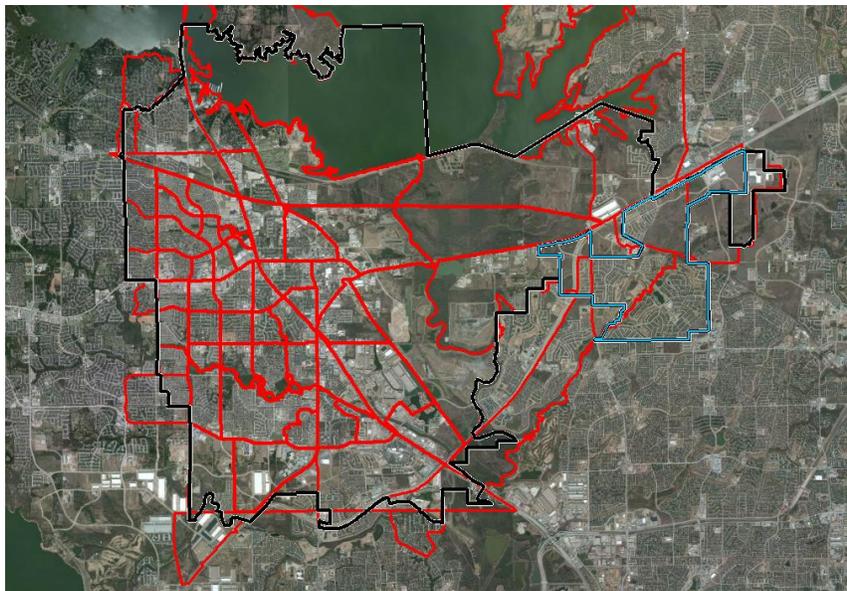
These land use assumptions and future growth projections take into consideration several factors influencing development patterns, including the following:

- The character, type, density, and quantity of existing development,
- Anticipated future land use derived from the City's current land use trend, Lewisville 2025 (the City's Comprehensive Plan) and Small Area Plans
- Availability of land for future expansion
- Current and historical growth trends of population and development within the City,
- Location and configuration of vacant land, and
- Known or anticipated development projects as defined by City Staff.

A series of work tasks were undertaken in the development of this report and are described below:

Step 1: Scope of the Study and Data Collection

A kick-off meeting was held between FNI and the City Staff to discuss the general methodological approach in the study. Data from NCTCOG was used as an initial database for this study. Population and Employment Data for 2017 by TSZ were collected.



Study Area with TSZ Boundaries

Step 2: Estimation of 2017 Population and Employment

Although TSZs were as a basis for the data analysis purpose, it is important to note that TSZ boundaries do not follow the City Limits in some locations. In order to calculate data for the study area, 2017 population and employment data for each TSZ was reviewed and adjustments were made where necessary. For example, a TSZ that is geographically located completely within the study area (which in this case are the City Limits and ETJ), the base 2017 population and employment estimates were kept the same as received from NCTCOG. However, instances where only a certain portion of a TSZ was located within the study area, detailed spatial and geographical analysis of that TSZ was conducted to adjust 2017 population and employment numbers. The 2017 total population and employment numbers were calculated by aggregating the numbers of all applicable TSZs.



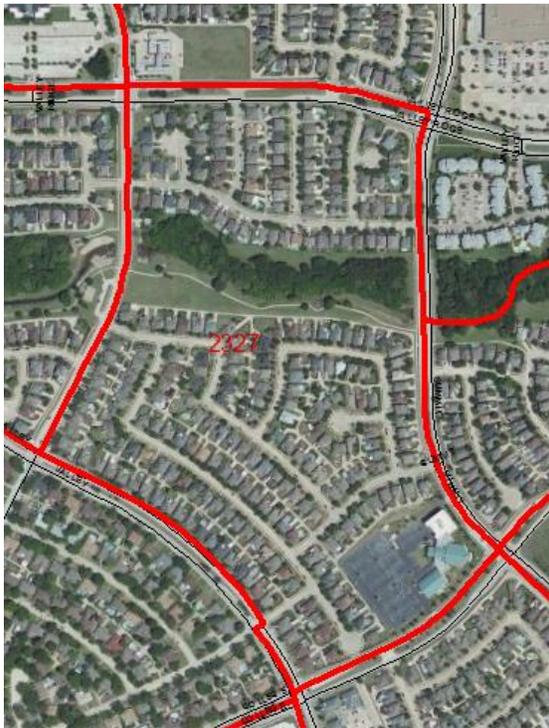
TSZ Completely within the Study Area



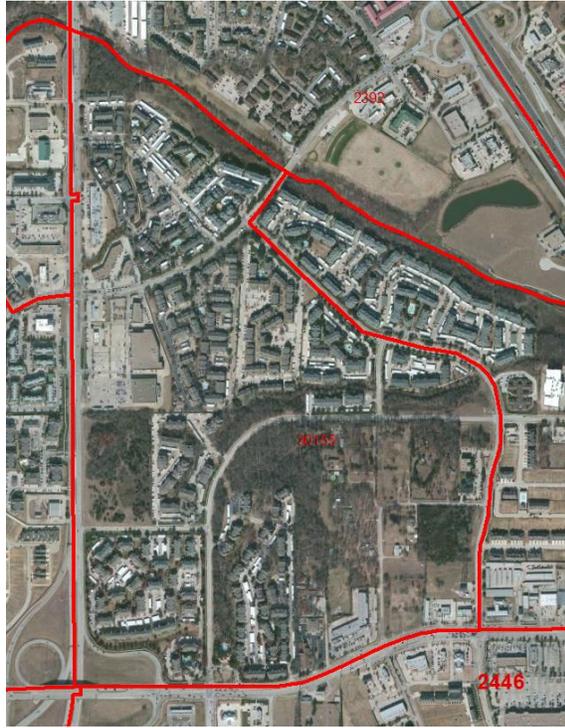
TSZ partially within the Study Area

Step 3: Estimation of 2027 Population and Employment

Each TSZ was evaluated from the perspective of its current development condition and anticipated future development trends. In general, past growth rates and the anticipated development trends were analyzed. Aerial images were used extensively to gain proper understanding of the future development potential for each TSZ. For example, for a TSZ that is built-out and no redevelopment projects are anticipated for that TSZ, the 2017 numbers remained the same for 2027. On the other hand, for a TSZ that was only partially developed or completely vacant, the City's anticipated future land use pattern was analyzed for that area to determine what type of development that TSZ was likely to host by 2027 and population and employment for 2027 were calculated based on that analysis. The City has also adopted Special Area Plans in certain portions of the City such as the I-35 Corridor Identity Plan and the Old Town TOD Plan. Where it was anticipated that redevelopment would occur within portions of the study area, adjustments were also made. The 2027 total population and employment numbers were calculated by aggregating the numbers for all applicable TSZs.



TSZ Completely Built-out



TSZ with Vacant Land

Step 4: Build-out Population and Employment

The residential and non-residential vacant acreages were calculated for the study area. The build-out population was calculated by taking the vacant residential areas and multiplying by the approximated dwelling units per acre, persons per household and occupancy rates to calculate how many new residents the vacant residential acreages can accommodate. New residents were added to the existing population (2017 population) to calculate the build-out population. The additional employment was calculated by deriving a ratio between the existing developed non-residential acreages and corresponding employment and then applying the ratio to the vacant non-residential acreages. New employment was added to the existing employment (2017 employment) to calculate the build-out employment.

4. BASELINE ANALYSIS

This section documents the City’s historical growth trends and data used to derive the 2017 base year population estimate for the City of Lewisville. This “benchmark” information provides a starting basis of data for the ten-year growth assumptions that will be presented within the following section.

Historical Growth

A City’s past growth rates are often the best indicator of future growth rates. **Table 1** and **Table 2** show Lewisville’s population, numerical change, and Compound Annual Growth Rate (CAGR) of recent years and by decade.

Analysis of growth rates since 1970 reveals Lewisville to have experienced phenomenal growth. However, the growth rate has been significantly decreasing every decade since 1980. The 45-year CAGR is 5.4%.

Table 1: Population Trend by Decade (City Limits only)

Year	Population	Population Change	Percent Change	CAGR
1970	9,264	-	-	5.4%
1980	24,273	15,009	162.0%	
1990	46,418	22,145	91.2%	
2000	77,737	31,319	67.5%	
2010	95,290	17,553	22.6%	
2015*	99,480	4,190	4.4%	

Source: Lewisville 2025 Vision

*2015 Data is from NCTCOG Population Estimate

Lewisville has grown at a moderate pace from 2011 and 2017, indicating that natural growth may become slower in the next few years. Growth rate of 4% between the years of 2016 and 2017 is the highest in the recent years. Between 2011 and 2017, the CAGR was 1.5%.

Table 2: Population Trend in Recent Years (City Limits only)

Year	Population	Population Change	Percent Change	CAGR
2011	95,430	-	-	1.5%
2012	96,000	570	0.6%	
2013	97,860	1,860	1.9%	
2014	98,330	470	0.5%	
2015	99,480	1,150	1.2%	
2016	100,400	920	0.9%	
2017*	104,390	3,990	4%	

Source: NCTCOG Population Estimate

*2017 Population Data is derived from TSZ Calculation

Projections for 2027: Multiple Scenarios

Based on the growth trends in Lewisville in recent years, a series of projections using 2017 as a base year have been calculated for both Study Area 1 (City Limits and ETJ) and Study Area 2 (City Limits only) in order to work as a basis for the Land Use Assumption process:

Table 3: Growth Projection Scenarios (City Limits and ETJ)

1%		1.5%		2%	
Year	Population	Year	Population	Year	Population
2017	120,624	2017	120,624	2017	120,624
2018	121,830	2018	122,433	2018	123,036
2019	123,049	2019	124,270	2019	125,497
2020	124,279	2020	126,134	2020	128,007
2021	125,522	2021	128,026	2021	130,567
2022	126,777	2022	129,946	2022	133,179
2023	128,045	2023	131,896	2023	135,842
2024	129,325	2024	133,874	2024	138,559
2025	130,619	2025	135,882	2025	141,330
2026	131,925	2026	137,920	2026	144,157
2027	133,244	2027	139,989	2027	147,040

Table 4: Growth Projection Scenarios (City Limits only)

1%		1.5%		2%	
Year	Population	Year	Population	Year	Population
2017	104,390	2017	104,390	2017	104,390
2018	105,434	2018	105,956	2018	106,478
2019	106,488	2019	107,545	2019	108,607
2020	107,553	2020	109,158	2020	110,780
2021	108,629	2021	110,796	2021	112,995
2022	109,715	2022	112,458	2022	115,255
2023	110,812	2023	114,145	2023	117,560
2024	111,920	2024	115,857	2024	119,911
2025	113,039	2025	117,595	2025	122,310
2026	114,170	2026	119,358	2026	124,756
2027	115,312	2027	121,149	2027	127,251

It was determined, based upon past and anticipated development patterns that an approximate of 2% CAGR would be a realistic assumption for future population growth within Lewisville City Limits.

2017 Population and Employment in Land Use Assumptions Process

For the land use assumptions process, 2017 base population and employment data was calculated using and adjusting data from the North Central Texas Council of Governments (NCTCOG). This information provided a breakout of population and employment by traffic survey zone (TSZ) for 2017. It is important to note that the TSZs do not follow City limits in some locations, so adjustments were made based on the locations of existing land uses and upon the percentage of each TSZ located within the study areas. For detailed description of the methodology, please see Section 3. Methodology.

Table 5: 2017 Estimates (City Limits and ETJ)

2017 Population & Employment	
Population	120,624
Housing Units	42,473
Total Employment	68,515
<i>Basic Employment</i>	<i>13,911</i>
<i>Retail Employment</i>	<i>8,262</i>
<i>Service Employment</i>	<i>46,342</i>
Source: Freese and Nichols, Inc.	

Table 6: 2017 Estimates (City Limits only)

2017 Population & Employment	
Population	104,390
Housing Units	36,757
Total Employment	67,754
<i>Basic Employment</i>	<i>13,868</i>
<i>Retail Employment</i>	<i>7,923</i>
<i>Service Employment</i>	<i>45,963</i>
Source: Freese and Nichols, Inc.	

5. TEN-YEAR POPULATION AND EMPLOYMENT

Projected growth has been characterized in two forms: population and employment. A series of assumptions were made to arrive at reasonable growth rates for population and employment. The following assumptions were made as a basis from which ten-year projections could be initiated.

- Future land uses will occur based on similar trends of the past and will conform with the anticipated future development and redevelopment opportunities as forecasted in the Comprehensive Plan and Small Area Plans, and
- The City will be able to finance the necessary improvements to accommodate continued growth.

For description of the projection methodology, please see *Section 3. Methodology*.

A large scale multi-family and mixed-use development is anticipated to be completed by 2027 in the Castle Hills area. This development attributes to a large growth in the ETJ area. Although a 2% CAGR has been identified to be the anticipated level of growth within the City Limits, a higher CAGR for the combined area of the City Limits and ETJ is estimated based on the large-scale development in the ETJ.

Table 7: 2027 Land Use Assumptions

Ten-Year Population and Employment Projections						
	2017			2027		
	Units	Population	Employment	Units	Population	Employment
City Limits and ETJ	42,473	120,624	68,515	53,825	152,864	81,313
City Limits only	36,757	104,390	67,754	44,493	126,362	75,987

Table 8: Numerical Changes and Percent Changes

Growth from 2017 to 2027						
	Units Added	Units Pct. Change	Population Added	Population Pct. Change	Employment Added	Employment Pct. Change
City Limits and ETJ	11,352	2.40%	32,240	2.40%	12,798	1.73%
City Limits only	7,736	1.93%	21,972	1.93%	8,233	1.15%

Table 9: Employment Breakdown 2027

Employment Breakdown for 2027			
	Basic	Retail	Service
City Limits and ETJ	16,646	9,484	55,183
City Limits only	15,556	8,863	51,568

6. BUILD-OUT POPULATION AND EMPLOYMENT

Build-out population and employment has been calculated using residential and non-residential vacant acreages and vacant lots to determine the ultimate number of new residents and new employments the study areas can add and then combining the results with the 2017 population and employment estimates. It should be noted that the numbers for the build-out population and employment are different than the 2027 estimates as the study area is not going to be completely build-out by 2027.

Build-out Population

Calculation of Build-out Population for Study Area 1 (City Limits and ETJ)

2017 Population Estimates in City Limits and ETJ	120,624
New Residents in City Limits	31,043
New Residents in ETJ	11,495
<hr/>	
<i>Build-out Population in City Limits and ETJ</i>	<i>163,162</i>

Calculation of Build-out Population for Study Area 2 (City Limits only)

2017 Population Estimates in City Limits	104,390
New Residents in City Limits	31,043
<hr/>	
<i>Build-out Population in City Limits</i>	<i>135,433</i>

Build-out Employment

Calculation of Build-out Employment for Study Area 1 (City Limits and ETJ)

2017 Employment Estimates in City Limits and ETJ	68,515
New Employment in City Limits	23,863
New Employment in ETJ	6,815
<hr/>	
<i>Build-out Employment in City Limits and ETJ</i>	<i>99,193</i>

Build-out Employment Breakdown

Basic	20,307
Retail	11,569
Service	67,317

Calculation of Build-out Employment for Study Area 2 (City Limits only)

2017 Employment Estimates in City Limits	67,754
New Employment in City Limits	23,863
<hr/>	
<i>Build-out Employment in City Limits</i>	<i>91,617</i>

Build-out Employment Breakdown

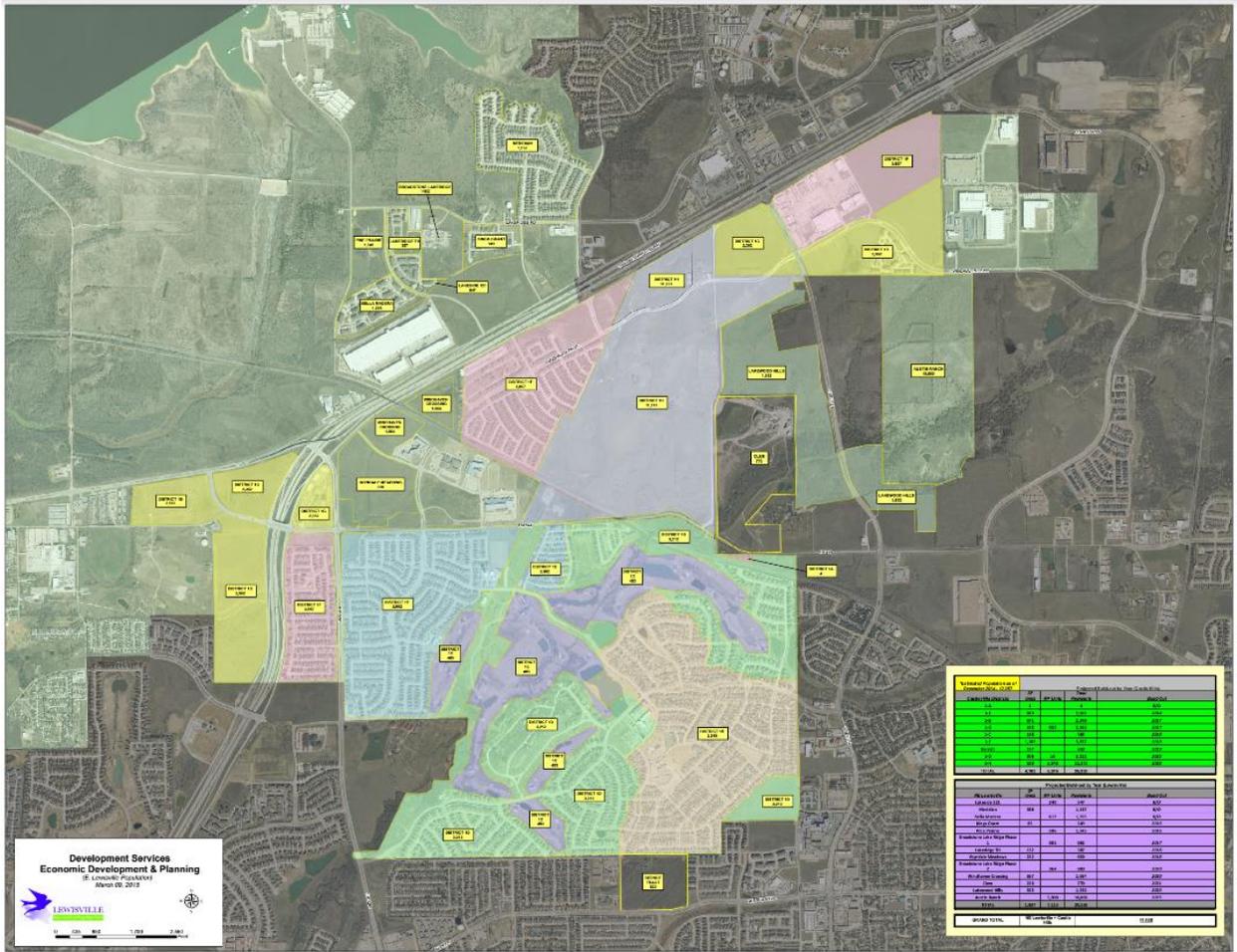
Basic	18,756
Retail	10,686
Service	62,175

Castle Hills

The ETJ consists of the Castle Hills area which is currently undergoing large scale residential and nonresidential development. These existing and upcoming developments in the Castle Hills area have been incorporated in the land use assumption process. It has been assumed residential developments in Castle Hills will be approximately built-out by 2027 but it will take more years for office, retail and commercial developments in Castle Hills to be built-out.

Castle Hills Population Summary	
2017 Population	= 15,091
2027 Population	= 26,003
Build-out Population	= 26,215

Castle Hills Employment Summary	
2017 Employment	= 761
2027 Employment	= 5,316
Build-out Employment	= 5,875



7. SUMMARY

- The existing 2017 population for the City Limits and ETJ is approximately 120,000 while the 2017 population Lewisville City Limits is approximately 104,000.
- The existing 2017 employment for the City Limits and ETJ is over 68,500 while the 2017 employment for Lewisville City Limits is approximately 67,700.
- The ten-year (2027) population growth projection for the City Limits and ETJ is approximately 153,000 with a CAGR of 2.4% while the 2027 population for Lewisville City Limits is approximately 126,000 using a CAGR of 1.93%.
- The ten-year (2027) employment growth projection for the City Limits and ETJ is approximately 81,000 while the 2027 employment for Lewisville City Limits is approximately 76,000.
- Build-out population is approximately 163,000 for the City Limits and ETJ and approximately 135,000 for City Limits only.
- Build-out employment is approximately 99,000 for the City Limits and ETJ and approximately 91,000 for City Limits only.
- Details of the 2017 and 2027 demographics by TSZs are attached.

APPENDICES

Population and Employment Estimates by TSZ (City Limits and ETJ)

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
40084	0	0	0	0	0
30161	1,594	148	1,594	148	1,594
30164	1,771	185	1,771	185	1,771
2383	2,478	417	2,478	417	2,478
2351	1,130	737	1,130	745	1,130
2385	1,465	168	1,465	170	1,465
2384	801	444	801	445	801
30162	1,268	629	1,268	629	1,268
30250	2,272	910	2,272	912	2,272
2352	1,045	737	1,045	737	1,045
2387	3,300	75	3,300	75	3,300
2354	1,988	1,097	1,988	1,097	1,988
2386	1,462	273	1,462	295	1,462
2418	6,674	1,179	6,830	1,306	6,830
2388	2,201	444	2,201	444	2,201
2391	3,695	370	3,695	370	3,695
30160	2,343	514	2,343	514	2,343
2389	1,142	222	1,142	222	1,142
2390	1,982	737	2,224	737	2,224
2353	258	810	295	875	295
2356	355	1,179	467	1,452	467
2357	843	737	843	750	843
2444	852	1,479	852	1,754	852
30155	3,791	1,034	4,281	1,064	4,281
2392	4,470	1,921	4,470	2,319	4,470
30156	2,113	1,917	2,113	1,917	2,113
30157	2,260	2,360	4,394	2,854	4,394
2312	1,937	941	1,937	941	1,937
2328	940	1,131	940	1,521	940
2311	1,139	629	1,139	678	1,139
2358	861	1,770	1,101	1,770	1,101
41031	707	3,025	2,278	3,825	4,191
2419	2,326	296	2,326	296	2,326
2359	565	1,039	565	1,201	565
2360	957	1,928	1,048	2,212	1,048
2331	0	1,070	144	1,470	2,180

TSZ	2017 Population Estimate	2017 Employment Estimate	2027 Population Estimate	2027 Employment Estimate	Build-out Population
30158	568	10,162	568	10,170	568
2361	576	1,097	576	1,697	576
2332	0	0	0	0	0
30165	1,113	296	1,113	310	1,113
30163	2,783	382	2,783	382	2,783
2325	1,138	326	1,138	326	1,138
2326	1,915	2,495	1,915	2,603	1,915
2327	640	69	640	69	640
2355	277	222	277	231	277
2382	1,772	148	1,772	148	1,772
2446	8,245	11,380	9,429	11,396	9,429
2273	1,262	359	2,001	464	2,001
2445	78	1,867	78	2,237	78
2308	1,690	500	4,352	679	7,472
40128	1,181	1,951	1,181	2,261	1,181
6008	630	0	630	0	630
2447	0	1,832	0	2,032	0
40008	0	0	0	0	0
30154	2,100	732	2,650	5,122	2,650
40009	677	0	1,618	203	1,618
2313	780	0	780	0	780
2291	2,105	48	2,825	549	2,825
30153	0	0	0	0	0
2364	1,324	0	1,324	7	1,324
2365	3,497	61	3,497	68	3,497
2334	2,861	215	9,057	497	10,775
2314	1,852	514	13,794	1,151	14,611
40321	502	0	502	59	502
30159	2,151	27	2,151	27	2,151
2443	2,042	296	2,042	589	2,042
2290	3,955	629	6,044	1,336	6,738
30166	2,794	148	2,794	148	2,794
2309	932	185	932	185	932
40211	0	6	0	6	0
2366	3,600	10	3,600	8	3,600
2396	750	0	750	0	750
2368	1,849	6	1,849	6	1,849
Total	120,624	68,515	152,864	81,313	163,162

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6008	630	0	630	0	630
2447	0	1,832	0	2,032	0
40008	0	0	0	0	0
30154	350	732	350	1,232	350
40009	677	0	1,618	203	1,618
2313	780	0	780	0	780
2291	2,105	48	2,825	549	2,825
30153	0	0	0	0	0
2314	0	45	8,919	301	10,227
40321	502	0	502	59	502
30159	2,151	27	2,151	27	2,151
2443	2,042	296	2,042	589	2,042
2290	3,955	629	6,044	1,336	6,738
30166	2,794	148	2,794	148	2,794
2309	932	185	932	185	932
2396	750	0	750	0	750
40211	0	6	0	6	0
Total	104,390	67,754	126,362	75,987	135,433



ENGINEERING EVALUATION REPORT OF THE



WATER AND WASTEWATER 2018-2028 IMPACT FEE REVIEW



Submitted To



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.



Submitted By



BIRKHOFF, HENDRICKS & CARTER, L.L.P.
*SPECIALIZING IN CIVIL ENGINEERING FOR
MUNICIPALITIES AND GOVERNMENTAL AGENCIES
TBPE FIRM NO. 526*



July 2018

CITY OF LEWISVILLE, TEXAS

ENGINEERING EVALUATION REPORT
FOR THE
WATER AND WASTEWATER
2018-2028 IMPACT FEE REVIEW

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Appendix "A": Water Distribution System - Impact Fee Data

- (1) Existing Water Facilities
- (2) Existing Water Lines
- (3) Proposed Water Facilities
- (4) Proposed Water Lines

Appendix "B": Wastewater Collection System - Impact Fee Data

- (1) Existing Wastewater Facilities
- (2) Existing Collection Lines
- (3) Proposed Wastewater Facilities
- (4) Proposed Collection Lines

John W Birkhoff
7/31/18



GENERAL

The engineering analysis portion of the 2018-2028 Water and Wastewater Impact Fee Review determines utilized capacity cost of the major water distribution and wastewater collection system components between the year 2018 and the year 2028. It does not include water distribution lines or sewer trunk lines constructed by developers. Facilities include treatment plants, pump stations, major water transmission lines, major wastewater trunk lines, major force mains and water storage tanks. The analysis also includes the capital improvement component of the Dallas Water Utility billing known as the demand charge. The study period is a ten-year period with 2018 as the base year. The engineering analysis of the water and wastewater systems is based on the existing land uses and the projected land uses for year 2028 and for buildout, and it is based on the existing and proposed infrastructure that is required to provide service for new development.

The City's Water Distribution Master Plan and the Wastewater Collection System Master Plan were updated in 2018. These master plans utilized the City's 2018 Land Use Assumptions Report, completed by Freese and Nichols, Incorporated, and dated March 2018. The 2018 review of the impact fee includes the updated master plan data. The Master Plans include the revision by the City of its build-out population. Projections today include a 2018 population of 120,624, a 2028 population projection of 152,864, and the Master Plan build-out population of approximately 163,162 people. The equivalency factors utilized conform to the American Water Works Association Standards (C700 - C703).

COST OF FACILITIES

Actual construction costs of the various elements of the water distribution and wastewater collection system were used where the information was known. The costs of completed water and sewer projects were determined from Contractor final pay requests, bid tabulation forms, or were provided by the City. Costs for proposed lines and facilities were estimated, referencing costs of recently bid projects that were similar in nature, and those costs typically considered the associated costs of engineering, land rights, and cost of financing.

UTILIZED CAPACITY

Utilized capacity for the water distribution and wastewater collection systems was calculated based on population growth projections. Population Projections are from the "Land Use Assumptions" report, prepared by Freese & Nichols, March 2018. A ratio of flows is set up between the design years of 2018 and 2028 and the build-out plan for the water distribution and wastewater collection systems.

Utilized capacity of improvements in the period is used to calculate the dollar value associated with growth for that period.

METHOD

The Lewisville Water and Wastewater Master Plans were updated in 2018 to reflect changes to population and land use assumptions. The existing digital hydraulic models were updated for both the Water and Wastewater Systems which simulate the hydraulic responses of the systems to the demands. The hydraulic models include three models, the 2018, 2028 and buildout scenarios. Demands, or flows, were distributed to the water model nodes and to the wastewater model manholes for each scenario. 48-hour (wastewater) and 72-hour (water) extended period computer simulations were run for each scenario, and the resulting flow rates were used as the basis for the utilized capacity calculations over the 10-year study period.

LAND USE ASSUMPTIONS SUMMARY

The land use and population assumptions were updated in 2017 by Freese & Nichols, Incorporated. Land use maps were also provided by Freese & Nichols which showed the geographical distribution of the various land uses.

Table 1 shows those population growth assumptions and the demand growth assumptions. The flow rates were used in the calculations for utilized capacities.

Table 1 – Population and Flow Assumptions

Population Growth Assumption:

	2018	2028	Buildout
Population Assumption (# People)	120,624	152,864	163,162
Percent of Buildout Population (%)	73.9%	93.7%	100.0%
2018 to 2028 Population Growth:		126.7%	

Demand Growth Assumption:

	2018	2028	Growth
Water Max-Hour Demand (MGD)	71.06	87.08	122.5%
Wastewater Average Daily Flow (MGD)	14.81	18.18	122.8%

LIVING UNIT EQUIVALENCY CALCULATION

The approach taken to relate the demand growth for the City to the existing and future users was to apply the growth to the number and type of existing connections to the water system. Residential and commercial connections to the water system each require a water meter, and those meters can vary in flow rate capacity, by size. A connection with a high-capacity water meter can cause larger demands on the water system because they draw water from the system at a greater rate, and thus a proportionally larger maximum impact fee to the system. Additionally, wastewater production rates generally relate to the water usage rates, and therefore the same methodology was applied for the wastewater collection system.

Maximum impact fee values were calculated for the various water meter size connections by assigning unitless Living Unit Equivalency (LUE) values to each meter size, based on the flow rate capacities of the meters. The LUE values allow for ratios of capacity to be developed for projection of the calculated maximum impact fee values. The American Water Works Association Standards for Water Meters provides the table of continuous duty maximum flow rates that were used for the LUE assignment, as shown in **Table 2**.

Table 2 – Living Unit Equivalencies for Various Types & Sizes of Water Meters

Meter Type	Meter Size	Continuous Duty Maximum Rate (gpm) ^(a)	Ratio to ¾" Meter
Simple	¾"	15	1
Simple	1"	25	1.7
Simple	1½"	50	3.3
Simple	2"	80	5.3
Compound	2"	80	5.3
Turbine	2"	100	6.7
Compound	3"	160	10.7
Turbine	3"	240	16
Compound	4"	250	16.7
Turbine	4"	420	28
Compound	6"	500	33.3
Turbine	6"	920	61.3
Compound	8"	800	53.3
Turbine	8"	1,600	106.7
Compound	10"	2,300	153.3
Turbine	10"	2,500	166.7
Turbine	12"	3,300	220

^(a) Source: AWWA Standard C700 (2002) - C703 (1996)

CURRENT METER COUNT & ESTIMATION OF SERVICE UNITS

Existing water meter counts in 2018 were provided by the City, by size. **Table 3** show the conversion of the existing meter counts to Living Units, and the projection of future Living Units at the end of the study period, based on the anticipated growth from the Land Use Assumptions.

Table 3A – 2018 - 2028 Living Unit Equivalentents (LUE) by Meter Size

Meter Size	2018			2028			New Living Units During Impact Fee Period
	Meter Count	Living Units per Meter	Total Living Units	Meter Count	Living Units per Meter	Total Living Units	
¾"	19,551	1.0	19,551	23,959	1.0	23,958	4,407
1"	1,740	1.7	2,958	2,132	1.7	3,624	666
1½"	410	3.3	1,353	502	3.3	1,658	305
2"	1,089	6.7	7,296	1,335	6.7	8,941	1,645
3"	158	16.0	2,528	194	16.0	3,097	569
4"	48	28.0	1,344	59	28.0	1,646	302
6"	14	61.3	858	17	61.3	1,051	193
8"	7	106.7	746	9	106.7	915	169
10"	10	166.7	1,667	12	166.7	2,042	375
12"	3	220.0	660	4	220.0	808	148
Totals:	23,030		38,961	28,222		47,740	8,779

WATER DISTRIBUTION SYSTEM

Changes to the water system plan are reflected in the 2018 Water Distribution System Master Plan by Birkhoff, Hendricks & Carter, L.L.P. These changes are centered around the maximum daily demand that were calculated for the revised Land Use Assumptions. Computer hydraulic models for years 2018, 2028 and Buildout were prepared based on the Master Plan, and were used for the ten-year study period analysis. The proposed waterline and facility projects, as shown in the Master Plan, were determined necessary for service to the projected populations and land uses. These facilities include ground storage reservoirs, and distribution lines.

Computer models were run for 72-hour extended period simulations to insure proper sizing of the facilities to meet peak demands. Pump stations and ground storage was analyzed with the maximum daily demand, while elevated storage was analyzed with the maximum hourly demand. This is consistent with the sizing of these facilities in the Water Distribution Master Plan.

- **Existing Water System Facilities**

The existing system includes the facilities shown in **Tables 4 and 5**:

Table 4 – Existing Pump Stations and Ground Storage Reservoirs

Pump Station	Number of Pumps	No. of Ground Storage Reservoirs (Capacity Million Gallons)
Feaster	5	1 @ (5 MG ea.) 2 @ (2 MG ea.) 1 @ (1 MG ea.)
North side	4	Combined with Feaster Ground Storage Reservoirs
East Side	4	1 @ (2 MG ea.) 1 @ (1 MG ea.)
Eastside Booster	4	Combined With Eastside Ground Storage Reservoirs
Southside	4	1 @ (2 MG ea.)
Midway	5	1 @ (3 MG ea.)

Table 5 – Existing Elevated Storage Tanks

Existing Elevated Storage Tank	High Level Elevation	Volume
Bellaire	692.5	1.0 MG
Valley Parkway	692.5	2.5 MG
F.M. 407	740.0	2.0 MG
Austin Ranch	735.0	2.0 MG

- **Capital Improvement Program**

The additions to the water distribution system during the study period are shown in **Table 6** and by **Figure 1 - 2018-2028 Water Impact Fee C.I.P. Map**, on the following page. Proposed transmission main and distribution line projects are listed in **Appendix A**.

