

ORDINANCE 25-S-010

AN ORDINANCE BY THE CITY COUNCIL OF THE CITY OF SCHERTZ, TEXAS, ADOPTING UPDATED WATER AND WASTEWATER MASTER PLANS AS SUPPLEMENTS TO THE COMPREHENSIVE LAND USE PLAN, REPEALING ALL ORDINANCES OR PARTS OF ORDINANCES IN CONFLICT WITH THIS ORDINANCE; AND PROVIDING AN EFFECTIVE DATE

WHEREAS, the City Council of the City of Schertz, Texas, (the “City”) has determined that there is a need for updates to the City’s Master Plans for Water and Wastewater infrastructure; and

WHEREAS, the City Staff worked with a consultant to develop updated Master Plans that address anticipated growth and operational needs of the City in its service areas; and

WHEREAS, the Planning and Zoning Commission of the City conducted a public hearing and, after considering the report and presentation, made a recommendation of approval of the proposed updated Water and Wastewater Master Plans; and

WHEREAS, the City Council has been presented with the background report and proposed updated plans which are set forth on Exhibits A and B attached hereto and determined that it is in the best interest of the City to adopt the plans as presented; and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SCHERTZ, TEXAS THAT:

Section 1. The City hereby adopts the updated Water and Wastewater Master Plans as set forth on Exhibits A and B to this Ordinance. The plans as adopted will be considered supplemental to the City’s Comprehensive Land Use Plan.

Section 2. The recitals contained in the preamble hereof are hereby found to be true, and such recitals are hereby made a part of this Ordinance for all purposes and are adopted as a part of the judgment and findings of the Council.

Section 3. All ordinances and codes, or parts thereof, which are in conflict or inconsistent with any provision of this Ordinance are hereby repealed to the extent of such conflict, and the provisions of this Ordinance shall be and remain controlling as to the matters resolved herein.

Section 4. This Ordinance shall be construed and enforced in accordance with the laws of the State of Texas and the United States of America.

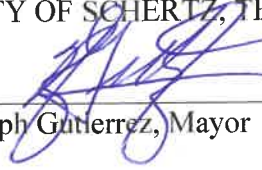
Section 5. If any provision of this Ordinance or the application thereof to any person or circumstance shall be held to be invalid, the remainder of this Ordinance and the application of such provision to other persons and circumstances shall nevertheless be valid, and the City hereby declares that this Ordinance would have been enacted without such invalid provision.

Section 6. It is officially found, determined, and declared that the meeting at which this Ordinance is adopted was open to the public and public notice of the time, place, and subject matter of the public business to be considered at such meeting, including this Ordinance, was given, all as required by Chapter 551, as amended, Texas Government Code.

Section 7. This Ordinance shall be effective upon the date of final adoption hereof and any publication required by law.

PASSED AND APPROVED on the 4th day of March, 2025.

CITY OF SCHERTZ, TEXAS



Ralph Gutierrez, Mayor

ATTEST:


Sheree Courney, Deputy City Secretary





City of Schertz 2024 Water & Wastewater Master Plan & CIP

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January 2025



TBPE Firm No. 2614

SCHERTZ
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1. EXECUTIVE SUMMARY

The City of Schertz (City) contracted Lockwood, Andrews, and Newnam Inc. (LAN) to analyze and update the Water and Wastewater Master Plan & Capital Improvements Plan (CIP). The goal of this update is to provide a strategic framework for the City's growth, development, and infrastructure enhancements over the next 30 years, ensuring that future investments align with the community's long-term vision and needs.

A master plan serves as the City's guiding document for land use, zoning, utilities, public services, and economic development. This document specifically focuses on water and wastewater utility improvements that are required due to growth and various system needs.

As part of this update, land use assumptions were developed based on past data from the City and Alamo Area Metropolitan Planning Organization (AAMPO) Traffic Analysis Zone (TAZ) demographic databases. These assumptions then indicated where areas of residential and commercial growth are likely to occur as well as the projected increase in those areas as shown in the tables below. This data was applied to the hydraulic water and wastewater models which are discussed later in this report.

Population Projections

Population Projections (Cumulative) ⁽¹⁾	Historical	5-Year	10-Year	15-Year	20-Year	25-Year	30-year
	2020	2025	2030	2035	2040	2045	2050
Compound Annual Growth Rate	-	1.8%	2.0%	2.0%	1.9%	1.9%	1.8%
Population	45,719	49,985	55,187	60,933	66,946	73,553	80,416
Total Increase	(+)	4,266	5,202	5,745	6,013	6,607	6,863

Employment & Commercial Property Projections

Employment Projections (Cumulative)	Historical ⁽¹⁾	5-Year	10-Year	15-Year	20-Year	25-Year	30-year
	2020	2025	2030	2035	2040	2045	2050
Compound Annual Growth Rate⁽²⁾	-	0.8%	0.8%	3.0%	2.4%	2.2%	2.2%
Persons Employed	21,437	22,363	23,288	24,213	27,305	30,397	33,839
Commercial Parcels	313	327	340	394	445	495	551
Total Increase in Commercial Parcels	(+)	14	14	54	50	50	56

After developing the land use assumptions and identifying areas of growth, the existing water and wastewater systems were analyzed. The analysis for the water system model focused on meeting the Texas Commission for Environmental Quality's (TCEQ) requirements for system storage capacity, supply, service capacity, and minimum pressure requirements for public water systems. For the wastewater system model evaluation, emphasis was placed on identifying sanitary sewer overflows at manholes and surcharged gravity mains.

From the analysis of the systems and the growth identified from the land use assumptions, projects were proposed in the Capital Improvements Plan (CIP). The CIP typically spans a 5- to

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10-year horizon with longer term projections for major capital projects. These improvements are crucial for maintaining and enhancing the city's infrastructure to accommodate growth and improve the existing system.

High level estimates of probable cost for each CIP project were developed based on four industry standard price sources. For the 2030 and 2050 projects, inflation rates were calculated and applied in order to capture the increase in construction costs. These project costs help the City determine how much funding is required and determine if additional funding sources need to be identified.

The updated master plan and CIP provide a comprehensive, actionable roadmap for the City's growth and development, aligning infrastructure investments with community priorities and long-term goals. By adopting these plans, the City can continue to maintain and develop a reliable water and wastewater system for both the intermediate and future demands.

INTERIM REVIEW ONLY

Not to be used for construction, bidding, permit or regulatory approval purposes. This document is released for the purpose of interim review under the authority of:

LEE B. HAMM

Engineer

106029

Registration Number

JANUARY 2025

Date

Lockwood, Andrews & Newnam, Inc.
Texas Registered Engineering Firm F-2614

2. LAND USE ASSUMPTIONS

Land use assumptions are required to be periodically updated in accordance with TLGC Section 395.052. These assumptions form the basis for analyzing existing and future water and wastewater needs based on growth projections. This section describes how LAN performed a land use assessment, developed growth projections, and applied this data to the hydraulic water and wastewater models which are discussed later in this report.

2.1 Data Review & Methodology

2.1.1 City Provided Data

Data and resources necessary for LAN to assess current and future land uses, development projections, and Water and Wastewater service networks were provided by the City. Sources available up to December 31, 2021 were incorporated in the land use assumptions for this master plan effort. The plan was modified based on residential subdivision development information received from the City on April 8th, 2022. This includes the following:

- GIS Shapefiles
 - Received by LAN in the December 2019 data package from the City
 - Shapefiles in this data package included:
 - Comprehensive Land Use
 - Zoning Ordinances
 - Water and Wastewater infrastructure
 - CCN Service Areas
 - Municipal Boundaries
 - Customer Meters
 - Subdivision Land Use Statistics
- Residential Land Use Forecasts
 - Microsoft excel spreadsheet received by LAN in April 2020 from the City's Director of Planning and Community Development.
- 2018 City of Schertz Comprehensive Land Use Plan Map
- 2017 Roadway Impact Fee Land Use Assumption Report by Freese and Nichols, Inc.

2.1.2 AAMPO TAZ Data

Alamo Area Metropolitan Planning Organization (AAMPO) Traffic Analysis Zone (TAZ) demographic databases were used to determine the City's growth projections. TAZs are the geographic units used to inventory existing and future demographic data required for modeling purposes. TAZ data included 2020, 2025, 2035, and 2045 population, number of households, average household size, and employment inventories for the study area. Databases were downloaded from the AAMPO website in the form of GIS shapefiles and concentrated to correctly reflect the City's extent.

It should be noted that TAZ demographic data from 2020 was provided to LAN separately from the 2025-2045 projected demographic data. Because the 2020 data package was a direct result from the official 2020 Census and the projected data was calculated by AAMPO before 2020, LAN identified discrepancies in growth rates between the years 2020 and 2030 for population and employment. For the purpose of this Land Use Assessment, population and employment data between the years 2020 and 2030 was interpolated to reflect consistent growth rate throughout the

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planning period. LAN has communicated with AAMPO about the data discrepancies and will update all projections accordingly for future system modeling.

At the request of City staff, the projected growth rate for each 5-year period was increased by 0.1% to be conservative. These adjusted population numbers are presented in subsequent sections.

2.1.3 Planning Period

This Comprehensive Land Use Assessment utilizes a 30-year planning period from 2020 to 2050. Because the AAMPO TAZ demographic data is limited to the year 2045, demographics were projected to 2050 by assuming the same compound annual growth rate (CAGR) established in 2045.

2.2 Summary of Comprehensive Land Use and Future Development Assumptions

2.2.1 2017 Roadway Impact Fee Land Use Assumptions by Freese and Nichols, Inc.

The 2017 Roadway Impact Fee Land Use Assumptions Report identified land use assumptions and recommendations for the City over a 10-year planning period ending in 2027. Upon completion of this 2021 Comprehensive Land Use Assessment, LAN has identified that the following assumptions from the 2017 Report will remain true for the 30-year planning period ending in 2050:

- Territories south of Randolph Air Force Base are impacted by restrictions based on Air Impact Compatible Use Zones (shown on the City's Comprehensive Land Use Plan Map as Attachment 1). Restrictions include limits on residential development densities.
- Continued commercial and residential development pressure in the North from New Braunfels will impact growth around the City.

2.2.2 Assumptions Made by LAN

A series of assumptions in relation to the City's land use and future development have been made by LAN after completing this Land Use Assessment. The following assumptions were made to initiate updates to the water master plan and CIP:

- Land uses identified in the 2018 Comprehensive Land Use Plan Map were modified based on updated residential subdivision development information received from the City on April 8th, 2022. It is assumed that these developments will remain in place for the 30-year planning period. The names and location of these updated developments are labeled on Appendix 5 and Appendix 6.
- Land use data available up to April 8th, 2022 were incorporated in the land use assumptions for this master plan effort.
- New growth throughout the 30-year planning period will expand away from the City center, where the highest densities of development currently exist.
- Continued development pressure in the North along the IH-35 corridor and from New Braunfels will result in future residential and commercial development at higher densities throughout the north, than in the south.
- Territories under delayed annexation agreements with the City will be annexed by 2025. The annexation of these territories will expand municipal boundaries.
- Regions within Municipal Boundaries that do not currently lie within City water or wastewater Certificates of Convenience and Necessity (CCN)s identified by the Public Utilities

Commission (PUC) are serviced by other authorities and will remain so throughout the 30-year planning period.

- The existing water and wastewater CCNs will remain in place for the 30-year planning period.

2.3 Land Use and Growth Projections

2.3.1 2018 Comprehensive Land Use Plan

The City's Comprehensive Land Use Plan Map is included in this report as Appendix 1 and serves as a provisional guideline for future development across the City. The land uses identified in the 2018 map provide a framework that will be reflected by the City's future development decisions. The exception is the area south of Schaeffer Rd and east of FM 1518. Recent land use plan amendments in this area include zoning changes based on data available up to October 1st, 2022.

2.3.2 Zoning

The City's existing zoning ordinances are included in this report as Appendix 2. The existing zoning ordinances were published in 2019 and serve as a means for which the 2018 Comprehensive Future Land Use Plan will be implemented. Based on land use data available up to October 1st, 2022 (including residential subdivision development information received from the City), the 2019 zoning designations were updated. It is assumed for the purposes of this study, that the zoning identified in Attachment 2 will remain in place for the 30-year planning period ending in 2050 apart from areas south of Schaeffer Rd and east of FM 1518 and areas just north of Trainer Hale Rd which are already approved for rezoning as of May 26, 2022. All existing and future subdivisions are shown in Appendix 5 & 6.

2.3.3 Delayed Annexation Agreements

Zoning ordinances were used to locate territories around the City under delayed annexation agreements. Territories under delayed annexation agreements currently exist within zones of Extra Territorial Jurisdiction (ETJ), which constrain the City's growth. These territories are primarily located throughout the Northeast corner of the City extending toward New Braunfels and in the Southeast between FM 1518 and IH-10.

2.3.3.1 Annexation Schedule

The City's Director of Planning and Community Development provided LAN with timelines for completing existing annexation agreements. The City Plans for the existing annexations to be completed by 2025.

2.3.3.2 Supported Land Uses of Territories to be Annexed

Table 1 summarizes the supported land uses of the territories under delayed annexation agreements. The annexation data provided to LAN was geographically categorized between the north and south. The location of the areas under a delayed annexation agreement is illustrated in Appendix 2 and the supported land uses for future development of these area is presented in Appendix 9 & 10.

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Table 1: Land Use of Territories Under Delayed Annexation Agreements

Delayed Annexation Agreements: Parcel Land Use	Supported Land Uses ⁽¹⁾	Total Parcels	Total Acreage	Single-Family Residential Lots Allowed	Commercial Parcels
North Schertz	Commercial, Single-Family Residential	43	1,037	822	2
South Schertz	Commercial, Single-Family Residential	86	3,110	2,000	5

⁽¹⁾For the purpose of this assessment, single-family residential land use includes Agricultural Conservation, Traditional Neighborhood Development (TND), Transit Oriented Development (TOD), and Estate Neighborhood

2.3.4 Population Projections

Table 2 uses AAMPO TAZ demographic data to summarize population projections over the 30-year planning period ending in 2050. Combining these projections with development anticipated as of October 1st, 2022, Projections suggest that population is expected to steadily increase throughout the 30-year planning period at an average compound annual growth rate (CAGR) of 1.%. Appendix 3 presents 2020 (historical) and 2050 (projected) population distribution across the City, reflecting the population increase provided in Table 2.

Table 2: Population Projections

Population Projections (Cumulative) ⁽¹⁾	Historical 2020	5-Year 2025	10-Year 2030	15-Year 2035	20-Year 2040	25-Year 2045	30-year 2050
Compound Annual Growth Rate	-	1.8%	2.0%	2.0%	1.9%	1.9%	1.8%
Population	45,719	49,985	55,187	60,933	66,946	73,553	80,416
Total Increase	(+)	4,266	5,202	5,745	6,013	6,607	6,863

⁽¹⁾Total population accounts for areas of existing Extra Territorial Jurisdiction (ETJ) for which growth is constrained

2.3.5 Residential Land Use

Table 3 uses AAMPO TAZ demographic data to summarize projections for the total number of households over the 30-year planning period. Future residential development across the City is expected to reflect population growth and increased traffic along IH-35. The number of households is expected to increase throughout the 30-year planning period at an average CAGR of 2.2%. 2020 (historical) and 2050 (projected) residential housing distribution across the City are shown in Appendix 4. Because AAMPO TAZ data does not categorize residence type, the housing projections include both single-family and multi-family residences.

Table 3: Housing Projections

Housing Projections (Cumulative)	Historical 2020	5-Year 2025	10-Year 2030	15-Year 2035	20-Year 2040	25-Year 2045	30-year 2050
Compound Annual Growth Rate ⁽¹⁾⁽²⁾	-	3.2%	2.4%	2.2%	2.1%	2.0%	2.0%
Households	15,441	18,034	20,305	22,640	25,120	27,735	30,742
Total Increase	(+)	2,593	2,271	2,335	2,480	2,615	2,737

⁽¹⁾Total number of households accounts for all categories of residential housing units throughout the City

⁽²⁾Total number of households accounts for all residential housing units located within areas of existing Extra Territorial Jurisdiction (ETJ) for which growth is constrained

2024 Water & Wastewater Master Plan & CIP

The City's Director of Planning and Community Development provided LAN with maximum build-out estimates for existing and planned single-family and multi-family residential developments throughout the City. Appendix 5 & 6 shows the location and density of these subdivisions in comparison to the Wastewater and Water Certificates of Convenience and Necessity (CCNs) service areas. Appendix 5 & 6 serves as an exhibit of where the City is allowed to provide services and where their population may be distributed. Table 4 summarizes the maximum build-out estimates. According to this data, approximately 90% of the existing and planned residential developments are single-family residential.

Table 4: Maximum Build-Out Estimates

Residential Type Land Use Statistics	Single-Family	Multi-Family
Number of Households Expected at Maximum Build-Out for Existing and Planned Subdivisions⁽²⁾	20,102	3,339

⁽²⁾Total number of households includes subdivisions in areas of existing ETJ for which growth is constrained

2.3.5.1 Single-Family Residential Development

The Comprehensive Land Use Plan indicates that single-family is the primary type of residential land use throughout the City. Over the 30-year planning period, development pressure along IH-35 and from New Braunfels will impact the distribution of residences across the City. Single-family housing density is expected to be higher in the north throughout this corridor. However, in the southern portion of the City, west of FM 1518, residential development will primarily consist of lower density rural and estate style subdivisions. It is anticipated that additional single-family development will occur east of FM 1518 based on recent requested and authorized zoning changes.

2.3.5.2 Multi-Family Residential Development

Currently, multi-family residential establishments are located centrally in the City and account for a small percentage of the City's residential type land uses. While the number single-family residences will continue to dominate over the 30-year planning period, data provided by the City's Director of Planning and Community Development notes a few new multi-family residential subdivisions have been planned. These developments are primarily located in the northeast between IH-35 and the Schertz City Limits, with one in the southern portion of the City. The location and density of these three developments are included in Appendix 5 & 6.

2.3.5.3 Average Household Size

Table 5 uses AAMPO TAZ demographic data to summarize the average number of persons per household over the 30-year planning period. Because AAMPO TAZ data did not categorize residence type, household size accounts for both single-family and multi-family residences. Table 5 indicates the average household size will remain close to three persons over the 30-year planning period.

Table 5: Household Size Projections

Average Household Size	Historical	5-Year	10-Year	15-Year	20-Year	25-Year	30-Year
	2020	2025	2030	2035	2040	2045	2050
Persons⁽¹⁾⁽²⁾	3.0	2.8	2.7	2.7	2.7	2.7	2.6

⁽¹⁾All categories of residential housing throughout the City are accounted for

⁽²⁾Total number of households includes subdivisions in areas of existing ETJ for which growth is constrained

2.3.6 Commercial Land Use

The Comprehensive Land Use Plan implies that commercial type land uses will continue to exist primarily along major thoroughfares in the north surrounding IH-35, in the south surrounding IH-10, and centrally surrounding FM 3009. The number and location of existing and planned commercial-type parcels were provided by the City in the form of a GIS Shapefile, shown in Appendix 7 & 8. These exhibits show the Wastewater and Water CCN service areas, respectively, to compare where the City is allowed to provide service to where they can expect commercial development. It was determined that AAMPO TAZ data for the number of persons employed throughout the City could reflect the number of commercial-type establishments. The CAGR for employment was used to project the number of commercial establishments over the 30-year planning period. Table 6 summarizes the employment projections, CAGR, and anticipated number of commercial establishments. Increased traffic and population among the IH-35 corridor could result in a higher demand for commercial property development in the North.

Table 6: Employment & Commercial Property Projections

Employment Projections (Cumulative)	Historical ⁽¹⁾	5-Year	10-Year	15-Year	20-Year	25-Year	30-year
	2020	2025	2030	2035	2040	2045	2050
Compound Annual Growth Rate⁽²⁾	-	0.8%	0.8%	3.0%	2.4%	2.2%	2.2%
Persons Employed	21,437	22,363	23,288	24,213	27,305	30,397	33,839
Commercial Parcels	313	327	340	394	445	495	551
Total Increase in Commercial Parcels	(+)	14	14	54	50	50	56

⁽¹⁾Employment and commercial projections include areas of existing Extra Territorial Jurisdiction (ETJ), for which growth is constrained

2.4 CCNs Service Area Updates

The City's existing Water and Wastewater certificates of convenience and necessity (CCNs) identified by the Public Utility Commission (PUC) were reviewed to identify areas the City is currently serving as well as resolve where the City may be servicing outside their PUC identified CCN boundaries.

Per correspondence on August 11, 2021, it was decided that the current water and wastewater CCN service areas would remain unchanged for the 30-year planning period. This conservative approach would allow the City to monitor potential CCN changes as development occurs and to adapt using the 5-year impact fee cycle in lieu of wholesale CCN change assumptions for the next 30 years.

The City is aware that some regions within their municipal City Limits currently exist outside their water and wastewater CCN service areas and will remain under the service of their existing providers throughout the 30-year planning period. Likewise, regions annexed into the City during the 30-year planning period will not be added to the City's water and wastewater CCN service areas if they are not currently located within the service areas. The existing water and wastewater CCN service areas can be seen in Appendix 9 & 10. These exhibits present the land use categories used in the development of population projection allocations, calculations of future demands, and wastewater loading development.

2.5 Future System Modeling

To develop future conditions for water and wastewater system modeling the existing system models will be modified to reflect the assumptions made in this report. Assumptions and projections made for City growth, land uses, and development are used to establish and allocate future demands and supply requirements for the required planning period. In general, the expansion of Municipal Boundaries throughout the planning period will result in City-wide growth and the extension of water and wastewater service networks. Projected residential and commercial development throughout the planning period will produce increased water and wastewater flows.

3. WATER SYSTEM EVALUATION & CIP

3.1 Modeling & Evaluating the Existing Water System

This section provides an overview of the existing system model evaluation and the assessment of the results against the TCEQ requirements for system storage capacity, supply, service capacity, and minimum pressure requirements for public water systems.

3.1.1 Updates to Existing System Model

LAN built a hydraulic model of the City's existing water distribution system in Bentley's WaterGEMS software using data provided by the City. The model and the Technical Memo with model build details and preliminary model verification results for the existing system were presented to the City at a review meeting on September 10, 2020.

After the existing water system review meeting on September 10, 2020, the following items were updated in the hydraulic model to better reflect existing conditions:

- Wholesale Customer Demands
- Residential Water Usage Patterns
- Live Oak Pressure Reducing Valve Settings
- Removal of Waterlines Not in Service

3.1.1.1 Wholesale Customer Demands

Meter usage data from the City of Selma and City of Cibolo was provided to LAN by the City and were used to identify average and peak day demands at the wholesale customers' meters. Average day demands and peak day demands were input into the existing system model at each customer meter location and are summarized in Table 7 and Table 8, respectively.

Table 7: Average Day Wholesale Customer Meter Demands

City of Selma		
EST	360	gpm
GST	70	gpm
City of Cibolo		
Mesa	10	gpm
Ripps-Kreusler	6	gpm
Cibolo Crossing	8	gpm

Table 8: Peak Day Wholesale Customer Meter Demands

City of Selma		
EST	610	gpm
GST	330	gpm
City of Cibolo		
Mesa	20	gpm
Ripps-Kreusler	14	gpm
Cibolo Crossing	14	gpm

3.1.1.2 Residential Water Usage Patterns

During the review of the existing system model with the City, it was noted that the residential water usage patterns did not reflect the observed peak hour usage for the Schertz water system. With only monthly flow monitoring data available from the City, updated representative average day and peak day water usage patterns for residential customers was developed using an American Water Works Association report.

The updated water usage patterns were developed using the 1993 American Water Works Association (AWWA) Residential Water Use Patterns report using data. The City of Norman, Oklahoma was selected to best represent residential water use patterns for the City of Schertz because of similarities in annual precipitation, average seasonal temperatures, and land use. The AWWA report provided separate usage pattern for both single and multi-family land use types and these patterns were used to update the residential and apartment demands in the existing system model.

The average day water usage patterns for Single-Family and Multi-Family use were developed using the Norman info provided in the 1993 report. The average to peak multipliers, used to develop the peak day water usage patterns for Single-Family and Multi-Family use, were calculated using the 36 months of billing data provided to LAN by the City. These average to peak multipliers are:

- Single-Family = 3.2
- Multi-Family = 2.6

The Single-Family and Multi-Family average day and peak day diurnal curves used in the existing system model are illustrated in Figure 1 and Figure 2, respectively.

Figure 1: Average & Peak Day Diurnal Patterns for Single-Family Residential Meters

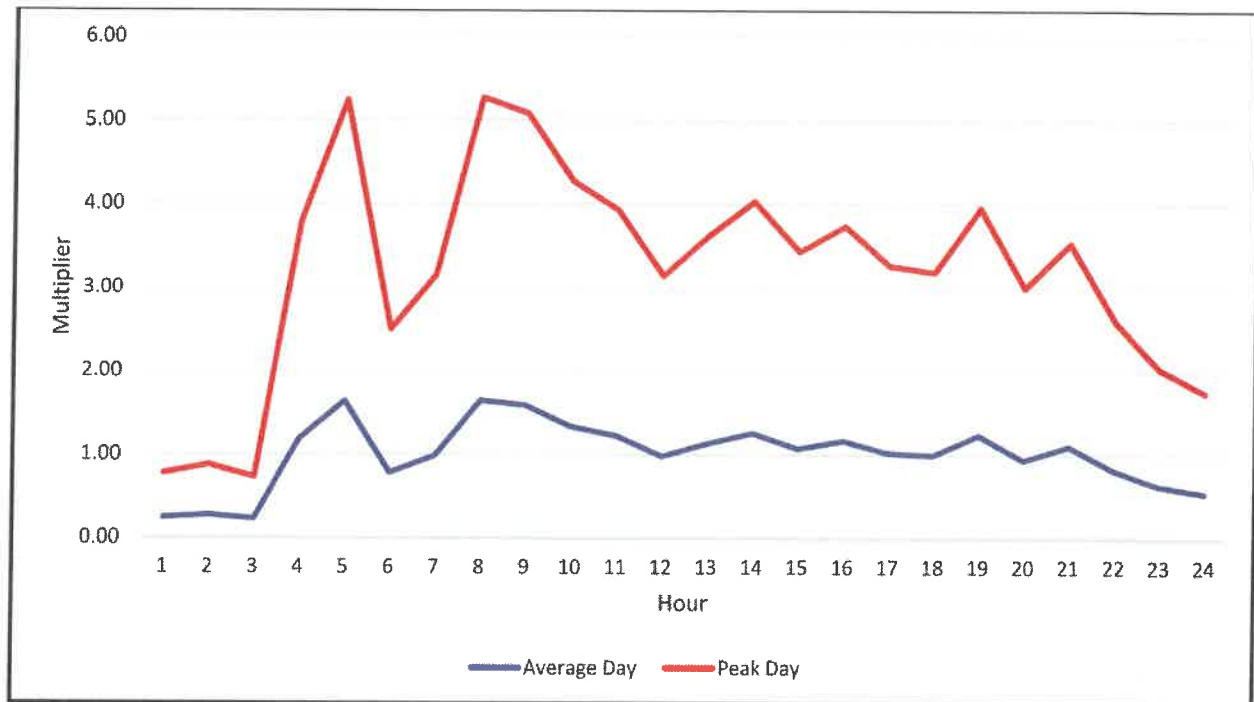
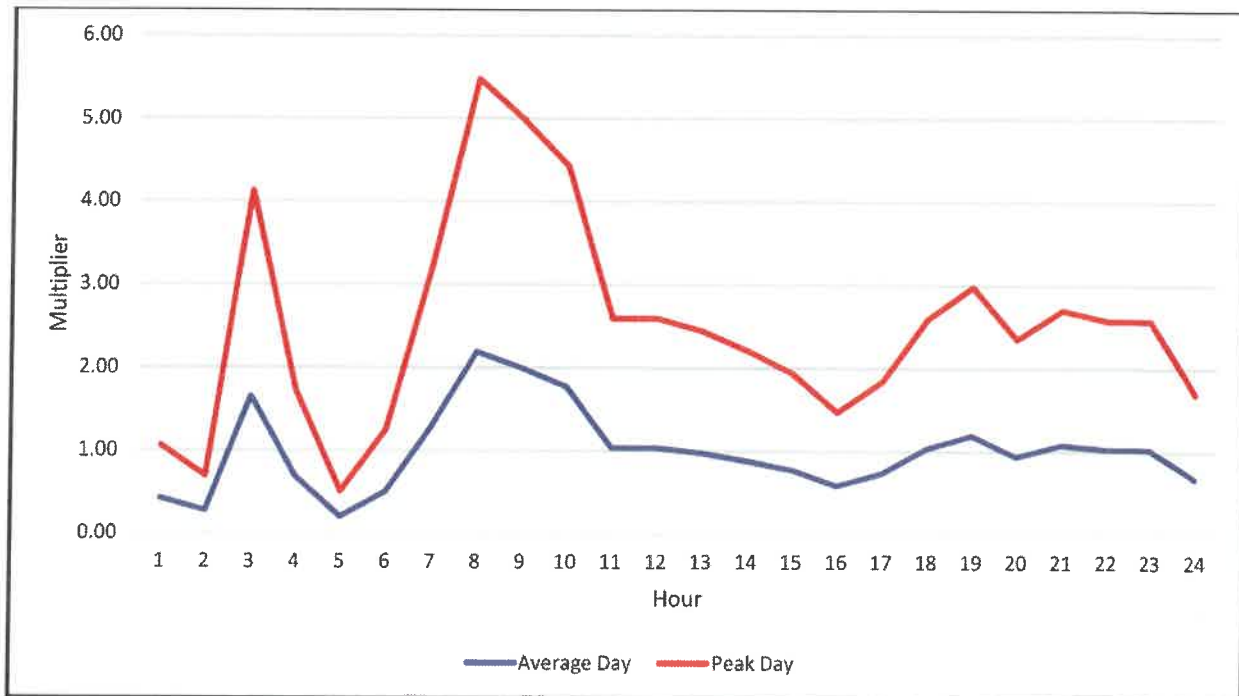


Figure 2: Average & Peak Day Diurnal Patterns for Multi-Family Residential Meters

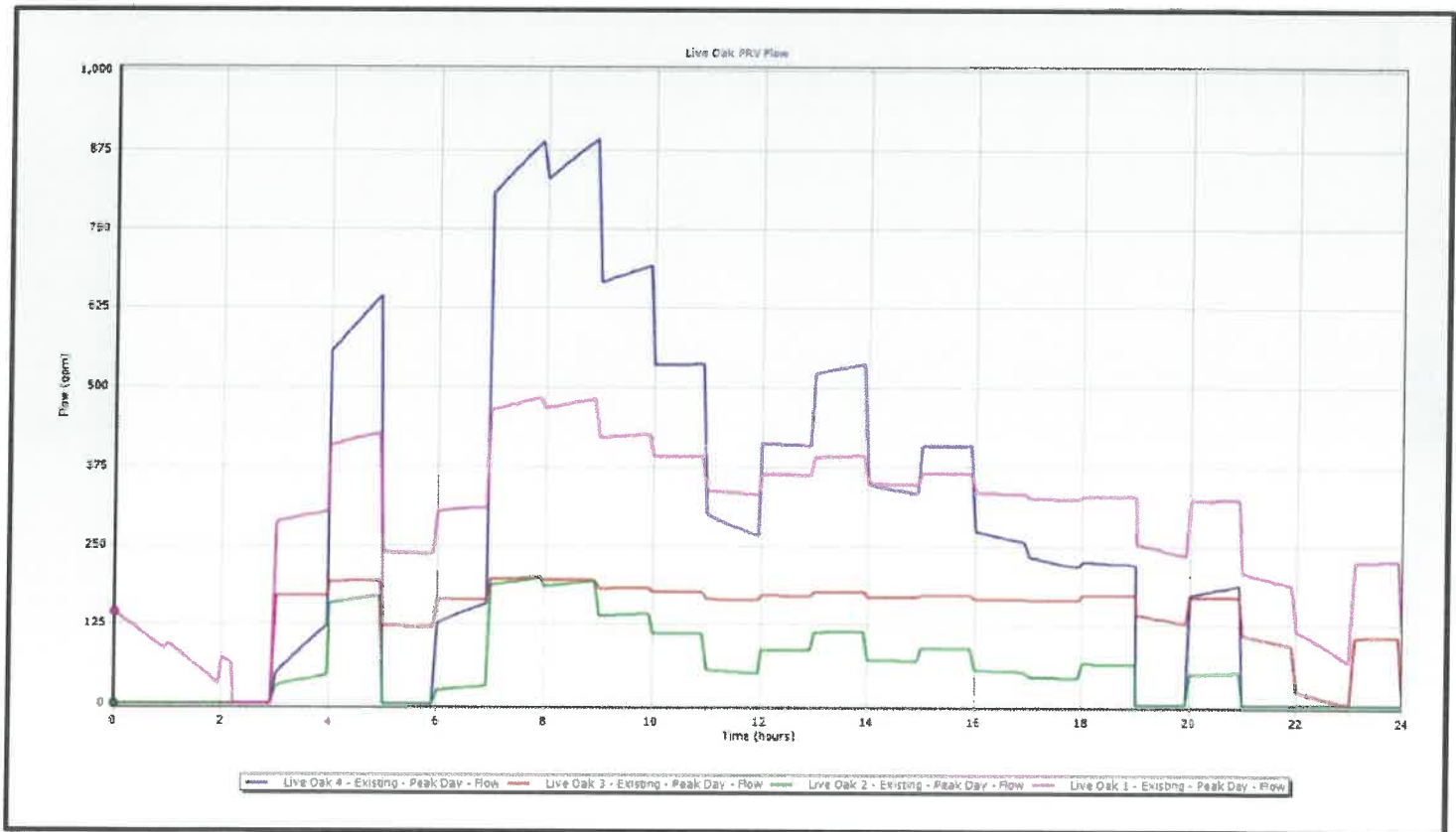


3.1.1.3 Live Oak Pressure Reducing Valve Settings

Comments provided by the City describe that the PRVs separating the Live Oak and I-35 pressure planes do not open under typical average day conditions but do open under peak day conditions. The City indicated that under peak day conditions these valves open around 4:30 am and stay open until around midnight. To simulate these conditions, the assumption was made that, all PRVs were given the same pressure setting.

On the Live Oak side of the pressure plane boundary, under peak day conditions, and with all the valves closed, observed pressures at the PRVs averaged 67-psi. Therefore, a pressure setting of 67-psi was tested in the model to see if the PRVs would open during the simulation in the window of time provided by the City. The PRV located near the corner of Mare Way and Schertz Parkway is at a lower elevation of 713-ft (approximately 14 feet lower than the other PRVs). It was assumed that it was unlikely to open in tandem with the other four PRVs on this pressure plane boundary. The results showed all PRVs were open during a window of time similar to the one provided by the City, except the PRV located near the corner of Mare Way and Schertz Parkway as assumed. Flow through the four PRVs that opened throughout a 24-hour EPS peak day scenario at a pressure setting of 67-psi is shown in Figure 3. The PRVs shown in Figure 3 are primarily open between 4:30 am and midnight. The PRV located near the corner of Mare Way and Schertz Parkway was not shown because it did not open at any time during the 24-hour EPS peak day scenario.

Figure 3: Live Oak PRV Flows



3.1.1.4 Removal of Waterlines Not in Service

The waterlines shown in Figure 4 were removed from the existing system model. While the lines are planned, the City reported that these waterline segments designated as “Active” in the waterline shapefile, were not yet in service. They will be included in the future conditions model.

Figure 4: Extent of Waterline Segment Removed from Existing System Model



3.1.2 Public Water System Evaluation Criteria

To evaluate the City’s existing system model, criteria were developed in accordance with Texas Commission on Environmental Quality (TCEQ) Public Drinking Water Rules and Regulations for Public Water Systems found in the Texas Administrative Code (TAC) Chapter 290.D. The TCEQ Rules and Regulations provide minimum capacity requirements for public water systems. The rules and regulations effective January 3, 2019 are applied in this analysis.

Several of the evaluation criteria are calculated based on the number of connections in the existing system model. The City of Schertz reports 16,434 connections in the existing water system as of December 15, 2020.

The City operates their existing water system as three pressure planes, Scenic Hills, I-35, and Live Oak. For the purposes of this evaluation the system will be assessed as one contiguous network because of the interactions between the existing pressure planes.

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Extended period simulations were performed using Bentley's WaterGEMS software which provided the tools and results necessary to assess the existing system model according to the TCEQ criteria for the following:

- 24-hour Average Day Flow (ADF)
- 24-hour Peak Day Flow (PDF)
- 48-hour Peak Daily Plus Fire Flow Analysis

The key criteria for the City's existing system are summarized in Table 9. Detailed results for the evaluation criteria are discussed in the order as they appear in Table 9 throughout this section.

Table 9: TAC Criteria for the Evaluation of the City's Existing System

Category	Memo Section	Rule	Description	Results
System Storage and Supply	3.2.1	<u>290.45.a & 290.45.f</u>	Sources of water supply can supply maximum daily demands during extended peak usage.	Field Verification Needed
	3.2.2	<u>290.45.e.3 & 290.45.e.1</u>	Minimum water system capacity requirements shall be determined by calculating the requirements based upon the number of retail customer service connections of that wholesale water supplier, if any, fire flow capacities, if required by §290.46(x) and (y) of this title and adding that amount to the maximum amount of water obligated or pledged under all wholesale contracts. Wholesalers must provide enough service pumping capacity to meet or exceed combined maximum daily commitments specified in obligations.	Field Verification Needed
	3.2.3	<u>290.45.b.1.D.i-iii</u>	System must have a minimum total storage capacity of 200 gpm gallons per connection.	Meets Minimum Criteria
	3.2.4	<u>290.45.b.1.D.iv</u>	System must have a minimum total elevated storage capacity of 100 gallons per connection.	Meets Minimum Criteria
System Service Capacity	3.2.5	<u>290.45.b.1.D.iii & 290.45.b.1.D.i</u>	System must have a minimum total pump/well capacity of 0.6 gpm per connection.	Meets Minimum Criteria
System Minimum Pressure Requirements	3.2.6	<u>290.44.d</u>	System must maintain a minimum pressure of 35-psi under normal conditions.	Field Verification Needed
	3.2.7	<u>290.44.d</u>	System must maintain a minimum pressure of 20-psi under combined fire and drinking water flow conditions.	Field Verification Needed

3.1.2.1 Supply & Storage

TAC 290.45.a

“Sources of supply, both ground and surface, shall have a safe yield capable of supplying the maximum daily demands of the distribution system during extended periods of peak usage and critical hydrologic conditions. The pipelines and pumping capacities to treatment plants or distribution systems shall be adequate for such water delivery. Minimum capacities required are specified in §290.45 (relating to Minimum Water System Capacity Requirements).”

A 24-hour extended period simulation (EPS) scenario, beginning at midnight, was run for the existing system under peak day conditions. Over the 24-hour simulation, it was observed that both the I-35 elevated storage tank (EST) and the Live Oak ground storage tank (GST) water supply did not recover to at least the same percent full as it was set to at the beginning of the simulation. Figure 5 shows the I-35 EST and Live Oak GST capacities over the 24-hour simulation.

In Figure 5, the I-35 EST begins the simulation at 98% capacity and ends the simulation at 20% capacity. Likewise, the Live Oak GST begins the simulation at 83% capacity and ends the simulation at 56% capacity. Because the tanks did not recover by the end of the 24-hour simulation, the run time was lengthened to 48-hours to assess if the tanks recovered by peak hour (5:00 am) and if the decline in tank level continued throughout the second day. Figure 6 shows that neither tank recovers and the Live Oak GST almost drains completely by hour 48. The observed results indicate that the existing system model's water supply would be incapable of supplying peak day demands for an extended period as stated in TAC 290.45.a. The City did not indicate that they have issues filling the Live Oak EST or GST as severely as seen in the existing system model. A meeting was held to discuss this issue, and additional information about the system and SCADA was provided to LAN. With this information, the model was re-calibrated, and the results more closely reflected what the Live Oak EST and GST were experiencing.

