



CAPITAL IMPROVEMENT PLAN CITY OF WILLOW PARK, TEXAS

AUGUST 2022

Prepared by:



Weatherford Office Address:

1508 Santa Fe Drive, Suite 203

Weatherford, Texas 76086

(817) 594-9880

www.jacobmartin.com

Firm No. F-2448

PRELIMINARY

CITY OF WILLOW PARK CAPITAL IMPROVEMENT PLAN

MAY 2022

I. GENERAL

A. Introduction

The City of Willow Park authorized JACOB & MARTIN, LLC to prepare an update to the capital improvement plan in January, 2022. The City has authorized an update to the plan completed in 2019 to include discussions for capital improvements to the water, sewer, street and drainage systems. Willow Park is located in an area of rapid growth, along the Interstate 20 corridor, approximately 20 miles west of the City of Fort Worth.

The outlook for the City of Willow Park is for sustained growth over the next 25 to 30 years. It is therefore imperative for the City to maintain a workable plan to prepare for and accommodate that growth with the least detrimental impact to the public.

B. Purpose

The purpose of the updated plan is to evaluate the City's existing water, wastewater, street, and drainage facilities and provide a plan which will allow the City to conduct orderly improvement of the water and wastewater systems to meet demands through the year 2032.

C. Scope of Work

The following areas are to be considered:

- Population & Land Use Assumptions
- Water & Wastewater Design Criteria
- Water Use Projections
- Water Supply
- Water System Infrastructure
- Recommended Water System Improvements
- Costs of Water System Improvements
- Wastewater Flows
- Wastewater System Infrastructure
- Recommended Wastewater System Improvements
- Costs of Wastewater System Improvements
- Street Inventory and Evaluation
- Recommended Street Improvements
- Drainage Inventory and Evaluation
- Recommended Drainage Improvements

D. Description of Plan Area

The plan area includes the City Limits and Extraterritorial Jurisdiction (ETJ) of the City of Willow Park. The plan area is depicted in Figure I.1.

E. Water Plan Approach

The approach to the development of the water plan involves the following steps:

1. Develop water use projections and estimate per capita use (current & future)
2. Identify and evaluate current & potential water supply sources
3. Inventory and evaluate the current infrastructure
4. Develop strategies for addressing current shortfalls & meeting future demands
5. Develop costs and financing strategies for addressing the identified needs

F. Wastewater Plan Approach

1. Develop wastewater flow projections and estimate per capita contributions
2. Identify and evaluate current & potential treatment alternatives
3. Inventory and evaluate the current infrastructure
4. Develop strategies for addressing current shortfalls & meeting future needs
5. Develop costs and financing strategies for addressing the identified needs

G. Street Plan Approach

1. Inventory and evaluate the current streets
2. Develop strategies for addressing current shortfalls & meeting future needs
3. Develop Costs and financing strategies for addressing the identified needs

H. Drainage Plan Approach

1. Inventory and evaluate the current drainage infrastructure
2. Develop strategies for addressing current shortfalls & meeting future needs
3. Develop Costs and financing strategies for addressing the identified needs

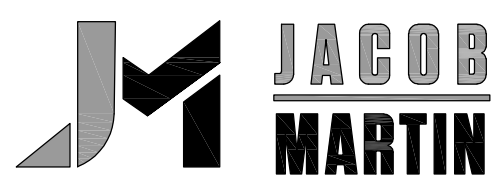
II. DEVELOPMENT AND GROWTH

A. Population Projections

According to the 2000 and 2010 Census, the City's population was 2,849 and 3,779, respectively. This is a population increase of approximately 33% in ten years or a 3.3% increase per year. The results of the 2020 census are not yet available, however, various sources estimate the population between 4,950 and approximately 6,500.

CITY OF WILLOW PARK
ETJ MAP

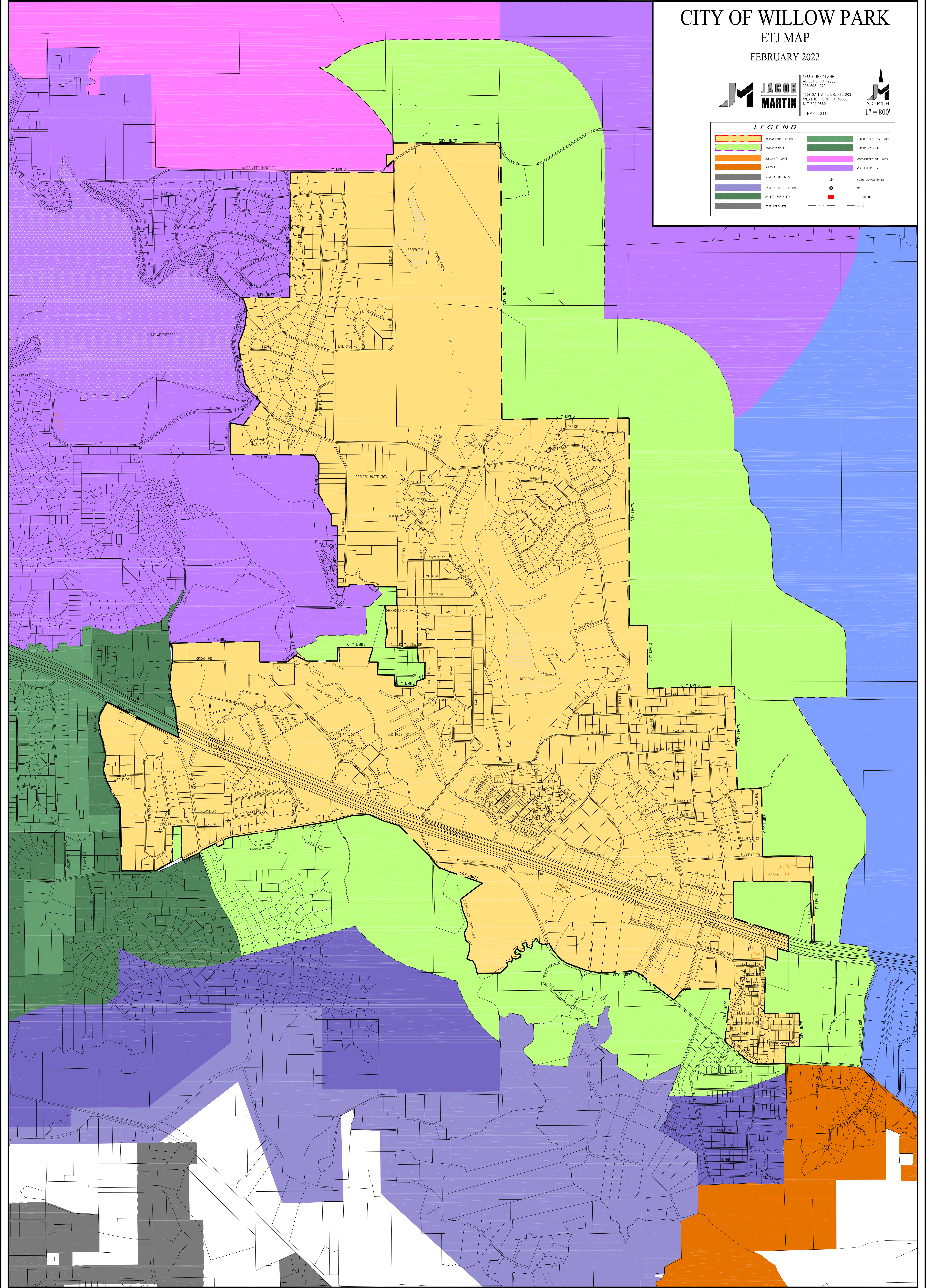
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3465 CURRY LANE
ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 203
WEATHERFORD, TX 76086
817-594-9880
FIRM# F-2448



LEGEND			
	WILLOW PARK CITY LIMITS		HUDSON OAKS CITY LIMITS
	WILLOW PARK ETJ		HUDSON OAKS ETJ
	ALISO CITY LIMITS		WEATHERFORD CITY LIMITS
	ALISO ETJ		WEATHERFORD ETJ
	ANNETTA CITY LIMITS		WATER STORAGE TANKS
	ANNETTA NORTH CITY LIMITS		WELL
	ANNETTA NORTH ETJ		LIFT STATION
	FORT WORTH ETJ		CREEK



Various sources including, the Census Bureau, the Texas Water Development Board, the City's Comprehensive Plan, and previous engineering studies for the City of Willow Park have been used to develop the historical and projected population growth for the City as illustrated in Table II.1. Based on this data, Willow Park is projected to increase in population by an average 4.65% per year through the year 2050. This growth will be impacted early in the planning period by development projects that are underway or currently being proposed. Ultimate population is based on available land and land use assumptions as discussed in Section II.B. Therefore, the total utility service projection is limited by the build-out potential of various types. The water system currently serves the majority of the population and the water service projections, therefore follow a similar growth pattern. The sewer system only serves a portion of the total population. It is expected that, ultimately, residences and businesses not currently receiving sewer service will be tied on throughout the planning period. However, due to financing and other constraints, much of this change over would not be expected to occur until late in the planning period. Therefore, the sewer service projection is weighted toward the end of the planning period. This is consistent with the City's plans for new wastewater treatment facilities which would cover a useful life of 20 years before additional improvements would be necessary.

**TABLE II.1
POPULATION PROJECTION**

Year	Estimated Population	Total Water Connections	Total Sewer Connections
2020	6,086	2061	810
2025	6,804	2494	1026
2030	7,853	2932	1206
2035	8,653	3231	1329
2040	9,829	3670	1510
2045	11,365	4244	1746
2050	14,587	5447	2241

B. Land Use

As previously mentioned, the City of Willow Park is located along the Interstate 20 (I-20) Corridor approximately ten miles east of Downtown Weatherford and twenty miles west of Downtown Fort Worth. The City is a small North Central Texas community developed on mostly high and flat to steep rolling terrain in eastern Parker County. As development and growth occur within the City, the infrastructure needs to be expanded to serve existing and future residences and businesses in the service area.

A land use inventory or assessment identifies the current uses of the land throughout the planning area. An inventory of the City's land use is shown in Figure II.1 – Existing Land Use Map and the acreages are tabulated below in Table II.2 from the City's 2014 Comprehensive Plan. The inventory is a critical set of data used to create a Future Land Use Plan. The Existing Land Use Map and acreage tabulations should be updated as new building permits are issued and property tax records are changed. This will allow the City to evaluate where it is in relation to its Future Land Use Plan.

TABLE II.2

EXISTING LAND USE		
Type of Land Use	Acres	Percent
Residential - Single Family	1982	28.1%
Residential - Two-Family	2	0.03%
Residential - Multi-Family	76	1.08%
Retail	42	0.59%
Office	17	0.24%
Commercial	221	3.13%
Industrial	4	0.05%
Public/Semi-Public	220	3.12%
Parks & Open Space	37	0.52%
Golf Course (Private)	246	3.48%
Utilities	31	0.43%
TxDOT Right-of-Way	163	2.30%
Total Developed Land	3,040	43.1%
Agriculture & Vacant	4,019	56.9%
Total Land Area	7,059	100.0%

Based on the update land use plan, there is approximately 3,040 developed acres or 43% of the total 7,059 acres of land within the City Limits and ETJ, while the remaining acreage is vacant or used for some agricultural purpose. Currently, the most predominant land use is residential which is approximately 1,982 acres or 65.2% of the total 3,040

developed acres. The future land use is expected to be predominantly residential as well. Office, retail, commercial and industrial land uses cover approximately 588 acres or 8.9% of the developed land. Most of the existing office, retail, commercial and industrial land uses in the City are located along the frontage of Interstate 20. Most of the future office, retail, commercial and industrial land uses are expected to continue along the highway frontage with minor development for these land uses occurring away from the highway. Figure II.2 - Future Land Use Plan shows the expected development areas by land use types. Table II.3 below shows the expected acreage and percentage for each land use type.