Table 6 – Major Water System Facilities Capital Improvement Program

Approximate Date to be Placed in Service	Water Facility	Capacity of Improvement	Total Capacity After Improvement
2025	Southside 2.0 MG GSR	2.0 MG	4.0 MG
2027	Midway 3.0 MG GSR	3.0 MG	6.0 MG

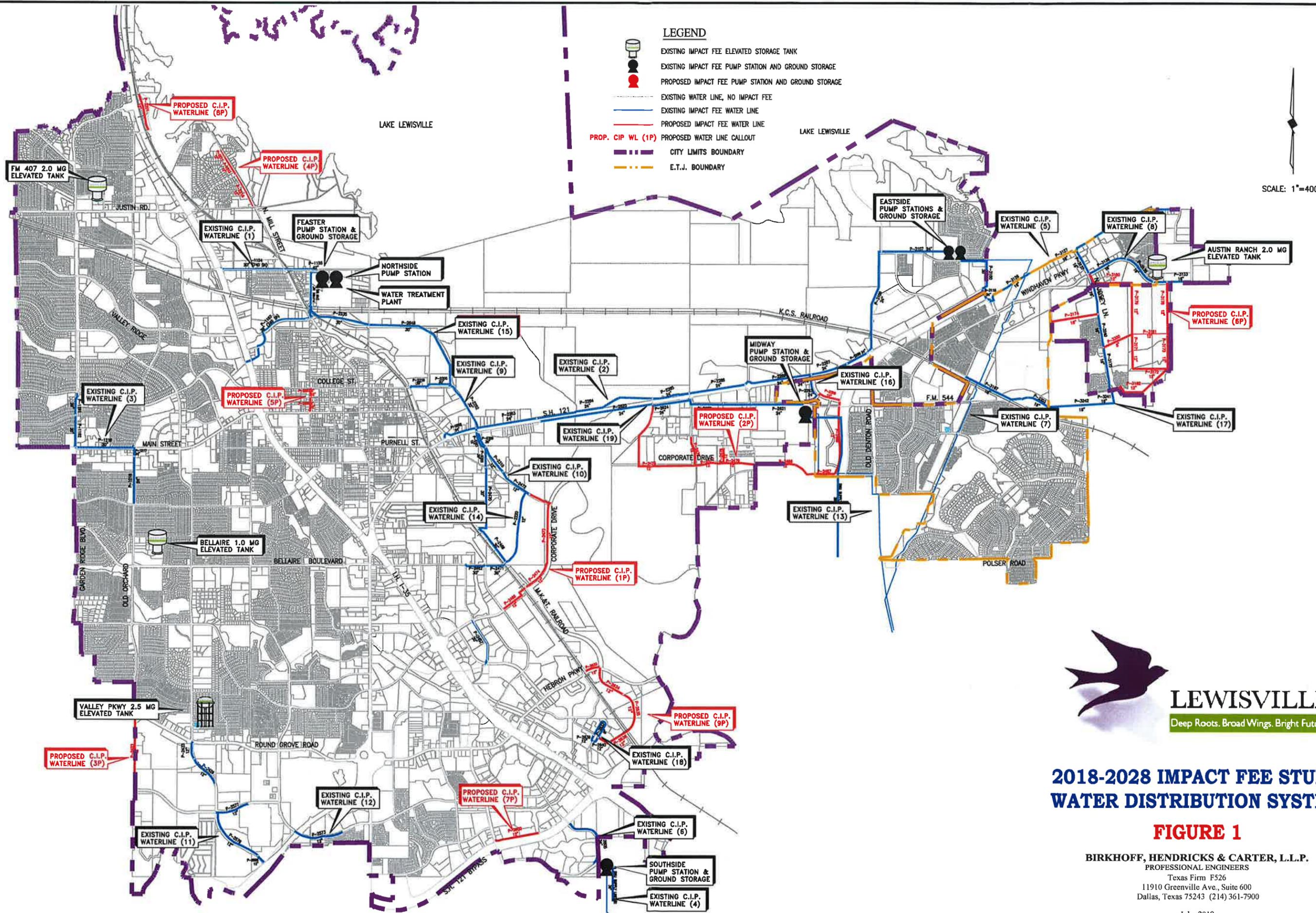
- **Water System Impact Fee Summary**

Appendix “A” includes the calculations for the impact fee eligible projects that were determined to have utilized capacity during the study period. Total project costs and utilized capacity costs for the impact fee projects are summarized in **Table 7**.

Table 7 – 2018-2028 Water Distribution System C.I.P. Summary

Water System	Total 20-year Project Cost (\$)	Utilized Capacity During Fee Period (\$)
Existing Water Distribution Lines	\$34,342,637	\$5,587,630
Existing Elevated Storage Tanks	\$13,058,149	\$2,514,248
Existing Pump Stations	\$22,740,081	\$3,673,374
Existing Ground Storage Reservoirs	\$18,334,844	\$2,636,428
Existing Water Treatment	\$29,219,755	\$2,308,326
Existing Water System Planning Expenses	\$61,000	\$61,000
Existing Water System Subtotal:	\$117,756,466	\$16,781,006
Proposed Water Distribution Lines	\$10,749,815	\$7,579,052
Proposed Facilities	\$21,962,670	\$21,552,236
Proposed Water System Subtotal:	\$32,712,485	\$29,131,288
Total:	\$150,468,951	\$45,912,294

The total 20-year project costs and utilized capacity costs over the study period include costs of construction, engineering, land rights, and cost of financing.



**2018-2028 IMPACT FEE STUDY
WATER DISTRIBUTION SYSTEM**

FIGURE 1

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 Texas Firm F526
 11910 Greenville Ave., Suite 600
 Dallas, Texas 75243 (214) 361-7900

July, 2018

WASTEWATER COLLECTION SYSTEM

The City's Wastewater Collection System Master Plan was updated in 2018 by Birkhoff, Hendricks & Carter, L.L.P. to reflect the revised Land Use Assumptions and to reconfigure future facilities on the east side of the wastewater collection system.

The 2028 and Buildout model scenarios include the proposed capital improvement plan improvements. The model scenarios (2018,2028, and Buildout) were run for the 48-hour extended period simulation, and modeled flows were used in the utilized capacity calculations for the 10-year study period. For the impact fee analysis, the variable affects of rainfall-derived infiltration and inflow (RDII) flows were standardized across the entire study area, so that growth of land use and flows are proportional for all areas in the service area. Inflow and infiltration peaks were set at an allowable factor of 3.0.

- **Existing Wastewater System**

Existing trunk lines are included in the impact fee analysis. The facilities include major wastewater lift stations, force mains, and the treatment plant.

The existing system includes the wastewater lift stations shown in **Table 8**.

Table 8 – Existing Lift Stations

Lift Station	Number of Pumps	Calculated FIRM Capacity (Million Gallons per Day)
Timber Creek	4	21-MGD
Prairie Creek	4	18-MGD
Whippoorwill	4	7-MGD

- **Capital Improvement Program**

Table 9 shows proposed facilities to the wastewater collection system for the study period. Proposed trunk lines are listed in Appendix “B” and shown by Figure 2; 2018-2028 Wastewater Impact Fee C.I.P. Map, on the following page.

Table 9 – Wastewater System Facilities Capital Improvement Program

Projected Date in Service	Wastewater Facility	Capacity of Improvement (MGD)	Total Capacity After Improvement (MGD)
2019	Midway Branch Lift Station & Force Main	15.0	15.0
2020	Castle Hills Lift Station & Force Main	10.0	10.0
2021	Wastewater Treatment Plant Expansion	3.0	15.0

- **Wastewater System Impact Fee Summary**

Appendix “B” includes the calculations for the impact fee eligible projects that were determined to have utilized capacity during the study period. Total project costs and utilized capacity costs for the impact fee projects are summarized in Table 10.

Table 10 – 2018-2028 Wastewater Collection System C.I.P. Summary

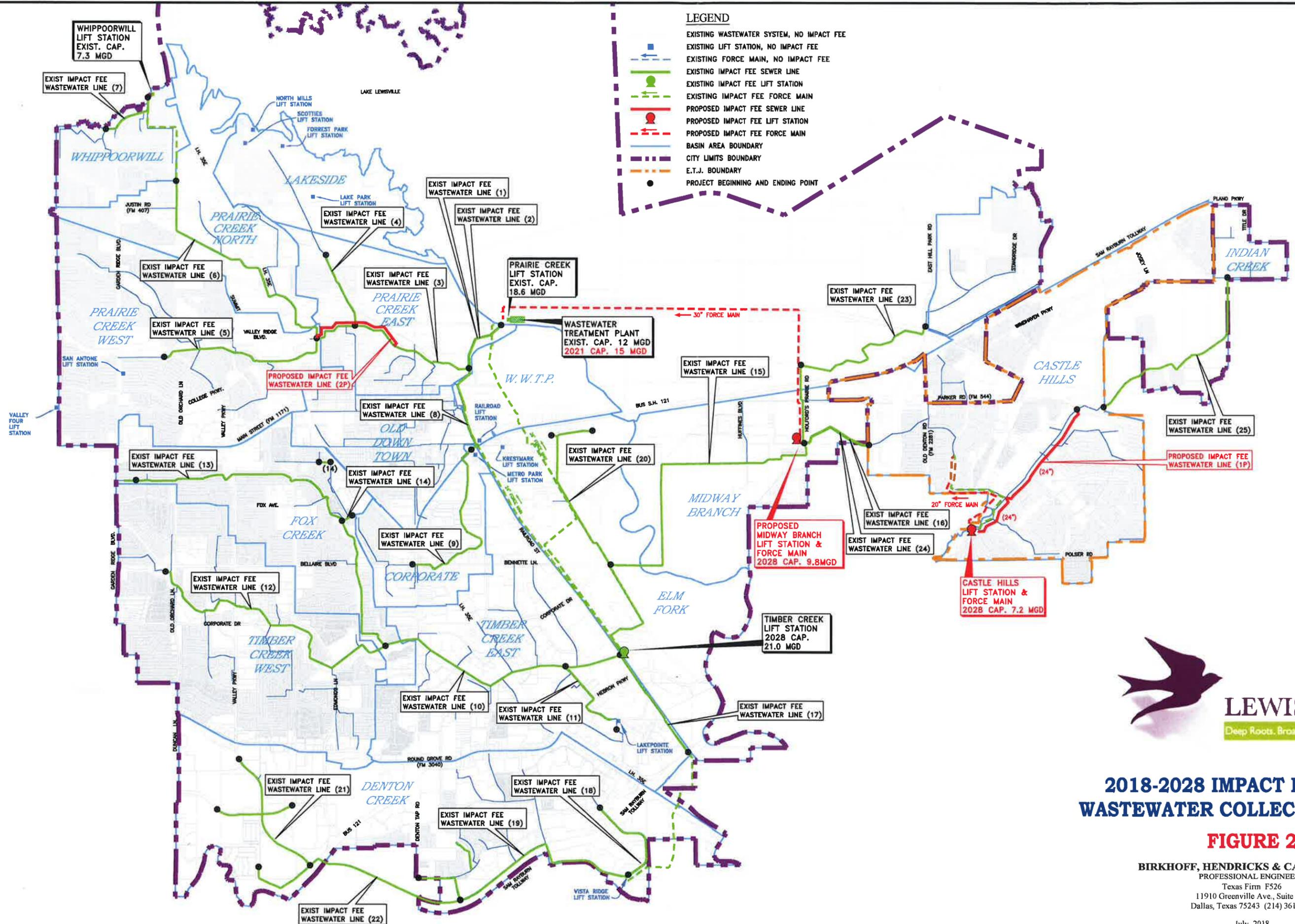
Wastewater System	Total 20-year Project Cost (\$)	Utilized Capacity During Fee Period (\$)
Existing Wastewater Collection Lines	\$31,459,516	\$3,348,959
Existing Wastewater Facilities: Lift Stations	\$28,430,918	\$2,776,262
Existing Wastewater Facilities: Treatment	\$41,936,150	\$351,474
Existing Wastewater System Planning Expenses	\$71,000	\$71,000
Existing Wastewater System Subtotal:	\$101,897,584	\$6,547,695
Proposed Wastewater Collection Sewer Lines	\$5,178,273	\$2,395,979
Proposed Wastewater Facilities: Lift Stations	\$33,967,606	\$14,453,251
Proposed Wastewater Facilities: Treatment	\$53,044,540	\$45,952,320
Proposed Wastewater System Subtotal:	\$92,190,419	\$62,801,550
Total:	\$194,088,003	\$69,349,245

The total 20-year project costs and utilized capacity costs over the study period include costs of construction, engineering, land rights, and cost of financing.

LEGEND

- EXISTING WASTEWATER SYSTEM, NO IMPACT FEE
- EXISTING LIFT STATION, NO IMPACT FEE
- EXISTING FORCE MAIN, NO IMPACT FEE
- EXISTING IMPACT FEE SEWER LINE
- EXISTING IMPACT FEE LIFT STATION
- EXISTING IMPACT FEE FORCE MAIN
- PROPOSED IMPACT FEE SEWER LINE
- PROPOSED IMPACT FEE LIFT STATION
- PROPOSED IMPACT FEE FORCE MAIN
- BASIN AREA BOUNDARY
- CITY LIMITS BOUNDARY
- E.T.J. BOUNDARY
- PROJECT BEGINNING AND ENDING POINT

SCALE: 1" = 4000'



**2018-2028 IMPACT FEE STUDY
WASTEWATER COLLECTION SYSTEM**

FIGURE 2

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 Texas Firm F526
 11910 Greenville Ave., Suite 600
 Dallas, Texas 75243 (214) 361-7900

July, 2018

SUMMARY OF FINDINGS OF FIVE-YEAR REVIEW

The water and wastewater Master Plans were updated in 2018 to reflect the population & Land Use Assumptions that were revised in 2017. The study area was revised for the east side of the City to remove the Lord and Clem area and include a portion of the same area, now called Lakewood Hills.

A water demand rate study was performed for the planning area to determine per-capita usage rates and the maximum usage rates for design. The results were that the per-capita usage rate was less than the usage from the previous study. Due to less usage of water in this impact fee period from the previous period, this will postpone an expansion of the water treatment plant within the 10-year period. Additional water supply from Dallas Water Utilities will be required.

The previous wastewater collection system capital improvement plan included two proposed lift stations and associated force mains that were removed from the plan for this Impact Fee Update, namely the Indian Creek and the Crossroads Centre South Lift Stations and Force Mains. The removed lift stations were proposed for the purpose of separating the ETJ (Castle Hills) flows from the City-generated flows. As a result of the removal of the lift stations, City-generated flow is allowed to pass through the Castle Hills ETJ area and be served by the existing Castle Hills Lift Station, resulting in capacity expansion to the Castle Hills lift station. Only the City-generated portion of flows were considered for the utilized capacity calculation of the impact fee for the proposed expansion. Additionally, a wastewater flow monitoring study of the existing flows was conducted in 2017 and was incorporated with the master plan study to determine the existing per-capita average wastewater flows and to project for buildout design flows.

CALCULATION OF MAXIMUM IMPACT FEES

Impact fees for the water and wastewater systems are calculated separately by dividing the cost of the capital improvements or facility expansions necessitated and attributable to new development in the service area within the next ten years by the number of living units anticipated to be added to Lewisville within the next ten years and the calculated number is divided by two, per Chapter 395 of the Local Government Code. The maximum impact fee for each meter size is calculated in **Table 9**. To simplify collection, we recommend that the fee remain fixed for the five-year period, unless changed by Council.

Table 11 – Maximum Impact Fee Calculations

Water Impact Fee =	$\frac{\text{Eligible Existing Utilized Cost} + \text{Eligible Proposed Utilized Cost}}{\text{Number of New Living Unit Equivalent over the Next 10 Years}}$	
	$= \frac{\$16,781,006}{8,779} + \frac{\$29,131,288}{8,779}$	$= \frac{\$45,912,294}{8,779}$
Calculated Impact Fee =	<u>\$ 5,229.79</u>	
Allowable Maximum Water Impact Fee: (Max Impact Fee x 50%)* =	<u>\$ 2,614.89</u>	
<i>* - Maximum allowable impact fee is 50% of the maximum calculated impact fee per Chapter 395 LGC</i>		

Wastewater Impact Fee =	$\frac{\text{Eligible Existing Utilized Cost} + \text{Eligible Proposed Utilized Cost}}{\text{Number of New Living Unit Equivalent over the Next 10 Years}}$	
	$= \frac{\$6,547,695}{8,779} + \frac{\$62,801,550}{8,779}$	$= \frac{\$69,349,245}{8,779}$
Calculated Impact Fee =	<u>\$7,899.45</u>	
Allowable Maximum Wastewater Impact Fee: (Max Impact Fee x 50%) =	<u>\$ 3,949.72</u>	
<i>* - Maximum allowable impact fee is 50% of the maximum calculated impact fee per Chapter 395 LGC</i>		

**Table 12 – Allowable Maximum Impact Fee per Living Unit Equivalent
And per Meter Size & Type**

50% Max . Water Impact Fee /LUE \$2,614.89
50% Max . Wastewater Impact Fee /LUE \$3,949.72

Meter Type	Meter Size	LUE	Maximum Impact Fee		Total
			Water	Wastewater	
Simple	3/4"	1	\$2,615	\$3,950	\$6,565
Simple	1"	1.7	\$4,445	\$6,715	\$11,160
Simple	1-1/2"	3.3	\$8,629	\$13,034	\$21,663
Simple	2"	5.3	\$13,859	\$20,934	\$34,792
Compound	2"	5.3	\$13,859	\$20,934	\$34,792
Turbine	2"	6.7	\$17,520	\$26,463	\$43,983
Compound	3"	10.7	\$27,979	\$42,262	\$70,241
Turbine	3"	16	\$41,838	\$63,196	\$105,034
Compound	4"	16.7	\$43,669	\$65,960	\$109,629
Turbine	4"	28	\$73,217	\$110,592	\$183,809
Compound	6"	33.3	\$87,076	\$131,526	\$218,602
Turbine	6"	61.3	\$160,293	\$242,118	\$402,411
Compound	8"	53.3	\$139,374	\$210,520	\$349,894
Turbine	8"	106.7	\$279,009	\$421,435	\$700,445
Compound	10"	153.3	\$400,863	\$605,493	\$1,006,356
Turbine	10"	166.7	\$435,903	\$658,419	\$1,094,322
Turbine	12"	220	\$575,276	\$868,939	\$1,444,216

IMPACT FEE PERIOD
CONSULTANT HISTORY

<u>Study Consultant</u>	<u>Year</u>	<u>Audit Consultant</u>
<u>Determination:</u> <i>KSA Engineers</i>	1990	1 st 3-year period Audit by KPMG (Peat Marwick)
	1991	
	1992	
<u>Review:</u> <i>KSA Engineers</i>	1993	2 nd 3-year period Audit by Birkhoff, Hendricks & Conway, L.L.P.
	1994	
	1995	
<u>Review:</u> <i>Birkhoff, Hendricks & Conway, L.L.P.</i>	1996	3 rd 3-year period Audit by Birkhoff, Hendricks & Conway, L.L.P.
	1997	
	1998	
<i>Birkhoff, Hendricks & Conway, L.L.P.</i>	1999	4 th 3-year period Audit by Birkhoff, Hendricks & Conway, L.L.P.
	2000	
	2001	
<i>Birkhoff, Hendricks & Conway, L.L.P.</i>	2002	Change in State Law No Audit Required Duration of Fee 5-Years Maximum
	2003	
	2004	
	2005	
	2006	
<i>Birkhoff, Hendricks & Conway, L.L.P.</i>	2007	No Audit Required Duration of Fee 5-Years Maximum
	2008	
	2009	
	2010	
	2011	
<i>Birkhoff, Hendricks & Carter, L.L.P.</i>	2012	No Audit Required Duration of Fee 5-Years Maximum
	2013	
	2014	
	2015	
	2016	
<i>Birkhoff, Hendricks & Carter, L.L.P.</i>	2018	No Audit Required Duration of Fee 5-Years Maximum
	2019	
	2020	
	2021	
	2022	



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

**WATER AND WASTEWATER
FIVE YEAR IMPACT FEE REVIEW**

APPENDIX "A"

**WATER DISTRIBUTION SYSTEM
IMPACT FEE DATA**

**PUMP STATION
GROUND STORAGE RESERVOIR
ELEVATED STORAGE TANK
WATER TREATMENT PLANT
TRANSMISSION LINES
DISTRIBUTION LINES**

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER DISTRIBUTION IMPACT FEE STUDY
EXISTING WATER FACILITIES**

Pump Station Improvements	Year Const.	Capacity	Cost (\$)							Capacity Utilized (%)			Capacity Utilized (\$)		
			Const.	Engineering, Testing and Property Acquisition	Total Project Cost	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost \$	2018	2028	In The CRF Period	2018	2028	In The CRF Period	
Existing Elevated Storage Tanks															
FM 407 2.0 MG EST	1	2001	2.0	\$1,784,000	\$178,400	\$1,962,400	4.5%	\$1,054,835	\$3,017,235	89%	93%	4.1%	\$2,694,934	\$2,820,135	\$125,201
Bellaire 1.0 MG EST	2	2004	1.0	\$1,560,730	\$156,073	\$1,716,803	4.5%	\$922,821	\$2,639,624	90%	96%	6.1%	\$2,373,486	\$2,534,173	\$160,687
(2) Valley Parkway 2.5 MG EST	3	1984	2.5	\$1,438,000	\$143,800	\$1,581,800	4.5%	\$850,254	\$2,432,054	90%	96%	6.1%	\$2,186,844	\$2,334,895	\$148,051
Austin Ranch 2.0 MG EST	4	2011	2.0	\$2,938,159	\$293,816	\$3,231,975	4.5%	\$1,737,261	\$4,969,236	50%	92%	41.9%	\$2,496,019	\$4,576,328	\$2,080,309
Subtotal Existing Elevated Storage Tanks:				\$7,720,889	\$772,089	\$8,492,978		\$4,565,171	\$13,058,149				\$9,751,283	\$12,265,531	\$2,514,248
Pump Station															
(2) Feaster	6	1973	27.5	\$1,500,000	\$150,000	\$1,650,000	4.5%	\$886,913	\$2,536,913	85%	93%	8.2%	\$2,158,538	\$2,367,545	\$209,007
(2) Eastside	7	1991	9.0	\$2,573,000	\$257,300	\$2,830,300	4.5%	\$1,521,351	\$4,351,651	52%	92%	40.0%	\$2,255,553	\$3,997,953	\$1,742,400
Eastside Booster	8	2002	4.7	\$925,359	\$92,536	\$1,017,895	4.5%	\$547,142	\$1,565,037	52%	92%	40.0%	\$811,192	\$1,437,832	\$626,640
Northside	9	2001	12.7	\$1,629,893	\$162,989	\$1,792,882	4.5%	\$963,715	\$2,756,597	87%	92%	5.3%	\$2,393,043	\$2,538,464	\$145,421
Southside	10	2004	13.8	\$2,348,126	\$234,813	\$2,582,939	4.5%	\$1,388,389	\$3,971,328	85%	93%	8.2%	\$3,379,013	\$3,706,197	\$327,184
Midway	11	2010	26.7	\$4,469,145	\$446,915	\$4,916,060	4.5%	\$2,642,495	\$7,558,555	85%	93%	8.2%	\$6,431,214	\$7,053,936	\$622,722
Subtotal Pump Station:				\$13,445,523	\$1,344,553	\$14,790,076		\$7,950,005	\$22,740,081				\$17,428,553	\$21,101,927	\$3,673,474
Ground Storage Reservoir															
(2) Feaster 5.0 MG	12	1973	5.0	\$1,500,000	\$150,000	\$1,650,000	4.5%	\$886,913	\$2,536,913	85%	93%	8.2%	\$2,158,538	\$2,367,545	\$209,007
Feaster 5.0 MG	13	2013	5.0	\$4,203,140	\$420,314	\$4,623,454	4.5%	\$2,485,212	\$7,108,666	85%	93%	8.2%	\$6,048,425	\$6,634,082	\$585,657
(2) Eastside 1.0 MG	14	1991	1.0	\$800,000	\$80,000	\$880,000	4.5%	\$473,020	\$1,353,020	52%	92%	40.0%	\$701,299	\$1,243,048	\$541,749
Eastside 2.0MG	15	1998	2.0	\$1,293,318	\$129,332	\$1,422,650	4.5%	\$764,707	\$2,187,357	52%	92%	40.0%	\$1,133,753	\$2,009,570	\$875,817
(1) Midway GSR 1	16	2012	3.0	\$1,489,715	\$148,972	\$1,638,687	4.5%	\$880,832	\$2,519,519	85%	93%	8.2%	\$2,143,738	\$2,351,312	\$207,574
Southside 2.0 MG	17	2004	2.0	\$1,554,666	\$155,467	\$1,710,133	4.5%	\$919,236	\$2,629,369	85%	93%	8.2%	\$2,237,205	\$2,453,829	\$216,624
Subtotal Ground Storage Reservoir:				\$10,840,839	\$1,084,085	\$11,924,924		\$6,409,920	\$18,334,844				\$14,422,958	\$17,059,386	\$2,636,428
Treatment															
(2) Feaster	18	1973	6.0	\$3,000,000	\$300,000	\$3,300,000	4.5%	\$1,773,826	\$5,073,826	100%	100%	0.0%	\$5,073,826	\$5,073,826	\$0
Feaster Plant Expansion	19	1980	12.0	\$3,300,000	\$330,000	\$3,630,000	4.5%	\$1,951,208	\$5,581,208	100%	100%	0.0%	\$5,581,208	\$5,581,208	\$0
(2) Flouridation System	20	1984	12.0	\$29,893	\$2,989	\$32,882	4.5%	\$17,675	\$50,557	100%	100%	0.0%	\$50,557	\$50,557	\$0
(2) Chlorine System Renovation	21	1993	12.0	\$367,942	\$36,794	\$404,736	4.5%	\$217,555	\$622,291	100%	100%	0.0%	\$622,291	\$622,291	\$0
(2) Feaster Plant Expansion	22	1996	15.0	\$1,228,410	\$122,841	\$1,351,251	4.5%	\$726,328	\$2,077,579	100%	100%	0.0%	\$2,077,579	\$2,077,579	\$0
Feaster Plant Expansion	23	2002	18.0	\$5,221,412	\$522,141	\$5,743,553	4.5%	\$3,087,291	\$8,830,844	100%	100%	0.0%	\$8,830,844	\$8,830,844	\$0
Raw Water Intake Pumps	24	2001	21.0	\$64,800	\$6,480	\$71,280	4.5%	\$38,315	\$109,595	90%	100%	10.0%	\$98,636	\$109,595	\$10,959
(2) Raw Water Intake Structure	25	1994	40.0	\$3,080,000	\$308,000	\$3,388,000	4.5%	\$1,821,128	\$5,209,128	45%	76%	31.0%	\$2,344,108	\$3,958,937	\$1,614,829
Raw Water Pipe Line	26	2001	30.3	\$984,303	\$98,430	\$1,082,733	4.5%	\$581,994	\$1,664,727	59%	100%	41.0%	\$982,189	\$1,664,727	\$682,538
Treatment Plant Clear Well	27	2015	2.0	\$4,203,140	\$420,314	\$4,623,454	4.5%	\$2,485,212	\$7,108,666	100%	100%	0.0%	\$7,108,666	\$7,108,666	\$0
Subtotal Treatment:				\$21,479,900	\$2,147,989	\$23,627,889		\$12,700,532	\$36,328,421				\$32,769,904	\$35,078,230	\$2,308,326
TOTAL EXISTING WATER FACILITIES:				\$53,487,151	\$5,348,716	\$58,835,867		\$31,625,628	\$90,461,495				\$74,372,698	\$85,505,074	\$11,132,376

(1) Estimated Cost
(2) Cost Estimates from May, 1998 Impact Fee Study

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
EXISTING - WATER LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)			
									2018	2028	During Fee Period	2018	2028	During Fee Period	
(1) - 740 Service Area Transmission Line															
This project begins at Feaster Pump Station and extends west as a 42" water line and diverges to a 20" & 36", from 1997 Impact Fee Report (1)															
(2)	P-1154	4,442	20	\$200.71	\$891,627		\$479,270	\$1,370,897	100%	100%	0%	\$1,370,897	\$1,370,897	\$0	
(2)	P-1155	250	42	\$372.69	\$93,172		\$50,082	\$143,254	100%	100%	0%	\$143,254	\$143,254	\$0	
(2)	P-1156	2,070	42	\$246.60	\$510,452		\$274,380	\$784,832	100%	100%	0%	\$784,832	\$784,832	\$0	
(2)	P-1157	3,944	36	\$252.20	\$994,720		\$534,685	\$1,529,405	100%	100%	0%	\$1,529,405	\$1,529,405	\$0	
	Subtotal:	10,707			\$2,489,971	4.5%	1,338,417	\$3,828,388				\$3,828,388	\$3,828,388	\$0	
(2) - SH 121 Transmission Line															
This project begins at the Eastside pump station and extends west to junction 2357, from 1997 Impact Fee Report (2)															
	P-2282	1,527	24	\$41.81	\$63,828		\$34,309	\$98,137	80%	89%	9%	\$78,191	\$87,358	\$9,167	
	P-2283	2,760	24	\$41.81	\$115,394		\$62,027	\$177,421	100%	100%	0%	\$177,421	\$177,421	\$0	
	P-2284	5,365	24	\$41.81	\$224,293		\$120,563	\$344,856	100%	100%	0%	\$344,856	\$344,856	\$0	
	P-2285	1,746	24	\$41.81	\$72,979		\$39,228	\$112,207	100%	100%	0%	\$112,207	\$112,207	\$0	
	P-2288	2,516	24	\$41.81	\$105,169		\$56,531	\$161,700	100%	100%	0%	\$161,700	\$161,700	\$0	
	P-2289	3,238	24	\$41.81	\$135,393		\$72,777	\$208,170	100%	100%	0%	\$208,170	\$208,170	\$0	
	P-2297	1,802	24	\$41.81	\$75,327		\$40,490	\$115,817	0%	0%	0%	\$0	\$0	\$0	
	P-2299	879	24	\$41.81	\$36,763		\$19,761	\$56,524	0%	0%	0%	\$0	\$0	\$0	
	P-3107	3,114	24	\$41.81	\$130,209		\$69,990	\$200,199	100%	100%	0%	\$200,199	\$200,199	\$0	
	P-3109	4,670	24	\$41.81	\$195,258		\$104,956	\$300,214	100%	100%	0%	\$300,214	\$300,214	\$0	
	Subtotal:	27,618	1992		\$1,154,613	4.5%	620,632	\$1,775,245				\$1,582,958	\$1,592,125	\$9,167	
(3) - Garden Ridge Elevated Storage Supply Line															
This project begins at J-1187 and extends north to the old Valley Ridge EST, from 1997 Impact Fee Report (3)															
	P-1191	1,025	20	\$135.01	\$138,447		\$74,418	\$212,865	100%	100%	0%	\$212,865	\$212,865	\$0	
	P-1192	1,409	20	\$198.34	\$279,419		\$150,194	\$429,613	100%	100%	0%	\$429,613	\$429,613	\$0	
	P-1217	493	24	\$207.93	\$102,419		\$55,053	\$157,472	84%	84%	0%	\$132,585	\$133,031	\$446	
	P-1218	2,117	24	\$207.78	\$439,798		\$236,401	\$676,199	88%	88%	0%	\$592,933	\$592,933	\$0	
	P-1219	2,716	20	\$199.27	\$541,299		\$290,961	\$832,260	97%	100%	3%	\$806,008	\$832,260	\$26,252	
	Subtotal:	7,760	1987		\$1,501,382	4.5%	807,027	\$2,308,409				\$2,174,004	\$2,200,702	\$26,698	
(4) - Dallas 36-inch Water Supply Line No. 2															
This project begins at the Southside pump station and extends to the 60" Dallas Transmission															
	P-2017	8,960	36	\$164.41	\$1,473,158		\$791,856	\$2,265,014	100%	100%	0%	\$2,265,014	\$2,265,014	\$0	
	Subtotal:	8,960	2004		\$1,473,158	4.5%	791,856	\$2,265,014				\$2,265,014	\$2,265,014	\$0	
(5) - East Pump Station 30, 24 & 16-inch Distribution Lines															
This project at the new Eastside pump station extends south to SH121 and extends east to Cysco(4)															
	P-3100	2,575	30	\$156.86	\$403,981		\$217,149	\$621,130	30%	67%	36%	\$188,569	\$414,650	\$226,081	
	P-3115	295	24	\$156.86	\$46,248		\$24,859	\$71,107	40%	66%	26%	\$28,270	\$46,782	\$18,512	
	P-3126	3,257	16	\$156.86	\$510,942		\$274,643	\$785,585	52%	75%	22%	\$412,169	\$588,497	\$176,328	
	P-3127	1,076	16	\$156.86	\$168,806		\$90,737	\$259,543	56%	80%	24%	\$144,548	\$206,776	\$62,228	
	P-3128	5,902	16	\$156.86	\$925,772		\$497,624	\$1,423,396	55%	76%	21%	\$787,661	\$1,082,468	\$294,807	
	Subtotal:	13,106	2002		\$2,055,749	4.5%	\$ 1,105,012	\$ 3,160,761				\$ 1,561,217	\$ 2,339,173	\$ 777,956	

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
EXISTING - WATER LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
									2018	2028	During Fee Period	2018	2028	During Fee Period
(6) - 24-inch Distribution line from the Southside Pump Station														
This project begins at the Southside pump station and extends north to SH 121 Bypass (5)														
	P-2605	2,624	24		\$119.53		\$168,587	\$482,223	91%	100%	9%	\$436,739	\$482,223	\$45,484
	Subtotal:	2,624	2004				168,587	\$482,223				\$436,739	\$482,223	\$45,484
(7) - Old Eastside DWU Transmission Line														
30-inch DWU transmission line that delivers to Eastside Pump Station														
(2)	P3045	1	30	1991	\$1,200,000		\$645,027	\$1,845,027	100%	100%	0%	\$1,845,027	\$1,845,027	\$0
	Subtotal:	1	1991				645,027	\$1,845,027				\$1,845,027	\$1,845,027	\$0
(8) - 16-inch Austin Ranch EST Upper Loop														
This project begins at Memorial Drive and extends south along Josey Lane. Then extends east along Windhaven Parkway to Trinity Drive														
(1)	P-3133	1,079	16		\$18.00		\$19,415	\$29,851	73%	79%	6%	\$21,806	\$23,704	\$1,898
(1)	P-3135	1,358	16		\$18.00		\$24,437	\$37,572	63%	80%	17%	\$23,683	\$30,163	\$6,480
(1)	P-3136	2,427	16		\$18.00		\$43,692	\$67,177	58%	83%	25%	\$39,273	\$55,920	\$16,647
(1)	P-3137	1,455	16		\$18.00		\$26,199	\$40,282	48%	78%	30%	\$19,294	\$31,411	\$12,117
(1)	P-3177	793	16		\$18.00		\$14,275	\$21,948	38%	80%	42%	\$8,329	\$17,540	\$9,211
	Subtotal:	7,112	2006				68,812	\$196,830				\$112,385	\$158,738	\$46,353
(9) - Valley Ridge Northeast 30-inch Water Line														
This project begins at Railroad Street and extends east along College Street. Then extends south along Valley Ridge Boulevard														
	P-2252	2,280	30		\$74.05		\$168,841	\$90,756	100%	100%	0%	\$259,597	\$259,597	\$0
	P-2305	1,195	30		\$74.05		\$88,512	\$47,577	89%	100%	11%	\$120,471	\$136,089	\$15,618
	P-2318	843	30		\$74.05		\$62,412	\$33,548	84%	91%	7%	\$80,497	\$87,689	\$7,192
	P-2320	823	30		\$74.05		\$60,925	\$32,749	78%	100%	22%	\$72,828	\$93,674	\$20,846
	P-2322	909	30		\$74.05		\$67,340	\$36,197	79%	100%	21%	\$81,545	\$103,537	\$21,992
	P-2457	2,077	30		\$74.05		\$153,791	\$82,666	82%	100%	18%	\$193,915	\$236,457	\$42,542
	P-2462	1,237	30		\$74.05		\$91,623	\$49,249	85%	100%	15%	\$119,653	\$140,872	\$21,219
	P-2469	1,964	30		\$74.05		\$145,431	\$78,172	81%	100%	19%	\$181,568	\$223,603	\$42,035
	P-2470	3,083	30		\$74.05		\$228,254	\$122,692	80%	100%	20%	\$281,770	\$350,946	\$69,176
	P-2471	1,237	30		\$74.05		\$91,596	\$49,235	87%	100%	13%	\$122,283	\$140,831	\$18,548
	P-2615	177	30		\$74.05		\$13,092	\$7,037	100%	100%	0%	\$20,129	\$20,129	\$0
*	Subtotal:	15,825	2007				\$1,171,817	\$629,878				\$1,534,256	\$1,793,424	\$259,168
(10) - Valley Ridge Boulevard South of SH-21 Bus. 12-inch Water Line														
This project begins at SH 121 business and extends south along Valley Ridge Boulevard to Locomotive Drive														
	P-2310	1,363	12		\$54.72		\$74,609	\$40,104	72%	99%	27%	\$82,395	\$113,273	\$30,878
	P-2321	901	12		\$54.72		\$49,321	\$26,511	80%	100%	20%	\$60,429	\$75,832	\$15,403
	P-2472	1,598	12		\$54.72		\$87,445	\$47,004	53%	89%	36%	\$70,690	\$119,454	\$48,764
*	Subtotal:	3,863	2011				\$211,375	\$113,619				\$213,514	\$308,559	\$95,045