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Figure 5: Live Oak GST & I-35 EST Percent Full Over 24 Hours

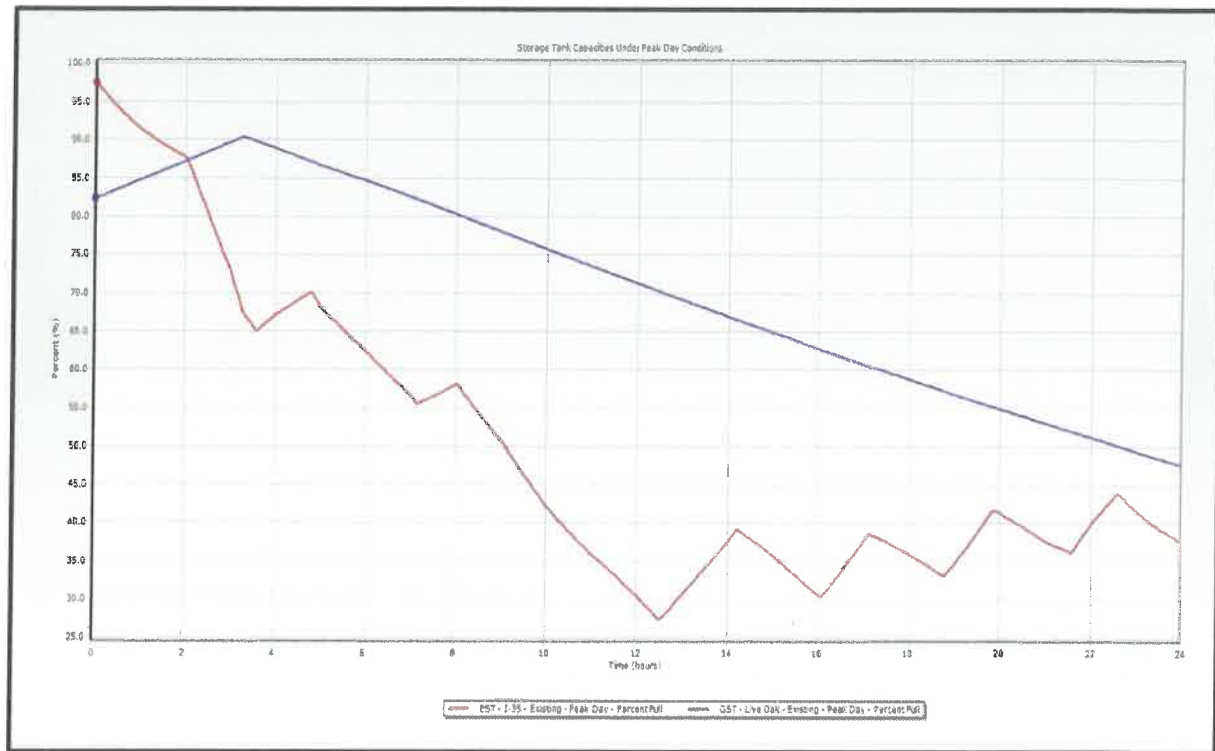
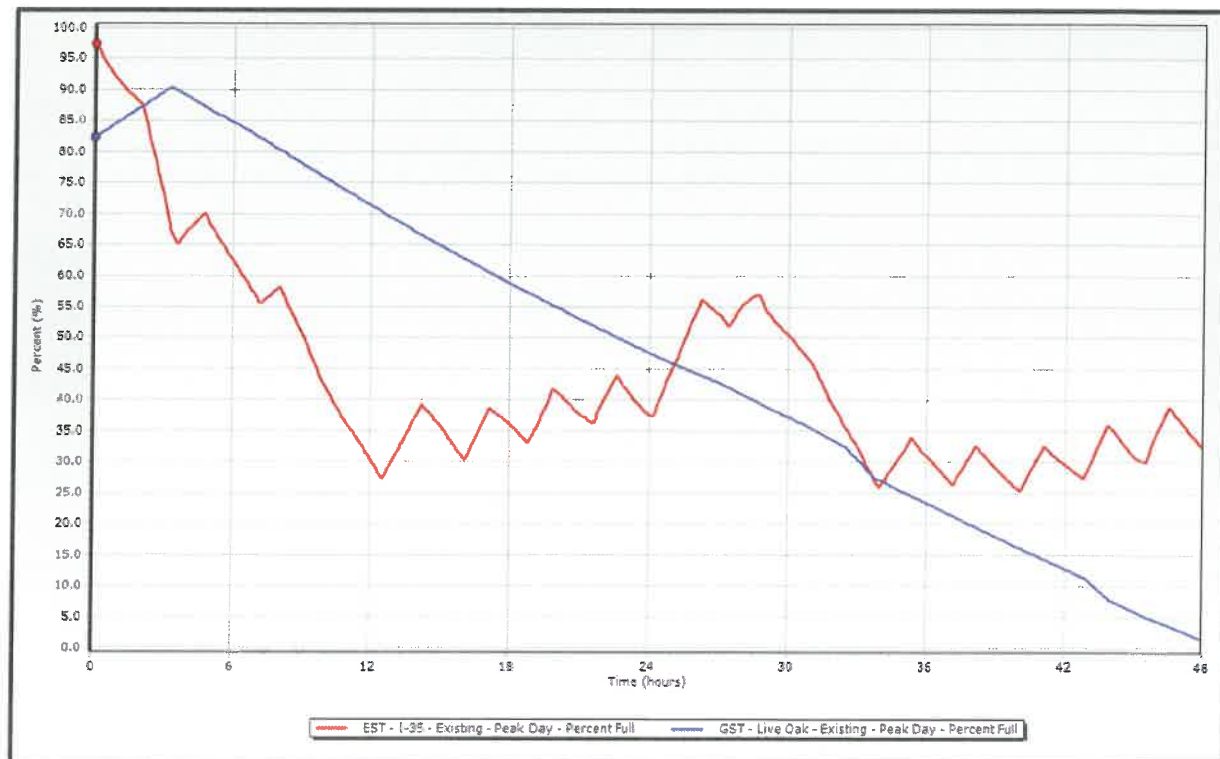


Figure 6: Live Oak GST & I-35 EST Percent Full Over 48 Hours



3.1.2.2 Wholesale Supplier Requirements

TAC 290.45.e

"The following requirements apply to systems which supply wholesale treated water to other public water supplies: Wholesalers must provide enough production, treatment, and service pumping capacity to meet or exceed the combined maximum daily commitments specified in their various obligations."

"... minimum water system capacity requirements shall be determined by calculating the requirements based upon the number of retail customer service connections of that wholesale water supplier, if any, fire flow capacities required by chapter 290.46, and adding that amount to the maximum amount of water obligated or pledged under all wholesale contracts, if required."

The minimum required water supply is of 0.6 gpm per connections. For Schertz's 16,434 connections this minimum water supply is approximately 9,860 gpm. The combination of water supplies is 10,400 gpm as shown in Table 10.

- Schertz-Seguin Local Government Corporation (SSLGC) is the main supply of water to the existing system. Based on monthly flow monitoring data provided by the City, the maximum daily supply (under peak day conditions) for Schertz from SSLGC is approximately 6,800 gpm.
- Schertz Wells - There are two Schertz wells which can supply up to 1,800 gpm each. The wells supply water directly to the Nacogdoches EST under peak day conditions.

Table 10 summarizes the system's maximum supply which **meets the minimum required capacity** for existing conditions.

Table 10: Well Capacities

Water Supply	Capacity
SSLGC	6,800 gpm
Nacogdoches 1	1,800 gpm
Nacogdoches 2	1,800 gpm
Total Peak Day Supply	10,400 gpm

The City of Schertz provides water to two wholesale customers, the City of Cibolo and the City of Selma. The wholesale contracts with Cibolo and Selma do not specify maximum daily commitments.

- Cibolo - from their wholesale water contracts with the City of Cibolo, the City of Schertz is to supply a combined total of 750 acre-feet of potable water per year, this includes 350 acre-feet of potable water per year designated to the Keli Heights Subdivision. 750 acre-feet per year is approximately 465 gpm.
- Selma - from their wholesale water contract with the City of Selma, the City of Schertz is to supply a total of 800 acre-feet of potable water per year. 800 acre-feet per year is approximately 496 gpm.

Table 11 summarizes contracted commitments to wholesale customers.

Table 11: Wholesale Water Commitments

Wholesale Customer	Commitment (acre-feet/year)	Commitment (gpm)
City of Cibolo	750	465
City of Selma	800	496

Under peak day conditions, the existing water system's current available supply of 10,400 gpm (from Table 10) cannot meet the minimum required supply to the City (9,860 gpm) and its wholesale customers (961 gpm, from Table 11) which totals 10,821 gpm.

3.1.2.3 Total Storage Capacity

TAC 290.45.b

"For more than 250 connections, the system must have a total storage capacity of at least 200 gallons per connection."

The minimum required storage capacity, at 200 gallons per connection, for the existing water system is 3,286,800 gallons. There are eight storage tanks within the existing water system: four elevated storage tanks and four ground storage tanks. The combined total capacity of the storage tanks is 8,500,000 gallons, meeting the minimum storage capacity requirement. Table 12 summarizes storage tank capacities.

Table 12: Storage Tank Capacities

Tank	Capacity Gallons
Northcliffe EST	1,000,000
Nacogdoches EST	500,000
Live Oak EST	1,500,000
I-35 EST	1,000,000
Deer Haven GST	1,500,000
Live Oak GST	1,500,000
Ware Seguin GST	500,000
Northcliffe GST	1,000,000
Total Storage Capacity	8,500,000

3.1.2.4 Elevated Storage Tank Capacity

TAC 290.45.b

"For more than 250 connections, the system must meet the following requirements: Have an elevated storage tank capacity of 100 gallons per connection or a pressure tank capacity of 20 gallons per connection. An elevated storage capacity of 100 gallons per connection is required for systems with more than 2,500 connections."

Based upon the number of connections in the existing water system, the minimum required EST capacity, at 100 gallons per connection, is 1,643,400 gallons. There are four ESTs within

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the existing water system with a combined storage capacity of 4,000,000 gallons, meeting the minimum required EST capacity. Table 13 summarizes the existing water system elevated storage tank maximum capacities.

Table 13: Elevated Storage Tank Capacities

Tank	Capacity (Gallons)
Northcliffe EST	1,000,000
Nacogdoches EST	500,000
Live Oak EST	1,500,000
I-35 EST	1,000,000
Total Elevated Storage Capacity	4,000,000

3.1.2.5 Pumping Capacity

TAC 290.45.b

“For systems which provide an elevated storage capacity of 200 gallons per connection, two service pumps with a minimum combined capacity of 0.6 gpm per connection are required at each pump station or pressure plane. If only wells and elevated storage are provided, service pumps are not required.”

Based upon the number of connections in the existing water system, the minimum required elevated storage capacity of 200 gallons per connection is 3,286,800 gallons. Schertz currently has 4,000,000 gallons of elevated storage within their system. Therefore, the minimum pumping capacity for the City is 0.6 gpm per connection based on the requirements.

The minimum required combined pumping capacity for the existing water system, at 0.6 gpm per connection, is 9,860 gpm. There are four pump stations within the existing water system housing a total of 13 pumps. Table 14 summarizes the capacities of the 13 existing water system pumps. The maximum total pumping capacity of the pumps is 23,600 gpm, meeting the minimum required capacity. The firm pump capacity (with the largest pump out of service is 20,800 gpm which also meets the minimum capacity.

Table 14: Pump Capacities

Location	Pump Details
Northcliffe 1	2,100 gpm, 232 TDH
Northcliffe 2	2,100 gpm, 232 TDH
Live Oak - HS4	2,800 gpm, 299 TDH <i>Goulds</i>
Live Oak - HS3	2,800 gpm, 295 TDH <i>Fairbanks Morse</i>
Live Oak - HS2	2,400 gpm, 295 TDH <i>Fairbanks Morse</i>
Live Oak - HS1	2,400 gpm, 295 TDH <i>Fairbanks Morse</i>
Live Oak - LS3	2,200 gpm, 145 TDH <i>Goulds</i>
Live Oak - LS2	LS - 2,200 gpm, 145 TDH
Live Oak - LS1	LS - 2,200 gpm, 145 TDH
Ware Seguin 2	600 gpm, 123 TDH
Ware Seguin 1	600 gpm, 123 TDH
Deer Haven 1	600 gpm, 172 TDH
Deer Haven 2	600 gpm, 172 TDH
Maximum Pumping Capacity	23,600 gpm

3.1.2.6 System Minimum Pressures

TAC 290.44.d

“... capable of providing a minimum pressure of at least 35-psi at all points within the distribution network”

In coordination with the City, LAN made assumptions about the existing water system for the hydraulic model where data was limited. While the model indicates operations concerns in the water system, these should be field verified by the City. The existing system under peak day and average day conditions was evaluated in the model using a 24-hour EPS to observe system wide minimum pressures. The TCEQ required minimum pressure of 35-psi at all points within the distribution network applies to normal operating conditions (e.g. no fire flow or line breaks) and is used as the benchmark for assessing the observed pressures for peak day and average day conditions in the existing system model.

Average Day Conditions

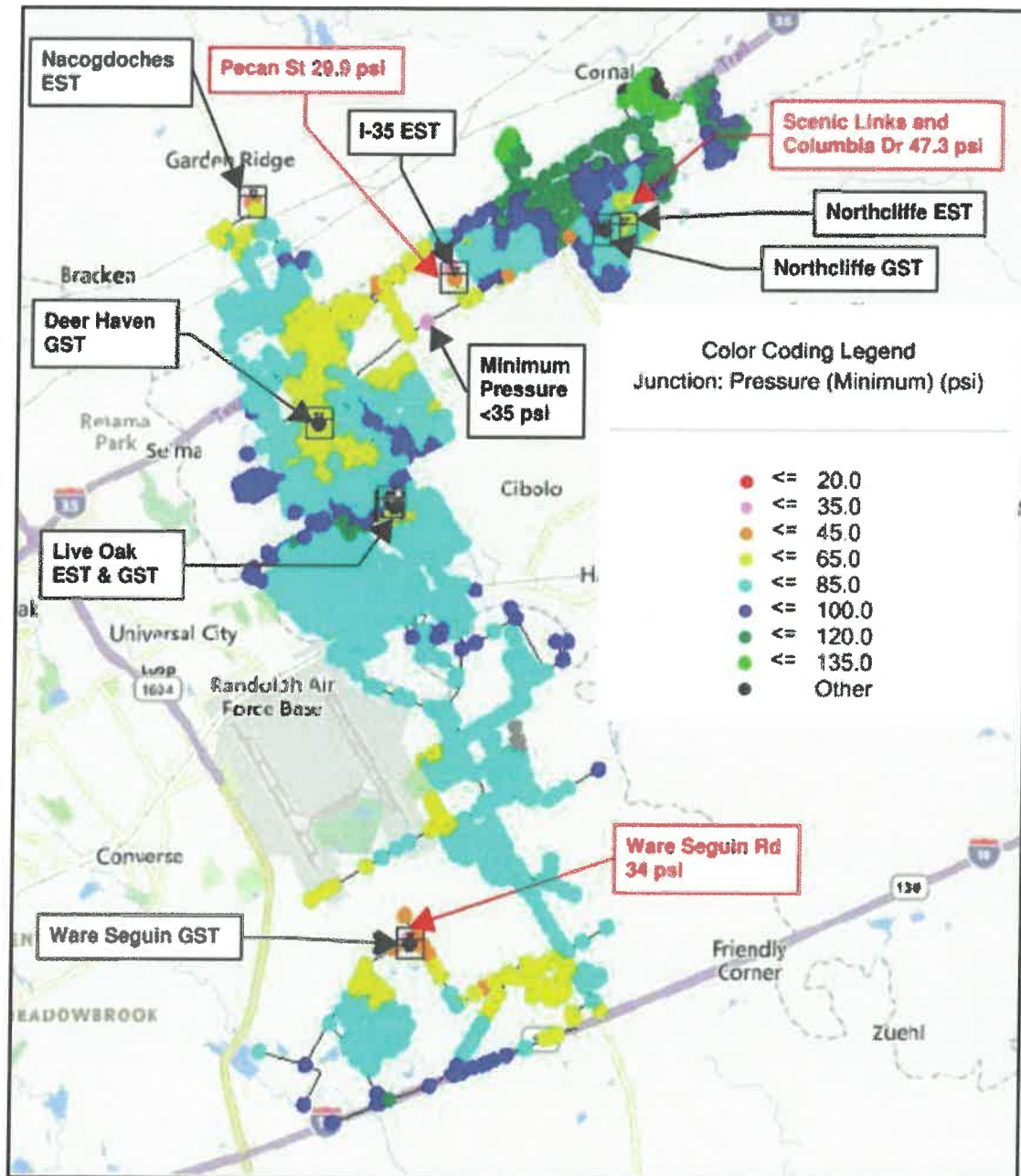
Without detailed pressure readings across the service area, the existing system model can be used to approximate a system pressure. While the majority of the system does meet the minimum 35-psi, the results from the existing system model indicate pressure concerns under average day conditions in some areas. Observed minimum system pressures under average day conditions are summarized in Table 15. Figure 7 illustrates the observed minimum system pressures across the existing system model under average day conditions.

Table 15: Average Day Minimum Pressures Observed in Each Pressure Plane

Pressure Plane	Min. Pressure (psi)	Location	Time Step
Scenic Hills	47	Scenic Links and Columbia Dr	4 am
I-35	30	Pecan St, East of I-35 EST	12 pm
Live Oak	34	Near Ware Seguin Plant	11 pm

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Figure 7: Average Day Conditions Minimum Pressures



While minimum pressures in the existing system model indicated flows approximately 1-psi below the minimum required pressure of 35-psi at the intersection of Ware Seguin Road and the Ware Seguin Plant and at high elevations adjacent to the I-35 EST, the pressures were significantly above the emergency operations threshold of 20-psi. This is a small deviation and indicates additional data collection, and analysis should be conducted by the City for verification of operations.

The Ware Seguin Plant low pressures occur near the end of the model day and could be related to the storage/capacity issues referenced above. The I-35 EST area low pressures occur near mid-day and could be related to demand patterns used in place of detailed Schertz demand data.

Peak Day Conditions

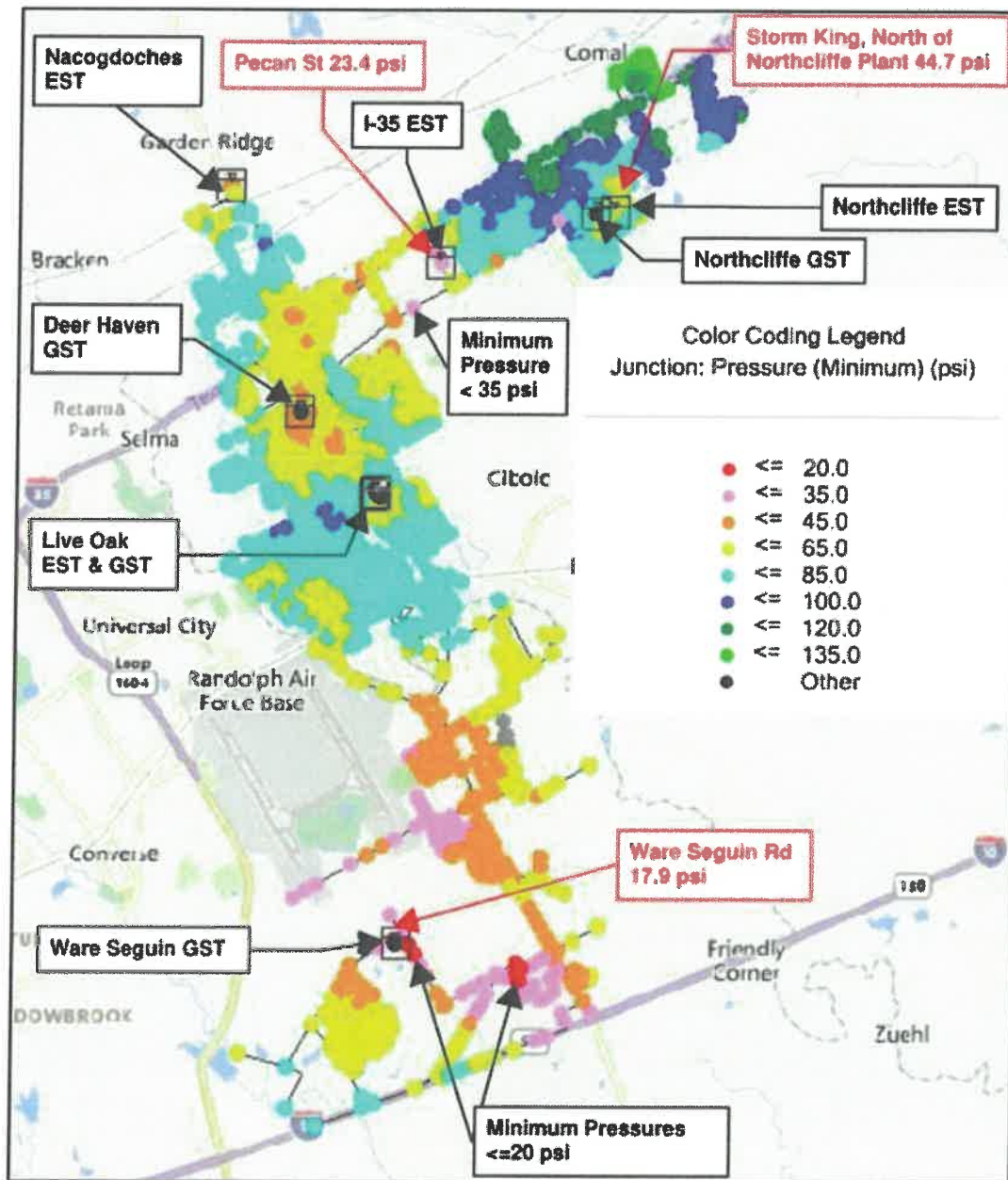
Under peak day conditions, the majority of the system does meet the minimum 35-psi. This is illustrated on Figure 8 which summarizes the observed minimum system pressures across the existing water system under peak day demand conditions. However, there were locations in the existing system model where pressures below the minimum requirement were observed, along Ware Seguin Road and near the I-35 EST at Pecan Street. The I-35 EST area low pressures occur near mid-day and could be related to demand patterns used in place of detailed Schertz demand data. These locations are noted on Figure 8.

Pressures were below the required 35-psi minimum, as well as the below the 20-psi emergency operations minimum along Ware Seguin Road and surrounding the Ware Seguin Plant. There are two factors driving the low pressure at this location, first its elevation is higher than the surrounding area by approximately 40-ft and, second, at 5 am when this low pressure occurs, the peak residential demand overlaps with irrigation demand from the HOA meters in the residential subdivisions immediately to the northeast and southwest. These low-pressure results indicate additional data collection, and analysis should be prioritized. Observed minimum system pressures under peak day conditions are summarized in Table 16.

Table 16: Peak Day Minimum Pressures Observed in Each Pressure Plane

Pressure Plane	Min. Pressure (psi)	Location	Time Step
Scenic Hills	45	Storm King, North of Northcliffe Plant	7 am
I-35	23	Pecan St, East of I-35 EST	12 pm
Live Oak	18	Near Ware Seguin Plant	5 am

Figure 8: Peak Day Conditions Minimum Pressures



3.1.2.7 Fire Flows

TAC 290.44.d.

"When the system is intended to provide firefighting capability, it must also be designed to maintain a minimum pressure of 20-psi under combined fire and drinking water flow conditions."

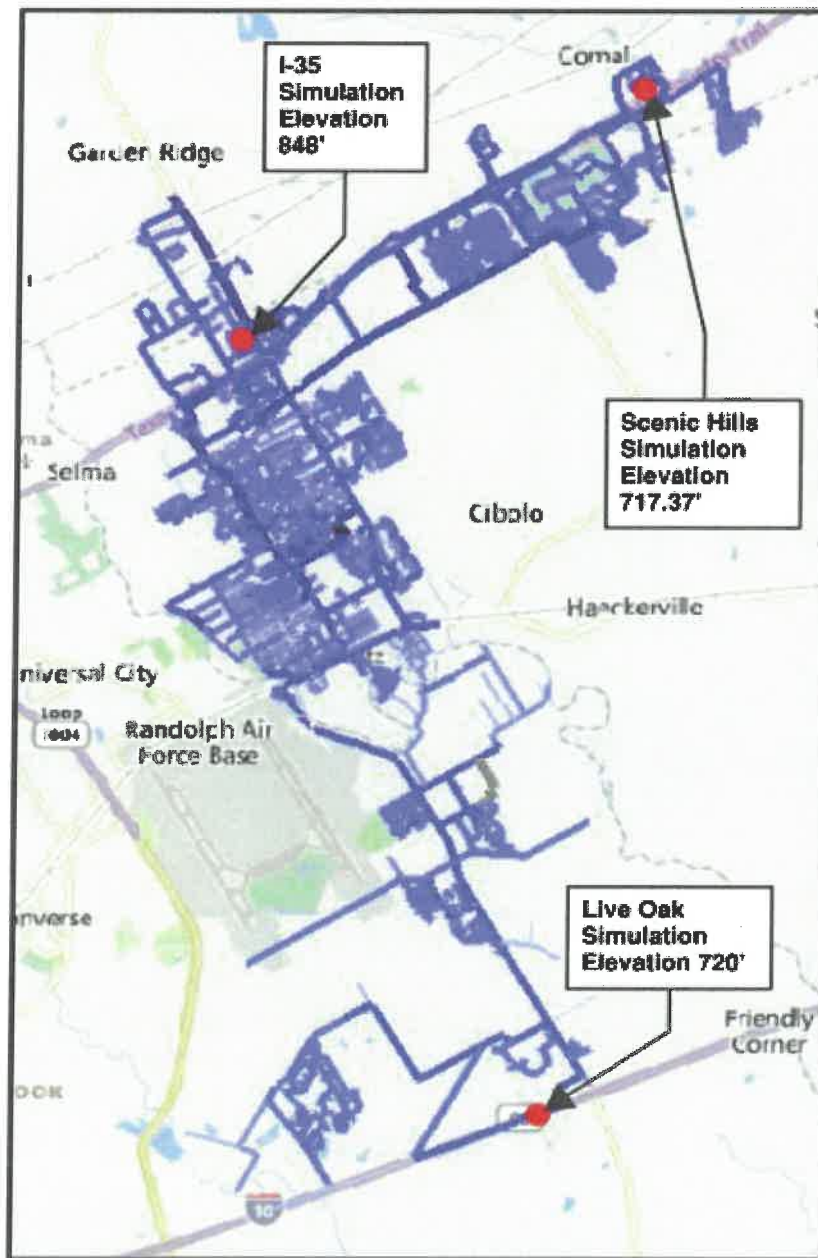
For conservative modeling purposes, the existing water system was evaluated for three separate peak day plus fire flow scenarios (one in each pressure plane) to observe any potential interaction between the pressure planes. Fire Flow simulations were run at a commercial meter selected to provide "worst case" scenarios within each pressure plane. These specific locations for fire flows

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in each pressure plane were selected because its commercial meter was at a higher elevation than other commercial meter locations in the pressure plane and were not close in proximity to an elevated storage tank or pump station. A representative Fire Flow demand of 3,500 gpm was placed at the selected meter during the corresponding simulation. Simulating worst case scenario fire flow conditions for each pressure plane provides an analysis of how the pressure planes interact while under critical conditions.

The selected locations for each simulation are shown in Figure 9. Fire Flow simulations were set to occur from 7 am to 10 am under peak day conditions. This creates a “worst case” condition where the fire flow occurs during peak hour.

Figure 9: Fire Flow Simulation Locations



City of Schertz, Texas

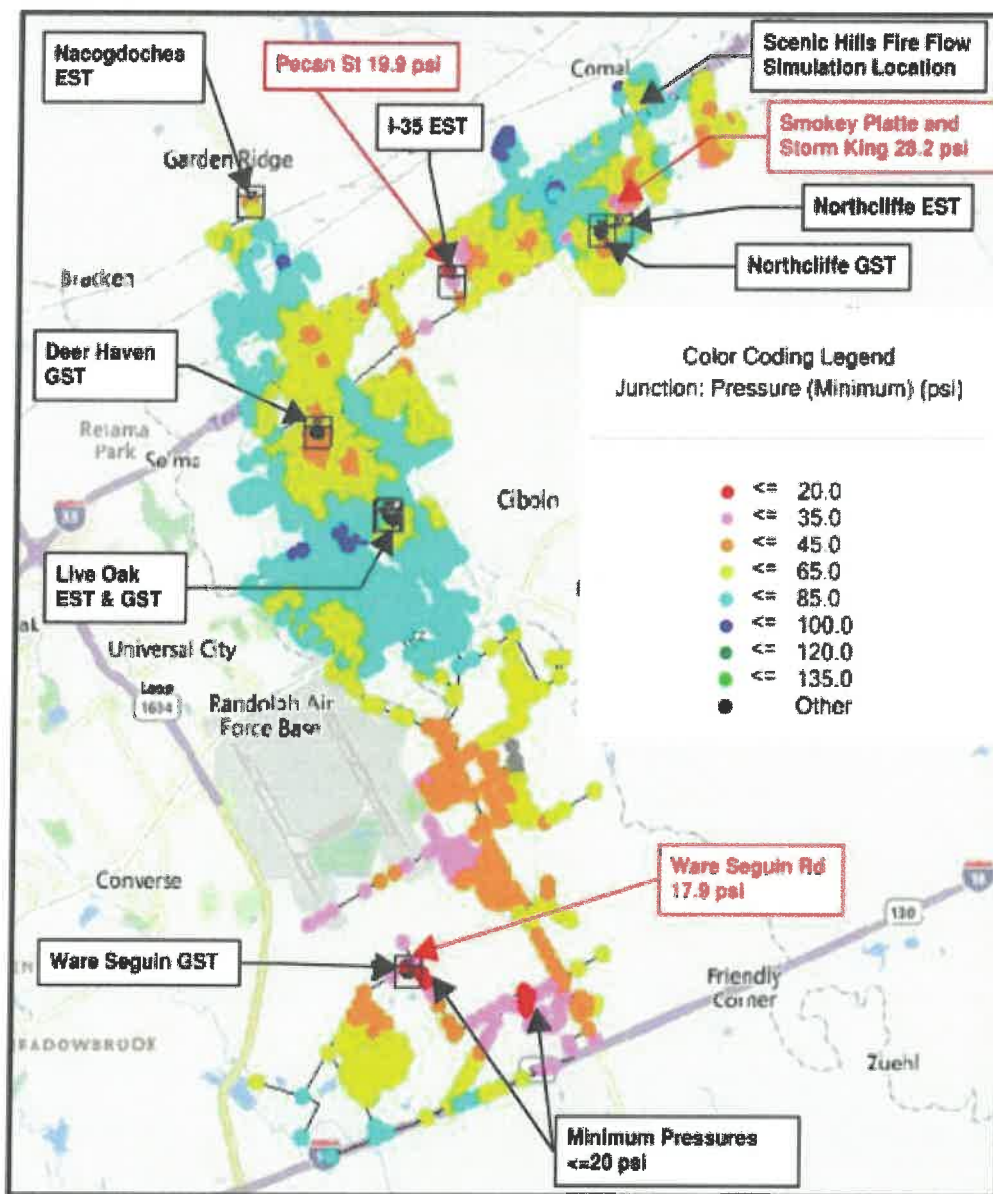
The Scenic Hills Fire Flow simulation was placed off I-35 at a commercial meter south of Baugh Lane. For the Scenic Hills Peak Day plus Fire Flow simulation, the majority of the system does meet the minimum 20-psi. However, there were locations in the existing system model where pressures below the minimum requirement were observed. The observed system minimum pressures fell below the minimum required pressure of 20-psi at high elevations along Ware Seguin Road, surrounding the Ware Seguin Plant, and at high elevations adjacent to the I-35 EST. These locations are noted on Figure 10 which summarizes the observed minimum system pressures across the existing system model under Peak Day plus Fire Flow conditions. This minimum pressure is a small deviation and systematically observed through non-fire flow conditions. It indicates additional data collection, and analysis is needed.

Observed minimum system pressures for the Scenic Hills Peak Day plus Fire Flow simulation are summarized in Table 17.

Table 17: Peak Day Plus Fire Flow Scenic Hills Simulation

Pressure Plane	Min. Pressure (psi)	Location	Time Step
Scenic Hills	28	Smokey Platte and Storm King	7 am
I-35	20	Pecan St, East of I-35 EST	5 pm
Live Oak	18	Near Ware Seguin Plant	5 am

Figure 10: Scenic Hills Fire Flow Simulation

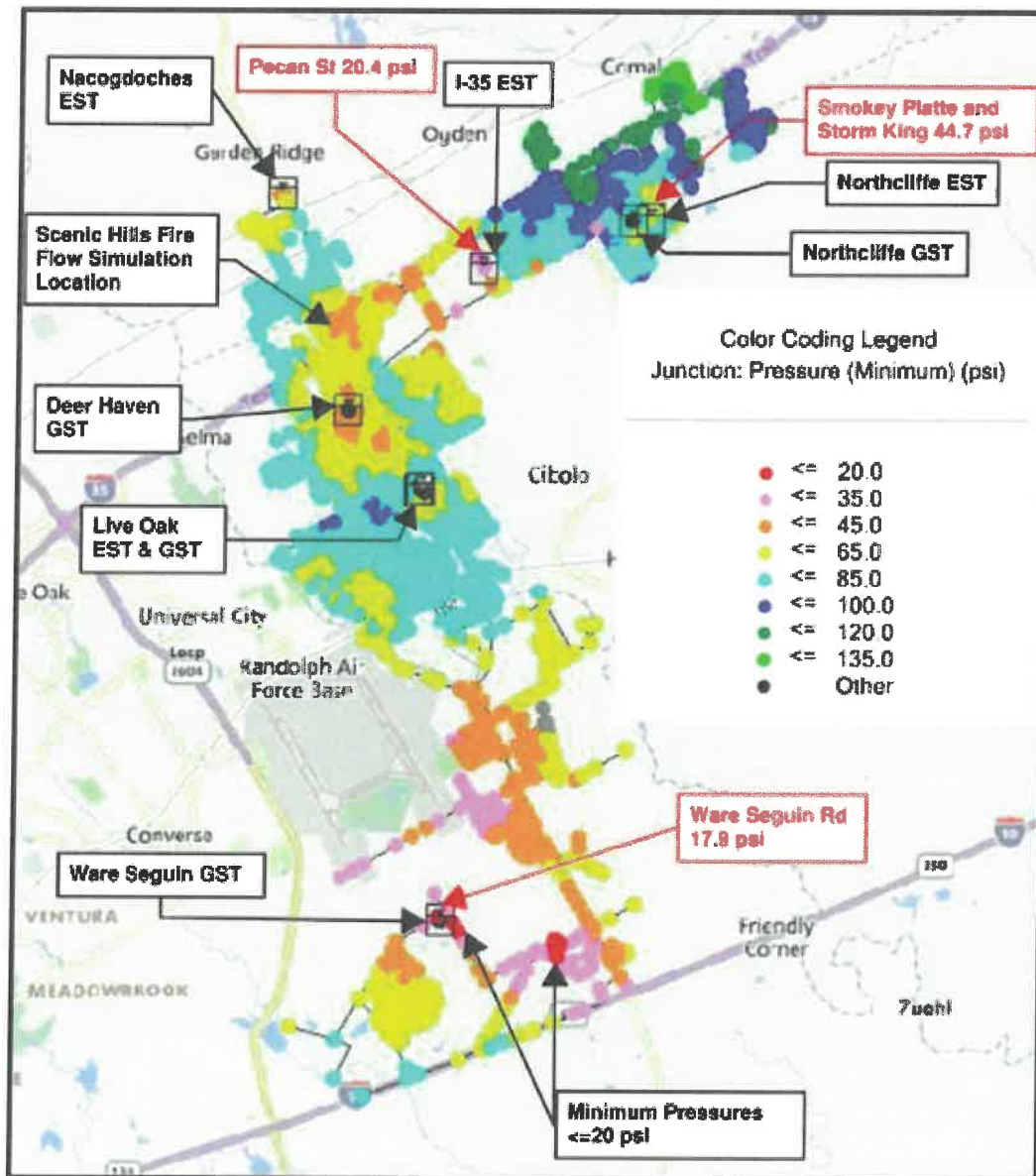


The I-35 Fire Flow simulation was placed near the intersection of I-35 and FM 3009 at a commercial meter adjacent to Corridor Parkway. For the I-35 Peak Day plus Fire Flow simulation, the majority of the system does meet the minimum 20-psi. However, there were locations in the existing system model where pressures below the minimum requirement were observed. The observed system minimum pressures fell below the minimum required pressure of 20-psi at high elevations along Ware Seguin Road and surrounding the Ware Seguin Plant. These locations are noted on Figure 11 which summarizes the observed minimum system pressures across the existing system model under Peak Day plus Fire Flow conditions. This minimum pressure is a small deviation and systematically observed through non-fire flow conditions. It indicates additional data collection, and analysis is needed. Observed minimum system pressures for the I-35 Peak Day plus Fire Flow simulation are summarized in Table 18.

Table 18: Peak Day Plus Fire Flow I-35 Simulation

Pressure Plane	Min. Pressure (psi)	Location	Time Step
Scenic Hills	45	Storm King and Smokey Platte, North of Northcliffe	7 am
I-35	20	Pecan St, East of I-35 EST	1 pm
Live Oak	18	Near Ware Seguin Plant	5 am

Figure 11: I-35 Fire Flow Simulation

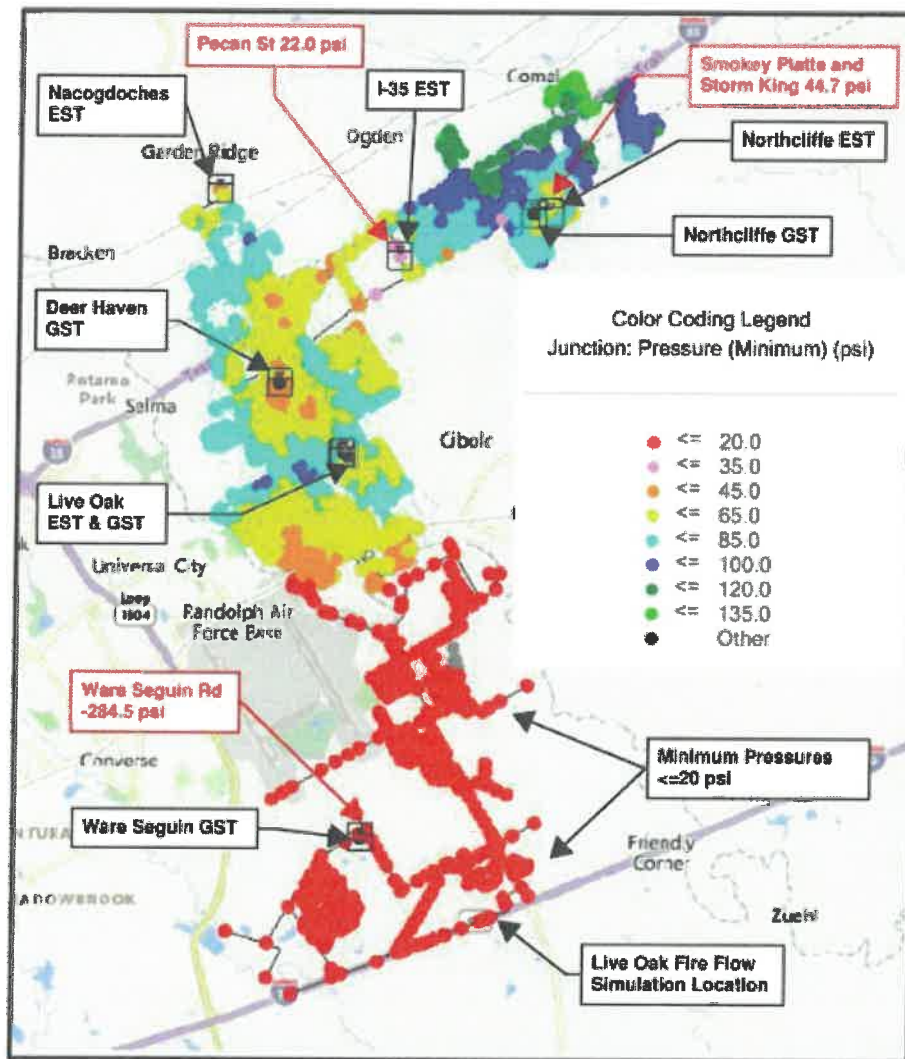


The Live Oak Fire Flow simulation was located at a commercial meter approximately 0.6 miles west of the intersection of I-10 and FM 1518. For the Live Oak Peak Day plus Fire Flow simulation, the majority of the I-35 and Scenic Hills Pressure Planes do meet the minimum 20-psi. However, the observed system minimum pressures fell below the minimum required pressure of 20-psi across the majority of the Live Oak Pressure Plane south of FM 78. These locations are noted on Figure 12 which summarizes the observed minimum system pressures across the existing system model under Peak Day plus Fire Flow conditions. These results indicate additional data collection, and analysis is needed. Observed minimum system pressures for the I-35 Peak Day plus Fire Flow simulation are summarized in Table 19.

Table 19: Peak Day Plus Fire Flow Live Oak Simulation

Pressure Plane	Min. Pressure (psi)	Location	Time Step
Scenic Hills	45	Storm King and Smokey Platte, North of Northcliffe	7 am
I-35	22	Old Wiederstein Rd, Southwest of I-35 EST	1 pm
Live Oak	Negative Pressures	Near Ware Seguin Plant	8 am

Figure 12: Live Oak Fire Flow Simulation



3.1.3 Recommendations

For the TAC Criteria where the model did not demonstrate that the minimum criteria was met, it is recommended that the City take steps to verify the behavior of the water system in the field. This section presents the steps the City can take to verify the model observations.

3.1.3.1 System Storage & Supply

Although the system meets the minimum total storage capacity, the existing system model results indicated that the system cannot supply peak day demands for an extended period of time. It is recommended that the City perform pressure and flow monitoring at all pump stations and ESTs concurrently for two weeks during a peak day period (e.g., Mid-August) to verify behavior of the water system under these conditions.

It is LAN's understanding that a second supply connection from the SSLGC will be connected to the proposed Corbett EST (located near the east dead end of Ray Corbett Dr.). This additional supply location and EST will be assessed in the Future System Evaluation effort. These future

conditions results will be considered when developing the final recommendations for storage and supply of the City's water system.

3.1.3.2 System Minimum Pressure Requirements

Because pressures below the minimum requirements for the average day, peak day, and peak day plus fire scenarios were observed in the existing system model, it is recommended that the City perform pressure monitoring at the locations where these low pressures were observed at the same time that the peak day period flow and pressure monitoring at the pump stations and ESTs is being performed.

It is recommended that the data recording equipment used be set to record pressure and flow readings at least every 15-minutes.

3.1.4 Summary

The results from this existing system evaluation were used to develop preliminary infrastructure and operational recommendations for near-term and future system improvements. These recommendations, in conjunction with currently planned improvements, are assessed in the future system evaluation and used in the development of the Capital Improvements Plan. Preliminary recommendation alternatives under consideration are (but not limited to):

- Increase in water supply
- Increased pumping capacity
- Increased storage capacity
- Changes to pump operating pressure controls or schedules

3.2 Future Water System Evaluation & CIP

The following information, criteria, and constraints were used to identify and develop proposed water system improvement projects.

- City direction for projects already in planning, design, and construction
- Minimum pipe size of 8-inches
- Minimum normal system pressure of 45 psi

3.2.1 Near Term System Evaluation

Before proceeding to model future scenarios, the system was analyzed to identify improvements needed to solve present day system issues. This analysis is referred to as 'near-term' system improvements and accounts for projects which are currently under design or construction and other projects identified in the analysis to resolve existing system deficiencies.

The near-term system water model was developed based on the existing conditions model previously developed. Projects which are currently in various stages of design and construction were provided by the City and implemented into the model. After implementing City-identified projects the model was run in average day, peak day, and fire flow conditions to identify additional improvements needed.

3.2.1.1 Fire Flow Analysis

Fire flow analysis of the existing system was performed in the development of the “Existing Water System Model Evaluation” memo published January 2021. Projects to resolve fire flow deficiencies in the existing system were identified in the near-term system evaluation and are included in the recommended Near-Term CIPs and proposed Pipe Replacement Program.