TABLE II.3

FUTURE LAND USE		
Type of Land Use	Acres	Percent
Residential - Single Family	4,995	70.8%
Residential - Two-Family	2	0.03%
Residential - Multi-Family	76	1.08%
Retail	145	2.05%
Office	18	0.26%
Commercial	424	6.01%
Industrial	112	1.59%
Public/Semi Private	258	3.66%
Parks & Open Space	90	1.28%
Golf Course (Private)	246	3.48%
Utilities	31	0.43%
TxDOT Right-of-Way	187	2.65%
Total Developed	6,586	93.3%
Undeveloped (Road & Flood Plain)	473	6.70%
Total Planning Area	7,059	100.0%

CITY OF WILLOW PARK

FIGURE II.1
EXISTING LAND USE MAP
MAY 2022



**JACOB
MARTIN**
[FIRM # F-2448]

3465 CURRY LANE
ARLINGTON, TX 76010
817-554-9880

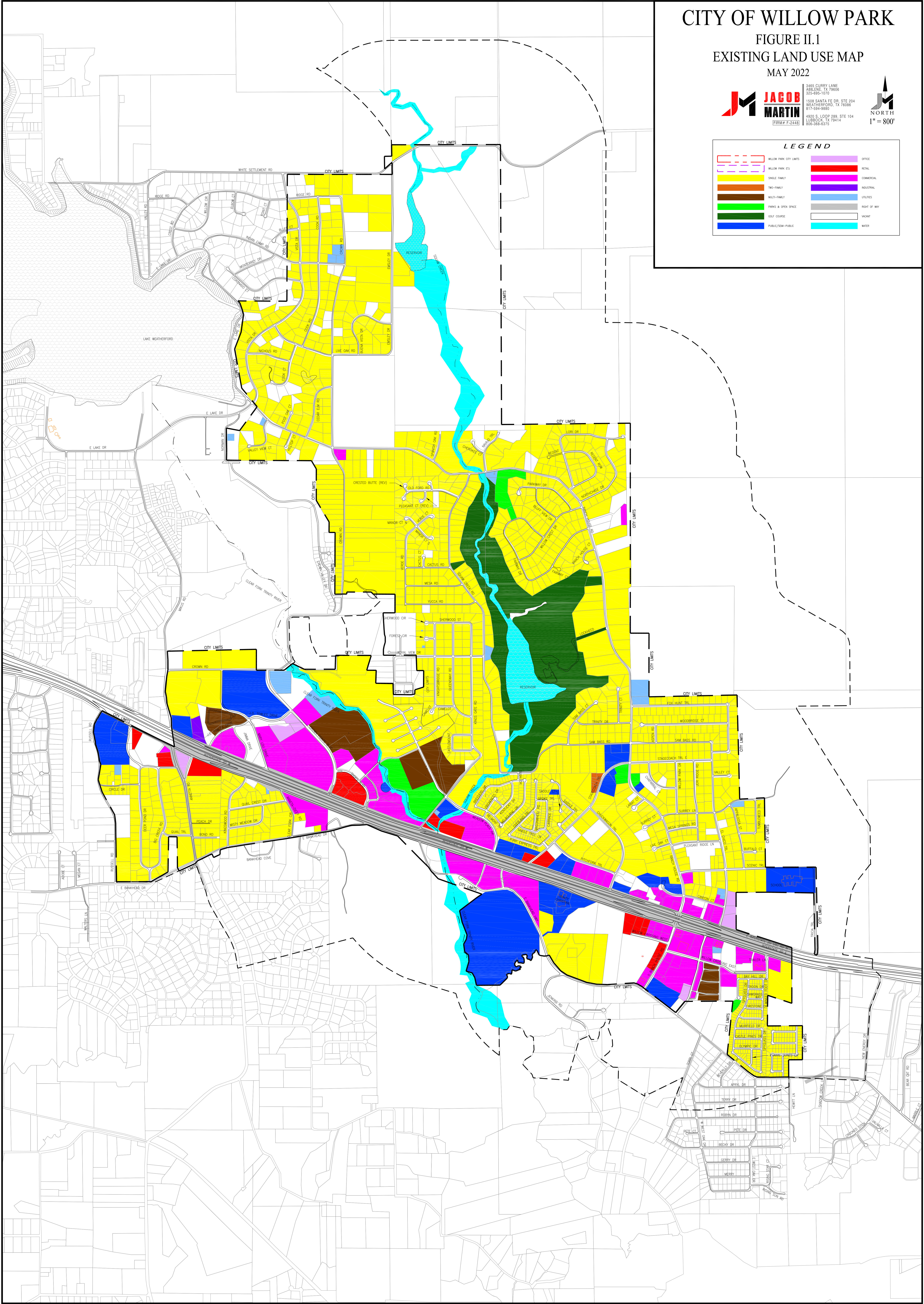
1508 SANTA FE DR. STE 204
WEATHERFORD, TX 76086
817-554-9880

4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375



NORTH
1" = 800'

LEGEND	
	WILLOW PARK CITY LIMITS
	WILLOW PARK CT2
	SINGLE FAMILY
	TWO-FAMILY
	MULTI-FAMILY
	PARKS & OPEN SPACE
	GOLF COURSE
	PUBLIC/SEM-PUBLIC
	OFFICE
	RETAIL
	COMMERCIAL
	INDUSTRIAL
	UTILITIES
	RIGHT OF WAY
	VACANT
	WATER




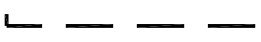





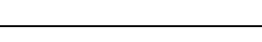





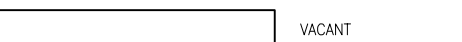

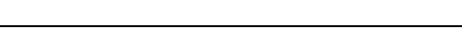


CITY OF WILLOW PARK

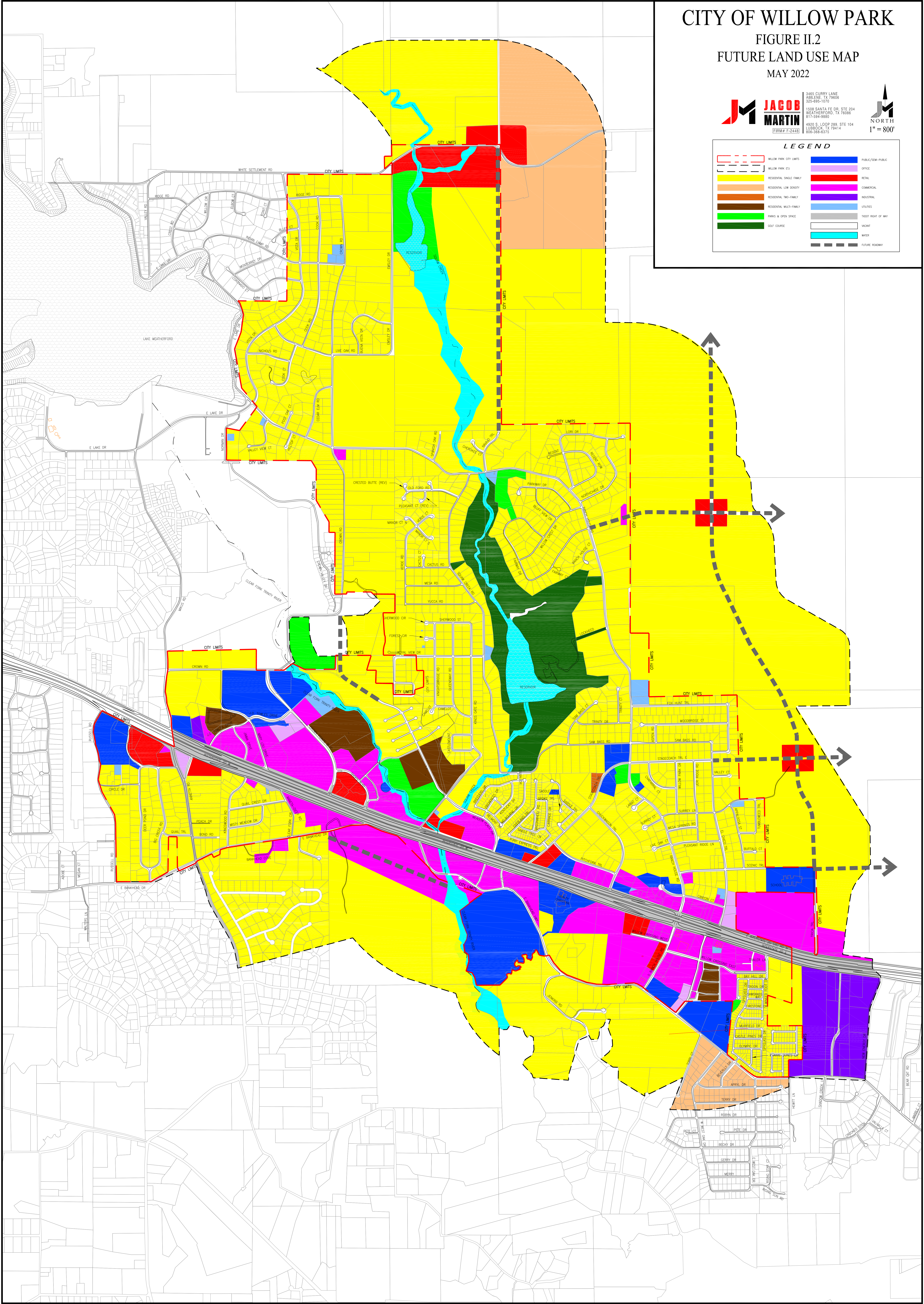
FIGURE II.2
FUTURE LAND USE MAP
MAY 2022

**JACOB
MARTIN**
[FIRM # F-2448]

3465 CURRY LANE
ARLINGTON, TX 76008
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375

**NORTH**
1" = 800'

LEGEND	
	WILLOW PARK CITY LIMITS
	WILLOW PARK EU
	RESIDENTIAL SINGLE FAMILY
	RESIDENTIAL LOW DENSITY
	RESIDENTIAL TWO-FAMILY
	RESIDENTIAL MULTI-FAMILY
	PARKS & OPEN SPACE
	GOLF COURSE
	PUBLIC/SEMI-PUBLIC
	OFFICE
	RETAIL
	COMMERCIAL
	INDUSTRIAL
	UTILITIES
	TRUCK RIGHT OF WAY
	VACANT
	WATER
	FUTURE ROADWAY



III. WATER SYSTEM

A. Regulations

The agency which oversees public water systems in the State of Texas is the Texas Commission on Environmental Quality (TCEQ). The TCEQ is tasked with insuring compliance with EPA and Texas regulations concerning the quality, capacity, and operation of water systems. The rules promulgated by the TCEQ for this purpose are found in 30 TAC Chapter 290. Subchapter D of the 290 rules pertains to the operational requirements and capacities for public water systems. The relevant sections of the rules for this discussion are 290.44(d) and 290.45(b)(1)(D)(iv). Section 290.44(d) states that “the system must be designed to maintain a minimum pressure of 35 psi at all points within the distribution network at flow rates of at least 1.5 gpm per connection”. This is the peak hourly demand requirement which must be met by public water systems. The TCEQ further requires, in Section 290.45(b)(1)(D)(i), that supplies of 0.6 gpm per connection be available (peak day requirement) for either well supplies or surface water sources. Section 290.45(b)(1)(D)(iv) requires 100 gallons per connection of elevated storage or a pressure tank capacity of 20 gallons per connection. Section 290.45(b)(1)(D)(ii) requires a total storage capacity of 200 gallons per connection. Each section cited herein pertains to groundwater supplies. The requirements for surface water systems are the same, for systems serving more than 250 connections, and are found in Section 290.45(b)(2) of the TCEQ regulations. The TCEQ’s regulations governing public water systems can be viewed online at www.tceq.texas.gov/rules/indxpdf.html.