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
EXISTING - WATER LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
									2018	2028	During Fee Period	2018	2028	During Fee Period
(11) - Southwest Lewisville Infrastructure														
This project begins at Spinks Road and extends along Valley Parkway to SH 121														
	P-2426	1,387	12	\$76.36	\$105,888		\$56,917	\$162,805	63%	68%	5%	\$103,041	\$110,597	\$7,556
	P-2433	678	12	\$76.36	\$51,797		\$27,842	\$79,639	68%	74%	6%	\$54,304	\$59,084	\$4,780
	P-2577	2,313	12	\$76.36	\$176,600		\$94,927	\$271,527	26%	100%	74%	\$71,104	\$271,527	\$200,423
	P-2578	2,931	12	\$76.36	\$223,820		\$120,308	\$344,128	9%	44%	36%	\$29,894	\$152,946	\$123,052
	P-2585	430	12	\$76.36	\$32,857		\$17,661	\$50,518	0%	44%	44%	\$0	\$22,362	\$22,362
*	Subtotal:	7,739			\$590,962	4.5%	317,655	\$908,617				\$258,343	\$616,516	\$358,173
(12) - Vista Ridge Mall Drive 12-inch Water Line														
This project begins at SH 121 and extends along Vista Ridge Mall Drive to Highpoint Oaks Drive														
	P-2573	2,044	12	\$93.48	\$191,047		\$102,692	\$293,739	62%	64%	2%	\$182,926	\$189,234	\$6,308
*	Subtotal:	2,044			\$191,047	4.5%	102,692	\$293,739				\$182,926	\$189,234	\$6,308
(13) - 30-inch Transmission Water from Midway Pump Station to Dallas Water Line No. 3														
30-inch DWU transmission line that delivers to Midway Pump Station														
	P-2169	1	30	\$2,501,413	\$2,501,413		\$1,344,567	\$3,845,980	60%	97%	37%	\$2,307,588	\$3,748,859	\$1,441,271
*	Subtotal:	1			\$2,501,413	4.5%	1,344,567	\$3,845,980				\$2,307,588	\$3,748,859	\$1,441,271
(14) - Railroad Athletics Complex 12-inch Water Line														
This project begins at Valley Ridge Boulevard and extends south along Locomotive Drive to Railroad Street														
	P-2220	3,628	12	\$59.27	\$215,000		\$115,567	\$330,567	95%	100%	5%	\$313,101	\$330,567	\$17,466
*	Subtotal:	3,628			\$215,000	4.5%	115,567	\$330,567				\$313,101	\$330,567	\$17,466
(15) - Valley Ridge Boulevard 30-inch Distribution Line														
This project begins at Mill Street and extends along Valley Ridge Boulevard to College Street														
(2)	P-2235	1,999	30	\$265.19	\$530,093		\$284,937	\$815,030	100%	100%	0%	\$815,030	\$815,030	\$0
(2)	P-2235A	876	30	\$265.19	\$232,422		\$124,932	\$357,354	100%	100%	0%	\$357,354	\$357,354	\$0
(2)	P-2235C	198	30	\$265.19	\$52,404		\$28,168	\$80,572	100%	100%	0%	\$80,572	\$80,572	\$0
(2)	P-2648	5,512	30	\$265.19	\$1,461,605		\$785,646	\$2,247,251	100%	100%	0%	\$2,247,251	\$2,247,251	\$0
*	Subtotal:	8,585			\$2,276,524	4.5%	1,223,683	\$3,500,207				\$3,500,207	\$3,500,207	\$0
(16) - 24" Water Line From Midway Pump Station to S.H. 121														
This project begins at Midway Pump Station and extends north along FM 544 to SH 121 business														
(2)	P-2292	331	24	\$182.38	\$60,386		\$32,459	\$92,845	100%	100%	0%	\$92,845	\$92,845	\$0
(2)	P-2293	1,263	24	\$182.38	\$230,320		\$123,802	\$354,122	100%	100%	0%	\$354,122	\$354,122	\$0
*	Subtotal:	1,594			\$290,706	4.5%	156,261	\$446,967				\$446,967	\$446,967	\$0
(17) - Josey-FM 544 16-Inch Water Line														
This project begins at Windhaven Parkway and extends south along Josey Lane to FM 544. Then extends west along FM 544 to Indian Creek														
(1)	P-3138	1,870	16	\$77.70	\$145,266		\$78,084	\$223,350	40%	48%	8%	\$89,037	\$106,299	\$17,262
(1)	P-3240	1,518	16	\$77.70	\$117,937		\$63,394	\$181,331	51%	100%	49%	\$93,120	\$181,331	\$88,211
(1)	P-3242	2,971	16	\$77.70	\$230,821		\$124,072	\$354,893	36%	49%	12%	\$128,919	\$172,477	\$43,558
(1)	P-3175	2,065	16	\$77.70	\$160,463		\$86,253	\$246,716	73%	100%	27%	\$180,878	\$246,716	\$65,838
(1)	P-3241	495	16	\$77.70	\$38,458		\$20,672	\$59,130	45%	45%	0%	\$26,669	\$26,877	\$208
*	Subtotal:	8,919			\$692,945	4.5%	372,475	\$1,065,420				\$518,623	\$733,700	\$215,077

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
EXISTING - WATER LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
									2018	2028	During Fee Period	2018	2028	During Fee Period
(18) - Arthur's Lane Bridge at Timber Creek														
This project consists of an 8-inch line around Hebron Station Circle and 12-inch line along Union Station Parkway														
(1)	P-2637	1,622	8	\$55.24	\$89,582		\$48,152	\$137,734	100%	100%	0%	\$137,734	\$137,734	\$0
(1)	P-2639	334	12	\$55.24	\$18,429		\$9,906	\$28,335	100%	100%	0%	\$28,335	\$28,335	\$0
(1)	P-2640	339	12	\$55.24	\$18,742		\$10,074	\$28,816	45%	100%	55%	\$12,940	\$28,816	\$15,876
*	Subtotal:	2,294	2011		\$126,753	4.5%	68,132	\$194,885				\$179,009	\$194,885	\$15,876
(19) - SH 121 Business 24-Inch Water Line														
This project extends along SH 121 business to Huffines Boulevard. Then extends from east Huffines Boulevard along Midway road to Midway Pump Station														
(2)	P-2426	1,387	12	\$484.74	\$672,148		\$361,295	\$1,033,443	63%	68%	5%	\$654,078	\$702,044	\$47,966
(2)	P-2433	678	12	\$484.74	\$328,796		\$176,735	\$505,531	68%	74%	6%	\$344,708	\$375,052	\$30,344
(2)	P-2577	2,313	12	\$484.74	\$1,121,008		\$602,567	\$1,723,575	26%	100%	74%	\$451,350	\$1,723,575	\$1,272,225
(2)	P-2578	2,931	12	\$484.74	\$1,420,754		\$763,688	\$2,184,442	9%	44%	36%	\$189,760	\$970,863	\$781,103
(2)	P-2585	430	12	\$484.74	\$208,568		\$112,110	\$320,678	0%	44%	44%	\$0	\$141,950	\$141,950
*	Subtotal:	7,739	2011		\$3,751,274	4.5%	2,016,395	\$5,767,669				\$1,639,896	\$3,913,484	\$2,273,588
TOTAL EXISTING WATER LINES:														
	140,116				\$ 22,336,343.00		\$ 12,006,294.00	\$ 34,342,637.00				\$ 24,900,162.00	\$ 30,487,792.00	\$ 5,587,630.00

1 - City Participate in Cost Oversize
2 - City Initiated and Funded
* - Based on Cost Provided by the City

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER DISTRIBUTION IMPACT FEE STUDY
PROPOSED WATER FACILITIES**

Pump Station Improvements	Projected Year	Projected Capacity	Cost (\$)							Capacity Utilized (%)			Capacity Utilized (\$)		
			Const.	Engineering, Testing and Property Acquisition	Total Project Cost	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost \$	2018	2028	In The CRF Period	2018	2028	In The CRF Period	
Proposed Facilities															
(1) Southside GSR	25	2015	2.0 MG	\$1,310,000	\$131,000	\$1,441,000	4.5%	\$774,570	\$2,215,570	0.0%	93.3%	93.3%	\$0	\$2,067,656	\$2,067,656
(1) Midway GSR 2	26	2017	3.0 MG	\$2,325,000	\$232,500	\$2,557,500	4.5%	\$1,374,715	\$3,932,215	0.0%	93.3%	93.3%	\$0	\$3,669,695	\$3,669,695
(1) DWU Water	27		7.25 MGD	\$15,814,885	\$0	\$15,814,885	0.0%	\$0	\$15,814,885	0.0%	100.0%	100.0%	\$0	\$15,814,885	\$15,814,885
Subtotal Proposed Facilities:				\$19,449,885	\$363,500	\$19,813,385		\$2,149,285	\$21,962,670				\$0	\$21,552,236	\$21,552,236
TOTAL PROPOSED WATER FACILITIES:				\$19,449,885	\$363,500	\$19,813,385		\$2,149,285	\$21,962,670				\$0	\$21,552,236	\$21,552,236

(1) Estimated Cost

**CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
PROPOSED CIP - WATER LINES**

*Birkhoff, Hendricks Carter, L.L.P.
7/23/2018*

** Average Unit costs are based in 2017 dollars unless otherwise indicated and includes 20% for engineering and easements.

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)			
								2018	2028	During Fee Period	2018	2028	During Fee Period	
(1P) - Corporate Drive West 12-inch Distribution Line for Southern Connection														
This project will begin at Waters Ridge Drive and extends Northeast along Corporate Drive to Valley Ridge														
(2) P-2466 B	1,416	12	\$165.09	\$233,709		\$125,624	\$359,333	0%	100%	100%	\$0	\$359,333	\$359,333	
(2) P-2474	1,490	12	\$122.00	\$181,826		\$97,736	\$279,562	0%	98%	98%	\$0	\$274,941	\$274,941	
(2) P-2473	3,789	12	\$122.00	\$462,317		\$248,506	\$710,823	0%	100%	100%	\$0	\$710,823	\$710,823	
Subtotal:	6,696			\$877,852	4.5%	471,866	\$1,349,718				\$0	\$1,345,097	\$1,345,097	
(2P) - Corporate Drive East 12-inch Water Line														
This project will extend along Corporate Drive, south of Midway Pump Station														
(2) P-2306	1,959	12	\$122.00	\$239,002		\$128,469	\$367,471	0%	72%	72%	\$0	\$262,775	\$262,775	
(2) P-2475	5,508	12	\$122.00	\$672,025		\$361,229	\$1,033,254	0%	36%	36%	\$0	\$375,894	\$375,894	
(2) P-2476	1,194	12	\$122.00	\$145,706		\$78,320	\$224,026	0%	65%	65%	\$0	\$145,541	\$145,541	
(2) P-2477	1,287	12	\$122.00	\$157,038		\$84,412	\$241,450	0%	42%	42%	\$0	\$100,744	\$100,744	
(2) P-2478	389	12	\$122.00	\$47,438		\$25,499	\$72,937	0%	38%	38%	\$0	\$27,781	\$27,781	
(2) P-2479	1,497	12	\$122.00	\$182,643		\$98,175	\$280,818	0%	43%	43%	\$0	\$119,452	\$119,452	
(2) P-2486	2,670	12	\$122.00	\$325,679		\$175,060	\$500,739	0%	59%	59%	\$0	\$293,674	\$293,674	
(2) P-2487	1,281	12	\$122.00	\$156,254		\$83,990	\$240,244	0%	65%	65%	\$0	\$155,548	\$155,548	
(2) P-2489	2,933	12	\$122.00	\$357,785		\$192,318	\$550,103	0%	51%	51%	\$0	\$280,839	\$280,839	
Subtotal:	18,718			\$2,283,570	4.5%	1,227,472	\$3,511,042				\$0	\$1,762,248	\$1,762,248	
(3P) - Duncan Lane 12-inch Water line														
This project will begin at Spinks Road and extends along Duncan Lane to Round Grove Road														
(2) P-2423	3,953	12	\$122.00	\$482,211		\$259,199	\$741,410	0%	49%	49%	\$0	\$360,863	\$360,863	
Subtotal:	3,953			\$482,211	4.5%	259,199	\$741,410				\$0	\$360,863	\$360,863	
(4P) - Parallel 12-inch Waterline From Lake Park Road to Forest Park														
The project will begin at Midway Pump Station and extend north to S.H. 121.														
(2) P-2211	464	12	\$122.00	\$56,579		\$30,413	\$86,992	0%	100%	100%	\$0	\$86,992	\$86,992	
(2) P-2213	1,161	12	\$122.00	\$141,635		\$76,132	\$217,767	0%	100%	100%	\$0	\$217,767	\$217,767	
(2) P-2216	1,780	12	\$122.00	\$217,194		\$116,747	\$333,941	0%	100%	100%	\$0	\$333,941	\$333,941	
Subtotal:	3,405			\$415,408	4.5%	223,292	\$638,700				\$0	\$638,700	\$638,700	
(5P) - 12-inch New and Replacement Waterline From Southfork to Main Street														
This project will begin at Southfork and extends south along North Cowan Avenue to Main St West.														
(2) P-2267 R	408	12	\$122.00	\$49,820		\$26,779	\$76,599	0%	100%	100%	\$0	\$76,599	\$76,599	
(2) P-2268 R	680	12	\$122.00	\$82,925		\$44,574	\$127,499	0%	100%	100%	\$0	\$127,499	\$127,499	
Subtotal:	1,088			\$132,745	4.5%	71,353	\$204,098				\$0	\$204,098	\$204,098	

CITY OF LEWISVILLE, TEXAS
2018-2028 WATER SYSTEM IMPACT FEE STUDY
PROPOSED CIP - WATER LINES

Birkhoff, Hendricks Carter, L.L.P.
7/23/2018

** Average Unit costs are based in 2017 dollars unless otherwise indicated and includes 20% for engineering and easements.

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
(6P) - 12-inch Waterline Loop South of Windhaven Parkway													
This project will begin at Windhaven Parkway and extends south and loops back to Windhaven Parkway													
(2) P-3171	1,553	12	\$122.00	\$189,505		\$101,863	\$291,368	0%	100%	100%	\$0	\$291,368	\$291,368
(2) P-3172	1,577	12	\$122.00	\$192,334		\$103,384	\$295,718	0%	68%	68%	\$0	\$201,784	\$201,784
(2) P-3173	1,576	12	\$122.00	\$192,253		\$103,340	\$295,593	0%	100%	100%	\$0	\$295,593	\$295,593
(2) P-3178	2,320	12	\$122.00	\$283,001		\$152,120	\$435,121	0%	100%	100%	\$0	\$435,121	\$435,121
(2) P-3179	2,316	12	\$122.00	\$282,541		\$151,872	\$434,413	0%	100%	100%	\$0	\$434,413	\$434,413
(2) P-3180	2,193	12	\$122.00	\$267,515		\$143,795	\$411,310	0%	100%	100%	\$0	\$411,310	\$411,310
(2) P-3181	1,595	12	\$122.00	\$194,538		\$104,569	\$299,107	0%	51%	51%	\$0	\$151,513	\$151,513
Subtotal:	13,129			\$1,601,687	4.5%	860,943	\$2,462,630				\$0	\$2,221,102	\$2,221,102
(7P) - 12-inch S.H. 121 Bypass Service Road Water Line													
This project will begin west of Lake Vista Drive and extend along the eastbound service road of S.H. 121 Bypass to Mac Arthur Boulevard.													
(2) P-2600	2,050	12	\$122.00	\$250,088		\$134,428	\$384,516	0%	47%	47%	\$0	\$182,323	\$182,323
Subtotal:	2,050			\$250,088	4.5%	134,428	\$384,516				\$0	\$182,323	\$182,323
(8P) - 12-Inch Water Line From Eagle Point Road to Tower Bay Park along I-35E													
This project begins at Eagle Point Road and extends along I-35 to Tower Bay Park													
(2) P-1243 B	1,764	12	\$122.00	\$215,253		\$115,703	\$330,956	0%	73%	73%	\$0	\$241,508	\$241,508
Subtotal:	1,764			\$215,253	4.5%	115,703	\$330,956				\$0	\$241,508	\$241,508
(9P) - Hebron Parkway 12-Inch Water Line Loop													
This project begins at Union Station Parkway and extends east and north to Hebron Parkway													
(2) P-2633	709	12	\$122.00	\$86,453		\$46,470	\$132,923	0%	100%	100%	\$0	\$132,923	\$132,923
(2) P-2634 B	1,808	12	\$122.00	\$220,591		\$118,573	\$339,164	0%	68%	68%	\$0	\$230,341	\$230,341
(2) P-2635	1,976	12	\$122.00	\$241,029		\$129,559	\$370,588	0%	47%	47%	\$0	\$174,962	\$174,962
(2) P-2636	1,514	12	\$122.00	\$184,758		\$99,312	\$284,070	0%	30%	30%	\$0	\$84,887	\$84,887
Subtotal:	6,007			\$732,831	4.5%	393,914	\$1,126,745				\$0	\$623,113	\$623,113
TOTAL PROPOSED WATER LINES:													
	56,809			\$ 6,991,645		\$ 3,758,170	\$ 10,749,815				\$ -	\$ 7,579,052	\$ 7,579,052

- (1) - City Participate in Cost Oversize
- (2) - City Initiated and Funded
- B - Bore Across State Highway or Interstate
- P - Parallel Water Line
- * - Based on Actual Bid Price
- R- Replacement



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

**WATER AND WASTEWATER
FIVE YEAR IMPACT FEE REVIEW**

APPENDIX "B"

**WASTEWATER COLLECTION SYSTEM
IMPACT FEE DATA**

**LIFT STATION
WASTEWATER TREATMENT PLANT
FORCE MAINS
COLLECTION LINES**

**CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER FACILITIES**

Pump Station Improvements	Year Const.	Projected Capacity	Cost (\$)					Capacity Utilized (%)			Capacity Utilized (\$)			
			Const.	Engineering	Total Project Cost	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost \$	2018	2028	In The CRF Period	2018	2028	In The CRF Period
Existing Lift Station Facilities														
(2) Prairie Creek	1976	9.1 MGD	\$800,000	\$80,000	\$880,000	4.5%	\$473,020	\$1,353,020	76%	89%	13%	\$1,024,294	\$1,200,972	\$176,678
(2) Timber Creek	1976	6.0 MGD	\$1,000,000	\$100,000	\$1,100,000	4.5%	\$591,275	\$1,691,275	100%	100%	0%	\$1,691,275	\$1,691,275	\$0
(2) Timber Creek Interim Improvements	1995	9.0 MGD	\$150,300	\$15,030	\$165,330	4.5%	\$88,869	\$254,199	100%	100%	0%	\$254,199	\$254,199	\$0
(3) Timber Creek Phase I Improvements	1996	23.2 MGD	\$1,683,673	\$168,367	\$1,852,040	4.5%	\$995,514	\$2,847,554	100%	100%	0%	\$2,847,554	\$2,847,554	\$0
(3) Timber Creek 36" Force Main	1997	54.1 MGD	\$1,960,064	\$196,006	\$2,156,070	4.5%	\$1,158,937	\$3,315,007	75%	75%	0%	\$2,493,430	\$2,488,937	\$0
(3) Whippoorwill	1985	11.7 MGD	\$1,096,973	\$109,697	\$1,206,670	4.5%	\$648,613	\$1,855,283	97%	99%	2%	\$1,799,068	\$1,836,545	\$37,477
(4) Whippoorwill Force Main	1986	7.0 MGD	\$292,622	\$29,262	\$321,884	4.5%	\$173,020	\$494,904	97%	99%	2%	\$479,908	\$489,905	\$9,997
(3) Prairie Creek Pump Station Improvements	2004	18.6 MGD	\$579,658	\$57,966	\$637,624	4.5%	\$342,737	\$980,361	76%	89%	13%	\$742,175	\$870,191	\$128,016
(3) Timber Creek Replacement	2012	26.0 MGD	\$9,707,709	\$464,052	\$10,171,761	4.5%	\$5,467,554	\$15,639,315	53%	68%	16%	\$8,226,280	\$10,650,374	\$2,424,094
Subtotal Existing Lift Station Facilities:			\$17,270,999	\$1,220,381			\$9,939,539	\$28,430,918				\$19,558,183	\$22,329,952	\$2,776,262
Existing Wastewater Treatment Facilities														
(1) Waste Water Treatment Plant	1976	6.0 MGD	\$2,200,000	\$330,000	\$2,530,000	4.5%	\$1,359,933	\$3,889,933	100%	100%	0%	\$3,889,933	\$3,889,933	\$0
(3) Filter Pump Station Addition	1984		\$21,932	\$3,290	\$25,222	4.5%	\$13,557	\$38,779	100%	100%	0%	\$38,779	\$38,779	\$0
(3) Aeration System Improvements	1985		\$227,476	\$34,121	\$261,597	4.5%	\$140,614	\$402,211	100%	100%	0%	\$402,211	\$402,211	\$0
(3) WWTP Expansion Phase I	1986	12.0 MGD	\$7,485,785	\$1,122,868	\$8,608,653	4.5%	\$4,627,348	\$13,236,001	100%	100%	0%	\$13,236,001	\$13,236,001	\$0
(3) Dechlorination	1992		\$404,567	\$60,685	\$465,252	4.5%	\$250,084	\$715,336	100%	100%	0%	\$715,336	\$715,336	\$0
(2) Digester Project	1993		\$1,229,295	\$184,394	\$1,413,689	4.5%	\$759,890	\$2,173,579	100%	100%	0%	\$2,173,579	\$2,173,579	\$0
(2) Telemetry Project	1993		\$243,747	\$36,562	\$280,309	4.5%	\$150,673	\$430,982	100%	100%	0%	\$430,982	\$430,982	\$0
(2) WWTP & Pump Station Rehab	1996		\$3,080,550	\$462,083	\$3,542,633	4.5%	\$1,904,246	\$5,446,879	100%	100%	0%	\$5,446,879	\$5,446,879	\$0
(2) WWTP Upgrade	1996		\$2,800,500	\$420,075	\$3,220,575	4.5%	\$1,731,133	\$4,951,708	100%	100%	0%	\$4,951,708	\$4,951,708	\$0
(4) WWTP Expansion Phase II	2006	12.0 MGD	\$6,023,660	\$903,549	\$6,927,209	4.5%	\$3,723,533	\$10,650,742	97%	100%	3%	\$10,299,268	\$10,650,742	\$351,474
Subtotal Existing Wastewater Treatment Facilities:			\$23,717,512	\$3,557,627			\$14,661,011	\$41,936,150				\$41,584,676	\$41,936,150	\$351,474
TOTAL EXISTING WASTEWATER FACILITIES:			\$40,988,511	\$4,778,008			\$24,600,550	\$70,367,068				\$61,142,859	\$64,266,102	\$3,127,736

- (1) Opinion of Probable Cost
- (2) Cost Obtained from the City of Lewisville
- (3) Cost Obtained from Final Pay Request
- (4) Cost from Bid Tabulation

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(%) Utilized Capacity			(\$) Utilized Capacity		
								2018	2028	During Fee Period	2018	2028	During Fee Period
1 - Prairie Creek 21" Trunk Main To WWTP													
1001	608	21	\$71.12	\$43,267		\$23,257	\$66,524	75%	89%	13%	\$50,144	\$58,902	\$8,758
1004	681	21	\$71.12	\$48,444		\$26,040	\$74,484	75%	89%	13%	\$56,225	\$66,003	\$9,778
1005	808	21	\$71.12	\$57,481		\$30,897	\$88,378	76%	89%	13%	\$66,833	\$78,401	\$11,568
1008	567	21	\$71.12	\$40,298		\$21,661	\$61,959	76%	89%	13%	\$46,939	\$55,010	\$8,071
1009	15	21	\$71.12	\$1,068		\$574	\$1,642	76%	89%	13%	\$1,246	\$1,459	\$213
Subtotal:	2,679			\$190,558	4.5%	\$102,429	\$292,987				\$221,387	\$259,775	\$38,388
2 - Prairie Creek 42" Parallel Trunk Main To WWTP													
1000	157	42	\$176.26	\$27,735		\$14,908	\$42,643	76%	89%	13%	\$32,283	\$37,851	\$5,568
1002	607	42	\$176.26	\$106,930		\$57,477	\$164,407	76%	89%	13%	\$124,601	\$145,999	\$21,398
1003	685	42	\$176.26	\$120,755		\$64,909	\$185,664	76%	89%	13%	\$140,775	\$164,909	\$24,134
1006	819	42	\$176.26	\$144,341		\$77,587	\$221,928	76%	89%	13%	\$168,334	\$197,161	\$28,827
1007	570	42	\$176.26	\$100,535		\$54,040	\$154,575	76%	89%	13%	\$117,300	\$137,363	\$20,063
Subtotal:	2,838			\$500,296	4.5%	\$268,921	\$769,217				\$583,293	\$683,283	\$99,990
3 - Prairie Creek East Trunk Main To Prairie Creek North And West													
2000	950	27	\$81.12	\$77,051		\$41,417	\$118,468	100%	100%	0%	\$118,468	\$118,468	\$0
2001	685	27	\$81.12	\$55,535		\$29,851	\$85,386	100%	100%	0%	\$85,386	\$85,386	\$0
2002	111	30	\$81.12	\$9,004		\$4,840	\$13,844	100%	100%	0%	\$13,844	\$13,844	\$0
2003	965	27	\$81.12	\$78,266		\$42,070	\$120,336	100%	100%	0%	\$120,336	\$120,336	\$0
2004	949	27	\$81.12	\$76,959		\$41,367	\$118,326	100%	100%	0%	\$118,326	\$118,326	\$0
2005	748	24	\$81.12	\$60,640		\$32,595	\$93,235	100%	100%	0%	\$93,235	\$93,235	\$0
2006	192	24	\$81.12	\$15,535		\$8,350	\$23,885	100%	100%	0%	\$23,885	\$23,885	\$0
2007	321	24	\$81.12	\$26,030		\$13,992	\$40,022	100%	100%	0%	\$40,022	\$40,022	\$0
2008	395	24	\$81.12	\$32,022		\$17,213	\$49,235	100%	100%	0%	\$49,235	\$49,235	\$0
2009	376	24	\$81.12	\$30,542		\$16,417	\$46,959	100%	100%	0%	\$46,959	\$46,959	\$0
2010	235	24	\$81.12	\$19,039		\$10,234	\$29,273	100%	100%	0%	\$29,273	\$29,273	\$0
2011	436	24	\$81.12	\$35,346		\$18,999	\$54,345	100%	100%	0%	\$54,345	\$54,345	\$0
2012	279	24	\$81.12	\$22,657		\$12,179	\$34,836	100%	100%	0%	\$34,836	\$34,836	\$0
2013	205	24	\$81.12	\$16,665		\$8,958	\$25,623	100%	100%	0%	\$25,623	\$25,623	\$0
2014	13	24	\$81.12	\$1,061		\$570	\$1,631	100%	100%	0%	\$1,631	\$1,631	\$0
2015	146	24	\$81.12	\$11,864		\$6,377	\$18,241	100%	100%	0%	\$18,241	\$18,241	\$0
2017	866	24	\$81.12	\$70,236		\$37,753	\$107,989	100%	100%	0%	\$107,989	\$107,989	\$0
Subtotal:	7,870			\$638,452	4.5%	\$343,182	\$981,634				\$981,634	\$981,634	\$0

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
4 - Prairie Creek East Trunk Main To Lakeside													
3000	141	12	\$34.39	\$4,854		\$2,609	\$7,463	94%	100%	6%	\$7,035	\$7,457	\$422
3001	446	12	\$34.39	\$15,342		\$8,247	\$23,589	94%	100%	6%	\$22,251	\$23,589	\$1,338
3002	513	12	\$34.39	\$17,631		\$9,477	\$27,108	94%	100%	6%	\$25,585	\$27,108	\$1,523
3003	733	12	\$34.39	\$25,196		\$13,543	\$38,739	94%	100%	6%	\$36,533	\$38,706	\$2,173
3004	351	12	\$34.39	\$12,082		\$6,494	\$18,576	94%	100%	6%	\$17,502	\$18,576	\$1,074
3005	769	12	\$34.39	\$26,454		\$14,220	\$40,674	94%	100%	6%	\$38,324	\$40,674	\$2,350
3006	391	10	\$34.39	\$13,446		\$7,228	\$20,674	94%	100%	6%	\$19,461	\$20,674	\$1,213
3007	127	10	\$34.39	\$4,382		\$2,355	\$6,737	94%	100%	6%	\$6,330	\$6,731	\$401
Subtotal:	3,472			\$119,387	4.5%	\$64,173	\$183,560				\$173,021	\$183,515	\$10,494
5 - Prairie Creek West Trunk Main													
5000	111	24	\$64.09	\$7,123		\$3,829	\$10,952	99%	100%	1%	\$10,795	\$10,933	\$138
5001	191	24	\$64.09	\$12,274		\$6,598	\$18,872	99%	100%	1%	\$18,601	\$18,839	\$238
5002	294	24	\$64.09	\$18,827		\$10,120	\$28,947	99%	100%	1%	\$28,532	\$28,891	\$359
5003	203	24	\$64.09	\$13,040		\$7,009	\$20,049	99%	100%	1%	\$19,761	\$20,010	\$249
5006	271	24	\$64.09	\$17,360		\$9,331	\$26,691	99%	100%	1%	\$26,307	\$26,644	\$337
5007	478	24	\$64.09	\$30,631		\$16,465	\$47,096	99%	100%	1%	\$46,411	\$47,005	\$594
5008	355	24	\$64.09	\$22,730		\$12,218	\$34,948	99%	100%	1%	\$34,445	\$34,880	\$435
5009	665	21	\$64.09	\$42,626		\$22,912	\$65,538	99%	100%	1%	\$64,631	\$65,419	\$788
5010	138	21	\$64.09	\$8,813		\$4,737	\$13,550	99%	100%	1%	\$13,370	\$13,525	\$155
5011	139	21	\$64.09	\$8,903		\$4,786	\$13,689	99%	100%	1%	\$13,516	\$13,666	\$150
5012	297	21	\$64.09	\$19,066		\$10,248	\$29,314	99%	100%	1%	\$28,961	\$29,263	\$302
5013	160	21	\$64.09	\$10,285		\$5,528	\$15,813	99%	100%	1%	\$15,630	\$15,785	\$155
5014	167	21	\$64.09	\$10,723		\$5,764	\$16,487	99%	100%	1%	\$16,307	\$16,457	\$150
5015	265	21	\$64.09	\$17,001		\$9,138	\$26,139	99%	100%	1%	\$25,877	\$26,095	\$218
5016	689	21	\$64.09	\$44,173		\$23,744	\$67,917	99%	100%	1%	\$67,287	\$67,801	\$514
5017	40	21	\$64.09	\$2,544		\$1,367	\$3,911	99%	100%	1%	\$3,877	\$3,904	\$27
5018	607	21	\$64.09	\$38,879		\$20,898	\$59,777	99%	100%	1%	\$59,313	\$59,671	\$358
5019	816	21	\$64.09	\$52,268		\$28,095	\$80,363	99%	100%	1%	\$79,729	\$80,218	\$489
5020	115	21	\$64.09	\$7,395		\$3,975	\$11,370	99%	100%	1%	\$11,279	\$11,349	\$70
5021	61	21	\$64.09	\$3,934		\$2,115	\$6,049	99%	100%	1%	\$6,000	\$6,038	\$38
5023	112	12	\$64.09	\$7,190		\$3,865	\$11,055	100%	100%	0%	\$11,055	\$11,055	\$0
5024	465	12	\$64.09	\$29,804		\$16,020	\$45,824	100%	100%	0%	\$45,824	\$45,824	\$0
5025	642	12	\$64.09	\$41,172		\$22,131	\$63,303	100%	100%	0%	\$63,303	\$63,303	\$0
5026	125	12	\$64.09	\$8,017		\$4,309	\$12,326	100%	100%	0%	\$12,326	\$12,326	\$0
5027	51	12	\$64.09	\$3,289		\$1,768	\$5,057	100%	100%	0%	\$5,057	\$5,057	\$0
5028	329	12	\$64.09	\$21,107		\$11,345	\$32,452	100%	100%	0%	\$32,452	\$32,452	\$0
Subtotal:	7,788			\$499,174	4.5%	\$268,315	\$767,489				\$760,646	\$766,410	\$5,764

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
6 - Prairie Creek North Trunk Main													
4000	499	24	\$70.94	\$35,405		\$19,031	\$54,436	42%	78%	36%	\$22,728	\$42,212	\$19,484
4001	150	24	\$70.94	\$10,630		\$5,714	\$16,344	42%	78%	36%	\$6,816	\$12,667	\$5,851
4002	346	24	\$70.94	\$24,511		\$13,175	\$37,686	42%	78%	36%	\$15,693	\$29,207	\$13,514
4003	196	24	\$70.94	\$13,926		\$7,486	\$21,412	42%	77%	36%	\$8,908	\$16,589	\$7,681
4004	124	24	\$70.94	\$8,762		\$4,710	\$13,472	42%	77%	36%	\$5,596	\$10,433	\$4,837
4005	125	24	\$70.94	\$8,889		\$4,778	\$13,667	41%	77%	36%	\$5,671	\$10,581	\$4,910
4006	664	24	\$70.94	\$47,089		\$25,311	\$72,400	41%	77%	36%	\$30,021	\$56,029	\$26,008
4007	150	24	\$70.94	\$10,660		\$5,730	\$16,390	41%	77%	36%	\$6,789	\$12,680	\$5,891
4008	629	24	\$70.94	\$44,631		\$23,990	\$68,621	41%	77%	36%	\$28,403	\$53,083	\$24,680
4009	367	24	\$70.94	\$26,006		\$13,979	\$39,985	41%	77%	36%	\$16,534	\$30,930	\$14,396
4010	349	24	\$70.94	\$24,789		\$13,325	\$38,114	37%	76%	39%	\$14,177	\$28,860	\$14,683
4011	625	24	\$70.94	\$44,313		\$23,819	\$68,132	36%	75%	39%	\$24,672	\$51,336	\$26,664
4012	709	21	\$70.94	\$50,316		\$27,046	\$77,362	36%	76%	39%	\$28,015	\$58,422	\$30,407
4013	59	21	\$70.94	\$4,199		\$2,257	\$6,456	36%	76%	39%	\$2,338	\$4,887	\$2,549
4014	465	21	\$70.94	\$32,991		\$17,733	\$50,724	36%	76%	40%	\$18,384	\$38,498	\$20,114
4015	497	21	\$70.94	\$35,250		\$18,948	\$54,198	36%	76%	40%	\$19,649	\$41,225	\$21,576
4016	408	21	\$70.94	\$28,961		\$15,567	\$44,528	36%	76%	40%	\$16,161	\$33,974	\$17,813
4017	497	21	\$70.94	\$35,270		\$18,958	\$54,228	36%	77%	40%	\$19,688	\$41,492	\$21,804
4018	206	21	\$70.94	\$14,648		\$7,874	\$22,522	57%	83%	26%	\$12,845	\$18,746	\$5,901
4019	570	21	\$70.94	\$40,469		\$21,753	\$62,222	59%	84%	26%	\$36,453	\$52,419	\$15,966
4020	987	21	\$70.94	\$70,003		\$37,628	\$107,631	60%	85%	25%	\$64,861	\$91,862	\$27,001
4021	102	21	\$70.94	\$7,234		\$3,888	\$11,122	62%	87%	24%	\$6,933	\$9,642	\$2,709
4022	400	21	\$70.94	\$28,365		\$15,247	\$43,612	63%	88%	24%	\$27,623	\$38,169	\$10,546
4023	1,002	21	\$70.94	\$71,066		\$38,200	\$109,266	64%	88%	24%	\$70,408	\$96,700	\$26,292
4024	91	21	\$70.94	\$6,482		\$3,484	\$9,966	66%	89%	24%	\$6,542	\$8,918	\$2,376
4025	145	21	\$70.94	\$10,291		\$5,532	\$15,823	66%	90%	24%	\$10,460	\$14,217	\$3,757
4026	146	21	\$70.94	\$10,387		\$5,583	\$15,970	67%	90%	24%	\$10,647	\$14,424	\$3,777
4027	805	21	\$70.94	\$57,090		\$30,687	\$87,777	67%	91%	24%	\$59,044	\$79,805	\$20,761
4028	74	24	\$70.94	\$5,276		\$2,836	\$8,112	42%	77%	36%	\$3,372	\$6,283	\$2,911
4029	18	21	\$70.94	\$1,295		\$696	\$1,991	68%	91%	24%	\$1,351	\$1,819	\$468
Subtotal:	11,407			\$809,204	4.5%	\$434,965	\$1,244,169				\$600,782	\$1,006,109	\$405,327