3.2.1.2 Pipe Replacement Program

In addition to the recommended CIPs identified in the model evaluation, the City also desires to replace undersized ($\leq 6"$) and asbestos-cement (AC) distribution pipes within their system. The undersized distribution pipes are unable to provide fire flow and reduce the system capacity. Undersized pipes are recommended to be upsized to 8" PVC, and the AC pipes greater than or equal to 8" should be replaced with PVC pipes of the same size. Based on the pipe attributes in the hydraulic model, there are approximately 280,460 LF of AC pipe in the system and an additional 175,380 LF of undersized pipe in the system. These pipe replacement programs can be established with a goal to replace a certain amount of pipe per year. A 20-year program would include an average replacement rate of 22,800 LF per year.

3.2.1.3 Near Term CIP Projects

Recommended near-term CIPs are listed in Table 20 and illustrated in Appendix 11.

Table 20: Near Term Water CIP Project Summary

CIP Number	Description	Notes
System Improvement Projects		
NT-W1	Bubbling Springs 6" WL Replacement	City identified maintenance project.
NT-W2	Corbett Pump Station & 3.0 MG GST	Per “Corbett 3.0 MG GST Project” Preliminary Engineering Report (2021), currently underway.
NT-W3	Ware Seguin Pump Station Operational Improvement	Potentially zero cost project to improve pump station performance in this service area.
NT-W4	12" from Ware Seguin to Lower Seguin	Currently underway.
NT-W5	Fred Couples to Schwab	Complete.
NT-W6	Schwab to Eckhardt	Currently in design.
NT-W7	Graytown to Pfeil	Currently underway.
NT-W8	FM 78 Water Line Replacement	Needed for fire flow.
NT-W9	Moonlight Meadow Dr & Lost Meadow Dr WL Replacement	Needed for fire flow.
NT-W10	Robinhood Way WL Replacement	Needed for fire flow.
NT-W11	Undersized Pipe Replacement Program	Replacement of pipes $\leq 6"$.
NT-W12	Asbestos Cement Pipe Replacement Program	Replacement of AC pipes.

3.2.2 2030 System Evaluation

The 2030 planning scenario is the first future scenario that was modeled. To develop the 2030 model, the near-term model was updated to include the water demands associated with 2030 project land use. The City identified projects that were not needed until 2030 were implemented in the 2030 model and additional projects were identified to meet the 2030 system needs. The model was run in average day, peak day, and fire flow conditions to identify additional improvements needed. A TCEQ capacity analysis was completed to confirm the system would meet TCEQ criteria with the recommended 2030 projects implemented.

3.2.2.1 TCEQ capacity Analysis

An evaluation of the City's system was performed to determine if the system met the Texas Commission on Environmental Quality's (TCEQ's) minimum pumpage and storage requirements as outlined in Chapter §290.45 of the Texas Administrative Code. A summary of the applicable TCEQ minimum requirements is included below. TCEQ's requirements are based on the raw number of connections, which have been approximated based on the number of connections in the model and City GIS data.

TCEQ Minimum Requirements:

1. Well Pump Capacity: Two (2) or more wells having a total capacity of 0.6 GPM per connection.
2. Elevated Storage Capacity: Elevated storage capacity of 100 gallons per connection.
3. Elevated Storage Credit: If elevated storage capacity of 200 gallons per connection is provided, reduced service pumping requirements can be applied as discussed below.
4. Pressure Tank Capacity: For future systems, if elevated storage is not provided, a pressure tank capacity of 20 gallons per connection is required.
5. Total Storage Capacity (elevated and ground storage): Total storage capacity of 200 gallons per connection, inclusive of the 100-gallon minimum requirement listed above.
6. Service Pump Capacity:
 - 6.1 A minimum of two (2) pumps with a combined capacity of 2.0 GPM per connection, except for systems meeting one of the two requirements below.
 - 6.1.1 For systems that meet the elevated storage credit requirement listed above, a minimum of two (2) pumps with a combined capacity of 0.6 GPM per connection are required for each pump station or pressure plane.
 - 6.1.2 If only wells and elevated storage are provided, service pumps are not required.

The City's existing system is divided into three (3) pressure planes – IH-35, Scenic Hills, and Live Oak. For the TCEQ Capacity Analysis, IH-35 and Scenic Hills pressure planes have been grouped together as they receive water from the same supply point. The 2030 system meets all TCEQ capacity requirements. The number of projected connections for each pressure plane based on current number of connections and projected growth in the system is provided in Table 21, and TCEQ capacity results are summarized in Table 22 and Table 23.

Table 21: Projected 2030 Number of Connections per Pressure Plane

Pressure Plane	Existing Number of Connections	2030 Number of Connections
IH-35 + Scenic Hills	9,913	11,966
Live Oak	6,118	7,385
Total	16,031	19,351

Note: The capacity analysis in Table 22 and Table 23 below assume that all near-term and recommended 2030 projects are complete and in-service.

Table 22: 2030 TCEQ Capacity Analysis for IH-35 & Scenic Hills Pressure Planes

	IH-35 + Scenic Hills Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	7,180	8,100	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	1,196,000	3,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	2,393,200	3,500,000	MEETS TCEQ REQUIREMENTS
Total Storage Capacity [gal]	200	gal/conn	2,393,200	13,500,000	MEETS TCEQ REQUIREMENTS
Service Pump Capacity [gpm]	0.6	gpm/conn	7,180	11,600	MEETS TCEQ REQUIREMENTS

Table 23: 2030 TCEQ Capacity Analysis for Live Oak Pressure Plane

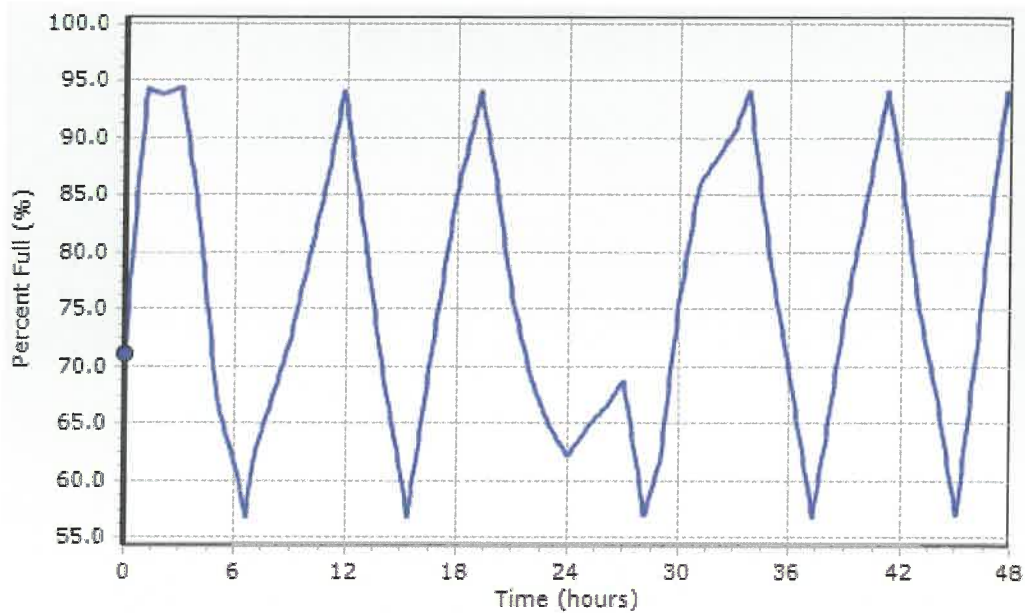
	Live Oak Pressure Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	4,431	8,855	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	738,500	2,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	1,477,000	2,500,000	MEETS TCEQ REQUIREMENTS
Total Storage Capacity [gal]	200	gal/conn	1,477,000	7,500,000	MEETS TCEQ REQUIREMENTS
Service Pump Capacity [GPM]	0.6	gpm/conn	4,431	12,600	MEETS TCEQ REQUIREMENTS

3.2.2.2 System Storage

The City's system includes five (5) elevated storage tanks (ESTs). Tank levels through the 2030 peak day scenario are illustrated in the following figures.

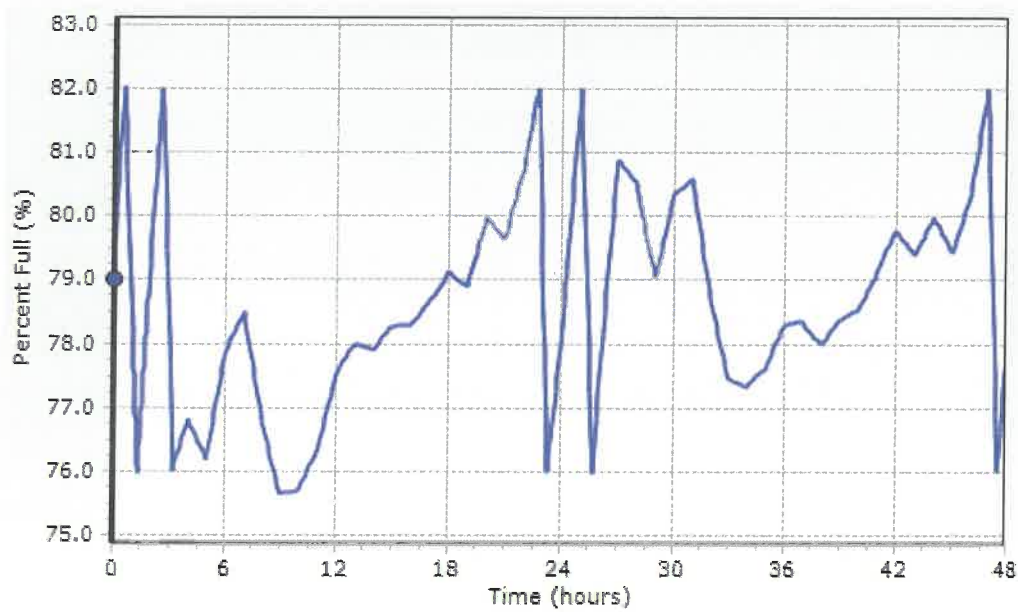
The Corbett EST is filled by the new Corbett pump station and is able to easily fill when the pump station is running. The lower water level can easily be manipulated based on the pump controls.

Figure 13: 2030 Peak Day Corbett EST Levels



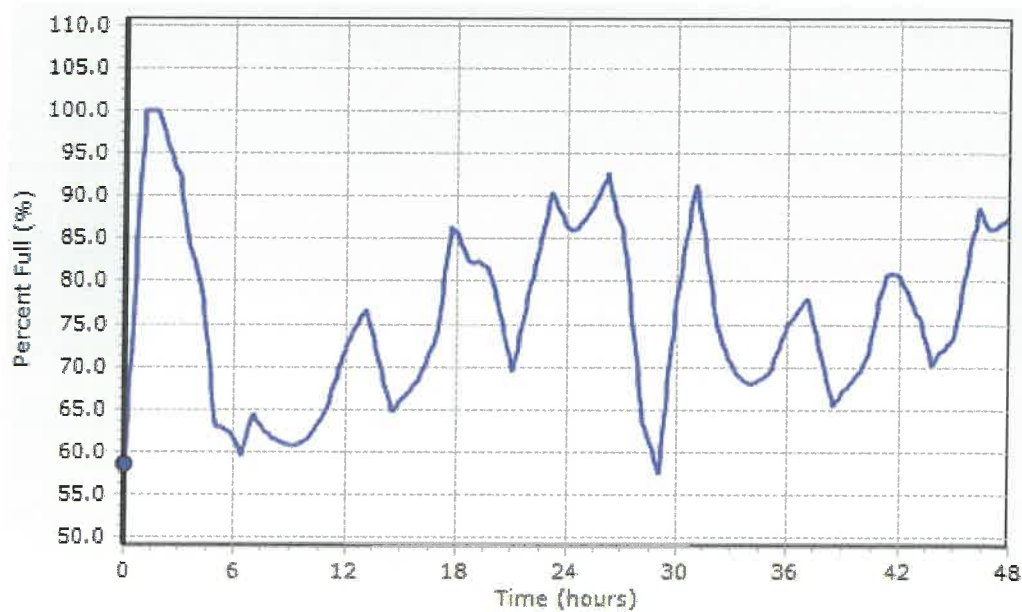
The Live Oak EST drains slightly during peak demand times of the day but is able to recover.

Figure 14: 2030 Peak Day Live Oak EST Levels



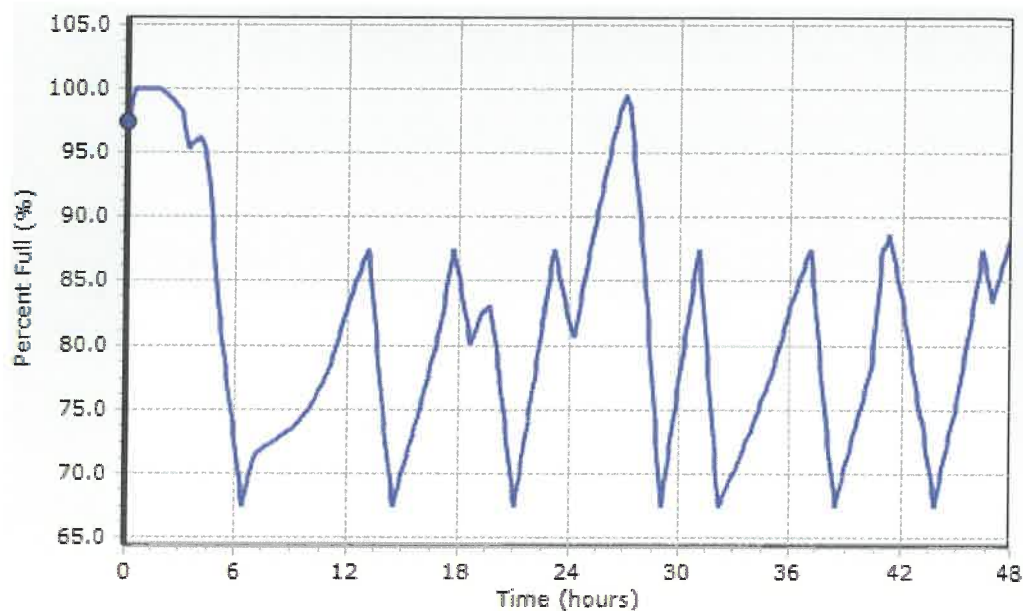
The Nacogdoches EST level fluctuates throughout the peak day simulation but is able to be filled with the well.

Figure 15: 2030 Peak Day Nacogdoches EST Levels



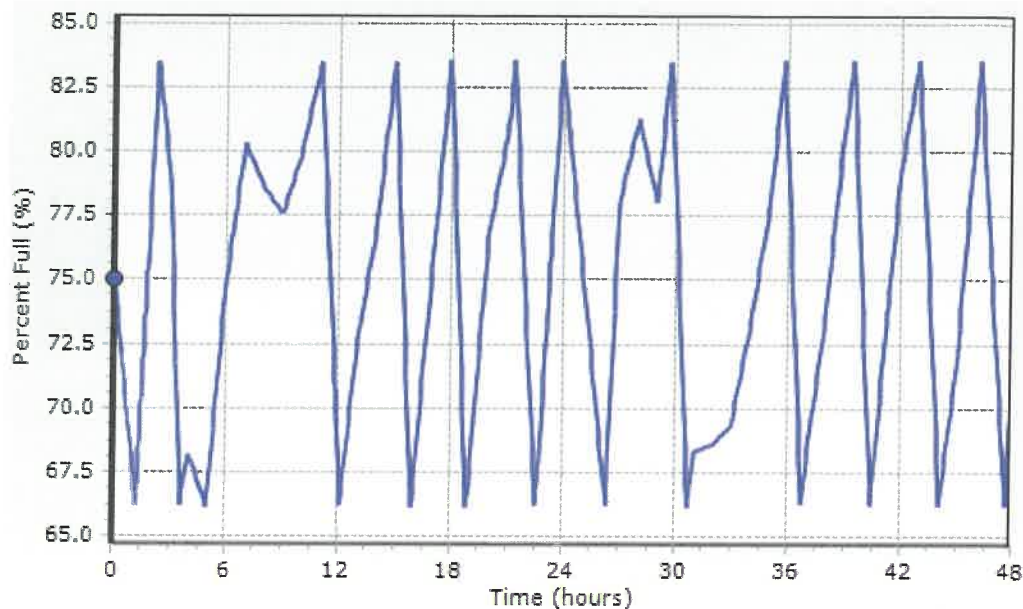
The IH-35 EST drains during the peak day simulation but is able to recover to initial levels around hour 27.

Figure 16: 2030 Peak Day IH-35 EST Levels



The Northcliffe EST levels fluctuate frequently throughout the day but can easily recover to initial levels.

Figure 17: 2030 Peak Day Northcliffe EST Levels



3.2.2.3 Fire Flow Analysis

The 2030 water system was evaluated to determine the best locations to simulate fire flow conditions for residential and commercial users. For residential fire flow, a 1,500 gpm fire flow demand was modeled. For commercial fire flow, a 3,500 gpm fire flow demand was modeled. For all fire flow analyses, a minimum system pressure of 20 psi is required per TCEQ. The fire flow nodes were selected at extremities of the system to represent the most conservative locations to achieve acceptable fire flow. The fire flow node locations are illustrated in Appendix 12. All modeled locations passed fire flow with the recommended 2030 system improvements.

3.2.2.4 2030 CIP Projects

Recommended CIPs for 2030 are listed in Table 24 and illustrated in Appendix 13.

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Table 24: 2030 Water CIP Project Summary

CIP Number	Description	Notes
Growth Projects		
2030-W1	New 12" loop east of FM 3009, north of IH-35 (approximately 6,060 LF)	Serves new service area.
2030-W2	Raf Burnette Rd 12" WL Improvements	Serves new service area.
2030-W3	8" WL from Ray Corbett Dr to Lower Seguin Rd	Serves new service area.
2030-W4	Trainer Hale Rd 2" WL Replacement & 8" WL Improvement	Upgrades distribution system to current min. pipe size (8") to serve new service area.
2030-W5	Boenig Dr S 6" WL Replacement & 8" WL Improvement	Needed to meet growth in area and provide fire flow.
2030-W6	Live Oak to IH-35 24" Transmission Main	In progress, pending easement acquisition. Needed to meet growth and provide redundancy.
2030-W7	Ware Seguin Pump Station Expansion Phase 1	Needed to meet new growth in Ware Seguin area.
2030-W8	IH-10 8" WL Improvements	Needed to meet growth in area.
System Improvement Projects		
2030-W9	PRV Installation for Proposed Southwest Pressure Plane	Avoids high pressures and improves performance of Ware Seguin Pump Station.
2030-W10	River Rd 6" WL Replacement	Removes system bottleneck.
2030-W11	Undersized Pipe Replacement Program	Replacement of pipes ≤6".
2030-W12	Asbestos Cement Pipe Replacement Program	Replacement of AC pipes.

3.2.2.5 2030 SSLGC Supply Need

As part of the modeling effort, the water supply needed from the Schertz-Seguin Limited Government Corporation (SSLGC) was evaluated. Schertz is currently contracted for 5,801 gpm (8,351 acre-ft per year). An additional 3,799 gpm SSLGC water supply capacity for a total of 9,600 gpm is recommended to meet the 2030 projected system demands.

3.2.3 2050 System Evaluation

The 2050 planning scenario is the final future scenario that was modeled. To develop the 2050 model, the 2030 model was updated to include the water demands associated with 2050 project land use. The model was run in average day, peak day, and fire flow conditions to identify improvements needed. A TCEQ capacity analysis was completed to confirm the system would meet TCEQ criteria with the recommended 2050 projects implemented.

3.2.3.1 TCEQ Capacity Analysis

The TCEQ capacity analysis was also performed for supply, storage, and pumping with recommended improvements through 2050 implemented. The 2050 system meets all TCEQ capacity requirements. The number of projected connections for each pressure plane based on

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current number of connections and projected growth in the system is provided in Table 25, and TCEQ capacity results are summarized in Table 26 and Table 27.

Table 25: Projected 2050 Number of Connections per Pressure Plane

Pressure Plane	Number of Connections for TCEQ Capacity Analysis
IH-35 + Scenic Hills	16,846
Live Oak	10,397
Total	27,243

Note: The capacity analysis in Table 26 and Table 27 assume that all near-term, recommended 2030, and recommended 2050 projects are complete and in-service.

Table 26: 2050 TCEQ Capacity Analysis for IH-35 & Scenic Hills Pressure Planes

	IH-35 + Scenic Hills Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	10,108	13,300	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	1,684,600	3,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	3,369,200	3,500,000	MEETS TCEQ REQUIREMENTS
Total Storage Capacity [gal]	200	gal/conn	3,369,200	16,500,000	MEETS TCEQ REQUIREMENTS
Service Pump Capacity [gpm]	0.6	gpm/conn	10,108	13,300	MEETS TCEQ REQUIREMENTS

Table 27: 2050 TCEQ Capacity Analysis for Live Oak Pressure Plane

	Live Oak Pressure Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	6,239	9,400	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	1,039,700	2,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	2,079,400	2,500,000	MEETS TCEQ REQUIREMENTS
Total Storage Capacity [gal]	200	gal/conn	2,079,400	7,500,000	MEETS TCEQ REQUIREMENTS
Service Pump Capacity [GPM]	0.6	gpm/conn	6,239	13,000	MEETS TCEQ REQUIREMENTS

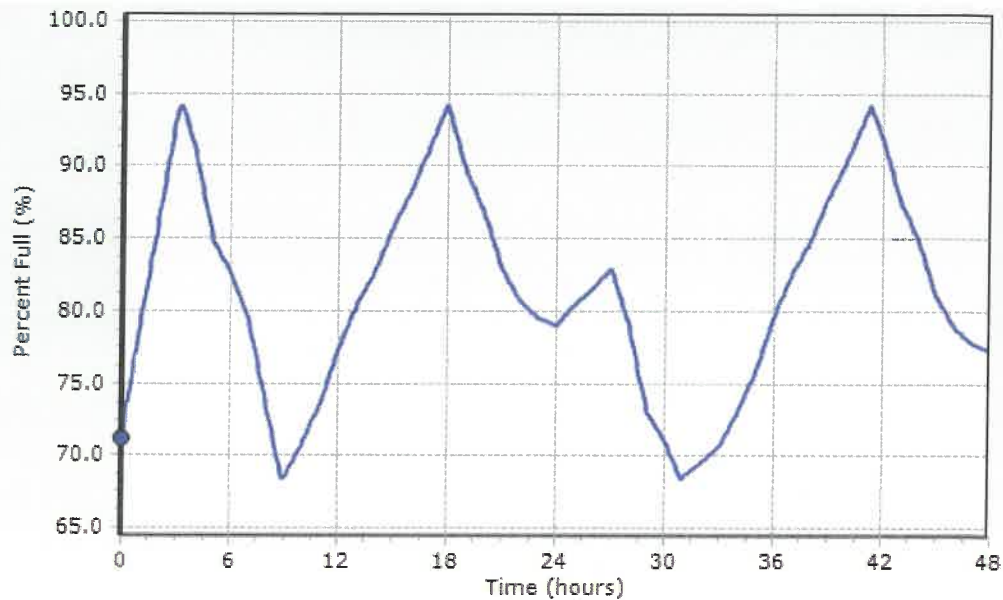
3.2.3.2 System Storage

The City's system includes five (5) elevated storage tanks (ESTs). Tank levels through the 2050 peak day scenario are illustrated in the following figures.

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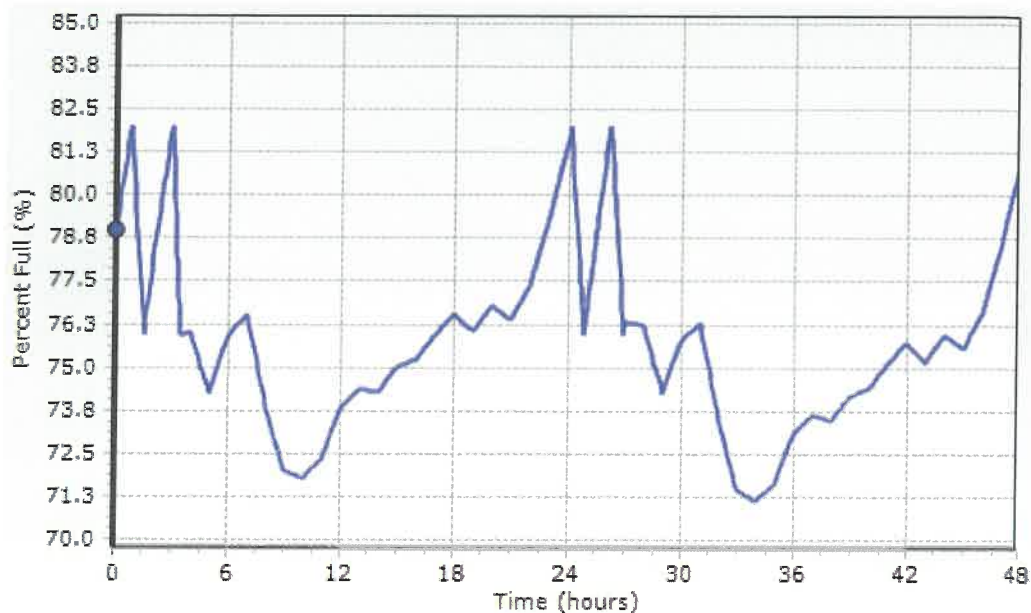
The Corbett EST is filled by the Corbett pump station and is able to easily fill when the pump station is running. The lower water level can easily be manipulated based on the pump controls.

Figure 18: 2050 Peak Day Corbett EST Levels



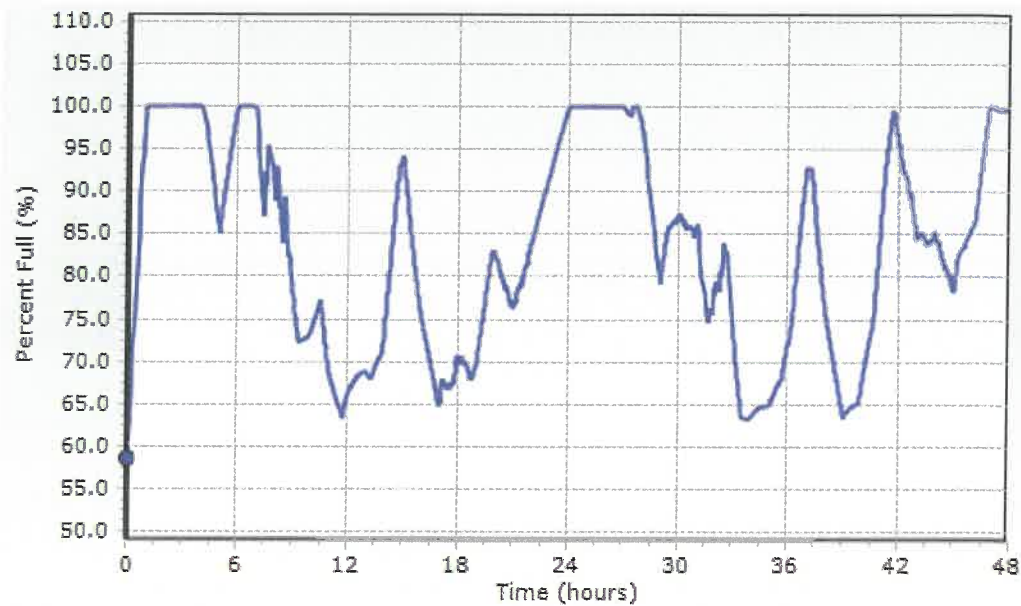
The Live Oak EST levels drop in the peak demand times but are able to recover to initial levels within 24 hours.

Figure 19: 2050 Peak Day Live Oak EST Levels



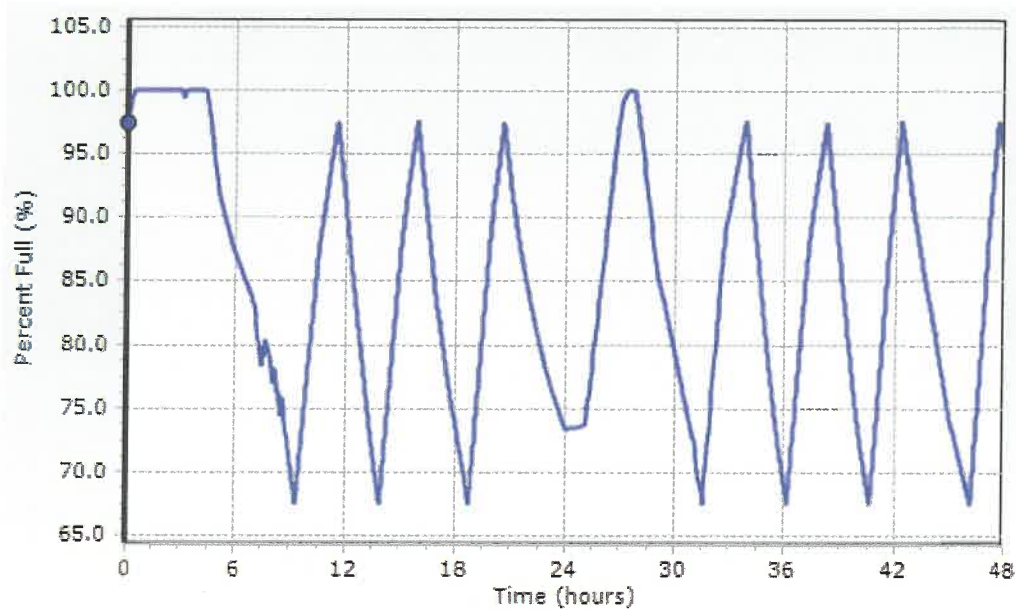
The Nacogdoches EST levels fluctuate throughout the peak day simulation but are able to easily recover.

Figure 20: 2050 Peak Day Nacogdoches EST Levels



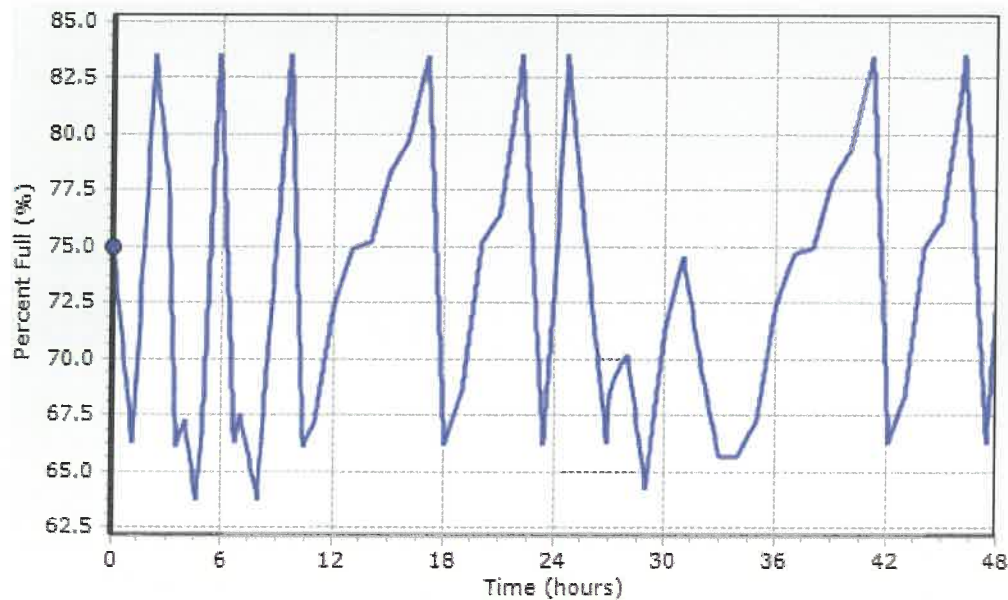
The IH-35 EST is fed by the new 2050 IH-35 pump station and is easily able to fill based on running the proposed pump station.

Figure 21: 2050 Peak Day IH-35 EST Levels



The Northcliffe EST level fluctuates frequently throughout the peak day simulation but is able to easily recover.

Figure 22: 2050 Peak Day Nortcliffe EST Levels



3.2.3.3 Fire Flow Analysis

The 2050 water system was evaluated to determine the best locations to simulate fire flow conditions for residential and commercial users. For residential fire flow, a 1,500-gpm fire flow demand was modeled. For commercial fire flow, a 3,500-gpm fire flow demand was modeled. For all fire flow analyses, a minimum system pressure of 20 psi is required per TCEQ. The fire flow nodes included all nodes included in the 2030 analysis with some additional nodes extending into new 2050 service areas. The fire flow node locations are illustrated in Appendix 14. All modeled locations passed fire flow with the recommended 2050 system improvements.

3.2.3.4 2050 CIP Projects

Recommended CIPs for 2050 are listed in Table 28 and illustrated in Appendix 15.

Table 28: 2050 Water CIP Project Summary

CIP Number	Description	Notes
Growth Projects		
2050-W1	Corbett Pump Station Expansion	Prevents low pressures throughout southern part of system
2050-W2	FM 2252 8" WL Improvements	Serves new service area
2050-W3	Ware Seguin Pump Station Improvements Phase 2	Prevents low pressures in Ware Seguin area
2050-W4	Beck St 6" WL Replacement	Upgrades distribution system to current min. pipe size (8") to serve new service area
2050-W5	Raf Burnette Rd 8" WL Improvements	Needed to meet growth in area
2050-W6	IH-35 Pump Station & 3.0 MG GST	Needed to meet growth in area
2050-W7	IH-10 and FM 1518 8" Improvements	Needed to meet growth in area
System Improvement Projects		
2050-W8	Lower Seguin Rd 8" WL Replacement	Needed for fire flow

3.2.3.5 2050 SSLGC Supply Needs

Additional water supply from SSLGC is needed for the 2050 planning scenario. A total of 16,965 gpm of SSLGC supply is recommended to meet the 2050 projected system demands.

3.2.4 Summary

The recommendations provided in this section were a collaborative effort with City staff and LAN to identify and model water system improvements to resolve near-term problems as well as meet the needs due to projected growth for the 2030 and 2050 planning periods. The water model should be maintained and updated as new projects are implemented and can be adjusted to address changes in development schedules.

4. WASTEWATER SYSTEM EVALUATION & CIP

A wastewater system model was created in Bentley Sewer GEMS by LAN using data provided by the City. LAN presented the model to the City during a meeting on September 10, 2020. Updates to the model were then made according to the comments from the City.

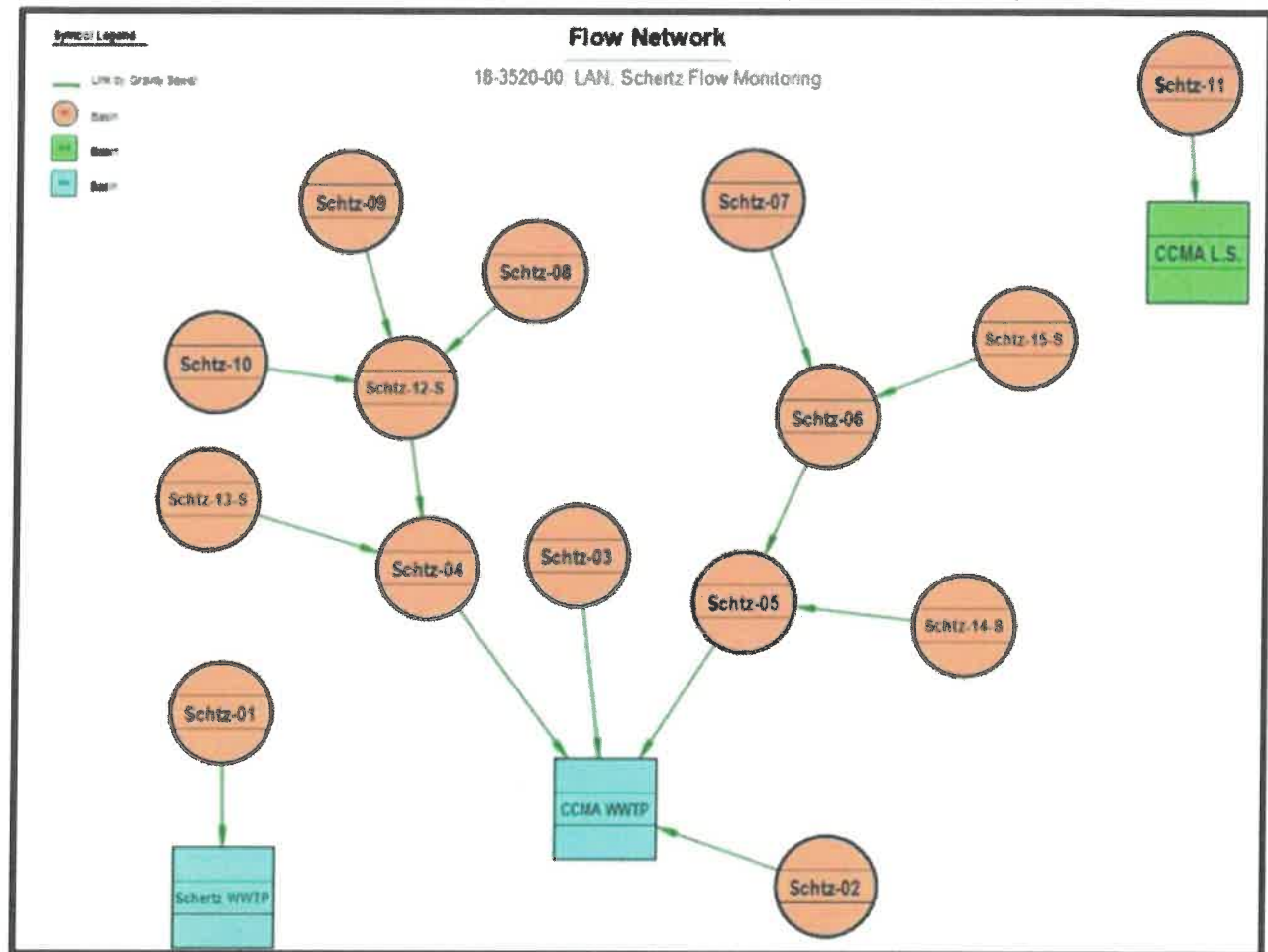
To evaluate the existing wastewater system, a reliable hydraulic model is needed. Model reliability is developed through hydraulic model calibration. Model calibration and simulation were performed using Sewer GEMS software which provided the tool and results necessary to assess the existing wastewater system under dry and wet weather conditions. The purpose of this technical memorandum (TM) is to summarize the calibration results for Average Day Flow (ADF) dry and wet weather conditions and to identify areas with hydraulic deficiencies in the City's wastewater system based on a design storm.

4.1 Modeling the Existing Wastewater System

4.1.1 Flow Monitoring and Rain Gauges

RJN Group installed 15 flow monitors in the City's wastewater system across a variety of gravity main sizes. The flow monitors recorded data in 5-minute increments from April through June of 2020. The goal of the flow monitoring was to record dry weather flows as well as wet weather flows during rain events. RJN also installed six rain gauges in concert with the flow monitors to collect the rainfall data. The rain gauges were located to capture spatial variation of rainfall across the sewer system in 5-minute increments. Appendix 16 illustrates placement of rain gauges, where the 15 flow monitors were placed in the City's sewer system and the boundaries of the corresponding sewer shed basin for each flow monitor. A schematic network of the flow monitor basins within the City's sewer system is provided in Figure 23.

Figure 23: Schematic of Flow Monitors in the City's Wastewater System



4.1.2 Dry Weather Calibration Criteria

The following guidelines were used as calibration criteria for dry weather calibration effort:

- The modeled and monitored flow hydrographs should follow closely in terms of the shape and magnitude.
- Timing of the high and low flows from the model and the flow monitors should be within 1-hour.
- The modeled and monitored peak flows should be within +/- 10% range.
- The modeled and monitored total volume should be within +/- 10% range.

4.1.3 Dry Weather Flows (DWF)

Developing base sanitary sewer loads for each sewershed basin is an iterative process. First, preliminary base loads were estimated by applying Traffic Analysis Zone (TAZ) population and employment data to each sewershed basin. A unique gallon per capita per day (gpcd) was estimated for each basin using the TAZ data and the flow monitoring data. These gpcds were then used to calculate the preliminary base load for each basin which was input into the model.

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Second, Tuesday May 26, 2020, was chosen as the dry weather calibration day due to the lack of any rainstorms on that day and the consistency in the monitoring across all 15 of the flow monitors within this 24-hour period. Next, a 24-hour Extended Period Simulation was run in the model and the results were compared to the flow monitoring data collected on the chosen dry weather calibration day. Based on this comparison, adjustments were made to the base load and diurnal pattern for each basin until the model results met the dry weather calibration criteria.

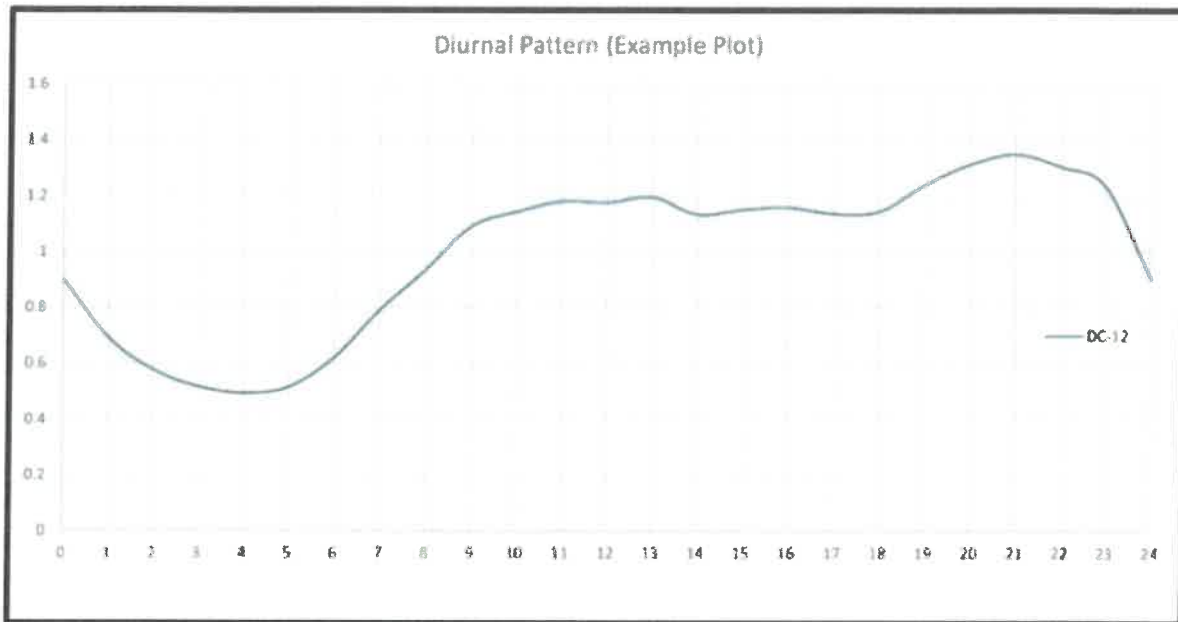
Some adjustments to the preliminary sanitary loading were significant because the TAZ polygon data which were used to calculate the initial base load estimates are on a large scale. These adjustments were needed to represent the density of load distribution more accurately in the system. To further refine the sanitary loading in the system, point loads were applied to represent significantly large contributors such as apartment buildings or schools. A summary of the adjustments made per basin is provided in Table 29.