B. Water Use

The City’s historical and projected water use is illustrated in Table III.1.

**TABLE III.1
METER CONNECTIONS PROJECTION**

Year	Water conn	Yearly Flow (MG/Yr)	Avg. Daily Flow		Max Daily Flow		Peak Hour gpm/conn
			MGD	gpm/conn	MGD	gpm/conn	
2020	2061	279.74	0.77	0.26	1.38	0.46	1.50
2021	2,150	268.1	0.74	0.24	1.42	0.46	1.50
2025	2,494	338.6	0.93	0.25	2.16	0.60	1.50
2030	2,932	398.0	1.09	0.25	2.53	0.60	1.50
2035	3,231	438.5	1.20	0.25	2.79	0.60	1.50
2040	3,670	498.2	1.36	0.25	3.17	0.60	1.50
2045	4,244	576.0	1.58	0.25	3.67	0.60	1.50
2050	5,447	739.3	2.03	0.25	4.71	0.60	1.50

Historically, the City’s average day, peak day, and peak hourly flows have been somewhat less than the guidelines established by the TCEQ. The average daily flow, expressed as gallons per minute per connection (gpm/conn) between 2007 and 2021 has

been 0.25. Repairs and water conservation measures have led to a general decline in average daily water use for the system and this trend would be expected to continue. The City's peak day use has averaged 0.55 gpm/conn and the peak hourly use has averaged 1.50 gpm per connection. The TCEQ requires planning and design for 0.6 gpm/conn peak day and 1.5 gpm/conn peak hourly flow as discussed in Section III.A. For planning purposes, the TCEQ criteria has been used to project peak day and hourly water uses through the year 2050.

C. Water Supply

The current water supply for the system is from twenty-five Paluxy and Trinity formation groundwater wells and a contracted treated surface water supply from the City of Fort Worth. The Fort Worth water supply is expected become available in late 2022. The capacity of the City's existing wells is indicated in Table III.2. The available treated water supply from Fort Worth, by contract, is 3.5 million gallons per day (MGD).

Based on the water use projections stated above, it is expected that the City's current water supply will be sufficient beyond the year 2050. The City's wells have been decreasing in capacity over the last several years due to reduction in aquifer levels and poorer water quality. However, the reduction in use due to the availability of treated surface water is expected to prolong the available groundwater supply.

**TABLE III.2
WATER WELL INVENTORY**

Well #	Capacity (gpm)	Depth	Pump (HP)
1	60	182	7.5
2	36	148	7.5
3	48	166	7.5
4	24	177	7.5
5	26	158	7.5
6T	64	620	10
6P	50	160	7.5
7	37	135	7.5
9T	114	650	15
9P	85	260	7.5
10T	31	650	15
10P	58	270	7.5
11	35	215	3
El Chico T	50	650	15
El Chico P	22	221	5
14	44	290	7.5
15	97	650	30

16T	35	624	10
16P	26	269	3
WWN	31	250	5
WWS	37	255	3
WSO-T	85	650	15
WSO-P	38	235	5
WSS	12	256	3
WSN	17	256	1
Total GPM	1,137		
Total MGD	1.64		

D. Existing Water System

The City's existing water facilities are depicted in Figure III.1 – Water System Inventory Map. Approximately 43% of the well supply is conveyed directly to the City's Indian Camp pump station and elevated tank site on the north end of the system. The pump station at this site fills the adjacent elevated tank and provides supply flow to the rest of the system. The water is conveyed through the distribution system and the City's main 12-inch groundwater supply line to the Foxhunt elevated tank and pump station site. Additional groundwater is pumped into the system at this site. The Foxhunt elevated tank is on the same pressure plane as the Indian Camp tank (North Pressure Plane). Well 9, Well 10 and the El Chico well site located downstream of the Foxhunt elevated tank site, provide additional groundwater into this portion of the system as well. The Indian Camp elevated tank site provides direct service to the southwest portion of the City's system and supply flow to the Willow Springs Oaks pressure plane (South Pressure Plane) on the far southwest corner of the service area. Well 11 and the Willow Wood wells and pump station located centrally in the City's system provides additional groundwater into the distribution system prior to the South Pressure Plane. The Willow Springs Oaks pump station and elevated tank site provides direct service to the South Pressure Plane. The Willow Springs pump station and well site located on the east end of the South Pressure Plane provides additional groundwater into this portion of the system.

The Fort Worth supply is conveyed to the El Chico Pump Station site through a shared 18-inch pipeline. The water then enters the system by a direct connection to the existing 12-inch transmission line in El Chico Drive. Surface water is then conveyed to Hudson Oaks via a 14-inch shared pipeline which runs west along Interstate 20.

Schematic layouts of the City's pumping and storage facilities are included in Appendix A.

The City's distribution system is comprised of approximately 74 miles of pipe ranging in size from 2-inch to 12-inch (excluding the Fort Worth transmission line). An evaluation of the system has been made and locations of deteriorated and undersized pipe determined. Deteriorated pipe has led to significant water loss due to

CITY OF WILLOW PARK

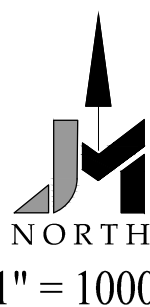
FIGURE III.1

WATER SYSTEM INVENTORY MAP

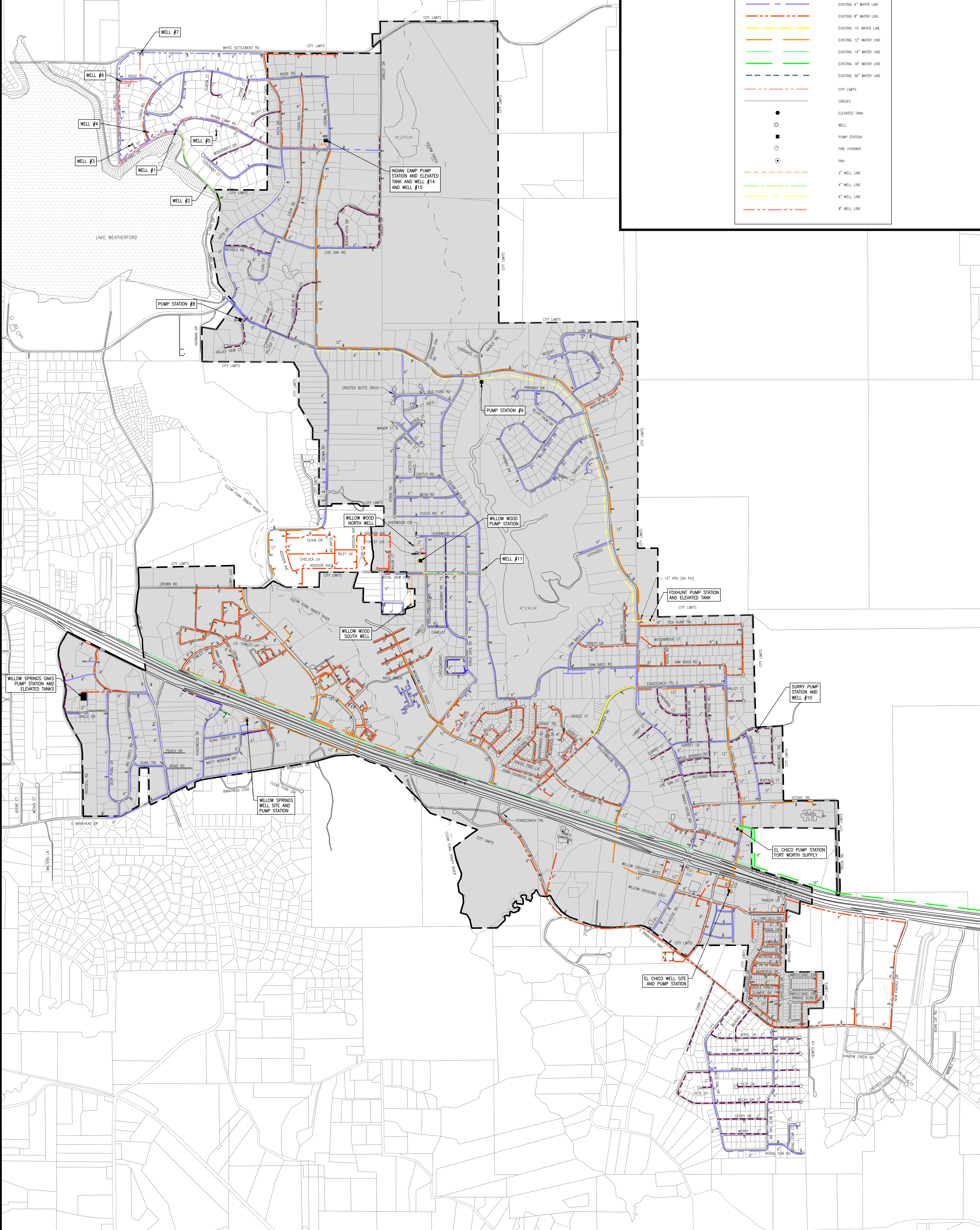
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3465 CURRY LANE
ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375



LEGEND	
	EXISTING 2" WATER LINE
	EXISTING 3" WATER LINE
	EXISTING 4" WATER LINE
	EXISTING 6" WATER LINE
	EXISTING 8" WATER LINE
	EXISTING 10" WATER LINE
	EXISTING 12" WATER LINE
	EXISTING 14" WATER LINE
	EXISTING 18" WATER LINE
	EXISTING 36" WATER LINE
	CITY LIMITS
	CREEKS
	ELEVATED TANK
	WELL
	PUMP STATION
	FIRE HYDRANT
	PRV
	2" WELL LINE
	4" WELL LINE
	6" WELL LINE
	8" WELL LINE



pipe breaks in the system as well as service outages. Undersized lines require higher feed pressures to maintain minimum service requirements. These higher pressures lead to even more breaks in vulnerable areas of the system. Additionally, adequate fire protection requires larger pipes to insure sufficient flow can be maintained during a fire. A 6-inch pipe is the smallest size that is acceptable for fire coverage and there are several locations within the City where neighborhoods are being served by 2-inch pipes. Additionally, adequate fire coverage requires fire hydrants spaced at 500 to 1,000 feet depending upon the area. Many areas in the City exceed even the 1,000 foot separation. The City is contemplating a project to address many of these areas. The City's system is looped, from north to south, in three locations. Additional north-south, as well as east-west, looping will be necessary to insure adequate flow throughout the system.

