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Water & Wastewater Impact Fee Report

July 2012

Prepared for:

City of Lancaster

Lancaster

Prepared by:

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Water & Wastewater Impact Fee Report
July 2012

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ES EXECUTIVE SUMMARY

1.0 Background

Chapter 395 of the Texas Local Government Code requires an impact fee analysis before impact fees can be created and assessed. Chapter 395 defines an impact fee as "a charge or assessment imposed by a political subdivision against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development." In September 2001, Senate Bill 243 amended Chapter 395 thus creating the current procedure for implementing impact fees. Chapter 395 identifies the following items as impact fee eligible costs:

- Construction contract price
- Surveying and engineering fees
- Land acquisition costs
- Fees paid to the consultant preparing or updating the capital improvements plan (CIP)
- Projected interest charges and other finance costs for projects identified in the CIP

Chapter 395 also identifies items that impact fees cannot used to pay for, such as:

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

- Principal payments and interest or other finance charges on bonds or other indebtedness, except as allowed above

In June 2011, the City of Lancaster, Texas, authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis of the City's water and wastewater systems. The purpose of this report is to address the methodology used in the development and calculation of water and wastewater impact fees for the City of Lancaster. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment of water and wastewater impact fees.

2.0 Land Use Assumptions

Population and land use are important elements in the analysis of water and wastewater systems. Water demands and wastewater flows depend on the residential population and commercial development served by the systems and determines the sizing and location of system infrastructure. A thorough analysis of historical and projected populations, along with land use, provides the basis for projecting future water demands and wastewater flows. **Tables ES-1 and ES-2** present service area population and employment for each planning year.

Table ES-1 Water and Wastewater Population Projections

Year	Service Population	Average Annual Population Growth	Average Annual Growth Rate
2012	35,959	-	-
2022	46,949	1,099	2.7%
2035	65,751	1,446	2.6%

Table ES-2 Water and Wastewater Employment Projections

Year	Number of Employees in Service Area	Average Annual Employee Growth	Average Annual Growth Rate
2012	14,848	-	-
2022	23,773	893	4.8%
2035	36,100	948	3.3%

3.0 Capital Improvement Plan

A capital improvements plan (CIP) was developed for the City of Lancaster to ensure high quality water and wastewater service that promotes residential and commercial development. The recommended improvements will provide capacity and reliability to meet projected water demands and wastewater flows through year 2035.

Water demands and wastewater flows were developed based on historical data provided by the City. The projected average day, maximum day, and peak hour water demand by pressure plane are presented in **Table ES-3**. The projected average annual daily and peak wet weather wastewater flows are presented in **Table ES-4**.

Table ES-3 Projected Water Demands

Pressure Plane	Year	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
Upper (792')	**2012**	3.38	6.76	12.17
	2022	4.60	9.20	16.56
	2035	5.77	11.66	20.99
Lower (705')	**2012**	1.40	2.80	5.04
	2022	2.00	4.00	7.20
	2035	3.50	6.91	12.43
Total	**2012**	**4.78**	**9.56**	**17.21**
	2022	**6.60**	**13.20**	**23.76**
	2035	**9.27**	**18.57**	**33.42**

Table ES-4 Projected Wastewater Flows

Year	Average Annual Daily Flow (MGD)	Peak Wet Weather Flow (MGD)
2012	5.17	31.05
2022	7.06	42.38
2035	10.09	60.53

Proposed water and wastewater system projects to serve the system through 2035 were developed as part of this project based on load projections and design criteria. **Table ES-5**

summarizes the costs of the water CIP, and **Table ES-6** summarizes the costs of the wastewater CIP.

Table ES-5 Summary of Water System Project Costs

Planning Period	Capital Costs
2012-2016	$17,161,710
2017-2021	$19,122,990
2022-2035	$18,120,210
Total	**$54,404,910**

Table ES-6 Summary of Wastewater System Project Costs

Planning Period	Capital Costs
2012-2016	$15,536,670
2017-2021	$11,242,640
2022-2035	$19,179,490
Total	**$45,958,800**

4.0 Impact Fee Analysis

The total projected costs include the projected capital improvement costs to serve 10-year development, the projected finance cost for the capital improvements, and the consultant cost for preparing and updating the Capital Improvements Plan. A 4.0% interest rate was used to calculate financing costs.

Water Impact Fee:

Total Capital Improvement Costs	$11,892,365
Financing Costs	$3,955,774
Total Eligible Costs	$15,848,139
Growth in Service Units	5,173

Base Maximum Calculated Water Impact Fee Per Service Unit Without Credit Analysis = Total Eligible Costs/Growth in Service Units

= $15,848,139/5,173

= $3,064 per Service Unit

Maximum Allowable Water Impact Fee	=	Maximum Impact Fee – Credit
	=	$3,064 - $1,532
	=	**$1,532 per Service Unit**

Wastewater Impact Fee:

Total Capital Improvement Costs	$9,043,142
Financing Costs	$3,008,033
Total Eligible Costs	$12,051,175
Growth in Service Units	5,173

Base Maximum Calculated Wastewater Impact Fee Per Service Unit Without Credit Analysis	=	Total Eligible Costs/Growth in Service Units
	=	$12,051,175/5,173
	=	$2,330 per Service Unit
Maximum Allowable Wastewater Impact Fee	=	Maximum Impact Fee – Credit
	=	$2,330 - $1,165
	=	**$1,165 per Service Unit**

1.0 BACKGROUND

Chapter 395 of the Texas Local Government Code requires an impact fee analysis before impact fees can be created and assessed. Chapter 395 defines an impact fee as "a charge or assessment imposed by a political subdivision against new development in order to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development." In September 2001, Senate Bill 243 amended Chapter 395 thus creating the current procedure for implementing impact fees. Chapter 395 identifies the following items as impact fee eligible costs:

- Construction contract price
- Surveying and engineering fees
- Land acquisition costs
- Fees paid to the consultant preparing or updating the capital improvements plan (CIP)
- Projected interest charges and other finance costs for projects identified in the CIP

Chapter 395 also identifies items that impact fees cannot used to pay for, such as:

- Construction, acquisition, or expansion of public facilities or assets other than those identified on the capital improvements plan
- Repair, operation, or maintenance of existing or new capital improvements
- Upgrading, updating, expanding, or replacing existing capital improvements to serve existing development in order to meet stricter safety, efficiency, environmental, or regulatory standards
- Upgrading, updating, expanding, or replacing existing capital improvements to provide better service to existing development
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In June 2011, the City of Lancaster, Texas, authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis of the City's water and wastewater systems. The purpose of this report is to address the methodology used in the development and calculation of water and wastewater impact fees for the City of Lancaster. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment of water and wastewater impact fees.

Table 1-1 provides a list of abbreviations used in this report.

Table 1-1 List of Abbreviations

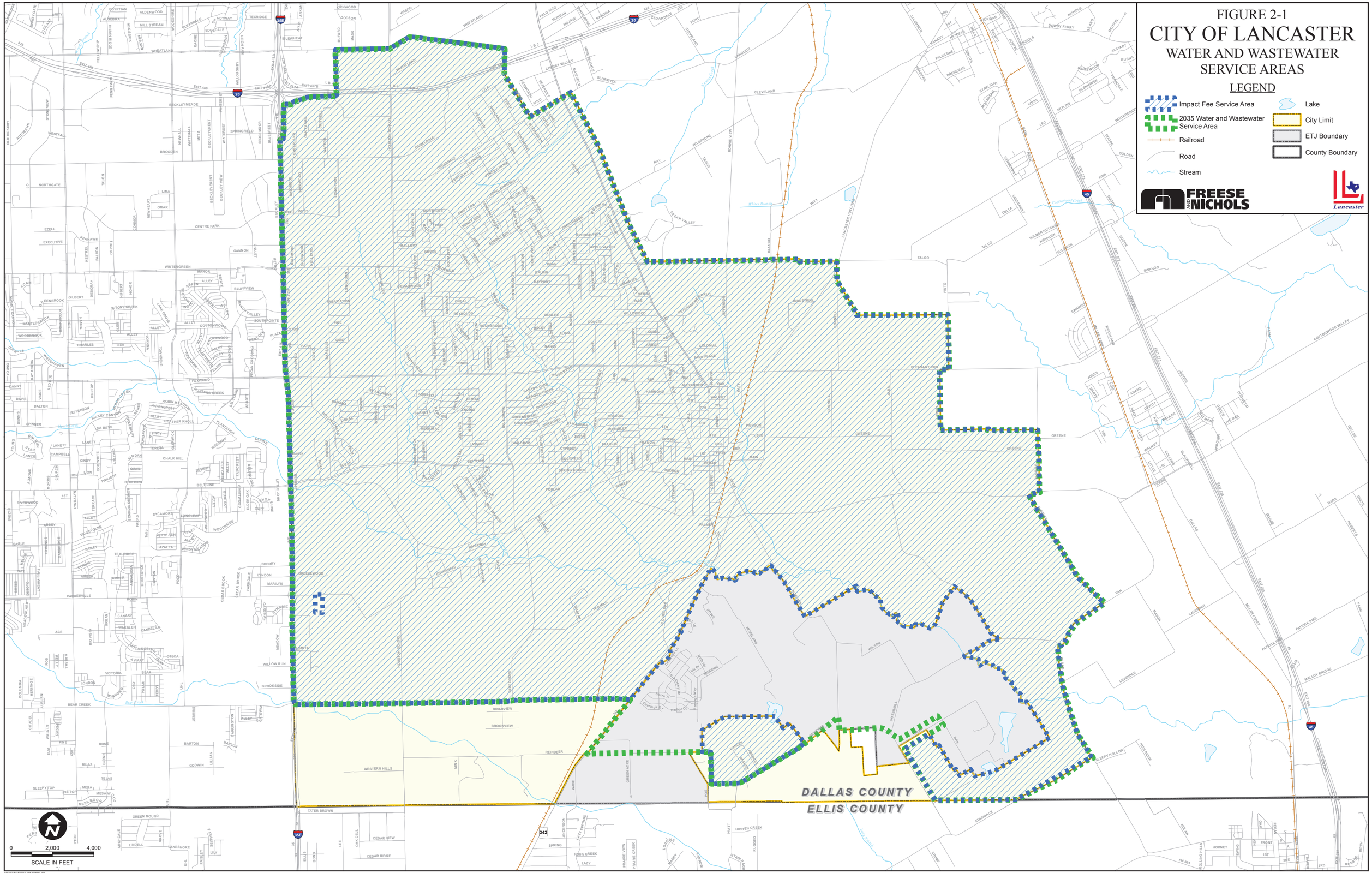
Abbreviation	Full Nomenclature
AWWA	American Water Works Association
CCN	Certificate of Convenience and Necessity
CIP	Capital Improvements Plan
ETJ	Extra-territorial Jurisdiction
GPCD	Gallons Per Capita per Day
GPED	Gallons Per Employee per Day
FNI	Freese and Nichols, Inc.
NCTCOG	North Central Texas Council of Government
SUD	Special Utility District
TCEQ	Texas Commission on Environmental Quality
TSZ	Traffic Survey Zone

2.0 LAND USE ASSUMPTIONS

Population and land use are important elements in the analysis of water and wastewater systems. Water demands and wastewater flows depend on the residential population and commercial development served by the systems and determines the sizing and location of system infrastructure. A thorough analysis of historical and projected populations, along with land use, provides the basis for projecting future water demands and wastewater flows.

2.1 Service Area

The service area for impact fee analysis for Lancaster's water and wastewater systems is defined as the current city limits with the exception of areas that fall within Rockett Special Utility District (SUD)'s Certificate of Convenience and Necessity (CCN). The current city limits include recently annexed areas in the southeastern portion of the service area. Areas in the City's extra-territorial jurisdiction (ETJ) were included in the 2035 service area, but Rockett's CCN was excluded in this service area as well. **Figure 2-1** illustrates the impact fee (2022) service area and 2035 service area for both water and wastewater.



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2.2 Historical Population

The City of Lancaster provided yearly population data from 2000 through 2011. The data indicated an average growth rate of about 3% annual growth over the last 11 years. **Table 2-1** presents the historical populations for the entire City of Lancaster.

Table 2-1 Historical Population

Year	City Population	Population Growth	Growth Rate
2000	25,894	-	-
2001	26,350	456	1.8%
2002	27,550	1,200	4.6%
2003	28,700	1,150	4.2%
2004	29,850	1,150	4.0%
2005	31,700	1,850	6.2%
2006	33,550	1,850	5.8%
2007	33,213	-337	-1.0%
2008	35,800	2,587	7.8%
2009	36,200	400	1.1%
2010	36,361	161	0.4%
2011	36,390	29	0.1%
Average	-	954	3.2%

2.3 Projected Population and Employment

Population and employment projections were developed based on traffic survey zone (TSZ) data provided by North Central Texas Council of Government (NCTOCG) and the City of Lancaster Planning Department. The City provided comments on the location of planned development and additional detail about the existing land use. The TSZs were clipped to match the existing and future service areas. **Tables 2-2 and 2-3** present the population and employment projections for the City of Lancaster water and wastewater service area for 2012, 2022, and 2035. Since a portion of the City falls within the Rockett Special Utility District SUD's CCN, the service area population is less than the total population within the City limits. **Figure 2-2** shows the population projections by TSZ, and **Figure 2-3** displays the employment projections by TSZ. **Figure 2-4** displays the impact fee land use assumptions for 2022.

Table 2-2 Water and Wastewater Population Projections

Year	Service Population	Average Annual Population Growth	Average Annual Growth Rate
2012	35,959	-	-
2022	46,949	1,099	2.7%
2035	65,751	1,446	2.6%

Table 2-3 Water and Wastewater Employment Projections

Year	Number of Employees in Service Area	Average Annual Employee Growth	Average Annual Growth Rate
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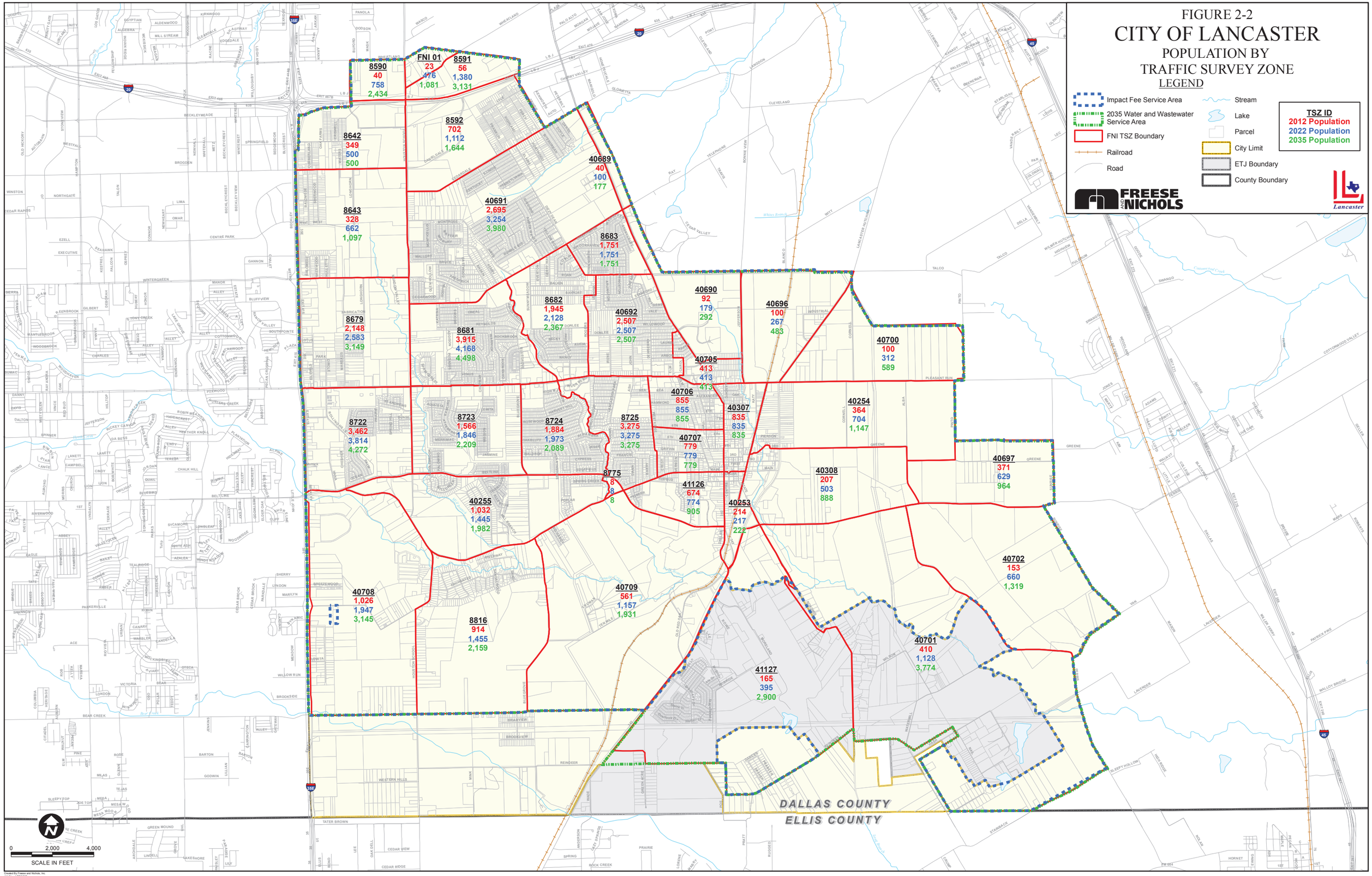

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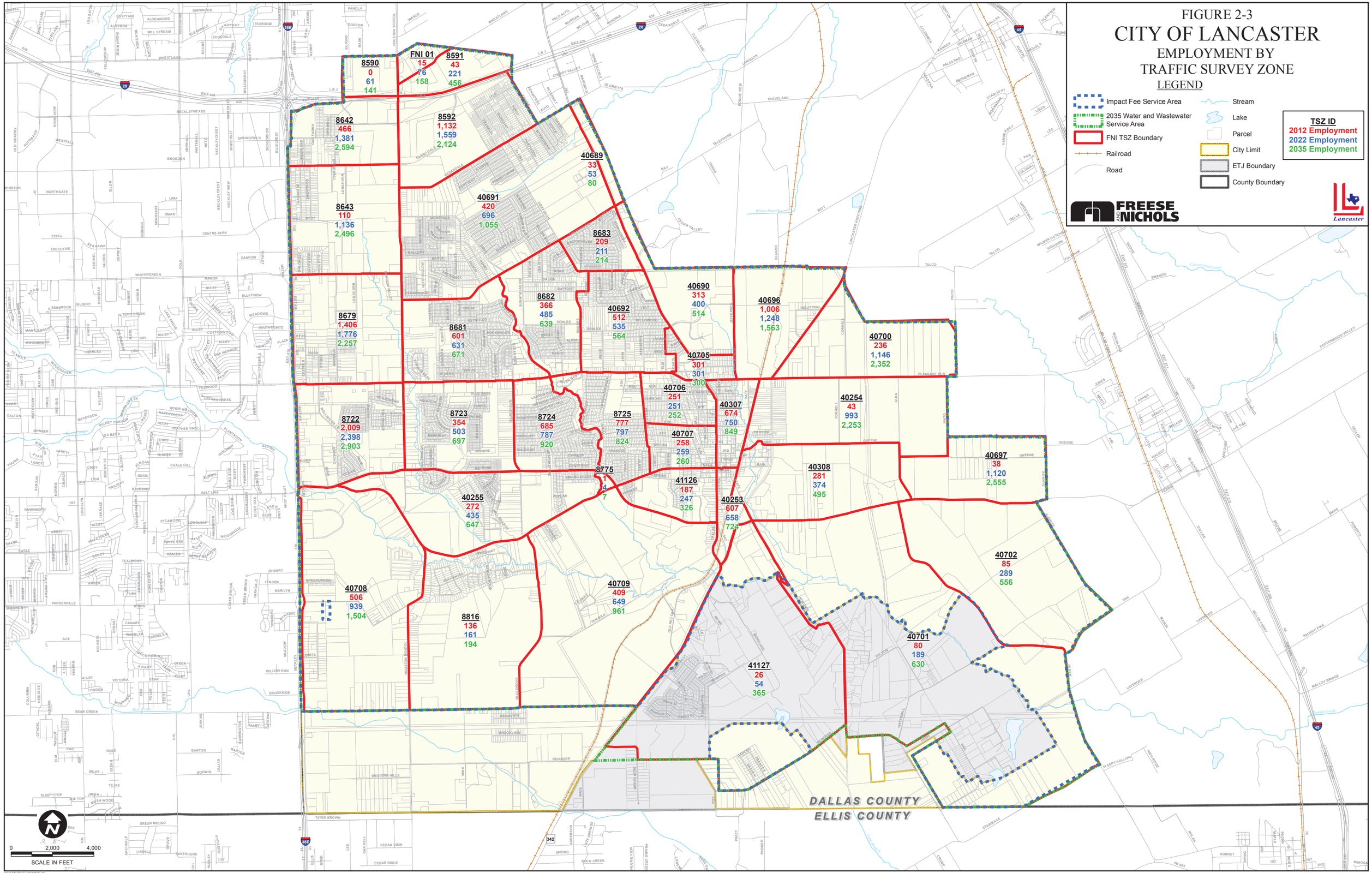