Table 29: Dry Weather Sanitary Load & Diurnal Curve Adjustment Summary

Flow Monitor Basin	Adjustment(s) Made
FM-01	Sanitary loading reduced by 62.5%
FM-02	Diurnal curve adjusted by one timestep; Sanitary loading reduced by 20%
FM-03	Sanitary loading reduced by 20%
FM-04	None
FM-05	This basin had several added demands for one apartment building (0.1 mgd), local businesses (0.04 mgd), and two schools (0.03 mgd); Increased loading by 50%
FM-06	Added institute loading (0.1 mgd) and business loading (0.123 mgd)
FM-07	Sanitary loading increased by 15%
FM-08	Diurnal curve adjusted by one timestep; Sanitary loading increased by 20%
FM-09	Diurnal curve adjusted by one timestep; Sanitary loading increased by 25%
FM-10	Diurnal curve adjusted by half an hour; Added sanitary loading for the FedEx lift station (0.1 mgd)
FM-11	Reduced sanitary loading by 10%
FM-12	Added sanitary loading (1.15 mgd) on the manhole at the intersection of Wiederstein Rd. and Ike Ln. to represent flow from City of Selma
FM-13	None
FM-14	None
FM-15	Reduced sanitary loading by 10%

Figure 24 provides an example of a diurnal pattern developed for flow monitor basin FM-12.

Figure 24: Example Plot of Diurnal Pattern



4.1.4 Dry Weather Calibration Results

The dry weather calibration was an iterative process involving adjustment of base sanitary loadings, diurnal curves, and point loads. Eventually, the adjustment process produced results that fit the calibration criteria. Figure 25 presents a typical plot of observed versus modeled dry weather flows (FM-06). Graphs for the 15 flowmeter basins are provided in Appendix 17.

Figure 25: Sample Dry Weather Calibration Plot

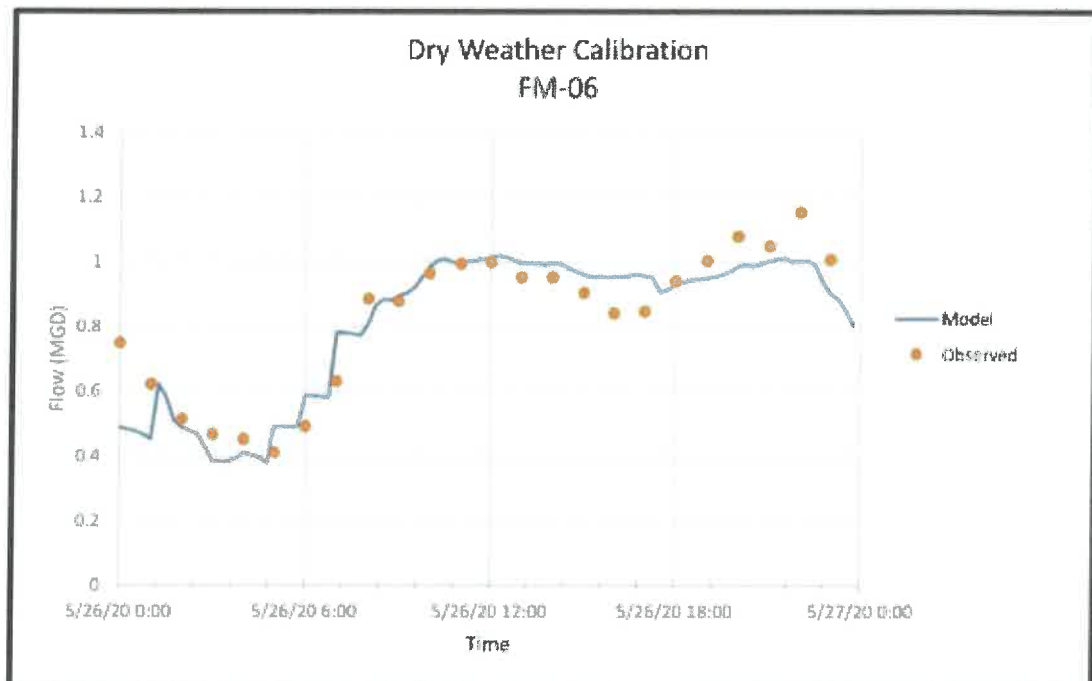


Table 30 shows the dry weather calibration results for the 15 flow monitoring locations.

Table 30: Dry Weather Calibration Results

Flow Meter Basin	Peak Flow (mgd)			Volume (Million Gallons)		
	Model	Monitor	% Difference	Model	Monitor	% Difference
FM-01	0.074	0.076	-2.7%	0.0521	0.0512	1.6%
FM-02	0.073	0.075	-2.2%	0.0554	0.0535	3.6%
FM-03	0.301	0.361	-16.6%	0.2582	0.245	5.5%
FM-04	3.561	3.525	1.0%	2.4641	2.6665	-7.6%
FM-05	1.905	1.894	0.6%	1.4374	1.3983	2.8%
FM-06	1.019	1.154	-11.7%	0.8127	0.8255	-1.6%
FM-07	0.218	0.215	1.5%	0.1751	0.1717	1.9%
FM-08	0.151	0.156	-3.2%	0.1068	0.1241	-13.9%
FM-09	0.178	0.181	-1.4%	0.1104	0.1082	2.0%
FM-10	0.628	0.533	17.9%	0.3645	0.3341	9.1%
FM-11	1.462	1.053	38.9%	0.7732	0.7980	-3.1%
FM-12	2.355	2.454	-4.0%	1.7350	1.8006	-3.6%
FM-13	0.662	0.676	-2.0%	0.5324	0.5428	-1.9%
FM-14	0.253	0.250	1.3%	0.1649	0.1635	0.8%
FM-15	0.271	0.266	1.8%	0.2185	0.2117	3.2%

As shown in Table 30, dry weather calibration reached reasonable results with most basins meeting the calibration criteria. There are few flow monitor basins that do not fully meet the criteria described above. Those basins are FM-03, FM-08, FM-10, and FM-11. All these basins have lift stations upstream of the monitoring locations which directly affect the model results. For basins FM-03 and FM-11, assumptions were made for the lift stations within the basin. Those assumptions were provided in the Existing Wastewater System TM (September 4, 2020). The FM-08 basin has eight lift stations. Without accurate pump curves and pump operations for all the lift stations in these basins, the results are satisfactory with the current level of accuracy achieved. In addition to the City-owned lift stations in basins FM-03 and FM-11, there are several privately owned lift stations that contribute to the overall sanitary loadings in the wastewater system. Pump curves for these smaller lift stations were not available, therefore pump curves were assumed for modeling purposes. The following lift stations are privately owned: Aquatic Center, FedEx, & Fire Station 3. For Basins FM-06 and FM-10, calibration was performed by assuming sanitary loadings for business and institutes in the basins (see Table 29 for the specific adjustments performed on each basin).

4.1.5 Wet Weather Calibration Criteria

Wet weather calibration is necessary along with dry weather calibration to adequately model the effects that rainfall derived inflow and infiltration (RDII) have on the wastewater system. The following guidelines were used as calibration criteria for VWW calibration effort:

- The hydrographs (modeled and observed) should closely reflect the same shape and magnitude.
- The peaks and troughs of the hydrographs (modeled and observed) should be within one hour.
- The modeled and monitored peak flows should be within +/- 15% range.
- The modeled and monitored total volume should be within +/- 15% range.

4.1.6 Calibration Rainfall Event

Six rain gauges were installed for the duration of the flow monitoring period to record rainfall events. Review of the observed rainfall and flow monitoring data identified a distinct rain event with reliable flow monitoring data that could be used for wet weather calibration. Table 31 summarizes the rainfall event identified for wet weather calibration at the six rain gauges.

Table 31: Rainfall Event Properties

Rain Gauge	Date/Time	Total Precipitation (inch)
RG-01	5/24/20 8PM – 5/25/20 6AM	2.46
RG-02	5/24/20 8PM – 5/25/20 6AM	2.18
RG-03	5/24/20 8PM – 5/25/20 6AM	1.43
RG-04	5/24/20 8PM – 5/25/20 6AM	1.81
RG-05	5/24/20 8PM – 5/25/20 6AM	1.71
RG-06	5/24/20 8PM – 5/25/20 6AM	2.36

Because there were only six rain gauges for the 15 flowmeter basins, it was necessary to make assumptions as to which rain data to associate with each basin. Table 32 presents those assumptions.

Table 32: Rain Gauge Data Assumptions

Flow Meter Basin	Corresponding Rain Gauge(s)
FM-01	RG-01
FM-02	RG-01
FM-03	RG-02 & RG-05
FM-04	RG-02 & RG-05
FM-05	RG-02
FM-06	RG-04 & RG-06
FM-07	RG-06
FM-08	RG-05
FM-09	RG-05
FM-10	RG-04
FM-11	RG-03
FM-12	RG-05
FM-13	RG-05
FM-14	RG-05
FM-15	RG-06

In addition to the basins listed above, the SARA and Hallie's Cove Outfalls were associated with RG-01 data because no rain monitoring took place in those areas.

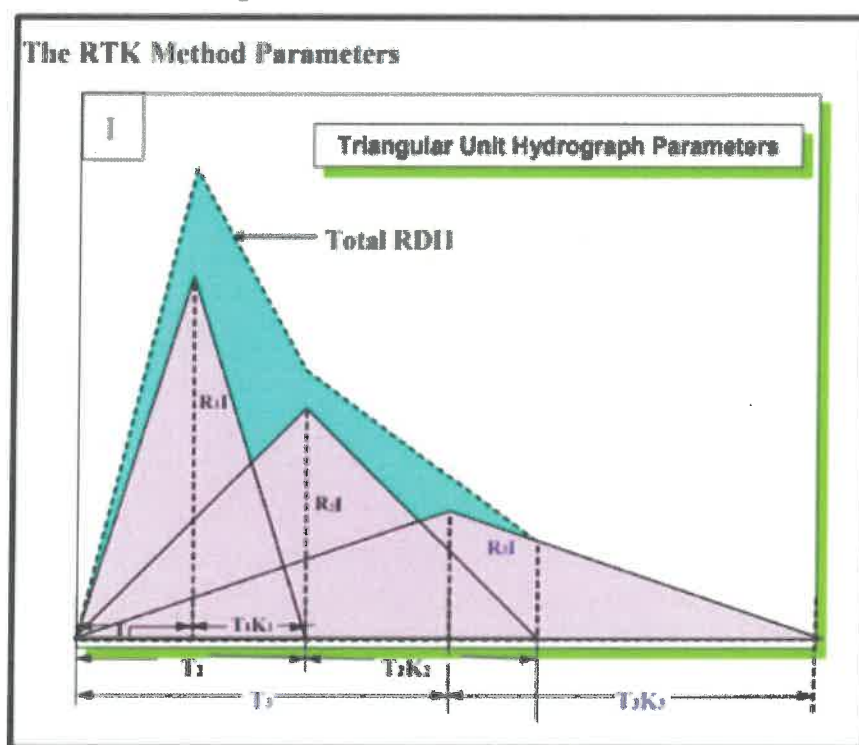
4.1.7 Wet Weather Flow Characterization

To calibrate for wet weather, the RTK Method was used in the model to predict the sanitary sewer system's short-, medium-, and long-term response to a rainfall event. These parameters, developed using the flow monitoring data recorded in the field, are applied in the model so that results are representative of field conditions. The R, T, and K parameters are defined as follows:

- R - fraction of precipitation that enters the sanitary sewer system
- T - the time to peak of the hydrograph
- K - the ratio of the 'time of recession' to the 'time to peak'.

How these parameters are used to generate the short-, medium-, and long-term unit hydrographs used in the model is illustrated in Figure 26.

Figure 26: RTK Method Parameters



The RTK method creates a triangle from the three values with a separate triangle made for each type of response (short, medium, and long). The final hydrograph is represented by the addition of the three triangles. Therefore, this method uses a total of 9 parameters (3 RTK parameter sets for each of the 3 triangles that represent the short, medium, and long-term responses.)

LAN assigned a RTK hydrograph to each of the flow monitoring locations that would represent the response to the rainfall. Then, iterative model runs were used to adjust the RTK parameters until the model outputs and flow monitoring were within tolerances specified by the calibration criteria. A 30-hour extended period simulation (EPS) scenario for wet weather calibration was created for the following period: Sunday May 24, 2020, through 6:00 AM on Monday May 25, 2020.

There can be some variations between a sewer's diurnal pattern on a weekday vs. a weekend. Because the rainfall event selected to use for wet weather calibration occurred on a weekend, the flow monitoring data was used to develop an adjusted diurnal pattern that represents the behavior of system base flows on a weekend. The weekend diurnal pattern was applied to the base sanitary loads in the system for the wet weather calibration. Accurately representing the pattern of the base flow will prevent the over or under estimation of the system's response to rainfall with the development of the RTK parameters.

4.1.8 Wet Weather Calibration Results

Using the data from the six rain gauges, the flow monitoring data and the RTK hydrographs, the model was calibrated. With the rain data collected and assigned to the separate flow monitor basins, the RTK hydrograph values were estimated for each basin. Table 33 lists calibrated RTK parameters for wet weather calibration for each flowmeter basin.

Table 33: Calibrated RTK Parameters

Meter Basin	R1	T1	K1	R2	T2	K2	R3	T3	K3
FM-01	0.001	0.5	1.6	0.001	1	2.5	-	-	-
FM-02	0.001	0.75	1.4	0.001	3.5	1.8	-	-	-
FM-03	0.002	1.75	1.2	0.001	3	1.4	-	-	-
FM-04	0.001	4	2	-	-	-	-	-	-
FM-05	0.001	0.5	1.4	0.001	4	1.6	-	-	-
FM-06	0.01	2.2	0.8	0.001	2.5	1.6	0.003	5	1.2
FM-07	0.001	0.5	1.4	0.001	3	1.6	-	-	-
FM-08	0.001	1	1	-	-	-	-	-	-
FM-09	0.001	1	1	-	-	-	-	-	-
FM-10	0.001	1	1	-	-	-	-	-	-
FM-11	0.001	1	1.4	-	-	-	0.01	4	1.75
FM-12	0.1	2	1.2	0.07	4	1.5	0.01	4	1.75
FM-13	0.5	4	1.4	0.2	5	1.6	0.1	7	1.75
FM-14	0.001	0.75	1.4	-	-	-	-	-	-
FM-15	0.001	1	1.4	0.001	3	1.6	-	-	-

Figure 27 presents a typical plot of observed versus modeled wet weather flows (FM-06). Wet weather graphs for the 15 flowmeter basins are shown in Appendix 17.

Figure 27: Sample Wet Weather Calibration Plot

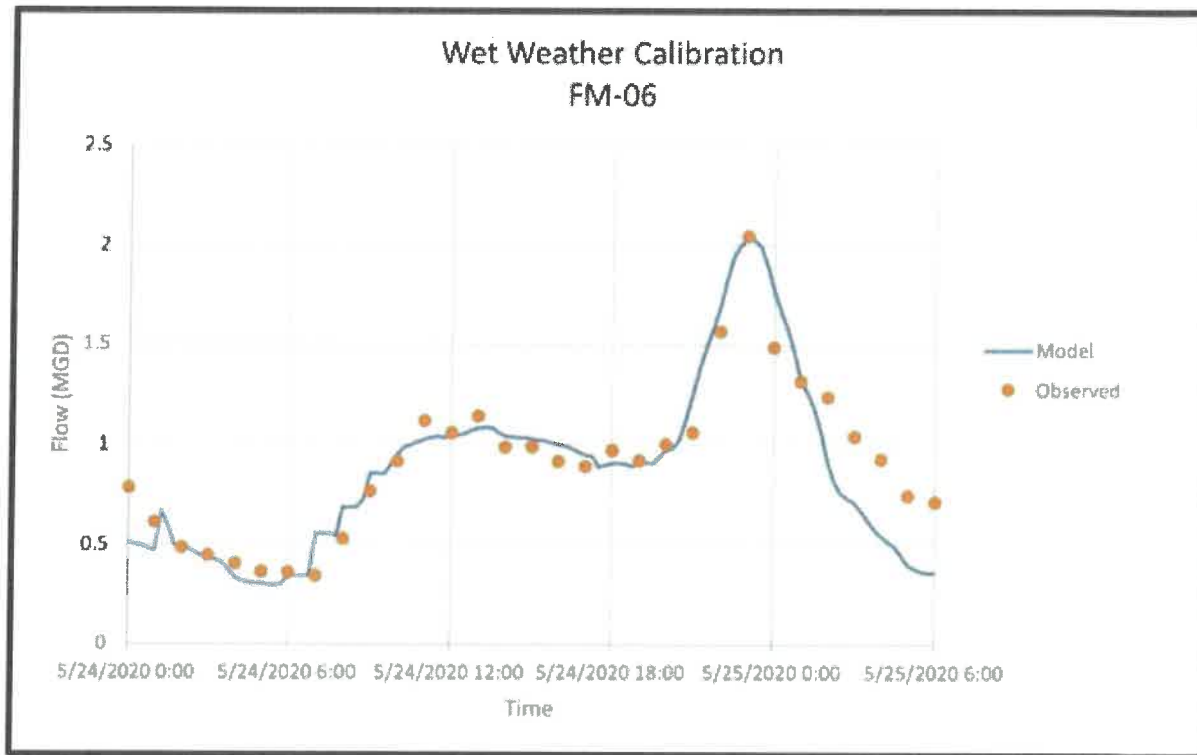


Table 34 documents the results of the wet weather calibration for all 15 flowmeter basins.

Table 34: Wet Weather Calibration Results

Flow Meter Basin	Peak Flow (mgd)			Volume (Million Gallons)		
	Model	Monitor	% Difference	Model	Monitor	% Difference
FM-01	0.078	0.08	-2.5%	0.043	0.039	10.3%
FM-02	0.103	0.095	8.4%	0.055	0.05	10.0%
FM-03	0.672	0.711	-5.5%	0.298	0.259	-15%
FM-04	6.489	5.014	29.4%	2.874	2.745	4.7%
FM-05	2.87	2.45	17.1%	1.456	1.42	2.5%
FM-06	2.031	2.043	-0.6%	0.877	0.949	-7.6%
FM-07	0.304	0.3	1.3%	0.162	0.145	11.7%
FM-08	0.1529	0.153	-0.1%	0.1	0.097	3.1%
FM-09	0.162	0.165	-1.8%	0.097	0.095	2.1%
FM-10	0.474	0.413	14.8%	0.23	0.255	-9.8%
FM-11	1.739	1.124	54.7%	0.845	0.715	18.2%
FM-12	5.261	5.396	-2.5%	2.029	1.868	8.6%
FM-13	0.738	0.754	-2.1%	0.546	0.519	5.2%
FM-14	0.259	0.263	-1.5%	0.159	0.152	4.6%
FM-15	0.273	0.298	-8.4%	0.169	0.204	-17.2%

Wet weather calibration reached reasonable results with most basins meeting the calibration criteria. There were few flow monitor basins that do not fully meet the wet weather calibration criteria. Those basins were FM-04, FM-11, and FM-15. Like dry weather calibration, inaccurate pump curves and pump operation for lift stations within these basins could adversely affect the model

results. In addition, FM-11 flowmeter data seems to be erroneous at some time periods. Looking at the FM-04 graph in Appendix 18 and comparing its peak flow with upstream contributing flowmeter basins (FM-12 and FM-13), the observed FM-04 peak flow (5 mgd) is lower than summation of peak flows at FM-12 (5.4 mgd) and FM-13 (0.75 mgd). In fact, summing up the observed peak flows at FM-12 and FM-13 (6.15 mgd) provides a peak flow closer to the modeled peak flow at FM-04. This discrepancy might be related to erroneous flowmeter data at FM 04 or there might be an unknown unmetered interconnect with leaving flows to another basin from FM 04. For FM-15, the observed flows at 5/25/20 from 0:00 to 6:00 AM seems too high, as the rain started to diminish around that time based on the recording at RG-03, which indicates flows cannot be as high as the FM-15 showed during that time period.

4.1.9 RDII Assessment

The flow monitoring data for the calibration days were used to assess the sewer system susceptibility and response to RDII. Table 35 shows the wet weather peaking factors (peak WWF/average DWF).

Table 35: Calibration Event Wet Weather Peaking Factors for Metered Basins

Flow Monitor Basin	Average DWF (mgd)	Peak WWF (mgd)	Peaking Factor
FM-01	0.05	0.08	1.6
FM-02	0.053	0.095	1.8
FM-03	0.247	0.378	1.5
FM-04	2.7	3.025	1.1
FM-05	1.4	1.894	1.4
FM-06	0.83	2.043	2.5
FM-07	0.17	0.3	1.8
FM-08	0.1	0.15	1.5
FM-09	0.11	0.165	1.5
FM-10	0.32	0.41	1.3
FM-11	0.8	1.12	1.4
FM-12	1.82	5.4	3
FM-13	0.55	0.64	1.2
FM-14	0.16	0.25	1.6
FM-15	0.21	0.27	1.3

Only FM-06 and FM-12 had substantial RDII response. The rest of the basins did not have significant RDII response based on the flow monitoring data for the calibration days.

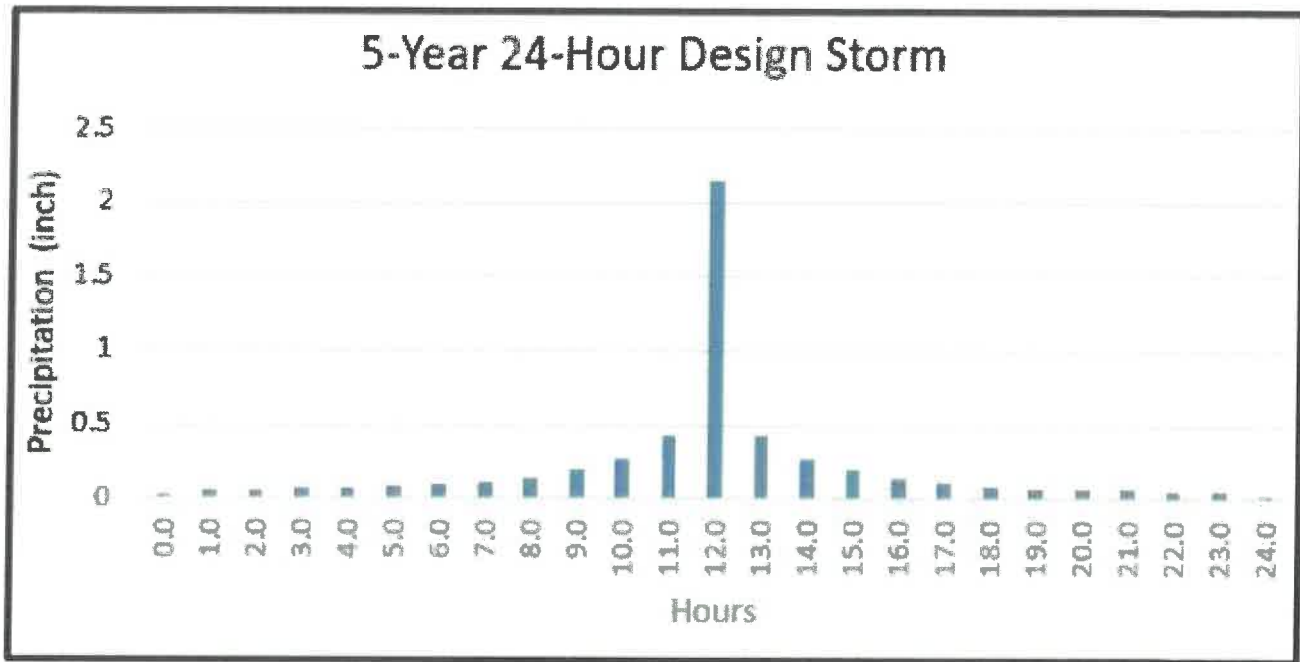
4.2 Existing Wastewater System Evaluation

4.2.1 Design Storm

To evaluate the existing wastewater system, a 5-year design storm with a 24-hour duration was applied to the calibrated model. For the City of Schertz, the rainfall depth provided in the National Oceanic and Atmospheric Association's Atlas 14 precipitation frequency estimates is 5.3-inches.

The rainfall depth was distributed over time using the Soil Conservation Service (SCS) rainfall distribution type III. Figure 28 shows the hyetograph of the design storm used for this evaluation.

Figure 28: 5-Year 24 Hour Design Storm



4.2.2 System Evaluation

The 5-year 24-hour design storm shown in Figure 28 was then applied to the City's calibrated model for system evaluation. The following criteria were used to evaluate the existing wastewater system and identify potential problem areas:

- Sanitary Sewer Overflows (SSO) at manholes
- Surcharged gravity mains

The majority of the SSOs and surcharged lines in the system are located on the 10-inch CCMA line which parallels Roy Richard Dr. and the 30-inch CCMA line which follows the drainage channel from I-35 down to the outfall at Cibolo Creek. Some surcharging and SSOs were also predicted by the model in the Northcliffe area around the I-35 corridor. The extents and locations of these SSOs and surcharged lines for the existing system evaluation results are presented in Appendix 19.

4.2.3 Summary

Using data collected from the flow monitors and rain gauges, the wastewater hydraulic model for the City of Schertz was calibrated for both dry and wet weather flows. The model calibration reached the required level of accuracy for both calibration scenarios. Further accuracy may be achieved with the provision of further data such as pump curve information and detailed customer sanitary sewer flow information for certain areas.

Following the model calibration, the City's wastewater system was evaluated based on a 5-year, 24-hour design storm for wet weather condition. The total number of SSOs found to be 21 (7 of these 21 SSOs are on lines owned by the City) which is less than 1 percent of the total number of manholes. The total length of sewer found to be capacity deficient (maximum flow greater than pipe full capacity)

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was approximately 52,000-feet (of which approximately 22,500-feet is owned by the City). This is about 5.7 percent of the total existing conduits length.

The next phase of the modeling process is a future model evaluation. This phase of the modeling includes running the model with population predictions based on the future TAZ population data and recommendations for future system improvements as part of the City's capital improvement plan. This evaluation will be described in the next section.

4.3 Future Wastewater System Evaluation & CIPs

The City contracted LAN to conduct the wastewater system improvement analysis and update the Capital Improvements Plan (CIP). This effort requires developing a future sanitary sewer representation model of the City's collection system based on anticipated growth areas. Future Average Dry Weather Flow and Wet Weather Flow scenarios for 10-year and 30-year were developed. The purpose of this section is to summarize the results of the future wastewater system improvement analysis and list the 10-year and 30-year wastewater system CIPs.

4.3.1 Future Modeling Methodology

The future scenarios assumed increases in residential and commercial/industrial developments based on information about planned development projects provided by the City. LAN used the City's calibrated model for dry and wet weather scenarios as the base for this analysis and allocated wastewater sanitary loads to the wastewater hydraulic model using the projected water demands developed for the Schertz water hydraulic model. To generate the sanitary loads, a return rate of 70% was applied to water demand at each node. Then GIS tools were used to determine which demand nodes fell within the existing wastewater service areas. If a demand node fell outside an existing service area, new interceptors were recommended to connect them to an existing or future wastewater treatment plant. Using Thiessen polygon and Loadbuilder tools from SewerGEMS, the sanitary loads were allocated to the nearest manholes in the model. Table 36 presents the existing and future average dry weather flow projections.

Table 36: Dry Weather Flow Projections

Condition	Estimated Average DWF (MGD)	% Increase
Existing	5.2	-
10-yr (2030)	6.4	23.0
30-yr (2050)	7.4	42.3

Future scenarios were created in the model for the 10-year (2030) and 30-year (2050) increments, along with their respective sanitary loads to simulate the future growth anticipated by the City. Diurnal curves were developed from the field monitoring data for the existing system model and then used to distribute the future average dry weather sanitary flows over 24 hours. Analysis began on the 2030 scenario to evaluate the system and to find where the required improvements to the existing system are, besides any future projects to accommodate the new growth areas.

4.3.1.1 Hydraulic Criteria

Hydraulic criteria used for this analysis include capacity deficiency and design criteria. Capacity deficiency criteria identify the need to replace an existing facility, while design criteria determine the size of new facilities. These criteria were established based on the Texas Commission on Environmental Quality (TCEQ) and engineering best practices. Table 37 lists a summary of capacity deficiency criteria used for the existing system in this analysis.

Table 37: Capacity Deficiency Criteria for Existing Facilities

Item	Recommended Value
Maximum Allowable Flow Depth	No sanitary sewer overflows (SSOs)
Force Main Velocity	Maximum velocity of 8 ft/s under peak wet weather flow
Pump Station Capacity	Peak design flow (from 5-year, 24-hour design storm) not to exceed firm capacity (i.e., capacity with the largest pump out of service)

Table 38 lists a summary of design criteria used for new sewer facilities.

Table 38: Design Criteria for New Sewer Facilities

Item	Recommended Value
Maximum Allowable Flow Depth	Maximum depth-to-diameter (d/D) of 1.0 (full pipe) under peak design flow (from 5-year, 24-hour design storm)
Force Main Velocity	Minimum velocity of 2 ft/s (for a pump station with two pumps, with one pump in operation) Maximum velocity of 8 ft/s under peak wet weather flow
Pump Station Capacity	Peak design flow not to exceed firm capacity (i.e., capacity with the largest pump out of service)
Minimum Gravity Line Size	8-inch
Slopes for Gravity Lines	8-inch: 0.33% to 8.4% 10-inch: 0.25% to 6.23% 12-inch: 0.20% to 4.86% 15-inch: 0.15% to 3.62% 18-inch: 0.115% to 2.83% 21-inch: 0.095% to 2.30% 24-inch: 0.08% to 1.93% 27-inch: 0.07% to 1.65% 30-inch: 0.06% to 1.43% 33-inch: 0.055% to 1.26% 36-inch: 0.045% to 1.12%
Maximum Manhole Spacing	500 ft

4.3.1.2 Design Storm

For wet weather scenarios, a 5-year design storm with a 24-hour duration was applied to the model. For the City of Schertz, the rainfall depth provided in the National Oceanic and Atmospheric Association's Atlas 14 precipitation frequency estimates is 5.4 inches.

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The rainfall depth was distributed over time using the Soil Conservation Service (SCS) rainfall distribution Type III, representing the rainfall temporal distribution type happening in the Gulf of Mexico and Atlantic coastal areas (TR-55 Cover (hydrocad.net)). The same hyetograph in section 4.2.1 is applicable to this evaluation.

4.3.1.3 Inflow & Infiltration Assumption

The RTK hydrographs developed from the field monitoring data for the existing system model were used to represent the inflow and infiltration (I&I) for the existing infrastructure and service areas. In addition to utilizing diurnal curves to incorporate peak dry flow, a peaking factor of 4 was applied to represent the effect of I&I for future loadings outside the existing service areas where there is no historical data is available. The assumption was that new infrastructure would meet current standards and would therefore be less susceptible to I&I.

4.3.2 Future System Analysis & CIPs

The following scenarios were created for future system analysis:

- Dry Weather 2030 Scenario
- Wet Weather 2030 Scenario
- Dry Weather 2050 Scenario
- Wet Weather 2050 Scenario

Table 39 shows a breakdown of the dry weather flow projections for each planning period by the system outfalls.

Table 39: Breakdown of Average Dry Weather Flows by Outfalls

Outfall	Estimated Average DWF (gpm)		
	Existing	2030	2050
Whisper Branch	16	16	16
NBU	19	19	60
O-4	469	707	934
SARA	22	68	92
Bubbling Springs	1,960	2,023	2,178
Aztec Way	21	21	44
O-21-22	992	1,014	1,156
Greaves WWTP	30	-	-
Corbett	61	-	-
Halley's Cove	7	-	-
CCMA S WWTP	-	586	667
Total (gpm)	3,597	4,454	5,147
Total (MGD)	5.2	6.4	7.4

4.3.2.1 Near Term CIP Projects

The near-term project list for Schertz provided by the City was incorporated into the existing system to create future scenarios along with future sanitary loadings. Each scenario includes all the currently planned projects that will be in place by that planning year. Table 40 lists currently planned projects (near-term) provided by the City (shown in Appendix 20).

Table 40: Near Term Projects Summary

CIP Number	Project Description
Growth Projects	
NT-S1	Town Creek Phase IV 24" – Section 1
NT-S2	Town Creek Phase IV 24" – Section 2
NT-S3	Town Creek Phase V 24"
NT-S4	Upsize Lookout Line
NT-S5	Upsize Tri County Line
NT-S6	Cibolo West Main
NT-S7	Woman Hollering Creek Lift Station, Gravity Line, and Force Main
System Improvement Projects	
NT SI-1	Decommission Tri County Lift Station
NT SI-2	Decommission Corbett Lift Station
NT SI-3	Decommission Sedona Lift Station & Woman Hollering Creek WWTP

It is important to note that the pipe size was undetermined for the Cibolo West Main Trunkline. Based on the available information and hydraulic model results, LAN recommends an 18-inch pipe size for the above project. In addition, LAN received the 2021 Wastewater Collection System Master Plan for the Cibolo Creek Municipal Authority (CCMA) prepared by Kimley Horn Inc. The CCMA's CIP projects affecting the Schertz sewer system were also incorporated into each scenario based on the planning year.

4.3.2.2 2030 CIP Growth Projects

The 2030 scenario included the currently planned CIP projects for the City. To serve the new development areas happening between 2022 to 2030, LAN proposes new growth CIPs as listed in Table 41. The alignments are based on the available information regarding topographic elevations, existing roads, and engineering judgment and are to be considered as preliminary. Final alignments will be determined as part of the design process.

The design criteria listed in Table 38 was used to size the new facilities. For modeling purposes, slopes for new growth CIP lines were assumed based on the TCEQ minimum slope requirement. At some locations, higher than minimum slopes were considered to prevent extra excavation. Appendix 21 shows the location of the 2030 growth CIPs.

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Table 41: 2030 Growth Projects Summary

CIP Number	Project Description
NT-S1	Hope Lane 8" Gravity Line
NT-S2	Old Wiederstein Road 8"
NT-S3	Union Pacific Railroad 8" – Section 1
NT-S4	Union Pacific Railroad 8" – Section 2
NT-S5	Wiederstein Road 8"
NT-S6	Schaefer Road 8" – Section 1
NT-S7	Schaefer Road 8" – Section 2
NT-S8	Aranda 8"
NT-S9	Weir Road 10"
NT-S10	Trainer Hale Road 10"
NT-S11	Ware Seguin Road 8"
NT-S12	FM 1518 8"
NT-S13	I-10 8" – Section 1
NT-S14	Boenig Drive 8"
NT-S15	N Greytown Road 8"

4.3.2.3 Model Results Under 2030 Flows

After bringing in the 2030 new growth CIPs, the model was run with predicted 2030 dry weather flows. The modeling results for this scenario are presented in Appendix 22. The results show 98% of conduits have a maximum depth to diameter (d/D) of less than 0.5. It also shows gravity lines parallel to Friesenhahn Ln and upstream of the Friesenhahn lift station having maximum d/D of greater than 0.75, and gravity lines right upstream of Riata lift station having a maximum d/D between 0.5 and 0.75. This indicates these gravity lines (i.e., with maximum d/D greater than 0.5) may not accommodate the additional capacity needs from future flows and could require upsizing.

Since peak wet weather is crucial for analyzing a sewer system, the 2030 wet weather flow (average dry weather plus 5-year, 24-hour I&I) was used to determine areas that are susceptible to sanitary sewer overflows (SSOs). Note that the model shows SSOs at locations where the maximum hydraulic grade (HGL) rises above manhole rim elevations. The modeling results for this scenario are presented in Appendix 23. The results show a total of 11 manholes within the existing service areas are overflowing. Per the Capacity Deficiency Criteria listed in Table 37, the sewer system is capacity deficient at the locations where SSOs are reported by the model.

4.3.2.4 2030 CIP System Improvement Projects

LAN proposes several system improvement projects listed in Table 42 to address the SSOs. In addition, Belmont Park lift station is set to go offline by 2030 per City staff. Therefore, that lift station was set inactive in the model, and gravity lines were added to bypass it. LAN also determined that the Northcliffe (Town Creek) lift station needs to upgrade to a firm capacity of 4,800 gpm to meet TCEQ requirements (refer to section 2.5.3). Appendix 24 shows the location of the 2030 system improvement projects.

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Table 42: 2030 System Improvement Projects Summary

CIP Number	Project Description	Purpose
2030 SI-1	Friesenhahn West Line WW Upsize	To resolve 4 SSOs upstream of Friesenhahn LS.
2030 SI-2	Fairlawn WW Upsize	To resolve an SSO upstream of Riata LS.
2030 SI-3	Cibolo Crossing WW Line Upsize	To resolve an SSO near I-35 N.
2030 SI-4	Woodland Oak Drive Replacements	To resolve an SSO near Woodland Oak Dr.
2030 SI-5	Old Wiederstein WW Upsize	To increase line capacity.
2030 SI-6	Northcliffe LS Upgrade	To follow TCEQ requirement of peak flow not to exceed firm capacity. This upgrade is based on buildout flow of 4,485 gpm.
2030 SI-7	Decommission Belmont Park Lift Station	Per City request.

4.3.2.5 2030 CCMA Recommended Projects

The results of the 2030 wet weather flow scenario showed some of the CCMA's gravity lines have capacity issues that would affect the City's sewer system performance. LAN recommends the following system improvement projects related to CCMA's gravity lines (listed in Table 43 and shown in Appendix 24). Although originally listed as 2041 CCMA CIPs (Projects 2030 C-1 & 2030 C-2) and as Buildout CCMA CIP (Project 2030 C-4) in the Wastewater Collection System Master Plan prepared by Kimley Horn Inc. in 2021, LAN currently recommends these CIP projects for inclusion in the 2030 planning period.

Table 43: 2030 CCMA System Improvement Projects Summary

CIP Number	Project Description	Purpose
2030 C-1	Roy Richard Drive Replacements	To resolve 2 SSOs near Woodland Oak Dr and Valencia Ln.
2030 C-2	Valencia Lane Replacements	To resolve 2 SSOs near Woodland Oak Dr and Valencia Ln.
2030 C-3	Savannah Drive Replacements	To resolve an SSO near Maske Rd.
2030 C-4	Build Out Project 25 – 36" Schertz Line	To resolve 2 SSOs near Maske Rd.

4.3.2.6 2050 CIP Growth Projects

To develop the 2050 scenario, the system changes proposed for 2030 were used as the base. To serve the new development areas happening between 2030 to 2050, LAN proposes new growth CIPs listed in Table 44 and shown in Appendix 25. Similar to 2030 growth CIPs, the alignments are based on the available information regarding topographic elevations, existing roads, and engineering judgment, and final alignments will be determined as part of the design process. The design criteria listed in Table 38 were used to size the new facilities.

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Table 44: 2050 Growth Projects Summary

CIP Number	Project Description
2050-S1	I-35 N 8"
2050-S2	Friesenhahn Lane 8"
2050-S3	Schaefer Road 8" – Section 3
2050-S4	Corbett JH 8"
2050-S5	Lower Seguin Road 8"
2050-S6	IH-10 8" – Section 2

In addition, Schertz Pkwy, Cover's Cove, and Park lift stations are set to go offline by 2050 per City staff. Therefore, Cover's Cove and Park lift stations were set inactive in the model, and gravity lines were added to bypass that lift station. Schertz Pkwy lift station will also go offline, and its flow will be conveyed to a new CCMA line which will be built by 2050. However, due to the unavailability of information about the new CCMA's line, the Schertz Pkwy lift station was set inactive in the model and its flow was directed to a new outfall.

4.3.2.7 Model Results Under 2050 Flows

After bringing in the 2050 new growth CIPs, the model was run with predicted 2050 dry weather flows. The modeling results for this scenario are presented in Appendix 26. Similar to 2030 scenario results, 97% of conduits have a maximum depth to diameter (d/D) of less than 0.5, and only 3% of gravity lines have a maximum (d/D) of greater than 0.5. Since peak wet weather is crucial for analyzing a sewer system, the 2050 wet weather flow was used to determine areas that are susceptible to overflowing. The modeling results show no manholes are overflowing indicating the 2050 system has sufficient capacity per the Capacity Deficiency Criteria listed in Table 37. Therefore, LAN does not recommend any capacity-related CIPs for the 2050 planning period.

4.3.2.8 2050 CIP System Improvement Projects

LAN determined that Cypress Point lift station needs to upgrade to a firm capacity of 1,250 gpm to meet TCEQ requirements (refer to section 2.5.3). Table 45 describes 2050 system improvement projects shown in Appendix 27.

Table 45: 2050 System Improvement Projects Summary

CIP Number	Project Description	Purpose
2050 SI-1	Cypress Point Lift Station Upgrade	To follow TCEQ requirement of Peak flow not to exceed firm capacity. This upgrade is based on buildout flow of 1,233 gpm.
2050 SI-2	Decommission Schertz Parkway Lift Station	To convey flow to a new CCMA's line which will be built by 2050.
2050 SI-3	Decommission Park Lift Station	Per City request.
2050 SI-4	Decommission Cover's Cove Lift Station	Per City request.