E. Storage and Pumping Requirements

According to TCEQ regulations, the following minimum requirements must be provided by a community-type water system that serves more than 250 connections. Minimum residual pressure of 20 psi and a minimum normal operating pressure of 35 psi with an instantaneous use in the system of 1.5 gpm per connection are required.

*TOTAL STORAGE CAPACITY	200 Gallons per Connection
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PRESSURE MAINTENANCE FACILITIES:

A. Pressure Tank	20 Gallons per each Connection
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B. Elevated Tank	100 Gallons per Connection
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WATER SUPPLY FLOW RATE:	0.6 gpm per Connection
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SERVICE PUMPS:	2 or more pumps with total rated capacity of 2.0 gpm per connection or 0.6 gpm if 200 gallons per connection of elevated tank capacity provided
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* Pressure tank storage is not recognized.

1. Ground Storage

The City of Willow Park currently maintains nine ground storage tanks at seven locations within the system. An inventory of the ground storage facilities is included in Table III.3. Table III.4 provides the expected ground storage requirement based on the water customer projections from Section III.B. As evidenced in these tables, the City will meet the projected regulatory requirement for ground storage volume with the existing facilities. However, from an operational standpoint, additional ground storage may be

needed to meet the needs of additional supply and blending as well as insuring adequate emergency supply.

**TABLE III.3
GROUND STORAGE FACILITIES**

Site Name	Ground Elev. (Ft. above MSL)	Capacity (MG)
Indian Camp Rd.	1,012	0.500
		0.350
Well 9	896	0.06
Fox Hunt	963	0.286
Site 10 (Surry Ln)	954	0.092
El Chico Well Site	945	0.031
Willow Wood	944	0.042
Willow Springs	958	0.024
Willow Springs Oaks	975	0.042
		0.031
El Chico Pump Station	932	0.50
Total Ground Storage		1.958

**TABLE III.4
PROJECTED GROUND STORAGE REQUIREMENTS**

Year	Water Connections	Required Ground Storage (MG)
2020	2061	0.412
2025	2494	0.499
2030	2932	0.586
2035	3231	0.646
2040	3670	0.734
2045	4244	0.849
2050	5447	1.089

2. High Service Pumping

The City currently maintains nine pump stations located throughout the system as well as one emergency pump station. An inventory of the pumping facilities is included in Table

III.5. Based on an elevated storage requirement of 100 gallons per connection, the pumping requirement for the City would be 2.0 gallons per connection. Table III.6 provides the expected high service pump requirements based on this scenario and the water customer projections from Section III.B. The ultimate high service pump capacity under this scenario would be 10,894 gpm. While there is a deficiency by the year 2050, it is slight. Potential improvements to address this shortfall will be examined in later sections of this report.

**TABLE III.5
HIGH SERVICE PUMP FACILITIES**

Site Name	Ground Elev. (Ft. above MSL)	Pump (HP)	Capacity (gpm)
Indian Camp Rd.	1,012	30	700
		30	700
		30	700
Well 9	896	7.5	80
		7.5	80
Fox Hunt	963	20	300
		20	300
Site 10 (Surry Ln)	954	15	350
		15	350
		15	200
El Chico	945	5	100
		10	200
		10	200
Willow Wood	944	10	175
		10	175
		10	175
Willow Springs	958	10	175
		10	175
Willow Springs Oaks	975	10	200
		10	200
		10	200
El Chico Pump Station WP	932	150	1215
		150	1215
		150	1215
El Chico Pump Station HO	932	150	468
		150	468
		150	468
Total High Service Capacity			10,784

TABLE III.6
PROJECTED HIGH SERVICE PUMP REQUIREMENTS

Year	Water Connections	Required High Service Pump Capacity (gpm)
2020	2,061	4,122
2025	2,494	4,989
2030	2,932	5,865
2035	3,231	6,462
2040	3,670	7,340
2045	4,244	8,487
2050	5,447	10,894

*Based on 2.0 gpm per connection.

3. Elevated Storage

The City of Willow Park currently maintains three elevated storage tanks at the Indian Camp, Fox Hunt and Willow Springs Oaks locations. The Indian Camp and Fox Hunt tanks provide pressure maintenance for the North Pressure Plane with high water levels of 1,132 MSL. The South Pressure Plane is served by the Willow Springs Oaks tank with a high water level of 1,102 MSL. An inventory of the elevated storage facilities is included in Table III.7. Table III.8 provides the expected elevated storage requirement based on the water customer projections from Section III.B and a requirement of 100 gallons per connection through the year 2045, as discussed in Section III.E.2. As evidenced in these tables, the elevated tank capacity is expected to be sufficient through the year 2050. However, the City has had issues with storage running low in the past. From an operational perspective, the tanks have not been adequate to maintain water supply during times of supply outages. Note also that the elevated storage in the south pressure plane may become insufficient during the planning period based on growth in that area. Additionally, the existing tanks are not expected to last through 2050 as they have deteriorated and will continue to do so. It is likely that one or all of them will require replacement in that time.

TABLE III.7
ELEVATED STORAGE FACILITIES

Site Name	Ground Elev. (Ft. above MSL)	Capacity (MG)
Indian Camp Rd.	1,012	0.250
Fox Hunt	963	0.250
Willow Springs Oaks	975	0.125
Total Ground Storage		0.625

TABLE III.8
PROJECTED ELEVATED STORAGE REQUIREMENTS

Year	Water Connections	Required Elevated Storage (MG)
2020	2,061	0.206
2025	2,494	0.249
2030	2,932	0.293
2035	3,231	0.323
2040	3,670	0.367
2045	4,244	0.424
2050	5,447	0.545

*Based on 100 gallons per connection.

From a regulatory standpoint, the facilities meet the projected ground storage and elevated storage needs through the planning period. Based on population projections, the pumping capacity becomes deficient sometime prior to 2050. Phased improvements will be necessary for the City to meet regulatory requirements and maintain a high level of service to its customers.

F. Recommended Water System Improvements

An analysis of the system has identified some areas that are or will likely become deficient by the year 2050. Elevated storage, distribution piping, and transmission lines are elements that should be addressed over the next several years and beyond. Pumping capacity will potentially become inadequate by 2050 and may be resolved with minor upgrades at that time.

1. Elevated Storage

Elevated Storage

A previous Capital Improvement Plan recommended siting a new 0.25 MG elevated tank in the vicinity of the existing El Chico Well and Pump Station. This would be an advantageous site and would address some high pressure issues as well. An alternative would be to replace an existing tank, most likely at the Fox Hunt site, with a larger tank. A second new elevated tank or replacement of an existing tank would be recommended for future development with an added capacity of 0.4 MG.

2. Distribution System

Most of the water loss in the City's system is attributable to deteriorated, leaking cast iron or ductile iron waterlines. There are several additional, deteriorated lines in the system that are in need of replacement as depicted in Figure III.3. Additionally, there are a number of lines that are less than 6-inches in diameter and serving residential areas. It is recommended that these lines be upsized to 6-inch and that fire hydrants be installed in locations where the maximum separation is being exceeded.

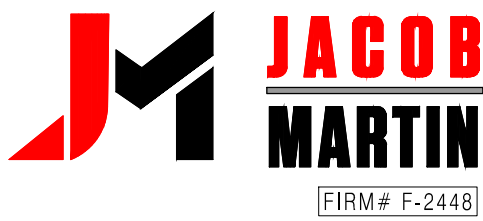
3. Transmission Lines

It is recommended that a new 12-inch transmission line be installed from the new El Chico Pump Station to the Fox Hunt ground storage facility. This would eliminate supply flow through the distribution system, reducing system pressures, and it would be a more efficient means of filling the Fox Hunt Elevated tank. Additionally, main line loops along Crown Road, Bankhead Highway, and others would provide more reliable service at lower pressures. A tie-in from the new Willow Park/Hudson Oaks 14-inch supply line to provide surface water supply to the Willow Springs Oaks pressure plane is also recommended.

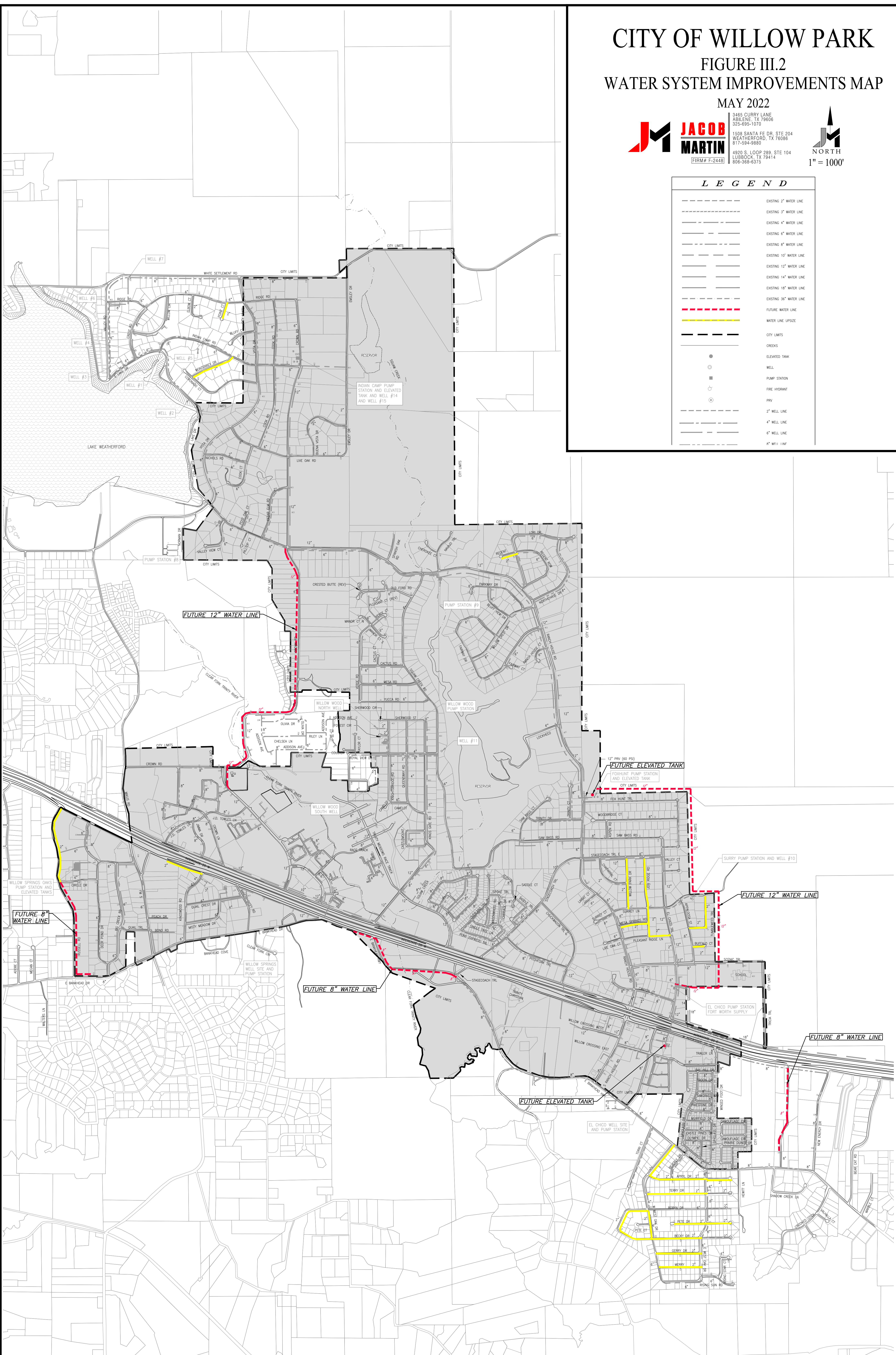
All of the proposed water distribution and storage improvements are depicted in Figure III.2.