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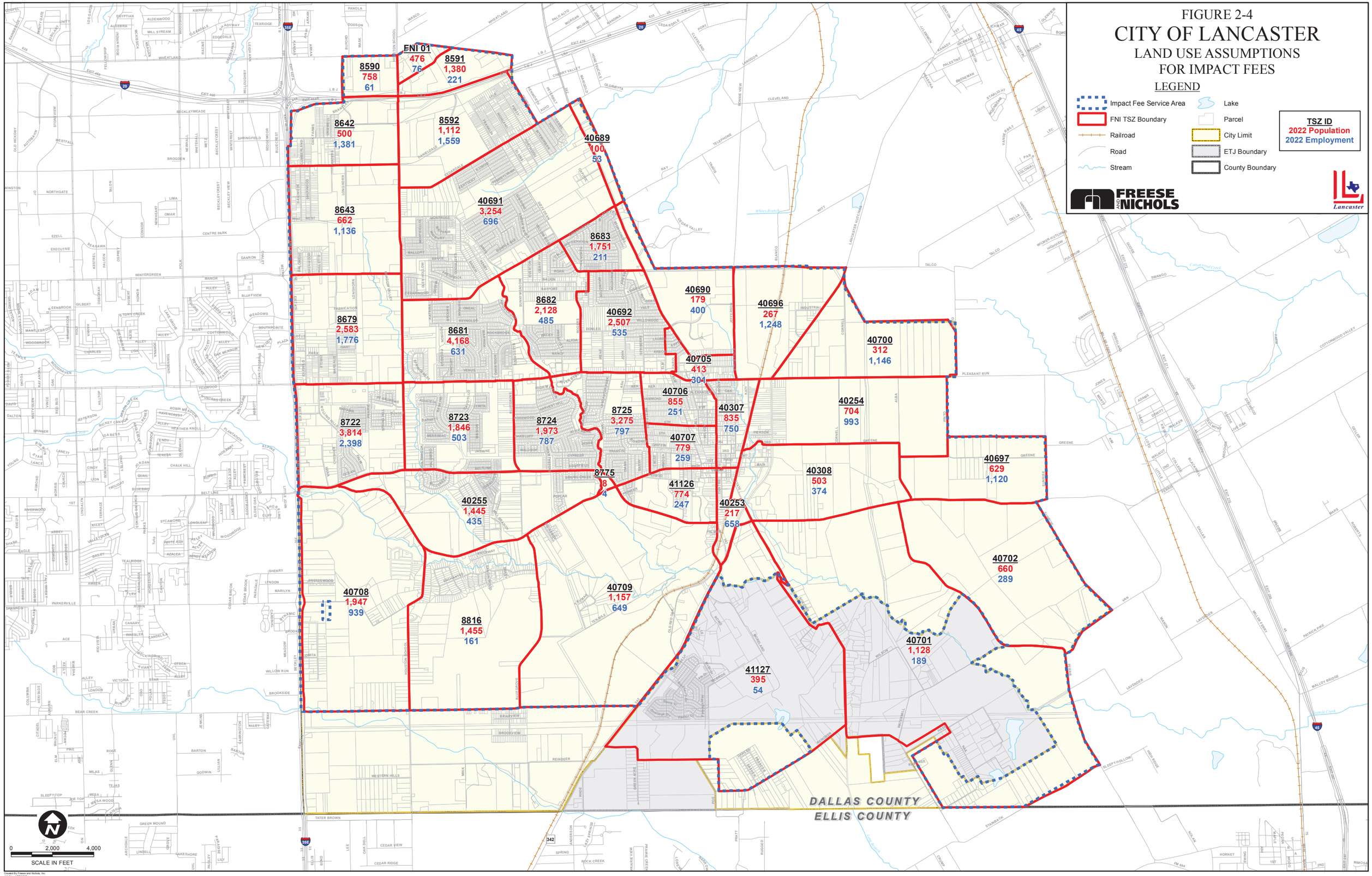

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3.0 CAPITAL IMPROVEMENTS PLAN

A capital improvements plan (CIP) was developed for the City of Lancaster to ensure high quality water and wastewater service that promotes residential and commercial development. The recommended improvements will provide the required capacity and reliability to meet projected water demands and wastewater flows through year 2035.

3.1 Existing Water and Wastewater Systems

The existing water distribution system currently consists of a network of lines ranging in size from 1.25-inches to 36-inches, two pump stations, three ground storage tanks, and three elevated storage tanks. The City receives water from DWU at two delivery points: the James R. Williams pump station and the Ames pump station. The City of Lancaster currently operates the distribution system with two pressure planes, the Upper Pressure Plane (UPP) and the Lower Pressure Plane (LPP). The UPP generally includes the western portion of the city while the LPP consists of the eastern portion. Water is supplied to the UPP through two pump stations located at the intersections of Ames Road and Houston School Road and Wintergreen Road and Bonnie View Road, respectively. During low demand periods, the City utilizes the Ames PS to serve the LPP through valves from the UPP. One elevated storage tank serves the UPP with an overflow of 792 feet, which sets the static hydraulic gradient. The pump station at Wintergreen Road and Bonnie View Road also serves the LPP which has a static hydraulic gradient of 705 feet established by two elevated storage tanks.

The existing wastewater system has 15 major basins, 4 lift stations, and a network of lines ranging from 4-inches to 24-inches. The majority of the existing wastewater collection system is located north of Ten Mile Creek, and west of Keller Branch. Because of existing topography, the wastewater collection system generally flows from north to south until reaching Ten Mile Creek. The Trinity River Authority (TRA) owns and operates two interceptors (36” and 54”) that parallel Ten Mile Creek and terminate at the TRA Ten Mile Wastewater Treatment Plant (WWTP). A third interceptor parallels Red Oak Creek and terminates at TRA’s Red Oak WWTP. The City currently has two small sewer lines connected to the Red Oak system.

3.2 Water Model Update and Validation

The hydraulic model developed for the *2007 Water Master Plan*, performed by FNI, was updated to include recently constructed water lines, updated pressure plane boundaries, and changes in system operations. Recent pumping improvements at the Ames Pump Station were added to the model based on schematic drawings and pump test curves. In order to verify that the hydraulic model is an accurate representation of the actual distribution system, a model validation analysis was performed. Field pressure testing was conducted at eight locations throughout the distribution system in August 2011 to assist in model validation. SCADA readings for tank levels and pump status were collected on an hourly basis during this time and were used to create diurnal demand curves. In order to create the curves, a mass balance of the system demand was calculated using the sum of water pumped into the distribution system from the Ames and James R. Williams Pump Stations and adding or subtracting the demand or supply provided by the elevated storage tanks.

The model validation time was chosen by analyzing the diurnal demand curves and finding a peak hour on a week day with no irregularities; therefore, August 25th at 9:00 PM was chosen. A peak hour demand condition was selected because it represents the system at its most stressed hydraulic state and gives a more accurate measure of headloss in the system. Operational data was used to determine system inputs such as tank levels and pump status. Since the model results closely matched the field pressure testing data, it was assumed to be an accurate representation of field conditions. Field pressure testing data, the diurnal demand curves, and a map showing the validation results can be found in **Appendix A**.

3.3 Water and Wastewater Load Projections

Historical water demands from 2000 through July 2011 were provided to FNI by the City for the development of projected water usage rates and peaking factors. **Table 3-1** illustrates the average and maximum day water demands for these years. Design criteria for water demand projections were developed based on historical water usage and are shown in **Table 3-2**. The population and land use data and design criteria were used to develop the future water demands for 2012, 2022 and 2035 that are shown in **Table 3-3**.

Table 3-1 Historical Water Demands

Year	Population	Average Day Demand (mgd)	Average Day Overall Per Capita (gpcd)	Maximum Day Demand (mgd)	Maximum Day/Average Day Peaking Factor
2000	25,894	2.99	115	-	-
2001	26,350	3.63	138	-	-
2002	27,550	3.44	125	-	-
2003	28,700	3.55	124	-	-
2004	29,850	3.52	118	-	-
2005	31,700	4.28	135	6.87	1.61
2006	33,550	4.63	138	10.00	2.16
2007	33,213	3.65	110	6.80	1.86
2008	35,800	4.67	130	11.10	2.38
2009	36,200	4.35	120	7.25	1.67
2010	36,361	4.28	118	6.83	1.60
2011[(1)]	36,390	4.37	120	8.10	1.85
Average	-	**3.95**	**124**	**8.14**	**1.87**

[(1)] Average daily usage is estimated based on data through July.

Table 3-2 Water Design Criteria

Average Day Residential Per Capita Usage (gpcd)	Average Day Employment Per Capita Usage (gped)	Maximum Day to Average Day Peaking Factor	Peak Hour to Maximum Day Peaking Factor
100	75	2.0	1.8

Table 3-3 Projected Water Demands

Pressure Plane	Year	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Peak Hour Demand (MGD)
Upper (792')	**2012**	3.38	6.76	12.17
	2022	4.60	9.20	16.56
	2035	5.77	11.66	20.99
Lower (705')	**2012**	1.40	2.80	5.04
	2022	2.00	4.00	7.20
	2035	3.50	6.91	12.43
Total	**2012**	**4.78**	**9.56**	**17.21**
	2022	**6.60**	**13.20**	**23.76**
	2035	**9.27**	**18.57**	**33.42**

Historical wastewater flows from 2003 through July 2011 were provided to FNI by the City for the development of projected wastewater flows and peaking factors. **Table 3-4** illustrates the average annual daily flows and peak flows for these years. Design criteria for wastewater flow projections were developed based on historical wastewater flows and are shown in **Table 3-5**. The population and land use data and design criteria were used to develop the future wastewater flows for 2012, 2022 and 2035 that are shown in **Table 3-6**.

Table 3-4 Historical Wastewater Flows

Year	Population	Average Annual Daily Flow (MGD)	Average Annual Daily Flow Per Capita (gpcd)
2003	28,700	3.86	135
2004	29,850	4.83	162
2005	31,700	4.00	126
2006	33,550	3.67	110
2007	33,213	5.03	151
2008	35,800	4.44	124
2009	36,200	4.87	134
2010	36,361	5.16	142
2011[(1)]	36,390	3.92	108
Average	-	**4.42**	**132**

[(1)] Average daily usage is estimated based on data through August.

Table 3-5 Wastewater Design Criteria

Average Day Residential Per Capita Usage (gpcd)	Average Day Employment Per Capita Usage (gped)	Peak Wet Weather to Average Daily Peaking Factor
115	70	6.0

Table 3-6 Projected Wastewater Flows

Year	Average Annual Daily Flow (MGD)	Peak Wet Weather Flow (MGD)
2012	5.17	31.05
2022	7.06	42.38
2035	10.09	60.53

3.4 TCEQ Requirements

The City is required to meet all rules and regulations for public water systems established by the Texas Commission on Environmental Quality (TCEQ) in Title 30 Texas Administrative Code (30 TAC), Chapter 290. These requirements are based on number of connections in each pressure plane. Existing connections were provided by City staff, and there are currently 11,782 connections in the Upper Pressure Plane and 2,000 connections in the Lower Pressure Plane.

A. Elevated Storage

The City is required to meet the TCEQ elevated storage capacity requirement of 100 gallons per connection in each pressure plane. The Lower Pressure Plane (705') currently has 2.0 MG of elevated storage which can serve a total of 20,000 connections. Since the existing number of connections in the Lower Pressure Plane is 2,000, the existing elevated storage can serve an additional 18,000 connections.

A letter to the City of Lancaster from TCEQ, dated January 18, 2011, indicated that the City has exceeded the allowable number of connections in the Upper (792') Pressure Plane based on existing elevated storage capacity. The existing elevated storage capacity of 1.0 MG in the Upper Pressure Plane can serve 10,000, and there are 11,782 connections. A 2.0 MG elevated storage tank in the Upper Pressure Plane is under design and will be constructed in 2013. After the second elevated storage tank is in service, the existing elevated storage tank at the Ames Pump Station will be abandoned based on age, condition, and system operations. The proposed 2.0 MG EST in the Upper Pressure Plane will be able to serve 20,000 connections or an additional 8,218 connections.

B. Total Storage

The City is required to meet the TCEQ total storage capacity requirement of 200 gallons per connection in each pressure plane. The City currently has 4.5 MG of ground storage in the Upper Pressure Plane and can serve a total of 22,500

connections or 10,718 connections in addition to current connections. There is currently 8 MG of storage in the Lower Pressure Plane and can serve a total of 40,000 connections or 38,000 connections in addition to current connections.

C. Pumping

The City is required to meet the TCEQ service pumping capacity requirements established in 30 TAC §290.45(b)(2)(F) and summarized in **Table 3-7. Table 3-8** summarizes the existing pumping facilities. Since the City currently has 1,000 gallons/connection of elevated storage in the Lower Pressure Plane, 0.6 gpm/connection or 1,200 gpm of pumping capacity is required. The City exceeds the required pumping capacity with 3,700 gpm of pumping capacity to the Lower Pressure Plane. Lancaster can add up to 8,000 connections in the Lower Pressure Plane and maintain 200 gallons of elevated storage per connection.

Table 3-7 Service Pumping Capacity Requirements [(1)]

Elevated Storage Capacity	Service Pumping Capacity Requirement
> 200 gallons per connection	Two service pumps with a minimum combined capacity of 0.6 gpm per connection at each pressure plane
< 200 gallons per connection	The lesser of (a) or (b):
	(a) Total pumping capacity of 2.0 gpm per connection
	(b) Total pumping capacity of at least 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service

[(1)] According to 30 TAC §290.45(b)(2)(F)

Table 3-8 Pumping Facilities Summary

Pump Station Name	Pump No.	Rated Capacity (gpm)	Rated Capacity (MGD)	Rated Head (feet)	Pressure Plane
Ames Rd. Pump Station	1	1,250	1.80	168	Upper
	2	1,250	1.80	168	Upper
	3	2,300	3.31	168	Upper
	4	2,600	3.74	168	Upper
	5	5,500	7.92	185	Upper
	6	5,500	7.92	185	Upper
James R. Williams Pump Station	1	500	0.72	125	Lower
	2	700	1.01	125	Lower
	3	1,250	1.80	125	Lower
	5	1,250	1.80	125	Lower
	11	700	1.01	175	Upper
Total	**Upper**	**19,100**	**27.50**	-	-
	Lower	**3,700**	**5.33**	-	-

The City currently has less than 200 gallons per connections of elevated storage capacity in the Upper Pressure Plane, which requires the lesser of a service pumping capacity of 2.0 gpm per connection or the ability to meet peak hourly demands with the largest pump out of service, also known as the firm pumping capacity. The estimated peak hourly demand in 2012 for the Upper Pressure Plane is 12.2 MGD. Since this is significantly less than 2 gpm/connection of pumping capacity, the ability to meet peak hourly demands with the firm pumping capacity will be used as the pumping requirements for the Upper Pressure Plane. The firm pumping capacity to the Upper Pressure Plane is 19.6 MGD, so the City meets this pumping requirement. The peak hourly demand for the Upper Pressure Plane in 2035 is 21.0 MGD. The proposed firm pumping capacity including the pump at in 2035 is 25.6 MGD based on recommended expansions at Ames Pump Station and James R. Williams Pump Station to the Upper Pressure Plane. **Table 3-9** presents a summary of the TCEQ minimum requirements for the existing system.

Table 3-9 TCEQ Checklist

		Requirement	Actual	Meets TCEQ?
Upper Pressure Plane (792')	Elevated Storage	100 gallons per connection	85 gallons per connection	**No**
	Total Storage	200 gallons per connection	382 gallons per connection	Yes
	Pump Station	Peak Hour Demand (12.2 MGD)	19.6 MGD Firm Pumping Capacity	Yes
Lower Pressure Plane (702')	Elevated Storage	100 gallons per connection	1,000 gallons per connection	Yes
	Total Storage	200 gallons per connection	4,000 gallons per connection	Yes
	Pump Station	0.6 gpm per connection	1.85 gallons per connection	Yes

3.5 FNI Design Criteria for CIP Sizing

Freese and Nichols, Inc. worked with the City of Lancaster to establish design criteria for sizing future water and wastewater facilities. Criteria were developed for sizing water transmission lines, elevated storage tanks, ground storage tanks and pump stations for the water system and for sizing sewer trunk lines and lift stations for the wastewater system. These criteria are typically more stringent than TCEQ requirements and take into consideration many additional factors including operational flexibility, fire protection, and energy efficiency.

A. Water System Design Criteria

Hydraulic modeling analysis was performed for the existing and future systems for four operating conditions: average day, maximum day, peak hour, and maximum day with fire flow. The TCEQ required minimum pressure within a distribution system is 35 psi under normal operating conditions. Headloss and velocity in the pipelines are additional criteria used to analyze the water system. Typically, headlosses in water lines should not exceed 4 feet/1000 feet, and velocities should not exceed 7 feet/second.

Freese and Nichols, Inc. developed criteria for sizing of storage and pumping capacity improvements for the City. The design criteria recommended to size ground storage tank capacity is to provide adequate storage volume to meet 12 hours of maximum day demand. This criterion is standard industry practice and allows the City to endure a supply outage for at least 12 hours. **Figures 3-1 and 3-2** summarize the recommended ground storage capacity and associated improvements based on the design criteria for the Upper and Lower Pressure Planes, respectively.