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
7 - Whipoorwill Trunk Main													
4700	92	21	\$429.73	\$39,510		\$21,238	\$60,748	69%	92%	23%	\$41,816	\$55,903	\$14,087
4701	173	21	\$429.73	\$74,337		\$39,958	\$114,295	69%	92%	23%	\$79,127	\$105,379	\$26,252
4702	310	21	\$429.73	\$133,270		\$71,636	\$204,906	70%	92%	23%	\$142,792	\$189,320	\$46,528
4703	165	21	\$429.73	\$70,827		\$38,071	\$108,898	76%	94%	18%	\$82,664	\$102,292	\$19,628
4704	381	18	\$429.73	\$163,930		\$88,116	\$252,046	76%	94%	18%	\$191,697	\$236,959	\$45,262
4705	326	18	\$429.73	\$139,975		\$75,240	\$215,215	76%	94%	18%	\$164,395	\$202,510	\$38,115
4706	399	18	\$429.73	\$171,518		\$92,195	\$263,713	77%	94%	17%	\$202,340	\$248,370	\$46,030
4707	100	18	\$429.73	\$43,120		\$23,178	\$66,298	77%	94%	17%	\$51,008	\$62,384	\$11,376
4708	293	18	\$429.73	\$125,718		\$67,576	\$193,294	77%	94%	17%	\$149,413	\$182,414	\$33,001
4710	190	18	\$429.73	\$81,825		\$43,983	\$125,808	78%	94%	17%	\$97,717	\$118,845	\$21,128
4711	233	18	\$429.73	\$100,163		\$53,840	\$154,003	78%	95%	17%	\$120,212	\$145,630	\$25,418
4712	41	18	\$429.73	\$17,597		\$9,459	\$27,056	75%	94%	19%	\$20,260	\$25,389	\$5,129
Subtotal:	2,704			\$1,161,790	4.5%	\$624,490	\$1,786,280				\$1,343,441	\$1,675,395	\$331,954
8 - Railroad Street Trunk Main													
1010	237	27	\$214.80	\$50,936		\$27,379	\$78,315	81%	87%	7%	\$63,297	\$68,478	\$5,181
6000	273	27	\$214.80	\$58,689		\$31,547	\$90,236	81%	88%	7%	\$73,429	\$79,327	\$5,898
6001	237	27	\$214.80	\$50,980		\$27,403	\$78,383	82%	88%	7%	\$64,127	\$69,235	\$5,108
6002	161	27	\$214.80	\$34,586		\$18,591	\$53,177	82%	89%	6%	\$43,750	\$47,197	\$3,447
6003	43	27	\$214.80	\$9,258		\$4,976	\$14,234	85%	91%	6%	\$12,067	\$12,928	\$861
6004	355	27	\$214.80	\$76,226		\$40,973	\$117,199	85%	91%	6%	\$100,044	\$107,103	\$7,059
6005	348	27	\$214.80	\$74,646		\$40,124	\$114,770	86%	92%	6%	\$98,678	\$105,585	\$6,907
6006	95	27	\$214.80	\$20,494		\$11,016	\$31,510	87%	93%	6%	\$27,291	\$29,172	\$1,881
6007	274	27	\$214.80	\$58,853		\$31,635	\$90,488	87%	93%	6%	\$78,935	\$84,309	\$5,374
6008	106	24	\$214.80	\$22,773		\$12,241	\$35,014	96%	98%	2%	\$33,514	\$34,357	\$843
6009	83	24	\$214.80	\$17,882		\$9,612	\$27,494	97%	99%	2%	\$26,566	\$27,205	\$639
6010	392	24	\$214.80	\$84,239		\$45,280	\$129,519	97%	99%	2%	\$125,142	\$128,158	\$3,016
6011	294	24	\$214.80	\$63,088		\$33,911	\$96,999	97%	99%	2%	\$93,744	\$95,978	\$2,234
6012	63	24	\$214.80	\$13,511		\$7,262	\$20,773	97%	99%	2%	\$20,075	\$20,548	\$473
6013	162	24	\$214.80	\$34,812		\$18,712	\$53,524	97%	99%	2%	\$51,753	\$52,959	\$1,206
6014	205	24	\$214.80	\$43,946		\$23,622	\$67,568	97%	99%	2%	\$65,329	\$66,854	\$1,525
6015	65	24	\$214.80	\$13,961		\$7,504	\$21,465	97%	99%	2%	\$20,759	\$21,238	\$479
6016	423	24	\$214.80	\$90,919		\$48,871	\$139,790	97%	99%	2%	\$135,184	\$138,308	\$3,124
6017	315	24	\$214.80	\$67,674		\$36,376	\$104,050	97%	99%	2%	\$101,014	\$103,328	\$2,314
6060	19	27	\$214.80	\$4,004		\$2,152	\$6,156	81%	87%	7%	\$4,982	\$5,385	\$403
Subtotal:	4,150			\$891,477	4.5%	\$479,187	\$1,370,664				\$1,239,680	\$1,297,652	\$57,972

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
9 - Corporate Trunk Main													
6018	360	18	\$94.15	\$33,849		\$18,195	\$52,044	97%	99%	2%	\$50,521	\$51,683	\$1,162
6019	224	18	\$94.15	\$21,045		\$11,312	\$32,357	97%	99%	2%	\$31,417	\$32,141	\$724
6020	145	18	\$94.15	\$13,635		\$7,329	\$20,964	97%	99%	2%	\$20,353	\$20,824	\$471
6021	225	18	\$94.15	\$21,189		\$11,390	\$32,579	97%	99%	2%	\$31,626	\$32,351	\$725
6022	362	18	\$94.15	\$34,106		\$18,333	\$52,439	97%	99%	2%	\$50,900	\$52,089	\$1,189
6023	348	18	\$94.15	\$32,796		\$17,629	\$50,425	97%	99%	2%	\$48,956	\$50,107	\$1,151
6024	223	18	\$94.15	\$20,993		\$11,284	\$32,277	97%	99%	2%	\$31,333	\$32,086	\$753
6025	275	18	\$94.15	\$25,928		\$13,937	\$39,865	97%	99%	2%	\$38,695	\$39,615	\$920
6026	280	18	\$94.15	\$26,335		\$14,156	\$40,491	97%	99%	2%	\$39,297	\$40,255	\$958
6027	137	18	\$94.15	\$12,916		\$6,943	\$19,859	97%	99%	2%	\$19,279	\$19,754	\$475
6028	641	12	\$94.15	\$60,385		\$32,458	\$92,843	97%	99%	2%	\$90,101	\$92,370	\$2,269
6029	102	12	\$94.15	\$9,561		\$5,139	\$14,700	97%	100%	3%	\$14,263	\$14,635	\$372
6030	253	12	\$94.15	\$23,830		\$12,809	\$36,639	97%	100%	3%	\$35,563	\$36,507	\$944
6031	204	12	\$94.15	\$19,229		\$10,336	\$29,565	97%	100%	3%	\$28,690	\$29,487	\$797
6032	40	12	\$94.15	\$3,751		\$2,016	\$5,767	97%	100%	3%	\$5,597	\$5,752	\$155
6033	873	12	\$94.15	\$82,176		\$44,171	\$126,347	97%	100%	3%	\$122,720	\$126,088	\$3,368
6034	897	12	\$94.15	\$84,419		\$45,377	\$129,796	97%	100%	3%	\$126,088	\$129,525	\$3,437
6035	306	12	\$94.15	\$28,799		\$15,480	\$44,279	97%	100%	3%	\$43,051	\$44,216	\$1,165
6036	527	12	\$94.15	\$49,591		\$26,656	\$76,247	97%	100%	3%	\$74,144	\$76,136	\$1,992
6037	353	12	\$94.15	\$33,255		\$17,875	\$51,130	97%	100%	3%	\$49,766	\$51,092	\$1,326
6038	179	12	\$94.15	\$16,822		\$9,042	\$25,864	97%	100%	3%	\$25,179	\$25,844	\$665
6039	174	12	\$94.15	\$16,392		\$8,811	\$25,203	97%	100%	3%	\$24,559	\$25,203	\$644
6040	309	12	\$94.15	\$29,132		\$15,659	\$44,791	97%	100%	3%	\$43,657	\$44,791	\$1,134
6041	162	12	\$94.15	\$15,233		\$8,188	\$23,421	97%	100%	3%	\$22,787	\$23,421	\$634
6042	329	12	\$94.15	\$31,009		\$16,668	\$47,677	97%	100%	3%	\$46,290	\$47,677	\$1,387
6043	211	12	\$94.15	\$19,860		\$10,675	\$30,535	97%	100%	3%	\$29,575	\$30,535	\$960
6044	144	12	\$94.15	\$13,604		\$7,312	\$20,916	97%	100%	3%	\$20,201	\$20,916	\$715
6045	99	12	\$94.15	\$9,312		\$5,005	\$14,317	96%	100%	4%	\$13,781	\$14,317	\$536
6046	14	12	\$94.15	\$1,275		\$685	\$1,960	96%	100%	4%	\$1,878	\$1,960	\$82
6047	106	12	\$94.15	\$9,955		\$5,351	\$15,306	95%	100%	5%	\$14,584	\$15,306	\$722
6061	26	18	\$94.15	\$2,437		\$1,310	\$3,747	97%	100%	2%	\$3,637	\$3,729	\$92
Subtotal:	8,527			\$802,819	4.5%	\$431,531	\$1,234,350				\$1,198,488	\$1,230,412	\$31,924

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
10 - Timber Creek East													
7000	44	42	\$150.53	\$6,556		\$3,524	\$10,080	100%	100%	0%	\$10,080	\$10,080	\$0
7001	124	42	\$150.53	\$18,726		\$10,066	\$28,792	96%	100%	4%	\$27,670	\$28,700	\$1,030
7011	715	42	\$150.53	\$107,578		\$57,826	\$165,404	96%	100%	4%	\$158,426	\$164,757	\$6,331
7012	728	42	\$150.53	\$109,663		\$58,946	\$168,609	96%	100%	4%	\$161,640	\$167,938	\$6,298
7013	542	42	\$150.53	\$81,584		\$43,853	\$125,437	96%	100%	4%	\$120,365	\$124,937	\$4,572
7014	205	42	\$150.53	\$30,814		\$16,563	\$47,377	97%	100%	3%	\$45,724	\$47,263	\$1,539
7015	306	42	\$150.53	\$46,113		\$24,787	\$70,900	97%	100%	3%	\$68,493	\$70,730	\$2,237
7016	565	42	\$150.53	\$85,055		\$45,719	\$130,774	98%	100%	2%	\$127,870	\$130,465	\$2,595
7017	706	42	\$150.53	\$106,233		\$57,103	\$163,336	98%	100%	2%	\$159,875	\$162,949	\$3,074
7018	342	42	\$150.53	\$51,418		\$27,638	\$79,056	98%	100%	2%	\$77,816	\$79,004	\$1,188
7019	771	42	\$150.53	\$116,100		\$62,406	\$178,506	98%	100%	2%	\$175,711	\$178,399	\$2,688
7020	522	42	\$150.53	\$78,626		\$42,263	\$120,889	98%	100%	1%	\$119,070	\$120,814	\$1,744
7021	257	36	\$150.53	\$38,677		\$20,790	\$59,467	99%	100%	1%	\$58,605	\$59,434	\$829
7022	358	36	\$150.53	\$53,928		\$28,988	\$82,916	99%	100%	1%	\$81,762	\$82,869	\$1,107
7023	398	36	\$150.53	\$59,859		\$32,176	\$92,035	99%	100%	1%	\$90,808	\$91,989	\$1,181
7024	804	36	\$150.53	\$121,009		\$65,045	\$186,054	99%	100%	1%	\$183,698	\$185,973	\$2,275
7025	526	36	\$150.53	\$79,235		\$42,591	\$121,826	99%	100%	1%	\$120,351	\$121,772	\$1,421
7026	274	36	\$150.53	\$41,312		\$22,206	\$63,518	99%	100%	1%	\$62,794	\$63,494	\$700
7027	232	36	\$150.53	\$34,849		\$18,732	\$53,581	99%	100%	1%	\$53,002	\$53,561	\$559
7028	327	36	\$150.53	\$49,254		\$26,475	\$75,729	99%	100%	1%	\$74,968	\$75,706	\$738
7029	258	36	\$150.53	\$38,809		\$20,861	\$59,670	99%	100%	1%	\$59,112	\$59,656	\$544
7030	284	36	\$150.53	\$42,740		\$22,974	\$65,714	99%	100%	1%	\$65,148	\$65,698	\$550
7031	749	36	\$150.53	\$112,717		\$60,588	\$173,305	99%	100%	1%	\$171,955	\$173,277	\$1,322
7032	147	36	\$150.53	\$22,165		\$11,914	\$34,079	99%	100%	1%	\$33,840	\$34,076	\$236
7033	394	36	\$150.53	\$59,337		\$31,895	\$91,232	99%	100%	1%	\$90,666	\$91,224	\$558
7034	974	36	\$150.53	\$146,554		\$78,776	\$225,330	99%	100%	1%	\$224,118	\$225,330	\$1,212
7036	8	42	\$150.53	\$1,131		\$608	\$1,739	96%	100%	4%	\$1,672	\$1,734	\$62
Subtotal:	11,559			\$1,740,042	4.5%	\$935,313	\$2,675,355				\$2,625,239	\$2,671,829	\$46,590

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
11 - Timber Creek East To Lakepointe Lift Station													
7037	81	18	\$64.04	\$5,211		\$2,801	\$8,012	64%	100%	36%	\$5,099	\$8,012	\$2,913
7101	57	18	\$64.04	\$3,652		\$1,963	\$5,615	64%	100%	36%	\$3,587	\$5,604	\$2,017
7102	357	18	\$64.04	\$22,883		\$12,300	\$35,183	64%	100%	36%	\$22,478	\$35,108	\$12,630
7103	344	18	\$64.04	\$22,020		\$11,836	\$33,856	64%	100%	36%	\$21,632	\$33,776	\$12,144
7104	317	18	\$64.04	\$20,331		\$10,928	\$31,259	64%	100%	36%	\$19,922	\$31,176	\$11,254
7105	451	18	\$64.04	\$28,913		\$15,541	\$44,454	64%	100%	36%	\$28,326	\$44,318	\$15,992
7106	442	18	\$64.04	\$28,296		\$15,210	\$43,506	64%	100%	36%	\$27,714	\$43,351	\$15,637
7107	500	18	\$64.04	\$32,025		\$17,214	\$49,239	64%	100%	36%	\$31,353	\$49,029	\$17,676
7108	349	18	\$64.04	\$22,340		\$12,008	\$34,348	64%	100%	36%	\$22,081	\$34,348	\$12,267
7109	438	18	\$64.04	\$28,048		\$15,076	\$43,124	64%	99%	35%	\$27,526	\$42,665	\$15,139
7110	455	18	\$64.04	\$29,169		\$15,679	\$44,848	64%	100%	36%	\$28,626	\$44,848	\$16,222
Subtotal:	3,793			\$242,888	4.5%	\$130,556	\$373,444				\$238,344	\$372,235	\$133,891

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
12 - Timber Creek West													
7699	772	27	\$79.35	\$61,242		\$32,919	\$94,161	100%	100%	0%	\$93,894	\$94,161	\$267
7700	229	27	\$79.35	\$18,165		\$9,764	\$27,929	100%	100%	0%	\$27,802	\$27,929	\$127
7702	542	27	\$79.35	\$42,998		\$23,112	\$66,110	100%	100%	0%	\$65,812	\$66,110	\$298
7703	185	27	\$79.35	\$14,655		\$7,877	\$22,532	100%	100%	0%	\$22,432	\$22,532	\$100
7704	289	27	\$79.35	\$22,934		\$12,328	\$35,262	100%	100%	0%	\$35,107	\$35,262	\$155
7705	154	27	\$79.35	\$12,211		\$6,564	\$18,775	100%	100%	0%	\$18,697	\$18,775	\$78
7708	621	27	\$79.35	\$49,252		\$26,474	\$75,726	100%	100%	0%	\$75,418	\$75,726	\$308
7709	696	27	\$79.35	\$55,238		\$29,692	\$84,930	100%	100%	0%	\$84,591	\$84,930	\$339
7710	215	27	\$79.35	\$17,070		\$9,176	\$26,246	100%	100%	0%	\$26,143	\$26,246	\$103
7712	658	27	\$79.35	\$52,219		\$28,069	\$80,288	100%	100%	0%	\$79,998	\$80,288	\$290
7713	439	27	\$79.35	\$34,850		\$18,733	\$53,583	100%	100%	0%	\$53,387	\$53,583	\$196
7714	341	27	\$79.35	\$27,094		\$14,564	\$41,658	100%	100%	0%	\$41,513	\$41,658	\$145
7715	167	27	\$79.35	\$13,247		\$7,121	\$20,368	100%	100%	0%	\$20,300	\$20,368	\$68
7716	129	27	\$79.35	\$10,270		\$5,520	\$15,790	100%	100%	0%	\$15,740	\$15,790	\$50
7717	338	27	\$79.35	\$26,853		\$14,434	\$41,287	100%	100%	0%	\$41,155	\$41,287	\$132
7718	240	27	\$79.35	\$19,013		\$10,220	\$29,233	100%	100%	0%	\$29,145	\$29,233	\$88
7719	627	27	\$79.35	\$49,763		\$26,749	\$76,512	100%	100%	0%	\$76,317	\$76,512	\$195
7720	361	27	\$79.35	\$28,609		\$15,378	\$43,987	100%	100%	0%	\$43,906	\$43,987	\$81
7721	126	27	\$79.35	\$9,999		\$5,375	\$15,374	100%	100%	0%	\$15,350	\$15,374	\$24
7722	725	27	\$79.35	\$57,495		\$30,905	\$88,400	100%	100%	0%	\$88,254	\$88,400	\$146
7723	713	27	\$79.35	\$56,597		\$30,422	\$87,019	100%	100%	0%	\$86,900	\$87,019	\$119
7724	135	27	\$79.35	\$10,712		\$5,758	\$16,470	100%	100%	0%	\$16,452	\$16,470	\$18
7725	68	27	\$79.35	\$5,376		\$2,890	\$8,266	100%	100%	0%	\$8,260	\$8,266	\$6
7726	153	27	\$79.35	\$12,172		\$6,543	\$18,715	100%	100%	0%	\$18,708	\$18,715	\$7
7727	487	21	\$79.35	\$38,638		\$20,769	\$59,407	100%	100%	0%	\$59,407	\$59,407	\$0
7728	335	21	\$79.35	\$26,595		\$14,295	\$40,890	100%	100%	0%	\$40,890	\$40,890	\$0
7729	515	21	\$79.35	\$40,845		\$21,955	\$62,800	100%	100%	0%	\$62,800	\$62,800	\$0
7730	428	21	\$79.35	\$33,945		\$18,246	\$52,191	100%	100%	0%	\$52,191	\$52,191	\$0
7731	111	21	\$79.35	\$8,774		\$4,716	\$13,490	100%	100%	0%	\$13,490	\$13,490	\$0
7732	478	21	\$79.35	\$37,955		\$20,402	\$58,357	100%	100%	0%	\$58,357	\$58,357	\$0
7733	594	21	\$79.35	\$47,152		\$25,345	\$72,497	100%	100%	0%	\$72,497	\$72,497	\$0
7734	171	21	\$79.35	\$13,552		\$7,285	\$20,837	100%	100%	0%	\$20,837	\$20,837	\$0
7735	94	21	\$79.35	\$7,472		\$4,016	\$11,488	100%	100%	0%	\$11,488	\$11,488	\$0
7736	208	21	\$79.35	\$16,482		\$8,859	\$25,341	100%	100%	0%	\$25,341	\$25,341	\$0
7737	186	21	\$79.35	\$14,773		\$7,941	\$22,714	100%	100%	0%	\$22,714	\$22,714	\$0
7738	70	21	\$79.35	\$5,569		\$2,993	\$8,562	100%	100%	0%	\$8,562	\$8,562	\$0
7739	38	12	\$79.35	\$3,032		\$1,630	\$4,662	100%	100%	0%	\$4,662	\$4,662	\$0
7740	33	12	\$79.35	\$2,588		\$1,391	\$3,979	100%	100%	0%	\$3,979	\$3,979	\$0
7741	13	12	\$79.35	\$1,002		\$539	\$1,541	100%	100%	0%	\$1,541	\$1,541	\$0
7742	624	15	\$79.35	\$49,542		\$26,630	\$76,172	100%	100%	0%	\$76,172	\$76,172	\$0
7743	222	10	\$79.35	\$17,648		\$9,486	\$27,134	100%	100%	0%	\$27,134	\$27,134	\$0
Subtotal:	13,530			\$1,073,598	4.5%	\$577,085	\$1,650,683				\$1,647,343	\$1,650,683	\$3,340

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
13 - Fox Creek South													
7499	87	21	\$61.74	\$5,385		\$2,895	\$8,280	99%	100%	1%	\$8,225	\$8,280	\$55
7500	368	21	\$61.74	\$22,720		\$12,213	\$34,933	99%	100%	1%	\$34,713	\$34,933	\$220
7501	141	21	\$61.74	\$8,720		\$4,687	\$13,407	99%	100%	1%	\$13,325	\$13,407	\$82
7502	148	21	\$61.74	\$9,151		\$4,919	\$14,070	99%	100%	1%	\$13,984	\$14,070	\$86
7503	146	21	\$61.74	\$9,041		\$4,860	\$13,901	99%	100%	1%	\$13,816	\$13,901	\$85
7504	601	21	\$61.74	\$37,095		\$19,939	\$57,034	99%	100%	1%	\$56,673	\$57,034	\$361
7505	277	21	\$61.74	\$17,113		\$9,199	\$26,312	99%	100%	1%	\$26,145	\$26,312	\$167
7506	283	21	\$61.74	\$17,470		\$9,391	\$26,861	99%	100%	1%	\$26,691	\$26,861	\$170
7507	284	21	\$61.74	\$17,554		\$9,436	\$26,990	99%	100%	1%	\$26,825	\$26,990	\$165
7508	117	21	\$61.74	\$7,224		\$3,883	\$11,107	99%	100%	1%	\$11,036	\$11,107	\$71
7509	133	21	\$61.74	\$8,182		\$4,398	\$12,580	99%	100%	1%	\$12,502	\$12,580	\$78
7510	36	21	\$61.74	\$2,216		\$1,191	\$3,407	99%	100%	1%	\$3,386	\$3,407	\$21
7511	278	21	\$61.74	\$17,145		\$9,216	\$26,361	99%	100%	1%	\$26,195	\$26,361	\$166
7512	86	21	\$61.74	\$5,313		\$2,856	\$8,169	99%	100%	1%	\$8,117	\$8,169	\$52
7513	113	21	\$61.74	\$6,997		\$3,761	\$10,758	99%	100%	1%	\$10,689	\$10,758	\$69
7514	253	21	\$61.74	\$15,649		\$8,412	\$24,061	99%	100%	1%	\$23,905	\$24,061	\$156
7515	61	21	\$61.74	\$3,757		\$2,019	\$5,776	99%	100%	1%	\$5,738	\$5,776	\$38
7516	27	21	\$61.74	\$1,695		\$911	\$2,606	99%	100%	1%	\$2,589	\$2,606	\$17
7517	750	21	\$61.74	\$46,308		\$24,892	\$71,200	99%	100%	1%	\$70,727	\$71,200	\$473
7518	313	21	\$61.74	\$19,345		\$10,398	\$29,743	99%	100%	1%	\$29,544	\$29,743	\$199
7519	148	21	\$61.74	\$9,110		\$4,897	\$14,007	99%	100%	1%	\$13,912	\$14,007	\$95
7520	242	21	\$61.74	\$14,928		\$8,024	\$22,952	99%	100%	1%	\$22,800	\$22,952	\$152
7521	114	21	\$61.74	\$7,054		\$3,792	\$10,846	99%	100%	1%	\$10,772	\$10,846	\$74
7522	237	21	\$61.74	\$14,645		\$7,872	\$22,517	99%	100%	1%	\$22,367	\$22,517	\$150
7523	208	21	\$61.74	\$12,851		\$6,908	\$19,759	99%	100%	1%	\$19,630	\$19,759	\$129
7524	139	21	\$61.74	\$8,609		\$4,628	\$13,237	99%	100%	1%	\$13,148	\$13,237	\$89
7525	147	21	\$61.74	\$9,100		\$4,891	\$13,991	99%	100%	1%	\$13,899	\$13,991	\$92
7526	279	21	\$61.74	\$17,231		\$9,262	\$26,493	99%	100%	1%	\$26,323	\$26,493	\$170
7527	659	21	\$61.74	\$40,701		\$21,878	\$62,579	99%	100%	1%	\$62,187	\$62,579	\$392
7528	188	18	\$61.74	\$11,590		\$6,230	\$17,820	100%	100%	0%	\$17,796	\$17,820	\$24
7529	439	18	\$61.74	\$27,137		\$14,587	\$41,724	100%	100%	0%	\$41,666	\$41,724	\$58
7530	347	18	\$61.74	\$21,448		\$11,529	\$32,977	100%	100%	0%	\$32,945	\$32,977	\$32
7531	375	18	\$61.74	\$23,172		\$12,455	\$35,627	100%	100%	0%	\$35,591	\$35,627	\$36
7532	919	12	\$61.74	\$56,733		\$30,495	\$87,228	100%	100%	0%	\$87,228	\$87,228	\$0
7533	119	12	\$61.74	\$7,377		\$3,965	\$11,342	100%	100%	0%	\$11,342	\$11,342	\$0
7534	133	12	\$61.74	\$8,184		\$4,399	\$12,583	100%	100%	0%	\$12,583	\$12,583	\$0
7535	667	12	\$61.74	\$41,186		\$22,138	\$63,324	100%	100%	0%	\$63,324	\$63,324	\$0
7537	67	12	\$61.74	\$4,123		\$2,216	\$6,339	100%	100%	0%	\$6,339	\$6,339	\$0
7538	66	15	\$61.74	\$4,074		\$2,190	\$6,264	100%	100%	0%	\$6,264	\$6,264	\$0
7539	67	15	\$61.74	\$4,132		\$2,221	\$6,353	100%	100%	0%	\$6,353	\$6,353	\$0
7540	82	15	\$61.74	\$5,068		\$2,724	\$7,792	100%	100%	0%	\$7,792	\$7,792	\$0
7541	122	12	\$61.74	\$7,507		\$4,035	\$11,542	100%	100%	0%	\$11,542	\$11,542	\$0
7542	37	12	\$61.74	\$2,309		\$1,241	\$3,550	100%	100%	0%	\$3,550	\$3,550	\$0

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
7543	238	12	\$61.74	\$14,690		\$7,896	\$22,586	100%	100%	0%	\$22,586	\$22,586	\$0
7544	167	12	\$61.74	\$10,306		\$5,540	\$15,846	100%	100%	0%	\$15,846	\$15,846	\$0
7545	172	12	\$61.74	\$10,601		\$5,698	\$16,299	100%	100%	0%	\$16,299	\$16,299	\$0
7546	451	12	\$61.74	\$27,830		\$14,959	\$42,789	100%	100%	0%	\$42,789	\$42,789	\$0
7547	456	12	\$61.74	\$28,145		\$15,129	\$43,274	100%	100%	0%	\$43,274	\$43,274	\$0
7548	193	12	\$61.74	\$11,936		\$6,416	\$18,352	100%	100%	0%	\$18,352	\$18,352	\$0
7549	273	12	\$61.74	\$16,842		\$9,053	\$25,895	100%	100%	0%	\$25,895	\$25,895	\$0
7550	441	12	\$61.74	\$27,257		\$14,651	\$41,908	100%	100%	0%	\$41,908	\$41,908	\$0
7551	103	12	\$61.74	\$6,346		\$3,411	\$9,757	100%	100%	0%	\$9,757	\$9,757	\$0
7552	110	8	\$61.74	\$6,769		\$3,638	\$10,407	100%	100%	0%	\$10,407	\$10,407	\$0
7553	177	8	\$61.74	\$10,910		\$5,864	\$16,774	100%	100%	0%	\$16,774	\$16,774	\$0
7554	28	8	\$61.74	\$1,699		\$913	\$2,612	100%	100%	0%	\$2,612	\$2,612	\$0
7555	178	8	\$61.74	\$10,985		\$5,905	\$16,890	100%	100%	0%	\$16,890	\$16,890	\$0
7556	281	8	\$61.74	\$17,335		\$9,318	\$26,653	100%	100%	0%	\$26,653	\$26,653	\$0
7557	463	8	\$61.74	\$28,606		\$15,376	\$43,982	100%	100%	0%	\$43,982	\$43,982	\$0
7558	427	8	\$61.74	\$26,365		\$14,172	\$40,537	100%	100%	0%	\$40,537	\$40,537	\$0
7559	159	8	\$61.74	\$9,825		\$5,281	\$15,106	100%	100%	0%	\$15,106	\$15,106	\$0
7560	202	10	\$61.74	\$12,488		\$6,713	\$19,201	100%	100%	0%	\$19,201	\$19,201	\$0
7561	406	10	\$61.74	\$25,060		\$13,470	\$38,530	100%	100%	0%	\$38,530	\$38,530	\$0
7562	422	10	\$61.74	\$26,080		\$14,019	\$40,099	100%	100%	0%	\$40,099	\$40,099	\$0
7563	80	10	\$61.74	\$4,922		\$2,646	\$7,568	100%	100%	0%	\$7,568	\$7,568	\$0
7565	121	10	\$61.74	\$7,480		\$4,021	\$11,501	100%	100%	0%	\$11,501	\$11,501	\$0
7566	530	10	\$61.74	\$32,743		\$17,600	\$50,343	100%	100%	0%	\$50,343	\$50,343	\$0
7567	476	10	\$61.74	\$29,405		\$15,806	\$45,211	100%	100%	0%	\$45,211	\$45,211	\$0
7568	49	10	\$61.74	\$3,041		\$1,635	\$4,676	100%	100%	0%	\$4,676	\$4,676	\$0
7569	134	18	\$61.74	\$8,274		\$4,447	\$12,721	100%	100%	0%	\$12,721	\$12,721	\$0
7570	132	18	\$61.74	\$8,150		\$4,381	\$12,531	100%	100%	0%	\$12,531	\$12,531	\$0
7571	39	12	\$61.74	\$2,392		\$1,286	\$3,678	100%	100%	0%	\$3,678	\$3,678	\$0
7572	321	12	\$61.74	\$19,832		\$10,660	\$30,492	100%	100%	0%	\$30,492	\$30,492	\$0
7573	536	12	\$61.74	\$33,116		\$17,801	\$50,917	100%	100%	0%	\$50,917	\$50,917	\$0
7597	71	12	\$61.74	\$4,409		\$2,370	\$6,779	100%	100%	0%	\$6,775	\$6,779	\$4
Subtotal:	18,142			\$1,120,188	4.5%	\$602,128	\$1,722,316				\$1,718,088	\$1,722,316	\$4,228
14 - Fox Creek North													
7605	94	12	\$46.06	\$4,341		\$2,333	\$6,674	98%	100%	2%	\$6,542	\$6,674	\$132
7606	21	12	\$46.06	\$959		\$515	\$1,474	98%	100%	2%	\$1,444	\$1,474	\$30
7607	205	12	\$46.06	\$9,449		\$5,079	\$14,528	98%	100%	2%	\$14,214	\$14,528	\$314
7608	195	10	\$46.06	\$8,990		\$4,832	\$13,822	98%	100%	2%	\$13,484	\$13,822	\$338
7621	475	10	\$46.06	\$21,869		\$11,755	\$33,624	97%	100%	3%	\$32,516	\$33,624	\$1,108
7622	39	10	\$46.06	\$1,803		\$969	\$2,772	96%	100%	4%	\$2,671	\$2,772	\$101
Subtotal:	1,029			\$47,411	4.5%	\$25,483	\$72,894				\$70,871	\$72,894	\$2,023
15 - Midway Branch - Timber Creek Lift Station To Sh 121													
9000	487	30	\$149.19	\$72,691		\$39,073	\$111,764	100%	100%	0%	\$111,764	\$111,764	\$0

CITY OF LEWISVILLE, TEXAS
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Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
9001	462	30	\$149.19	\$68,927		\$37,050	\$105,977	100%	100%	0%	\$105,977	\$105,977	\$0
9002	264	30	\$149.19	\$39,439		\$21,199	\$60,638	100%	100%	0%	\$60,638	\$60,638	\$0
9003	306	30	\$149.19	\$45,682		\$24,555	\$70,237	100%	100%	0%	\$70,237	\$70,237	\$0
9004	474	30	\$149.19	\$70,696		\$38,001	\$108,697	100%	100%	0%	\$108,697	\$108,697	\$0
9005	577	30	\$149.19	\$86,154		\$46,310	\$132,464	100%	100%	0%	\$132,464	\$132,464	\$0
9006	37	30	\$149.19	\$5,548		\$2,982	\$8,530	100%	100%	0%	\$8,530	\$8,530	\$0
9007	1,000	30	\$149.19	\$149,181		\$80,188	\$229,369	100%	100%	0%	\$229,369	\$229,369	\$0
9008	1,000	30	\$149.19	\$149,233		\$80,216	\$229,449	100%	100%	0%	\$229,449	\$229,449	\$0
9009	968	30	\$149.19	\$144,419		\$77,629	\$222,048	100%	100%	0%	\$222,048	\$222,048	\$0
9010	42	30	\$149.19	\$6,232		\$3,350	\$9,582	100%	100%	0%	\$9,582	\$9,582	\$0
9011	275	30	\$149.19	\$41,047		\$22,064	\$63,111	100%	100%	0%	\$63,111	\$63,111	\$0
9012	850	30	\$149.19	\$126,809		\$68,163	\$194,972	100%	100%	0%	\$194,972	\$194,972	\$0
9013	492	30	\$149.19	\$73,388		\$39,448	\$112,836	100%	100%	0%	\$112,836	\$112,836	\$0
9014	723	30	\$149.19	\$107,879		\$57,987	\$165,866	100%	100%	0%	\$165,866	\$165,866	\$0
9015	998	30	\$149.19	\$148,830		\$80,000	\$228,830	100%	100%	0%	\$228,830	\$228,830	\$0
9016	1,001	24	\$149.19	\$149,295		\$80,249	\$229,544	100%	100%	0%	\$229,544	\$229,544	\$0
9017	1,001	24	\$149.19	\$149,392		\$80,302	\$229,694	100%	100%	0%	\$229,694	\$229,694	\$0
9018	410	24	\$149.19	\$61,140		\$32,864	\$94,004	100%	100%	0%	\$94,004	\$94,004	\$0
9019	583	24	\$149.19	\$86,973		\$46,750	\$133,723	100%	100%	0%	\$133,723	\$133,723	\$0
9020	495	24	\$149.19	\$73,874		\$39,709	\$113,583	100%	100%	0%	\$113,583	\$113,583	\$0
9021	1,107	24	\$149.19	\$165,155		\$88,775	\$253,930	100%	100%	0%	\$253,930	\$253,930	\$0
9022	787	24	\$149.19	\$117,383		\$63,096	\$180,479	100%	100%	0%	\$180,479	\$180,479	\$0
9023	213	24	\$149.19	\$31,810		\$17,099	\$48,909	100%	100%	0%	\$48,909	\$48,909	\$0
9024	1,024	24	\$149.19	\$152,734		\$82,098	\$234,832	100%	100%	0%	\$234,832	\$234,832	\$0
9025	686	24	\$149.19	\$102,272		\$54,974	\$157,246	100%	100%	0%	\$157,246	\$157,246	\$0
9026	741	24	\$149.19	\$110,518		\$59,406	\$169,924	100%	100%	0%	\$169,924	\$169,924	\$0
9027	256	24	\$149.19	\$38,260		\$20,566	\$58,826	100%	100%	0%	\$58,826	\$58,826	\$0
9028	580	24	\$149.19	\$86,592		\$46,545	\$133,137	100%	100%	0%	\$133,137	\$133,137	\$0
9029	165	24	\$149.19	\$24,651		\$13,250	\$37,901	100%	100%	0%	\$37,901	\$37,901	\$0
9030	497	24	\$149.19	\$74,191		\$39,879	\$114,070	100%	100%	0%	\$114,070	\$114,070	\$0
9031	617	24	\$149.19	\$92,116		\$49,514	\$141,630	100%	100%	0%	\$141,630	\$141,630	\$0
9032	148	24	\$149.19	\$22,054		\$11,855	\$33,909	100%	100%	0%	\$33,909	\$33,909	\$0
9033	212	24	\$149.19	\$31,616		\$16,994	\$48,610	100%	100%	0%	\$48,610	\$48,610	\$0
9071	898	21	\$149.19	\$133,949		\$72,001	\$205,950	78%	95%	16%	\$160,768	\$194,714	\$33,946
9072	891	21	\$149.19	\$132,939		\$71,458	\$204,397	78%	95%	17%	\$159,451	\$193,220	\$33,769
9081	73	21	\$149.19	\$10,867		\$5,841	\$16,708	80%	98%	17%	\$13,441	\$16,349	\$2,908
9082	481	21	\$149.19	\$71,693		\$38,537	\$110,230	80%	98%	17%	\$88,608	\$107,771	\$19,163
9170	171	24	\$149.19	\$25,473		\$13,692	\$39,165	100%	100%	0%	\$39,165	\$39,165	\$0
9171	138	21	\$149.19	\$20,543		\$11,042	\$31,585	78%	95%	16%	\$24,676	\$29,867	\$5,191
Subtotal:	22,130			\$3,301,645	4.5%	\$1,774,711	\$5,076,356				\$4,954,430	\$5,049,407	\$94,977