CITY OF WILLOW PARK
FIGURE III.2
WATER SYSTEM IMPROVEMENTS MAP

MAY 2022



LEGEND	
	EXISTING 2" WATER LINE
	EXISTING 3" WATER LINE
	EXISTING 4" WATER LINE
	EXISTING 6" WATER LINE
	EXISTING 8" WATER LINE
	EXISTING 10" WATER LINE
	EXISTING 12" WATER LINE
	EXISTING 14" WATER LINE
	EXISTING 18" WATER LINE
	EXISTING 36" WATER LINE
	FUTURE WATER LINE
	WATER LINE UPSIZE
	CITY LIMITS
	CREEKS
	ELEVATED TANK
	WELL
	PUMP STATION
	FIRE HYDRANT
	PRV
	2" WELL LINE
	4" WELL LINE
	6" WELL LINE
	8" WELL LINE



G. Priority and Cost Estimates

The following costs and priority timelines may help in planning and budgeting for capital improvement projects. Table III.9 includes both the estimated costs of the recommended improvements and the recommended timeframes for completion of those projects.

TABLE III.9
WATER SYSTEM IMPROVEMENTS
PRIORITY AND PROJECTED COSTS

CIP #	Project	Location	Cost
1	El Chico to Fox Hunt Transmssion Line	El Chico/Fox Hunt	\$ 2,850,000.00
2	Disinfection Improvements	All Well Sites	\$ 100,000.00
3	Emergency Generators	All Well Sites	\$ 500,000.00
4	Willow Springs Oaks Interconnect	IH20 & Crown Pointe Blvd	\$ 75,000.00
5	New 0.5 MGElevated Tank	Fox Hunt	\$ 3,000,000.00
6	Replace Deteriorated Lines	City Wide	\$ 2,500,000.00
7	Bankhead 8" Water Line	Bankhead South of IH20	\$ 885,000.00
8	Crown Road 12" Loop	Crown Road	\$ 1,750,000.00
9	Bay Hill Loop	Bay Hill	\$ 575,000.00
10	New 0.5 MG Elevated Tank	South of IH 20	\$ 3,750,000.00
11	Fire Hydrant Additions	City Wide	\$ 100,000.00
12	Russell Road Water Line	Russell Road	\$ 830,000.00
13	Upsize Lines	City Wide	\$ 2,000,000.00
14	Fee Studies		\$ 35,000.00

The costs in Table III.9 make allowance for inflation. The line replacement item, Item 6, is a maintenance issue which will reduce water loss and save cost for repairs once completed. The line upsizes and hydrants are not demand driven and are not critical from an operational standpoint. The City must weigh this against safety concerns when attributing a priority to this item. The remainder of the recommended improvements are driven by increased demand in the system and there should have flexibility in the timing of the improvements. The pace at which development occurs may accelerate or delay the need for these items. Development may also help to offset the cost of these improvements through cost sharing agreements and impact fees.

IV. WASTEWATER SYSTEM

A. Regulations

The TCEQ is also the agency which oversees wastewater systems in the State of Texas. The TCEQ is tasked with insuring compliance with EPA and Texas regulations concerning the effects of wastewater discharge into the waters of the State as well as public welfare and air quality. The rules promulgated by the TCEQ for this purpose are found in 30 TAC Chapter 217. Subchapter B of the 217 rules pertains to the determination of capacity and design loadings for wastewater systems. Subchapter C sets out the regulations regarding collection systems and Subchapters E through L pertain to the design and sizing of wastewater treatment systems.

The TCEQ's regulations governing wastewater systems can be viewed online at www.tceq.texas.gov/rules/indxpdf.html.

B. Wastewater Flows

Critical parameters for wastewater systems design are average daily flow and peak hourly flow. Wastewater flow projections were made using the same growth patterns and land use assumptions discussed in previous sections. However, in the case of wastewater, there are approximately 1,003 water customers which are not currently connected to the sewer system. While it is reasonable to assume that, as facilities are made available, these customers will eventually be connected to the sewer collection system, it is not likely to happen until late in the planning period. Growth patterns and the timing of improvements will dictate to a large degree when these connections would come on line. For the purposes of this report, it is assumed this will occur starting in the year 2050 and the wastewater projections have been adjusted accordingly.

**TABLE IV.1
WASTEWATER CONNECTIONS AND FLOW PROJECTIONS**

Year	Sewer conn	Yearly Flow (MG/Yr)	Avg. Daily Flow		Peak Hour gal/day/conn
			MGD	gal/day/conn	
2020	810	97.02	0.265	327	825
2021	870	105.62	0.289	332	825
2025	1026	1123.61	0.339	330	825
2030	1206	145.30	0.398	330	825
2035	1329	160.10	0.439	330	825
2040	1510	181.86	0.498	330	825
2045	1746	210.28	0.576	330	825
2050	2241	269.90	0.739	330	825

C. Existing Wastewater System

The City's existing wastewater system is shown schematically in Figure IV.1. It consists of approximately 14 miles of 6-inch through 12-inch gravity mains and 2.7 miles of 2-inch through 6-inch force main, currently serving 897 customers. The wastewater system currently serves less than half the residences and businesses in Willow Park. Wastewater collected from the system is transferred by force main from three sewer lift stations. An area located on Crown Road on the west side of the City which serves eight homes utilizes individual, private lift stations. Sewer is transferred from these lift stations via a single, 2-inch force main directly to the wastewater treatment plant.

The Willow Park Village lift station serves the area generally east of Ranch House Road, south of Interstate 20, west of Hewitt Lane, and north of Bankhead Highway. The lift station was upgraded in 2015 and includes three 35 horsepower pumps rated at approximately 219 gpm each. This lift station pumps to a manhole in Willow Crossing Road through a 6-inch force main.

The Beavers Creek lift station serves the area bounded generally on the north by Scenic Drive, on the east by Tricia Trail, on the south by East Bankhead Highway, and on the west by Chuckwagon Trail. This station also receives flow from the Willow Park Village lift station. The Beavers Creek lift station was also upgraded in 2015 and consists of three 20 horsepower pumps rated at an estimated 278 gpm each and pumps via 6-inch force main to a manhole in Pitchfork Trail.

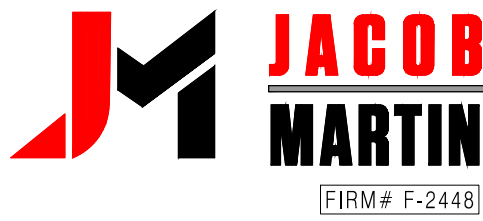
The Kings Gate lift station receives flow from the entire collection system except the few homes on Crown Lane previously mentioned. This station was upgraded along with the others and currently consists of three 25 horsepower pumps rated at an estimated 256 gpm each. This lift station pumps to the wastewater treatment plant through a 6-inch force main. The lift station clogs frequently due to the nature of the sewage and is in need of a grinder to eliminate larger solids and rags.

CITY OF WILLOW PARK

FIGURE IV.1

SEWER SYSTEM INVENTORY MAP

MAY 2022

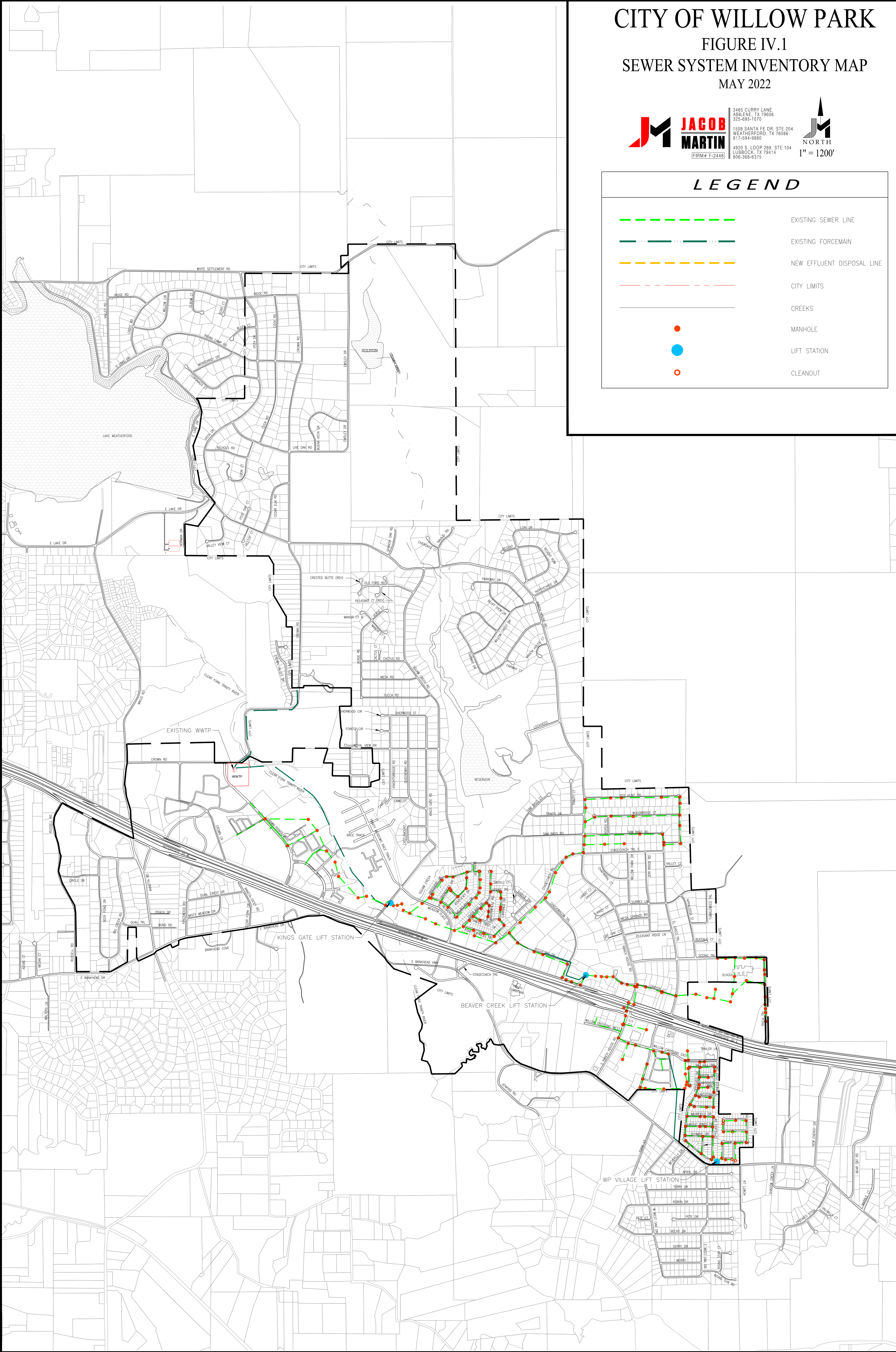


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ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375



LEGEND

- EXISTING SEWER LINE
- EXISTING FORCEMAIN
- NEW EFFLUENT DISPOSAL LINE
- CITY LIMITS
- CREEKS
- MANHOLE
- LIFT STATION
- CLEANOUT



The current capacity of the wastewater treatment plant is 500,000 gpd. The plant has been installed within the last three years as an interim solution to the City's overall wastewater treatment needs. However, a project is in progress to install a new 1.0 MGD wastewater treatment plant, replacing the existing interim plant. The interim facility is a conventional activated sludge wastewater plant contained in steel basins. The service area is located in the drainage basin for Lake Benbrook which has been designated as an impaired stream. Because of this, the TCEQ requires lower limits than would be typical for a plant of this size. The effluent standards in place for the plant are BOD-5 ppm, TDS-5 ppm, ammonia-nitrogen-1.8 ppm, and phosphorous-1.0 ppm. In order to meet these limits, filtration and coagulant feed are required at the plant. The City has obtained a new discharge point to dispose of up to 500,000 gpd into Reservoir No. 23 at Squaw Creek Golf Course. The effluent standards in place for the new discharge point are BOD-10 ppm, TDS-15 ppm, ammonia-nitrogen-3 ppm, and phosphorous-0.5 ppm. The City has obtained property and funding to construct a new 1.0 MGD wastewater treatment facility which will utilize both of the permitted discharge locations. This plant will be constructed as a permanent solution to the City's needs.