Figure 3-1 Recommended Upper Pressure Plane (792') Ground Storage Capacity

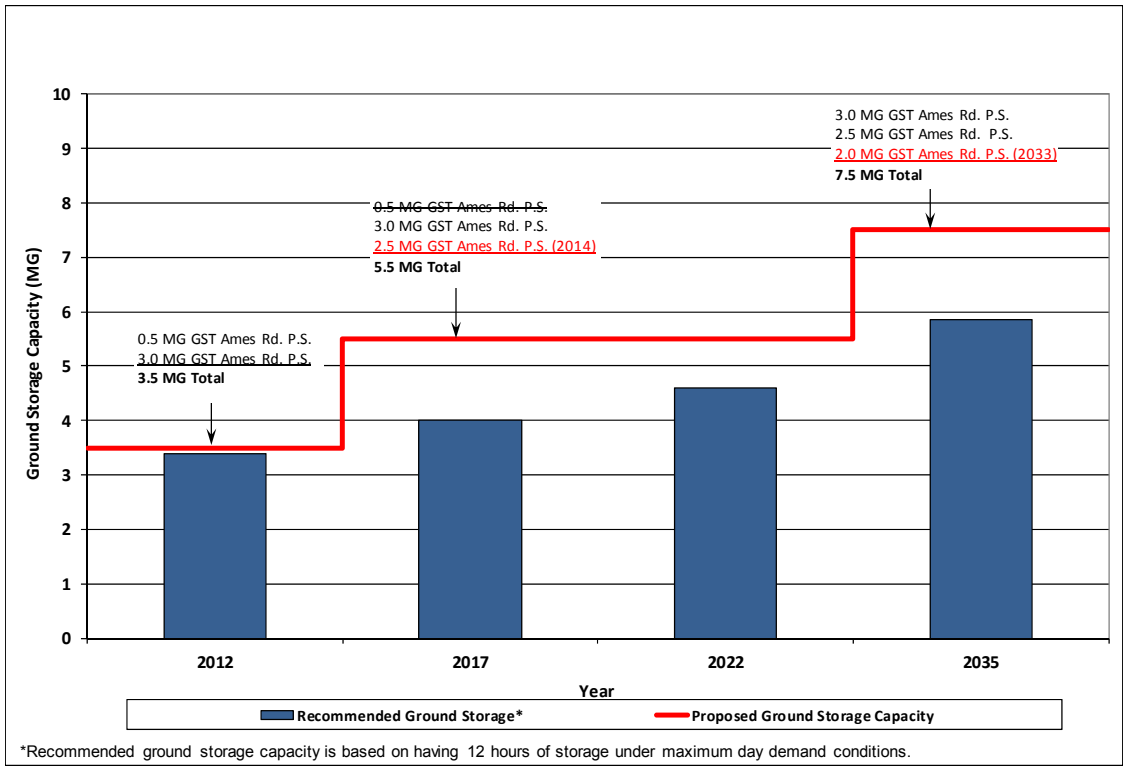
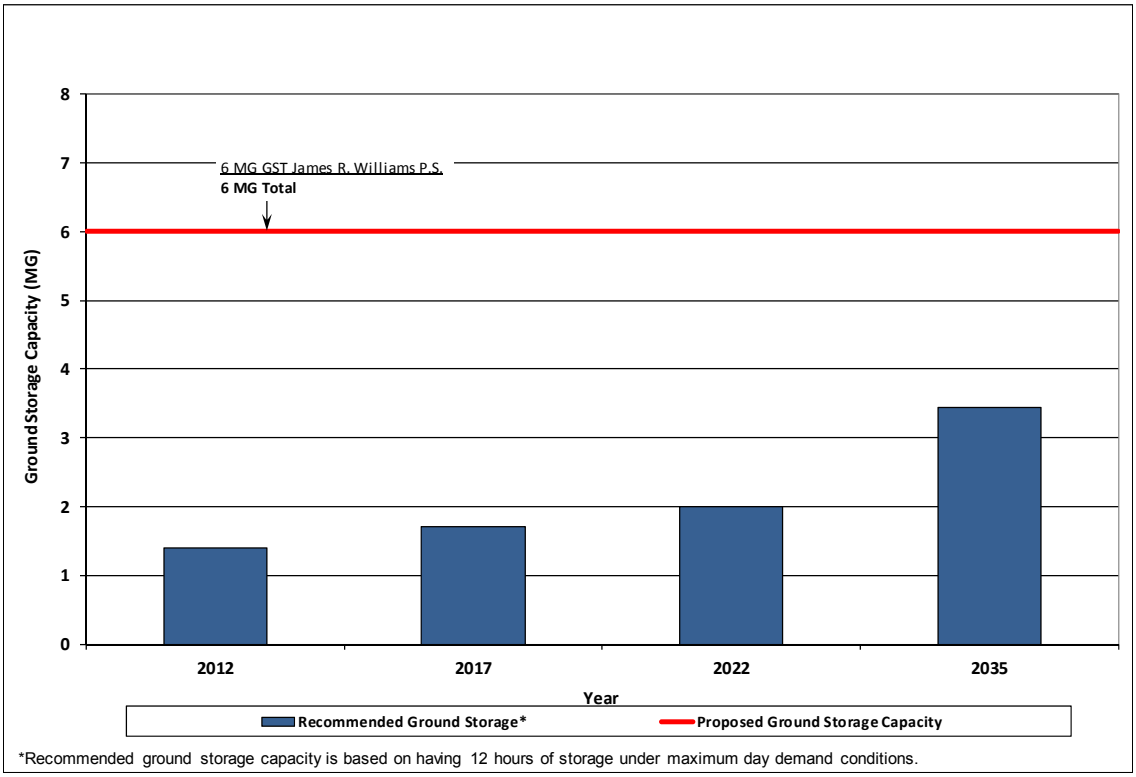
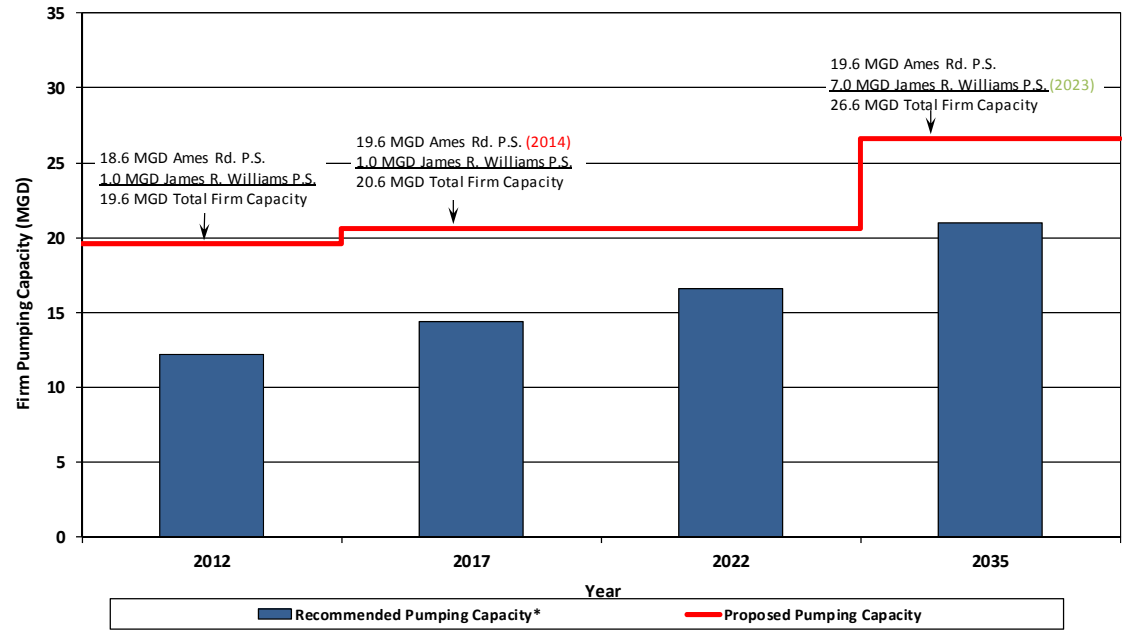


Figure 3-2 Recommended Lower Pressure Plane (705') Ground Storage Capacity



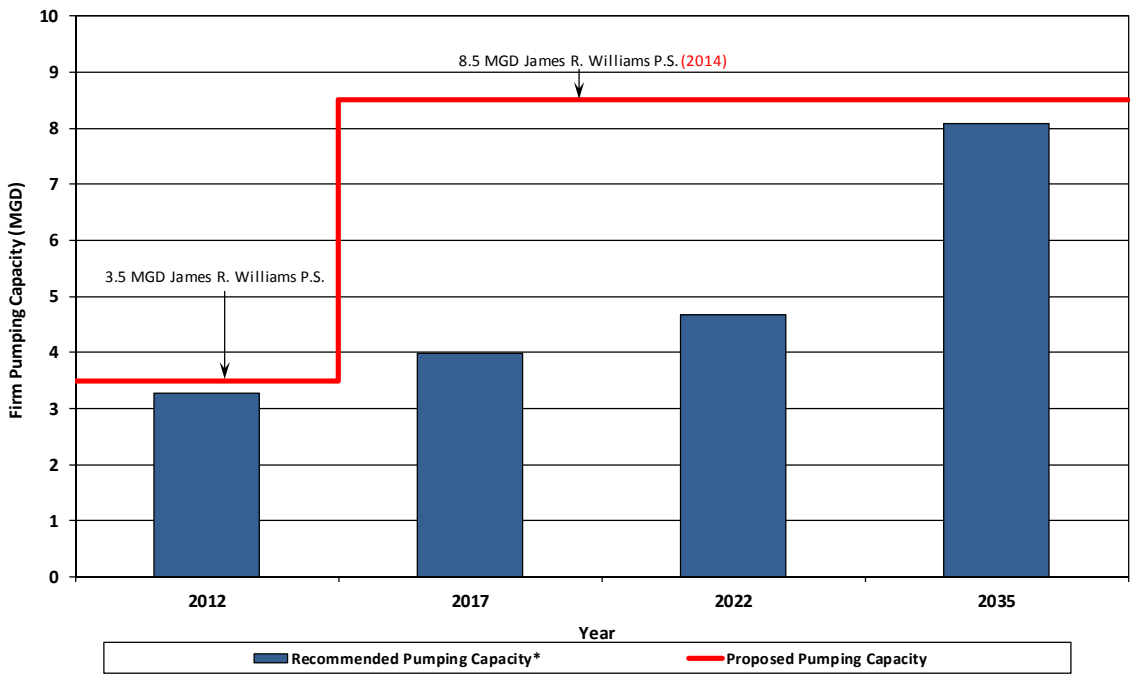
FNI design criteria recommended for pump station capacity is providing a firm pumping capacity to meet 65% of the peak hour demand. The firm pumping capacity is defined as the total available pumping capacity with the largest pump out of service to each pressure plane. However, based on the amount of elevated storage in the UPP, TCEQ requires the City to provide a firm pumping capacity to meet 100% of peak hour demands in the UPP. **Figures 3-3 and 3-4** display the recommended firm pumping capacity to the Upper and Lower Pressure Planes, respectively. The design criteria recommended for elevated storage capacity is based on the greater of twice the peaking volume or the peaking volume plus fire volume of 3,500 gpm for 3 hour duration. The peaking volume is defined as 35% of peak hour demands for a 3 hour duration. **Table 3-10** displays the recommended elevated storage capacity by pressure plane. **Figures 3-5** and **3-6** display the recommended elevated storage capacity and related improvements based on the design criteria.

Figure 3-3 Recommended Upper Pressure Plane (792') Firm Pumping Capacity



*Required firm pumping capacity is based on supplying of peak hour demands with the largest pump out of service. Existing firm pumping capacity does not take into account the Upper Pressure Plane pump at James R. Williams P.S. and assumes pumps 1-3 at Ames Rd. P.S. will be removed in 2014.

Figure 3-4 Recommended Lower Pressure Plane (705') Firm Pumping Capacity



*Recommended Firm Pumping Capacity is based on supplying 65% of peak hour demands.

Table 3-10 Recommended Elevated Storage Capacity

Pressure Plane	Year	Peak Demand[1] (mgd)	Peak Volume[2] (MG)	Fire Volume[3] (MG)	Total[4]
Upper (792')	**2012**	4.26	0.53	0.63	**1.16**
	2022	5.80	0.72	0.63	**1.45**
	2035	7.35	0.92	0.63	**1.84**
Lower (705')	**2012**	1.76	0.22	0.63	**0.80**
	2022	2.52	0.32	0.63	**0.95**
	2035	4.35	0.54	0.63	**1.17**

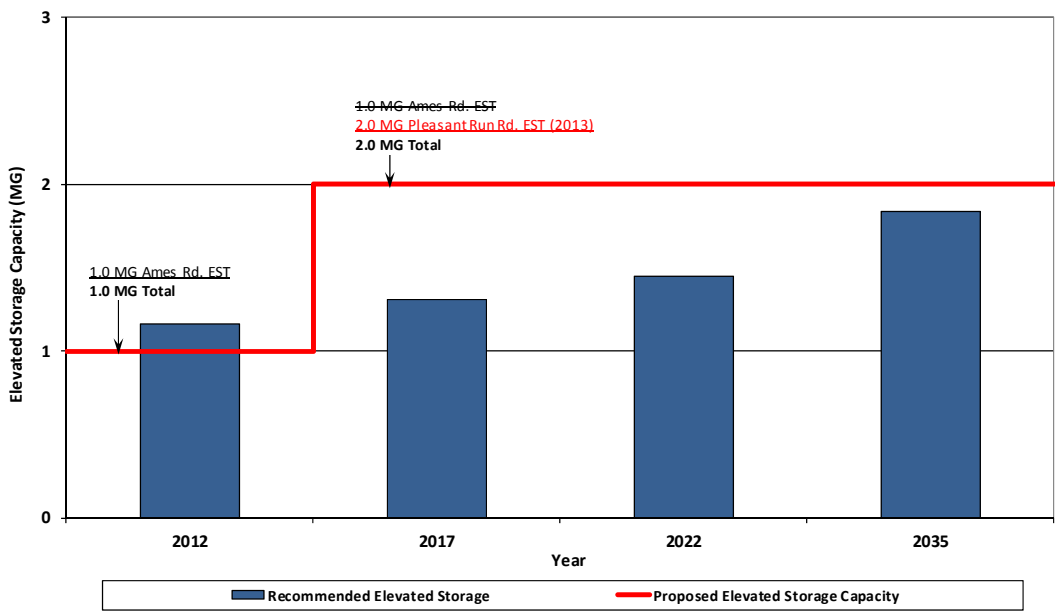
[1] Equals 35% of the peak hour demand

[2] Required volume to supply the peak demand for a duration of 3 hours

[3] Assuming highest fire flow required is 3,500 gpm for 3 hour duration

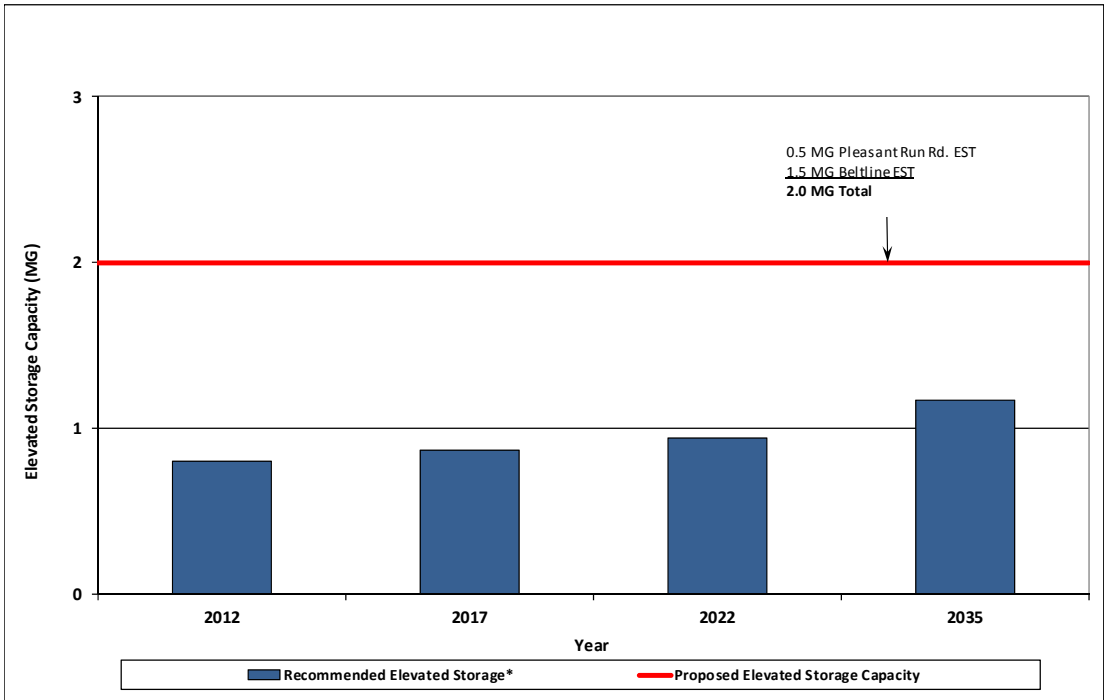
[4] The greater of twice the peaking volume or the peaking volume plus fire volume

Figure 3-5 Recommended Upper Pressure Plane (792') Elevated Storage Capacity



*Recommended elevated storage capacity is based on the greater of twice the peaking volume or the peaking volume plus fire volume of 3,500 gpm for 3 hour duration. The peaking volume is 35% of peak hour demands for a 3 hour duration.

Figure 3-6 Recommended Lower Pressure Plane (705') Elevated Storage Capacity



*Recommended elevated storage capacity is based on the greater of twice the peaking volume or the peaking volume plus fire volume of 3,500 gpm for 3 hour duration. The peaking volume is 35% of peak hour demands for a 3 hour duration.

B. Wastewater Design Criteria

Freese and Nichols established design criteria for future wastewater facilities. Criteria were developed for sizing gravity lines and lift station pumping capacities for the wastewater system.

Gravity lines were recommended for replacement when the ratio of actual flow depth to the diameter of the pipe (d/D) was 0.85 or greater. Slopes for new lines are based on the minimum slope requirement set forth by the TCEQ. Proposed lines are sized for replacement of the existing line.

The design criteria for lift station pumping is to provide firm pumping capacity to meet 125% of the peak wet weather design flows. TCEQ requires that the lift station be capable of pumping the expected peak flow; however, it is recommended to design for 125% of the peak wet weather design flow. The firm pumping capacity is defined by the TCEQ on page 129 of Chapter 217/317 as the total available lift station pumping capacity with the largest pump out of service. **Figure 3-7** through

Figure 3-9 display the recommend lift station firm capacity by planning year. A graph for the IH 635 lift station is not included because it is recommended to be decommissioned.