CITY OF LEWISVILLE, TEXAS
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EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
16 - Midway Branch - Holford's 18" Prairie Road To Castle Hills													
9034	42	18	\$147.56	\$6,253		\$3,361	\$9,614	62%	99%	37%	\$5,922	\$9,474	\$3,552
9035	236	18	\$147.56	\$34,790		\$18,700	\$53,490	62%	99%	37%	\$32,991	\$52,792	\$19,801
9036	276	18	\$147.56	\$40,722		\$21,889	\$62,611	62%	99%	37%	\$38,668	\$61,892	\$23,224
9037	565	18	\$147.56	\$83,363		\$44,810	\$128,173	62%	99%	37%	\$79,227	\$126,936	\$47,709
9038	364	18	\$147.56	\$53,716		\$28,874	\$82,590	62%	99%	37%	\$51,105	\$81,901	\$30,796
9039	505	18	\$147.56	\$74,519		\$40,056	\$114,575	62%	99%	37%	\$70,991	\$113,802	\$42,811
9040	488	18	\$147.56	\$72,000		\$38,702	\$110,702	62%	100%	37%	\$68,653	\$110,162	\$41,509
9041	545	18	\$147.56	\$80,485		\$43,263	\$123,748	62%	100%	38%	\$76,846	\$123,344	\$46,498
9042	100	18	\$147.56	\$14,756		\$7,932	\$22,688	62%	100%	38%	\$14,108	\$22,651	\$8,543
9043	245	18	\$147.56	\$36,173		\$19,444	\$55,617	62%	100%	38%	\$34,622	\$55,617	\$20,995
Subtotal:	3,367			\$496,777	4.5%	\$267,031	\$763,808				\$473,133	\$758,571	\$285,438
17 - Lower Timber Creek													
7002	982	42	\$173.05	\$169,874		\$91,311	\$261,185	97%	100%	3%	\$254,141	\$260,747	\$6,606
7003	51	42	\$173.05	\$8,743		\$4,700	\$13,443	98%	100%	2%	\$13,108	\$13,422	\$314
7004	402	42	\$173.05	\$69,511		\$37,364	\$106,875	98%	100%	2%	\$104,631	\$106,719	\$2,088
7005	14	42	\$173.05	\$2,492		\$1,340	\$3,832	98%	100%	2%	\$3,759	\$3,826	\$67
7006	63	42	\$173.05	\$10,844		\$5,829	\$16,673	98%	100%	1%	\$16,423	\$16,650	\$227
7007	1,325	42	\$173.05	\$229,336		\$123,273	\$352,609	99%	100%	1%	\$347,993	\$352,086	\$4,093
7008	71	42	\$173.05	\$12,306		\$6,615	\$18,921	99%	100%	1%	\$18,712	\$18,898	\$186
7009	907	42	\$173.05	\$156,942		\$84,360	\$241,302	99%	100%	1%	\$239,170	\$241,032	\$1,862
7010	907	42	\$173.05	\$156,996		\$84,389	\$241,385	100%	100%	0%	\$240,691	\$241,113	\$422
7038	55	42	\$173.05	\$9,558		\$5,138	\$14,696	98%	100%	2%	\$14,444	\$14,674	\$230
7039	536	42	\$173.05	\$92,712		\$49,835	\$142,547	98%	100%	2%	\$139,274	\$142,323	\$3,049
7040	25	42	\$173.05	\$4,245		\$2,282	\$6,527	97%	100%	3%	\$6,339	\$6,516	\$177
Subtotal:	5,337			\$923,559	4.5%	\$496,436	\$1,419,995				\$1,398,685	\$1,418,006	\$19,321
18 - Denton Creek East													
8000	19	36	\$56.13	\$1,043		\$561	\$1,604	84%	96%	12%	\$1,351	\$1,542	\$191
8001	53	18	\$56.13	\$2,951		\$1,586	\$4,537	89%	99%	10%	\$4,058	\$4,505	\$447
8002	734	18	\$56.13	\$41,223		\$22,158	\$63,381	90%	99%	10%	\$56,757	\$63,030	\$6,273
8003	788	18	\$56.13	\$44,220		\$23,769	\$67,989	90%	100%	10%	\$60,965	\$67,715	\$6,750
8004	376	18	\$56.13	\$21,130		\$11,358	\$32,488	90%	100%	10%	\$29,148	\$32,354	\$3,206
8005	350	18	\$56.13	\$19,672		\$10,574	\$30,246	90%	100%	10%	\$27,201	\$30,170	\$2,969
8006	799	18	\$56.13	\$44,848		\$24,107	\$68,955	90%	100%	10%	\$62,107	\$68,896	\$6,789
8007	392	18	\$56.13	\$22,003		\$11,827	\$33,830	90%	100%	10%	\$30,491	\$33,830	\$3,339
8008	295	18	\$56.13	\$16,576		\$8,910	\$25,486	90%	100%	10%	\$22,981	\$25,486	\$2,505
8009	192	15	\$56.13	\$10,760		\$5,784	\$16,544	90%	100%	10%	\$14,924	\$16,544	\$1,620
8010	353	15	\$56.13	\$19,815		\$10,651	\$30,466	90%	100%	10%	\$27,435	\$30,466	\$3,031
8011	247	15	\$56.13	\$13,880		\$7,461	\$21,341	90%	100%	10%	\$19,218	\$21,341	\$2,123
8015	13	18	\$56.13	\$732		\$393	\$1,125	90%	100%	10%	\$1,014	\$1,125	\$111
Subtotal:	4,612			\$258,853	4.5%	\$139,139	\$397,992				\$357,650	\$397,004	\$39,354

**CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
19 - Denton Creek West													
8100	289	36	\$115.57	\$33,394		\$17,950	\$51,344	83%	95%	13%	\$42,493	\$48,917	\$6,424
8103	525	36	\$115.57	\$60,715		\$32,636	\$93,351	83%	95%	13%	\$77,239	\$88,916	\$11,677
8104	817	36	\$115.57	\$94,458		\$50,773	\$145,231	83%	95%	13%	\$120,160	\$138,358	\$18,198
8105	190	36	\$115.57	\$21,906		\$11,775	\$33,681	83%	95%	13%	\$27,873	\$32,094	\$4,221
8106	583	36	\$115.57	\$67,433		\$36,247	\$103,680	83%	95%	13%	\$85,779	\$98,792	\$13,013
8107	507	36	\$115.57	\$58,633		\$31,517	\$90,150	83%	95%	13%	\$74,582	\$85,917	\$11,335
8108	660	36	\$115.57	\$76,261		\$40,992	\$117,253	83%	95%	13%	\$97,001	\$111,744	\$14,743
8109	903	36	\$115.57	\$104,392		\$56,113	\$160,505	83%	95%	13%	\$132,784	\$152,961	\$20,177
8147	55	27	\$115.57	\$6,358		\$3,418	\$9,776	82%	94%	12%	\$8,007	\$9,167	\$1,160
8148	722	27	\$115.57	\$83,490		\$44,878	\$128,368	82%	94%	12%	\$105,117	\$120,291	\$15,174
8149	727	27	\$115.57	\$84,019		\$45,162	\$129,181	82%	94%	12%	\$105,720	\$120,888	\$15,168
8150	39	27	\$115.57	\$4,522		\$2,431	\$6,953	82%	94%	12%	\$5,686	\$6,502	\$816
8162	489	27	\$115.57	\$56,502		\$30,371	\$86,873	81%	93%	12%	\$70,471	\$80,749	\$10,278
8163	509	27	\$115.57	\$58,789		\$31,600	\$90,389	81%	93%	12%	\$73,243	\$83,983	\$10,740
8164	590	27	\$115.57	\$68,181		\$36,649	\$104,830	81%	93%	12%	\$84,850	\$97,323	\$12,473
8165	794	27	\$115.57	\$91,735		\$49,310	\$141,045	81%	93%	12%	\$114,108	\$130,886	\$16,778
8166	14	27	\$115.57	\$1,602		\$861	\$2,463	81%	93%	12%	\$1,991	\$2,284	\$293
8167	148	27	\$115.57	\$17,135		\$9,210	\$26,345	81%	93%	12%	\$21,282	\$24,424	\$3,142
8168	14	27	\$115.57	\$1,599		\$859	\$2,458	81%	93%	12%	\$1,984	\$2,278	\$294
8169	442	27	\$115.57	\$51,057		\$27,444	\$78,501	81%	93%	12%	\$63,292	\$72,710	\$9,418
8170	38	27	\$115.57	\$4,376		\$2,352	\$6,728	81%	93%	12%	\$5,419	\$6,226	\$807
8173	14	27	\$115.57	\$1,668		\$897	\$2,565	80%	93%	12%	\$2,065	\$2,373	\$308
8174	20	27	\$115.57	\$2,294		\$1,233	\$3,527	92%	100%	8%	\$3,238	\$3,527	\$289
8175	493	21	\$115.57	\$57,019		\$30,649	\$87,668	92%	100%	8%	\$80,362	\$87,668	\$7,306
8176	530	21	\$115.57	\$61,208		\$32,901	\$94,109	92%	100%	8%	\$86,527	\$94,109	\$7,582
8177	30	21	\$115.57	\$3,442		\$1,850	\$5,292	92%	100%	8%	\$4,860	\$5,292	\$432
8178	657	21	\$115.57	\$75,972		\$40,837	\$116,809	94%	100%	6%	\$109,508	\$116,809	\$7,301
8179	931	21	\$115.57	\$107,625		\$57,851	\$165,476	94%	100%	6%	\$155,134	\$165,476	\$10,342
8183	251	15	\$115.57	\$29,062		\$15,621	\$44,683	91%	100%	9%	\$40,579	\$44,683	\$4,104
8184	352	15	\$115.57	\$40,663		\$21,857	\$62,520	91%	100%	9%	\$57,117	\$62,520	\$5,403
8185	217	15	\$115.57	\$25,051		\$13,465	\$38,516	92%	100%	8%	\$35,553	\$38,516	\$2,963
8186	112	15	\$115.57	\$12,916		\$6,943	\$19,859	92%	100%	8%	\$18,238	\$19,859	\$1,621
8187	375	15	\$115.57	\$43,387		\$23,322	\$66,709	91%	100%	9%	\$60,645	\$66,709	\$6,064
8188	223	15	\$115.57	\$25,753		\$13,843	\$39,596	94%	100%	6%	\$37,121	\$39,596	\$2,475
Subtotal:	13,261			\$1,532,617	4.5%	\$823,817	\$2,356,434				\$2,010,028	\$2,262,547	\$252,519

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(%) Utilized Capacity			(\$) Utilized Capacity		
								2018	2028	During Fee Period	2018	2028	During Fee Period
20 - Elm Fork Sanitary Sewer - Phase 1A & 1B													
9300	349	30	\$80.71	\$28,206		\$15,161	\$43,367	66%	69%	3%	\$28,559	\$29,919	\$1,360
9301	788	30	\$80.71	\$63,588		\$34,180	\$97,768	66%	69%	3%	\$64,384	\$67,450	\$3,066
9302	161	30	\$80.71	\$13,025		\$7,001	\$20,026	66%	69%	3%	\$13,188	\$13,816	\$628
9303	821	30	\$80.71	\$66,243		\$35,607	\$101,850	66%	69%	3%	\$67,072	\$70,266	\$3,194
9304	605	30	\$80.71	\$48,829		\$26,247	\$75,076	66%	69%	3%	\$49,440	\$51,795	\$2,355
9305	732	30	\$80.71	\$59,101		\$31,768	\$90,869	66%	69%	3%	\$59,841	\$62,690	\$2,849
9307	413	21	\$80.71	\$33,369		\$17,937	\$51,306	68%	71%	3%	\$34,801	\$36,193	\$1,392
9308	275	21	\$80.71	\$22,195		\$11,930	\$34,125	67%	71%	3%	\$23,015	\$24,073	\$1,058
9309	325	21	\$80.71	\$26,198		\$14,082	\$40,280	68%	71%	3%	\$27,322	\$28,415	\$1,093
9310	325	21	\$80.71	\$26,263		\$14,117	\$40,380	70%	72%	3%	\$28,090	\$29,144	\$1,054
9311	120	21	\$80.71	\$9,711		\$5,220	\$14,931	72%	75%	2%	\$10,771	\$11,143	\$372
9312	430	21	\$80.71	\$34,679		\$18,641	\$53,320	76%	78%	2%	\$40,300	\$41,540	\$1,240
9313	350	21	\$80.71	\$28,248		\$15,184	\$43,432	80%	83%	2%	\$34,928	\$35,839	\$911
9314	400	21	\$80.71	\$32,284		\$17,353	\$49,637	88%	89%	1%	\$43,541	\$43,977	\$436
9315	370	21	\$80.71	\$29,847		\$16,043	\$45,890	100%	100%	0%	\$45,890	\$45,890	\$0
9316	89	12	\$80.71	\$7,198		\$3,869	\$11,067	100%	100%	0%	\$11,067	\$11,067	\$0
9317	450	12	\$80.71	\$36,320		\$19,523	\$55,843	100%	100%	0%	\$55,843	\$55,843	\$0
9318	652	12	\$80.71	\$52,602		\$28,275	\$80,877	100%	100%	0%	\$80,877	\$80,877	\$0
9319	420	8	\$80.71	\$33,872		\$18,207	\$52,079	100%	100%	0%	\$52,079	\$52,079	\$0
9320	88	18	\$80.71	\$7,126		\$3,830	\$10,956	100%	100%	0%	\$10,956	\$10,956	\$0
9321	49	18	\$80.71	\$3,916		\$2,105	\$6,021	100%	100%	0%	\$6,021	\$6,021	\$0
9322	179	18	\$80.71	\$14,481		\$7,784	\$22,265	100%	100%	0%	\$22,265	\$22,265	\$0
Subtotal:	8,392			\$677,301	4.5%	\$364,064	\$1,041,365				\$810,250	\$831,258	\$21,008
21 - Southwest Lewisville Infrastructure													
8401	506	24	\$63.04	\$31,869		\$17,130	\$48,999	76%	91%	14%	\$37,464	\$44,511	\$7,047
8402	582	24	\$63.04	\$36,691		\$19,722	\$56,413	76%	91%	14%	\$42,956	\$51,119	\$8,163
8403	640	24	\$63.04	\$40,335		\$21,681	\$62,016	76%	90%	14%	\$47,006	\$55,993	\$8,987
8404	786	24	\$63.04	\$49,567		\$26,643	\$76,210	75%	90%	15%	\$57,480	\$68,534	\$11,054
8405	797	24	\$63.04	\$50,271		\$27,022	\$77,293	75%	90%	15%	\$57,953	\$69,251	\$11,298
8406	400	12	\$63.04	\$25,196		\$13,543	\$38,739	75%	90%	15%	\$29,248	\$34,872	\$5,624
8407	520	12	\$63.04	\$32,784		\$17,622	\$50,406	74%	89%	15%	\$37,432	\$44,876	\$7,444
8408	278	12	\$63.04	\$17,553		\$9,435	\$26,988	73%	88%	15%	\$19,628	\$23,717	\$4,089
8409	399	12	\$63.04	\$25,163		\$13,526	\$38,689	70%	86%	16%	\$27,253	\$33,336	\$6,083
8410	350	12	\$63.04	\$22,076		\$11,866	\$33,942	66%	83%	17%	\$22,503	\$28,129	\$5,626
8411	329	12	\$63.04	\$20,769		\$11,164	\$31,933	67%	83%	17%	\$21,289	\$26,611	\$5,322
8412	507	12	\$63.04	\$31,940		\$17,168	\$49,108	67%	83%	17%	\$32,739	\$40,923	\$8,184
8413	491	21	\$63.04	\$30,935		\$16,628	\$47,563	66%	83%	16%	\$31,603	\$39,346	\$7,743
8414	481	21	\$63.04	\$30,321		\$16,298	\$46,619	66%	83%	16%	\$30,950	\$38,495	\$7,545
8415	361	21	\$63.04	\$22,776		\$12,243	\$35,019	67%	83%	17%	\$23,346	\$29,183	\$5,837
8416	360	21	\$63.04	\$22,678		\$12,190	\$34,868	67%	83%	17%	\$23,245	\$29,057	\$5,812
8417	358	21	\$63.04	\$22,582		\$12,138	\$34,720	67%	83%	17%	\$23,147	\$28,933	\$5,786

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
8418	475	12	\$63.04	\$29,918		\$16,082	\$46,000	82%	95%	13%	\$37,708	\$43,828	\$6,120
8419	480	12	\$63.04	\$30,240		\$16,255	\$46,495	83%	95%	13%	\$38,396	\$44,395	\$5,999
8420	442	12	\$63.04	\$27,873		\$14,982	\$42,855	82%	95%	13%	\$35,163	\$40,657	\$5,494
Subtotal:	9,542			\$601,537	4.5%	\$323,338	\$924,875				\$676,509	\$815,766	\$139,257
22 - S.H. 121 Bypass Sanitary Sewer													
8300	83	27	\$114.38	\$9,515		\$5,115	\$14,630	79%	92%	12%	\$11,595	\$13,418	\$1,823
8301	502	27	\$114.38	\$57,370		\$30,838	\$88,208	79%	92%	13%	\$69,824	\$80,854	\$11,030
8302	492	27	\$114.38	\$56,285		\$30,254	\$86,539	79%	92%	13%	\$68,417	\$79,275	\$10,858
8303	496	27	\$114.38	\$56,734		\$30,496	\$87,230	79%	92%	13%	\$68,942	\$79,855	\$10,913
8304	307	27	\$114.38	\$35,100		\$18,867	\$53,967	79%	91%	13%	\$42,598	\$49,373	\$6,775
8305	55	27	\$114.38	\$6,265		\$3,368	\$9,633	79%	91%	13%	\$7,604	\$8,813	\$1,209
8306	195	27	\$114.38	\$22,259		\$11,965	\$34,224	79%	91%	13%	\$27,014	\$31,311	\$4,297
8307	318	27	\$114.38	\$36,331		\$19,529	\$55,860	79%	91%	13%	\$44,092	\$51,105	\$7,013
8308	497	27	\$114.38	\$56,850		\$30,558	\$87,408	79%	91%	13%	\$68,994	\$79,967	\$10,973
8309	497	27	\$114.38	\$56,820		\$30,542	\$87,362	79%	91%	13%	\$68,958	\$79,925	\$10,967
8310	494	27	\$114.38	\$56,500		\$30,370	\$86,870	79%	91%	13%	\$68,570	\$79,475	\$10,905
8311	496	27	\$114.38	\$56,724		\$30,490	\$87,214	79%	91%	13%	\$68,841	\$79,790	\$10,949
8312	493	27	\$114.38	\$56,353		\$30,291	\$86,644	79%	91%	13%	\$68,391	\$79,268	\$10,877
8313	295	27	\$114.38	\$33,703		\$18,116	\$51,819	79%	91%	13%	\$40,903	\$47,408	\$6,505
8314	381	27	\$114.38	\$43,549		\$23,409	\$66,958	79%	91%	13%	\$52,852	\$61,258	\$8,406
8315	237	27	\$114.38	\$27,102		\$14,568	\$41,670	79%	91%	13%	\$32,892	\$38,123	\$5,231
8316	380	27	\$114.38	\$43,443		\$23,352	\$66,795	79%	91%	13%	\$52,724	\$61,109	\$8,385
8317	499	27	\$114.38	\$57,032		\$30,656	\$87,688	79%	91%	13%	\$69,215	\$80,224	\$11,009
8318	219	24	\$114.38	\$25,024		\$13,451	\$38,475	79%	91%	13%	\$30,315	\$35,139	\$4,824
8319	239	24	\$114.38	\$27,392		\$14,724	\$42,116	84%	92%	8%	\$35,176	\$38,578	\$3,402
8320	484	24	\$114.38	\$55,378		\$29,767	\$85,145	83%	91%	8%	\$71,004	\$77,851	\$6,847
8321	234	15	\$114.38	\$26,748		\$14,378	\$41,126	83%	91%	8%	\$34,298	\$37,594	\$3,296
8322	106	15	\$114.38	\$12,100		\$6,504	\$18,604	84%	92%	8%	\$15,555	\$17,041	\$1,486
8323	449	15	\$114.38	\$51,328		\$27,590	\$78,918	83%	91%	8%	\$65,857	\$72,112	\$6,255
8324	127	15	\$114.38	\$14,554		\$7,823	\$22,377	83%	92%	8%	\$18,677	\$20,498	\$1,821
8325	136	15	\$114.38	\$15,580		\$8,375	\$23,955	83%	92%	8%	\$19,998	\$21,941	\$1,943
8326	275	15	\$114.38	\$31,423		\$16,891	\$48,314	84%	92%	8%	\$40,374	\$44,260	\$3,886
8327	66	15	\$114.38	\$7,498		\$4,030	\$11,528	84%	92%	8%	\$9,639	\$10,559	\$920
8328	96	15	\$114.38	\$10,928		\$5,874	\$16,802	83%	91%	8%	\$13,987	\$15,307	\$1,320
8329	507	15	\$114.38	\$57,971		\$31,161	\$89,132	83%	92%	8%	\$74,173	\$81,652	\$7,479
8330	94	15	\$114.38	\$10,696		\$5,749	\$16,445	83%	92%	8%	\$13,675	\$15,060	\$1,385
8331	376	12	\$114.38	\$43,029		\$23,129	\$66,158	83%	92%	8%	\$55,132	\$60,645	\$5,513
8400	258	24	\$114.38	\$29,496		\$15,855	\$45,351	79%	91%	13%	\$35,679	\$41,361	\$5,682
Subtotal:	10,378			\$1,187,080	4.5%	\$638,085	\$1,825,165				\$1,465,965	\$1,670,149	\$204,184

CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
23 - S.H. 121 East Sanitary Sewer													
9083	403	21	\$84.81	\$34,143		\$18,353	\$52,496	80%	98%	17%	\$42,199	\$51,325	\$9,126
9084	283	21	\$84.81	\$23,968		\$12,883	\$36,851	80%	98%	17%	\$29,623	\$36,029	\$6,406
9085	179	21	\$84.81	\$15,181		\$8,160	\$23,341	80%	98%	17%	\$18,763	\$22,820	\$4,057
9086	65	21	\$84.81	\$5,522		\$2,968	\$8,490	80%	98%	17%	\$6,825	\$8,301	\$1,476
9087	426	21	\$84.81	\$36,135		\$19,423	\$55,558	80%	98%	17%	\$44,660	\$54,319	\$9,659
9088	553	21	\$84.81	\$46,902		\$25,211	\$72,113	80%	98%	17%	\$57,968	\$70,504	\$12,536
9089	361	21	\$84.81	\$30,618		\$16,458	\$47,076	80%	98%	17%	\$37,842	\$46,026	\$8,184
9090	356	21	\$84.81	\$30,180		\$16,222	\$46,402	80%	98%	17%	\$37,300	\$45,367	\$8,067
9091	272	21	\$84.81	\$23,070		\$12,401	\$35,471	80%	98%	17%	\$28,513	\$34,680	\$6,167
9092	260	21	\$84.81	\$22,052		\$11,853	\$33,905	80%	98%	17%	\$27,254	\$33,149	\$5,895
9093	302	21	\$84.81	\$25,614		\$13,768	\$39,382	80%	98%	17%	\$31,657	\$38,503	\$6,846
9094	304	21	\$84.81	\$25,784		\$13,859	\$39,643	80%	98%	17%	\$31,867	\$38,759	\$6,892
9095	390	21	\$84.81	\$33,078		\$17,780	\$50,858	80%	98%	17%	\$40,882	\$49,723	\$8,841
9096	71	21	\$84.81	\$6,000		\$3,225	\$9,225	80%	98%	17%	\$7,415	\$9,019	\$1,604
9097	442	21	\$84.81	\$37,488		\$20,151	\$57,639	80%	98%	17%	\$46,333	\$56,353	\$10,020
9098	430	21	\$84.81	\$36,470		\$19,603	\$56,073	80%	98%	17%	\$45,074	\$54,822	\$9,748
9099	439	21	\$84.81	\$37,234		\$20,014	\$57,248	80%	98%	17%	\$46,019	\$55,971	\$9,952
9100	284	21	\$84.81	\$24,087		\$12,947	\$37,034	80%	98%	17%	\$29,770	\$36,208	\$6,438
9101	274	21	\$84.81	\$23,273		\$12,510	\$35,783	80%	98%	17%	\$28,764	\$34,985	\$6,221
9102	248	21	\$84.81	\$20,992		\$11,284	\$32,276	80%	98%	17%	\$25,945	\$31,556	\$5,611
9103	273	21	\$84.81	\$23,112		\$12,423	\$35,535	80%	98%	17%	\$28,565	\$34,742	\$6,177
9104	273	21	\$84.81	\$23,154		\$12,446	\$35,600	80%	98%	17%	\$28,617	\$34,806	\$6,189
9105	483	21	\$84.81	\$40,932		\$22,002	\$62,934	80%	98%	17%	\$50,589	\$61,530	\$10,941
9106	181	21	\$84.81	\$15,359		\$8,256	\$23,615	80%	98%	17%	\$18,983	\$23,088	\$4,105
9107	117	21	\$84.81	\$9,965		\$5,356	\$15,321	80%	98%	17%	\$12,316	\$14,979	\$2,663
9108	281	21	\$84.81	\$23,799		\$12,793	\$36,592	80%	98%	17%	\$29,414	\$35,776	\$6,362
9109	89	21	\$84.81	\$7,507		\$4,035	\$11,542	80%	98%	17%	\$9,278	\$11,285	\$2,007
9172	124	21	\$84.81	\$10,549		\$5,670	\$16,219	80%	98%	17%	\$13,038	\$15,857	\$2,819
Subtotal:	8,161			\$692,168	4.5%	\$372,054	\$1,064,222				\$855,473	\$1,040,482	\$185,009
24 - Holford's Prairie 30" Parallel													
9940	60	30	\$103.68	\$6,262		\$3,366	\$9,628	38%	86%	48%	\$3,667	\$8,319	\$4,652
9941	217	30	\$103.68	\$22,545		\$12,118	\$34,663	38%	86%	48%	\$13,201	\$29,965	\$16,764
9942	265	30	\$103.68	\$27,483		\$14,773	\$42,256	38%	86%	48%	\$16,092	\$36,549	\$20,457
9943	579	30	\$103.68	\$60,049		\$32,278	\$92,327	38%	87%	48%	\$35,150	\$79,909	\$44,759
9944	378	30	\$103.68	\$39,230		\$21,087	\$60,317	38%	87%	49%	\$22,963	\$52,233	\$29,270
9945	506	30	\$103.68	\$52,455		\$28,196	\$80,651	38%	87%	49%	\$30,704	\$69,879	\$39,175
9946	509	30	\$103.68	\$52,722		\$28,339	\$81,061	38%	87%	49%	\$30,850	\$70,272	\$39,422
9947	543	30	\$103.68	\$56,288		\$30,256	\$86,544	38%	87%	49%	\$32,937	\$75,075	\$42,138
9948	99	30	\$103.68	\$10,281		\$5,526	\$15,807	38%	87%	49%	\$6,016	\$13,720	\$7,704
9949	247	30	\$103.68	\$25,628		\$13,776	\$39,404	38%	87%	49%	\$14,996	\$34,219	\$19,223
Subtotal:	3,404			\$352,943	4.5%	\$189,715	\$542,658				\$206,576	\$470,140	\$263,564

**CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
EXISTING WASTEWATER COLLECTION LINES**

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
25 - Indian Creek Trunk Main - Eastside Sanitary Sewer Extension													
9184	395	15	\$63.57	\$25,112		\$13,498	\$38,610	21%	94%	73%	\$8,118	\$36,351	\$28,233
9625	313	24	\$63.57	\$19,926		\$10,711	\$30,637	22%	94%	73%	\$6,622	\$28,912	\$22,290
9626	45	24	\$63.57	\$2,843		\$1,528	\$4,371	22%	94%	73%	\$945	\$4,125	\$3,180
9627	752	18	\$63.57	\$47,784		\$25,685	\$73,469	22%	94%	73%	\$15,880	\$69,333	\$53,453
9628	346	18	\$63.57	\$22,010		\$11,831	\$33,841	22%	94%	73%	\$7,315	\$31,936	\$24,621
9629	336	18	\$63.57	\$21,354		\$11,478	\$32,832	22%	94%	73%	\$7,097	\$30,984	\$23,887
9630	396	18	\$63.57	\$25,177		\$13,533	\$38,710	22%	94%	73%	\$8,367	\$36,531	\$28,164
9631	353	18	\$63.57	\$22,458		\$12,072	\$34,530	22%	94%	73%	\$7,464	\$32,586	\$25,122
9632	161	18	\$63.57	\$10,242		\$5,505	\$15,747	22%	94%	73%	\$3,393	\$14,856	\$11,463
9633	474	18	\$63.57	\$30,165		\$16,214	\$46,379	22%	94%	73%	\$9,973	\$43,751	\$33,778
9634	437	18	\$63.57	\$27,802		\$14,944	\$42,746	21%	94%	73%	\$9,158	\$40,310	\$31,152
9635	155	18	\$63.57	\$9,849		\$5,294	\$15,143	21%	94%	73%	\$3,231	\$14,275	\$11,044
9636	327	15	\$63.57	\$20,789		\$11,175	\$31,964	21%	94%	73%	\$6,790	\$30,118	\$23,328
9637	525	15	\$63.57	\$33,376		\$17,940	\$51,316	21%	94%	73%	\$10,848	\$48,330	\$37,482
9638	355	15	\$63.57	\$22,601		\$12,149	\$34,750	21%	94%	73%	\$7,306	\$32,711	\$25,405
9639	80	15	\$63.57	\$5,086		\$2,734	\$7,820	21%	94%	73%	\$1,645	\$7,363	\$5,718
9640	554	15	\$63.57	\$35,198		\$18,920	\$54,118	21%	94%	73%	\$11,390	\$50,936	\$39,546
9641	553	15	\$63.57	\$35,144		\$18,891	\$54,035	21%	94%	73%	\$11,367	\$50,870	\$39,503
9642	508	15	\$63.57	\$32,296		\$17,360	\$49,656	21%	94%	73%	\$10,451	\$46,724	\$36,273
9643	349	12	\$63.57	\$22,201		\$11,934	\$34,135	21%	94%	73%	\$7,176	\$32,131	\$24,955
9644	500	12	\$63.57	\$31,787		\$17,086	\$48,873	21%	94%	73%	\$10,279	\$45,999	\$35,720
9645	500	12	\$63.57	\$31,787		\$17,086	\$48,873	21%	94%	73%	\$10,290	\$46,019	\$35,729
9646	500	12	\$63.57	\$31,768		\$17,076	\$48,844	21%	94%	73%	\$10,265	\$45,961	\$35,696
9647	514	12	\$63.57	\$32,653		\$17,552	\$50,205	21%	94%	73%	\$10,563	\$47,264	\$36,701
Subtotal:	9,428			\$599,408	4.5%	\$322,196	\$921,604				\$195,933	\$868,376	\$672,443
TOTAL EXISTING COLLECTION LINES:													
	197,501			\$20,461,172		\$10,998,344	\$31,459,516				\$26,806,889	\$30,155,848	\$3,348,959

**CITY OF LEWISVILLE, TEXAS
2012 WASTE WATER IMPACT FEE
WASTE WATER TREATMENT PLANT FACILITIES**

Waste Water Treatment Improvements	Year Const.	Projected Capacity	Facility Cost (\$)					Capacity Utilized (%)			Capacity Utilized (\$)				
			Const.	Engineering*	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost \$	2012	2022	In The CRF Period	2012	2022	In The CRF Period		
Existing Facilities															
1	Waste Water Treatment Plant	1	1976	6.0 MGD	\$2,200,000	\$330,000	4.5%	\$1,195,425	\$3,725,425	100.0%	100.0%	0.0%	\$3,725,425	\$3,725,425	\$0
3	Filter Pump Station Addition	2	1984		\$21,932	\$3,290	4.5%	\$11,917	\$37,139	100.0%	100.0%	0.0%	\$37,139	\$37,139	\$0
3	Aeration System Improvements	3	1985		\$227,476	\$34,121	4.5%	\$123,605	\$385,202	100.0%	100.0%	0.0%	\$385,202	\$385,202	\$0
3	WWTP Expansion Phase I	4	1986	12.0 MGD	\$7,485,785	\$1,122,868	4.5%	\$4,067,588	\$12,676,241	100.0%	100.0%	0.0%	\$12,676,241	\$12,676,241	\$0
3	Dechlorination	5	1992		\$404,657	\$60,699	4.5%	\$219,880	\$685,236	100.0%	100.0%	0.0%	\$685,236	\$685,236	\$0
2	Digester Project	6	1993		\$1,229,295	\$184,394	4.5%	\$667,968	\$2,081,657	100.0%	100.0%	0.0%	\$2,081,657	\$2,081,657	\$0
2	Telemetry Project	7	1993		\$268,122	\$40,218	4.5%	\$145,691	\$454,031	100.0%	100.0%	0.0%	\$454,031	\$454,031	\$0
2	WWTP Upgrade	9	1996		\$2,800,500	\$420,075	4.5%	\$1,521,722	\$4,742,297	100.0%	100.0%	0.0%	\$4,742,297	\$4,742,297	\$0
4	WWTP Expansion Phase II	10	2006	12.0 MGD	\$6,023,660	\$903,549	4.5%	\$3,273,106	\$10,200,315	96.7%	100.0%	3.3%	\$9,863,705	\$10,200,315	\$336,610
Subtotal - Existing Facilities					\$20,661,427	\$3,099,214		\$11,226,902	\$34,987,543				\$34,650,933	\$34,987,543	\$336,610
Proposed Facilities 2012 Through 2022															
1	WWTP Expansion III	11	2016	15.0 MGD	\$6,000,000	\$900,000	4.5%	\$0	\$6,900,000	0.0%	100.0%	100.0%	\$0	\$6,900,000	\$6,900,000
1	WWTP Expansion IV	12	2020	18.0 MGD	\$6,000,000	\$900,000	4.5%	\$3,260,250	\$10,160,250	0.0%	95.0%	95.0%	\$0	\$9,652,238	\$9,652,238
Subtotal - Proposed Facilities					\$12,000,000	\$1,800,000		\$3,260,250	\$17,060,250				\$0	\$16,552,238	\$16,552,238
Total Existing + Proposed					\$32,661,427	\$4,899,214		\$14,487,152	\$52,047,794				\$34,650,933	\$51,539,781	\$16,888,848

- (1) Opinion of Probable Cost
- (2) Cost Obtained from the City of Lewisville
- (3) Cost Obtained from Final Pay Request
- (4) Cost from Bid Tabulation
- * Multiplied Construction Cost Times 15%

**CITY OF LEWISVILLE, TEXAS
2018-2028 WASTEWATER IMPACT FEE
PROPOSED WASTEWATER COLLECTION LINES**

** Average Unit costs are based in 2017 dollars unless otherwise indicated and includes 20% for engineering and easements.
*** Project 1P Utilized Capacity was calculated for flows generated within the City Limits Only.