D. Recommended Wastewater System Improvements

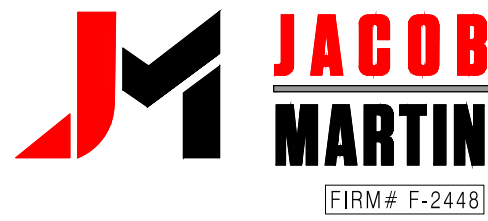
The capacity of the wastewater system has been impacted a great deal by inflow and infiltration as well as a high rate of growth in the community. Inflow and infiltration (I&I) occur when segments of the collection system are in disrepair and allow stormwater and water from other sources to infiltrate the sewer system. The City has had significant (I&I) over the last few years which results in overflows of manholes (unauthorized discharges), overburdening of lift stations and force mains, and capacity exceedance at the wastewater treatment plant. The City has begun the process of identifying sources of I&I and has significantly improved the system in recent months, however, some areas of the system still need to be addressed. Additionally, the City's Kings Gate lift station is in need of upgrades to prevent clogging of pumps and related treatment issues. Improvements discussed in the following sections are depicted in Figure IV.2.

1. Collection System

It is recommended that the City continue smoke testing and/or video inspection of existing sewer mains. Problem areas identified to date have been addressed, but it is expected that other areas will be identified. It is also recommended that the City adopt and enforce a pretreatment program to prevent toxic materials from entering the collection system and eventually interfering with the treatment process. The Kings Gate Lift station should be equipped with a grinder as previously stated. Other minor improvements to other lift stations are recommended.

The location and patterns of development will dictate when potential

CITY OF WILLOW PARK
FIGURE IV.2
SEWER SYSTEM IMPROVEMENTS MAP
MAY 2022

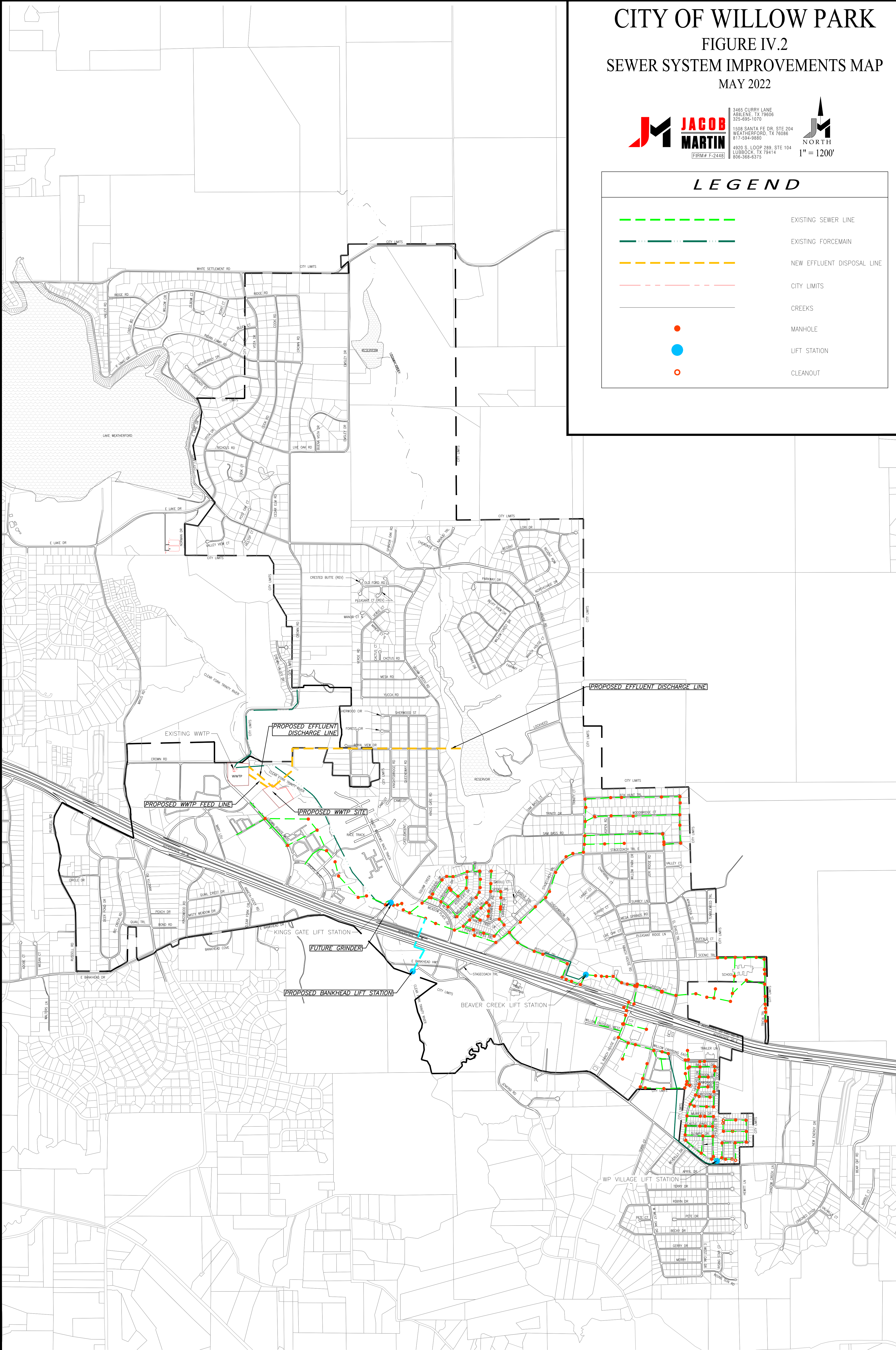


3465 CURRY LANE
ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375



LEGEND

- EXISTING SEWER LINE
- EXISTING FORCEMAIN
- NEW EFFLUENT DISPOSAL LINE
- CITY LIMITS
- CREEKS
- MANHOLE
- LIFT STATION
- CLEANOUT



improvements will be necessary as well as the need for new lift stations and collection lines. A project is underway to install a lift station on the south side of Interstate 20 on Bankhead Highway and a force main to the 12-inch gravity trunk line which feeds the Kings Gate Lift Station. The new lift station will allow service to the currently unserved areas west of Ranch House Road and South of Interstate 20. A new transmission line in this area will be required to collect and convey the sewer.

2. Wastewater Treatment

As mentioned previously, the City has begun the design for a new 1.0 MGD wastewater treatment plant. Based on the information in Table IV.1, the current plant would only be compliant until 2035 and the TCEQ has indicated that an acceptable timeframe for the interim plant will be approximately five years. Therefore, the City should strive to have a permanent solution for the wastewater treatment issues online as soon as possible. The proposed new plant is being designed for 1.0 MGD with expansion capabilities. This would be compliant beyond the year 2050 at which time expansion would need to be underway. Due to the efficiency of treatment and economy of space, sequencing batch reactor (SBR) technology has been selected for the new plant. Additionally, it is recommended locations for the irrigation of effluent be identified and secured as this will be a requirement of future permits for the disposal of wastewater effluent. Golf courses, parks, and athletic fields are among the sites commonly used for irrigation. The City is currently investigating a number of sites for this purpose. Other potential options should be explored as well including a joint effort with other communities to reduce the cost of the facility.

E. Priority and Cost Estimates

The following costs and priority timelines may help in planning and budgeting for capital improvement projects. Table IV.2 includes both the estimated costs of the recommended improvements and the recommended timeframes for completion of those projects. The costs in Table IV.2 make allowance for inflation.

**TABLE IV.2
WASTEWATER SYSTEM IMPROVEMENTS
PRIORITY AND PROJECTED COSTS**

Priority	Description	Cost
2022 -2025		
1	Collection System Inspection and Testing	\$150,000
2	Permanent 1.0 MGD Wastewater Treatment Plant	\$14,130,000
3	Lift Station Improvements	\$150,000
4	South of IH 20 Sewer Transmission	1,500,000
2022-2030		
5	Collection System Improvements (I&I Reduction)	\$650,000
2040-2050		
6	Wastewater Treatment Plant Expansion	\$10,000,000

V. STREET SYSTEM

A. Inventory

An inventory of the City's existing streets was performed including arterial, collector, and local streets. This is depicted in Figure V.1, Street System Map.

B. Evaluation

An evaluation was made of the condition of each street and improvements recommended based on the type of street, traffic volume, and condition. Table V.1 shows the streets identified as being in need of rehabilitation along with priorities and the associated cost.

While streets are not regulated like water and wastewater, the condition of the street can have a significant impact to the safety of residents and should be treated accordingly. Likewise, funding for street improvements is generally only available through the issuance of taxes and use of proceeds from property and sales taxes. Therefore, planning for future improvements is critical to maintain an adequate street system.

As part of that process, a seal coat program should be considered to maintain and extend the life of the streets that are not currently in poor condition or soon to be improved. A yearly operating allowance should be considered for this purpose in the street department budget and is usually in the range of \$100,000 for a city the size of Willow Park.

For the streets that have been identified as in need of major rehabilitation, consideration should be given to the type of improvement that will result in the most economical solution while providing the longest life cycle for the street. Local streets that see lower traffic volume as well as lower weight vehicles may be asphalt reconstruction or overlay, while streets that see heavier traffic volumes and loads may warrant more expensive concrete paving. In general, the subgrade soils in Willow Park are expansive, which was not accounted for when much of the existing street system was constructed. In most cases, where street rehabilitation is recommended, subgrade stabilization should be considered as well. In some areas that have been recently upgraded and this was not done, the surface layer is showing evidence of premature cracking due to the subgrade condition.