Figure 3-7 Recommended Wheatland Lift Station Capacity

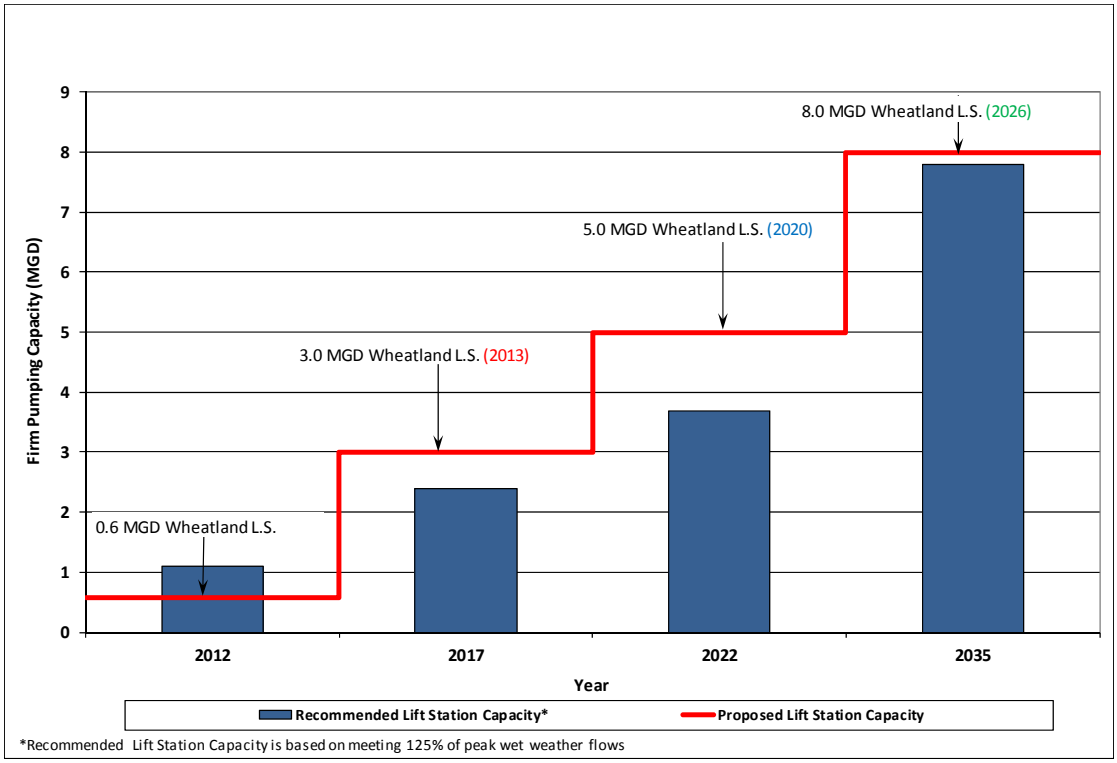


Figure 3-8 Recommended Lift Station #1 Capacity

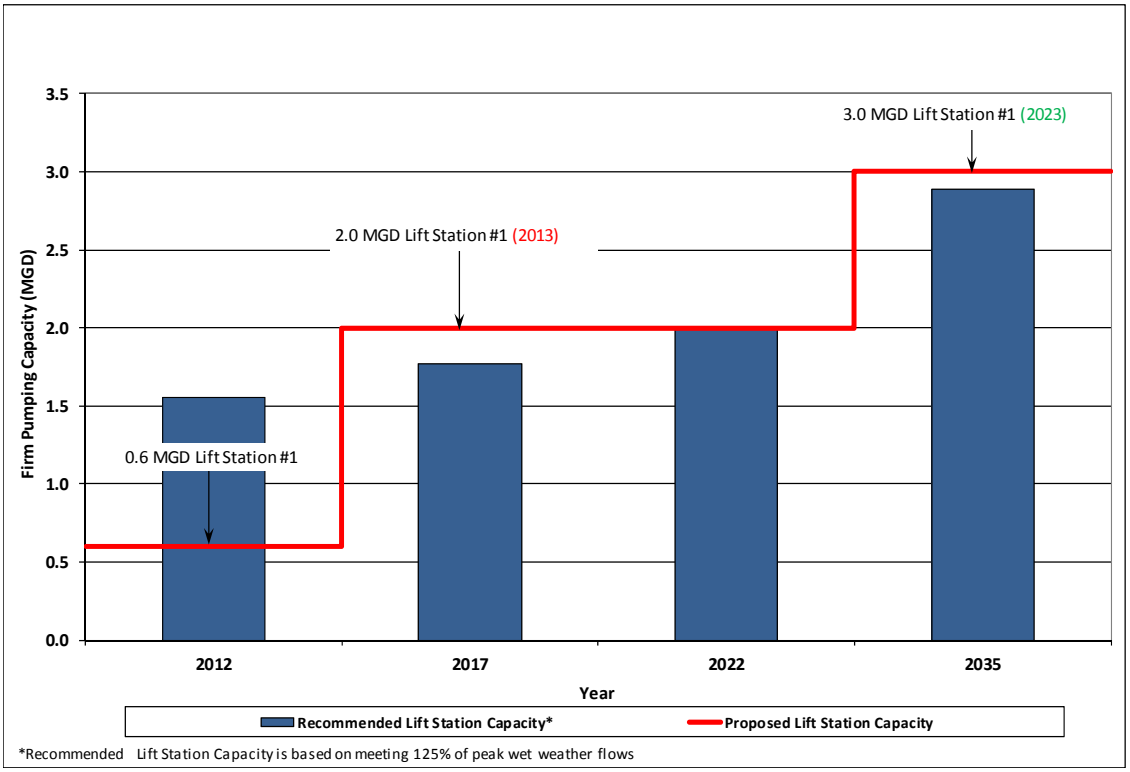
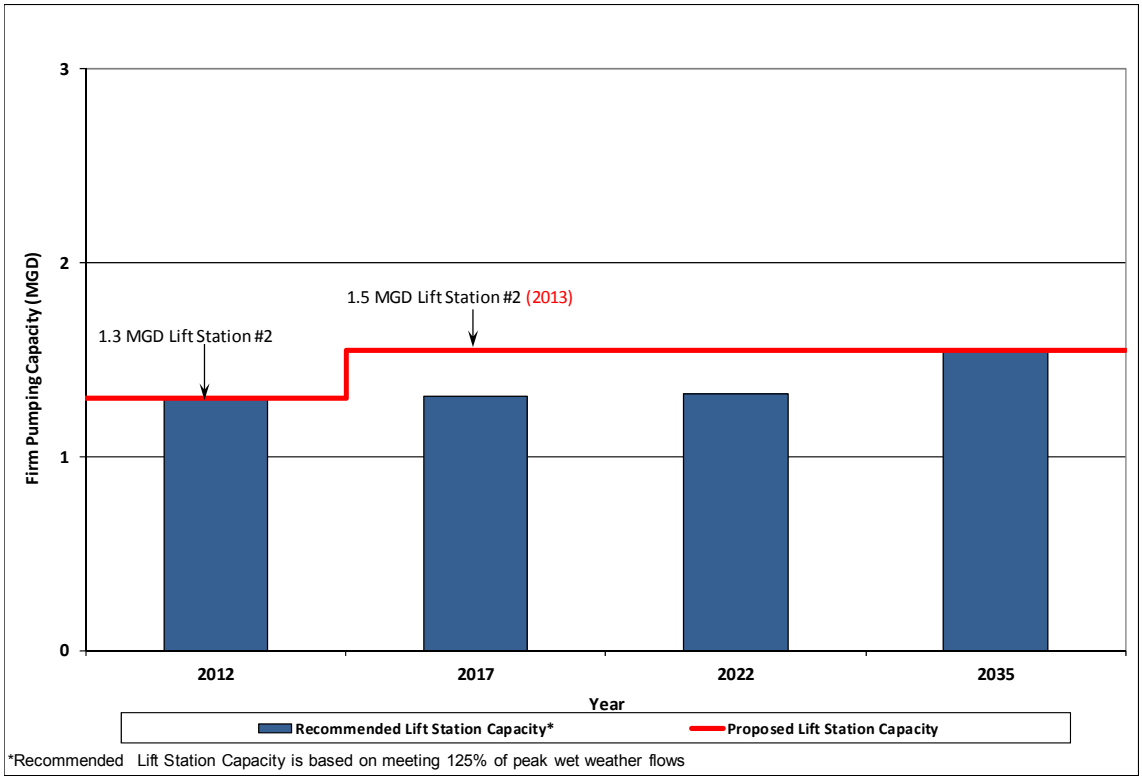


Figure 3-9 Recommended Lift Station #2 Capacity



3.6 Model Results

A. Water Model Results

Using the calibrated hydraulic model, system configurations were evaluated to determine the most appropriate layout for meeting projected water demands. Hydraulic analyses were performed for years 2012, 2022, and 2035. In general, analyses were performed for three basic demand conditions:

- Average day, which determines the ability of the system to replenish storage facilities during average day demands.
- Maximum day, which determines the ability of the system to maintain full storage facilities during maximum day demands.
- Peak hour, which determines the ability of the system to maintain minimum residual pressure during periods of peak demand.

The model was also used to analyze the available fire flow under existing system maximum day demand conditions. A map of the available fire flow is presented in **Appendix B**. Improvements were developed by assessing the transmission and reliability needs of the system as well as future growth considerations.

B. Wastewater Model Results

The wastewater hydraulic model was updated to include recently completed projects, and lines were assumed to be at TCEQ minimum slopes where invert data was not available. Ten-foot contours were used to assign rim elevations in the model. Wastewater system analysis was performed for peak wet weather flow for 2012, 2017, 2022 and 2035. The 2012 peak flow model run indicated that the system had some deficient areas and overflows in areas that city staff had indicated as historical problem areas. The modeling results were used to size proposed improvements and address deficiencies in the existing system.

3.7 Water and Wastewater System Improvements

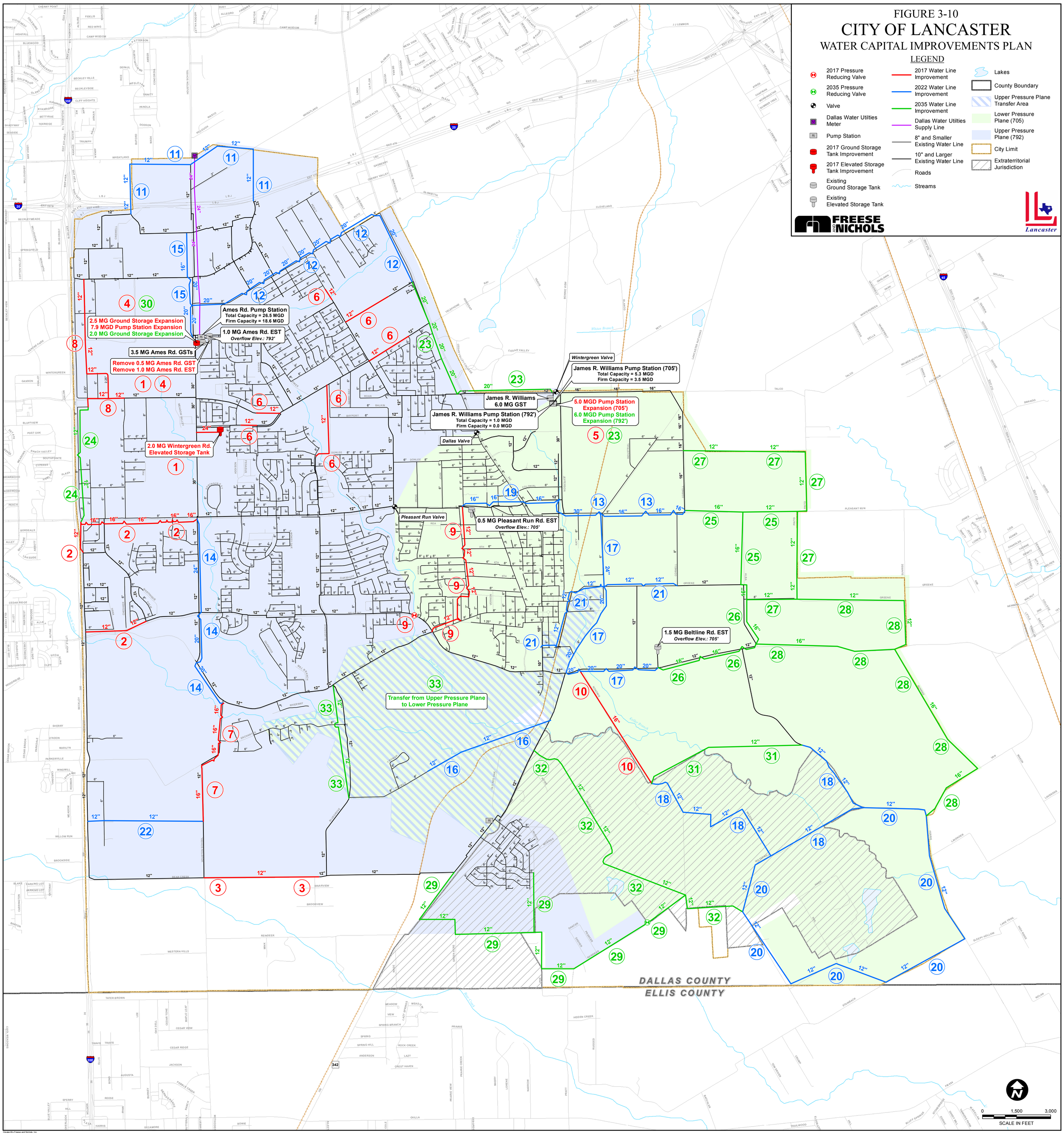
Proposed water and wastewater system projects to serve the system through 2035 were developed as part of this project based on load projections and design criteria. The proposed

water and wastewater lines were sized for replacement of the existing lines. The proposed water system improvements recommended to serve the City through 2035 are shown on **Figure 3-10**. Proposed wastewater system improvements to serve the City through 2035 are shown on **Figure 3-11**. Detailed cost estimates for the proposed water and wastewater system projects are included in **Appendix C** and **Appendix D**, respectively.

FIGURE 3-10

CITY OF LANCASTER

WATER CAPITAL IMPROVEMENTS PLAN



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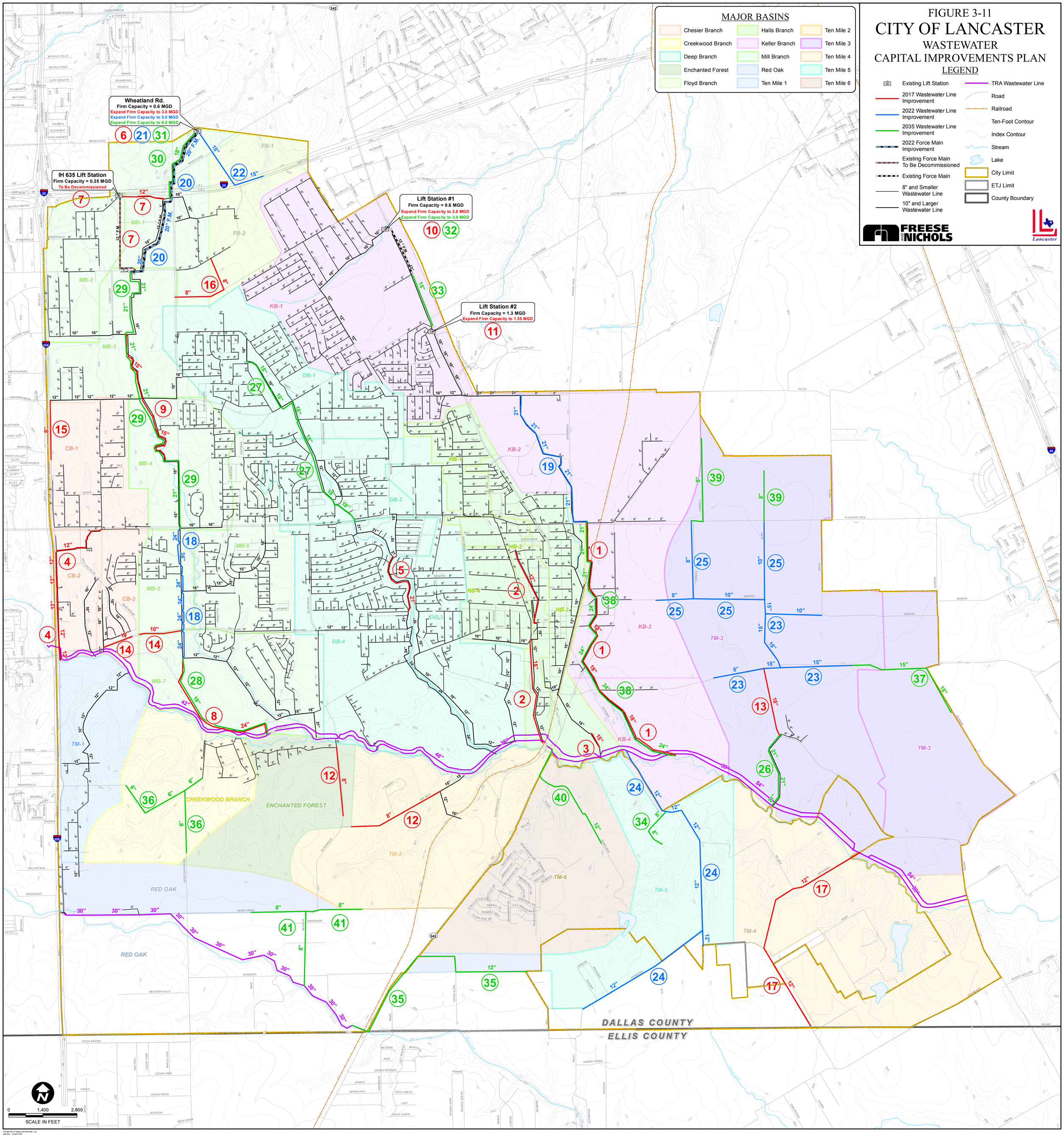

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4.0 IMPACT FEE ANALYSIS

The impact fee analysis involves determining the utilization of existing and proposed projects required as defined by the capital improvement plan to serve new development over the next 10-year time period. For existing or proposed projects, the impact fee is calculated as a percentage of the project cost, based upon the percentage of the project's capacity required to serve development projected to occur between 2012 and 2022. Capacity serving existing development and development projected for more than 10 years in the future cannot be charged to impact fees.

4.1 Eligible CIP Costs

A summary of the costs for each of the projects required for the 10-year growth period used in the impact fee analysis for both the water and wastewater systems is shown in **Table 4-1** and **Table 4-2**. Costs listed for the existing projects are based on actual design and construction costs provided by the City. **Table 4-1** and **Table 4-2** show 2012 percent utilization as the portion of a project's capacity required to serve existing development. It is not included in the impact fee analysis. The 2022 percent utilization is the portion of the project's capacity that will be required to serve the City of Lancaster in 2022. The 2012-2022 percent utilization is the portion of the project's capacity required to serve development from 2012 to 2022. The water and wastewater hydraulic models were used to assist in the calculation of project utilization percentages. The portion of a project's total cost that is used to serve development projected to occur from 2012 through 2022 is calculated as the total actual cost multiplied by the 2012-2022 percent utilization. Only this portion of the cost is used in the impact fee analysis. The proposed 10-year water system impact fee CIP is shown on **Figure 4-1.** Proposed 10-year wastewater impact fee CIP is shown on **Figure 4-2**.