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4.3.2.9 Pumping Capacity Evaluation

For pumping capacity evaluation, the existing firm capacity (i.e., capacity with the largest pump off) will be compared to peak wet weather flow at each lift station. Per TCEQ requirements, peak wet weather flow should not exceed firm capacity. Table 46 shows the results of the pumping capacity evaluation. Note that this analysis has only been conducted for public existing lift stations; private lift stations have been excluded from the study.

Table 46: Lift Station Capacity Evaluation

Lift Station Name	Number of Pumps	Capacity per pump ⁽¹⁾ (gpm)	Lift Station Firm Capacity (gpm)	Peak Existing WWF (gpm)	Peak 2030 WWF (gpm)	Peak 2050 WWF (gpm)	Note
Belmont Park	2	750	750	30	Plan to go offline by 2030		
Cover's Cove	2	75	75	4.5	5	Plan to go offline by 2050	
Cypress Point	3	915	1,012	435	997	1,233	Need upgrade by 2050 per TCEQ
Elbel	2	750	750	85	86	101	
Friesenhahn	3	1,500	1,800	772	1,293	1,610	
Homestead	2	900	900	646	737	894	
Maxfli	2	750	750	12	12	13	
Park	2	220	220	20	20	Plan to go offline by 2050	
Riata	2	750	750	660	727	728	
Schertz Pkwy	2	250	250	101	113	Plan to go offline by 2050	
Smoke Pit	2	600	600	20	20	20	
Northcliffe (Town Creek)	3	1,000	1,750	3,780	4,450	4,485	Need upgrade by 2030 per TCEQ
Corbett	2	Offline per Near-Term CIP					
Sedona	3	Offline per Near-Term CIP					
Tri-County	2	Offline per Near-Term CIP					

(1) Capacity per pump is estimated based on the pump curve for pumps within each lift station.

As seen in Table 46, except for Cypress Point and Northcliffe lift stations, all other existing lift stations have adequate capacity for existing and future peak flows since their peak flows are less than lift station firm capacities. Per TCEQ requirement, Northcliffe lift station requires an upgrade to firm capacity of 4,500 gpm based on its 2050 peak flow of 4,485 gpm, and Cypress Point lift

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station needs an upgrade to firm capacity of 1,250 gpm based on its 2050 peak flow of 1,233 gpm. Northcliffe lift station upgrade should be done as early as 2030, but Cypress Point's upgrade can wait until 2050.

4.3.2.10 Force Main Capacity Evaluation

As listed in Table 37, the hydraulic criterion for force mains is not to exceed a maximum velocity of 8 ft/s under the peak wet weather flow (average dry plus 5-year, 24-hour storm flow). Higher than 8 ft/s velocities correspond to high head loss in force mains which over time scour force main interior causing premature structural failure. Table 47 shows the results of the force main capacity evaluation.

Table 47: Force Main Capacity Evaluation

Lift Station Name	Force Main Diameter (inch)	Existing		2030		2050	
		Peak* WWF (gpm)	Velocity (ft/s)	Peak* WWF (gpm)	Velocity (ft/s)	Peak* WWF (gpm)	Velocity (ft/s)
Belmont Park	6	313	3.6	Plan to go offline by 2030			
Cover's Cove	3	89	4.0	89	4.0	Plan to go offline by 2050	
Cypress Point	8	713	4.6	810	5.2	933	6.0
Elbel	6	552	6.3	552	6.3	552	6.3
Friesenhahn	16	1,242	2	1,660	2.6	1,516	2.4
Homestead	8	553	3.5	905	5.8	908	5.8
Maxfli	4	162	4.1	162	4.1	162	4.1
Park	6	100	1.1	100	1.1	Plan to go offline by 2050	
Riata	6	321	3.7	321	3.7	321	3.7
Schertz Pkwy	6	182	2.1	182	2.1	Plan to go offline by 2050	
Smoke Pit	6	232	2.6	244	2.8	244	2.8
Northcliffe (Town Creek)	18	1,753	2.2	4,050	5.1	5,115	6.4

*Peak flows in this table represent peak flows through the force mains

All existing force mains have adequate capacity for existing and future peak flows since they have velocities below the maximum criterion (8 ft/s).

4.3.3 Summary

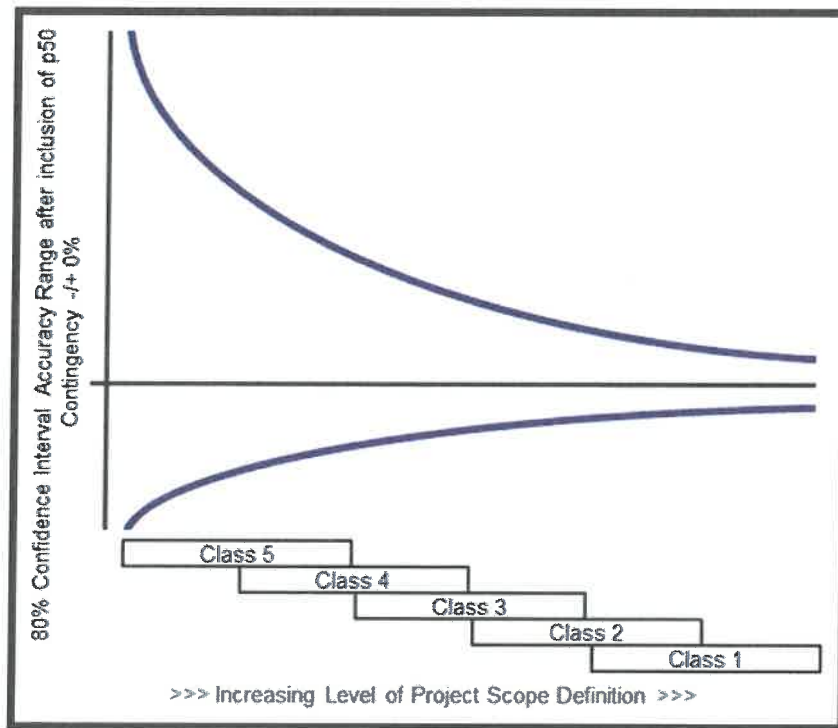
The recommendations outlined in this section were a joint effort with City personnel and LAN to identify improvements needed for the City's sewer system. These improvements aim to address capacity limitations and accommodate the anticipated growth in the planning years of 2030 and 2050. The sewer collection system model should be maintained and updated as new projects are implemented and adjusted to address changes in development schedules.

5. CIP Cost Data

5.1 Cost Data

The Association for the Advancement of Cost Engineering (AACE) provides a cost estimate classification system that includes five classes of estimates. Each class has specific characteristics that indicate the level of detail of the cost estimate, with 5 being the least defined and 1 being the most defined. These classes are commonly used industry standards for engineers, contractors, and estimators. The accuracy range of an estimate narrows (becomes more accurate) as the project scope becomes more defined as shown in Figure 29 from AACE below. In the same figure, the approximate overlap of classes is shown as well in relation to the level of scope definition.

Figure 29: AACE Cost Estimate Classes



For this analysis, Class 4 estimating was identified as the appropriate, industry standard, estimation class. According to AACE, Class 4 estimates “are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility and preliminary budget approval or approval to proceed to next stage”. The developed cost estimates are preliminary and rely on available information and standard preliminary engineering methods for Class 4 cost estimation. These methods were consistently applied to similar project components (e.g., pipelines, pump stations, lift stations, etc.) to facilitate comparison between different project alternatives.

2024 Water & Wastewater Master Plan & CIP

Cost data for the proposed CIP projects was obtained from the following sources:

- TxDOT Online Bid Reports (past year)
- RS Means Database
- Cost Estimates from Past & Current City Projects
- Cost Estimates from Past & Current LAN Projects

Item costs were averaged from these sources and an inflation rate was applied to the costs for 2030 and 2050, which is discussed in detail in the following section. A 30% contingency factor was applied across all cost estimates, which reflects the range of accuracy of a Class 4 estimate.

For cost components that were highly variable and unpredictable at this stage of analysis, such as developing construction documents and construction management, estimates were derived from previous project experience and included as a percentage of the total construction costs.

5.2 Inflation Rate Calculation

In order to accurately capture construction prices for the future scenarios, an average yearly inflation rate was calculated and applied to the 2030 & 2050 project cost estimates. Three sources were consulted for historical inflation indexes including RS Means, Mortenson Construction Cost Indexes, and Turner Building Cost Indexes. Varying time frames of inflation were provided by these sources, but the data was not normalized to ensure that a wide range of indexes were included in the yearly inflation rate calculation. Additionally, these indexes are the average of nationwide data. Table 48 below shows the varying time frames and their associated total and yearly inflation rates. The median yearly inflation rate of this data is 3.91%, and this value was applied to the line items in the 2030 and 2050 cost estimates. See Appendix 28 for inflation rate source data.

Table 48: Yearly Inflation Rate Calculations

Time Frame	Total Inflation Rate	Yearly Inflation Rate
RS Means Historical Inflation Indexes		
2020 to 2024	128%	6.31%
2010 to 2024	169%	3.81%
2000 to 2024	251%	3.91%
1990 to 2024	309%	3.38%
1980 to 2024	454%	3.50%
Mortenson Historical Inflation Indexes		
2020 to 2023	132%	9.65%
2010 to 2023	188%	5.93%
Turner Historical Inflation Indexes		
2020 to 2023	117%	5.27%
2010 to 2023	172%	4.25%
2000 to 2023	231%	3.70%
1996 to 2024	272%	3.77%
Average:		4.86%
Median:		3.91%

5.3 CIP Projects Estimates of Probable Cost

From the data discussed in the previous two sections, individual cost estimates were created for each CIP project and can be found in Appendix 29.

Table 49: Near Term Water CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Near Term CIP		
System Improvement Projects		
NT-W1**	Bubbling Springs 6" WL Replacement	\$763,000
NT-W2	Corbett Pump Station & 3.0 MG GST	\$8,600,000
NT-W3	Ware Seguin Pump Station Operational Improvement	\$175,000
NT-W4	12" WL from Ware Seguin to Lower Seguin	\$1,538,000
NT-W5	Fred Couples to Schwab	\$455,556
NT-W6	Schwab to Eckhardt	\$1,600,000
NT-W7**	Graytown to Pfeil	\$1,550,000
NT-W8**	FM 78 Water Line Replacement	\$875,000
NT-W9**	Moonlight Meadow Dr & Lost Meadow Dr WL Replacement	\$3,000,000
NT-W10**	Robinhood Way WL Replacement	\$4,650,000
NEAR TERM TOTAL:		\$23,206,556

Note: Projects denoted by ** indicate that it has both growth & system improvement components.

2024 Water & Wastewater Master Plan & CIP

Table 50: 2030 Water CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Proposed 2030 CIP		
Growth Projects		
2030-W1	12" WL from Tri-County Extension to Cibolo Valley Drive	\$4,788,000
2030-W2	Raf Burnette Rd 12" WL Improvements	\$1,438,000
2030-W3	8" WL from Ray Corbett Dr to Lower Seguin Rd	\$3,688,000
2030-W4**	Trainer Hale Rd 2" WL Replacement & 8" WL Improvement	\$9,850,000
2030-W5**	Boenig Dr S 6" WL Replacement & 8" WL Improvement	\$6,388,000
2030-W6	Live Oak to IH-35 24" Transmission Main	\$32,075,000
2030-W7	Ware Seguin Pump Station Expansion Phase 1	\$5,213,000
2030-W8	IH-10 8" WL Improvements	\$6,063,000
2030 Growth Subtotal:		\$69,503,000
System Improvement Projects		
2030-W9	PRV Installation for Proposed Southwest Pressure Plane	\$413,000.0
2030-W10**	River Rd 6" WL Replacement	\$2,325,000
2030 System Improvement Projects Subtotal:		\$2,738,000
2030 TOTAL:		\$72,241,000

Note: Projects denoted by ** indicate that it has both growth & system improvement components.

Table 51: 2050 Water CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Proposed 2050 CIP		
Growth Projects		
2050-W1	Corbett Pump Station Expansion	\$1,663,000
2050-W2	FM 2252 8" WL Improvements	\$8,800,000
2050-W3	Ware Seguin Pump Station Expansion Phase 2	\$2,725,000
2050-W4	Beck St 6" WL Replacement	\$5,288,000
2050-W5	Raf Burnette Rd 8" WL Improvements	\$4,438,000
2050-W6	IH-35 Pump Station & 3.0 MG GST	\$42,188,000
2050-W7	IH-10 & FM 1518 8" WL Improvements	\$3,075,000
2050 Growth Subtotal:		\$68,177,000
System Improvement Projects		
2050-W8	Lower Seguin Rd 8" WL Replacement	\$4,775,000
2050 System Improvement Projects Subtotal:		\$4,775,000
2050 TOTAL:		\$72,952,000

Table 52: Near Term Wastewater CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Near Term CIP		
Growth Projects		
NT-S1	Town Creek Phase IV 24" - Section 1	\$6,875,000
NT-S2	Town Creek Phase IV 12" - Section 2	\$2,925,000
NT-S3	Town Creek Phase V 24"	\$10,425,000
NT-S4**	Upsize Lookout Line	\$3,838,000
NT-S5**	Upsize Tri County Line	\$2,084,800
NT-S6	Cibolo West Main	\$16,213,000
NT-S7	Woman Hollering Creek Lift Station, Gravity Lines, and Force Main	\$3,400,000+
Near Term Growth Subtotal:		\$45,760,800
System Improvement Projects		
NT SI-1	Decommission Tri County Lift Station	\$88,000
NT SI-2	Decommission Corbett Lift Station	\$1,500,000
NT SI-3	Decommission Sedona Lift Station & Woman Hollering Creek WWTP	\$175,000
Near Term System Improvement Projects Subtotal:		\$1,763,000
NEAR TERM TOTAL:		\$47,523,800

Note: Projects denoted by ** indicate that it has both growth & system improvement components.

+Original 2009 master plan cost was \$9,000,000 and the 2024 construction cost was \$13,000,000 resulting in a difference of \$3,400,000.

2024 Water & Wastewater Master Plan & CIP

Table 53: 2030 Wastewater CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Proposed 2030 CIP		
Growth Projects		
2030-S1	Hope Lane 8" Gravity Line	\$2,025,000
2030-S2	Old Wiederstein Road 8"	\$1,338,000
2030-S3	Union Pacific Railroad 8" - Section 1	\$2,563,000
2030-S4	Union Pacific Railroad 8" - Section 2	\$400,000
2030-S5	Wiederstein Road 8"	\$1,663,000
2030-S6	Schaefer Road 8" - Section 1	\$4,913,000
2030-S7	Schaefer Road 8" - Section 2	\$1,938,000
2030-S8	Aranda 8"	\$475,000
2030-S9	Weir Road 10"	\$2,525,000
2030-S10	Trainer Hale Road 10"	\$1,038,000
2030-S11	Ware Seguin Road 8"	\$3,113,000
2030-S12	FM 1518 8"	\$400,000
2030-S13	I-10 8" - Section 1	\$2,713,000
2030-S14	Boenig Drive 8"	\$2,963,000
2030-S15	N Greytown Road 8"	\$1,275,000
2030 Growth Subtotal:		\$29,342,000
System Improvement Projects		
2030 SI-1**	Friesenhahn West Line WW Upsize	\$8,175,000
2030 SI-2**	Fairlawn WW Upsize	\$1,375,000
2030 SI-3**	Cibolo Crossing WW Line Upsize	\$1,288,000
2030 SI-4**	Woodland Oak Drive Replacements	\$338,000
2030 SI-5**	Old Wiederstein WW Upsize	\$5,050,000
2030 SI-6**	Northcliffe Lift Station Upgrade	\$7,838,000
2030 SI-7	Decommission Belmont Park Lift Station	\$463,000
2030 System Improvement Projects Subtotal:		\$24,527,000
2030 TOTAL:		\$53,869,000

Note: Projects denoted by ** indicate that it has both growth & system improvement components.

2024 Water & Wastewater Master Plan & CIP

Table 54: 2050 Wastewater CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost
Proposed 2050 CIP		
Growth Projects		
2050-S1	I-35 N 8"	\$9,088,000
2050-S2	Friesenhahn Lane 8"	\$6,500,000
2050-S3	Schaefer Road 8" - Section 3	\$5,713,000
2050-S4	Corbett JH 8"	\$2,888,000
2050-S5	Lower Seguin Road 8"	\$1,338,000
2050-S6	I-10 8" - Section 2	\$3,338,000
2050 Growth Subtotal:		\$28,865,000
System Improvement Projects		
2050 SI-1	Cypress Point Lift Station Upgrade	\$1,463,000
2050 SI-2	Decommission Schertz Parkway Lift Station	\$238,000
2050 SI-3	Decommission Park Lift Station	\$3,663,000
2050 SI-4	Decommission Cover's Cove Lift Station	\$238,000
2050 System Improvement Projects Subtotal:		\$5,602,000
2050 TOTAL:		\$34,467,000

6. LIST OF APPENDICES

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Appendix 2 – Zoning Map

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Appendix 4 - 30-Year Housing Distribution Projections

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Appendix 6 - Planned & Existing Residential Developments Comparison to Water CCN

Appendix 7 - Planned & Existing Commercial Development Comparison to Wastewater CCN

Appendix 8 - Planned & Existing Commercial Developments Comparison to Water CCN

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Appendix 10 - Water CCN Service Area & Comprehensive Land Use

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SECTION 4

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Appendix 24 – 2030 Wastewater System Improvement Projects

Appendix 25 – 2050 Wastewater System Growth Projects

Appendix 26 – Max Depth to Diameter With 2050 Dry Weather Flows

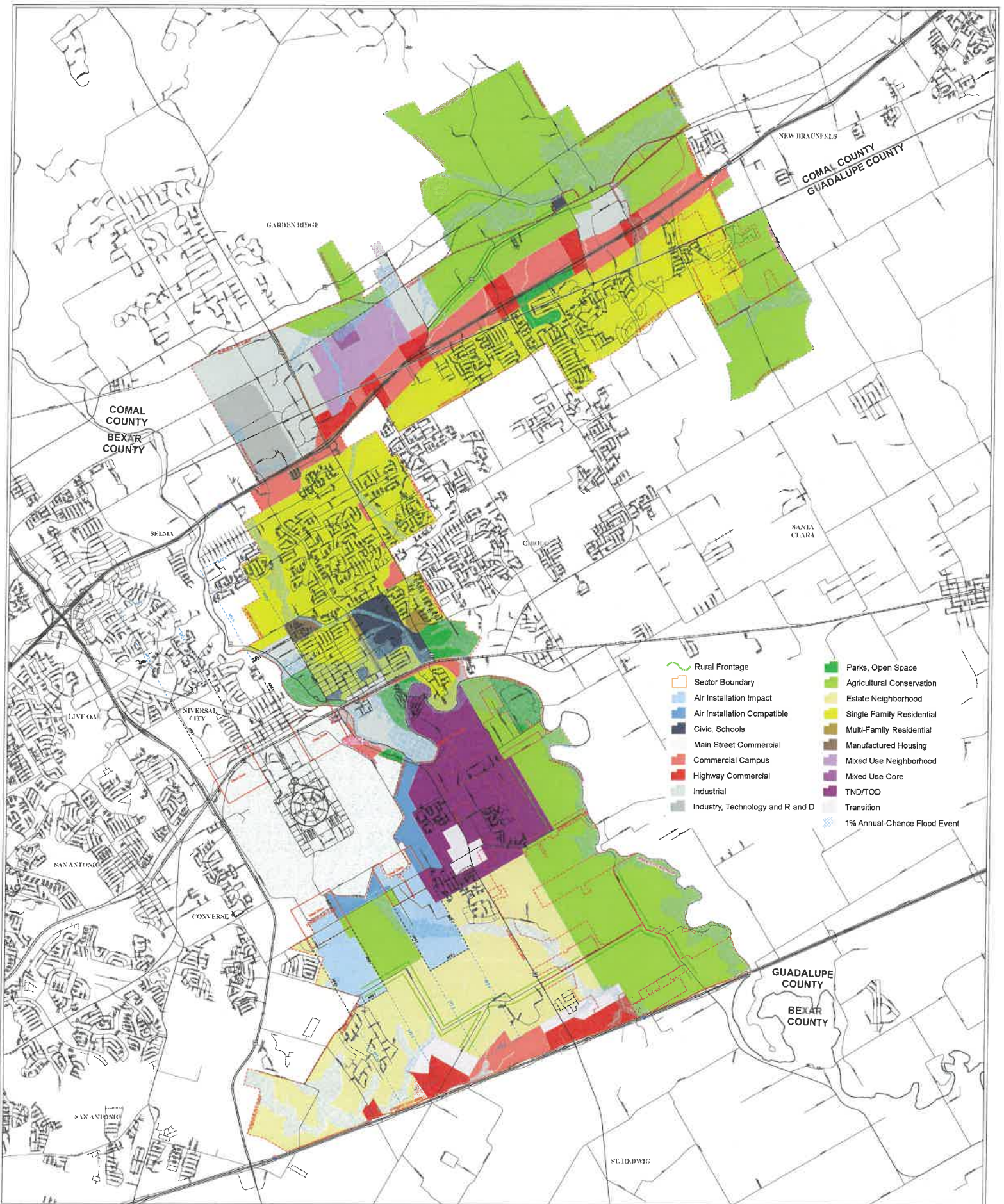
Appendix 27 – 2050 Wastewater System Improvement Projects

SECTION 5

Appendix 28 – Inflation Rate Calculation Sources

Appendix 29 – CIP Projects Cost Estimates

APPENDIX 1 - 2018 COMPREHENSIVE LAND USE PLAN



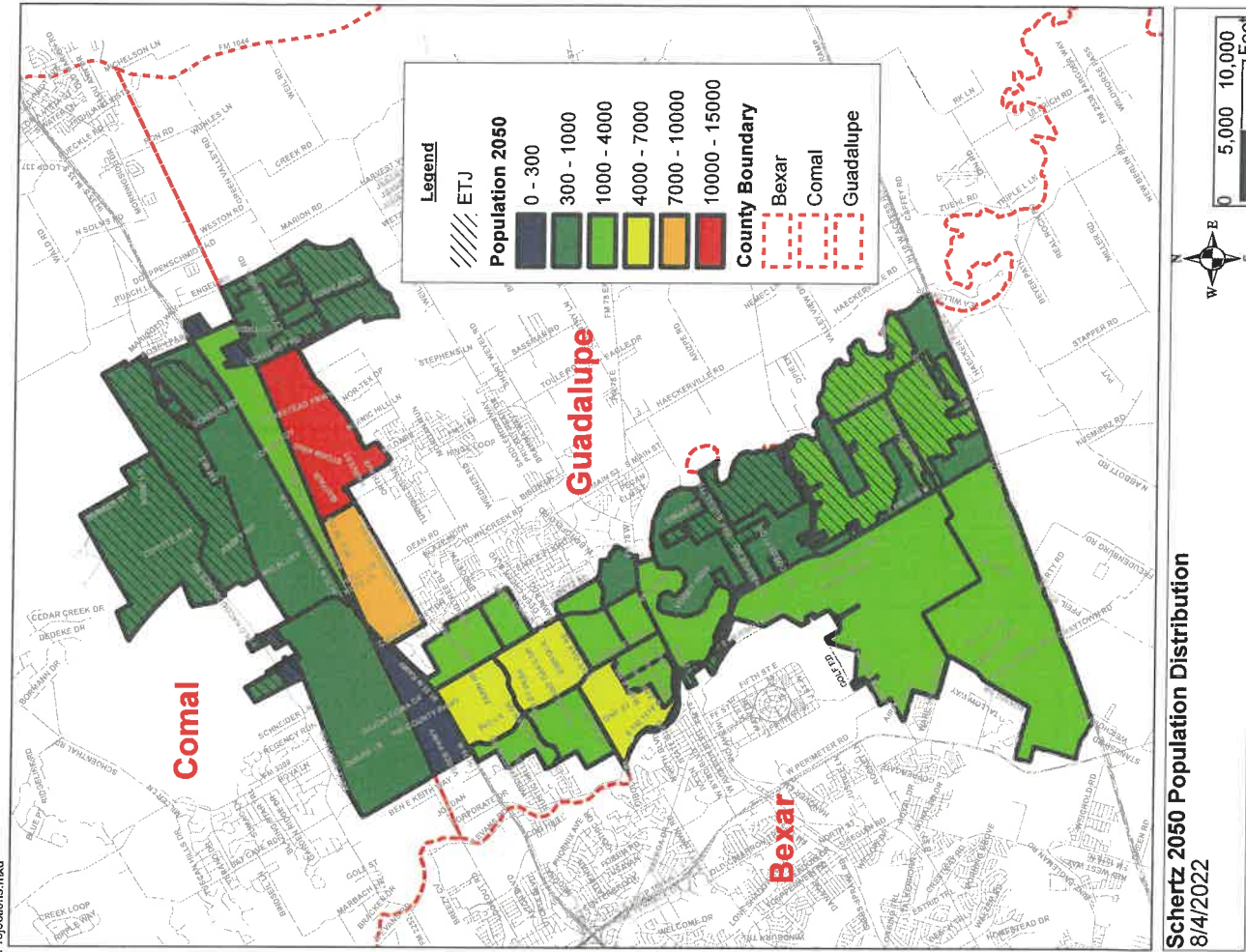
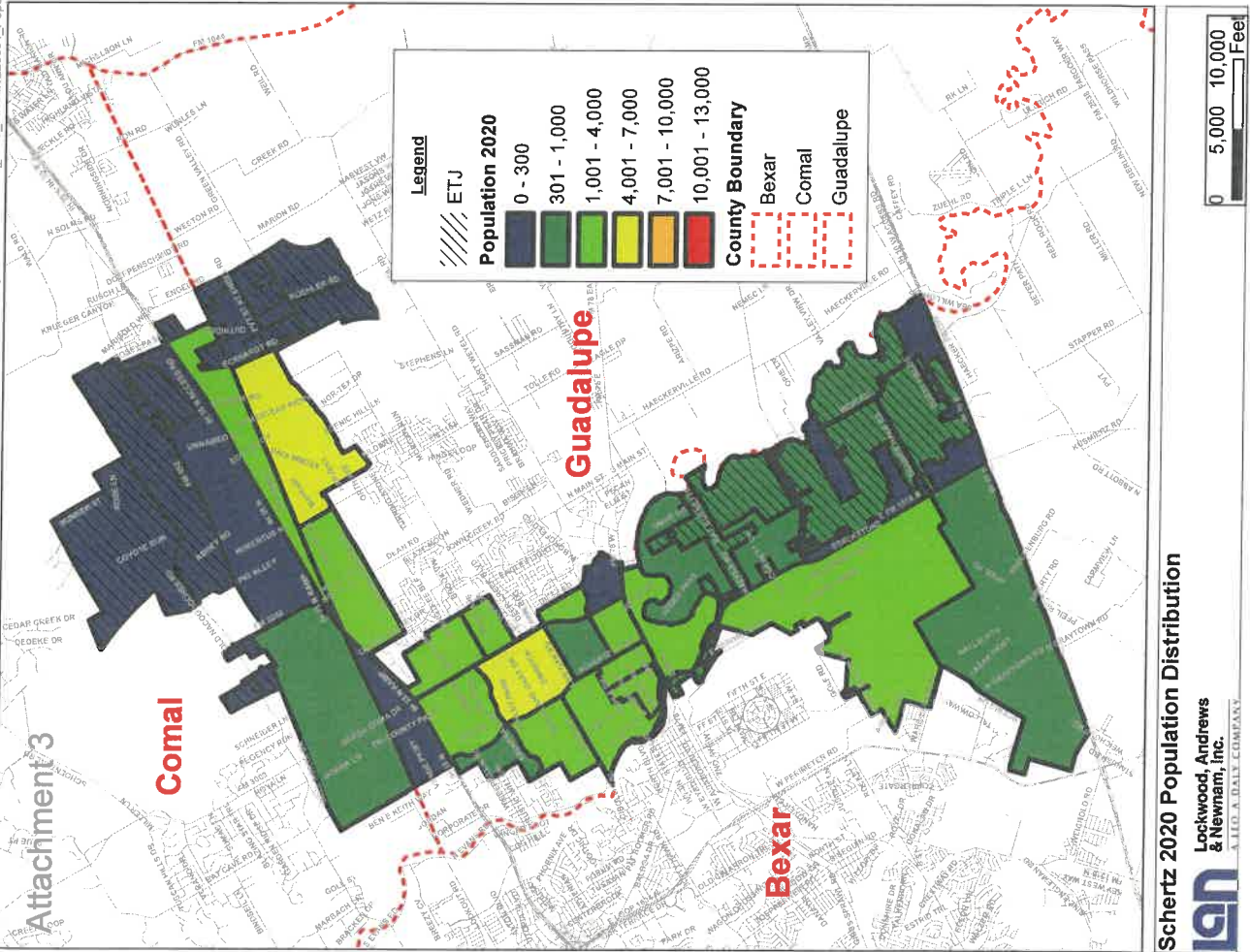
APPENDIX 2 - ZONING MAP

8/4/2022



APPENDIX 3 - 30 YEAR POPULATION DISTRIBUTION PROJECTIONS

Attachment 3

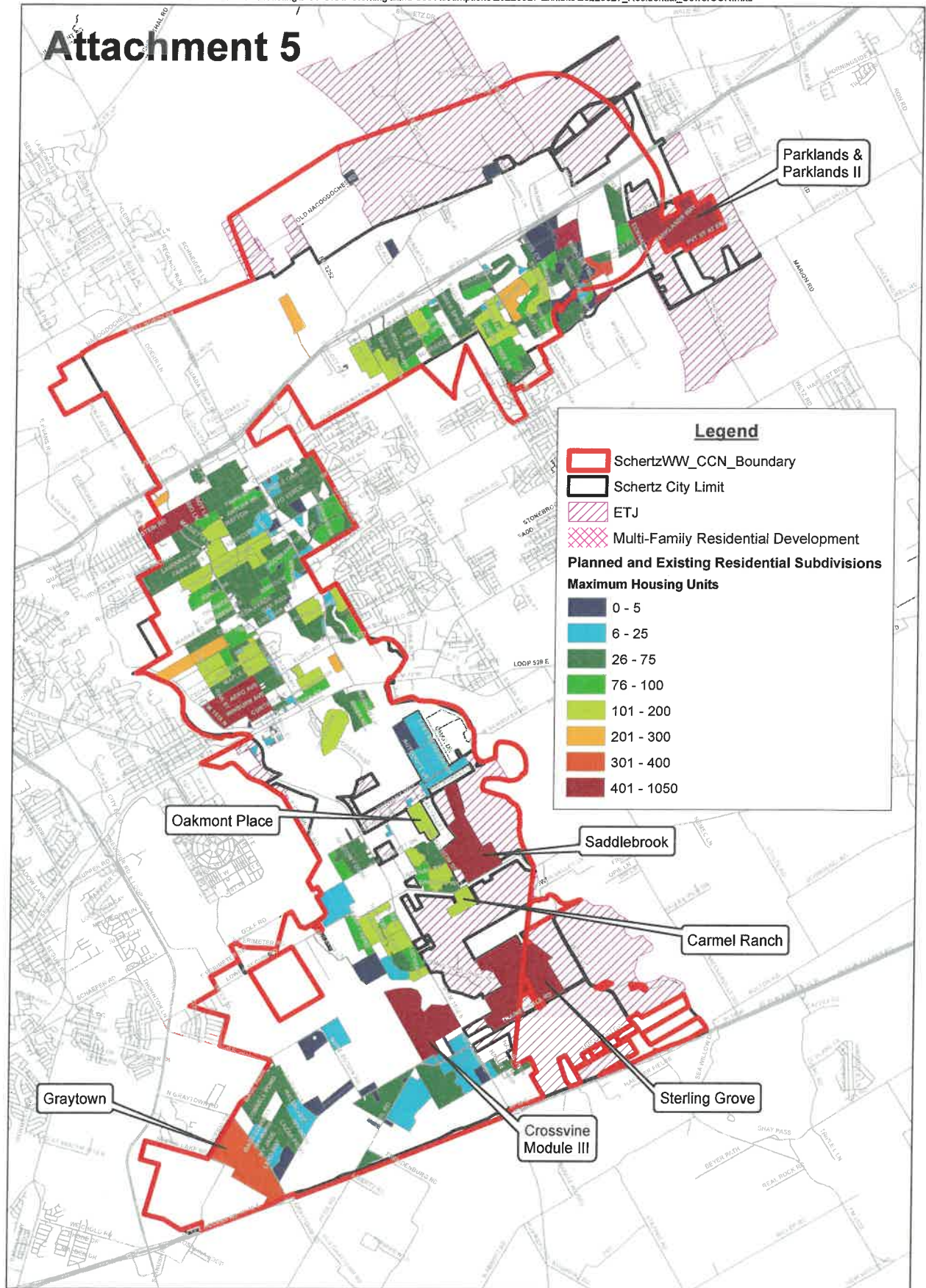


APPENDIX 4 - 30 YEAR HOUSING DISTRIBUTION PROJECTIONS



**APPENDIX 5 - PLANNED &
EXISTING RESIDENTIAL
DEVELOPMENTS COMPARISON
TO WASTEWATER CCN**

Attachment 5



Schertz Planned and Existing Residential Developments Comparison to Wastewater CCN Service Area

8/8/2022



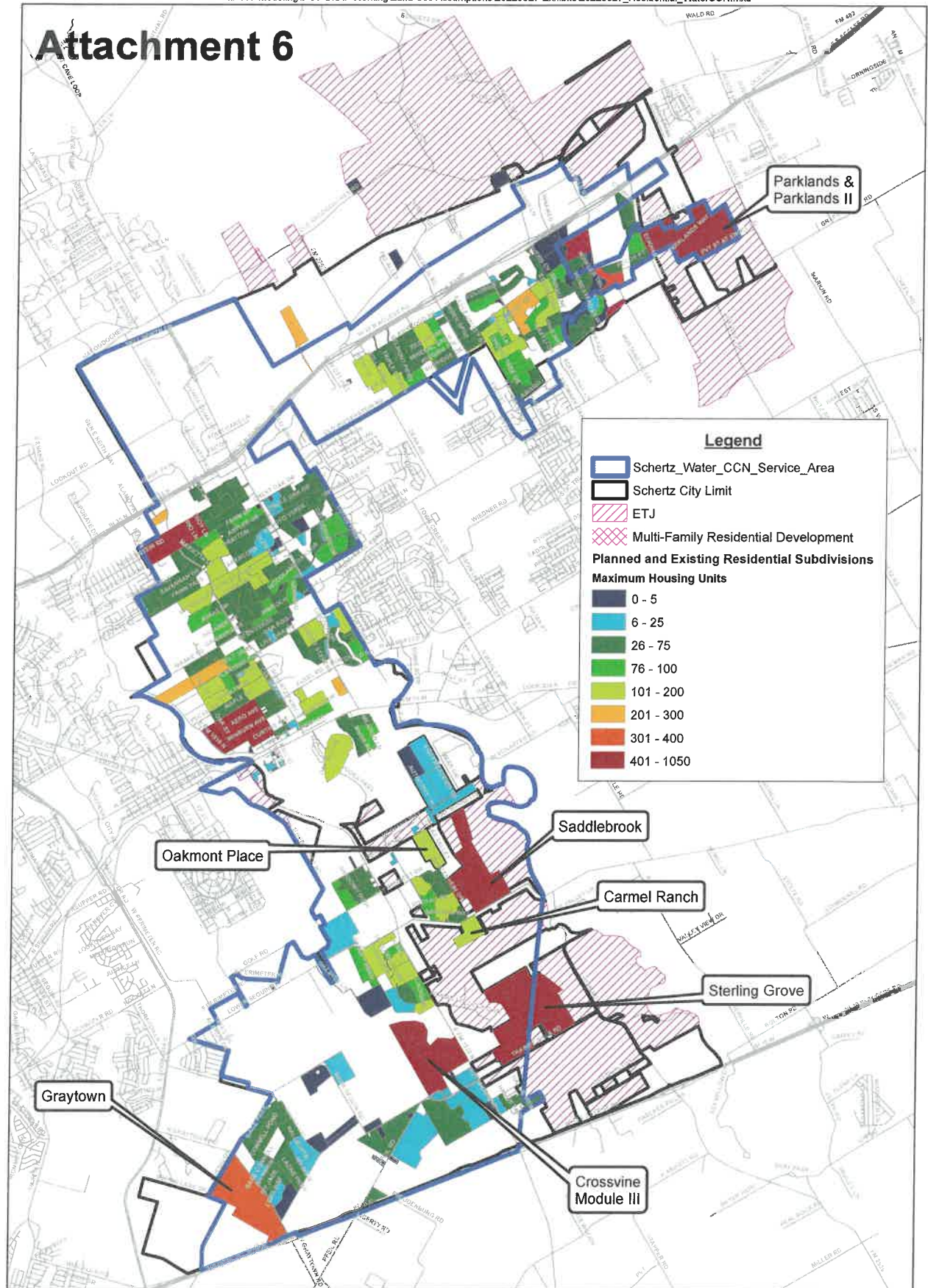
**Lockwood, Andrews
& Newnam, Inc.**
A LEO A DALY COMPANY



0 5,000 10,000 Feet

**APPENDIX 6 - PLANNED &
EXISTING RESIDENTIAL
DEVELOPMENTS COMPARISON
TO WATER CCN**

Attachment 6



Schertz Planned and Existing Residential Developments Comparison to Water CCN Service Area
8/8/2022



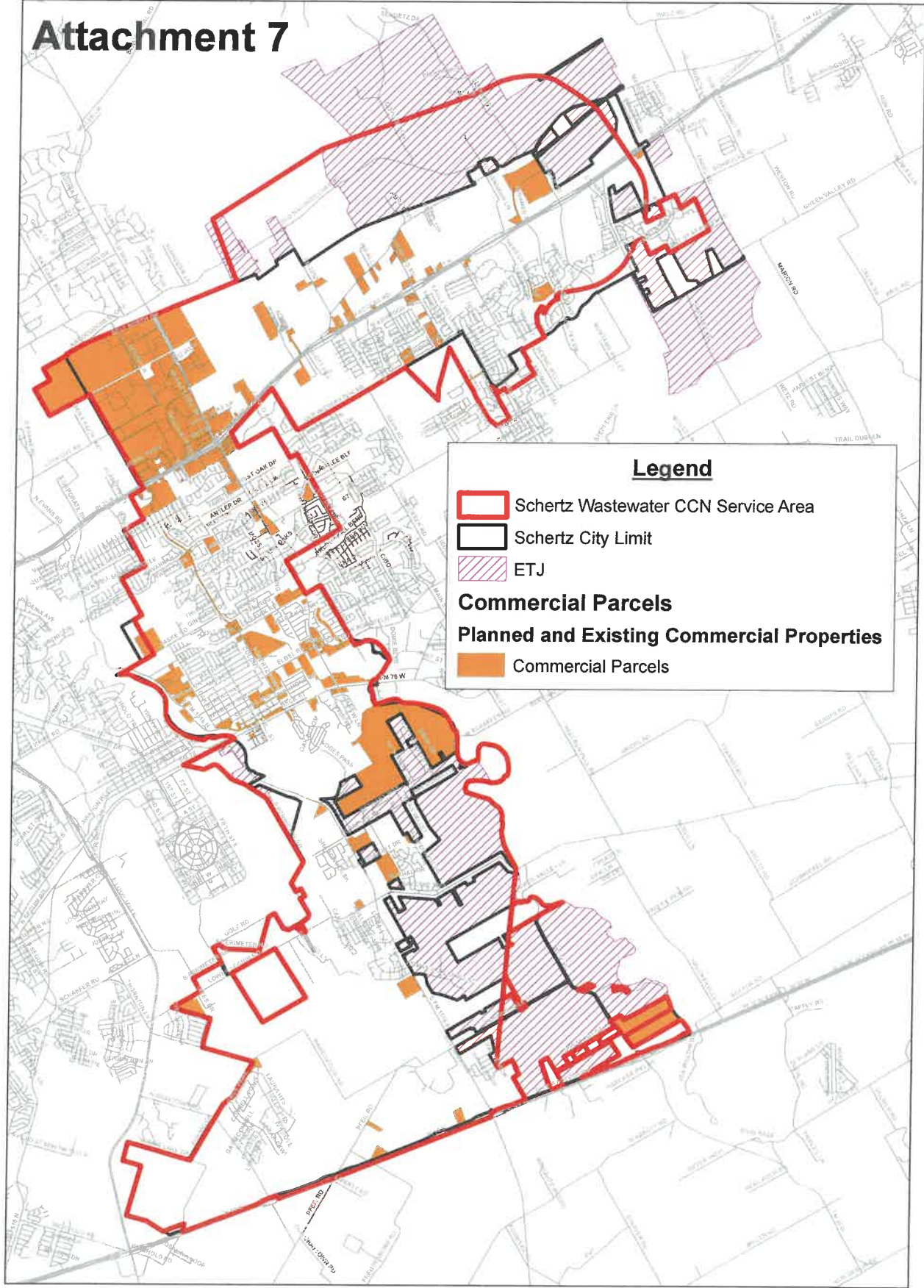
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& Newnam, Inc.**
A LEO A DALY COMPANY



0 5,000 10,000 Feet

APPENDIX 7 - PLANNED & EXISTING COMMERCIAL DEVELOPMENTS COMPARISON TO WASTEWATER CCN

Attachment 7



Schertz Planned and Existing Commercial Developments Comparison to Wastewater CCN Service Area