Pipe Number	Length (Ft.)	Diameter (Inches)	Avg. Unit Cost (\$/Ft.)	Total Capital Cost (\$)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Yr. Project Cost (\$)	(% Utilized Capacity)			(\$ Utilized Capacity)		
								2018	2028	During Fee Period	2018	2028	During Fee Period
1P - Castle Hills 21" Parallel Trunk Main (ETJ)													
(2) 9182 B	2,174	21	\$405.61	\$881,714		\$473,941	\$1,355,655	0%	38%	38%	\$0	\$514,825	\$514,825
(2) 9183 B	5,094	21	\$310.67	\$1,582,505		\$850,633	\$2,433,138	0%	43%	43%	\$0	\$1,043,505	\$1,043,505
Subtotal:	7,268			\$2,464,219	4.5%	\$1,324,574	\$3,788,793				\$0	\$1,558,330	\$1,558,330
2P - Prairie Creek East Parallel Trunk Main													
(2) 9905	919	18	\$212.00	\$194,771		\$104,694	\$299,465	0%	63%	63%	\$0	\$187,778	\$187,778
(2) 9906	753	18	\$212.00	\$159,699		\$85,842	\$245,541	0%	63%	63%	\$0	\$154,246	\$154,246
(2) 9907	222	18	\$212.00	\$47,158		\$25,349	\$72,507	0%	63%	63%	\$0	\$45,656	\$45,656
(2) 9908	335	18	\$212.00	\$70,973		\$38,150	\$109,123	0%	63%	63%	\$0	\$68,840	\$68,840
(2) 9927	428	18	\$212.00	\$90,649		\$48,726	\$139,375	0%	57%	57%	\$0	\$79,333	\$79,333
(2) 9928	419	18	\$212.00	\$88,794		\$47,729	\$136,523	0%	57%	57%	\$0	\$77,745	\$77,745
(2) 9929	706	15	\$175.00	\$123,488		\$66,378	\$189,866	0%	58%	58%	\$0	\$109,711	\$109,711
(2) 9931	319	15	\$175.00	\$55,769		\$29,977	\$85,746	0%	58%	58%	\$0	\$50,053	\$50,053
(2) 9930	414	15	\$175.00	\$72,411		\$38,923	\$111,334	0%	58%	58%	\$0	\$64,287	\$64,287
Subtotal:	4,514			\$903,712	4.5%	\$485,768	\$1,389,480				\$0	\$837,649	\$837,649
TOTAL PROPOSED COLLECTION LINES:													
	11,781			\$3,367,931		\$1,810,342	\$5,178,273				\$0	\$2,395,979	\$2,395,979

- (1) - City Participate in Cost Oversize
- (2) - City Initiated and Funded
- B - Bore Across State Highway or Interstate



LEWISVILLE

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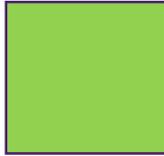
**ENGINEERING EVALUATION REPORT
OF THE
WATER AND WASTEWATER
2018-2028 IMPACT FEE REVIEW**

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
(214) 361-7900

JULY 2018



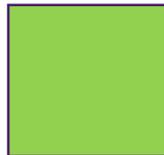
2018 WATER DISTRIBUTION SYSTEM MASTER PLAN



Submitted To



LEWISVILLE
Deep Roots. Broad Wings. Bright Future.



Submitted By



BIRKHOFF, HENDRICKS & CARTER, L.L.P.
*SPECIALIZING IN CIVIL ENGINEERING FOR
MUNICIPALITIES AND GOVERNMENTAL AGENCIES*



July 2018

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS

11910 Greenville Ave., Suite 600

Dallas, Texas 75243

Phone (214) 361-7900

www.bhellp.com

JOHN W. BIRKHOFF, P.E.
GARY C. HENDRICKS, P.E.
JOE R. CARTER, P.E.
MATT HICKEY, P.E.
ANDREW MATA, JR., P.E.
JOSEPH T. GRAJEWSKI, III, P.E.
DEREK B. CHANEY, P.E.
CRAIG M. KERKHOFF, P.E.

July 31, 2018

Mr. Keith Marvin
Director of Public Services
City of Lewisville
1100 N. Kealy, Suite D
Lewisville, Texas 75029

Re: Water Distribution System Master Plan

Dear Mr. Marvin:

This report presents the results from the 2018 Water Distribution Master Plan. Included in this report is the revised population projections from the 2018 Land Use Assumptions. It also includes the impact of the removal of the Lord & Clem tracts and incorporating Lakewood Hills into the Lewisville water distribution system. The system was designed for a buildout residential population of approximately 163,162 people and to meet the demand rate for the non-residential land uses within the existing planning boundaries. The maximum daily demand for design of the system at buildout was calculated to be 58.10 million gallons per day.

We are available at your convenience to assist the City in the development of the water distribution system.

Sincerely,



John W. Birkhoff, P.E.



Andrew Mata, Jr., P.E.

**CITY OF LEWISVILLE, TEXAS
2018 WATER DISTRIBUTION SYSTEM REPORT**

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CITY OF LEWISVILLE, TEXAS

2018 WATER DISTRIBUTION SYSTEM REPORT

GENERAL

Previous analyses have been performed for the City of Lewisville's Water Distribution System, which have resulted in long-range plans for the system. The latest of these reports was completed in 2011. Since 2011, projected conditions have changed enough to warrant a new analysis of the system to take into account the new information from the 2018 Land Use Assumptions prepared by Freese & Nichols and the removal of the Lord and Clem tracts from the master plan.

Although the proposed system is designed to accommodate the ultimate development of the city, it should be examined at intervals and revised to conform to any new conditions, which may arise in the future. Likewise, prior to undertaking a major expenditure, an examination should be made to verify that design criteria used in developing the overall plan is still valid.

The purpose of this report is to present a comprehensive plan for the development of a water distribution system to serve the full growth of the City of Lewisville. This plan is based on the best available information on existing land uses and the 2018 Land Use Assumptions, prepared for the City of Lewisville by Freese and Nichols, Inc. for areas within the City Limits and the City's Extra Territorial Jurisdiction (E.T.J.). A major change is the removal of the Lord & Clem tract from the master plan.

This Master Plan is the basis of the water impact fee analysis.

DEFINITIONS

The design of the water distribution system involves various rates of water use, which are generally referred to as water demand. The three most significant rates and a definition of each are:

- A. Maximum Daily Demand: This is the total amount of water used during the day of heaviest consumption in any given year and the minimum rate which the high service pumps must be capable of pumping. Water must be supplied to the pumps at this rate.

- B. Maximum Hourly Demand: This is the rate at which water is drawn from the entire distribution system during the hour of maximum consumption on the day of maximum demand. This rate is generally of a short duration and is most economically provided for by the use of elevated storage in addition to water supplied to the system by pumps. The distribution system, including storage and pumping capacity, must be able to satisfy this demand.
- C. Minimum Hourly Demand: This is the rate at which water is drawn from the entire distribution system during the hour of minimum demand on the day of maximum demand. This demand rate is used in the water distribution analysis to determine the adequacies of the system to replenish elevated storage tanks and ground storage reservoirs.

PLANNING AREA

The planning area for this report includes the entire area within the current city limits along with portions of the Lakewood Hills (remnants of Lord & Clem tracts) and the Castle Hills Subdivisions. The proposed system is designed to serve that planning area and includes approximately 22,223-acres or 34.7 square miles. Of the 34.7 square miles, approximately 16.2 square miles is expected to be residential, approximately 10.1 square miles being retail, commercial and industrial and the remaining 8.4 square miles being parks, open space and flood plain. This area is divided into three separate service area, generally referred to as 692.5, 735, and 740 Service Area. In the 692.5 Service Area, the City is expecting continued redevelopment at three locations along the DCTA corridor, also known as Transit Oriented Development areas that consist of a total of 573.0 acres. These three TOD areas are known as the Lewisville Lake Station, the Old Town Station, and the Hebron 121 Station and are located on **Figure 1**.

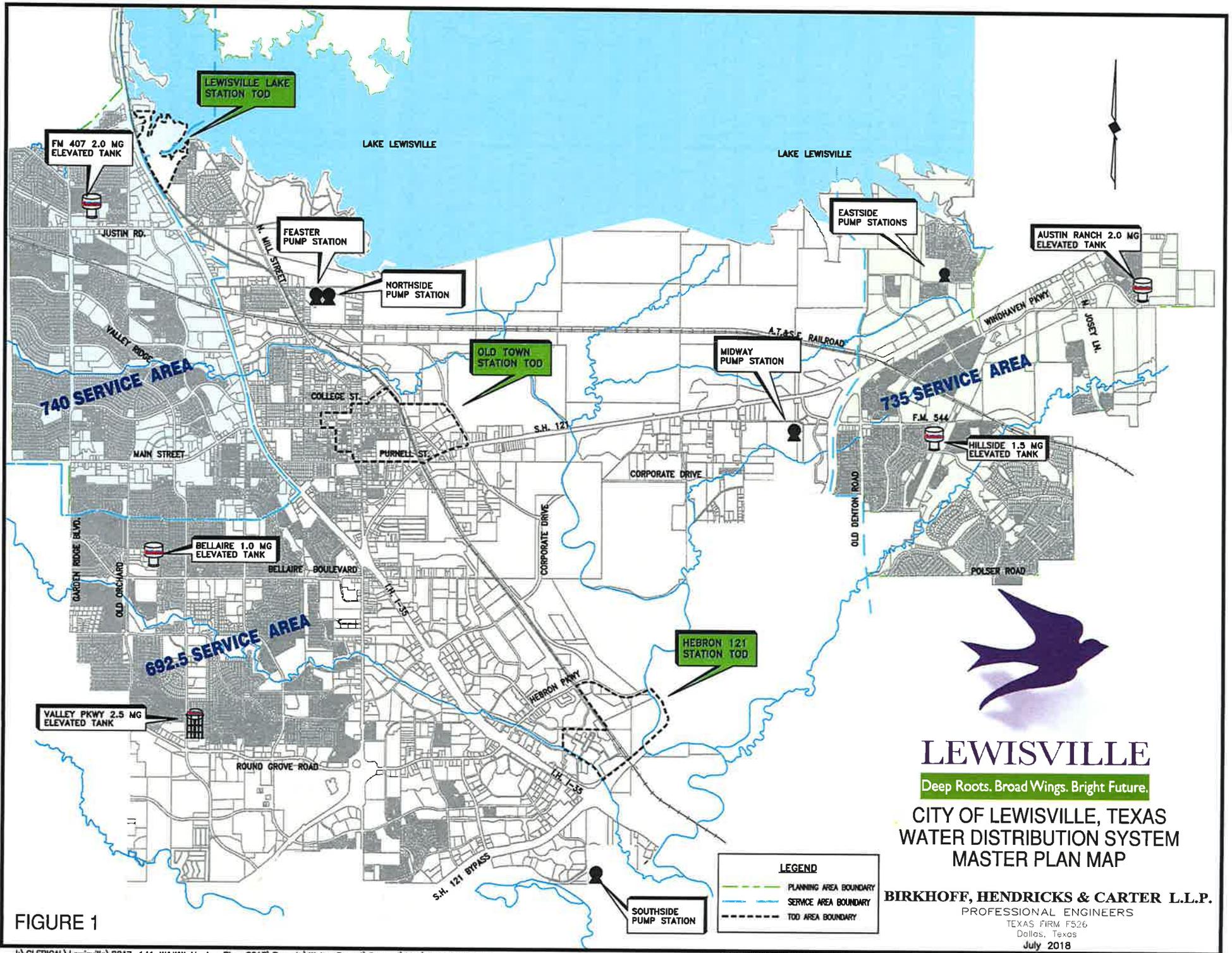


FIGURE 1


LEWISVILLE
 Deep Roots. Broad Wings. Bright Future.
 CITY OF LEWISVILLE, TEXAS
 WATER DISTRIBUTION SYSTEM
 MASTER PLAN MAP
BIRKHOFF, HENDRICKS & CARTER L.L.P.
 PROFESSIONAL ENGINEERS
 TEXAS FIRM FS26
 Dallas, Texas
 July 2018

POPULATION

The demand for water in a community is closely related to its residential population. Total population of a fully developed area dictates the ultimate size of facilities required, whereas the rate of growth is important to determine the timing of the construction of particular projects.

The projected buildout residential population of Lewisville used in this analysis is approximately 163,162 including the Castle Hills, and Lakewood Hills, with approximately 39,203 people located in the 740 Service Area, approximately 83,110 people located in the 692.5 Service Area, and approximately 40,849 people located in the 735 Service Area. The decrease in population compared to the 2011 report is attributable to not annexing Lord and Clem and revised population projections in the City's 2018 land use assumptions. The residential population for Lewisville is based on information from the Lewisville Land Use Assumption Report prepared by Freese and Nichols, Inc., March 2018. The actual population of Lewisville since 1980, together with the estimated population to build-out, is shown on **Plate No. 1, Table No. 1** and **Table No. 2**:

TABLE NO. 1

Service Area	2018 Population*	Buildout Population*
740 Lewisville	29,761	39,203
692.5 Lewisville	72,348	83,110
735 Lewisville	3,424	14,634
735 Castle Hills	15,091	26,215
735 Total	18,515	40,849

* Freese & Nichols, Inc. Land Use Plan

PLATE NO. 1 POPULATION GRAPH

ESTIMATED RESIDENTIAL POPULATION

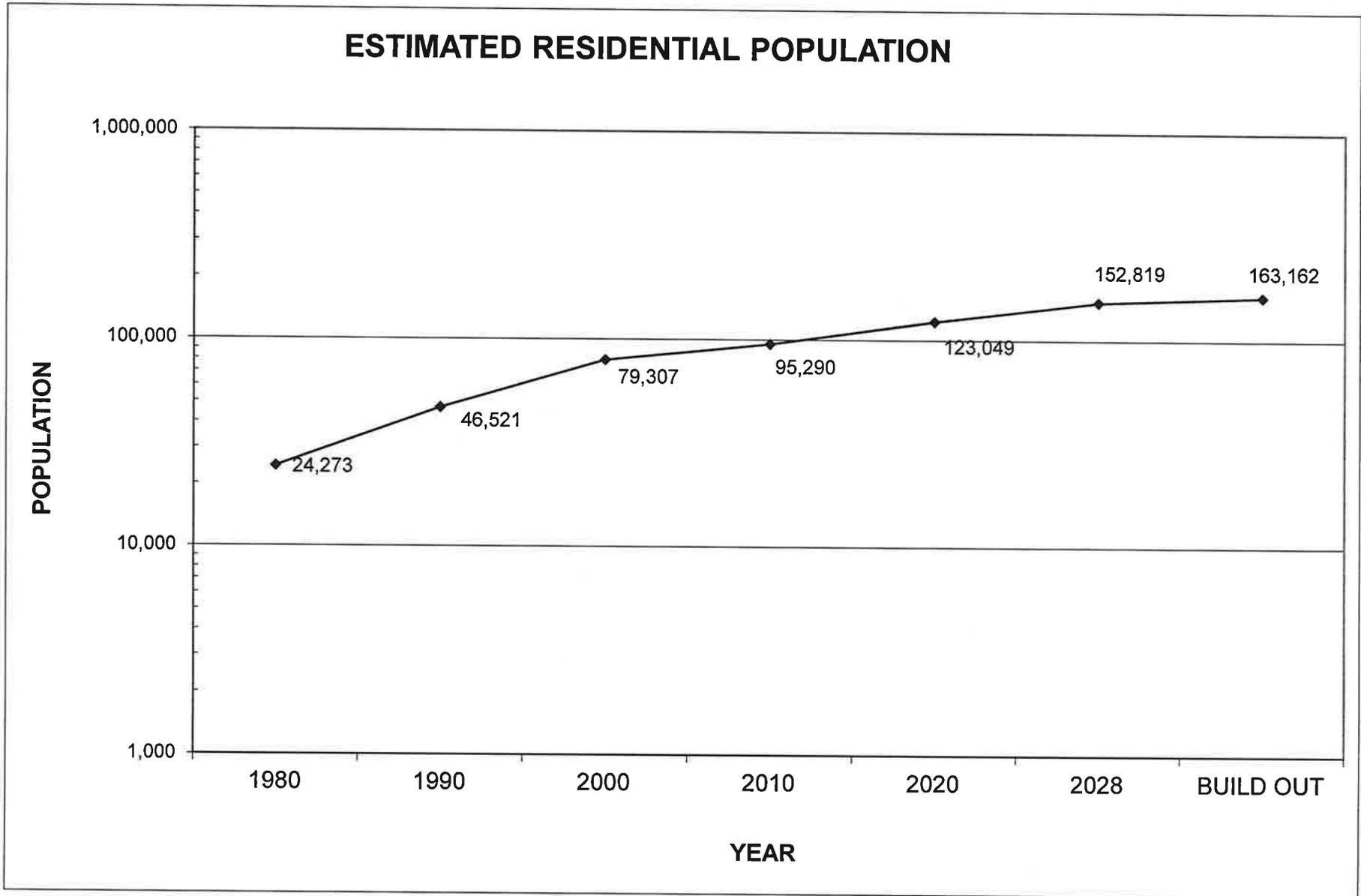


TABLE NO. 2
RESIDENTIAL POPULATION PROJECTIONS

Year	Status	2018 Report Population
1980	Actual	24,273
1990	Actual	46,521
2000	Actual	79,307
2006	Actual	89,100
2010	Actual	95,290
2015	Actual	99,480
2018	Actual	119,874
2020	Estimated	123,049
2028	Estimated	152,819
Build Out	Estimated	*163,162

** The 1997 Report projected buildout to 2020, the 2006 Report projected buildout to 2021, the 2010 Report projects buildout to 2030, and the 2018 Report projects buildout to be 2039.*

Based on this, the buildout population is expected to be reached around the year 2039, but could change with actual growth, changes in economic conditions or changes in development impacts. Since the estimated water demand in this analysis is based on growth projections, any future change will directly affect estimated demand rates and facility needs. The densities used for calculating the buildout residential population are shown on **Table No. 3**.

TABLE NO. 3
RESIDENTIAL UNIT AND POPULATION DENSITIES
BY SERVICE AREA

692 SERVICE AREA

Land Use	Units Per Acre	Population Per Unit
Low Density	4.0	3.0
Town Home Residential	8.0	3.0
High Density Residential	19.0	2.3
Old Town Residential	5.0	2.2
Mobile Home Park Residential	10.0	2.2
Mixed Use Residential	15.0	2.1

735 SERVICE AREA

Land Use	Units Per Acre	Population Per Unit
Low/Medium/Town Home Residential Density	6.0	3.0
High Density Residential	12.0	2.0
Mixed Use Residential	15.0	2.1

740 SERVICE AREA

Land Use	Units Per Acre	Population Per Unit
Low Density	4.0	3.0
Town Home Residential	8.0	3.0
High Density Residential	19.0	2.3
Old Town Residential	5.0	2.2
Mobile Home Park Residential	10.0	2.2
Mixed Use Residential	15.0	2.1

PROJECTED WATER USE

Analysis and design of the proposed water distribution system is based on the maximum water demand anticipated and the proposed future land use in Lewisville. Demand studies completed in surrounding Cities from the summer of 1980, the mid 1990's, and the year 2000 were reviewed in formulating the design demands for this analysis. These studies show the year of 1980 to remain the year of record since water demand rates far exceeded any that have been experienced, largely because of extreme hot summer weather. A demand study completed from the summer of 2017 shows that water demands rates decreased from the previous studies. This is most likely due to the community being more aware of water conservation, water restrictions, and limited water days. This is a trend that other North Central Texas communities are experiencing post draught/extreme water restrictions. Water demand studies are now proceeding for a number of cities in the North Central Texas for the summer of 2018 which his expected to be hot and dry. As demand is better defined, the effects on Lewisville is the water treatment expansions and rehabilitation of pump station will be known. Clarity of per capita usage will determine if a plant expansion is required and if smaller pumps can be considered as pumps are replaced. The peaking factor is the ratio of the maximum hour usage to maximum day usage. The peaking factor of 1.65 for low density residential was utilized in this study.

The following tables summarizes the residential demand rates in gallons per capita per day (g.p.c.d.) and nonresidential demand rates in gallons per acre per day (g.p.a.d.) by Service Area utilized in calculating Lewisville's buildout maximum day and hour water demands. The mixed-use areas utilized a lower maximum day demand rate, but a higher non-residential demand rate. Utilizing a lower per capita demand reduced the maximum daily demand by approximately 6.7 MGD. **Table No. 4A** and **4B** shows 2018 demands utilized in the 692.5 and 735 Service Areas.

TABLE NO. 4A

692.5 SERVICE AREA DESIGN WATER DEMAND RATES

Land Use	Residential		Non-Residential	
	Max Day Per Capita g.p.c.d.	Max. Hour Per Capita g.p.c.d.	Max. Day Per Acre g.p.a.d.	Max. Hour Per Acre g.p.a.d.
Low Density Residential	250	413		
Town Home Residential	250	413		
High Density Residential	250	413		
Mobile Home Park Residential	200	396		
Mixed Use Residential	225	400		
Mixed Use Non-Residential			3,000	3,900
Government/Institutional/Public			1,980	3,168
Office			1,540	2,464
Retail			1,540	2,464
Commercial			1,540	2,464
Industrial			1,980	3,168
Parks			1,540	2,464
Flood Plain			0	0
Agricultural / Open Space (AO)			1,540	2,464

**TABLE NO. 4B
740 SERVICE AREA DESIGN WATER DEMAND RATES**

Land Use	Residential		Non-Residential	
	Max Day Per Capita g.p.c.d.	Max. Hour Per Capita g.p.c.d.	Max. Day Per Acre g.p.a.d.	Max. Hour Per Acre g.p.a.d.
Low Density Residential	250	413		
Town Home Residential	250	413		
High Density Residential	250	413		
Mobile Home Park Residential	200	396		
Mixed Use Residential	225	400		
Mixed Use Non-Residential			3,000	3,900
Government/Institutional/Public			1,980	3,168
Office			1,540	2,464
Retail			1,540	2,464
Commercial			1,540	2,464
Industrial			1,980	3,168
Parks			1,540	2,464
Flood Plain			0	0
Agricultural / Open Space (AO)			1,540	2,464

The 735 Service Area utilized the same non-residential demand rates shown on Table No. 3, but different residential demand rates. **Table No. 5** illustrates the 735 Service Area has higher Low Density Residential demand rates for Maximum Day demands with a peaking factor of 1.65 for the Maximum Hourly demand rate.

TABLE NO. 5
735 SERVICE AREA DESIGN WATER DEMAND RATES

Land Use	Residential	
	Max Day Per Capita g.p.c.d.	Max Hour Per Capita g.p.c.d.
Low/Medium/Town Home Density Residential	350	578
High Density Residential	350	578
Mixed Use Residential	225	371

Table No. 6 summarizes the projected buildout demands being placed on the water distribution system by service area.

TABLE NO. 6
DESIGN WATER DEMANDS BY SERVICE AREA

Service Area and Land Use	Maximum Daily Demand (MGD)	Maximum Hourly Demand (MGD)
692.5 Service Area Residential	20.8	34.3
692.5 Service Area Non-Residential	11.0	18.2
692.5 Service Area Sub-Total:	31.8	52.5
735 Service Area Residential	12.9	21.3
735 Service Area Non-Residential	1.7	2.8
735 Service Area Sub-Total:	14.6	24.1
740 Service Area Residential	9.8	16.2
740 Service Area Non-Residential	1.9	3.1
740 Service Area Sub-Total:	11.7	19.3
Total:	58.1	95.9

Table No. 7 compares this report’s buildout demands with the previous years’ reports.

**TABLE NO. 7
DESIGN WATER DEMANDS
MASTER PLAN REPORT COMPARISON**

Report Year	Buildout Population	Maximum Daily Demand (MGD)	Maximum Hourly Demand (MGD)
1997	149,459	64.40	119.40
2006	166,365	67.50	127.90
2010	186,403	73.11	138.28
2018	163,162	58.10	95.90

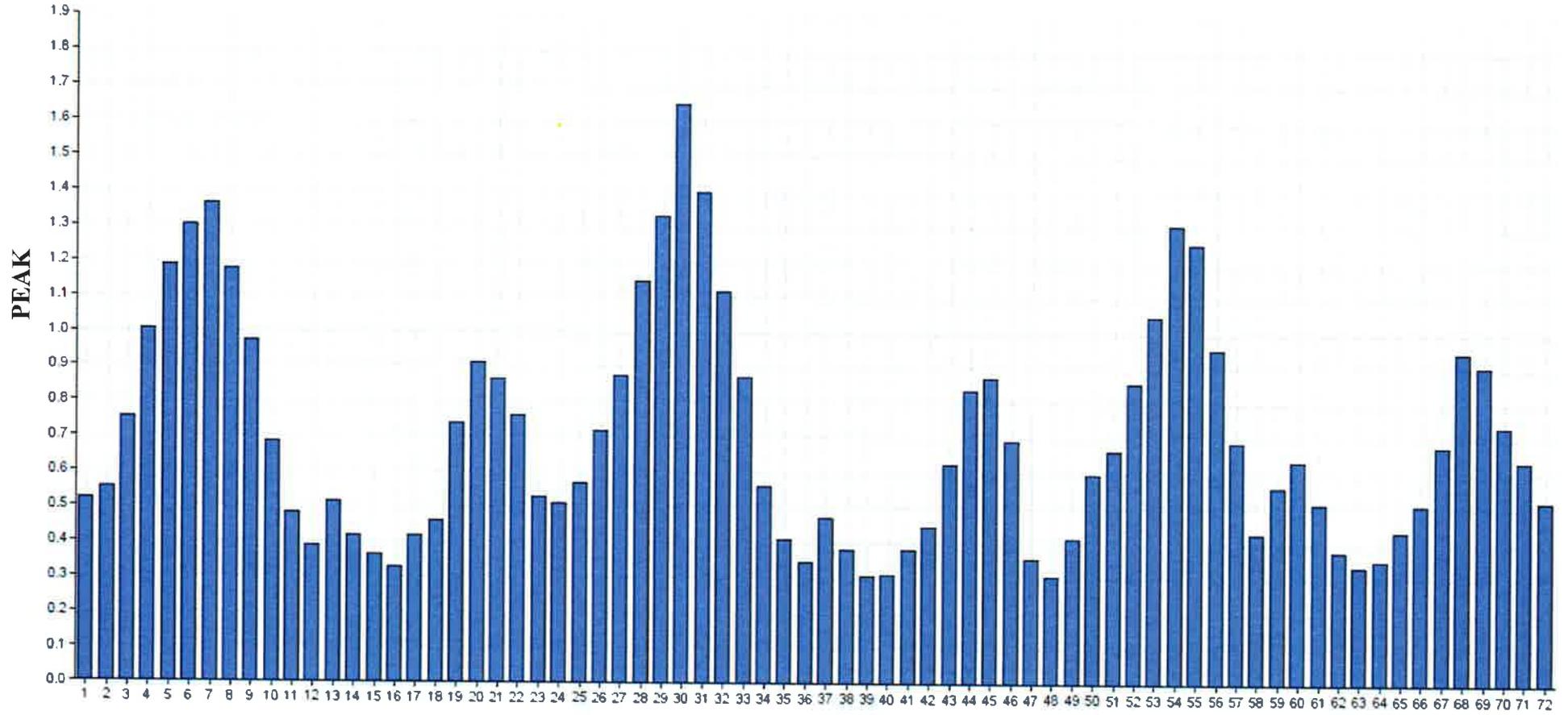
Most of the distribution lines have been constructed. Those lines have been sized for peak hour demands and utilized a maximum daily demand rate of 350 gpcd as the base throughout the network. The lower maximum daily demand has been used in the 692.5 and 740 Service Area to project water supply and to size high service pump stations as they are rehabilitated in future years. The lower demand for these service areas are based on recent water usage.

WATER DISTRIBUTION SYSTEM ANALYSIS

Analysis of the buildout water distribution system is based on the ultimate water demand anticipated and the geographical distribution of the water demand. The design of the proposed water distribution system is based on three separate demand conditions. The first condition is used to determine the buildout supply from the combination of the City's Water Treatment Plant and purchased treated water from Dallas Water Utilities (DWU) which is based on the maximum daily demand. This demand rate is the minimum supply and minimum pumping required by the system. The second condition utilizes the maximum hourly demand rate on the day of maximum demand. Maximum hourly demand rates are used to size distribution lines and to determine the volume of elevated storage. The size of existing and proposed distribution lines is shown on the Master Plan Map presented at the end of this report. The third condition is the minimum hourly demand rate on the day of maximum demand. This rate is used to analyze the refill rates of elevated storage. These three demand conditions were modeled over a three-day period (72 hours) with an Extended Period Simulation (EPS). The 72-hour EPS was developed with the use of a diurnal curve that is used to peak the water demand in the model from a minimum hourly demand condition through a maximum daily demand condition and to a maximum hourly demand condition. The design diurnal curve utilized in the model was created from Lewisville SCADA data in 2006 through 2009, and comparisons of diurnal curves generated in other North Central Texas Cities similar to Lewisville. **Plate No. 2** represents the design 72-hour diurnal curve input into the buildout EPS model. Modeling the water distribution system over a 72-hour period allowed for a check of the ability to draw down and refill ground storage reservoirs and elevated storage tanks and to determine the anticipated system pressures under severe conditions. From the SCADA data and comparing the total maximum hour demand to the total maximum day demand, the system experienced a global peak factor of 1.65 used to increase the maximum daily demands in the hydraulic model. This exceeds the Texas Commission of Environmental Quality (TCEQ) minimum standards of 1.25.

PLATE NO. 2
72-HOUR EPS DIURNAL CURVE

TIME



SERVICE AREAS

The City's existing water distribution system currently operates in three service areas, the 692.5 Service Area, the 735 Service Area, and the 740 Service Area. These three service areas are in three separate pressure zones, which are based off the High Water Level (HWL) of the elevated storage tanks in that particular service area, in relation to the ground level the establishes the pressure range for the service areas.

1) 692.5 Service Area

The 692.5 Service Area is generally located between the 740 and 735 Service Areas, to the City's north, south, and west boundary limits. Ground elevations range from 415 feet MSL to 600 feet MSL. Currently and at buildout, the Bellaire Elevated Tank, the Valley Parkway Elevated Tank, the Feaster Pump Station, the Southside Pump Station, and the Midway Pump Station supply water to the 692.5 Service Area.

2) 735 Service Area

The 735 Service Area is generally located from east of the State Highway (SH) 121 Bypass (Sam Rayburn Tollway) to the City's north, south, and east boundary limits. Ground Elevations range from 455 feet MSL to 615 feet MSL. Currently and at buildout, the Austin Ranch Elevated Tank, Castle Hills Elevated Tank (future in Lewisville system), and Eastside Pump Station supply water to the 735 Service Area.

3) 740 Service Area

The 740 Service Area is generally located from the City's west boundary limits to west of Interstate Highway (IH) 35, and north of Fox Avenue. The ground surface elevations within the 740 Service Area range from 615 feet MSL to 450 feet MSL. Currently and at buildout, the F.M. 407 Elevated Tank and the Northside Pump Station will supply water to the 740 Service Area.

WATER SUPPLY

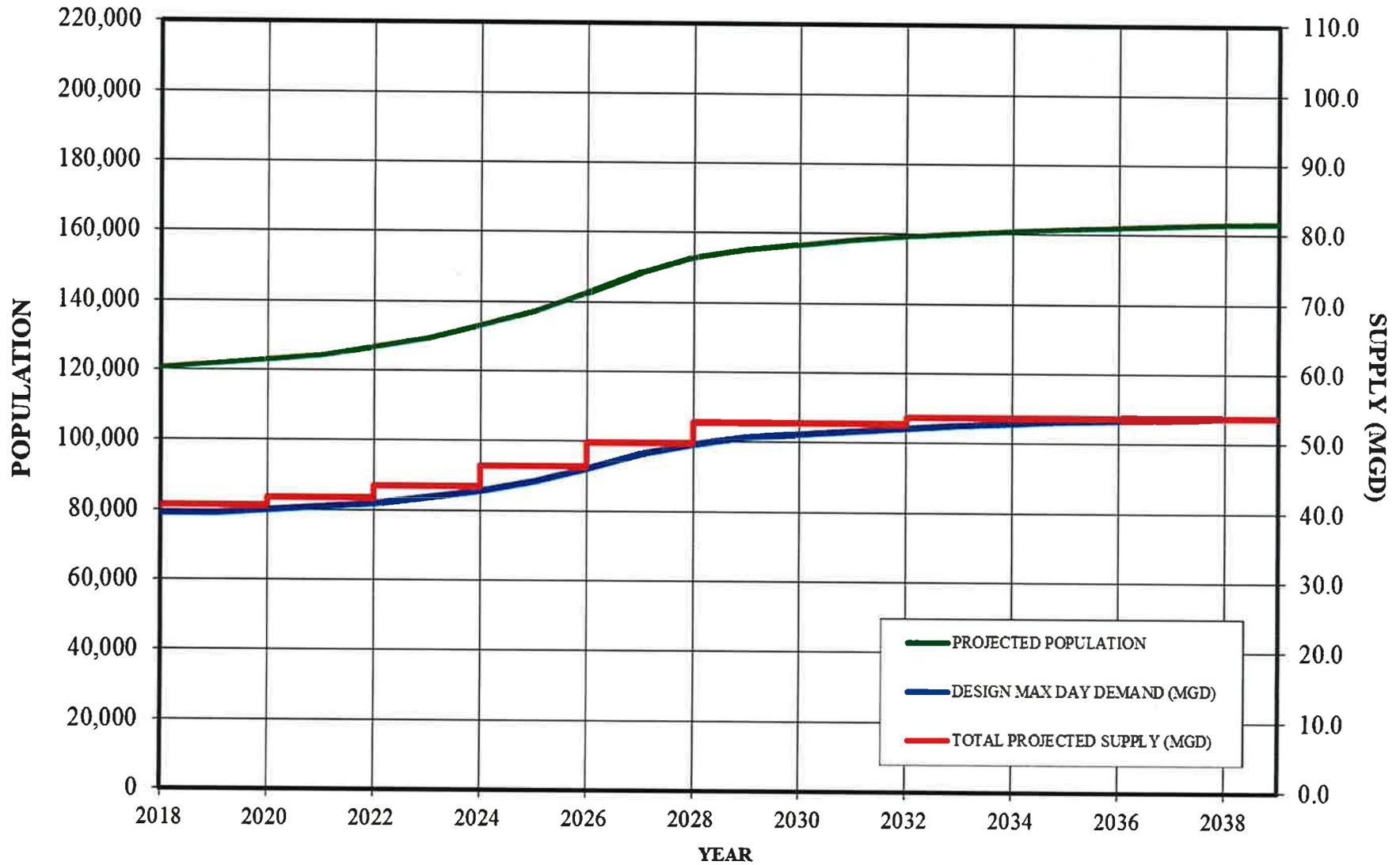
The City currently treats raw water from Lake Lewisville (purchased from Dallas Water Utilities (DWU)) at the City's Water Treatment Plant, and also purchases treated water from Dallas Water Utilities. DWU supplies potable water to three delivery points through rate of flow controllers (ROFC). The three DWU delivery points are the Southside Pump Station known as the Lake Vista ROFC, Midway Pump Station known as the Midway ROFC and the Eastside Pump Station known as the Kine-Pac ROFC. The Lewisville Water Treatment Plant supplies water to the City's Feaster Pump Station and the City's Northside Pump Station.