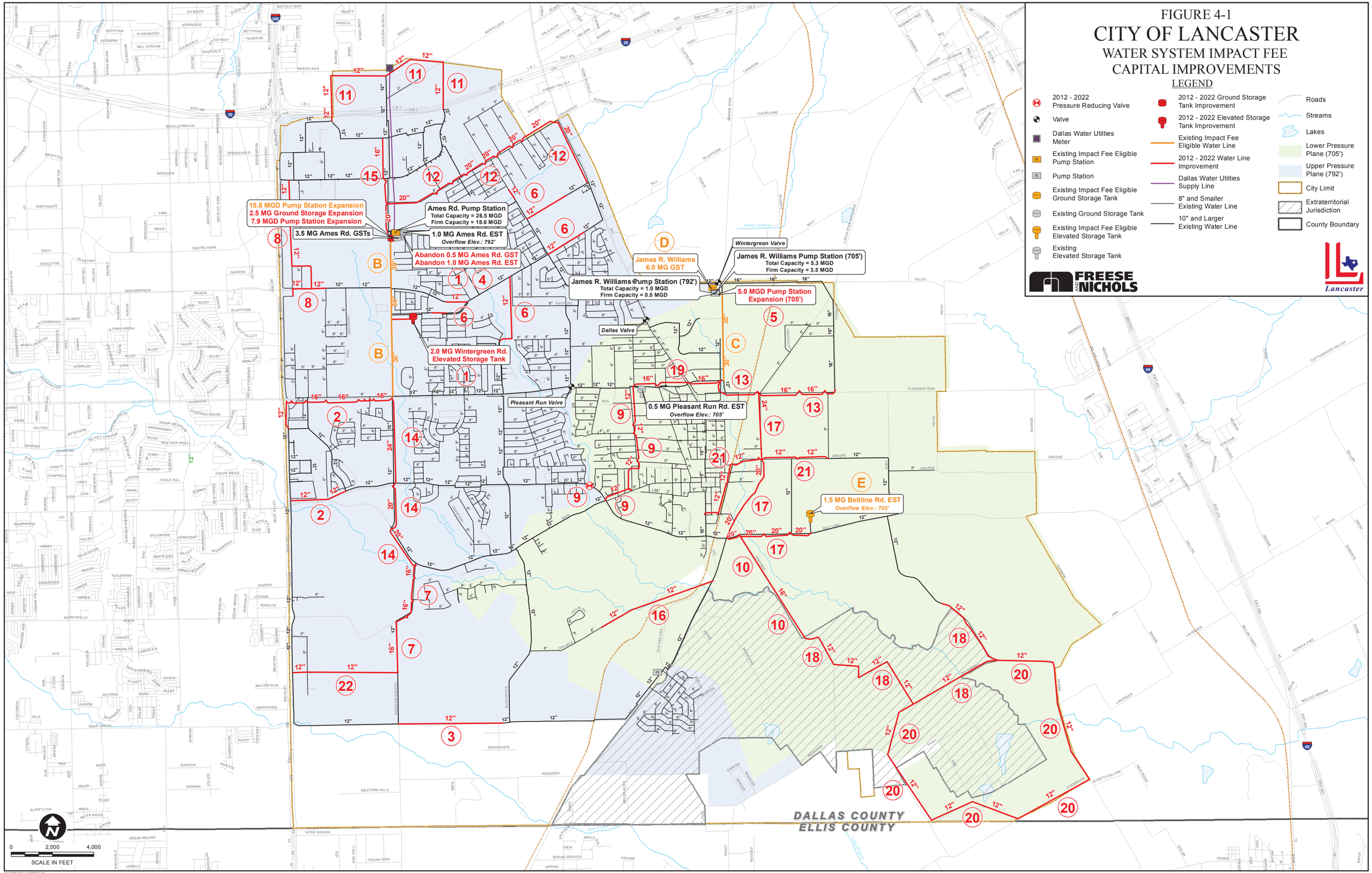

FIGURE 4-1
CITY OF LANCASTER
WATER SYSTEM IMPACT FEE
CAPITAL IMPROVEMENTS
LEGEND
2012 - 2022 Pressure Reducing Valve
Valve
Dallas Water Utilties Meter
Existing Impact Fee Eligible Pump Station
Pump Station
Existing Impact Fee Eligible Ground Storage Tank
Existing Ground Storage Tank
Existing Impact Fee Eligible Elevated Storage Tank
Existing Elevated Storage Tank
2012 - 2022 Ground Storage Tank Improvement
2012 - 2022 Elevated Storage Tank Improvement
Existing Impact Fee Eligible Water Line
2012 - 2022 Water Line Improvement
Dallas Water Utilties Supply Line
8" and Smaller Existing Water Line
10" and Larger Existing Water Line
Roads
Streams
Lakes
Lower Pressure Plane (705')
Upper Pressure Plane (792')
City Limit
Extraterritorial Jurisdiction
County Boundary
FREESE AND NICHOLS
Lancaster
15.8 MGD Pump Station Expansion
2.5 MG Ground Storage Expansion
7.9 MGD Pump Station Expansion
3.5 MG Ames Rd. GSTs
Ames Rd. Pump Station
Total Capacity = 26.5 MGD
Firm Capacity = 18.6 MGD
1.0 MG Ames Rd. EST
Overflow Elev.: 792'
Abandon 0.5 MG Ames Rd. GST
Abandon 1.0 MG Ames Rd. EST
James R. Williams 6.0 MG GST
Wintergreen Valve
James R. Williams Pump Station (705')
Total Capacity = 5.3 MGD
Firm Capacity = 3.5 MGD
James R. Williams Pump Station (792')
Total Capacity = 1.0 MGD
Firm Capacity = 0.0 MGD
5.0 MGD Pump Station Expansion (705')
Dallas Valve
2.0 MG Wintergreen Rd. Elevated Storage Tank
Pleasant Run Valve
0.5 MG Pleasant Run Rd. EST
Overflow Elev.: 705'
1.5 MG Beltline Rd. EST
Overflow Elev.: 705'
DALLAS COUNTY
ELLIS COUNTY
0 2,000 4,000
SCALE IN FEET

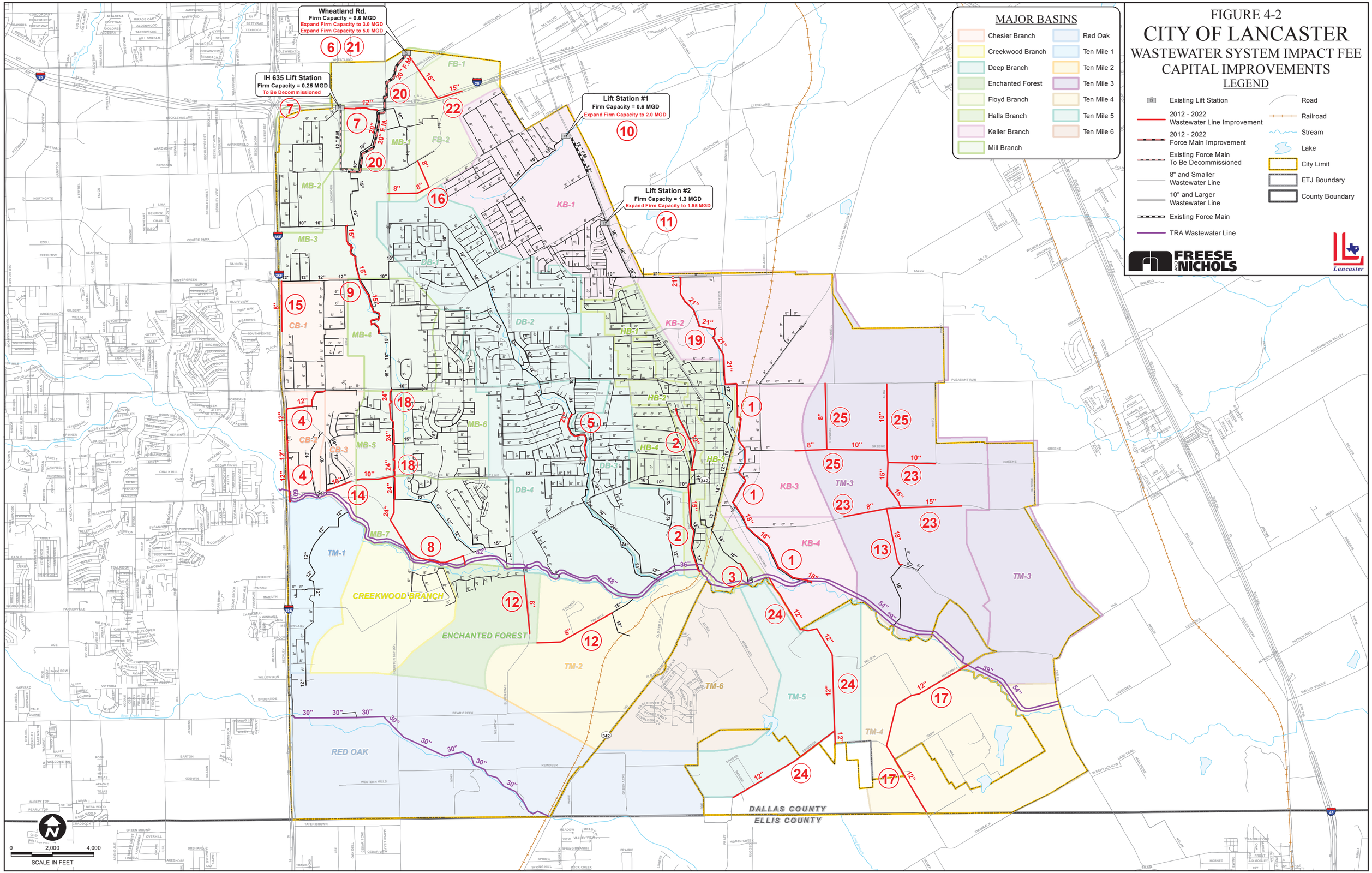

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Table 4-1 Water System Impact Fee Eligible Projects

		Percent Utilization			Costs Based on 2012 Dollars			
No.	**Description of Project**	**2012***	**2022**	**2012-2022**	**Capital Cost**	**Current Development**	**10-Year (2012-2022)**	**Beyond 2022**
EXISTING								
A	Ames Pump Station Expansion	6%	25%	19%	$3,766,376	$225,983	$715,611	$2,824,782
B	30-inch water line along Houston School Road	35%	60%	25%	$819,508	$286,828	$204,877	$327,803
C	30-inch water line along Jefferson Road	20%	25%	5%	$859,527	$171,905	$42,976	$644,645
D	James R. Williams Pump Station 6.0 MG GST	23%	33%	10%	$1,666,918	$388,948	$166,692	$1,111,279
E	Beltline Road 1.5 MG EST	20%	27%	7%	$2,779,869	$555,974	$185,325	$2,038,570
F	2012 Water and Wastewater Impact Fee Study (50%)	0%	100%	100%	$66,000	$0	$66,000	$0
Existing Project Sub-total					$9,958,197	$1,642,033	$1,357,166	$6,958,998
PROPOSED								
1	Abandon 1.0 MG Ames EST and construct new 2.0 MG EST	60%	80%	20%	$5,545,500	$3,327,300	$1,109,100	$1,109,100
2	Connect small diameter lines in the Upper Pressure Plane near the Pleasant Run Elevated Storage Tank	10%	65%	55%	$1,371,490	$137,149	$754,320	$480,022
3	12-inch waterline along Bear Creek	0%	60%	60%	$609,670	$0	$365,802	$243,868
4	Ames Pump Station 2.5 MG Ground Storage Tank, 7.9 MGD Pump Station Expansion, Remove 0.5 MG Ames Rd. GST and Pumps 1-3	50%	65%	15%	$3,760,500	$1,880,250	$564,075	$1,316,175
5	James R. Williams 5.0 MGD Pump Station Expansion	0%	24%	24%	$828,000	$0	$195,408	$632,592
6	Connect small diameter lines in the Upper Pressure Plane	30%	50%	20%	$1,491,210	$447,363	$298,242	$745,605
7	16-inch waterline along Houston School Road	25%	40%	15%	$932,940	$233,235	$139,941	$559,764
8	12-inch waterline along Sunnymeadow Road	0%	50%	50%	$551,900	$0	$275,950	$275,950
9	12-inch waterline south of Pleasant Run EST and new transfer valve	10%	50%	40%	$1,017,500	$101,750	$407,000	$508,750
10	16-inch waterline along Nokomis Road	0%	40%	40%	$1,053,000	$0	$421,200	$631,800
11	12-inch waterlines north of Interstate 20	0%	44%	44%	$1,283,430	$0	$566,219	$717,211

Table 4-1 Water System Impact Fee Eligible Projects (Continued)

		Percent Utilization			Costs Based on 2012 Dollars			
No.	**Description of Project**	**2012***	**2022**	**2012-2022**	**Capital Cost**	**Current Development**	**10-Year (2012-2022)**	**Beyond 2022**
12	20-inch waterline from Ames Pump Station along Cedardale Road	10%	45%	35%	$3,008,030	$300,803	$1,052,811	$1,654,417
13	30-inch waterline along Pleasant Run Road between River Oaks Circle and Lancaster Hutchins. 16-inch waterline along Pleasant Run between Lancaster Hutchins and Cornell Road	5%	30%	25%	$1,560,000	$78,000	$390,000	$1,092,000
14	24- and 20-inch waterline along Houston School Road south of Pleasant Run.	20%	50%	30%	$1,862,920	$372,584	$558,876	$931,460
15	20- and 16-inch waterline along Houston School Road	25%	65%	40%	$582,840	$145,710	$233,136	$203,994
16	12-inch waterline along Ten Mile Road west of Lancaster Hutchins	0%	30%	30%	$967,170	$0	$290,151	$677,019
17	24- and 20-inch waterlines along Lancaster Hutchins south of Pleasant Run Road and east along Beltline to the Beltline Road EST	10%	55%	45%	$2,503,670	$250,367	$1,126,652	$1,126,652
18	12-inch loop along Wilson Road, Watermill Road, and Ferris Road.	0%	20%	20%	$1,983,960	$0	$396,792	$1,587,168
19	16-inch waterline along Pleasant Run east of the Pleasant Run EST	25%	45%	20%	$723,220	$180,805	$144,644	$397,771
20	12-inch loop along Wilson Road, Nokomis Road, Stainback Road, and Ferris Road.	0%	20%	20%	$2,886,310	$0	$577,262	$2,309,048
21	12-inch waterline along Greene Road and Railroad between Greene Road and Pecan Street	10%	50%	40%	$1,148,720	$114,872	$459,488	$574,360
22	12-inch waterline along Parkerville Road between Interstate 35 and Houston School Road	0%	30%	30%	$612,720	$0	$183,816	$428,904
Proposed Project Sub-total					$36,284,700	$7,570,188	$10,510,884	$18,203,628
Total Capital Improvements Cost					**$46,242,897**	**$9,199,825**	**$11,892,365**	**$25,150,707**
	* Utilization in 2012 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.							

Table 4-2 Wastewater System Impact Fee Eligible Projects

		Percent Utilization			Costs Based on 2012 Dollars			
No.	**Description of Project**	**2012***	**2022**	**2012-2022**	**Capital Cost**	**Current Development**	**10-Year (2012-2022)**	**Beyond 2022**
				EXISTING				
A	Impact Fee Study	0%	100%	100%	$66,000	$0	$66,000	$0
				PROPOSED				
1	18-inch gravity line in the Keller Branch Basin	90%	95%	5%	$2,797,170	$2,517,453	$139,859	$139,859
2	15- and 12-inch gravity lines in the Halls Branch Basin	90%	95%	5%	$1,252,720	$1,127,448	$62,636	$62,636
3	15-inch gravity line in the Halls Branch Basin north of TRA interceptor	85%	90%	5%	$188,640	$160,344	$9,432	$18,864
4	12-inch gravity line in Chesier Branch Basin	80%	90%	10%	$978,220	$782,576	$97,822	$97,822
5	21-inch gravity line in the Deep Branch Basin	75%	80%	5%	$826,350	$619,763	$41,318	$165,270
6	Wheatland Lift Station expansion to 3.0 MGD firm capacity	21%	100%	79%	$1,380,000	$289,800	$1,090,200	$0
7	Decommission IH 635 Lift Station and construct new 12-inch gravity line	40%	80%	40%	$508,330	$203,332	$203,332	$101,666
8	Construct 24-inch relief line in Mills Branch Basin	80%	95%	15%	$1,538,070	$1,230,456	$230,711	$76,904
9	15-inch gravity line in the Mills Branch Basin	60%	85%	25%	$1,359,170	$815,502	$339,793	$203,876
10	Lift Station #1 expansion to 2.0 MGD Firm Capacity	68%	95%	27%	$828,000	$563,040	$223,560	$41,400
11	Lift Station #2 expansion to 1.55 MGD Firm Capacity	0%	15%	15%	$345,000	$0	$51,750	$293,250
12	8-inch gravity lines in Ten Mile-2 and Enchanted Forest Basin	0%	50%	50%	$710,120	$0	$355,060	$355,060
13	18-inch gravity line in Ten Mile-3	0%	50%	50%	$595,840	$0	$297,920	$297,920
14	10-inch gravity lines in Chesier Branch Basin and Mills Branch Basin	0%	85%	85%	$343,920	$0	$292,332	$51,588
15	8-inch gravity line in Chesier Branch	0%	80%	80%	$233,220	$0	$186,576	$46,644

Table 4-1 Wastewater System Impact Fee Eligible Projects (Continued)

		Percent Utilization			Costs Based on 2012 Dollars			
No.	**Description of Project**	**2012***	**2022**	**2012-2022**	**Capital Cost**	**Current Development**	**10-Year (2012-2022)**	**Beyond 2022**
16	8-inch gravity line in Floyd Branch Basin	0%	70%	70%	$331,830	$0	$232,281	$99,549
17	12-inch gravity line in Ten Mile-4	0%	30%	30%	$1,320,070	$0	$396,021	$924,049
18	24-inch gravity line in Mills Branch Basin	30%	70%	40%	$1,408,290	$422,487	$563,316	$422,487
19	21-inch gravity line in the Keller Branch Basin	20%	70%	50%	$1,872,220	$374,444	$936,110	$561,666
20	Wheatland Lift Station new 20-inch force main	20%	70%	50%	$1,599,360	$319,872	$799,680	$479,808
21	Wheatland Lift Station expansion to 5.0 MGD firm capacity	0%	50%	50%	$552,000	$0	$276,000	$276,000
22	15-inch gravity line in Floyd Branch Basin	0%	50%	50%	$655,710	$0	$327,855	$327,855
23	18-, 15-, 10-, and 8-inch gravity lines in the Ten Mile-3 Basin	0%	60%	60%	$1,920,940	$0	$1,152,564	$768,376
24	12-inch gravity line in Ten Mile-5	0%	10%	10%	$2,075,440	$0	$207,544	$1,867,896
25	10- and 8-inch gravity lines in Ten Mile-3 Basin	0%	40%	40%	$1,158,680	$0	$463,472	$695,208
Proposed Project Sub-total					$26,779,310	$9,426,517	$8,977,142	$8,375,652
Total Capital Improvements Cost					**$26,845,310**	**$9,426,517**	**$9,043,142**	**$8,375,652**
	* Utilization in 2012 on Proposed Projects indicates a portion of the project that will be used to address deficiencies within the existing system, and therefore are not eligible for impact fee cost recovery for future growth.							

4.2 Service Units

The maximum impact fee may not exceed the amount determined by dividing the cost of capital improvements required by the total number of service units attributed to new development during the impact fee eligibility period. A water service unit is defined as the service equivalent to a water connection for a single-family residence. The City of Lancaster does not directly meter wastewater flows and bills for wastewater services based on the customer's water consumption. Therefore, a wastewater service unit is defined as the wastewater service provided to a customer with a water connection for a single-family residence.

The service associated with public, commercial, and industrial connections is converted into service units based upon the capacity of the meter used to provide service. The number of service units required to represent each meter size is based on the safe maximum operating capacity of the appropriate meter type. American Water Works Association (AWWA) standards C708 (Cold Water Meters – Multi-jet Type), C701 (Cold Water Meters – Class I Turbine Type), and C702 (Cold Water Meters – Compound Type) were used to determine the safe maximum operating capacity. The service unit equivalent for each meter size used by the City is listed in **Table 4-3**.

Table 4-3 Service Unit Equivalencies

Meter Size	Meter Type	Safe Maximum Operating Capacity (gpm)	Service Unit Equivalent
3/4"	Multi-jet	25	1.0
1"	Multi-jet	35	1.4
1 1/2"	Multi-jet	70	2.8
2"	Compound	160	6.4
3"	Compound	320	12.8
4"	Compound	500	20.0
6"	Compound	1,000	40.0
8"	Compound	1,600	64.0
10"	Compound	2,300	92.0
10"	Turbine	2,900	116.0
12"	Turbine	4,300	172.0

Typically, in Lancaster, single-family residences are served with 3/4-inch water meters. Larger meters represent public, commercial, and industrial water use. The City provided data that included the meter size of each active water meter as of February 2012. **Table 4-4** shows the water and wastewater service units for 2012 and the projected service units for 2022.

Table 4-4 Water and Wastewater Service Units

Meter Size	2012 Connections	2012 Service Units	2022 Connections	2022 Service Units	Growth in Service Units
3/4"	10,440	10,440	13,572	13,572	3,132
1"	139	195	181	253	58
1 1/2"	57	160	74	207	47
2" (1)	391	2,502	587	3,757	1,255
3"	19	243	30	384	141
4"	12	240	19	380	140
6"	4	160	6	240	80
8"	9	576	14	896	320
Total	**11,071**	**14,516**	**14,483**	**19,689**	**5,173**

(1) Includes Multi-Family Meters

4.3 Maximum Impact Fee Calculations

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

Chapter 395 of the Texas Local Government Code states that the maximum impact fee may not exceed the amount determined by dividing the cost of capital improvements required by the total number of service units attributed to new development during the impact fee eligibility period less the credit to account for water and wastewater revenues used to finance capital improvement plans.