C. Priority and Cost Estimates

Estimated costs and priorities have been assigned to the street system based on the street evaluation, anticipated traffic volumes, and community input. Table V.1 includes both the estimated costs of the recommended improvements and the recommended priorities for completion of those projects. The priority one projects should be planned to be completed within a 1-2 year timeframe. The priority 2 projects recommended to be done within 3-7 years and the priority 3 projects within 10 years. The priority 4 projects would be 10-15 year projects with priority 5 being within 20 years. The costs in Table V.1 make allowance for inflation.

CITY OF WILLOW PARK

FIGURE V.1
STREET SYSTEM MAP
MAY 2022



3465 CURRY LANE
ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375



L E G E N D	
	\$ 6,209,550
	\$ 4,345,313
	\$ 3,651,563
	\$ 5,730,563
	\$ 2,826,563
	CONCRETE PAVEMENT

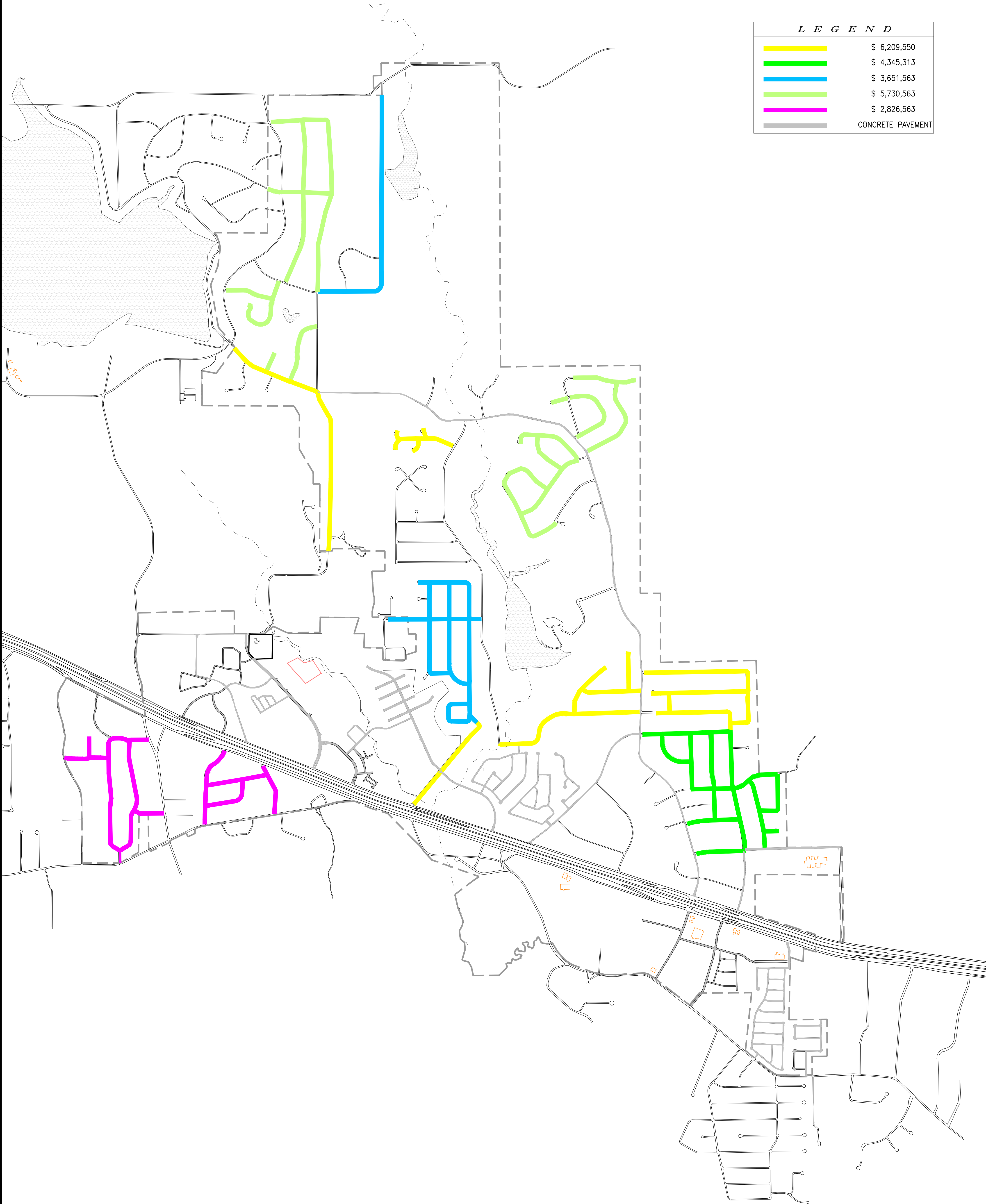


TABLE V.1
STREET SYSTEM IMPROVEMENTS
PRIORITY & PROJECTED COSTS

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of	Overall
1	Crown	Ranch House	Crown Valley	3,850	Arterial	Concrete	\$ 1,696,250
1	Kings Gate	Bridge	Castlemont	2,378	Arterial	Concrete	\$ 1,441,360
1	Ranch House Road	Crown	Vista	2,400	Arterial	Concrete	\$ 1,258,225
1	Sam Bass	Squaw Creek	Ranch House	3,650	Local	Concrete	\$ 1,546,125
1	Old Ford Road	Squaw Creek Road	End	1,600	Local	Reconstruction	442,500
1	Sam Bass Court	Sam Bass Road	End	1,300	Local	Reconstruction	443,500
1	Trinity Court	Trinity Drive	End	900	Local	Reconstruction	323,100
1	Trinity Drive	Sam Bass Court	Ranch House	1,450	Local	Reconstruction	395,500
1	Crested Butte Court	Old Ford Road	End	200	Local	Reconstruction	111,700
1	Ridge Haven	Old Ford Road	End	220	Local	Reconstruction	111,200
1	Pleasant Court	Old Ford Road	End	400	Local	Reconstruction	146,000
				Total Linear Feet	16,078		\$ 7,915,460
				Miles	3.05		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
2	Fox Hunt Trail	Ranch House	El Chico Trail	4,000	Local	Reconstruction	\$ 1,120,000
2	Woodbridge	Fox Hunt Trail	Cul De Sac	2,175	Local	Reconstruction	\$ 609,000
2	Sam Bass Road	Ranch House	El Chico Trail	2,275	Local	Reconstruction	\$ 637,000
2	Aspenwood Drive	Woodbridge	Sam Bass Road	500	Local	Reconstruction	\$ 140,000
2	Squaw Creek	Sam Bass Road	Ranch House Road	7,950	Minor Arterial	Reconstruction	\$ 6,000,000
				Total Linear Feet	16,900		\$ 8,506,000
				Miles	3.20		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
3	Verde	HOA Entrance	Yucca	1,475	Local	Reconstruction	\$ 442,500
3	Cactus	Verde	Squaw Creek	1,350	Local	Reconstruction	\$ 405,000
3	Mesa	Verde	Squaw Creek	1,450	Local	Reconstruction	\$ 435,000
3	Yucca	Verde	Squaw Creek	1,775	Local	Reconstruction	\$ 532,500
				Total Linear Feet	6,050		\$ 1,815,000
				Miles	1.15		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
3	Stage Coach Trail	Ranch House	El Chico Trail	2,050	Local	Reconstruction	\$ 635,500
3	El Chico	Stage Coach Trail	Scenic Trail	2,800	Local	Reconstruction	\$ 868,000
3	Jeri Ridge Road	Stage Coach Trail	Pleasant Ridge Lane	2,050	Local	Reconstruction	\$ 635,500
3	Willow Park Drive	Stage Coach Trail	Surrey	1,350	Local	Reconstruction	\$ 418,500
3	Chaparral Court	Stage Coach Trail	Willow Park Drive	1,115	Local	Reconstruction	\$ 345,650
3	Surrey Lane	Ranch House	El Chico Trail	1,315	Local	Reconstruction	\$ 407,650
3	Mesa Springs Road	Ranch House	Jeri Ridge Road	750	Local	Reconstruction	\$ 232,500
3	Pleasant Ridge LN	Ranch House	El Chico Trail	1,250	Local	Reconstruction	\$ 387,500
				Total Linear Feet	12,680		\$ 3,930,800
				Miles	2.40		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
3	Surry Lane	El Chico	Tumbleweed Trail	1,120	Local	Reconstruction	\$ 358,400
3	Appaloosa	Surry Ln	Scenic Trail	1,700	Local	Reconstruction	\$ 544,000
3	Tumbleweed Trl	Surry Ln	Appaloosa	1,275	Local	Reconstruction	\$ 408,000
3	Buffalo Court	Appaloosa	Cul De Sac	350	Local	Reconstruction	\$ 112,000
							\$ 1,422,400
			Total Linear Feet	4,445			
			Miles	0.84			

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
4	Kings Gate Rd	Castelmont	Sherwood	3,100	Local	Reconstruction	\$ 992,000
4	Queensway Rd	King Gate Rd	Sherwood	2,625	Local	Reconstruction	\$ 840,000
4	Kings Bridge Rd	Camelot	Sherwood	2,100	Local	Reconstruction	\$ 672,000
4	Sherwood	King Gate Rd	Cul De Sac	1,125	Local	Reconstruction	\$ 360,000
4	Royal View	Squaw Creek	Cul De Sac	2,275	Local	Reconstruction	\$ 728,000
4	Camelot	Kingsbridge	Queensway Rd	550	Local	Reconstruction	\$ 176,000
4	Casletmount	(All Square)	(All Square)	1,350	Local	Reconstruction	\$ 432,000
							\$ 4,200,000
			Total Linear Feet	13,125			
			Miles	2.49			

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
4	Emsley Dr	White Settlement	Crown	6,350	Local	Reconstruction	\$ 2,095,500
							\$ 2,095,500
			Total Linear Feet	6,350			
			Miles	1.20			

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
5	Crown Road	Live Oak	Ridge Road	4,036	Local	Reconstruction	\$ 1,331,880
5	Cook Road	Live Oak	Ridge Road	3,850	Local	Reconstruction	\$ 1,270,500
5	Indian Camp Rd	Crown	Vista	1,100	Local	Reconstruction	\$ 363,000
5	Live Oak	Crown	Vista	1,750	Local	Reconstruction	\$ 577,500
5	Nichols Rd	Cook Ct	Vista	1,150	Local	Reconstruction	\$ 379,500
5	Cook Ct	Live Oak	Cul De Sac	1,925	Local	Reconstruction	\$ 635,250
5	Cedar Elm Rd	Crown	Ranch House	1,600	Local	Reconstruction	\$ 528,000
5	Post Oak Ct	Ranch House	Cul De Sac	500	Local	Reconstruction	\$ 165,000
							\$ 5,250,630
			Total Linear Feet	11,875			
			Miles	2.25			

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
5	Fairway Drive	Ranch House	Willow Crest Dr.	3,475	Local	Reconstruction	\$ 1,146,750
5	Willow Crest Dr	Ranch House	Fairway	2,163	Local	Reconstruction	\$ 713,790
5	Parkway Drive	Willow Crest Dr	Cul De Sac	1,775	Local	Reconstruction	\$ 585,750
5	Bluff View Dr	Parkway Dr	Willow Crest Dr.	1,050	Local	Reconstruction	\$ 346,500
5	Ranch House Ct	Ranch House	Cul De Sac	600	Local	Reconstruction	\$ 198,000
							\$ 2,990,790
			Total Linear Feet	9,063			
			Miles	1.72			