8/16/2022



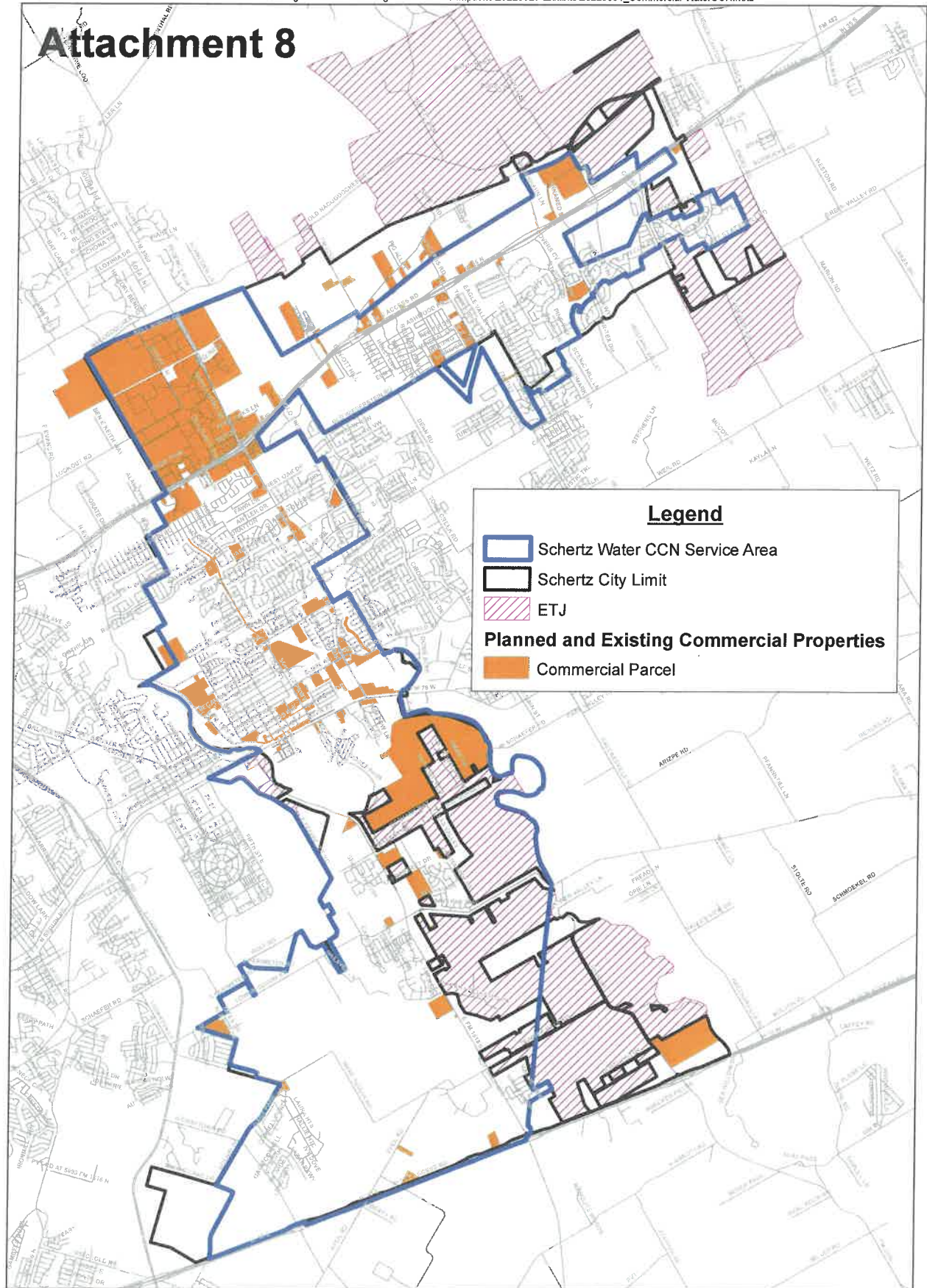
**Lockwood, Andrews
& Newnam, Inc.**
A LEO A DALY COMPANY



0 5,000 10,000
Feet

**APPENDIX 8 - PLANNED &
EXISTING COMMERCIAL
DEVELOPMENTS COMPARISON
TO WATER CCN**

Attachment 8



**Schertz Planned and Existing Commercial Developments
Comparison to Water CCN Service Area**
8/16/2022



**Lockwood, Andrews
& Newnam, Inc.**
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0 5,000 10,000
Feet

APPENDIX 9 - WASTEWATER CCN SERVICE AREA & COMPREHENSIVE LAND USE

Attachment 9



- ETJ
- Schertz City Limit
- Schertz Sewer CCN Service Area
- Schertz Sewer CCN Service Area

Legend

- | Future Land Use | |
|---------------------------|---------------------------|
| Agricultural Conservation | Mixed Use |
| Air Installation | Multi-Family Residential |
| Civic, Schools | Parks, Open Space |
| Commercial | Single Family Residential |
| Industrial | Transition |

**Schertz
CCN Sewer Service Area Map
Supported Land Uses**
8/8/2022

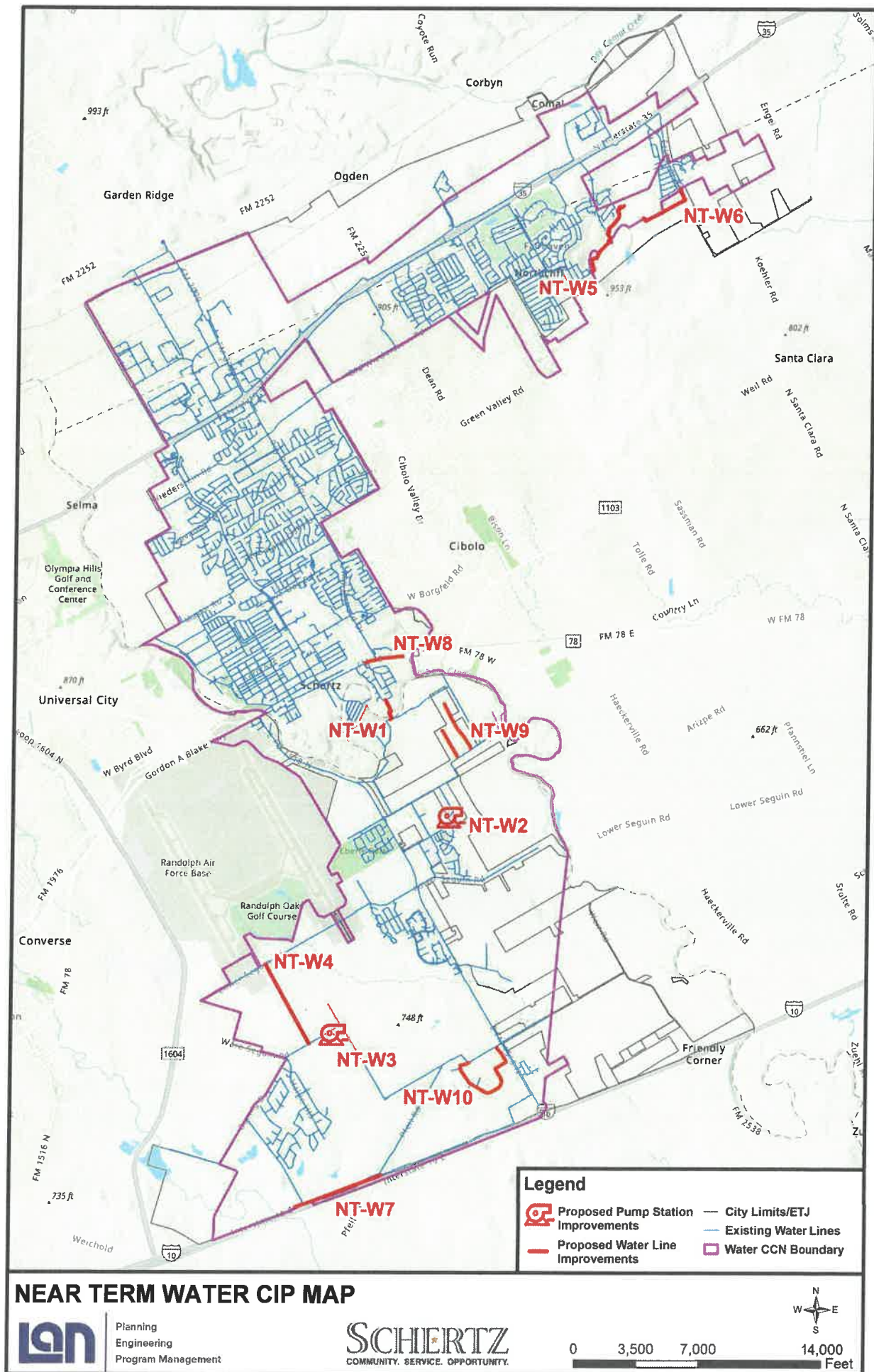


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APPENDIX 10 - WATER CCN SERVICE AREA & COMPREHENSIVE LAND USE



APPENDIX 11 - NEAR TERM WATER CIP MAP



NEAR TERM WATER CIP MAP

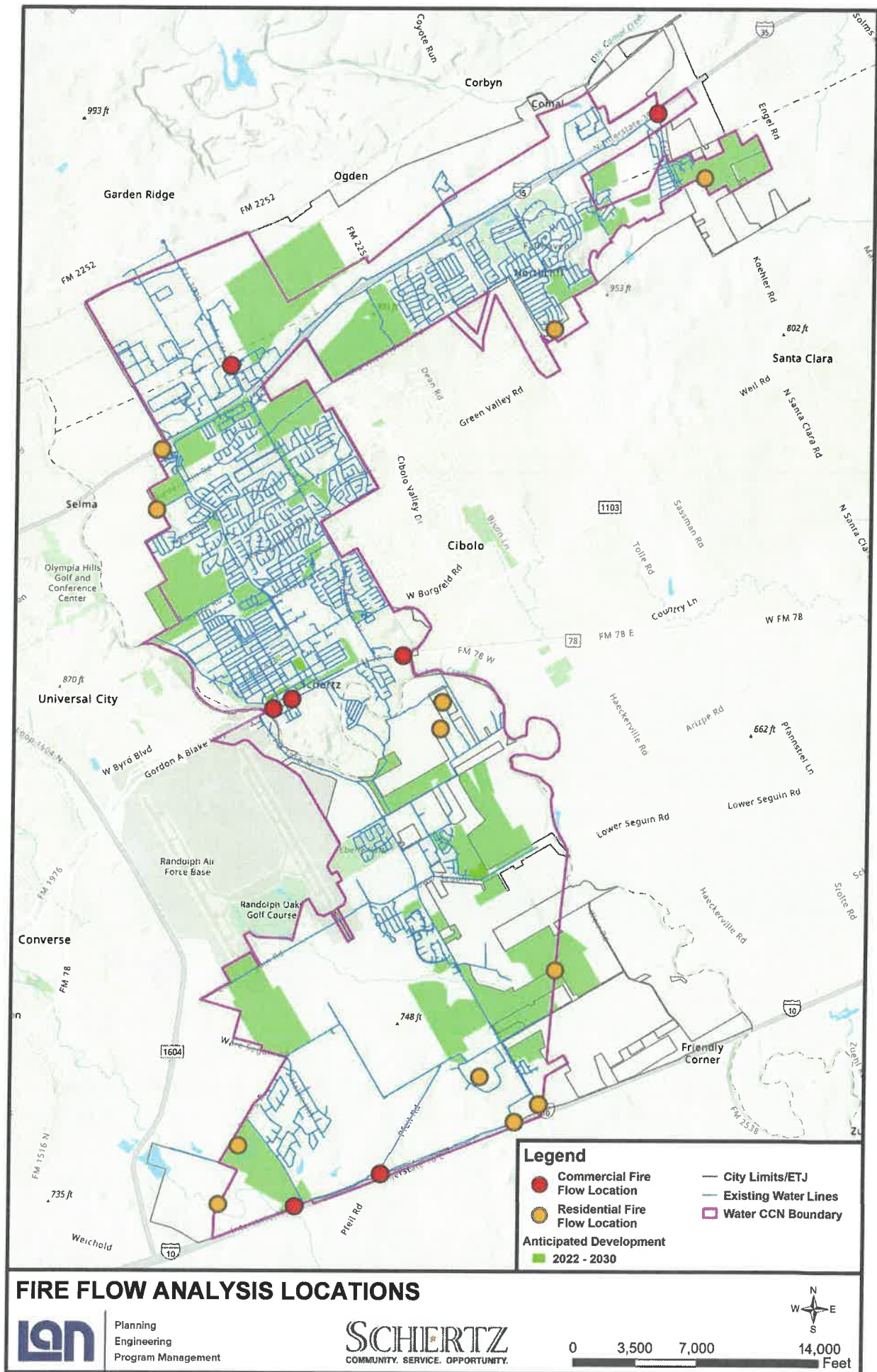


Planning
Engineering
Program Management

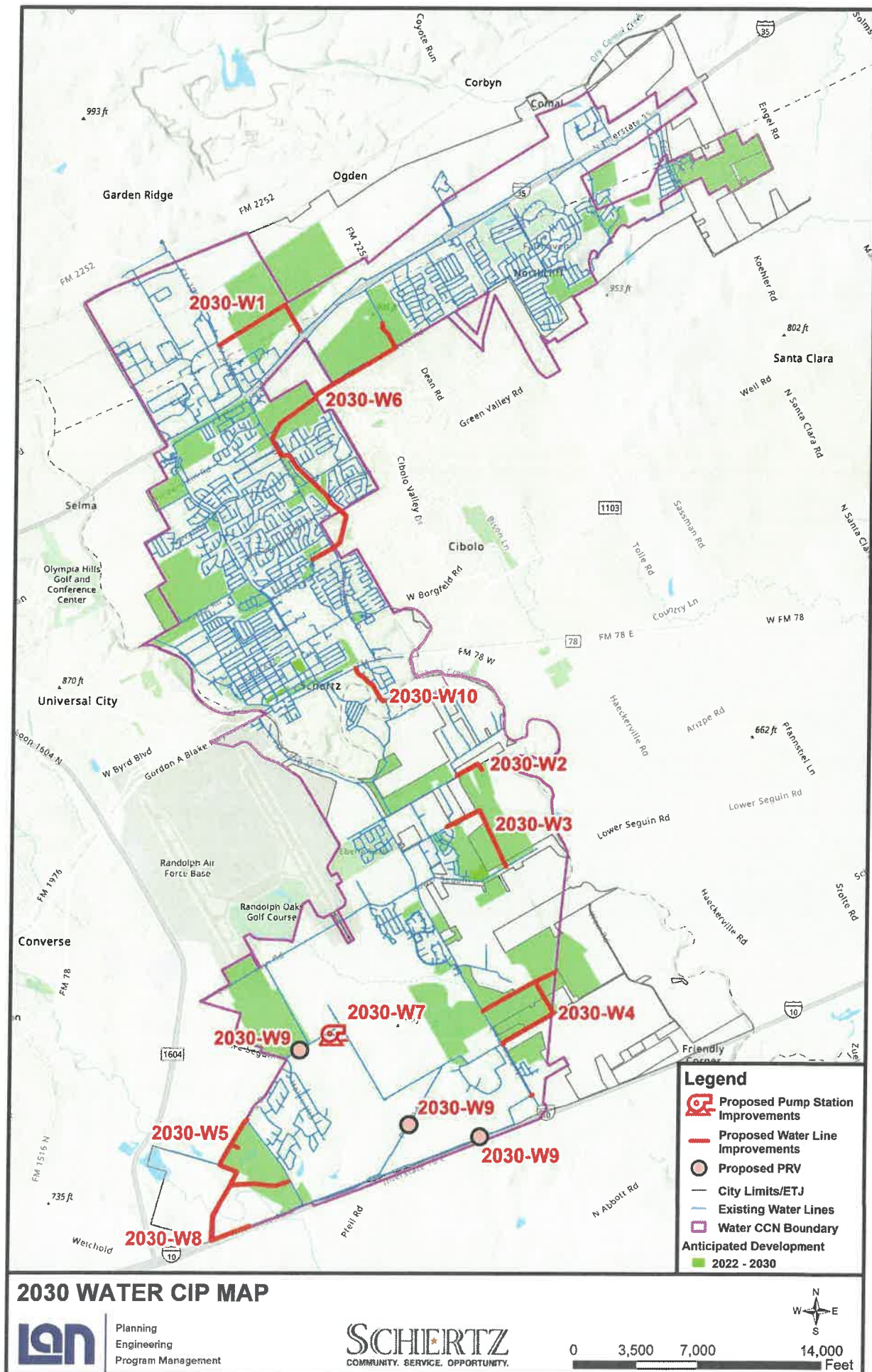
SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

0 3,500 7,000 14,000 Feet

**APPENDIX 12 - 2030
FIRE FLOW
ANALYSIS
LOCATIONS**



APPENDIX 13 - 2030 WATER CIP MAP

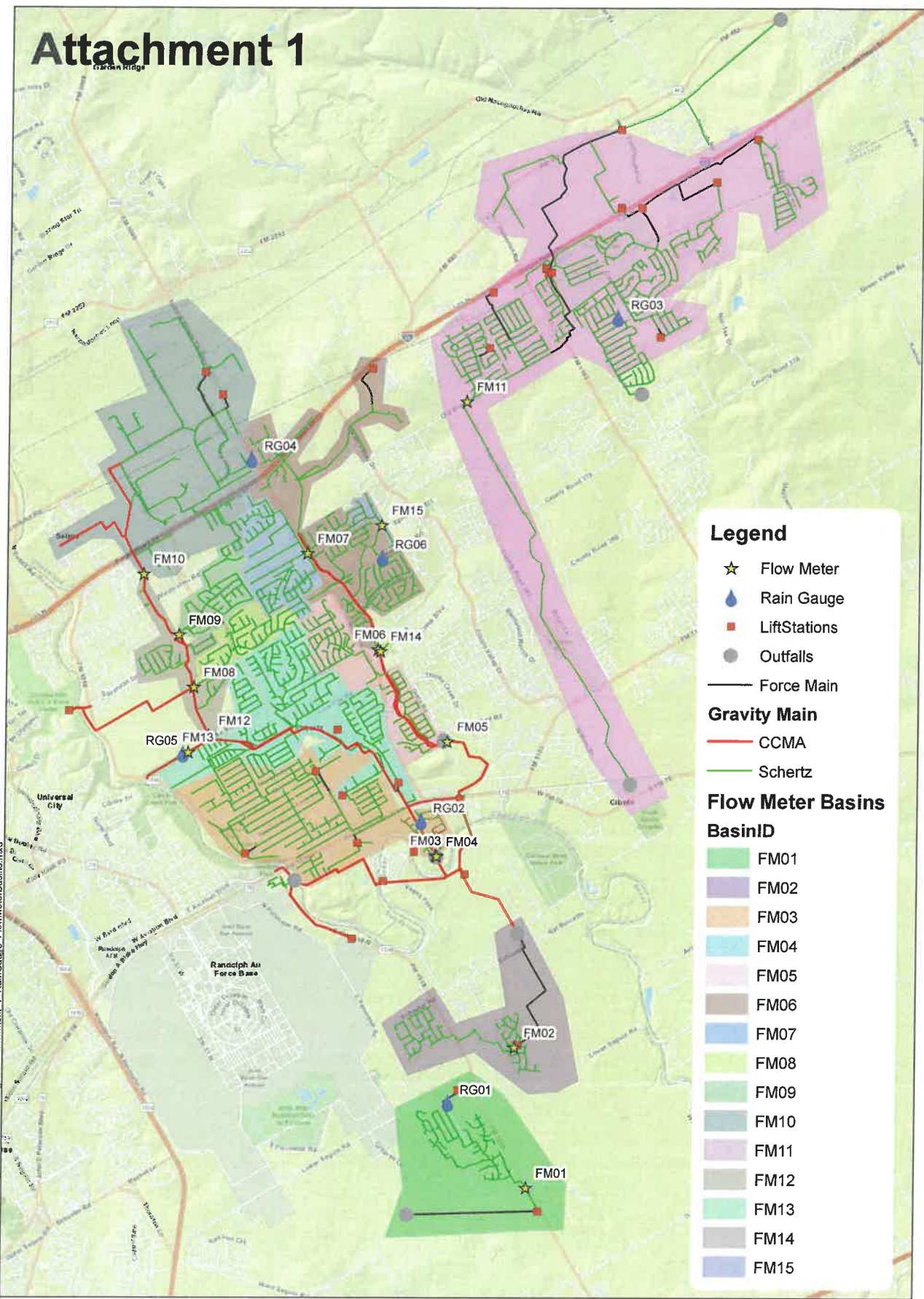


**APPENDIX 14 - 2050
FIRE FLOW
ANALYSIS
LOCATIONS**

APPENDIX 15 - 2050 WATER CIP MAP

**APPENDIX 16 - FLOW
METER, METER
BASIN, & RAIN
GAUGE LOCATION
MAP**

Attachment 1



Legend

- ★ Flow Meter
- Rain Gauge
- Lift Stations
- Outfalls
- Force Main

Gravity Main

- CCMA
- Schertz

Flow Meter Basins

BasinID

- FM01
- FM02
- FM03
- FM04
- FM05
- FM06
- FM07
- FM08
- FM09
- FM10
- FM11
- FM12
- FM13
- FM14
- FM15

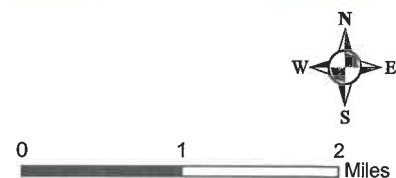
Flow Meter, Meter Basin, and Rain Gauge Location

8/26/2022



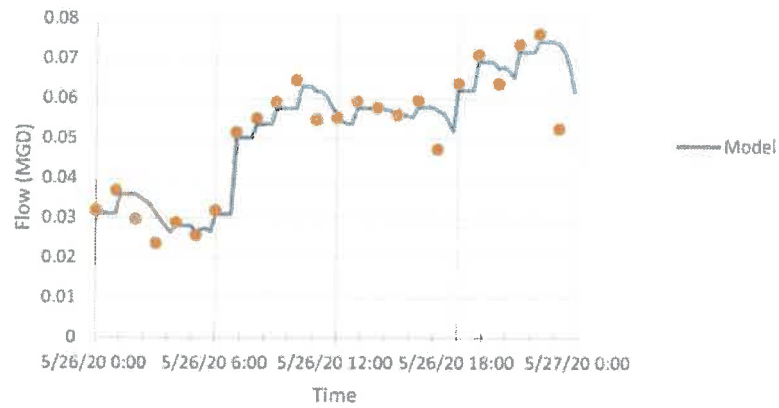
**Lockwood, Andrews
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SCHIERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

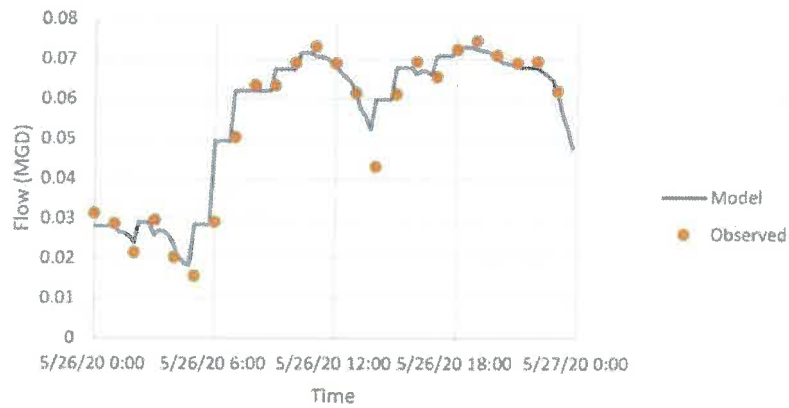


APPENDIX 17 - DRY WEATHER CALIBRATION GRAPHS

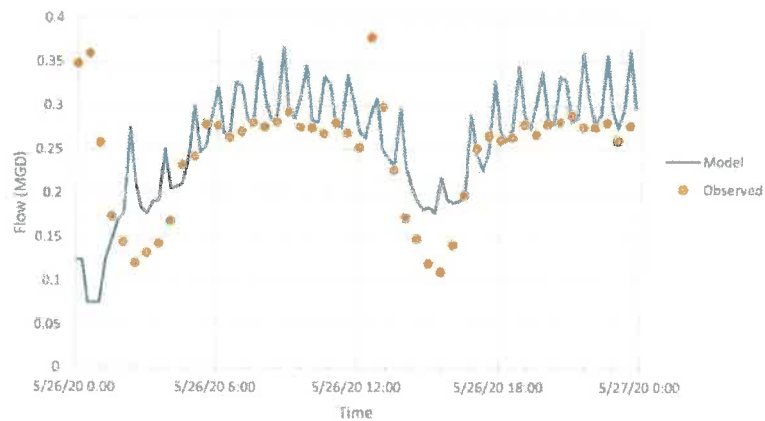
Dry Weather Calibration
FM-01



Dry Weather Calibration
FM-02



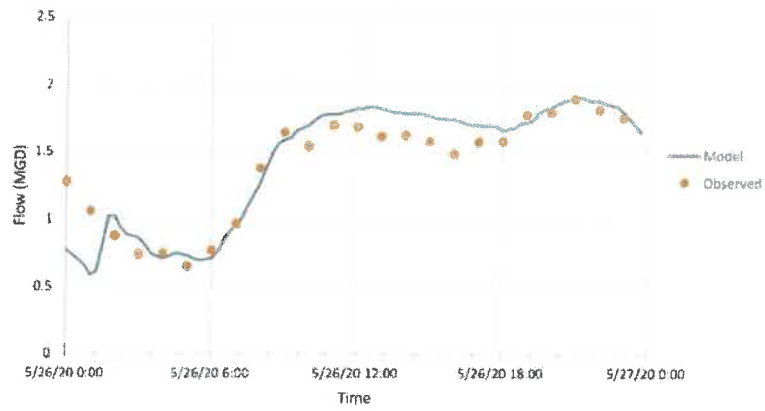
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FM-03



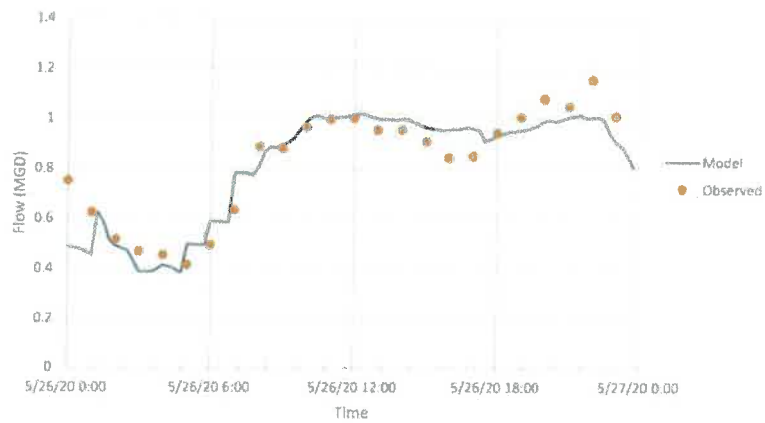
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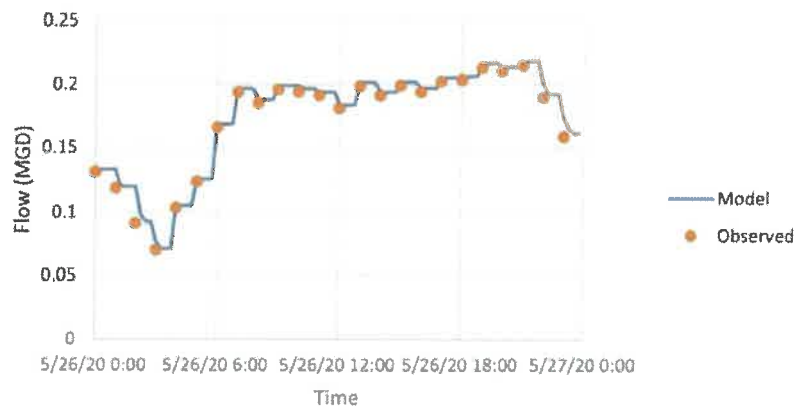
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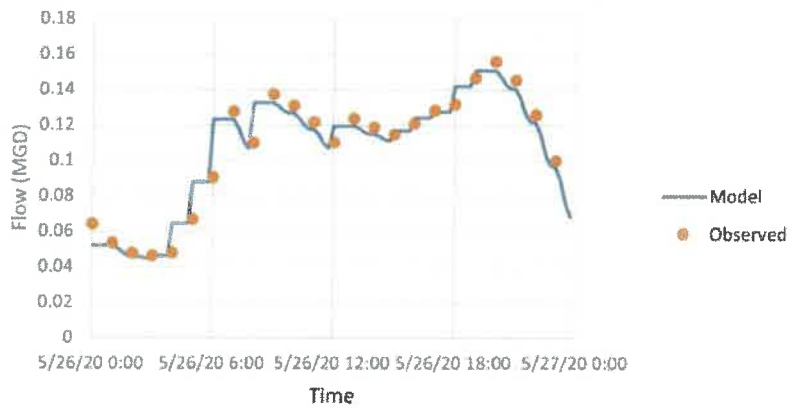
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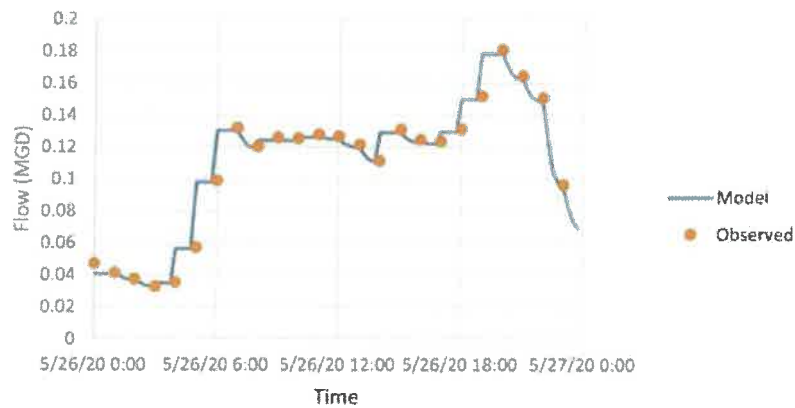
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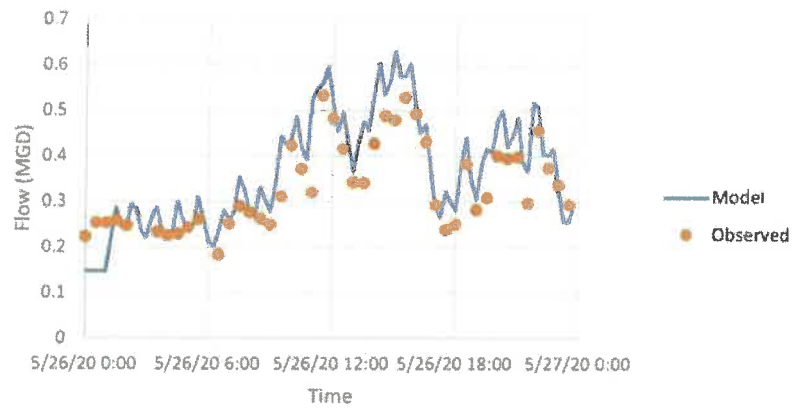
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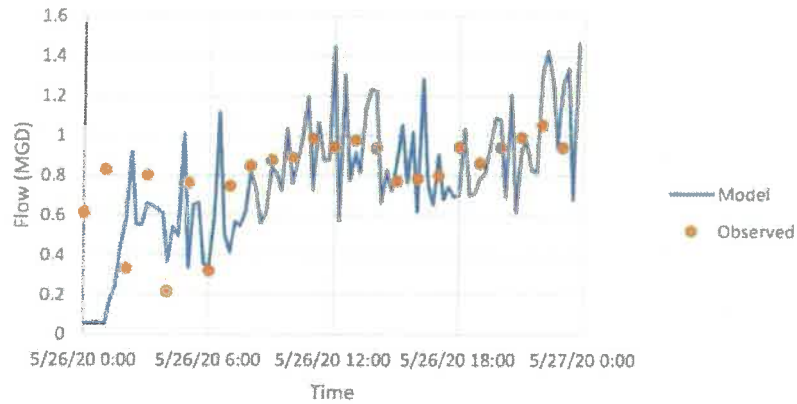
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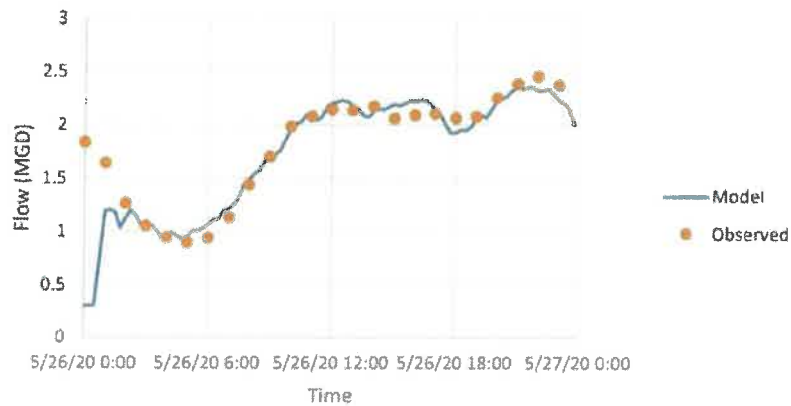
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FM-10



Dry Weather Calibration
FM-11



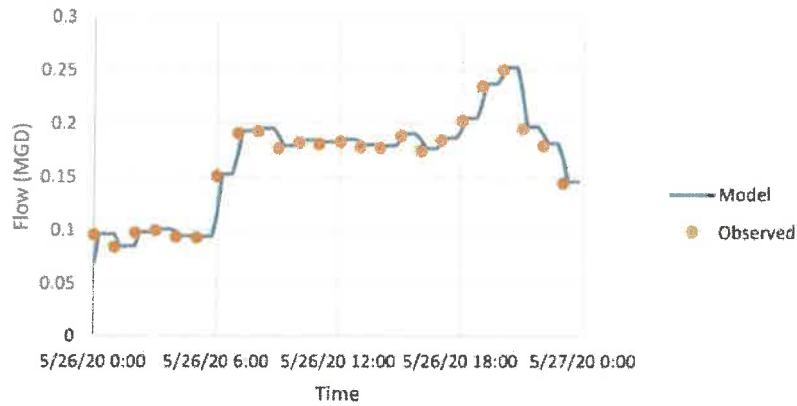
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FM-12



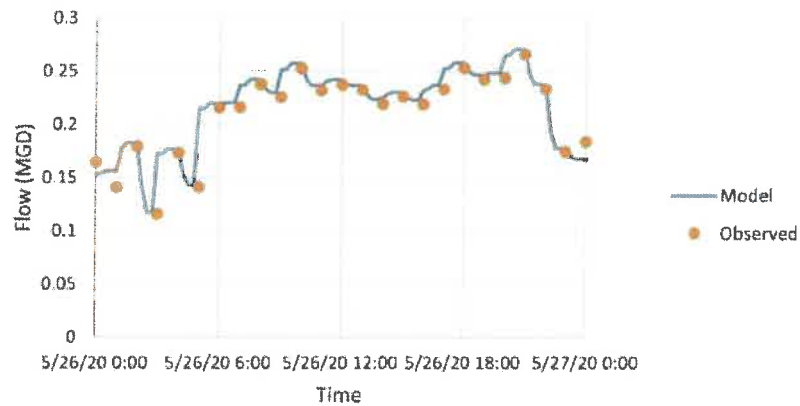
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FM-13



Dry Weather Calibration
FM-14

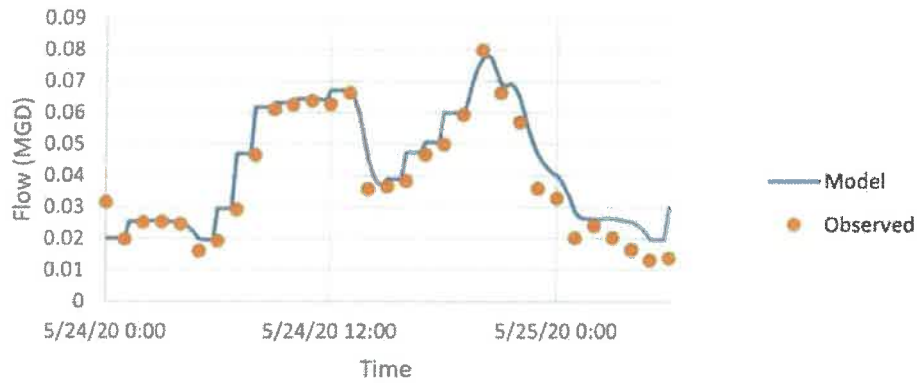


Dry Weather Calibration
FM-15

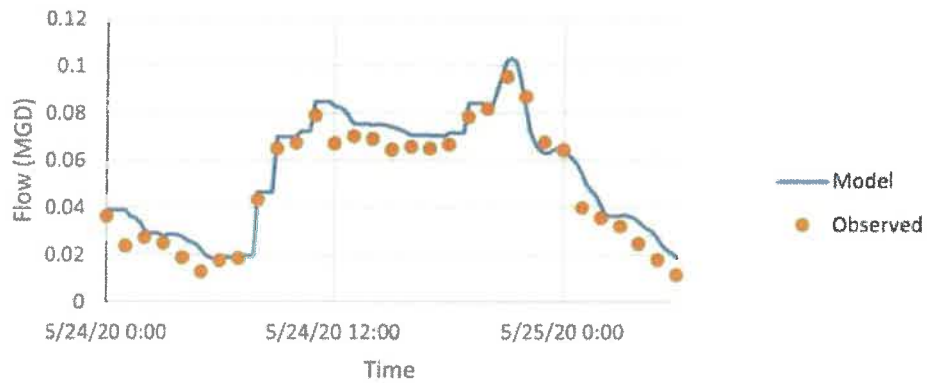


APPENDIX 18 - WET WEATHER CALIBRATION GRAPHS

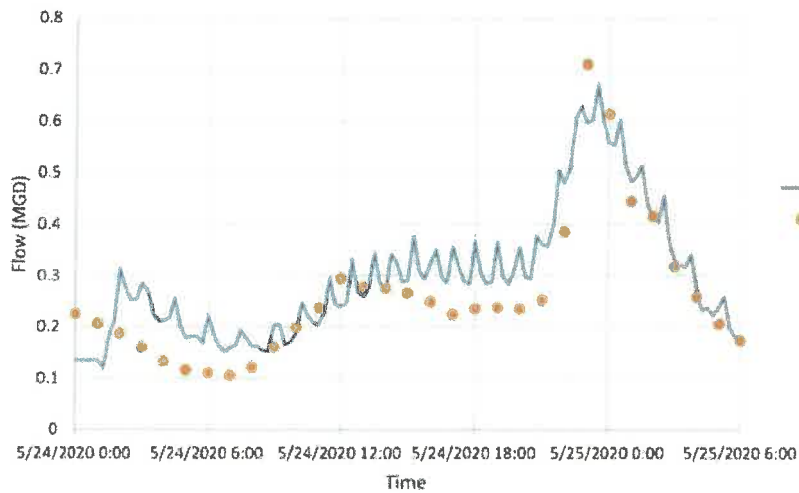
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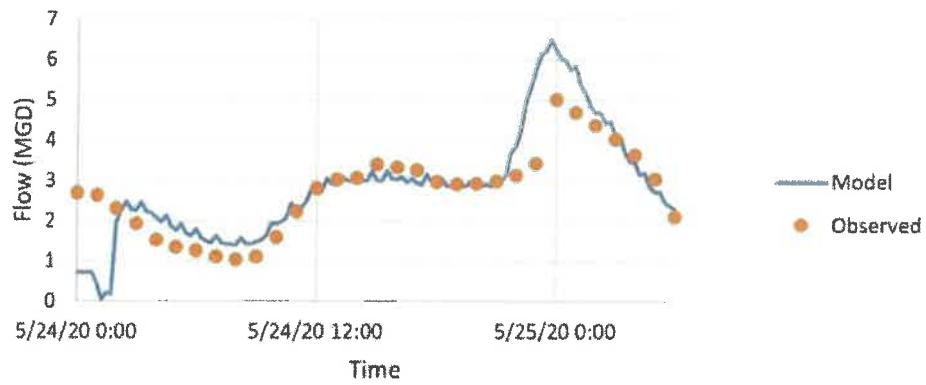
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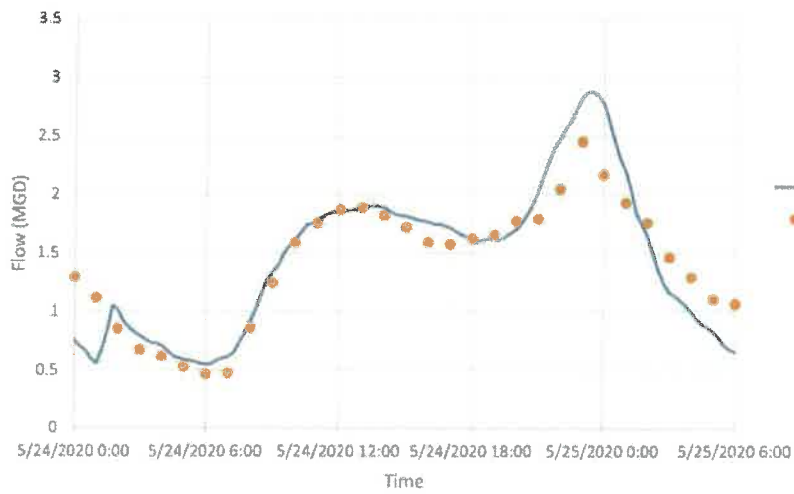
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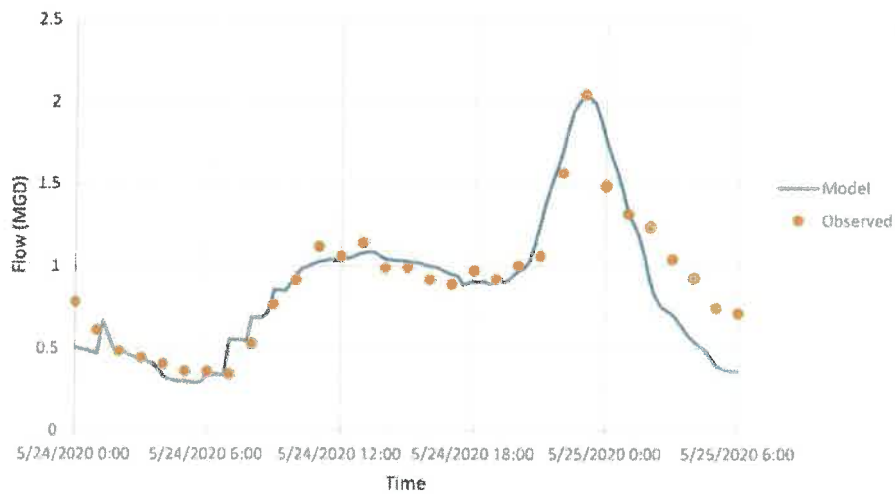
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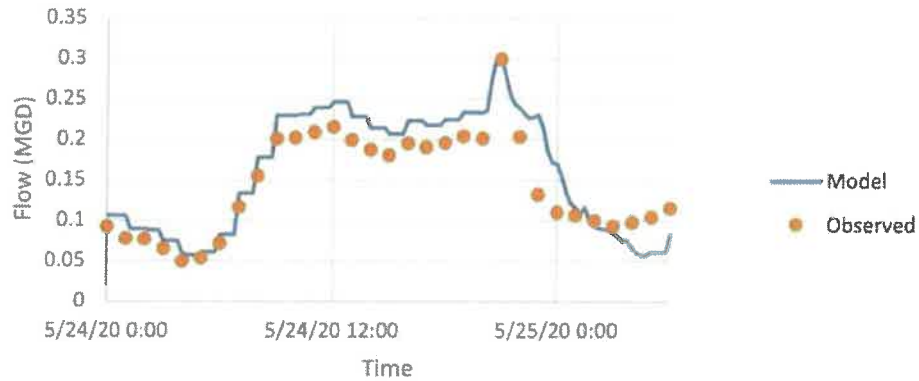
Wet Weather Calibration
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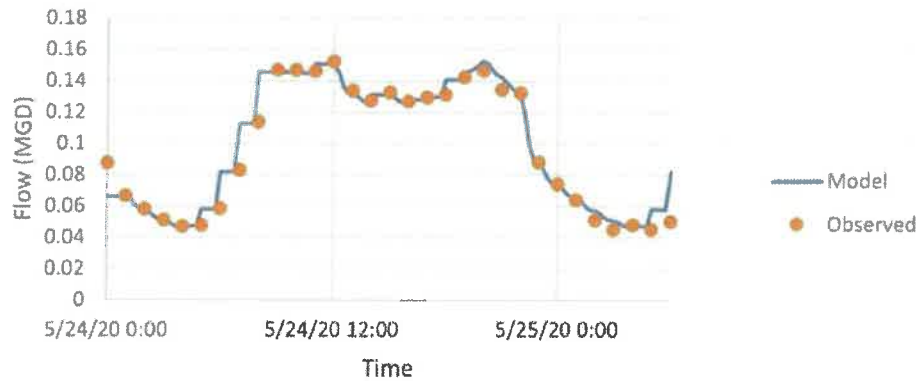
Wet Weather Calibration
FM-06