The total projected costs include the projected capital improvement costs to serve 10-year development, the projected finance cost for the capital improvements, and the consultant cost for preparing and updating the Capital Improvements Plan. A 4.0% interest rate was used to calculate financing costs. A comparison graph showing water and wastewater impact fees in other cities throughout the Metroplex are presented on **Figure 4-3**.

Water Impact Fee:	
Total Capital Improvement Costs	$11,892,365
Financing Costs	$3,955,774
Total Eligible Costs	$15,848,139
Growth in Service Units	5,173

Base Maximum Calculated Water Impact Fee Per Service Unit Without Credit Analysis	= Total Eligible Costs/Growth in Service Units
	= $15,848,139/5,173

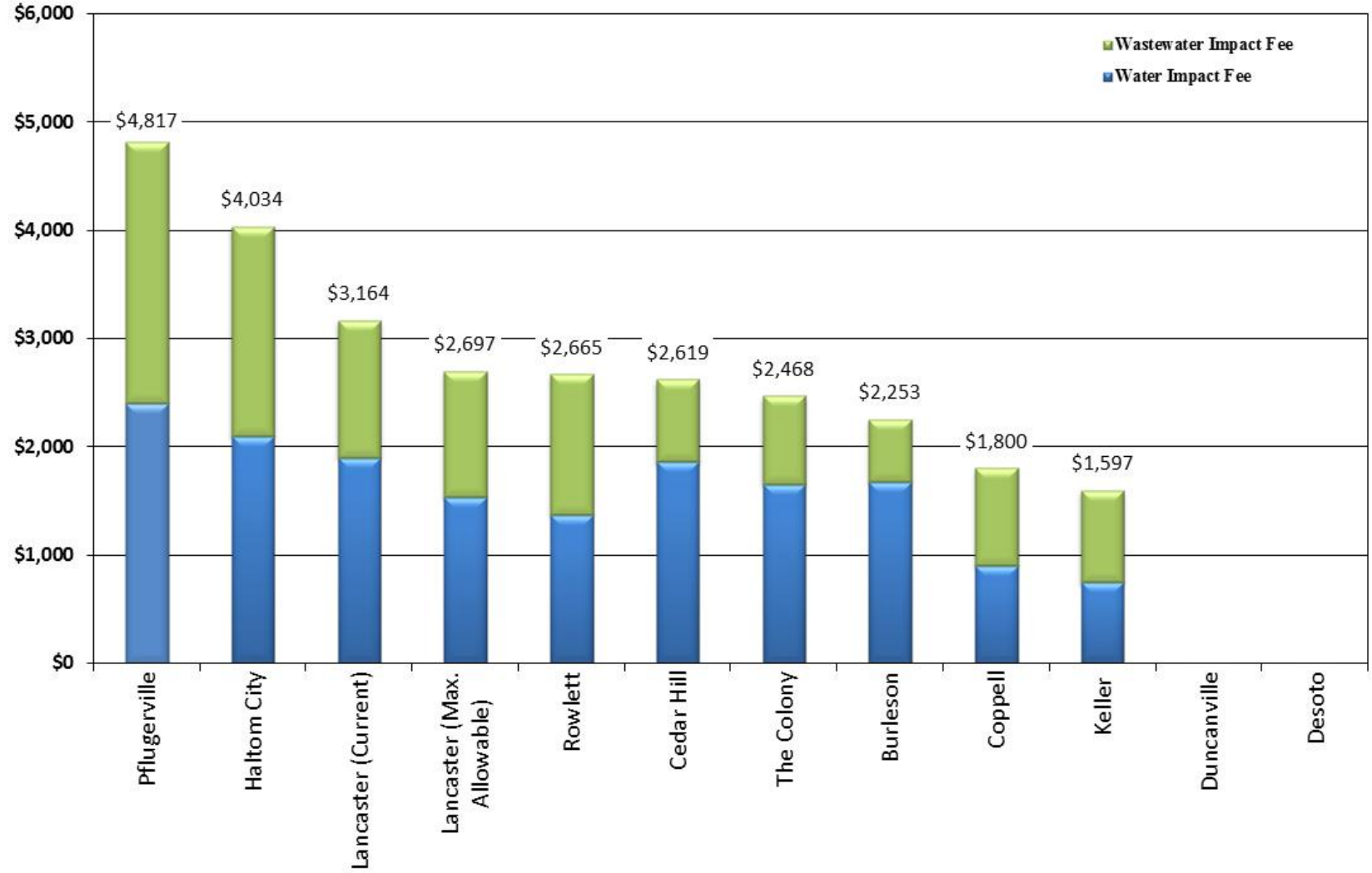
	= $3,064 per Service Unit
Maximum Allowable Water Impact Fee	= Maximum Impact Fee – Credit
	= $3,064 - $1,532
	= $1,532 per Service Unit

Wastewater Impact Fee:

Total Capital Improvement Costs	$9,043,142
Financing Costs	$3,008,033
Total Eligible Costs	$12,051,175
Growth in Service Units	5,173

Base Maximum Calculated Wastewater Impact Fee Per Service Unit Without Credit Analysis	= Total Eligible Costs/Growth in Service Units
	= $12,051,175/5,173
	= $2,330 per Service Unit
Maximum Allowable Wastewater Impact Fee	= Maximum Impact Fee – Credit
	= $2,330 - $1,165
	= $1,165 per Service Unit

Figure 4-3 Water and Wastewater Impact Fee per Service Unit Comparison



* Burleson and Haltom City include City of Fort Worth Impact Fees.
**The Colony Impact Fees are based on maximum allowable from the Impact Fee Report. Adopted Impact Fees may be lower.

Appendix A

Water Model Validation Data

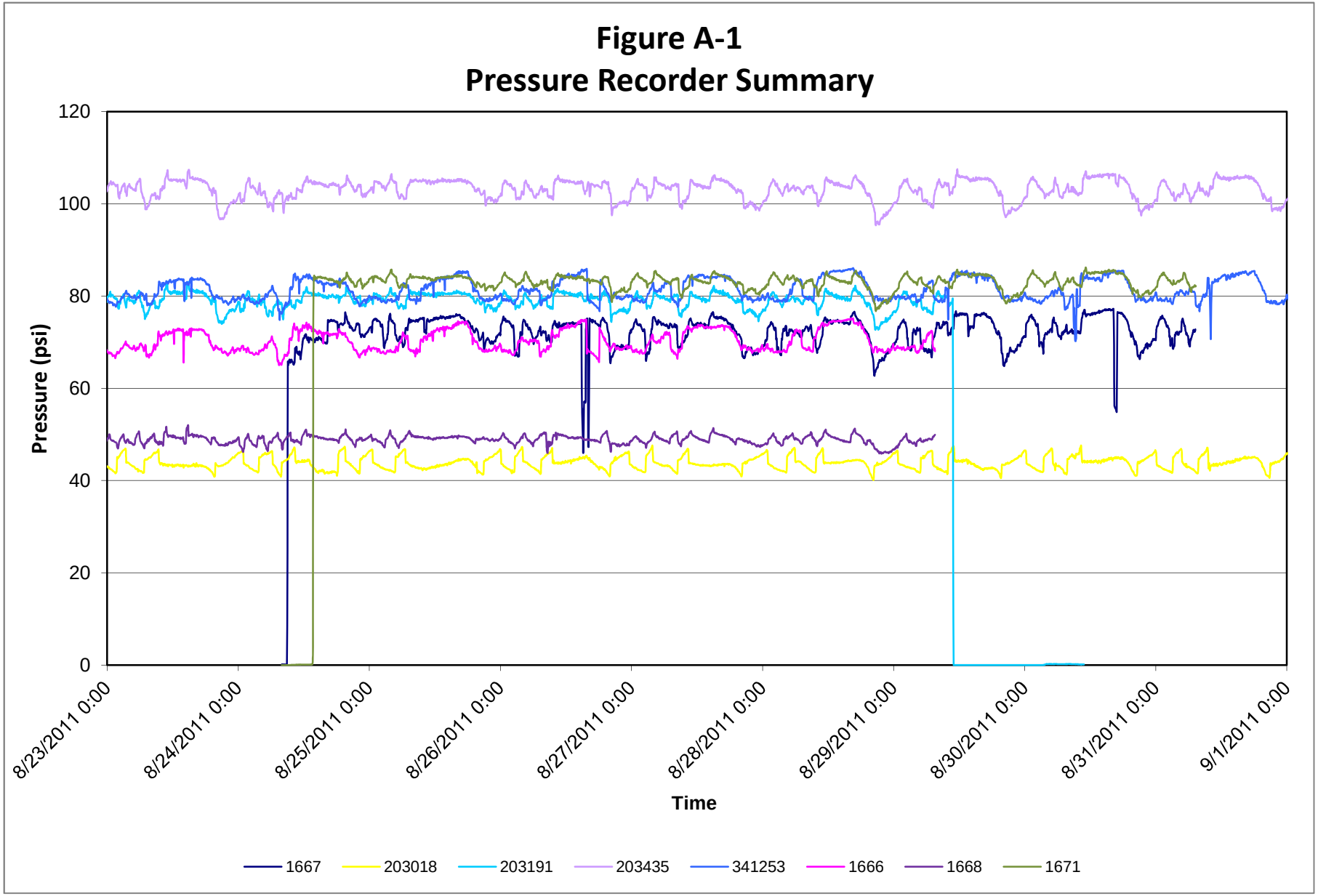


Figure A-1
Pressure Recorder Summary
Pressure (psi)
120
100
80
60
40
20
0
8/23/2011 0:00
8/24/2011 0:00
8/25/2011 0:00
8/26/2011 0:00
8/27/2011 0:00
8/28/2011 0:00
8/29/2011 0:00
8/30/2011 0:00
8/31/2011 0:00
9/1/2011 0:00
Time
1667
203018
203191
203435
341253
1666
1668
1671

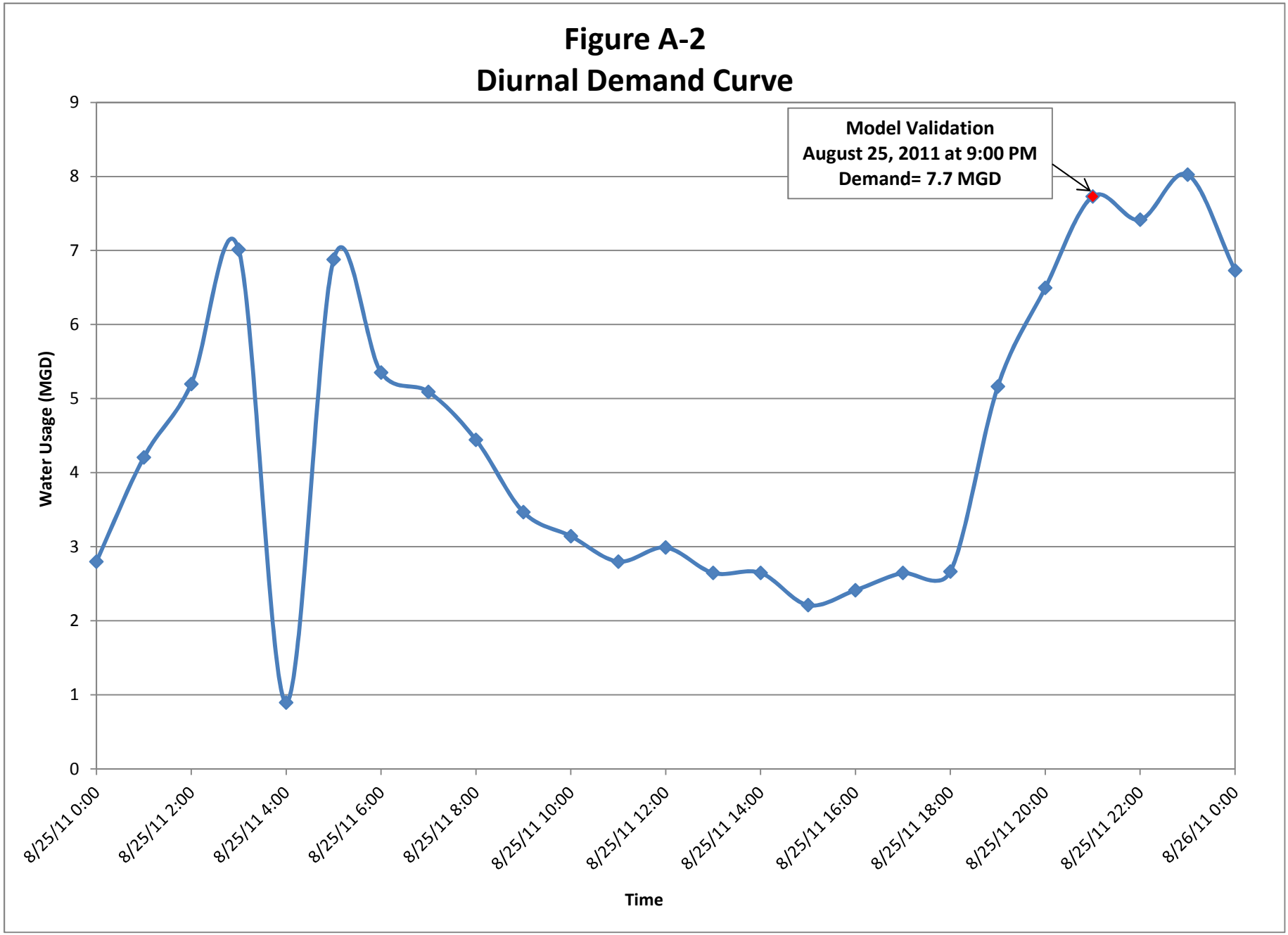


Figure A-2
Diurnal Demand Curve
Model Validation
August 25, 2011 at 9:00 PM
Demand= 7.7 MGD
Water Usage (MGD)
0
1
2
3
4
5
6
7
8
9
8/25/11 0:00
8/25/11 2:00
8/25/11 4:00
8/25/11 6:00
8/25/11 8:00
8/25/11 10:00
8/25/11 12:00
8/25/11 14:00
8/25/11 16:00
8/25/11 18:00
8/25/11 20:00
8/25/11 22:00
8/26/11 0:00
Time

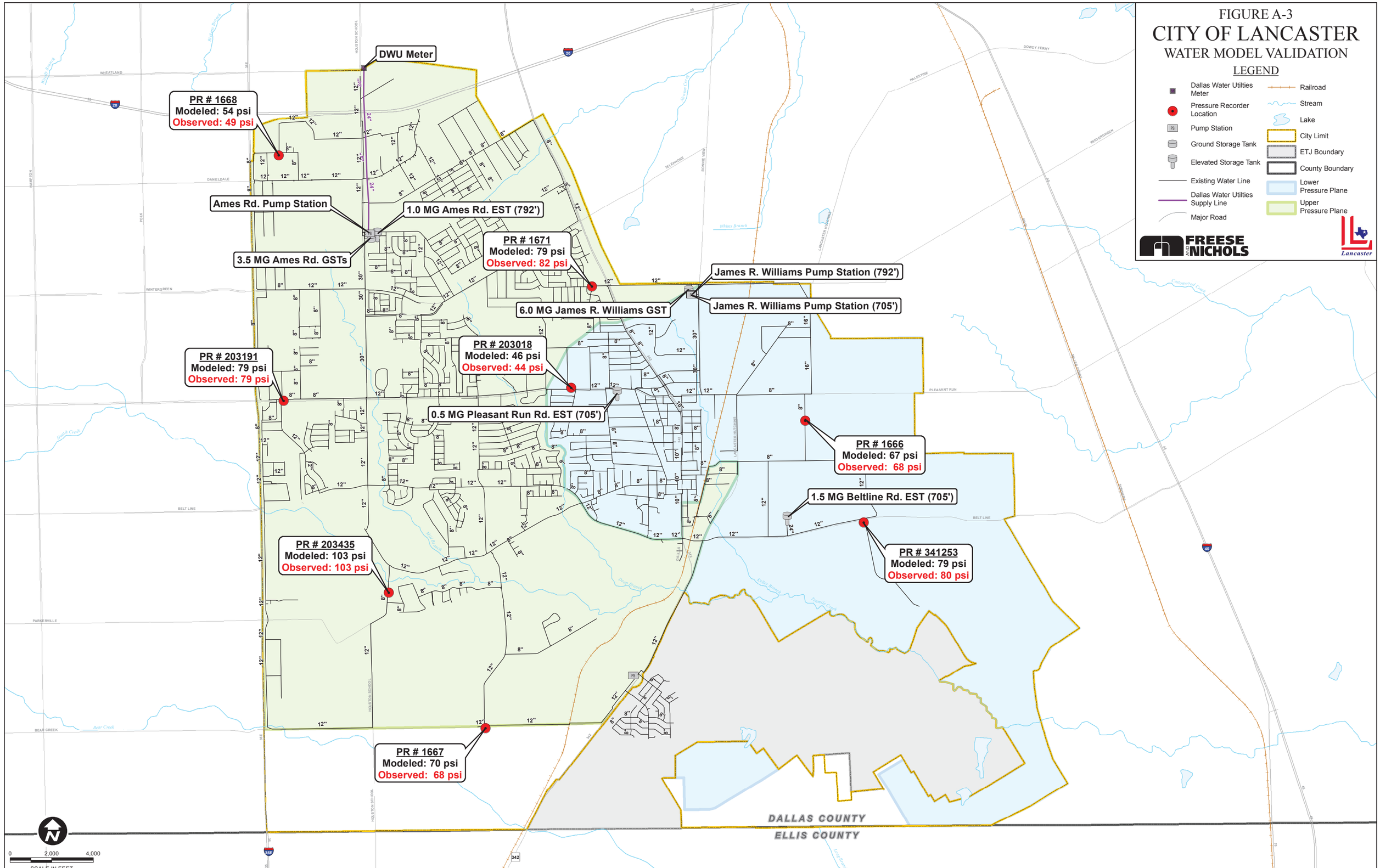
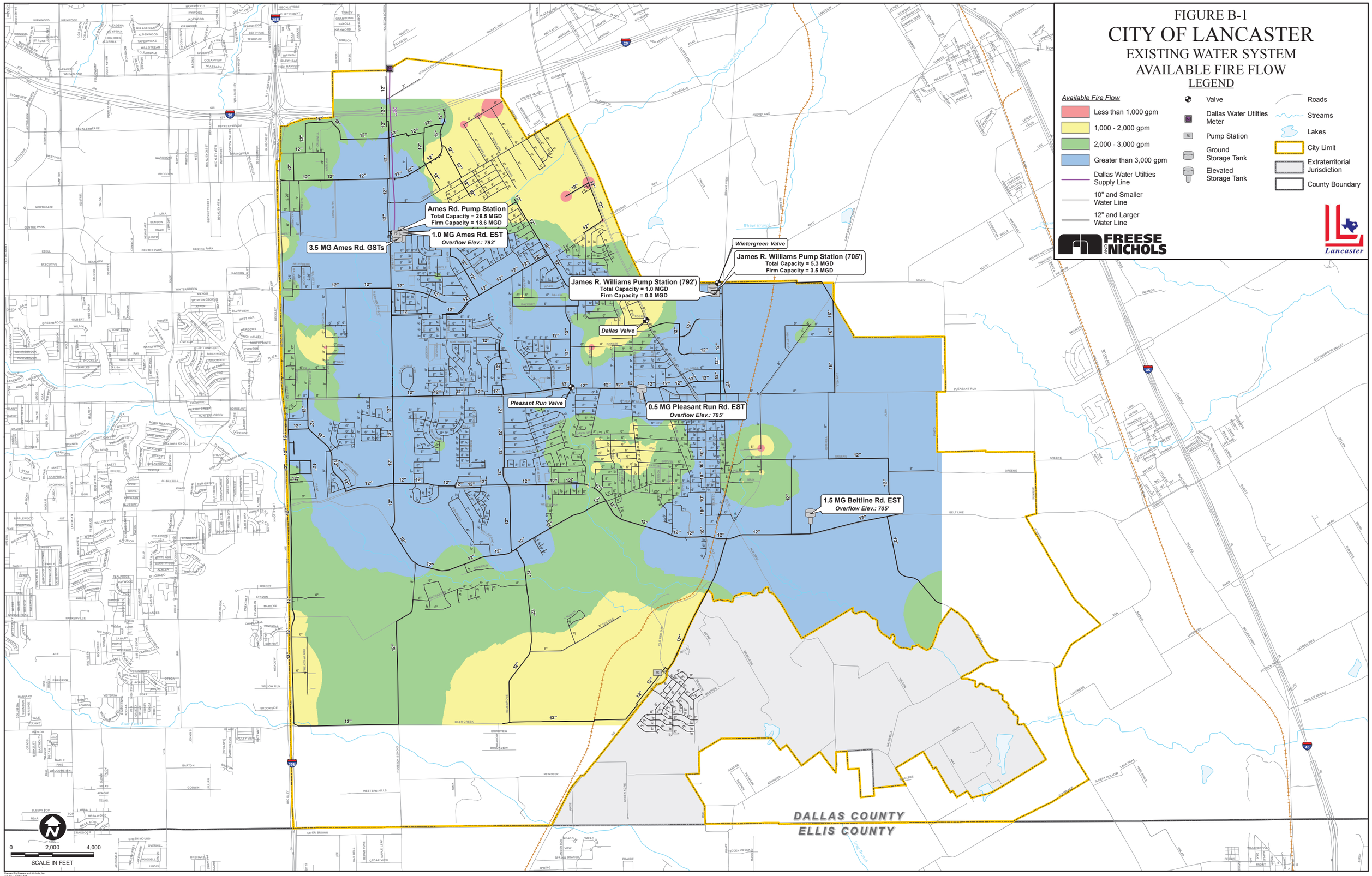