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
5	Lori Dr	End of Improve	Cul De Sac	1,039	Local	Reconstruction	\$ 342,870
5	Regent Row	Ranch House	Cul De Sac	2,350	Local	Reconstruction	\$ 775,500
5	Nortchase Dr	Ranch House	Lori Dr.	2,200	Local	Reconstruction	\$ 726,000
							\$ 1,844,370
				Total Linear Feet	5,589		
				Miles	1.06		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
6	Big Creek Road	Deer Pond Dr	Deer Pond Dr	2,700	Local	Reconstruction	\$ 945,000
6	Deer Pond Dr.	Mikus	Bankhead	3,950	Local	Reconstruction	\$ 1,382,500
6	Circle Dr	Russell Rd	Deer Pond Dr	1,075	Local	Reconstruction	\$ 376,250
6	Circle Ct.	Circle Dr.	Cul De Sac	500	Local	Reconstruction	\$ 175,000
6	Quail Trail	Big Creek Rd	Mikus	800	Local	Reconstruction	\$ 280,000
							\$ 3,158,750
				Total Linear Feet	9,025		
				Miles	1.71		

Priority	Street	Street (Start)	Street (End)	Linear Feet	Street Type	Type of Replacement	Overall
6	Kingswood	IH 20	Bankhead	1,950	Local	Reconstruction	\$ 682,500
6	Clear Fork Cir	IH 20	Bankhead	1,300	Local	Reconstruction	\$ 455,000
6	Quail Crest Dr	Kingswood	Clear Fork Cir	1,500	Local	Reconstruction	\$ 525,000
6	Misty Meadow Dr.	Quail Crest Dr	Kingswood	1,300	Local	Reconstruction	\$ 455,000
							\$ 2,117,500
				Total Linear Feet	6,050		
				Miles	1.15		

VI. DRAINAGE SYSTEM

A. Inventory

In 2019, the City authorized JACOB & MARTIN, LLC to complete a master plan for the City's drainage system. That study was completed in March 2019 and contains an inventory of the City drainage infrastructure as well as hydrologic and hydraulic analyses for most of the system's conveyance structures components. The drainage plan has been updated over the last six months. Table VI.1 is a summary of the findings of that report. Figure VI.1 shows the City's drainage infrastructure.

**Table VI.1
DRAINAGE SYSTEM
PRIORITIES & PROJECTED COSTS**

Priority	Description	Cost
2022 -2025		
1	Sam Bass & Pleasant Ridge Culvert & Channel Improvements	\$500,000
2	Fox Hunt to El Chico Channel Improvements	\$500,000
3	Crown Pointe Channel Improvements	\$225,000
4	IH 20 & Chuckwagon Trail Channel Improvements	\$130,000
5	133 Sam Bass Culvert & Channel Improvements	\$85,000
6	Castlemount Culvert & Channel Improvements	\$100,000
7	Vista Drive Culvert & Channel Improvements	\$250,000
8	Live Oak Road Culvert & Channel Improvements	\$100,000
9	Major Culverts – General Improvements	\$800,000
10	Minor Culverts – General Improvements	\$1,175,000
2025-2035		
11	Ditch & Culvert Maintenance (per year)	\$100,000

CITY OF WILLOW PARK

FIGURE VI.1
DRAINAGE IMPROVEMENTS MAP
MAY 2022



3465 CURRY LANE
ABILENE, TX 79606
325-695-1070
1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880
4920 S. LOOP 289, STE 104
LUBBOCK, TX 79414
806-368-6375

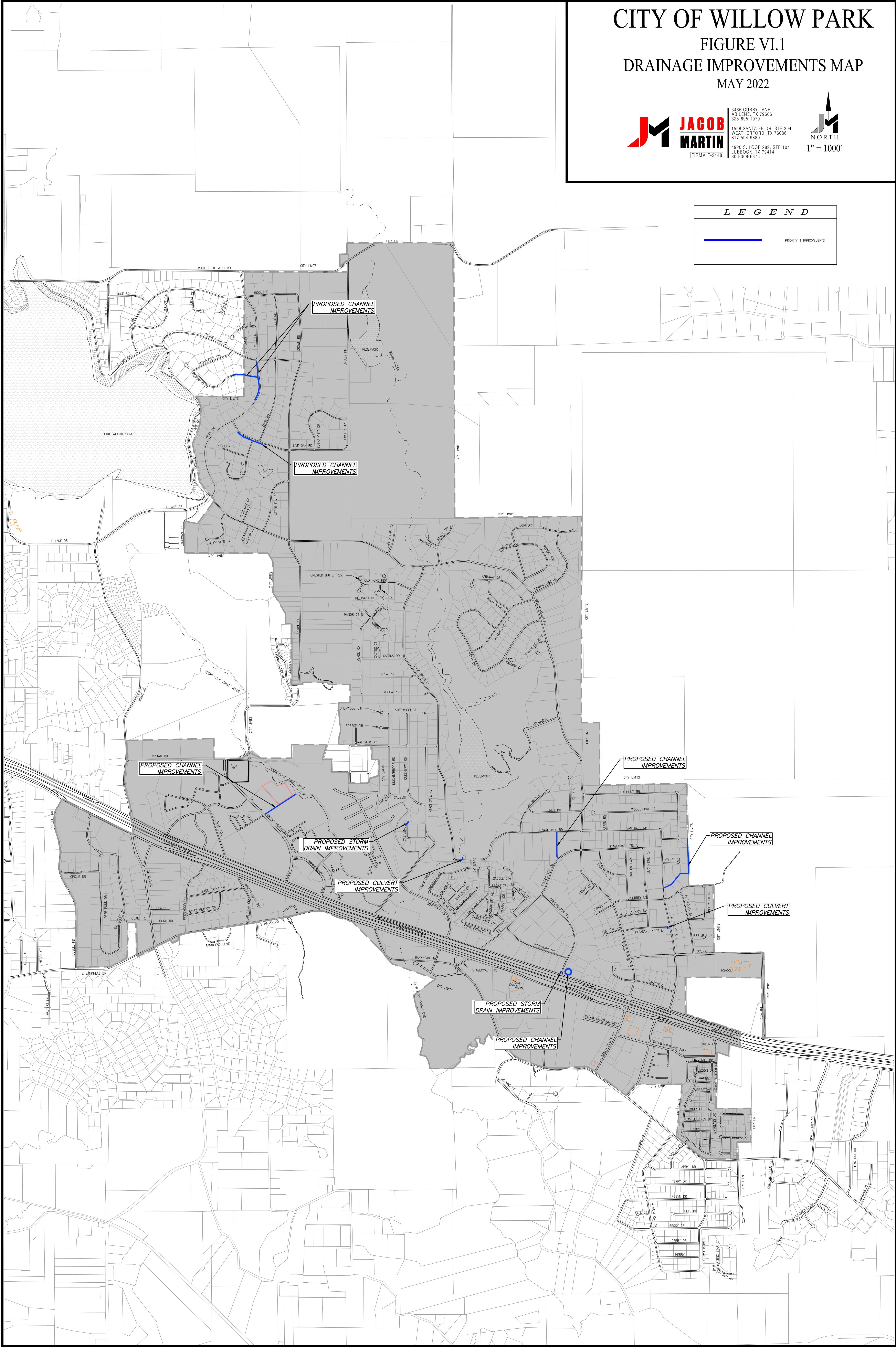


1" = 1000'

LEGEND



PRIORITY 1 IMPROVEMENTS



VII. CONCLUSIONS AND RECOMMENDATIONS

Based on our evaluation of the City of Willow Park's infrastructure, we offer the following conclusions and recommendations to assist the City with decisions related to capital improvements through the year 2050

A. Water System

The City has recently completed a project that should insure adequate water supply through 2050. However, water conveyance and distribution should remain a priority for the immediate future. The following is recommended toward that end:

- Complete a surface water supply transmission line to convey surface water to the Foxhunt site.
- Complete system loops in critical flow areas.

These projects would resolve issues with tank refill and allow backup options in times of shortage.

The reduction of water loss and improving pressure maintenance while serving expected growth should be the next priority:

- Install a new elevated tank by 2030.
- Complete replacement of old, poorly installed and deteriorated lines by 2030.

These projects would protect the water supply and insure that expected growth could be accommodated.

Long term supply and demand service should be considered early in the planning period to eliminate shortages in the future:

- Replace an existing elevated tank with a larger tank by 2040.
- Upsize existing small distribution lines.
- Install fire hydrants in various locations as needed by 2040.

These improvements would allow complete distribution of each water source throughout the service area.

B. Wastewater System

The upgrade of the City's wastewater treatment system should be the highest priority. The City should continue with the projects that are underway to address this concern:

- Upgrade the existing Kings Gate lift station by early 2025.
- Complete a new permanent wastewater plant by 2024.

In order to prolong the life of the treatment system and eliminate unauthorized discharges, the City should undertake collection system improvements as soon as possible.

- Begin collection system inspection and testing by 2023.
- Complete collection system replacements and repairs by 2030.

Planning for expansion on the proposed permanent wastewater plant will allow the City to serve future growth in the wastewater system without unnecessary capital expenditure.

- Complete expansion of the permanent wastewater plant by 2045.

C. Streets

A focus on the upgrade of the City's streets should be maintained. The City should continue with the projects that are underway to address this concern:

- Complete priority 1 street improvements by 2024.
- Begin a yearly seal coat program by 2023.

In order to ensure a safe and adequate street system other lower grade streets should be upgraded:

- Begin priority 2 and 3 street improvements by 2025.
- Continue yearly maintenance program.

Assuming yearly maintenance is performed on all streets, the final priority upgrades can be completed without revisiting previously rehabilitated streets.

- Complete priority 4 and 5 streets by the year 2035

D. Drainage

Inadequate drainage can result in significant property damage, damage to infrastructure and even loss of life. Additionally, drainage issues tend to worsen over time as erosion occurs. The City should allocate funds to address significant drainage issues:

- Complete priority years 1 by 2025.
- Continue maintenance program through the planning period.

VIII. FINANCING OF IMPROVEMENTS

The water and wastewater improvement projects currently underway are being funded by low interest loans from the Texas Water Development Board, special federal allocations, and local bond issues. The larger, future recommended improvements should be funded by the Texas Water Development Board as the terms of their funding is very favorable. Smaller projects should be funded by a combination of yearly budgeting and bond issues.

Additionally, capital improvement fees should be evaluated periodically. These fees can be used to fund much of the improvements needed in the system. As development increases in the City, impact fees will also serve to offset potential rate increases. Regardless of the financial vehicles used to fund the recommended projects, it is likely that water and sewer rates will have to increase as well.

Street projects are not generally ranked well enough to be funded through state and federal agencies. The City should consider allocating in the yearly budget for as much as possible and fund larger projects through general obligation bonds or tax notes.

The drainage projects are expected to be funded through the newly instituted Stormwater Utility Rate and impact fees. The larger projects are intended to be funded by a bond issue with these new fees covering the debt service. The Stormwater Utility and impact fees should cover yearly maintenance and smaller projects as well.

IX. CLOSURE

The City should continue to evaluate this plan on a five year basis. As development occurs, the need and timing for various improvements will be more clearly defined. The City should continue to encourage development in accordance with the most recent comprehensive plan and this document.