DWU has their ROFC's set to the City's current supply needs, with anticipated future increases until it reaches its maximum supply dictated by the supply line's maximum capacity. The Lake Vista ROFC (Southside PS) is currently set at 3.0 MGD, and 6.0 MGD is needed for build-out. The Kine-Pac ROFC (Eastside PS) is currently set at 3.0 MGD, and 12.4 MGD is needed for build-out. The Midway ROFC (Midway PS) is currently set at 3.0 MGD, and 15.0 MGD is needed for build-out. The total supply by DWU at buildout will be 33.4 MGD.

At build-out, the City's Water Treatment Plant will need to have a capacity of 20.4 MGD. This is a decrease from the 2011 report of 39.7 MGD. This is due to the decrease in the build-out population projections and a decrease in per capita usage. This population change decreased the pumpage needed to supply the demand. Based on a per capita demand of 250 gpcd for the 692.5 and 740 Service Area and 350 gpcd for the 735 Service Area and Upper Trinity water being supplied to a large part of the Castle Hills area, no additional plant expansions are envisioned in this study. All additional supply will need to be obtained by increasing supply from DWU to their maximum capacity. **Table No. 8** summarizes the projected buildout supply at each delivery point. **Exhibit 1** shows the projected population, supply, and max day demand from 2018 to buildout.

It is recommended that the City continue water demand studies to verify residential per capita demands as the City approaches buildout. Expansion to the water treatment plant and replacement of pumps at high service pump stations may be impacted by changes in the per capita demand rates, or population changes.

CITY OF LEWISVILLE
EXHIBIT 1
MAX. DAY DEMANDS PROJECTED SUPPLY



* City of Lewisville and Castle Hills

TABLE NO. 8
SUPPLY BY SERVICE AREA
WATER TREATMENT PLANT AND DWU

Delivery Point	Buildout (MGD)	Current 2018 (MGD)
692.5 Service Area		
WTP – Feaster PS	8.7	12.4
DWU – Lake Vista ROFC (Southside PS)	6.0	3.0
DWU – Midway ROFC (Midway PS)	15.0	3.0
DWU – Kine-Pac ROFC (Eastside PS)	2.1	0.0
Subtotal: 692.5 Service Area	31.8	18.4
735 Service Area		
DWU – Kine-Pac ROFC (Eastside PS)	10.3	3.0
DWU – Midway ROFC (Midway PS)*	0.0	0.0
Upper Trinity Supply (Castle Hills)	4.8	4.8
Subtotal: 735 Service Area	15.1	7.8
740 Service Area		
WTP – Northside PS	11.7	8.0
Subtotal: 740 Service Area	11.7	8.0
Total Supply:	58.6	34.2

* Backup only to 692.5 Service Area

PUMP STATIONS & GROUND STORAGE RESERVOIRS

A. Feaster Pump Station (692.5 Service Area)

The existing Feaster Pump Station is located at Lewisville’s Water Treatment Plant site and is one of three pump stations that serve the 692.5 Service Area. It is currently supplied by the Water Treatment Plant. At the present time the pump station has five pumps for a rated pumping capacity of 27.5 MGD with the largest pump out of service per TCEQ guide lines.

Pump No.	Rated Capacity (MGD)	TDH (Ft.)
1	6.1	240
2	8.0	150
3	4.8	140
4	9.0	252
5	9.0	150

The total maximum hour pumping capacity calculated at Feaster Pump Station in the hydraulic water model at build out is approximately 12.4 MGD.

The Feaster and North Side Pump Stations utilize the same ground storage reservoir (water treatment plant clear wells). Currently there is a total 7.0-MG of ground storage. The 7.0-MG is composed of three 2.0 MGD concrete reservoirs and one 1.0 MGD concrete reservoir. No additional storage is required. The schematic of the Feaster Pump Station is shown in Figure 2.

B. Southside Pump Station (692.5 Service Area)

The Southside pump station is located on Lake Vista Drive and serves the 692.5 Service Area. DWU currently supplies the pump station site with 3.0 MGD supply, and at buildout can supply it with up to 6.0 MGD through the existing Lake Vista ROFC. The pump station has one pump rated at 2.9 MGD with a total dynamic head of 246 feet (pump one), one pump rated 4.3 MGD with a total dynamic head of 246 feet (Pump two) and two pumps rated at 6.0 MGD with a total dynamic head of 246 feet (pumps three and four), for a rated pumping capacity of 13.2 MGD with the largest pump out of service.

Pump No.	Rated Capacity (MGD)	TDH (Ft.)
1	2.88	246
2	4.32	246
3	6.05	246
5	6.05	246

The total maximum hour pumping capacity calculated at the Southside Pump Station in the hydraulic water model at build out is approximately 9.1 MGD.

Currently there is one 2.0 MG prestressed concrete ground storage reservoir. The schematic for the Southside Pump Station is shown in Figure 3. A proposed 2.0 MG reservoir is projected in the future for reliability purposes.

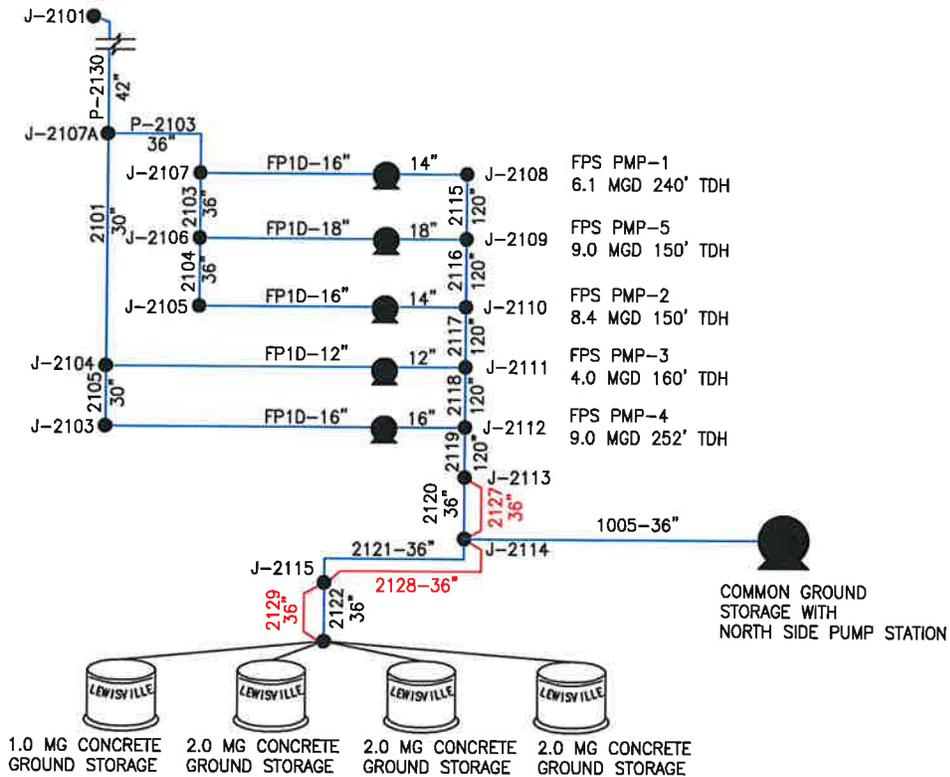
FIGURE NO. 2



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

SCHMATIC LAYOUT



LEGEND

- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING WATER PUMP
- PROPOSED WATER PUMP
- EXISTING GROUND STORAGE
- PROPOSED GROUND STORAGE

RATED PUMP STATION
 CAPACITY 27.5 MGD
 WITH LARGEST PUMP
 OUT OF SERVICE

CITY OF LEWISVILLE, TEXAS

FEASTER PUMP STATION

692.5 SERVICE AREA

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS — Texas Firm F526
 DALLAS, TEXAS

Aug, 2018

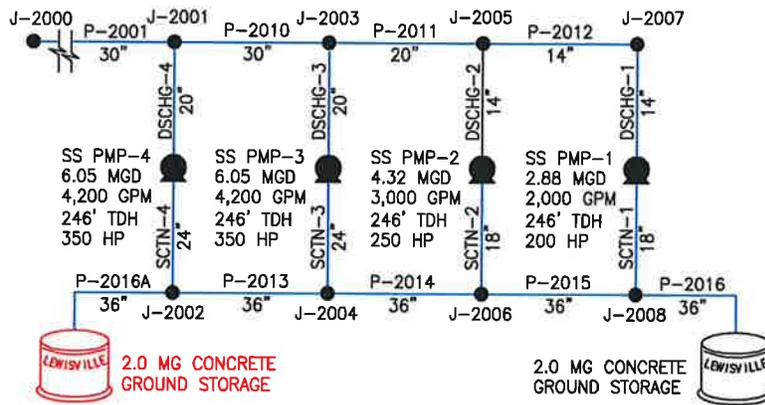
FIGURE NO. 3



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

SCHEMATIC LAYOUT



SOUTHSIDE PUMP STATION (692.5 SERVICE AREA)

LEGEND

-  EXISTING WATER LINE
-  PROPOSED WATER LINE
-  EXISTING WATER PUMP
-  PROPOSED WATER PUMP
-  EXISTING GROUND STORAGE
-  PROPOSED GROUND STORAGE

RATED PUMP STATION
CAPACITY 13.25 MGD
WITH LARGEST PUMP
OUT OF SERVICE

CITY OF LEWISVILLE, TEXAS

SOUTHSIDE PUMP STATION
692.5 SERVICE AREA

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS - Texas Firm F526
DALLAS, TEXAS

Jul, 2018

C. Midway Pump Station (692.5 & 735 Service Areas)

The Midway Pump Station is located on Midway Road, west of F.M.544. The Midway Pump Station serves both the 692.5 and 735 Service Area. DWU currently supplies 3.0 MGD, at buildout DWU can supply up to 15.0 MGD of treated water at the Midway Pump Station delivery point. The pump station consist of five pumps, each pump rated at 6.7 MGD with a total dynamic head of 234 feet, for a total rated pumping capacity of 26.8 MGD with the largest pump out of service. Four pumps are dedicated to the 692.5 Service Area, and one pump is dedicated to the 735 Service Area. This pump station was designed to allow for various pump combinations to the two service areas in case of an emergency.

Pump No.	Rated Capacity (MGD)	TDH (Ft.)
1 (692.5)	6.67	234
2 (692.5)	6.67	234
3 (692.5)	6.67	234
4 (692.5)	6.67	234
5 (735)	6.67	234

The total maximum hour pumping capacity calculated utilizing the hydraulic model for Midway Pump Station serving the 692.5 service area at build out is approximately 16.3 MGD.

A proposed 3.0-MG ground storage reservoir is recommended for reliability purposes. The schematic for the Midway Pump Station is shown in **Figure 4**.

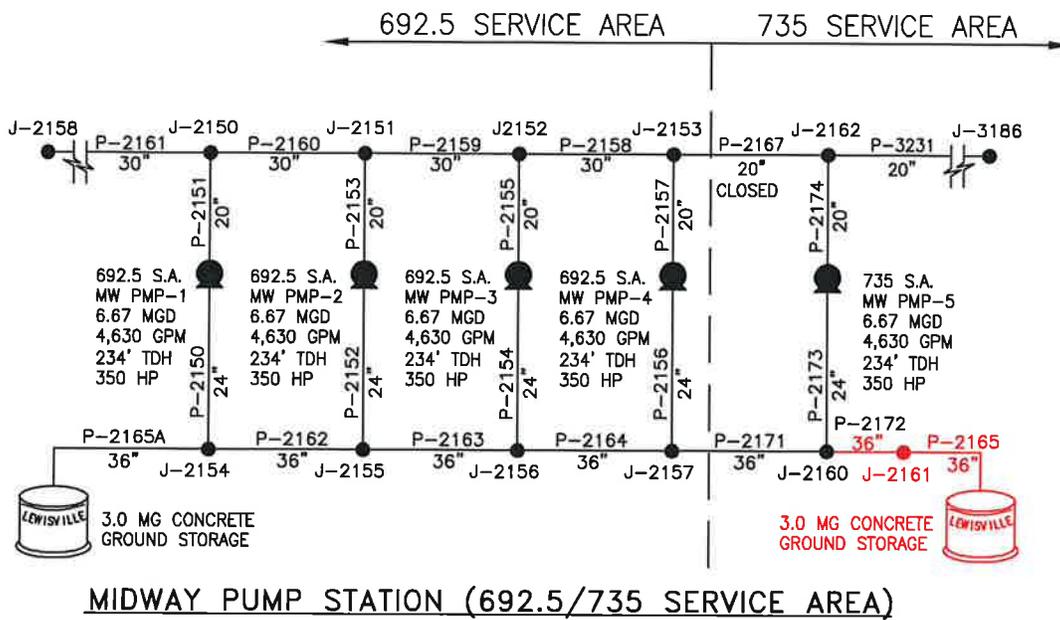
FIGURE NO. 4



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

SCHEMATIC LAYOUT



692.5 S.A. RATED PUMP
STATION CAPACITY 20.0
MGD WITH LARGEST PUMP
OUT OF SERVICE

735 S.A. RATED PUMP
STATION CAPACITY 6.67
MGD WITH LARGEST PUMP
OUT OF SERVICE

LEGEND

- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING WATER PUMP
- PROPOSED WATER PUMP
- EXISTING GROUND STORAGE
- PROPOSED GROUND STORAGE

CITY OF LEWISVILLE, TEXAS

MIDWAY PUMP STATION
692.5 & 735 SERVICE AREAS

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS — Texas Firm F526
DALLAS, TEXAS

Jul, 2018

D. Eastside Pump Station (735 Service Area)

The existing Eastside Pump Station is located along Lake Ridge Road and currently serves both the 692.5 and 735 Service Areas. The buildout service area includes Castle Hills. DWU currently supplies this station with 3.0 MGD through their existing Kine-Pac ROFC located at the Eastside Pump Station site. At buildout, its supply from DWU will be 12.4 MGD. Presently there are four pumps rated at 3.0 MGD with a total dynamic head of 246 feet for a total rated pumping capacity of 9.0 MGD with the largest pump out of service. The water model calculated that at build out the maximum hour pumping rate at Eastside Pump Station is 11.3 MGD.

The amount of ground storage required for this pump station is 3.0 MG. There is a 2.0 MG Prestressed Concrete Reservoir and a 1.0-MG Steel Ground Storage Reservoir serving for existing ground storage. If space is available, we recommend a 2.0 MG concrete tank be considered in lieu of the 1.0 MG required. We also recommend installing larger pumps whenever the Eastside Pump Station needs to be rehabilitated in order to meet buildout demand. The schematic for the pump station is shown on **Figure 5**.

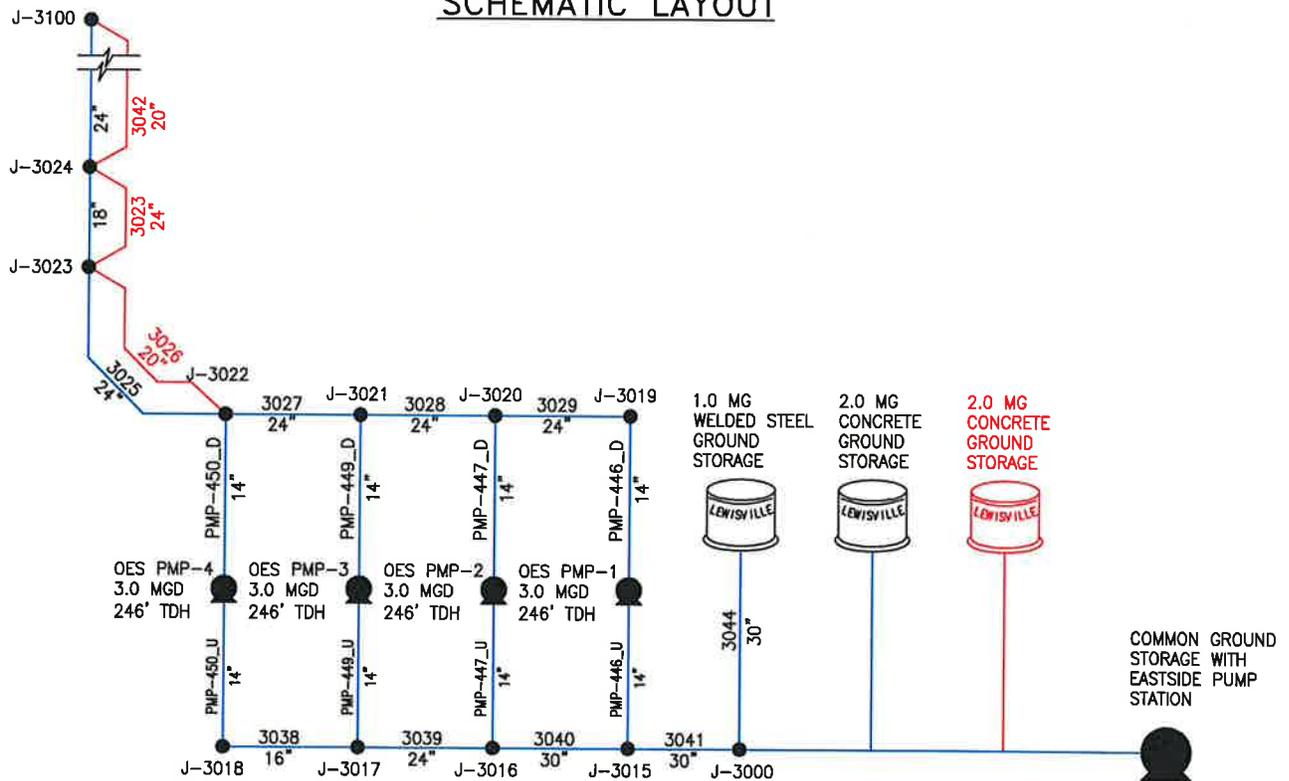
FIGURE NO. 5



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

SCHEMATIC LAYOUT



EASTSIDE PUMP STATION (735 SERVICE AREA)

LEGEND

-  EXISTING WATER LINE
-  PROPOSED WATER LINE
-  EXISTING WATER PUMP
-  PROPOSED WATER PUMP
-  EXISTING GROUND STORAGE
-  PROPOSED GROUND STORAGE

RATED PUMP STATION
CAPACITY 9.0 MGD
WITH LARGEST PUMP
OUT OF SERVICE

CITY OF LEWISVILLE, TEXAS

EASTSIDE PUMP STATION
735 SERVICE AREA

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS — Texas Firm F526
DALLAS, TEXAS

Jul, 2018

E. Northside Pump Station (740 Service Area)

The Northside Pump Station is located at Lewisville's Water Treatment Plant Site and serves the 740 Service Area. It is projected that at build out the service area will have a maximum day demand of approximately 11.7 MGD. The Northside Pump Station currently has one pump rated at 2.5 MGD with a total dynamic head of 198 feet (pump one), one pump rated at 4.0 MGD with a total dynamic head of 198 feet (Pump two), one pump rated at 7.3 MGD with a total dynamic head of 201 feet (Pump three) and one pump rated at 7.3 MGD with a total dynamic head of 201 feet (Pump four). The current total rated pumping capacity of the North Side Pump Station is 13.8 MGD with the largest pump out of service.

The water model calculated that at build out, the total maximum hourly pumping capacity at the Northside Pump Station is 13.2 MGD.

At the present time, the North Side Pump Station shares the same existing 7.0 MG of ground storage with the Feaster Pump Station. The schematic for the Northside Pump Station is shown in **Figure 6**.

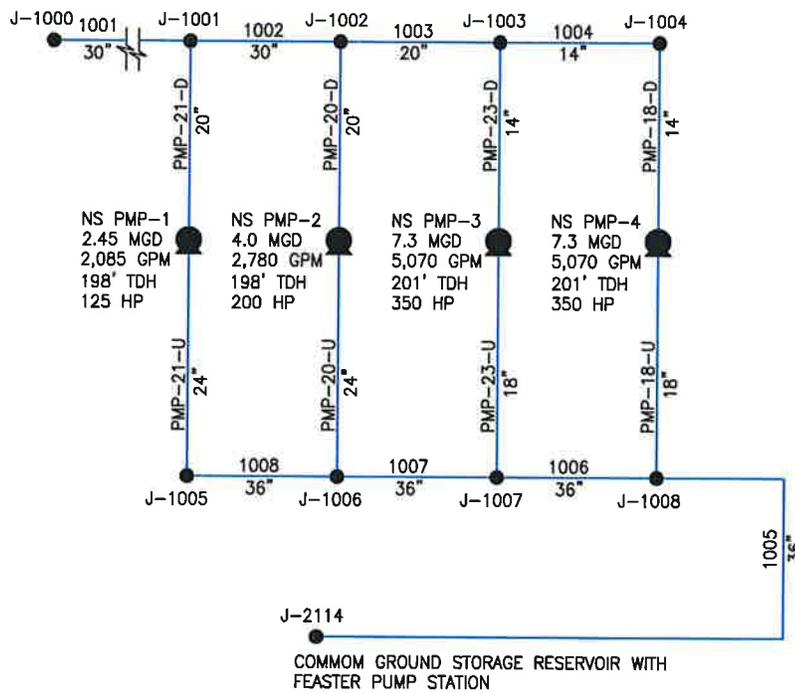
FIGURE NO. 6



LEWISVILLE

Deep Roots. Broad Wings. Bright Future.

SCHEMATIC LAYOUT



NORTHSIDE PUMP STATION (740 SERVICE AREA)

LEGEND

- EXISTING WATER LINE
- PROPOSED WATER LINE
- EXISTING WATER PUMP
- PROPOSED WATER PUMP
- EXISTING GROUND STORAGE
- PROPOSED GROUND STORAGE

RATED PUMP STATION
CAPACITY 13.80 MGD
WITH LARGEST PUMP
OUT OF SERVICE

CITY OF LEWISVILLE, TEXAS

NORTHSIDE PUMP STATION
740 SERVICE AREA

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS – Texas Firm F526
DALLAS, TEXAS

Jul, 2018

Table No. 9 summarizes the pump stations capacity at buildout compared to the Maximum Daily Demand as shown on **Table No. 6**.

TABLE NO. 9
PUMP STATION FIRM CAPACITY AT BUILDOUT BY SERVICE AREA

Pump Station Site	Pumping Firm Capacity (MGD)	Maximum Daily Demand (MGD)
692.5 Service Area		
Feaster Pump Station	27.5	
Southside Pump Station	13.2	
Midway Pump Station	20.1	
Subtotal: 692.5 Service Area	60.8	31.8
735 Service Area		
Eastside Pump Station	9.0	
Midway Pump Station	6.7	
Subtotal: 735 Service Area	15.7	14.6
740 Service Area		
Northside Pump Station	13.8	
Subtotal: 740 Service Area	13.8	11.7
TOTAL PUMPING CAPACITY:	90.3	58.1

GROUND STORAGE RESERVOIRS

Ground storage within the system is necessary to provide a dependable supply during periods of high demand, emergencies or disruption in supply. The volume of ground storage in this report was designed to match the pump stations' pumping capacity in MGD for a draw down period of 6 hours, or a 12-hour average day demand draw down. **Table No. 10** summarizes the projected ground storage required for each pump station site and the projected buildout storage.

Eastside, Southside, and Midway Pump Stations are supplied by Dallas Water Utilities. At the sites, ground storage is also utilized to extend bumps in supply that can cover an increase in the demand change in the DWU rate structure. Having two reservoirs at a pump station site provides reliability to the distribution system.

TABLE NO. 10
GROUND STORAGE SUMMARY

Pump Station Site	Pumping Capacity (MGD)	Required Storage (MG)	Existing Storage (MG)	Buildout Storage (MG)
Feaster/Northside	41.3	6.0	7.0	7.0
Southside	13.2	2.0	2.0	4.0
Eastside	9.0	3.0	3.0	5.0
Midway	26.8	3.0	3.0	6.0
Total:	90.3	14.0	15.0	22.0

ELEVATED STORAGE TANKS

The volume of elevated storage is based on the difference of the maximum daily demand (pumpage) and the maximum hourly demand rate. This volume in conjunction with pumpage will meet the projected peak hourly demands in the system. The minimum amount of elevated storage required by the Texas Commission on Environmental Quality (TCEQ) is 100 gallons per connection. The existing number of connections is estimated to be 39,958. At 100 gallons per connection, the TCEQ minimum volume of elevated storage required for the existing distribution system is approximately 4.0 million gallons. The existing system meets TCEQ’s requirements for minimum elevated storage. For buildout, comparing the buildout population with the existing population, the estimated buildout number of connections is approximately 52,791. The TCEQ minimum elevated storage volume required would equate to 5.3 million gallons. The City has 9.0 million gallons of elevated storage that will be sufficient and also meet TCEQ requirements, as shown on **Table No. 11**.

TABLE NO. 11
ELEVATED STORAGE CAPACITY
AT BUILDOUT

Elevated Storage Tank	Service Area	Elevated Storage Capacity (MG)
Valley Parkway Elevated Tank(All Steel Leg)	692.5	2.5
Bellaire Elevated Tank (Composite)	692.5	1.0
* IH-35 Elevated Tank(All Steel Leg)	692.5	0.5
F.M. 407 Elevated Tank(Composite)	740.0	2.0
Austin Ranch Elevated Tank(Composite)	735.0	2.0
Castle Hills Elevated Tank(Composite)	735.0	1.5
Total:		9.0

* The IH-35 Elevated Tank is not currently in service, not included in total amount

WATER TREATMENT PLANT

The existing production capacity of the water treatment plant is a firm 20.4 MGD. In addition to the DWU supply, the water treatment plant must be capable of producing a supply to meet the maximum daily demand. It is estimated at build out that the water treatment plant will need to have the capacity to produce 20.4 MGD. Sizing of the water treatment plant is based on the maximum day demand utilizing a per capita demand of 250 g.p.c.d. The per capita demand rate is lower than previous studies. The North Central Texas area is generally seeing a decrease in usage after the previous drought and water restrictions along with a strong public relations campaign by the water supplies. Continued monitoring of per capita usage should be conducted as Lewisville nears buildout to substantiate the continued low per capita demand and the determination of no water treatment plant expansion.

FIRE FLOW ANALYSIS

A fire hydrant is an element of the water distribution system that provides for public fire-protection service. The usage of a fire hydrant as a source of water for fighting a fire is the primary purpose for which the element is installed. A fire flow analysis was performed on the water distribution system utilizing the computer software. Each service area was analyzed for fire protection during the maximum daily demand at Build-out. Every junction node in each of the service areas was analyzed in order to meet the following constraints, which meet or exceed TECQ standards:

- 1) *Minimum Fire Flow Required for a Given Junction (1 hydrant) 1.44 mgd (1,000 gpm)*
- 2) *Residual Pressure at the Fire Flow Junction 20 psi*
- 3) *Minimum Acceptable System Pressure with a Fire in the System 35 psi*

A single fire hydrant has a maximum discharge rate of 1.44 MGD (1,000 gpm). The analysis consisted of placing up to 1.44 MGD (the equivalent of using one fire hydrant with 3 outlet nozzles) at each junction node and requiring the water distribution system to maintain minimum pressures. All the junction nodes in each Service Area were analyzed in the Build-out Model. A fire flow was added to a junction node during the maximum daily demand run to determine if the system could deliver the required fire flow while maintaining a residual pressure at the node of 20-psi. In addition, all other nodes were checked to determine if pressures within the system could be maintained at a minimum design pressure 35-psi. Junction Node No. J-2347 (in the Lake Station TOD Area) had the least amount of available flow of 2.17 MGD after sustaining a residual pressure of 20-psi. A copy of the results of the fire flow analysis of the Build-out model can be found at the end of the report by Service Area.

PROPOSED LINES

Table No. 12 shows the proposed lines greater than twelve inches for the 692.5 Service Area and 735 Service Area.

**TABLE NO. 12
PROPOSED PIPES IN SERVICE AREAS**

692.5 SA - BUILDOUT PIPES		
ID (Char)	Length (Ft.)	Diameter (in.)
P-2626	2,946	24

735 SA - BUILDOUT PIPES		
ID (Char)	Length (Ft.)	Diameter (in.)
P-3231	2,364	20

HYDRAULIC ANALYSIS

A computer assisted analysis was performed utilizing H2ONET computer software to aide in developing an overall system of water mains, storage facilities and pump stations to efficiently serve the entire city as development is now envisioned. The resulting plan is shown on the water distribution map outside this report. The master plan map shows the size and location of all existing and future feeder mains as well as elevated storage facilities. Also shown are reference numbers on all pipes and pipe intersections or nodes. These numbers refer to additional information contained in the computer printout. Two computer analyses were undertaken: One for the maximum hourly demand on the day of maximum demand and one for the minimum hourly demand on the day of maximum demand.

The hydraulic information shown on the computer printout is described as follows:

- 1) **PipeNumber** - number shown on system map for each section of pipe between nodes.
- 2) **JunctionNode** - Pump Station, intersection of pipe, or water use point. The first node number indicates the flow entering a section of pipe, the second node number indicates flow leaving that section of pipe. A minus sign indicates the flow opposite of the node order.
- 3) **Length** - Distance between nodes in feet.
- 4) **Diameter** - Pipe diameter in inches.
- 5) **Roughness** - Coefficient of friction designated to the section of pipe.
- 6) **Boundary Node** - Pressure zone elevation based on U.S.C.& G.S. datum. Location of elevated storage tank.
- 7) **Demand** - Design flow at nodes in million gallons per day (MGD). A minus sign indicates flow into the system.
- 8) **Elevation** - Ground elevation at node based on U.S.C.& G.S. datum.
- 9) **ConnectingPipe** - Pipe number connecting to junction node.
- 10) **FlowRate** - Rate of flow in pipe section in million gallons per day.
- 11) **Headloss** - Friction headloss in section of pipe, in feet.
- 12) **Velocity** - Velocity of flow in section of pipe in feet per second (fps).
- 13) **HL/1000** - Friction loss in feet per thousand feet of pipe.
- 14) **GradeLine** - Elevation of water surface at node based on U.S.C. & G.S. datum (hydraulic gradient).
- 15) **Pressure** - Pressure in pounds per square inch (psi) at the node.



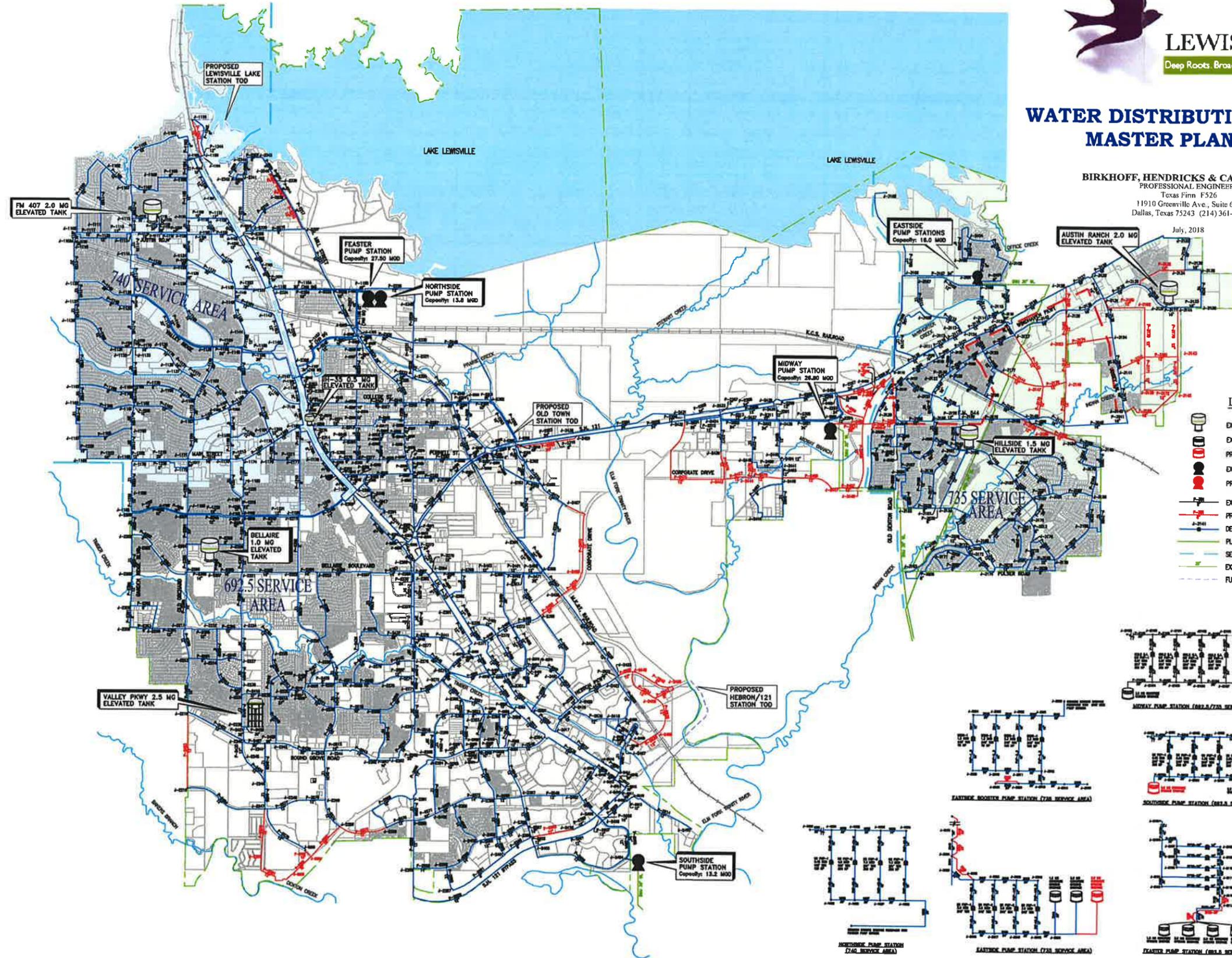
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WATER DISTRIBUTION SYSTEM MASTER PLAN 2018

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 Texas Firm F526
 11910 Greenville Ave., Suite 600
 Dallas, Texas 75243 (214) 361-7900

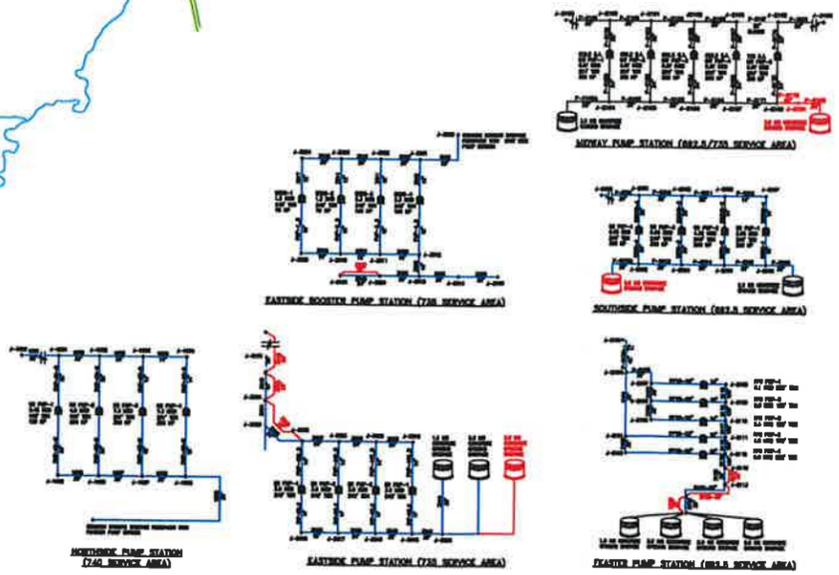
July, 2018

SCALE: 1"=5000'



LEGEND

- EXISTING ELEVATED STORAGE TANK
- EXISTING GROUND STORAGE TANK
- PROPOSED GROUND STORAGE TANK
- EXISTING PUMP STATION
- PROPOSED PUMP STATION
- EXISTING WATER LINE AND SIZE
- PROPOSED WATER LINE AND SIZE
- DEMAND NODE AND NUMBER
- PLANNING AREA BOUNDARY
- SERVICE AREA BOUNDARY
- EXIST. DALLAS WATER UTILITIES WATERLINE
- FUTURE TOO AREAS





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2018 WATER DISTRIBUTION SYSTEM MASTER PLAN

BIRKHOFF, HENDRICKS & CARTER, L.L.P.