FIGURE A-3
CITY OF LANCASTER
WATER MODEL VALIDATION
LEGEND
Dallas Water Utilties Meter
Pressure Recorder Location
Pump Station
Ground Storage Tank
Elevated Storage Tank
Existing Water Line
Dallas Water Utilties Supply Line
Major Road
Railroad
Stream
Lake
City Limit
ETJ Boundary
County Boundary
Lower Pressure Plane
Upper Pressure Plane
FREESE AND NICHOLS
Lancaster
DWU Meter
PR # 1668
Modeled: 54 psi
Observed: 49 psi
Ames Rd. Pump Station
1.0 MG Ames Rd. EST (792')
3.5 MG Ames Rd. GSTs
PR # 1671
Modeled: 79 psi
Observed: 82 psi
James R. Williams Pump Station (792')
James R. Williams Pump Station (705')
6.0 MG James R. Williams GST
PR # 203018
Modeled: 46 psi
Observed: 44 psi
PR # 203191
Modeled: 79 psi
Observed: 79 psi
0.5 MG Pleasant Run Rd. EST (705')
PR # 1666
Modeled: 67 psi
Observed: 68 psi
1.5 MG Beltline Rd. EST (705')
PR # 341253
Modeled: 79 psi
Observed: 80 psi
PR # 203435
Modeled: 103 psi
Observed: 103 psi
PR # 1667
Modeled: 70 psi
Observed: 68 psi
DALLAS COUNTY
ELLIS COUNTY
0
2,000
4,000
SCALE IN FEET

Appendix B

Available Fire Flow Map



Created By Freese and Nichols, Inc.
Job No.: LCS11318
Location: H:\W_WW_PLANNING\FINAL_REPORT\Figure-B-1)-Available_Fire_Flow_(ANSI-D).mxd
Updated: Wednesday, July 18, 2012 3:24:25 PM

Appendix C

Water System Project Cost Estimates

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 1

Project Description

Abandon 1.0 MG Ames EST and construct new 2.0 MG EST. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Remove EST	1	EA	$50,000	50,000
2	2.0 MG Elevated Storage Tank*	1	EA	$4,100,000	4,100,000
3	24" Line*	1	EA	$180,000	180,000

*Preliminary cost estimates from the EST design team, but the project is still in the site selection process.

SUBTOTAL:		$4,330,000
CONTINGENCY	20%	$866,000
SUBTOTAL:		$5,196,000
ENG/SURVEY	Actual	$349,500
SUBTOTAL:		$5,545,500

PROJECT TOTAL **$5,545,500**

Construction Project Number 2

Project Description

Connect small diameter lines in the Upper Pressure Plane near the Pleasant Run Elevated Storage Tank. This project will address existing system deficiencies and improve system operation. This project also allows for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	6,174	LF	$96	592,740
2	12" Pipe	5,015	LF	$72	361,090
3	Pavement Repair	400	LF	$100	40,000

SUBTOTAL:		$993,830
CONTINGENCY	20%	$198,770
SUBTOTAL:		$1,192,600
ENG/SURVEY	15%	$178,890
SUBTOTAL:		$1,371,490

PROJECT TOTAL **$1,371,490**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 3

Project Description

12-inch waterline a long Bear Creek. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	5,858	LF	$72	421,780
2	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$441,780
		CONTINGENCY		20%	$88,360
		SUBTOTAL:			$530,140
		ENG/SURVEY		15%	$79,530
		SUBTOTAL:			$609,670

PROJECT TOTAL **$609,670**

Construction Project Number 4

Project Description

Ames Pump Station 2.5 MG Ground Storage Tank, 7.9 MGD Pump Station Expansion, Remove 0.5 MG Ames Rd. GST and Pumps 1-3. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.5 MG Ground Storage Tank	1	EA	$1,875,000	1,875,000
2	7.9 MGD Pump Station Expansion	1	EA	$600,000	600,000
3	Remove GST	1	EA	$50,000	50,000
4	Yard Piping	1	EA	$200,000	200,000
		SUBTOTAL:			$2,725,000
		CONTINGENCY		20%	$545,000
		SUBTOTAL:			$3,270,000
		ENG/SURVEY		15%	$490,500
		SUBTOTAL:			$3,760,500

PROJECT TOTAL **$3,760,500**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST — UPDATE

Construction Project Number 5

Project Description

James R. Williams 5.0 MGD Pump Station Expansion to serve the Lower Pressure Plane. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	5.0 MGD Pump Station Expansion	1	EA	$600,000	600,000
		SUBTOTAL:			$600,000
		CONTINGENCY		20%	$120,000
		SUBTOTAL:			$720,000
		ENG/SURVEY		15%	$108,000
		SUBTOTAL:			$828,000

PROJECT TOTAL **$828,000**

Construction Project Number 6

Project Description

Connect small diameter lines in the Upper Pressure Plane. This project will address existing system deficienices and improve system operations. This project also allows for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	12,230	LF	$72	880,580
2	20" Boring and Casing	400	LF	$300	120,000
3	Pavement Repair	800	LF	$100	80,000
		SUBTOTAL:			$1,080,580
		CONTINGENCY		20%	$216,120
		SUBTOTAL:			$1,296,700
		ENG/SURVEY		15%	$194,510
		SUBTOTAL:			$1,491,210

PROJECT TOTAL **$1,491,210**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 7

Project Description

16-inch waterline along Houston School Road. This project will adress an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	5,865	LF	$96	563,040
2	30" Boring and Casing	200	LF	$465	93,000
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$676,040
		CONTINGENCY		20%	$135,210
		SUBTOTAL:			$811,250
		ENG/SURVEY		15%	$121,690
		SUBTOTAL:			$932,940

PROJECT TOTAL **$932,940**

Construction Project Number 8

Project Description

12-inch waterline along Wintergreen Road and between Wintergreen and Danieldale Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	4,304	LF	$72	309,920
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$399,920
		CONTINGENCY		20%	$79,990
		SUBTOTAL:			$479,910
		ENG/SURVEY		15%	$71,990
		SUBTOTAL:			$551,900

PROJECT TOTAL **$551,900**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST — UPDATE

Construction Project Number 9

Project Description

12-inch waterline south of Pleasant Run EST and new transfer valve. This project will improve system operations and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	7,602	LF	$72	547,310
2	Pavement Repair	1,100	LF	$100	110,000
3	Pressure Reducing Valve	1	EA	$80,000	80,000
		SUBTOTAL:			$737,310
		CONTINGENCY		20%	$147,470
		SUBTOTAL:			$884,780
		ENG/SURVEY		15%	$132,720
		SUBTOTAL:			$1,017,500

PROJECT TOTAL **$1,017,500**

Construction Project Number 10

Project Description

16-inch waterline along Nokomis Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	6,771	LF	$96	650,040
2	30" Boring and Casing	200	LF	$465	93,000
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$763,040
		CONTINGENCY		20%	$152,610
		SUBTOTAL:			$915,650
		ENG/SURVEY		15%	$137,350
		SUBTOTAL:			$1,053,000

PROJECT TOTAL **$1,053,000**

2012-2017 TOTAL **$17,161,710**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 11

Project Description

12-inch waterlines north of Interstate 20. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	11,667	LF	$72	840,010
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$930,010
		CONTINGENCY		20%	$186,010
		SUBTOTAL:			$1,116,020
		ENG/SURVEY		15%	$167,410
		SUBTOTAL:			$1,283,430

PROJECT TOTAL **$1,283,430**

Construction Project Number 12

Project Description

20-inch waterline from Ames Pump Station and along Cedardale Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	20" Pipe	16,606	LF	$120	1,992,720
2	34" Boring and Casing	200	LF	$535	107,000
3	Pavement Repair	800	LF	$100	80,000
		SUBTOTAL:			$2,179,720
		CONTINGENCY		20%	$435,950
		SUBTOTAL:			$2,615,670
		ENG/SURVEY		15%	$392,360
		SUBTOTAL:			$3,008,030

PROJECT TOTAL **$3,008,030**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 13

Project Description

30-inch waterline along Pleasant Run Road between River Oaks Circle and Lancaster Hutchins. 16-inch waterline along Pleasant Run between Lancaster Hutchins and Cornell Road. This project will improve system operation and allow for growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	30" Pipe	2,847	LF	$180	512,530
2	16" Pipe	4,291	LF	$96	411,900
3	48" Boring and Casing	200	LF	$880	176,000
4	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$1,130,430
		CONTINGENCY		20%	$226,090
		SUBTOTAL:			$1,356,520
		ENG/SURVEY		15%	$203,480
		SUBTOTAL:			$1,560,000

PROJECT TOTAL **$1,560,000**

Construction Project Number 14

Project Description

24- and 20-inch waterline along Houston School Road south of Pleasant Run. This project will improve system operations and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	4,683	LF	$144	674,320
2	20" Pipe	5,130	LF	$120	615,620
3	Pavement Repair	600	LF	$100	60,000
		SUBTOTAL:			$1,349,940
		CONTINGENCY		20%	$269,990
		SUBTOTAL:			$1,619,930
		ENG/SURVEY		15%	$242,990
		SUBTOTAL:			$1,862,920

PROJECT TOTAL **$1,862,920**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 15

Project Description

20- and 16-inch waterline along Houston School Road. This project will improve system operations and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	20" Pipe	1,365	LF	$120	163,810
2	16" Pipe	2,381	LF	$96	228,530
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$422,340
		CONTINGENCY		20%	$84,470
		SUBTOTAL:			$506,810
		ENG/SURVEY		15%	$76,030
		SUBTOTAL:			$582,840

PROJECT TOTAL **$582,840**

Construction Project Number 16

Project Description

12-inch waterline along Ten Mile Road west of Lancaster Hutchins. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	6,817	LF	$72	490,840
2	20" Boring and Casing	600	LF	$300	180,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$700,840
		CONTINGENCY		20%	$140,170
		SUBTOTAL:			$841,010
		ENG/SURVEY		15%	$126,160
		SUBTOTAL:			$967,170

PROJECT TOTAL **$967,170**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 17

Project Description

24- and 20-inch waterlines along Lancaster Hutchins south of Pleasant Run Road and east along Beltline to the Beltline Road EST. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	3,694	LF	$144	531,910
2	20" Pipe	9,628	LF	$120	1,155,340
3	34" Boring and Casing	200	LF	$535	107,000
4	Pavement Repair	400	LF	$50	20,000
		SUBTOTAL:			$1,814,250
		CONTINGENCY		20%	$362,850
		SUBTOTAL:			$2,177,100
		ENG/SURVEY		15%	$326,570
		SUBTOTAL:			$2,503,670

PROJECT TOTAL **$2,503,670**

Construction Project Number 18

Project Description

12-inch loop along Wilson Road, Watermill Road, and Ferris Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	18,717	LF	$72	1,347,650
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$1,437,650
		CONTINGENCY		20%	$287,530
		SUBTOTAL:			$1,725,180
		ENG/SURVEY		15%	$258,780
		SUBTOTAL:			$1,983,960

PROJECT TOTAL **$1,983,960**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 19

Project Description

16-inch waterline along Pleasant Run east of the Pleasant Run EST. This project will improve system operations and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	4,938	LF	$96	474,060
2	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$524,060
		CONTINGENCY		20%	$104,820
		SUBTOTAL:			$628,880
		ENG/SURVEY		15%	$94,340
		SUBTOTAL:			$723,220

PROJECT TOTAL **$723,220**

Construction Project Number 20

Project Description

12-inch loop along Watermill Road, Nokomis Road, Stainback Road, and Ferris Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	27,799	LF	$72	2,001,520
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$2,091,520
		CONTINGENCY		20%	$418,310
		SUBTOTAL:			$2,509,830
		ENG/SURVEY		15%	$376,480
		SUBTOTAL:			$2,886,310

PROJECT TOTAL **$2,886,310**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 21

Project Description

12-inch waterline along Greene Road and Railroad between Greene Road and Pecan Street. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	9,200	LF	$72	662,400
2	20" Boring and Casing	400	LF	$300	120,000
3	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$832,400
		CONTINGENCY		20%	$166,480
		SUBTOTAL:			$998,880
		ENG/SURVEY		15%	$149,840
		SUBTOTAL:			$1,148,720

PROJECT TOTAL **$1,148,720**

Construction Project Number 22

Project Description

12-inch waterline south of Parkerville Road between Interstate 35 and Houston School Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	5,750	LF	$72	414,000
2	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$444,000
		CONTINGENCY		20%	$88,800
		SUBTOTAL:			$532,800
		ENG/SURVEY		15%	$79,920
		SUBTOTAL:			$612,720

PROJECT TOTAL **$612,720**

2017-2022 TOTAL **$19,122,990**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 23

Project Description

20-inch waterline along State Highway 342 to the James R. Williams Pump Station. James R. Williams 6.0 MGD Pump Station Expansion to serve the Upper Pressure Plane. This project will allow for future growth and provide redundancy to the Upper Pressure Plane.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	20" Pipe	8,719	LF	$120	1,046,320
2	Pavement Repair	600	LF	$100	60,000
3	6.0 MGD Pump Station Expansion	1	EA	$600,000	600,000
		SUBTOTAL:			$1,706,320
		CONTINGENCY		20%	$341,270
		SUBTOTAL:			$2,047,590
		ENG/SURVEY		15%	$307,140
		SUBTOTAL:			$2,354,730

PROJECT TOTAL **$2,354,730**

Construction Project Number 24

Project Description

12-inch waterline along Interstate 35 between Wintergreen and Pleasant Run. This project will improve system operation.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	6,186	LF	$72	445,380
2	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$495,380
		CONTINGENCY		20%	$99,080
		SUBTOTAL:			$594,460
		ENG/SURVEY		15%	$89,170
		SUBTOTAL:			$683,630

PROJECT TOTAL **$683,630**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 25

Project Description

16- and 12-inch waterline along Pleasant Run between Cornell Road and Rinto Road. 16-inch waterline along Alba Road between Pleasant Run and Green Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	6,649	LF	$96	638,330
2	12" Pipe	2,813	LF	$72	202,530
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$870,860
		CONTINGENCY		20%	$174,180
		SUBTOTAL:			$1,045,040
		ENG/SURVEY		15%	$156,760
		SUBTOTAL:			$1,201,800

PROJECT TOTAL **$1,201,800**

Construction Project Number 26

Project Description

16-inch waterline east of Beltline Road EST along Belt Line Road and north along Alba Road to Greene Road. This project will improve system operations and allow for growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	8,717	LF	$96	836,830
2	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$876,830
		CONTINGENCY		20%	$175,370
		SUBTOTAL:			$1,052,200
		ENG/SURVEY		15%	$157,830
		SUBTOTAL:			$1,210,030

PROJECT TOTAL **$1,210,030**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 27

Project Description

12-inch waterline east of Cornell Road along the City Limits, south along Pinto to Greene Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	16,716	LF	$72	1,203,580
2	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$1,253,580
		CONTINGENCY		20%	$250,720
		SUBTOTAL:			$1,504,300
		ENG/SURVEY		15%	$225,650
		SUBTOTAL:			$1,729,950

PROJECT TOTAL **$1,729,950**

Construction Project Number 28

Project Description

16- and 12-inch waterline along the easter City Limit between Greene and Van Road and along Belt Line Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	16" Pipe	18,068	LF	$96	1,734,490
2	12" Pipe	7,718	LF	$72	555,670
3	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$2,340,160
		CONTINGENCY		20%	$468,040
		SUBTOTAL:			$2,808,200
		ENG/SURVEY		15%	$421,230
		SUBTOTAL:			$3,229,430

PROJECT TOTAL **$3,229,430**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 29

Project Description

12-inch waterline along State Highway 342 and Reindeer Road on southern City boundary and transfer valve. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	21,092	LF	$72	1,518,630
2	Pavement Repair	500	LF	$100	50,000
3	Pressure Reducing Valve	1	EA	$80,000	80,000
		SUBTOTAL:			$1,648,630
		CONTINGENCY		20%	$329,730
		SUBTOTAL:			$1,978,360
		ENG/SURVEY		15%	$296,760
		SUBTOTAL:			$2,275,120

PROJECT TOTAL **$2,275,120**

Construction Project Number 30

Project Description

Ames Pump Station 2.0 MG Ground Storage Tank. This project will improve system operations.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.0 MG Ground Storage Tank	1	EA	$1,500,000	1,500,000
2	Yard Piping	1	EA	$200,000	200,000
		SUBTOTAL:			$1,700,000
		CONTINGENCY		20%	$340,000
		SUBTOTAL:			$2,040,000
		ENG/SURVEY		15%	$306,000
		SUBTOTAL:			$2,346,000

PROJECT TOTAL **$2,346,000**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 31

Project Description

12-inch waterlines along Watermill Road and east of Ferris Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	13,688	LF	$72	985,570
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$1,065,570
		CONTINGENCY		20%	$213,120
		SUBTOTAL:			$1,278,690
		ENG/SURVEY		15%	$191,810
		SUBTOTAL:			$1,470,500

PROJECT TOTAL **$1,470,500**

Construction Project Number 32

Project Description

12-inch waterline along Moreland Road between State Highway 342 and Nokomis Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	15,739	LF	$72	1,133,200
2	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$1,173,200
		CONTINGENCY		20%	$234,640
		SUBTOTAL:			$1,407,840
		ENG/SURVEY		15%	$211,180
		SUBTOTAL:			$1,619,020

PROJECT TOTAL **$1,619,020**

City of Lancaster
Water CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 33

Project Description

12-inch waterline along Bluegrove between Main Street and Ten Mile Road. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	5,881	LF	$72	423,440
2	20" Boring and Casing	200	LF	$300	60,000
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$513,440
		CONTINGENCY		20%	$102,690
		SUBTOTAL:			$616,130
		ENG/SURVEY		15%	$92,420
		SUBTOTAL:			$708,550