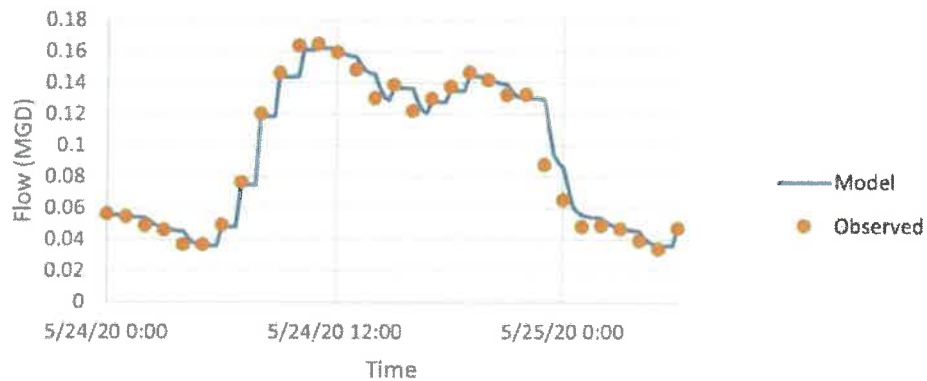
Wet Weather Calibration FM-07



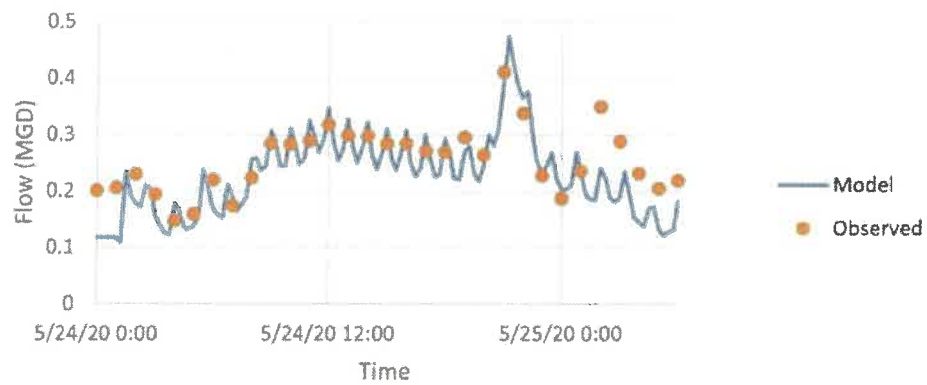
Wet Weather Calibration FM-08



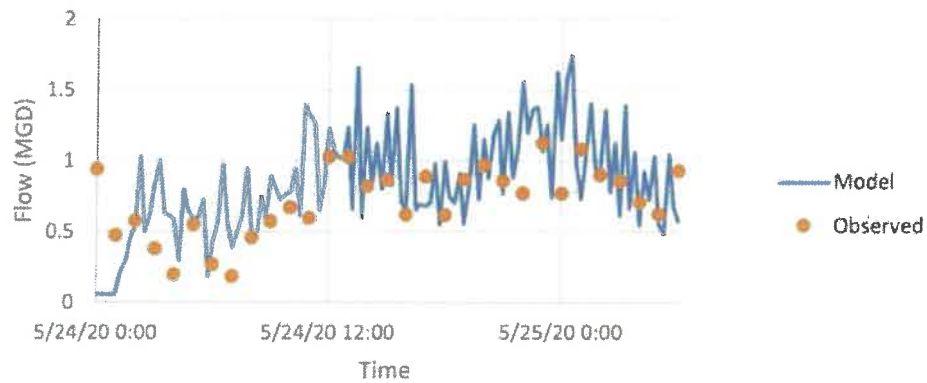
Wet Weather Calibration FM-09



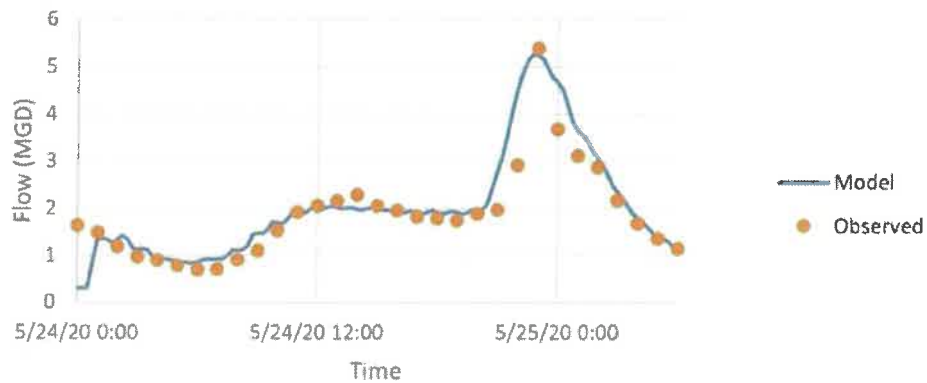
Wet Weather Calibration
FM-10



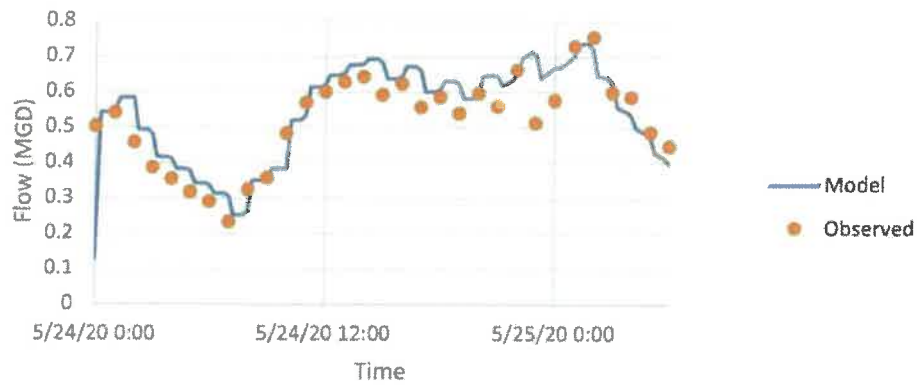
Wet Weather Calibration
FM-11



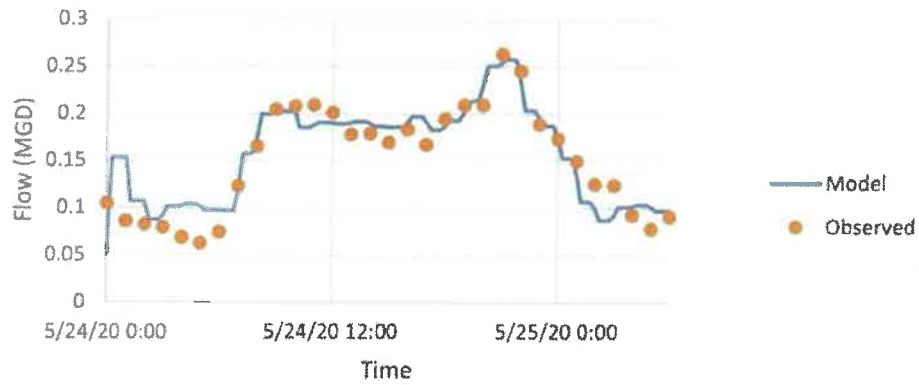
Wet Weather Calibration
FM-12



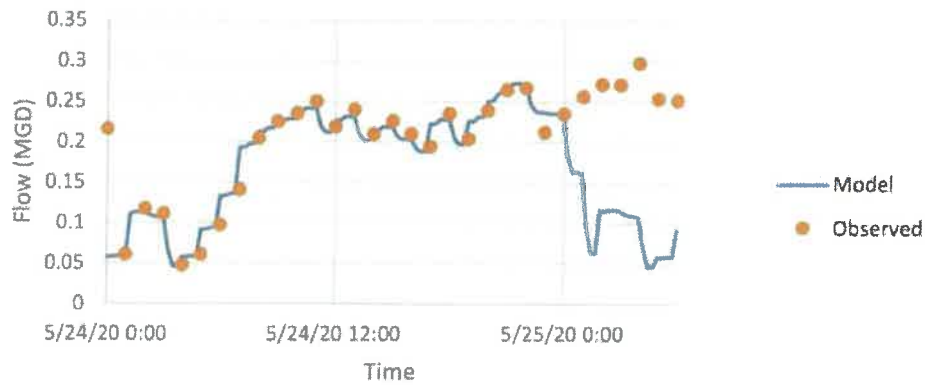
Wet Weather Calibration
FM-13



Wet Weather Calibration
FM-14



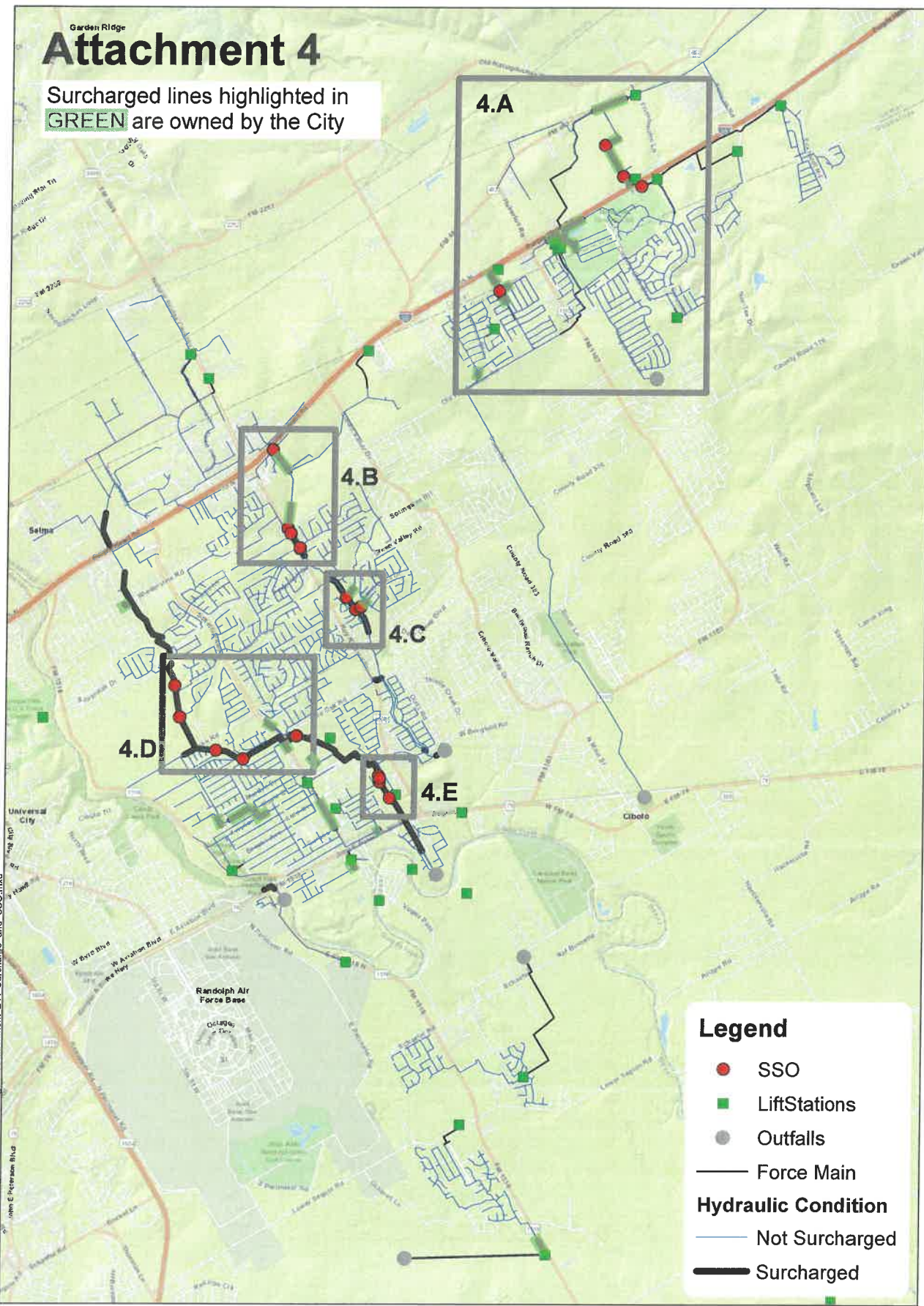
Wet Weather Calibration
FM-15



**APPENDIX 19 - EXISTING
SYSTEM EVALUATION
RESULTS, SURCHARGE, &
SSO LOCATION MAPS**

Attachment 4

Surcharged lines highlighted in **GREEN** are owned by the City



Existing System Evaluation Results - Surge and SSO Locations

8/26/2022



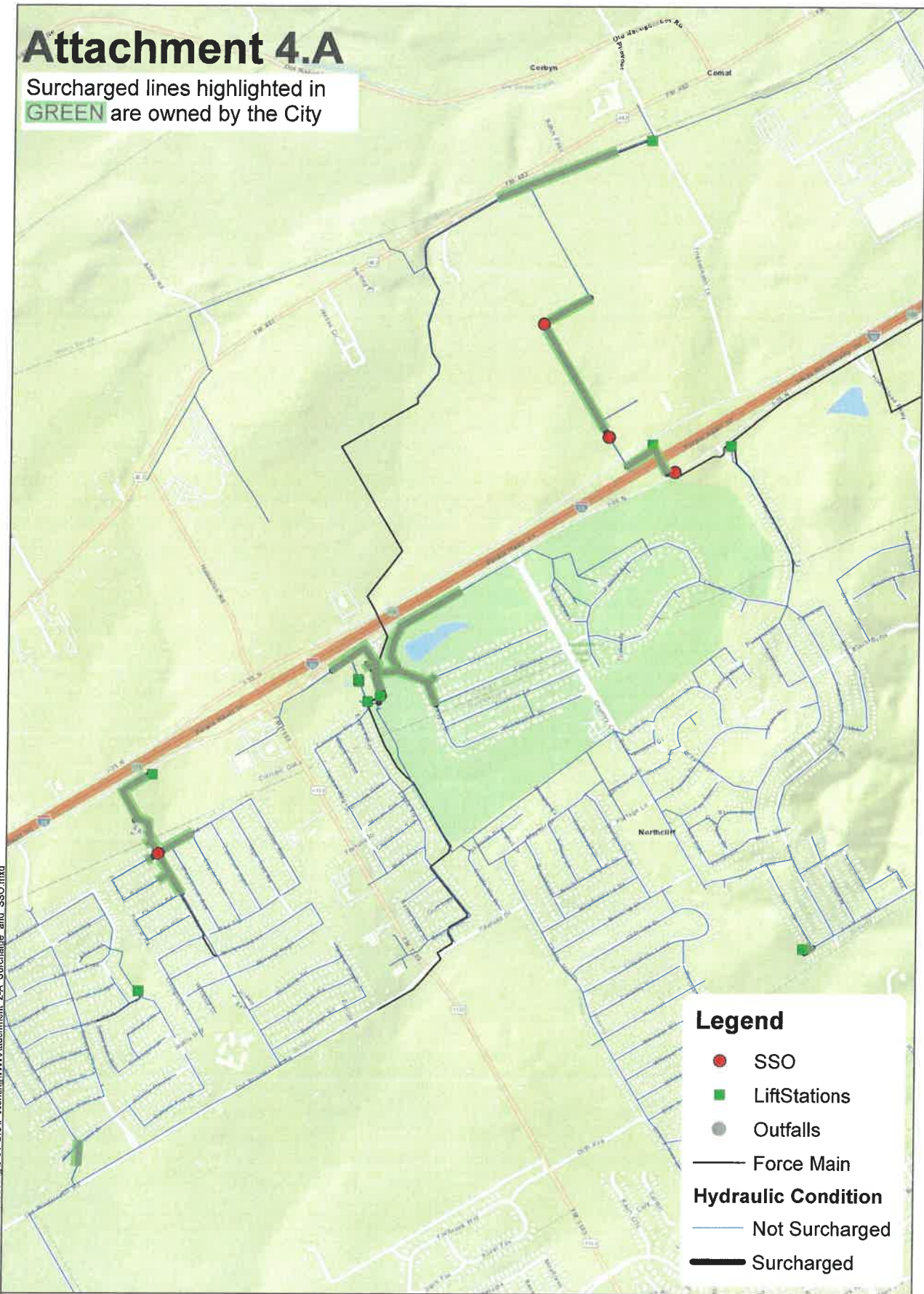
**Lockwood, Andrews
& Newnam, Inc.**
A LEO A DALY COMPANY

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.



Attachment 4.A

Surcharged lines highlighted in **GREEN** are owned by the City



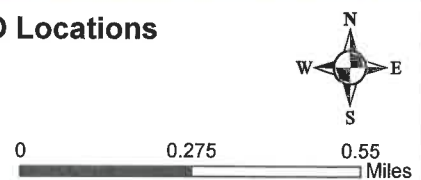
Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022



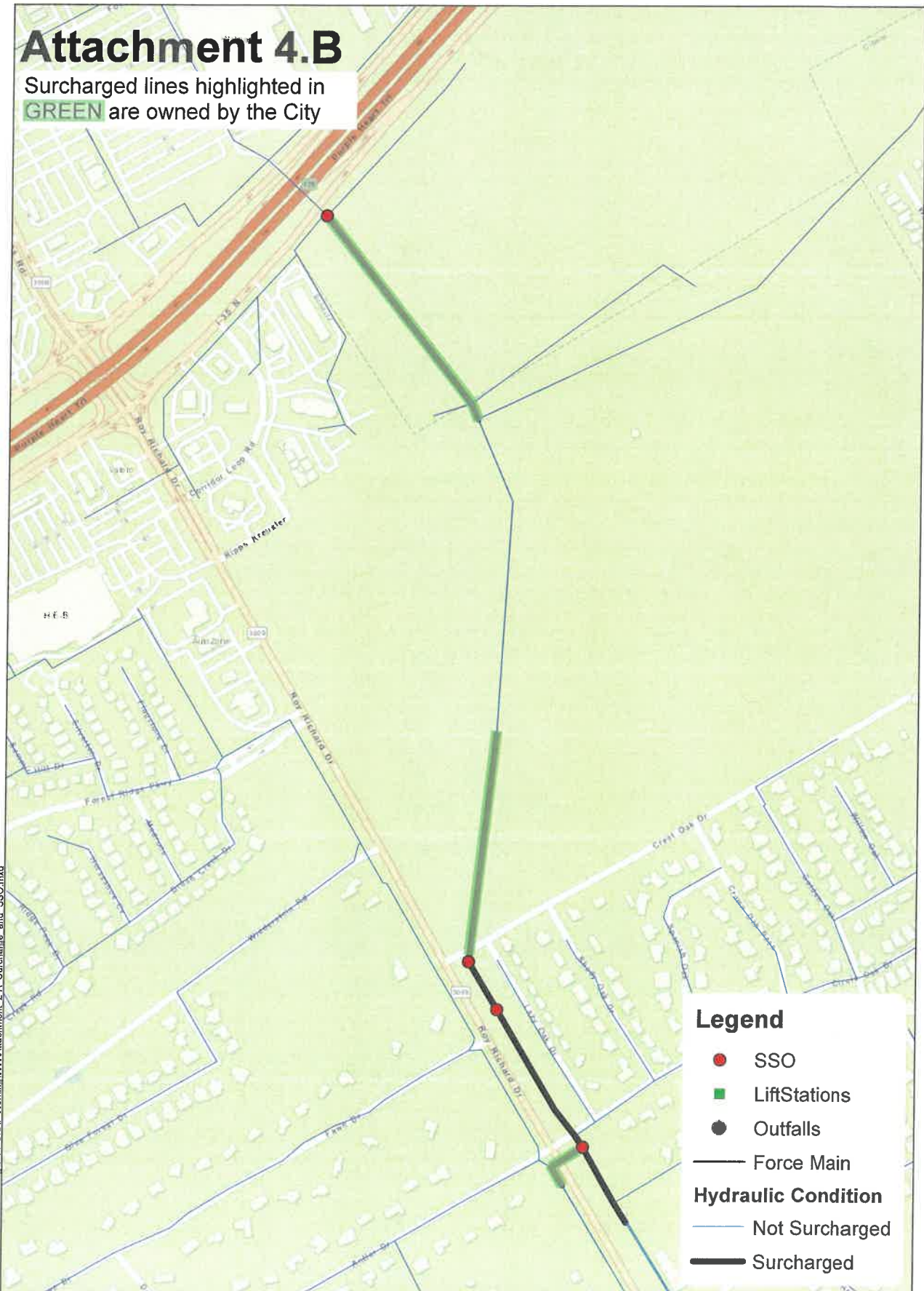
**Lockwood, Andrews
& Newnam, Inc.**
A LEO A DALY COMPANY

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Attachment 4.B

Surcharged lines highlighted in **GREEN** are owned by the City



Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022



**Lockwood, Andrews
& Newnam, Inc.**
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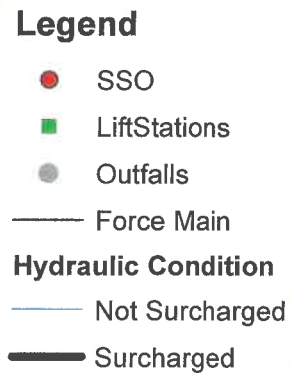
Surcharged lines highlighted in GREEN are owned by the City



0 0.05 0.1 Miles



Surcharged lines highlighted in GREEN are owned by the City

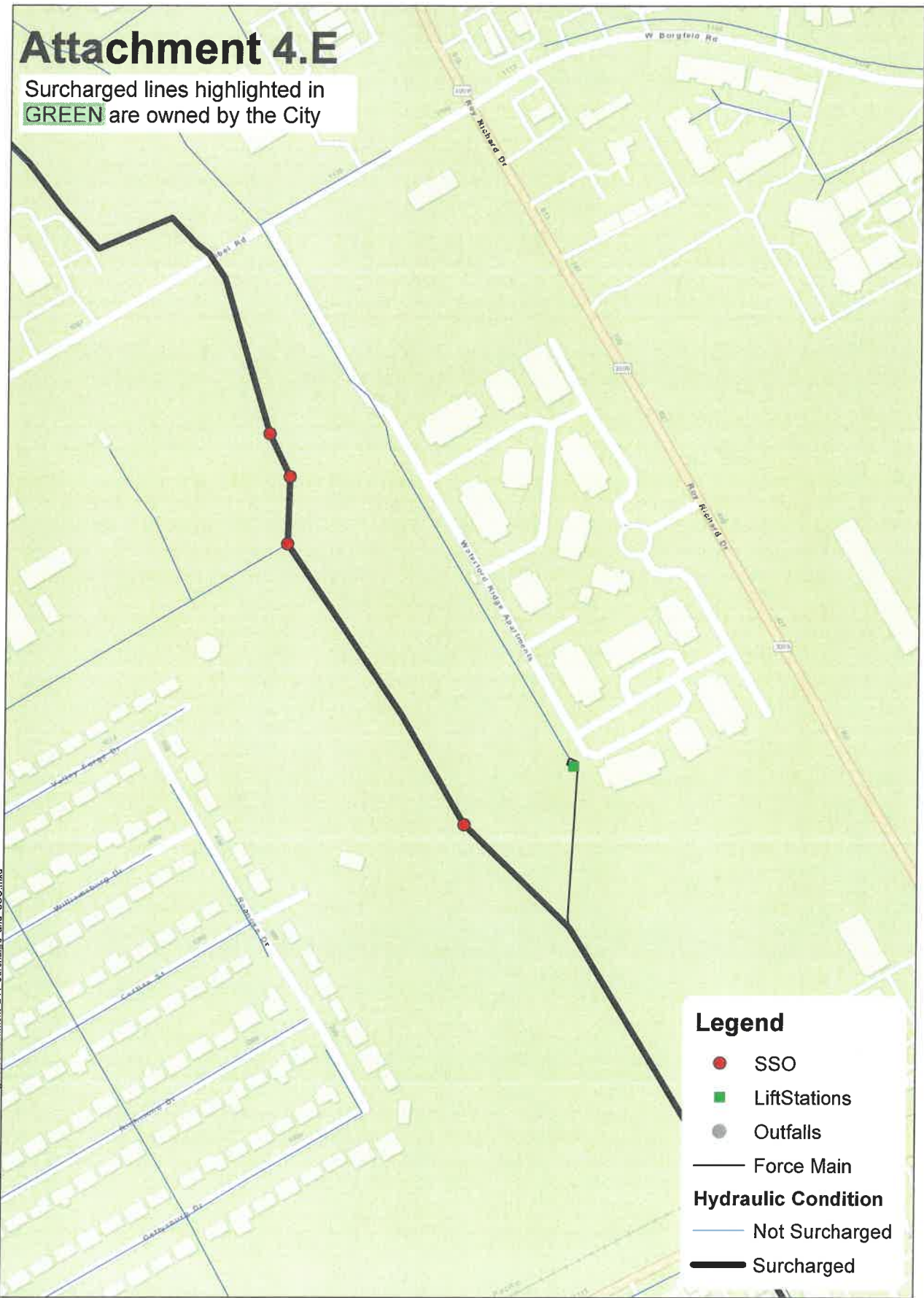


8/26/2022



Attachment 4.E

Surcharged lines highlighted in **GREEN** are owned by the City



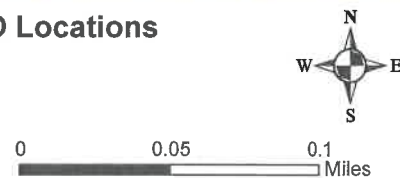
Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022



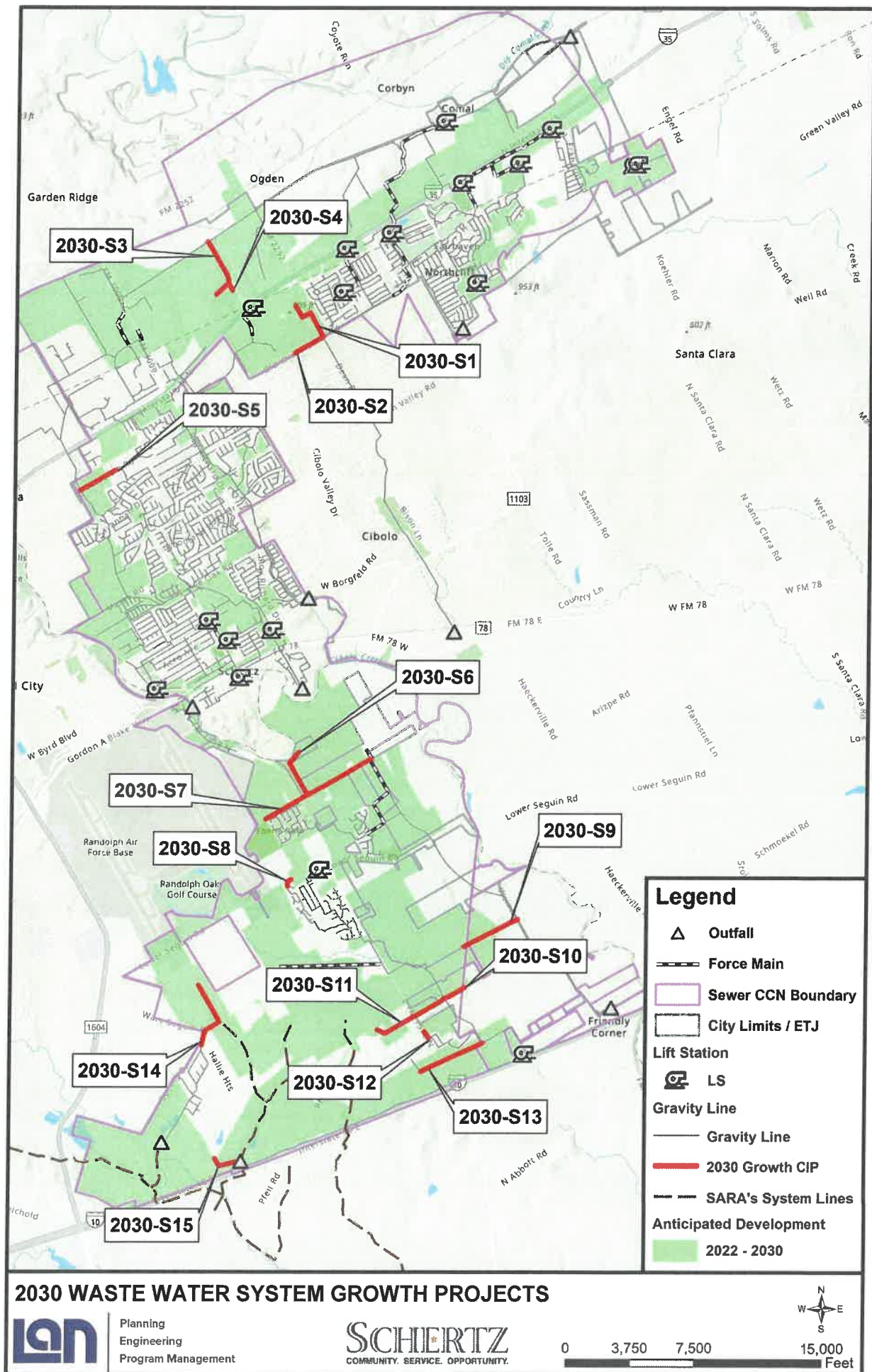
**Lockwood, Andrews
& Newnam, Inc.**
A LEO A DALY COMPANY