PROFESSIONAL ENGINEERS

DALLAS, TEXAS

(214) 361-7900

amata@bhcllp.com

JULY 2018

**2018 WASTEWATER COLLECTION SYSTEM
MASTER PLAN**

Submitted To



LEWISVILLE

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Submitted By

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
*SPECIALIZING IN CIVIL ENGINEERING FOR
MUNICIPALITIES AND GOVERNMENTAL AGENCIES*

July 2018

**2018 WASTEWATER COLLECTION SYSTEM
MASTER PLAN**

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WASTEWATER MASTER PLAN MAP

John W. Birkhoff
7/31/18



CITY OF LEWISVILLE, TEXAS
2018 WASTEWATER COLLECTION SYSTEM
MASTER PLAN UPDATE REPORT

GENERAL

Previous analyses have been performed for the City of Lewisville’s Wastewater Collection System, which have resulted in long-range plans for the system. The latest of these reports was completed in 2011. Since 2011, projected conditions have changed enough to warrant a new analysis of the system to take into account the new information from the 2018 Land Use Assumptions prepared by Freese & Nichols and the removal of 364-acres of Lord and Clem tracts from the master plan.

Although the proposed system is designed to accommodate the ultimate development of the City, it should be examined at intervals and revised to conform to any new conditions which may arise in the future. Likewise, prior to undertaking a major expenditure, an examination should be made to verify that design criteria used in developing the overall plan is still valid.

One focus of the 2018 Master Plan Update is the collection system improvements required to support development in the East Side of the City. It is now envisioned that flow in the Indian Creek basin will no longer be intercepted by the Indian Creek Lift Station and Force Main, but it will instead be conveyed through Castle Hills.

The proposed collection system improvements of this Master Plan Update were determined using the City’s wastewater hydraulic model. The hydraulic model software is InfoSewer Pro Suite 7.6, running on the ArcGIS 10.4.1 platform. The model has been updated to reflect the most current service areas, future land uses, population projections and flow monitoring observations. The model is named the “Master Plan Model”.

The purpose of the 2018 Master Plan update is to present the results from a re-examination of the elements in the wastewater system that will be required to serve the City when full development is reached and is the basis of the impact fee analysis.

PLANNING AREA

The current City Limits, the ETJ (Castle Hills), and the portion of Lakewood Hills are included in the wastewater collection system planning area. The total planning area for this study is approximately 22,223-acres, or 34.7-square miles. The approximately 7,788-acres of the City limits that are comprised of Lewisville Lake and the land owned by the Corp of Engineers, which lay in the corporate City limits where no development will take place, were not included in this study.

Parcels within the planning area were each classified by land use type and were used for wastewater flow calculations. Area that was not contained within the parcels, being typically right-of-way and greenspace, was not included in the calculations. Buildout land use composition by area is as follows: 25%-low density residential, 8%-high density residential, 2%-transportation-oriented development (T.O.D.), 4%-commercial, 9%-retail, 11%-industrial park, 12%-mixed use, 3%-public/semi-public, 17%-Lewisville commons, 2%-City uses, 8%-parks and open space. It should be noted that residential populations were determined for each sub-basin using the Land Use Assumptions reported Traffic Survey Zone (TSZ) populations.

SERVICE AREAS & SUB-BASINS

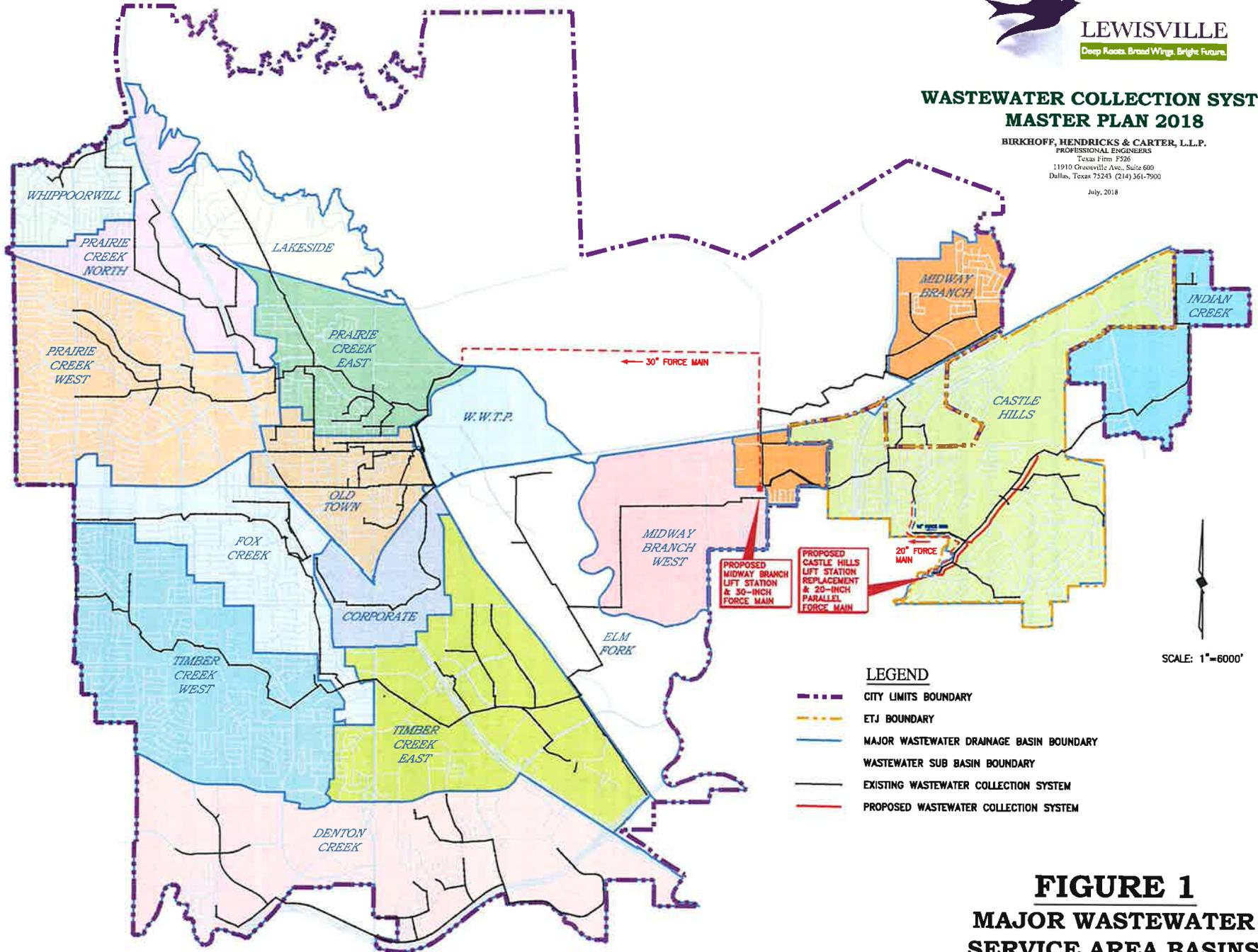
The planning area is now divided into the seventeen (17) separate drainage basin service areas, revised from sixteen (16) service areas in the previous master plan due to the revision of proposed lift stations for the East Side. These areas are generally defined by the natural topography. These service areas are shown by **Figure 1**. Flows generated from the service areas reach the City's wastewater treatment plant by combination of gravity lines, lift stations and force mains. Each major drainage basin is further divided into sub-basins, and a total of one-hundred two (102) sub-basins were individually assessed for land use composition and estimated for wastewater flows.



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**WASTEWATER COLLECTION SYSTEM
 MASTER PLAN 2018**

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 Texas Firm E326
 11910 Greenville Ave., Suite 600
 Dallas, Texas 75243 (214) 361-7900
 July, 2018



**FIGURE 1
 MAJOR WASTEWATER
 SERVICE AREA BASINS**

POPULATION

The projected build-out residential population of Lewisville used in this analysis is 163,162-people, which includes the Castle Hills and Lakewood Hills. The 2018, 2028 and Buildout residential populations for Lewisville were provided by the FNI Land Use Assumptions report. The populations are provided in **Table 1**.

**TABLE 1
POPULATION PROJECTIONS (CITY LIMITS AND E.T.J.)**

Year	Population
2018	120,624
2028	152,864
Buildout	163,162

The Land Use Report provides a table of populations that are divided among seventy-three (73) Traffic Survey Zone areas that were used to distribute the populations among the wastewater sub-basins. The existing population is approximately 74% of the anticipated buildout population.

The 2011 master plan projected a buildout residential population of 186,403-people for Lewisville City limits and ETJ. This master plan update is based on a buildout population projection that is reduced by 23,241-people, or 14% less than the previous master plan study. The actual population of Lewisville since 1980, together with the estimated population to build-out, is shown in **Table 2**.

**TABLE 2
RESIDENTIAL POPULATION PROJECTIONS**

Year	Status	2018 Report Population
1980	Actual	24,273
1990	Actual	46,521
2000	Actual	79,307
2006	Actual	89,100
2010	Actual	95,290
2015	Actual	99,480
2018	Actual	119,874
2020	Estimated	123,049
Build Out	Estimated	163,162

BUILDOUT WASTEWATER FLOWS

Buildout residential populations were provided by the Land Use Assumptions report for each Traffic Survey Zone. Those populations were distributed among the wastewater sub-basins and used to calculate and distribute the future generated average flows.

Buildout average flows were calculated for the projected 163,162-residents and 6,700-acres of non-residential land uses. Growth to buildout includes the addition of 42,538-residents and 1,819-acres of non-resident land use. The remaining growth represents 26% of the buildout population and 27% of the non-residential land use.

Table 3 summarizes the existing and buildout average flows calculated for each major wastewater collection basin. Generated flows utilized design demands and input from the 2017 Flow Monitoring Program completed by RJN Group, Inc. Existing per capita demands, calculated for the flow meter basins, ranged from 50 to 200-gallons per capita per day (gpcd). It was determined that an average daily flow of 19.60-MGD will be received by the WWTP at buildout. If the effluent flow at the WWTP continues to be reduced to 72% of the influent rate, due to the sludge removal and reuse processes, an effluent discharge rate of 14.2-MGD is expected at buildout. Today, the plant is permitted for 12-MGD.

TABLE 3

MAJOR COLLECTION BASIN DESIGN FLOWS (EXISTING & BUILDOUT)

Collection Basin (Service Area)	Service Area (Acres)	Average Daily Flow (MGD)					
		EXISTING (2018)			BUILDOUT		
		Residential	Non-Res.	Total	Residential	Non-Res.	Total
Castle Hills	2,813	1.59	0.11	1.70	2.63	0.25	2.89
Corporate	580	0.41	0.70	1.11	0.42	0.72	1.15
Denton Creek	2,745	1.08	0.57	1.64	1.18	0.78	1.95
Elm Fork	1,676	0.11	0.07	0.18	0.11	0.17	0.28
Fox Creek	1,253	1.11	0.79	1.90	1.12	0.79	1.91
Indian Creek*	667	0.15	0.15	0.30	1.21	0.19	1.40
Lakeside	714	0.31	0.01	0.33	0.34	0.01	0.35
Midway Branch	552	0.27	0.07	0.35	0.34	0.09	0.43
Midway Branch West	1,343	0.02	0.13	0.14	0.02	0.28	0.30
Old Town	737	0.26	0.21	0.47	0.37	0.23	0.60
Prarie Creek East	1,023	0.07	0.20	0.28	0.26	0.26	0.53
Prarie Creek North	811	0.37	0.14	0.51	0.96	0.21	1.17
Prarie Creek West	1,924	1.56	0.49	2.05	1.57	0.50	2.08
Timber Creek East	2,071	1.14	0.46	1.61	1.35	0.55	1.90
Timber Creek West	2,113	1.50	0.49	1.99	1.51	0.49	2.00
Whipporwill	663	0.22	0.01	0.23	0.36	0.03	0.40
WWTP	539	0.01	0.06	0.06	0.18	0.09	0.27
TOTAL:	22,223	10.19	4.65	14.85	13.95	5.65	19.60

*Lakewood Hills is included in the Indian Creek Basin

EAST SIDE COLLECTION SYSTEM

The Master Plan re-evaluates the Far East Lewisville Collection System. The major drainage basins on the East Side are: Indian Creek, Castle Hills and Midway Branch. A major change in this study is the removal of the Lord & Clem tract from the Indian Creek service area and replacing it with recently annexed Lakewood Hills. The Indian Creek Basin includes Lakewood Hills and the Sysco Food Processing Center. The Castle Hills Drainage Basin is a primarily residential area in the ETJ, and it includes a small area within the City limits. The Midway Branch drainage basin was split into two areas that are divided by S.H. 121 and by Holford Prairie Road.

The Eastside collection system has been reconfigured to allow flow generated in Indian Creek to gravity to the Castle Hills Lift Station by eliminating the intercepting Indian Creek Lift Station at F.M. 544 and Indian Creek. The previously-proposed Cross Roads Lift Station was also eliminated. The existing trunk main through Castle Hills will need to be paralleled to eliminate surcharging and overflow under buildout peak flow, and the Castle Hills Lift Station will require capacity expansion.

Flow generated by the Midway Branch, the Indian Creek and Castle Hills drainage basins is conveyed directly to the WWTP via the proposed Midway Branch Lift Station and Force Main.

EAST SIDE FACILITIES

The Castle Hills Trunk Sewer (Project: Castle Hills Phase-1) is primarily 24-inch and 21-inch diameter PVC sewer line constructed along Indian Creek. South of the railroad crossing (F.M. 544 and Indian Creek), the trunk line has a capacity of 3.2-MGD on the segments with the flattest slopes. The trunk sewer capacity increases downstream to approximately 8.5-MGD for the most downstream sections. Upstream, flow from Indian Creek is 4.2-MGD, and total flow is 10.5-MGD downstream near the Castle Hills Lift Station. At buildout the existing trunk line was surcharged with a predicted overflow in the Master Plan Model that utilized a wet weather peaking factor of 3.0, which is shown by **Figure 2**.

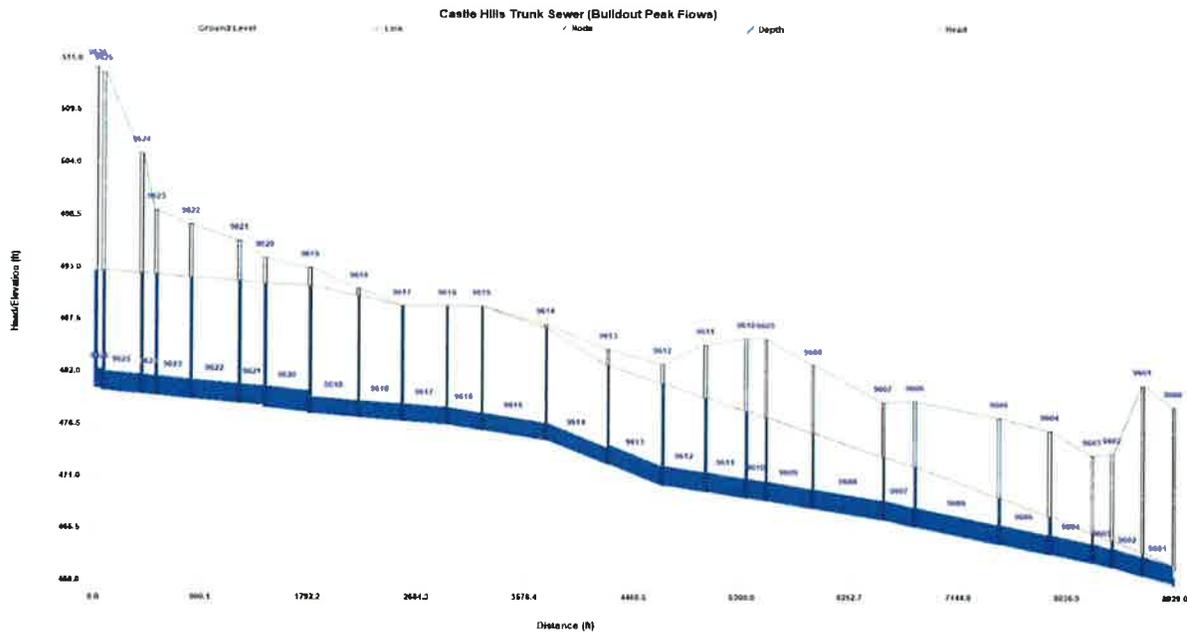


FIGURE 2 - EXISTING CASTLE HILLS TRUNK SEWER (Projected Buildout Flows)

In the future, approximately 7,300-linear feet of 21-inch diameter parallel trunk sewer will be required to eliminate surcharging and overflow. The parallel sewer will allow a free-flowing trunk line. Based on average slopes, the proposed 21-inch parallel sewer would provide an additional capacity in the range of 5.0-MGD. Alternatively, the existing trunk sewer can be replaced with a 30-inch diameter line for capacity in the range of 13.0-MGD.

The Castle Hills Lift Station, located near the intersection of King Arthur Boulevard and Morgan LeFay Lane, will require capacity improvements to convey the buildout peak flow, 10.5-MGD. The existing Lift Station uses a 16-inch diameter force main that is 6,000-linear feet in length. The TCEQ requires force main velocities between 3-feet per second (fps) and 6-fps, therefore the existing lift station pumping capacity, utilizing the 16-inch diameter force main, ranges from 2.7-MGD to 5.4-MGD. Pumping the Castle Hills Lift Station buildout peak flow, 10.5-MGD, would cause a 16-inch force main velocity of approximately 11.6-fps. For the purpose of this Master Plan, a parallel 20-inch force main is proposed to convey the buildout peak flows of the Castle Hills Lift Station. A single 24-inch diameter force main could replace the existing 16-inch for a capacity range of 6.1-MGD to 12.2-MGD.

The Castle Hills Lift Station is proposed for replacement to support the buildout East Side flows, including a new wet well, pumps and control panel. The proposed buildout firm capacity for the Lift Station is 13.5-MGD, based on additional calculations with the land uses and using the ASCE residential peaking factor from Curve A.

The Castle Hills Lift Station Force Main discharges into a 24-inch sewer that was constructed with the Castle Hills Phase-4, Section-A development. Although complete plans for this sewer line were not found, based on the known diameter and upstream and downstream flowline elevations, the 24-inch sewer has adequate capacity for the buildout flows. The Holford’s 18-inch and 30-inch parallel sewers (Lewisville Project Nos. 4255 & U90805) also have adequate capacity. Downstream of the Holford’s parallel sewers is the location of the proposed Midway Branch Lift Station. Based on calculations with the land uses and using the ASCE residential peaking factor from Curve A, the recommended buildout Firm capacity for the proposed Midway Branch Lift Station is 15.0-MGD.

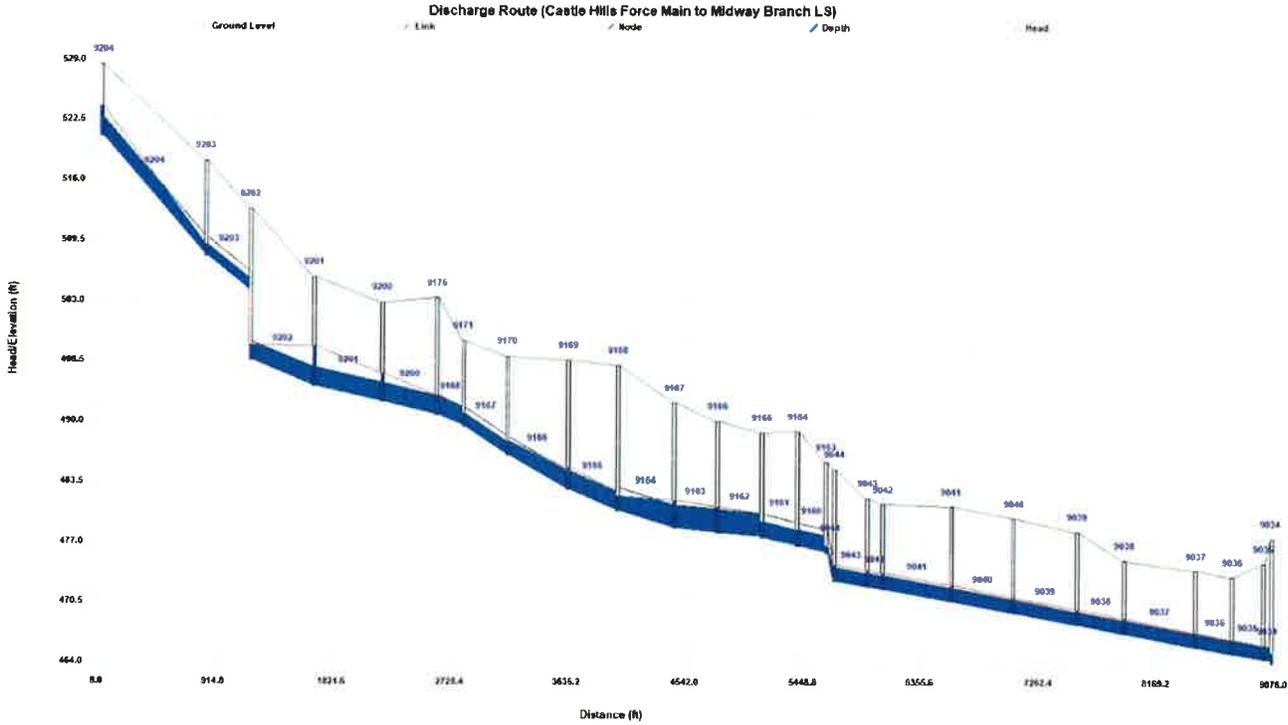


FIGURE 3 - CASTLE HILLS LIFT STATION OUTFALL SEWER (Projected Buildout Flows)

The full length of the route from the Castle Hills Force Main discharge manhole to the proposed Midway Branch Lift station is shown by **Figure 3**. Only minor surcharging is observed under peak buildout flows; 13.0-MGD at the downstream point and 10.9-MGD upstream.

It was determined that the 21-inch and 24-inch Holford’s Prairie Trunk Sewer downstream of the Midway Lift Station must remain in service to serve development along Corporate Drive, near Huffines Boulevard. This trunk discharges into the Timber Creek Lift Station.

WASTEWATER LIFT STATIONS

The six (6) lift stations included in the master plan model were: Prairie Creek, Timber Creek, Vista Ridge, Whippoorwill, Midway Branch (proposed) and Castle Hills (existing & proposed configurations). Firm capacity for the future Midway Branch, Castle Hills and rehabilitation of Vista Ridge were based on per capita flows of 100-gpcd, 1,000-gpad for non-residential, 700-gpad for I&I and the ASCE Peaking Factors.

TABLE 4
BUILDOUT FLOWS TO LIFT STATION

Lift Station	Lift Station Service Area (Acres)	Proposed Buildout FIRM Capacity (MGD)
Prairie Creek	6,990	22.0
Timber Creek	10,729	28.0
Vista Ridge	2,745	10.0
Whippoorwill	481	2.0
Castle Hills	2,714	13.5
Midway Branch	4,234	15.0

A. Prairie Creek Lift Station

The Prairie Creek Lift Station is situated at the City of Lewisville Wastewater Treatment Plant. It is a ‘headworks’ lift station that serves to elevate the water surface of the influent flow so that it may be conveyed via gravity through the treatment system components. Total wet well dimensions are approximately 23-feet by 30-feet and 19-feet deep. The 24-inch diameter Timber Creek Lift Station force main is shown by the plans to be routed through, and metered at, the Prairie Creek Lift Station building, but the Prairie Creek Lift Station does not re-lift the Timber Creek flow. The 16-inch diameter cast-iron force main is approximately 500-LF and discharges into the fine screens unit of the treatment plant.

The Lift Station is equipped with six (6) pumps, and has a Firm pumping capacity of 24.0-MGD. The required Firm capacity for buildout is 22.0-MGD.

B. Timber Creek Lift Station

The Timber Creek Lift Station is the largest lift station in the City's collection system. Total wet well dimensions are 32.5-feet by 83-feet and 37.5-feet deep. Timber Creek Lift Station operates dual 24-inch and 36-inch force mains in parallel (Lewisville Project Nos. WPC-TEX-1111 & 4399, respectively). Each force main is approximately 18,500-LF in length. The Lift Station is provided with seven (7) available pump slots, and currently four (4) pumps are installed. There are two larger pumps and two smaller pumps. The calculated existing Firm capacity of the Lift Station is 21.2-MGD. The required Firm capacity for buildout is 28.0-MGD.

This master plan update included model revisions to more accurately simulate the dual force main configuration of the Timber Creek lift station. At the anticipated buildout peak flow rate, 28.0-MGD, the 24-inch force main is calculated to convey approximately 7.2-MGD at 3.6-fps velocity, and the 36-inch force main would convey approximately 20.8-MGD at 4.5-fps velocity. This lift station uses variable frequency drives to throttle the motor speeds allowing flexibility in pumping rates.

C. Vista Ridge Lift Station

The Vista Ridge Lift Station serves the most southerly service area on the West Side, the Denton Creek major drainage basin. Denton Creek is largely composed of non-residential land uses and is approximately 73-percent developed at this time. The Vista Ridge total wet well dimensions are approximately 22-feet by 35-feet and 31-feet deep, and the 24-inch diameter force main is approximately 7,990-LF. Capacity of the 24-inch force main ranges from 6.1-MGD to 12.2-MGD, with force main velocities of 3-fps and 6-fps, respectively.

The City is in the process of pump replacement for Vista Ridge. The existing calculated Firm pumping capacity is 7.9-MGD with two (2) of the three (3) currently-installed pumps running. The required Firm capacity for buildout is 10.0-MGD. This lift station will be furnished with variable frequency drives.

D. Whippoorwill Lift Station

The Whippoorwill Lift Station exists in the northwest City of Lewisville planning area and serves approximately 480-acres of residential units. Constructed in 1987, Whippoorwill was designed and constructed to serve a portion of the City of Highland Village which is outside the current planning area. Highland Village flows are being conveyed to the Upper Trinity Regional Water District facilities. The previous master plan accounted for future connection of the proposed Lakeside TOD lift station to the Whippoorwill service area, but it was recently decided to re-route those flows southerly, to the Prairie Creek North drainage basin. As a result of the planning changes, the Whippoorwill Lift Station is oversized for the projected buildout flows, and the lift station service area is fully developed.

The total wet well dimensions of Whippoorwill are approximately 13-feet by 39-feet and 32-feet deep, and the 20-inch diameter, ductile iron pipe force main is approximately 5,700-LF. Four (4) pump slots are available, and there are three (3) installed two-speed Cornell Pumps ((2)- 8” 8NHTA-8VCX & (1)- 10” 10NHTA-VF12). The existing pumps were installed with the original construction and are approximately 30-years old. The Firm capacity of the two smaller pumps was calculated to be 7.3-MGD. The required Firm capacity for buildout is 2.0-MGD. The City is currently replacing these pumps and motors.

E. Castle Hills Lift Station

The Castle Hills Lift Station is situated in the City’s ETJ and is not operated by the City at this time. Constructed in 1997 with Castle Hills Phase-1, the station serves Indian Creek and most of the Castle Hills (ETJ) developments. A 421-acre portion of the western ETJ area, Castle Hills, do not flow to the Castle Hills Lift Station. Two (2) circular wet wells, each 6-feet in diameter, operating in parallel. Each wet well has just one pump installed. The existing 16-inch diameter force main is approximately 6,000-LF, and it is routed northeasterly, discharging to the Midway Branch Drainage Basin.

The Firm pumping capacity was not verified, and we recommend that the pumping capacity of this Lift Station be field measured. The Castle Hills Lift Station is proposed for replacement, including new wet well, pumps, control panel and parallel 20-inch force main. The force main will discharge into the existing 24-inch trunk sewer (Castle Hills - Phase 4 project). The required Firm capacity for buildout is 13.5-MGD.

F. Midway Branch Lift Station (Proposed)

The proposed Midway Branch Lift Station will intercept the East Side-generated flow (a 4,234-acre service area), and pump the flow directly to the WWTP, relieving the Timber Creek Lift Station. The required Firm capacity of the proposed Lift Station is 15.0-MGD.

Preliminary design of the Midway Branch Lift station includes a wet well with total dimensions 48-feet by 20.5-feet and 38-feet deep. Four (4) pump slots are provided.

The currently-proposed 30-inch diameter force main is approximately 19,400-LF and has a capacity range of 9.5-MGD to 19.0-MGD, based on the recommended velocity range of 3-fps to 6-fps. The capacity range of a 27-inch diameter force main is 7.7-MGD to 15.4-MGD.

LEWISVILLE WASTEWATER TREATMENT PLANT

The City owns and operates the wastewater treatment plant which serves the entire planning area, including the ETJ. The plant currently operates under a 12.0-MGD effluent discharge permit. Planning for expansion of treatment plant capacity and permit limits should follow Rule §305.126(a) of the Texas Administrative Code. The rule, known as the ‘75%/90%-Rule’, sets timeline parameters for capacity expansions. The rule states:

“Whenever flow measurements for any sewage treatment plant facility in the state reaches 75% of the permitted average daily or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the wastewater treatment and/or collection facilities. Whenever the average daily or annual average flow reaches 90% of the permitted average daily flow for three consecutive months, the permittee shall obtain necessary authorization from the commission to commence construction of the necessary additional treatment and/or collection facilities.”

Based on the 75%/90%-Rule, the City should begin planning for WWTP expansion when the monthly effluent, discharge flow, rate averages 9.0-MGD for three (3) consecutive months, and implementation of the expansion shall be triggered when the effluent rate averages 10.8-MGD for three (3) consecutive months.

Today, the average influent flow rate for the planning area is approximately 11.7-MGD, but the average effluent rate is 8.3-MGD which is approximately 72% of the influent flow rate. The effluent

flow rate determines the permit requirements. Two consecutive months in 2018 averaged effluent rates that were greater than 9.0-MGD, thus the requirement to begin planning for WWTP expansion is near. It is estimated that planning for the expansion should begin within the next two years.

The buildout average flow rate for the entire planning area is 19.6-MGD, based on the revised land uses, populations and flow assumptions. (Approximately 2.7-MGD of the total average flow will be generated by the ETJ.) If the effluent discharge flow rate continues to be 72% of the influent flow rate, the required discharge permit for buildout would be approximately 14.1-MGD, due to the sludge removal and reuse processes.

Projected peak buildout influent flow at the WWTP is 64.9-MGD.

EXISTING LINE ANALYSIS

A model-based analysis of the existing collection lines was conducted to determine if lines are of adequate size to carry buildout flows with a reasonable amount of Inflow & Infiltration, which was determined to be at a peak factor of 3.0. Any peak flows having a peaking factor above 3.0 signify excessive Inflow & Infiltration, and steps are required to repair the lines to reduce the Inflow & Infiltration and overall treatment.

The model results predicted one segment of line along the 24-inch and 27-inch Prairie Creek East Trunk, to experience overflow. In this condition, it was determined that future growth exceeds the available capacity and system improvements are warranted. An 18-inch and 15-inch relief sewer along this trunk line, from Manhole No. 2016 to Manhole No. 2004, is required to relieve the over flow condition. The noted lines are the upstream 24-inch sections of the Prairie Creek East Trunk Sewer. The length is approximately 4,200-linear feet. The relief sewer is predicted to eliminate potential overflows, however, surcharging would still occur.

Alternatively, the improvements could be extended downstream to also parallel the existing 27-inch sections of the trunk line. The total length of repair, between Manhole No. 2016 and Manhole No. 1018 is approximately 7,870-linear feet. The full-length relief line allows this segment to be in free flow conditions.



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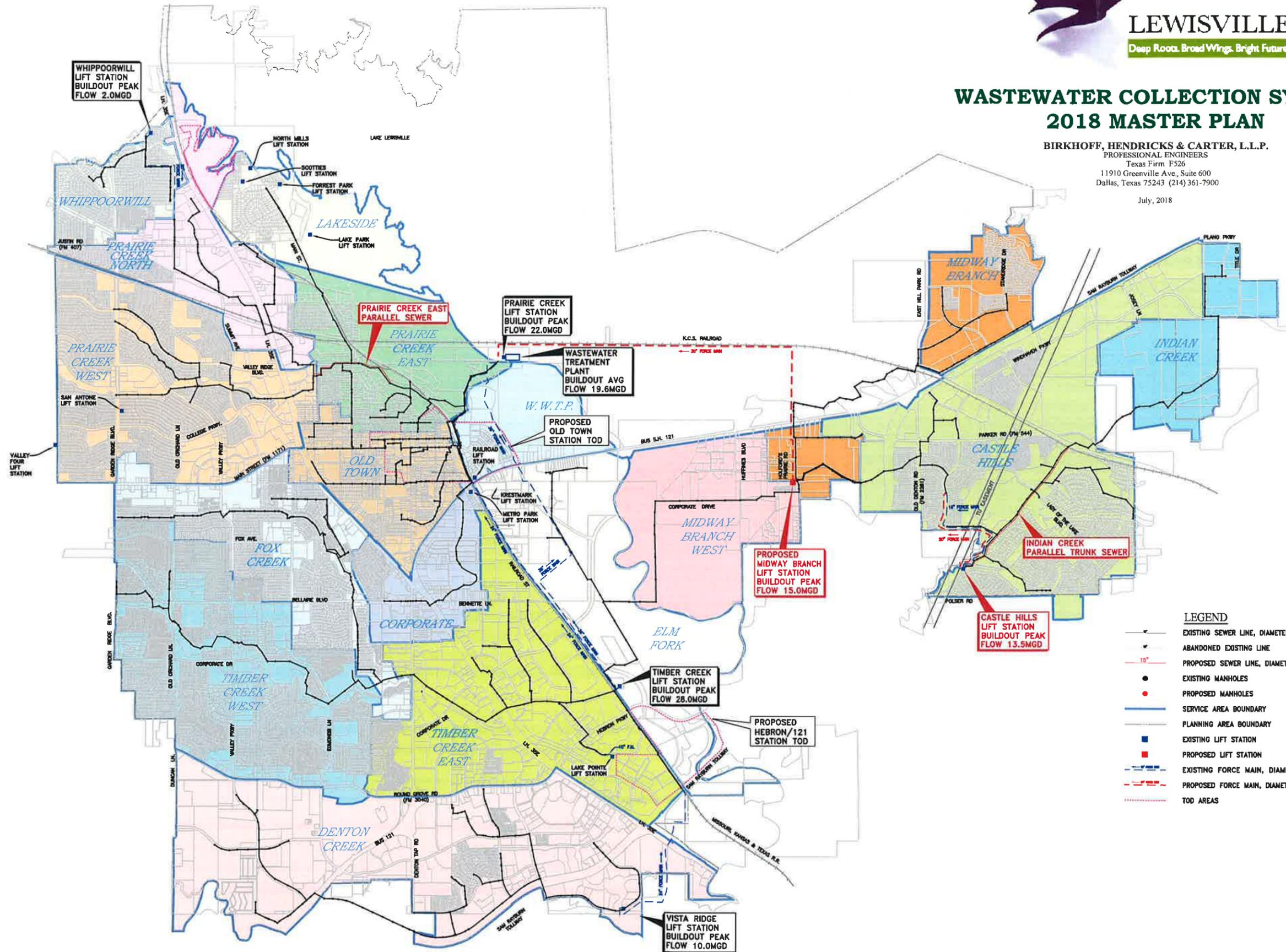
PROFESSIONAL ENGINEERS

Texas Firm F526

11910 Greenville Ave., Suite 600

Dallas, Texas 75243 (214) 361-7900

July, 2018



SCALE: 1"=4500'

LEGEND

- EXISTING SEWER LINE, DIAMETER
- ABANDONED EXISTING LINE
- PROPOSED SEWER LINE, DIAMETER
- EXISTING MANHOLES
- PROPOSED MANHOLES
- SERVICE AREA BOUNDARY
- PLANNING AREA BOUNDARY
- EXISTING LIFT STATION
- PROPOSED LIFT STATION
- EXISTING FORCE MAIN, DIAMETER
- PROPOSED FORCE MAIN, DIAMETER
- TOD AREAS



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BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
(214) 361-7900

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