PROJECT TOTAL **$708,550**

2022-2035 TOTAL **$18,120,210**

Appendix D

Wastewater System Project Cost Estimates

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 1

Project Description

18-inch gravity line in the Keller Branch Basin between Pleasant Run Road and TRA interceptor. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	13,898	LF	$108	1,500,960
2	60" Diameter Manhole	35	EA	$6,000	208,470
3	32" Boring and Casing	500	LF	$495	247,500
4	Pavement Repair	700	LF	$100	70,000
		SUBTOTAL:			$2,026,930
		CONTINGENCY		20%	$405,390
		SUBTOTAL:			$2,432,320
		ENG/SURVEY		15%	$364,850
		SUBTOTAL:			$2,797,170

PROJECT TOTAL **$2,797,170**

Construction Project Number 2

Project Description

15- and 12-inch gravity lines in the Halls Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	5,058	LF	$90	455,190
2	12" Pipe	3,866	LF	$72	278,370
3	60" Diameter Manhole	13	EA	$6,000	75,870
4	48" Diameter Manhole	10	EA	$5,000	48,330
5	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$907,760
		CONTINGENCY		20%	$181,560
		SUBTOTAL:			$1,089,320
		ENG/SURVEY		15%	$163,400
		SUBTOTAL:			$1,252,720

PROJECT TOTAL **$1,252,720**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 3

Project Description

15-inch gravity line in the Halls Branch Basin north of TRA interceptor. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	1,302	LF	$90	117,160
2	60" Diameter Manhole	3	EA	$6,000	19,530
		SUBTOTAL:			$136,690
		CONTINGENCY		20%	$27,340
		SUBTOTAL:			$164,030
		ENG/SURVEY		15%	$24,610
		SUBTOTAL:			$188,640

PROJECT TOTAL **$188,640**

Construction Project Number 4

Project Description

12-inch gravity line in Chesier Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	7,915	LF	$72	569,910
2	48" Diameter Manhole	20	EA	$5,000	98,940
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$708,850
		CONTINGENCY		20%	$141,770
		SUBTOTAL:			$850,620
		ENG/SURVEY		15%	$127,600
		SUBTOTAL:			$978,220

PROJECT TOTAL **$978,220**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 5

Project Description

21-inch gravity line in the Deep Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	21" Pipe	3,488	LF	$126	439,480
2	60" Diameter Manhole	9	EA	$6,000	52,320
3	34" Boring and Casing	200	LF	$535	107,000
		SUBTOTAL:			$598,800
		CONTINGENCY		20%	$119,760
		SUBTOTAL:			$718,560
		ENG/SURVEY		15%	$107,790
		SUBTOTAL:			$826,350

PROJECT TOTAL **$826,350**

Construction Project Number 6

Project Description

Wheatland Lift Station expansion to 3.0 MGD firm capacity. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.4 MGD Lift Station Expansion	1	EA	$1,000,000	1,000,000
		SUBTOTAL:			$1,000,000
		CONTINGENCY		20%	$200,000
		SUBTOTAL:			$1,200,000
		ENG/SURVEY		15%	$180,000
		SUBTOTAL:			$1,380,000

PROJECT TOTAL **$1,380,000**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 7

Project Description

Decommission IH 635 Lift Station and construct new 12-inch gravity line. This project will allow for easier system operation and future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Lift Station - Decomm	1	EA	$200,000	200,000
2	12" Pipe	2,130	LF	$72	153,350
3	48" Diameter Manhole	3	EA	$5,000	15,000
		SUBTOTAL:			$368,350
		CONTINGENCY		20%	$73,670
		SUBTOTAL:			$442,020
		ENG/SURVEY		15%	$66,310
		SUBTOTAL:			$508,330

PROJECT TOTAL **$508,330**

Construction Project Number 8

Project Description

Construct 24-inch relief line in Mills Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	6,884	LF	$144	991,280
2	72" Diameter Manhole	17	EA	$6,000	103,260
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$1,114,540
		CONTINGENCY		20%	$222,910
		SUBTOTAL:			$1,337,450
		ENG/SURVEY		15%	$200,620
		SUBTOTAL:			$1,538,070

PROJECT TOTAL **$1,538,070**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 9

Project Description

15-inch gravity line in the Mills Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	7,570	LF	$90	681,340
2	60" Diameter Manhole	19	EA	$6,000	113,560
3	26" Boring and Casing	400	LF	$400	160,000
4	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$984,900
		CONTINGENCY		20%	$196,980
		SUBTOTAL:			$1,181,880
		ENG/SURVEY		15%	$177,290
		SUBTOTAL:			$1,359,170

PROJECT TOTAL **$1,359,170**

Construction Project Number 10

Project Description

Lift Station #1 expansion to 2.0 MGD Firm Capacity. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	1.4 MGD Lift Station Expansion	1	EA	$600,000	600,000
		SUBTOTAL:			$600,000
		CONTINGENCY		20%	$120,000
		SUBTOTAL:			$720,000
		ENG/SURVEY		15%	$108,000
		SUBTOTAL:			$828,000

PROJECT TOTAL **$828,000**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 11

Project Description

Lift Station #2 expansion to 1.55 MGD Firm Capacity. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	0.25 MGD Lift Station Expansion	1	EA	$250,000	250,000
		SUBTOTAL:			$250,000
		CONTINGENCY		20%	$50,000
		SUBTOTAL:			$300,000
		ENG/SURVEY		15%	$45,000
		SUBTOTAL:			$345,000

PROJECT TOTAL **$345,000**

Construction Project Number 12

Project Description

8-inch gravity lines in Ten Mile-2 and Enchanted Forest Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	7,844	LF	$48	376,520
2	48" Diameter Manhole	20	EA	$5,000	98,050
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$514,570
		CONTINGENCY		20%	$102,920
		SUBTOTAL:			$617,490
		ENG/SURVEY		15%	$92,630
		SUBTOTAL:			$710,120

PROJECT TOTAL **$710,120**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 13

Project Description

18-inch gravity line in Ten Mile-3. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	3,348	LF	$108	361,550
2	60" Diameter Manhole	8	EA	$6,000	50,210
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$431,760
		CONTINGENCY		20%	$86,360
		SUBTOTAL:			$518,120
		ENG/SURVEY		15%	$77,720
		SUBTOTAL:			$595,840

PROJECT TOTAL **$595,840**

Construction Project Number 14

Project Description

10-inch gravity lines in Chesier Branch Basin and Mills Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	10" Pipe	3,437	LF	$60	206,240
2	48" Diameter Manhole	9	EA	$5,000	42,970
		SUBTOTAL:			$249,210
		CONTINGENCY		20%	$49,850
		SUBTOTAL:			$299,060
		ENG/SURVEY		15%	$44,860
		SUBTOTAL:			$343,920

PROJECT TOTAL **$343,920**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 15

Project Description

8-inch gravity line in Chesier Branch. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	2,793	LF	$48	134,080
2	48" Diameter Manhole	7	EA	$5,000	34,920
		SUBTOTAL:			$169,000
		CONTINGENCY		20%	$33,800
		SUBTOTAL:			$202,800
		ENG/SURVEY		15%	$30,420
		SUBTOTAL:			$233,220

PROJECT TOTAL **$233,220**

Construction Project Number 16

Project Description

8-inch gravity line in Floyd Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	3,974	LF	$48	190,770
2	48" Diameter Manhole	10	EA	$5,000	49,680
		SUBTOTAL:			$240,450
		CONTINGENCY		20%	$48,090
		SUBTOTAL:			$288,540
		ENG/SURVEY		15%	$43,290
		SUBTOTAL:			$331,830

PROJECT TOTAL **$331,830**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — UPDATE

Construction Project Number 17

Project Description

12-inch gravity line in Ten Mile-4. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	10,847	LF	$72	780,970
2	48" Diameter Manhole	27	EA	$5,000	135,590
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$956,560
		CONTINGENCY		20%	$191,320
		SUBTOTAL:			$1,147,880
		ENG/SURVEY		15%	$172,190
		SUBTOTAL:			$1,320,070

PROJECT TOTAL **$1,320,070**

2012-2017 TOTAL **$15,536,670**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 18

Project Description

24-inch gravity line in Mills Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	6,230	LF	$144	897,060
2	72" Diameter Manhole	16	EA	$6,000	93,440
3	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$1,020,500
		CONTINGENCY		20%	$204,100
		SUBTOTAL:			$1,224,600
		ENG/SURVEY		15%	$183,690
		SUBTOTAL:			$1,408,290

PROJECT TOTAL **$1,408,290**

Construction Project Number 19

Project Description

21-inch gravity line in the Keller Branch Basin. This project will address an existing system deficiency and allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	21" Pipe	7,891	LF	$126	994,300
2	60" Diameter Manhole	20	EA	$6,000	118,370
3	34" Boring and Casing	400	LF	$535	214,000
4	Pavement Repair	300	LF	$100	30,000
		SUBTOTAL:			$1,356,670
		CONTINGENCY		20%	$271,340
		SUBTOTAL:			$1,628,010
		ENG/SURVEY		15%	$244,210
		SUBTOTAL:			$1,872,220

PROJECT TOTAL **$1,872,220**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 20

Project Description

Wheatland Lift Station new 20-inch forcemain. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	20" Force Main	8,433	LF	$120	1,011,950
2	34" Boring and Casing	200	LF	$535	107,000
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$1,158,950
		CONTINGENCY		20%	$231,790
		SUBTOTAL:			$1,390,740
		ENG/SURVEY		15%	$208,620
		SUBTOTAL:			$1,599,360

PROJECT TOTAL **$1,599,360**

Construction Project Number 21

Project Description

Wheatland Lift Station expansion to 5.0 MGD firm capacity. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	2.0 MGD Lift Station Expansion	1	EA	$400,000	400,000
		SUBTOTAL:			$400,000
		CONTINGENCY		20%	$80,000
		SUBTOTAL:			$480,000
		ENG/SURVEY		15%	$72,000
		SUBTOTAL:			$552,000

PROJECT TOTAL **$552,000**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 22

Project Description

15-inch gravity line in Floyd Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	4,525	LF	$90	407,270
2	60" Diameter Manhole	11	EA	$6,000	67,880
		SUBTOTAL:			$475,150
		CONTINGENCY		20%	$95,030
		SUBTOTAL:			$570,180
		ENG/SURVEY		15%	$85,530
		SUBTOTAL:			$655,710

PROJECT TOTAL **$655,710**

Construction Project Number 23

Project Description

18-, 15-, 10-, and 8-inch gravity lines in the Ten Mile-3 Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	785	LF	$108	84,830
2	15" Pipe	6,843	LF	$90	615,830
3	10" Pipe	2,654	LF	$60	159,250
4	8" Pipe	2,395	LF	$48	114,980
5	60" Diameter Manhole	19	EA	$6,000	114,420
6	48" Diameter Manhole	13	LF	$5,000	63,120
7	Pavement Repair	2,395	LF	$100	239,550
		SUBTOTAL:			$1,391,980
		CONTINGENCY		20%	$278,400
		SUBTOTAL:			$1,670,380
		ENG/SURVEY		15%	$250,560
		SUBTOTAL:			$1,920,940

PROJECT TOTAL **$1,920,940**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 24

Project Description

12-inch gravity line in Ten Mile-5. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	17,325	LF	$72	1,247,380
2	48" Diameter Manhole	43	EA	$5,000	216,560
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$1,503,940
		CONTINGENCY		20%	$300,790
		SUBTOTAL:			$1,804,730
		ENG/SURVEY		15%	$270,710
		SUBTOTAL:			$2,075,440

PROJECT TOTAL **$2,075,440**

Construction Project Number 25

Project Description

10- and 8-inch gravity lines in Ten Mile-3 Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	10" Pipe	7,043	LF	$60	422,560
2	8" Pipe	5,438	LF	$48	261,040
3	48" Diameter Manhole	31	EA	$5,000	156,010
		SUBTOTAL:			$839,610
		CONTINGENCY		20%	$167,930
		SUBTOTAL:			$1,007,540
		ENG/SURVEY		15%	$151,140
		SUBTOTAL:			$1,158,680

PROJECT TOTAL **$1,158,680**

2017-2022 TOTAL **$11,242,640**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 26

Project Description

21-inch gravity line in Ten Mile-3 Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	21" Pipe	3,857	LF	$126	485,990
2	60" Diameter Manhole	10	EA	$6,000	57,860
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$563,850
		CONTINGENCY		20%	$112,770
		SUBTOTAL:			$676,620
		ENG/SURVEY		15%	$101,500
		SUBTOTAL:			$778,120

PROJECT TOTAL **$778,120**

Construction Project Number 27

Project Description

18-inch gravity line in the Deep Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	10,117	LF	$108	1,092,590
2	60" Diameter Manhole	25	EA	$6,000	151,750
3	32" Boring and Casing	500	LF	$495	247,500
4	Pavement Repair	600	LF	$100	
		SUBTOTAL:			$1,491,840
		CONTINGENCY		20%	$298,370
		SUBTOTAL:			$1,790,210
		ENG/SURVEY		15%	$268,540
		SUBTOTAL:			$2,058,750

PROJECT TOTAL **$2,058,750**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 28

Project Description

Construct 18-inch relief line in Mills Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	6,851	LF	$108	739,860
2	60" Diameter Manhole	17	EA	$6,000	102,760
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$862,620
		CONTINGENCY		20%	$172,530
		SUBTOTAL:			$1,035,150
		ENG/SURVEY		15%	$155,280
		SUBTOTAL:			$1,190,430

PROJECT TOTAL **$1,190,430**

Construction Project Number 29

Project Description

Construct 21-inch line in the Mills Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	21" Pipe	15,154	LF	$126	1,909,350
2	60" Diameter Manhole	38	EA	$6,000	227,300
3	34" Boring and Casing	600	LF	$535	321,000
4	Pavement Repair	500	LF	$100	50,000
		SUBTOTAL:			$2,507,650
		CONTINGENCY		20%	$501,530
		SUBTOTAL:			$3,009,180
		ENG/SURVEY		15%	$451,380
		SUBTOTAL:			$3,460,560

PROJECT TOTAL **$3,460,560**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 30

Project Description

18-inch gravity line in Mill Branch. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	18" Pipe	3,789	LF	$108	409,240
2	60" Diameter Manhole	9	EA	$6,000	56,840
3	Pavement Repair	400	LF	$100	40,000
		SUBTOTAL:			$506,080
		CONTINGENCY		20%	$101,220
		SUBTOTAL:			$607,300
		ENG/SURVEY		15%	$91,100
		SUBTOTAL:			$698,400

PROJECT TOTAL **$698,400**

Construction Project Number 31

Project Description

Wheatland Lift Station expansion to 8.0 MGD firm capacity. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	3.0 MGD Lift Station Expansion	1	EA	$600,000	600,000
		SUBTOTAL:			$600,000
		CONTINGENCY		20%	$120,000
		SUBTOTAL:			$720,000
		ENG/SURVEY		15%	$108,000
		SUBTOTAL:			$828,000

PROJECT TOTAL **$828,000**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST **UPDATE**

Construction Project Number 32

Project Description

Lift Station #1 Expansion to 3.0 MGD Firm Capacity. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	1.0 MGD Lift Station Expansion	1	EA	$400,000	400,000
		SUBTOTAL:			$400,000
		CONTINGENCY		20%	$80,000
		SUBTOTAL:			$480,000
		ENG/SURVEY		15%	$72,000
		SUBTOTAL:			$552,000

PROJECT TOTAL **$552,000**

Construction Project Number 33

Project Description

15-inch gravity line in Keller Branch. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	2,726	LF	$90	245,300
2	60" Diameter Manhole	7	EA	$6,000	40,880
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$306,180
		CONTINGENCY		20%	$61,240
		SUBTOTAL:			$367,420
		ENG/SURVEY		15%	$55,120
		SUBTOTAL:			$422,540

PROJECT TOTAL **$422,540**

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Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 34

Project Description

8-inch gravity line in Ten Mile-5. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	2,169	LF	$48	104,110
2	48" Diameter Manhole	5	EA	$5,000	27,110
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$151,220
		CONTINGENCY		20%	$30,250
		SUBTOTAL:			$181,470
		ENG/SURVEY		15%	$27,230
		SUBTOTAL:			$208,700

PROJECT TOTAL **$208,700**

Construction Project Number 35

Project Description

12-inch gravity line in Red Oak Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	10,956	LF	$72	788,840
2	48" Diameter Manhole	27	EA	$5,000	136,950
3	20" Boring and Casing	200	LF	$300	60,000
4	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$1,005,790
		CONTINGENCY		20%	$201,160
		SUBTOTAL:			$1,206,950
		ENG/SURVEY		15%	$181,050
		SUBTOTAL:			$1,388,000

PROJECT TOTAL **$1,388,000**

City of Lancaster
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Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 36

Project Description

6-inch gravity line in Creekwood Branch. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Pipe	7,704	LF	$36	277,340
2	48" Diameter Manhole	19	EA	$5,000	96,300
3	Pavement Repair	100	LF	$100	10,000
		SUBTOTAL:			$383,640
		CONTINGENCY		20%	$76,730
		SUBTOTAL:			$460,370
		ENG/SURVEY		15%	$69,060
		SUBTOTAL:			$529,430

PROJECT TOTAL **$529,430**

Construction Project Number 37

Project Description

15-inch gravity line in Ten Mile-3. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	15" Pipe	5,933	LF	$90	533,960
2	60" Diameter Manhole	15	EA	$6,000	88,990
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$642,950
		CONTINGENCY		20%	$128,590
		SUBTOTAL:			$771,540
		ENG/SURVEY		15%	$115,740
		SUBTOTAL:			$887,280

PROJECT TOTAL **$887,280**

City of Lancaster
Wastewater CIP

Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 38

Project Description

24-inch gravity line in the Keller Branch Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	24" Pipe	16,591	LF	$144	2,389,110
2	72" Diameter Manhole	41	EA	$6,000	248,870
3	32" Boring and Casing	500	LF	$495	247,500
4	Pavement Repair	700	LF	$100	70,000
		SUBTOTAL:			$2,955,480
		CONTINGENCY		20%	$591,100
		SUBTOTAL:			$3,546,580
		ENG/SURVEY		15%	$531,990
		SUBTOTAL:			$4,078,570

PROJECT TOTAL **$4,078,570**

Construction Project Number 39

Project Description

8-inch gravity lines in Ten Mile-3. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	6,877	LF	$48	330,100
2	48" Diameter Manhole	17	EA	$5,000	85,960
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$436,060
		CONTINGENCY		20%	$87,220
		SUBTOTAL:			$523,280
		ENG/SURVEY		15%	$78,500
		SUBTOTAL:			$601,780

PROJECT TOTAL **$601,780**

City of Lancaster
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Freese and Nichols

OPINION OF PROBABLE COST — **UPDATE**

Construction Project Number 40

Project Description

12-inch gravity line in Ten Mile-6. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" Pipe	6,098	LF	$72	439,090
2	48" Diameter Manhole	15	EA	$5,000	76,230
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$535,320
		CONTINGENCY		20%	$107,070
		SUBTOTAL:			$642,390
		ENG/SURVEY		15%	$96,360
		SUBTOTAL:			$738,750

PROJECT TOTAL **$738,750**

Construction Project Number 41

Project Description

8-inch gravity line in the Red Oak Basin. This project will allow for future growth.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	8" Pipe	8,750	LF	$48	420,020
2	48" Diameter Manhole	22	EA	$5,000	109,380
3	Pavement Repair	200	LF	$100	20,000
		SUBTOTAL:			$549,400
		CONTINGENCY		20%	$109,880
		SUBTOTAL:			$659,280
		ENG/SURVEY		15%	$98,900
		SUBTOTAL:			$758,180

PROJECT TOTAL **$758,180**

2022-2035 TOTAL **$19,179,490**