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

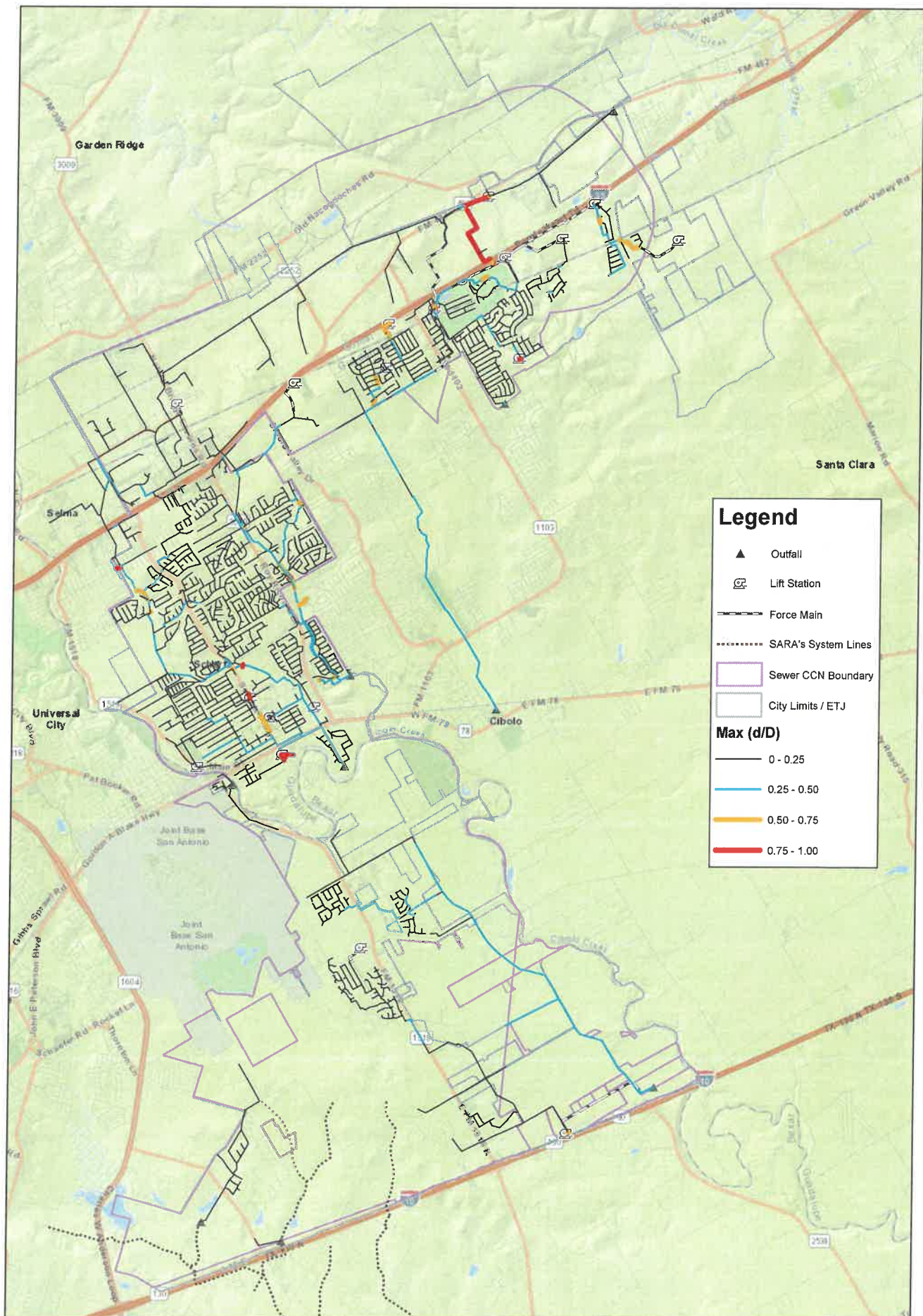


APPENDIX 20 - NEAR TERM WASTEWATER GROWTH & SYSTEM IMPROVEMENT PROJECTS

**APPENDIX 21 - 2030
WASTEWATER
SYSTEM GROWTH
PROJECTS**



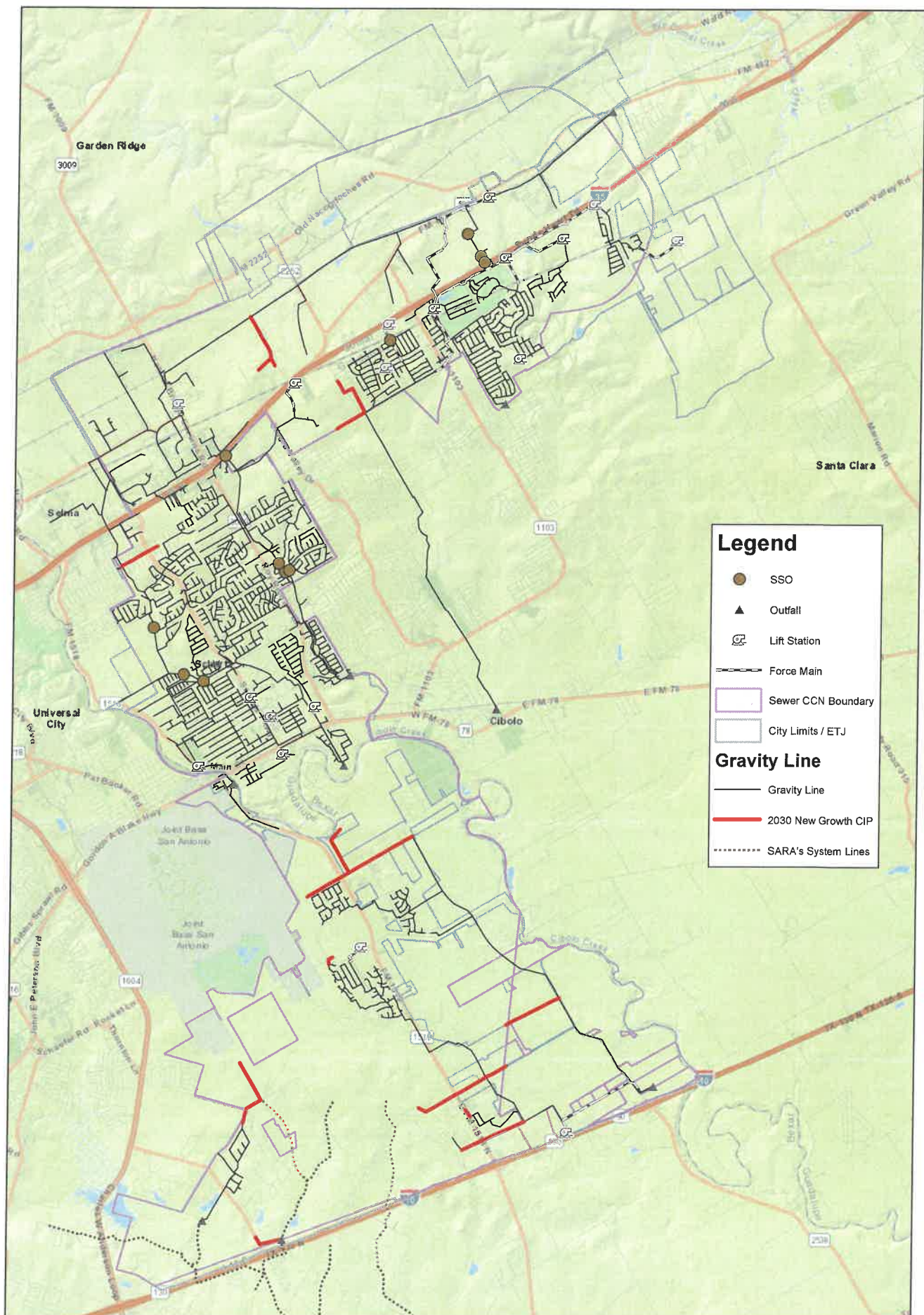
**APPENDIX 22 - MAX
DEPTH TO DIAMETER
WITH 2030 DRY
WEATHER FLOWS**



MAX DEPTH-DIAMETER (d/D) WITH 2030 DRY WEATHER FLOW



**APPENDIX 23 -
SANITARY SEWER
OVERFLOWS WITH
2030 WET WEATHER
FLOWS**



SANITARY SEWER OVERFLOWS (SSO) WITH 2030 WET WEATHER FLOWS



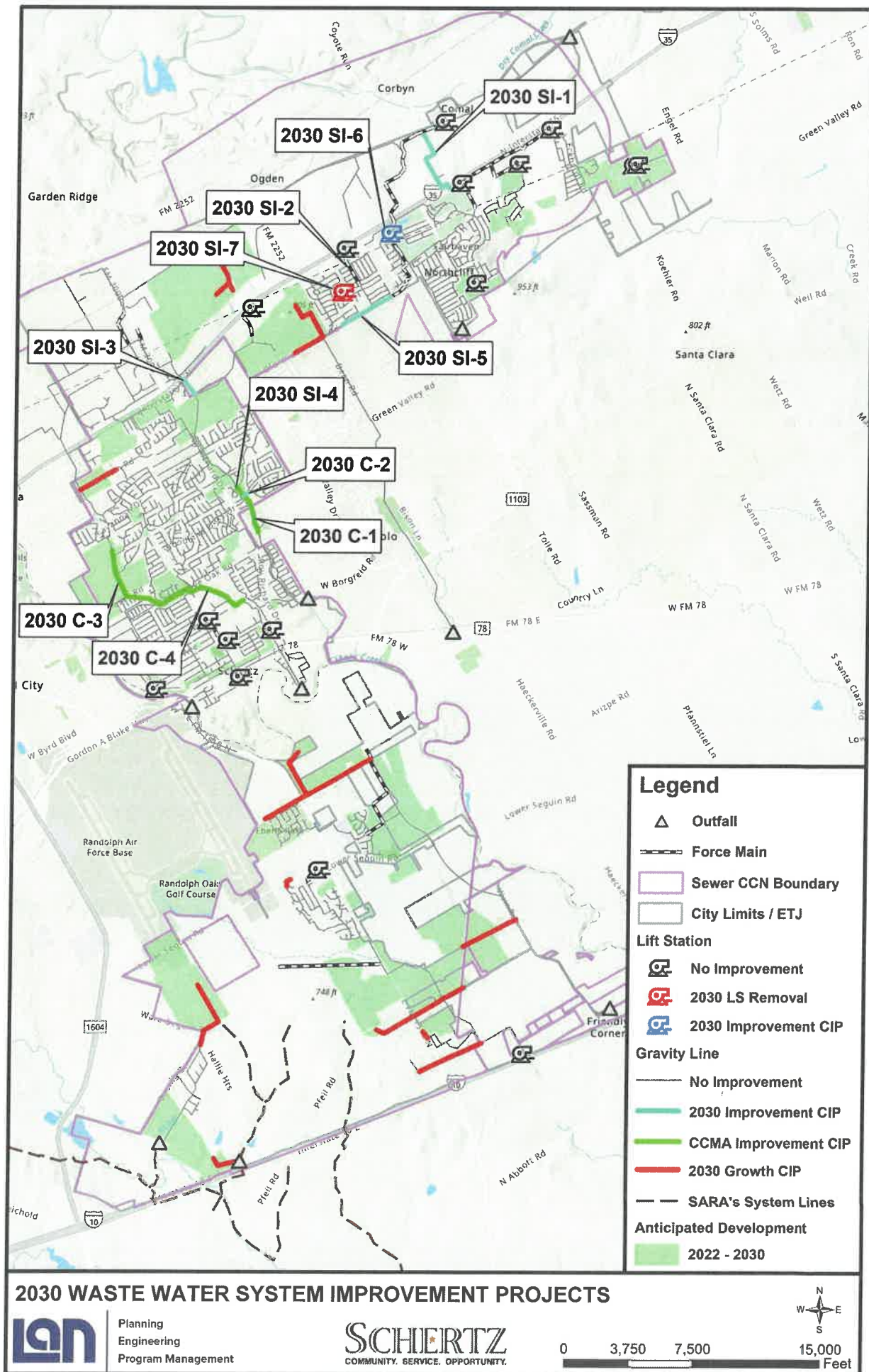
Planning
Engineering
Program Management

SCHIERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

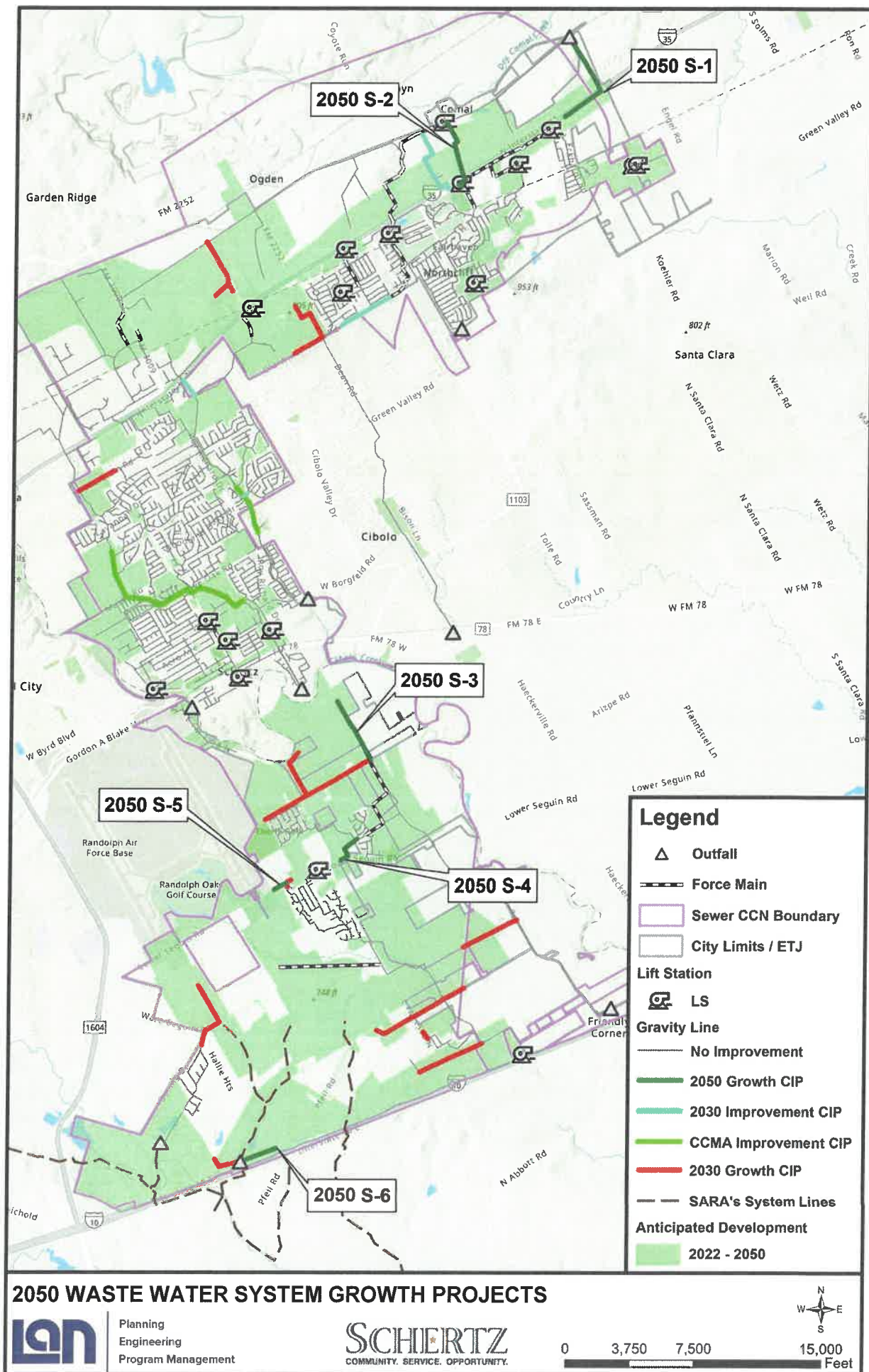
0 0.75 1.5 3
Miles



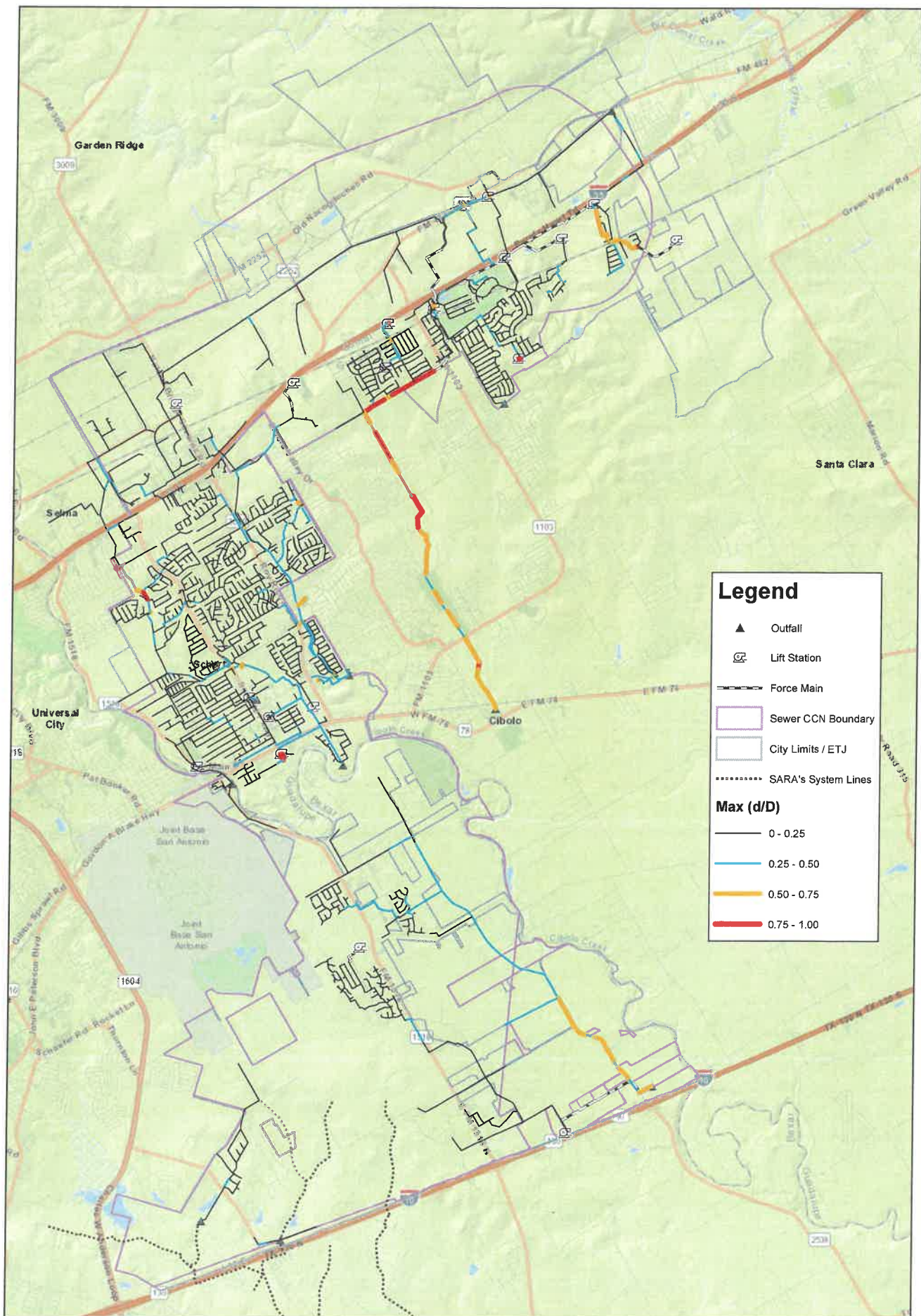
**APPENDIX 24 - 2030
WASTEWATER
SYSTEM
IMPROVEMENT
PROJECTS**



**APPENDIX 25 - 2050
WASTEWATER
SYSTEM GROWTH
PROJECTS**



**APPENDIX 26 - MAX
DEPTH TO DIAMETER
WITH 2050 DRY
WEATHER FLOWS**



MAX DEPTH-TO-DIAMETER (d/D) WITH 2050 DRY WEATHER FLOW



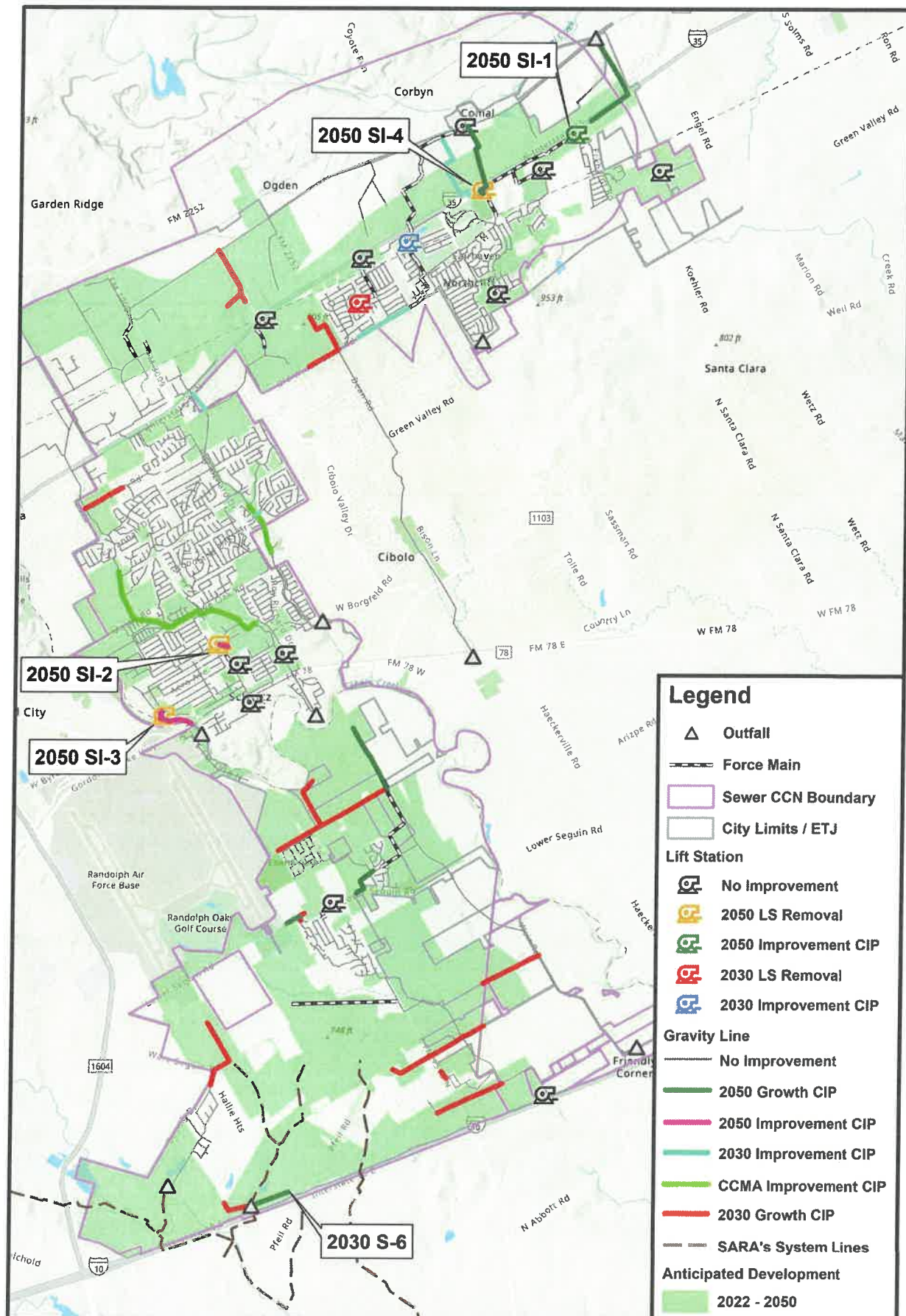
Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

0 0.75 1.5 3 Miles



**APPENDIX 27 - 2050
WASTEWATER
SYSTEM
IMPROVEMENT
PROJECTS**



2050 WASTE WATER SYSTEM IMPROVEMENT PROJECTS



Planning
Engineering
Program Management

SCHERTZ
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0 3,750 7,500 15,000
Feet



APPENDIX 28 - INFLATION RATE CALCULATION SOURCES

RSMMeans Historical Inflation Indexes		
Year	San Antonio Index	Difference
2024	249.7	-4.7
2023	254.4	21
2022	233.4	33.9
2021	199.5	4
2020	195.5	11
2019	184.5	3.5
2018	181	5.5
2017	175.5	2.4
2016	173.1	1.3
2015	171.8	2.3
2014	169.5	5.2
2013	164.3	3.6
2012	160.7	8.1
2011	152.6	4.7
2010	147.9	26.6
2005	121.3	21.9
2000	99.4	1.4
1999	98	3.2
1998	94.8	1.4
1997	93.4	4.5
1995	88.9	8.2
1990	80.7	6.8
1985	73.9	18.9
1980	55	-

Time Frame	Total Inflation Rate	Yearly Inflation Rate
2020 to 2024	128%	6.31%
2010 to 2024	169%	3.81%
2000 to 2024	251%	3.91%
1990 to 2024	309%	3.38%
1980 to 2024	454%	3.50%

Year	National 30 City Average	Texas													
		Abilene	Amarillo	Austin	Beaumont	Corpus Christi	Dallas	El Paso	Fort Worth	Houston	Lubbock	Odessa	San Antonio	Waco	Wichita Falls
Jan 2024	295.6	246.8	252.5	253	249.3	254.9	253.4	248.8	251.3	254	252.1	251.5	249.7	251.6	245.2
2023	299.4	250.1	254.6	254.9	254.5	254.5	261.8	252.4	258.3	261	252.5	250.2	254.4	252.2	251.3
2022	276.9	230.5	232.5	231.2	230.9	232.3	242.3	234.5	234.4	238.7	234.4	231.6	233.4	228.8	227.7
2021	238.3	195.4	196.7	195.7	198.7	200.1	203.2	196.2	197.6	204.8	196.3	194.4	199.5	192.6	192.8
2020	234.3	192.6	193.7	191.3	195.8	193.7	199.5	194.1	194.4	202.2	195.5	193.4	195.5	189.3	190.6
2019	227.3	182.1	181.4	182.3	186.2	184.5	188.6	181.9	183.9	188.7	184.7	183.6	184.5	180.1	179.7
2018	217.7	178.7	178.0	178.9	182.7	181.0	185.0	178.5	180.4	185.1	181.2	180.1	181.0	176.7	176.3
2017	209.4	174.0	172.8	172.6	178.0	178.9	180.0	173.5	174.9	179.2	176.6	175.6	175.5	170.7	170.4
2016	207.7	173.7	171.0	173.3	178.3	175.5	177.9	172.8	174.1	180.5	175.2	172.6	173.1	170.3	170.1
2015	204.0	170.8	170.7	172.3	174.0	172.8	174.4	168.8	172.5	176.4	173.3	171.5	171.8	167.3	169.0
2014	203.0	160.9	167.2	167.5	165.2	167.3	172.4	156.2	169.5	176.0	166.9	159.2	169.5	161.7	160.6
2013	196.9	155.2	161.7	158.7	160.2	157.7	167.4	151.2	161.7	169.4	159.3	151.5	164.3	156.1	155.9
2012	194.0	152.5	158.6	154.3	158.2	151.8	165.2	149.1	159.4	167.8	156.6	149.1	160.7	153.8	152.9
2011	185.7	145.9	151.9	147.6	152.4	145.0	157.9	142.5	152.8	160.8	150.0	142.5	152.6	147.3	146.6
2010	181.6	144.2	150.1	144.7	150.5	142.1	155.1	140.8	149.6	157.3	148.1	140.7	147.9	145.8	145.0
2005	146.7	113.8	117.3	117.9	121.3	114.4	123.7	112.5	119.4	129.0	115.5	110.5	121.3	116.1	117.3
2000	118.9	93.4	98.1	99.1	101.6	96.9	102.7	92.4	99.9	106.0	97.6	93.4	99.4	97.3	96.9
1999	116.6	91.8	94.5	96.0	99.7	94.0	101.0	90.7	97.6	104.6	96.0	92.1	98.0	94.8	95.5
1998	113.6	89.8	92.7	94.2	97.9	91.8	97.9	88.4	94.5	101.3	93.3	90.1	94.8	92.7	92.9
1997	111.5	88.4	91.3	92.8	96.8	90.3	96.1	87.0	93.3	100.1	91.9	88.8	93.4	91.4	91.5
1995	105.6	85.2	87.4	89.3	93.7	87.4	91.4	85.2	89.5	95.9	88.4	85.6	88.9	86.4	86.8
1990	93.2	78.0	80.1	81.3	86.5	79.3	84.5	76.7	82.1	85.4	81.5	78.6	80.7	79.6	80.3
1985	81.8	71.1	72.5	74.5	79.3	72.3	77.6	69.4	75.1	79.6	74.0	71.2	73.9	71.7	73.3
1980	60.7	53.4	55.2	54.5	57.6	54.5	57.9	53.1	57.0	59.4	55.6	57.2	55.0	54.9	55.4
1975	43.7	37.6	39.0	39.6	38.1	40.7	39.0	38.0	40.4	41.2	38.9	37.9	39.0	38.6	38.0
1970	27.8	24.5	24.9	24.9	25.7	24.5	25.5	23.7	25.9	25.4	25.1	24.6	23.3	24.8	24.5
1965	21.5	18.9	19.2	19.2	19.9	18.9	19.9	19.0	19.9	20.0	19.4	19.0	18.5	19.2	18.9
1960	19.5	17.1	17.4	17.4	18.1	17.1	18.2	17.0	18.1	18.2	17.6	17.3	16.8	17.4	17.2
1955	16.3	14.4	14.6	14.6	15.1	14.4	15.3	14.3	15.2	15.2	14.8	14.5	14.1	14.6	14.4
1950	13.5	11.9	12.1	12.1	12.5	11.9	12.6	11.8	12.5	12.6	12.2	12.0	11.6	12.1	11.9
1945	8.6	7.6	7.7	7.7	8.0	7.6	8.0	7.5	8.0	8.0	7.8	7.6	7.4	7.7	7.6
1940	6.6	5.9	5.9	5.9	6.1	5.8	6.2	5.8	6.2	6.2	6.0	5.9	5.7	5.9	5.8

Turner Historical Inflation Indexes		
Year	Average Index	Difference
2023	1373	78
2022	1295	96
2021	1199	22
2020	1177	21
2019	1156	60
2018	1096	58
2017	1038	49
2016	989	46
2015	943	41
2014	902	38
2013	864	34
2012	830	18
2011	812	13
2010	799	-33
2009	832	-76
2008	908	54
2007	854	61
2006	793	76
2005	717	62
2004	655	34
2003	621	2
2002	619	6
2001	613	18
2000	595	25
1999	570	21
1998	549	24
1997	525	20
1996	505	-

Quarter	Index	Δ%
4th Quarter 2023	1395	1.01
3rd Quarter 2023	1381	1.17
2nd Quarter 2023	1365	1.19
1st Quarter 2023	1349	1.28

Year	Average Index	Δ%
2023	1373	6.0
2022	1295	8.0
2021	1199	1.9
2020	1177	1.8
2019	1156	5.5
2018	1096	5.6
2017	1038	5.0
2016	989	4.8
2015	943	4.5
2014	902	4.4
2013	864	4.1
2012	830	2.1
2011	812	1.6

The Turner Building Cost Index is determined by the following factors considered on a nationwide basis: labor rates and productivity, material prices and the competitive condition of the marketplace.

2010-1996 rates are stored online and can be provided if desired

Time Frame	Total Inflation Rate	Yearly Inflation Rate
2020 to 2023	117%	5.27%
2010 to 2023	172%	4.25%
2000 to 2023	231%	3.70%
1996 to 2024	272%	3.77%

APPENDIX 29 - CIP PROJECTS COST ESTIMATES

City of Schertz
2024 Impact Fee Update
Water CIP Estimate of Probable Cost Summary

Project Number		Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
Near Term CIP					
System Improvement Projects					
NT-W1**	Bubbling Springs 6" WL Replacement		\$763,000	27%	\$206,715
NT-W2	Corbett Pump Station & 3.0 MG GST		\$8,600,000	0%	\$0
NT-W3	Ware Seguin Pump Station Operational Improvement		\$175,000	0%	\$0
NT-W4	12" WL from Ware Seguin to Lower Seguin		\$1,538,000	0%	\$0
NT-W5	Fred Couples to Schwab		\$455,556	0%	\$0
NT-W6	Schwab to Eckhardt		\$1,600,000	0%	\$0
NT-W7**	Graytown to Pfeil		\$1,550,000	69%	\$1,077,040
NT-W8**	FM 78 Water Line Replacement		\$875,000	22%	\$194,778
NT-W9**	Moonlight Meadow Dr & Lost Meadow Dr WL Replacement		\$3,000,000	0%	\$0
NT-W10**	Robinhood Way WL Replacement		\$4,650,000	0%	\$0
NEAR TERM TOTAL:			\$23,206,556	-	\$1,478,532
Proposed 2030 CIP					
Growth Projects					
2030-W1	12" WL from Tri-County Extension to Cibolo Valley Drive		\$4,788,000	100%	\$4,788,000
2030-W2	Raf Burnette Rd 12" WL Improvements		\$1,438,000	89%	\$1,272,934
2030-W3	8" WL from Ray Corbett Dr to Lower Seguin Rd		\$3,688,000	97%	\$3,569,245
2030-W4**	Trainer Hale Rd 2" WL Replacement & 8" WL Improvement		\$9,850,000	93%	\$9,192,317
2030-W5**	Boenig Dr S 6" WL Replacement & 8" WL Improvement		\$6,388,000	69%	\$4,411,757
2030-W6	Live Oak to IH-35 24" Transmission Main		\$32,075,000	100%	\$32,075,000
2030-W7	Ware Seguin Pump Station Expansion Phase 1		\$5,213,000	33%	\$1,737,667
2030-W8	IH-10 8" WL Improvements		\$6,063,000	100%	\$6,063,000
2030 Growth Subtotal:			\$69,503,000	-	\$63,109,920
System Improvement Projects					
2030-W9	PRV Installation for Proposed Southwest Pressure Plane		\$413,000.0	0%	\$0
2030-W10**	River Rd 6" WL Replacement		\$2,325,000	58%	\$1,354,926
2030 System Improvement Projects Subtotal:			\$2,738,000	-	\$1,354,926
2030 TOTAL:			\$72,241,000	-	\$64,464,846
Proposed 2050 CIP					
Growth Projects					
2050-W1	Corbett Pump Station Expansion		\$1,663,000	2050 CIP Projects are not included in this impact fee total.	
2050-W2	FM 2252 8" WL Improvements		\$8,800,000		
2050-W3	Ware Seguin Pump Station Expansion Phase 2		\$2,725,000		
2050-W4	Beck St 6" WL Replacement		\$5,288,000		
2050-W5	Raf Burnette Rd 8" WL Improvements		\$4,438,000		
2050-W6	IH-35 Pump Station & 3.0 MG GST		\$42,188,000		
2050-W7	IH-10 & FM 1518 8" WL Improvements		\$3,075,000		
2050 Growth Subtotal:			\$68,177,000		
System Improvement Projects					
2050-W8	Lower Seguin Rd 8" WL Replacement		\$4,775,000		
2050 System Improvement Projects Subtotal:			\$4,775,000		
2050 TOTAL:			\$72,952,000		
WATER CIP TOTAL:			\$168,399,556	\$65,943,379	
** - Indicates that there are both growth & system improvement components to the project.					

** - Indicates that there are both growth & system improvement components to the project.

City of Schertz
2024 Impact Fee Update
Waste Water CIP Estimate of Probable Cost Summary

Project Number	Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
Near Term CIP				
Growth Projects				
NT-S1	Town Creek Phase IV 24" - Section 1	\$6,875,000	21%	\$1,440,972
NT-S2	Town Creek Phase IV 12" - Section 2	\$2,925,000	0%	\$0
NT-S3	Town Creek Phase V 24"	\$10,425,000	23%	\$2,378,763
NT-S4**	Upsize Lookout Line	\$3,838,000	20%	\$771,788
NT-S5**	Upsize Tri County Line	\$2,084,800	25%	\$526,887
NT-S6	Cibolo West Main	\$16,213,000	83%	\$13,523,463
NT-S7	Woman Hollering Creek Lift Station, Gravity Lines, and Force Main	\$3,400,000	74%	\$2,517,091
Near Term Growth Subtotal:		\$45,760,800	-	\$21,158,965
System Improvement Projects				
NT SI-1	Decommission Tri County Lift Station	\$88,000	0%	\$0
NT SI-2	Decommission Corbett Lift Station	\$1,500,000	0%	\$0
NT SI-3	Decommission Sedona Lift Station & Woman Hollering Creek WWTP	\$175,000	0%	\$0
Near Term System Improvement Projects Subtotal:		\$1,763,000	-	\$0
NEAR TERM TOTAL:		\$47,523,800	-	\$21,158,965
Proposed 2030 CIP				
Growth Projects				
2030-S1	Hope Lane 8" Gravity Line	\$2,025,000	67%	\$1,359,153
2030-S2	Old Wiederstein Road 8"	\$1,338,000	5%	\$68,849
2030-S3	Union Pacific Railroad 8" - Section 1	\$2,563,000	10%	\$249,210
2030-S4	Union Pacific Railroad 8" - Section 2	\$400,000	12%	\$47,722
2030-S5	Wiederstein Road 8"	\$1,663,000	83%	\$1,372,188
2030-S6	Schaefer Road 8" - Section 1	\$4,913,000	33%	\$1,613,509
2030-S7	Schaefer Road 8" - Section 2	\$1,938,000	100%	\$1,938,000
2030-S8	Aranda 8"	\$475,000	100%	\$475,000
2030-S9	Weir Road 10"	\$2,525,000	100%	\$2,522,465
2030-S10	Trainer Hale Road 10"	\$1,038,000	100%	\$1,034,756
2030-S11	Ware Seguin Road 8"	\$3,113,000	97%	\$3,012,264
2030-S12	FM 1518 8"	\$400,000	40%	\$160,000
2030-S13	I-10 8" - Section 1	\$2,713,000	99%	\$2,677,145
2030-S14	Boenig Drive 8"	\$2,963,000	29%	\$849,531
2030-S15	N Greytown Road 8"	\$1,275,000	52%	\$661,379
2030 Growth Subtotal:		\$29,342,000	-	\$18,041,171
System Improvement Projects				
2030 SI-1**	Friesenhahn West Line WW Upsize	\$8,175,000	22%	\$1,833,143
2030 SI-2**	Fairlawn WW Upsize	\$1,375,000	9%	\$121,579
2030 SI-3**	Cibolo Crossing WW Line Upsize	\$1,288,000	4%	\$46,406
2030 SI-4**	Woodland Oak Drive Replacements	\$338,000	4%	\$13,741
2030 SI-5**	Old Wiederstein WW Upsize	\$5,050,000	61%	\$3,099,614
2030 SI-6**	Northcliffe Lift Station Upgrade	\$7,838,000	5%	\$392,686
2030 SI-7	Decommission Belmont Park Lift Station	\$463,000	0%	\$0
2030 System Improvement Projects Subtotal:		\$24,527,000	-	\$5,507,169
2030 TOTAL:		\$53,869,000	-	\$23,548,341
Proposed 2050 CIP				
Growth Projects				
2050-S1	I-35 N 8"	\$9,088,000	2050 CIP projects are not eligible to be included in the impact fee total.	
2050-S2	Friesenhahn Lane 8"	\$6,500,000		
2050-S3	Schaefer Road 8" - Section 3	\$5,713,000		
2050-S4	Corbett JH 8"	\$2,888,000		
2050-S5	Lower Seguin Road 8"	\$1,338,000		
2050-S6	I-10 8" - Section 2	\$3,338,000		
2050 Growth Subtotal:		\$28,865,000		
System Improvement Projects				
2050 SI-1	Cypress Point Lift Station Upgrade	\$1,463,000	2050 CIP projects are not eligible to be included in the impact fee total.	
2050 SI-2	Decommission Schertz Parkway Lift Station	\$238,000		
2050 SI-3	Decommission Park Lift Station	\$3,663,000		
2050 SI-4	Decommission Cover's Cove Lift Station	\$238,000		
2050 System Improvement Projects Subtotal:		\$5,602,000		
2050 TOTAL:		\$34,467,000		
WASTE WATER CIP TOTAL:		\$135,859,800		\$44,707,306
** - Indicates that there are both growth & system improvement components to the project.				

** - Indicates that there are both growth & system improvement components to the project.



City of Schertz
2024 Impact Fee Update
CCMA System Improvement Projects - Estimate of Probable Cost
Summary

Project Number	Project Name	Project Cost
Proposed 2030 CIP		
CCMA System Improvement Projects		
2030 C-1	Roy Richard Drive Replacements	\$1,588,000
2030 C-2	Valencia Lane Replacements	\$2,288,000
2030 C-3	Savannah Drive Replacements	\$12,425,000
2030 C-4	Build Out Project 25 - 36" Schertz Line	\$12,950,000
CCMA System Improvement Projects Total:		\$29,251,000

NEAR TERM WATER CIP PROJECTS



Capital Improvement Plan Estimate of Probable Cost

Project Name: Bubbling Springs 6" WL Replacement

Date: August 2024

Project Number: NT-W1**

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

Replace leaking 6" from River Rd to just south of Cibolo Creek along Bubbling Springs with 12", approximately 1,320 LF.

Justification:

City identified CIP.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	1,320	\$ 135	\$ 179,000
2	Gate Valve	EA	3	\$ 7,000	\$ 21,000
3	Fire Hydrant	EA	3	\$ 8,500	\$ 26,000
4	Service & System Connections	EA	27	\$ 2,100	\$56,700
4	Surface Replacement	LF	660	\$ 196	\$ 130,000
5	Traffic Control	LS	1	\$ 8,000	\$ 8,000
6	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 446,000
MOBILIZATION (5%)					\$23,000
CONTINGENCY (30%)					\$134,000
TOTAL CONSTRUCTION					\$610,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$153,000
ESTIMATE TOTAL PROJECT COST					\$763,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Corbett Pump Station & 3.0 MG GST

Date: August 2024

Project Number: NT-W2

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

Corbett Pump Station (2,000 gpm, 183 TDH firm capacity) and 3.0 MG GST.

Justification:

Per "Corbett 3.0 MG GST Project" Preliminary Engineering Report (2021), construction is currently underway.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	2,000 gpm Pump Station & 3.0 MG GST	LS	1	\$ 8,600,000	\$ 8,600,000
ESTIMATE TOTAL PROJECT COST					\$ 8,600,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Pump Station Operational Improvement			Date:	August 2024
Project Number: NT-W3				
Project Category: Water			Phase:	Near Term
CIP Type: System Improvement				

Project Description: Control improvements at Ware Seguin Pump Station to be per GST level rather than a timer.	Justification: Potentially zero cost project to improve pump station performance in this service area.
--	--

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Controls	LS	1	\$ 100,000	\$ 100,000
SUBTOTAL					\$ 100,000
MOBILIZATION (5%)					\$5,000
CONTINGENCY (30%)					\$30,000
TOTAL CONSTRUCTION					\$140,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$35,000
ESTIMATE TOTAL PROJECT COST					\$175,000

Project Location:	
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Capital Improvement Plan Estimate of Probable Cost

Project Name: 12" WL from Ware Seguin to Lower Seguin

Date: August 2024

Project Number: NT-W4

Project Category: Water

Phase: Near Term

CIP Type: Growth

Project Description:

Approximately 5,150 LF of 12" from Ware Seguin to Lower Seguin in open field.

Justification:

Currently in design.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	5,150	\$ 135	\$696,000
2	Gate Valve	EA	11	\$ 7,000	\$77,000
3	Fire Hydrant	EA	11	\$ 8,500	\$93,500
4	Traffic Control	LS	1	\$ 15,000	\$15,000
5	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$ 907,000
MOBILIZATION (5%)					\$46,000
CONTINGENCY (30%)					\$273,000
TOTAL CONSTRUCTION					\$1,230,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$308,000
ESTIMATE TOTAL PROJECT COST					\$1,538,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Fred Couples to Schwab

Date: August 2024

Project Number: NT-W5

Project Category: Water

Phase: Near Term

CIP Type: Growth

Project Description:

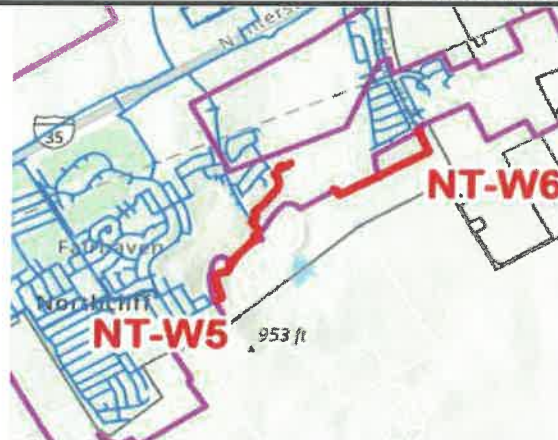
Approximately 2,270 LF of 12" from Fred Couples to Schwab. Total cost shown is portion paid for by the City.

Justification:

Currently under construction.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
ESTIMATE TOTAL PROJECT COST					\$455,555.79

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Schwab to Eckhardt

Date: August 2024

Project Number: NT-W6

Project Category: Water

CIP Type: Growth

Phase: Near Term

Project Description:

Approximately 5,400 LF of 12" from Schwab to Eckhardt.

Justification:

Currently in design.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	5,400	\$ 135	\$729,000
2	Gate Valve	EA	11	\$ 7,000	\$77,000
3	Fire Hydrant	EA	11	\$ 8,500	\$93,500
*	Traffic Control	LS	1	\$ 16,000	\$16,000
6	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$ 941,000
MOBILIZATION (5%)					\$48,000
CONTINGENCY (30%)					\$283,000
TOTAL CONSTRUCTION					\$1,280,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$320,000
ESTIMATE TOTAL PROJECT COST					\$1,600,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Graytown to Pfeil

Date: August 2024

Project Number: NT-W7**

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

Approximately 5,200 LF of 12" along IH-10 from N. Graytown Rd to Pfeil Rd.

Justification:

Currently in design.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	5,200	\$ 135	\$702,000
2	Gate Valve	EA	11	\$ 7,000	\$77,000
3	Fire Hydrant	EA	11	\$ 8,500	\$93,500
4	Traffic Control	LS	1	\$ 15,000	\$15,000
5	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$ 913,000
MOBILIZATION (5%)					\$46,000
CONTINGENCY (30%)					\$274,000
TOTAL CONSTRUCTION					\$1,240,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$310,000
ESTIMATE TOTAL PROJECT COST					\$1,550,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: FM 78 Water Line Replacement

Date: August 2024

Project Number: NT-W8**

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

Upsize existing 8"/10" to 12" along FM 78 from east of Bubbling Springs Rd to end of dead-end line, approximately 2,300 LF.

Justification:

Needed for fire flow.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	2,300	\$ 135	\$310,500
2	Gate Valve	EA	5	\$ 7,000	\$35,000
3	Fire Hydrant	EA	5	\$ 8,500	\$42,500
4	Service & System Connections	EA	46	\$ 2,100	\$96,600
5	Traffic Control	LS	1	\$ 8,000	\$8,000
6	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$ 518,000
MOBILIZATION (5%)					\$26,000
CONTINGENCY (30%)					\$156,000
TOTAL CONSTRUCTION					\$700,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$175,000
ESTIMATE TOTAL PROJECT COST					\$875,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Moonlight Meadow Dr & Lost Meadow Dr WL Replacement

Date: August 2024

Project Number: NT-W9**

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

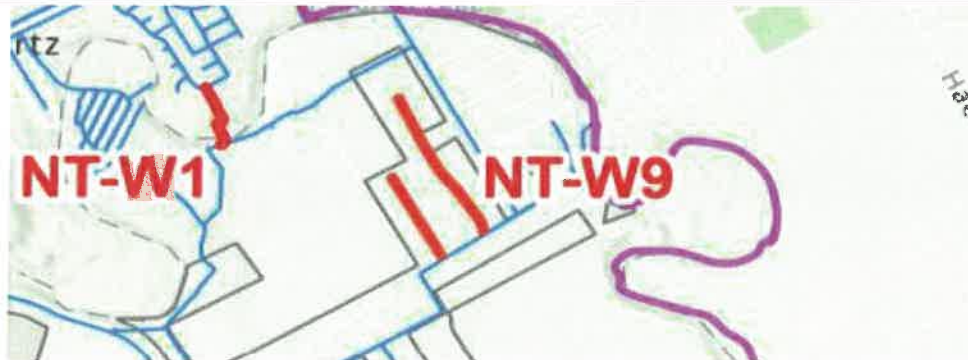
Upsize existing 4" to 8" along Moonlight Meadow Dr and Lost Meadows Dr north of Schaefer Rd, approximately 4,970 LF.

Justification:

Needed for fire flow.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	4,970	\$ 85	\$423,000
2	Gate Valve	EA	10	\$ 7,000	\$70,000
3	Fire Hydrant	EA	10	\$ 8,500	\$85,000
4	Service & System Connections	EA	100	\$ 2,100	\$210,000
5	Surface Replacement	LF	4,970	\$ 190	\$945,000
6	Traffic Control	LS	1	\$ 15,000	\$15,000
7	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$ 1,773,000
MOBILIZATION (5%)					\$89,000
CONTINGENCY (30%)					\$532,000
TOTAL CONSTRUCTION					\$2,400,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$600,000
ESTIMATE TOTAL PROJECT COST					\$3,000,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Robinhood Way WL Replacement

Date: August 2024

Project Number: NT-W10**

Project Category: Water

Phase: Near Term

CIP Type: System Improvement

Project Description:

Upsize existing 8" to 12" along Robin Hood Way, approximately 6,670 LF.

Justification:

Needed for fire flow.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	6,670	\$ 135	\$901,000
2	Gate Valve	EA	14	\$ 7,000	\$98,000
3	Fire Hydrant	EA	14	\$ 8,500	\$119,000
4	Service & System Connections	EA	134	\$ 2,100	\$281,400
5	Surface Replacement	LF	6,670	\$ 196	\$1,307,320
6	Traffic Control	LS	1	\$ 19,000	\$19,000
7	SWPPP	LS	1	\$ 25,000	\$25,000
SUBTOTAL					\$2,751,000
MOBILIZATION (5%)					\$138,000
CONTINGENCY (30%)					\$826,000
TOTAL CONSTRUCTION					\$3,720,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$930,000
ESTIMATE TOTAL PROJECT COST					\$4,650,000

Project Location:



2030 WATER CIP PROJECTS



Capital Improvement Plan Estimate of Probable Cost

Project Name: 12" WL from Tri-County Extension to Cibolo Valley Drive

Date: August 2024

Project Number: 2030-W1

Project Category: Water

Phase: 2030

CIP Type: Growth

Project Description:

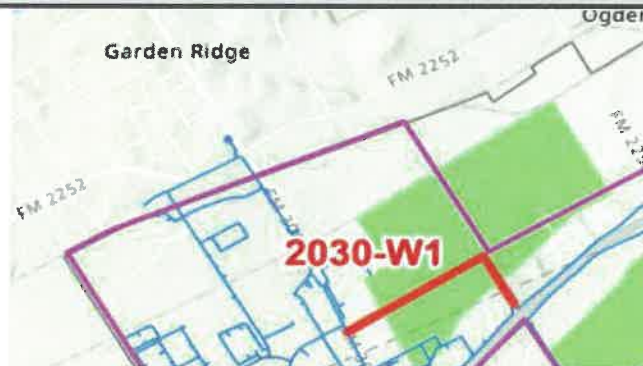
New 12" loop east of FM 3009, north of IH-35 (approximately 6,060 LF).

Justification:

Supplies new service area.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	6,060	\$ 170	\$1,030,200
2	Gate Valve	EA	13	\$ 8,900	\$115,700
3	Fire Hydrant	EA	13	\$ 10,700	\$139,100
4	Surface Replacement	LF	6,060	\$ 247	\$1,496,000
5	Traffic Control	LS	1	\$ 22,000	\$22,000
6	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$2,835,000
MOBILIZATION (5%)					\$142,000
CONTINGENCY (30%)					\$851,000
TOTAL CONSTRUCTION					\$3,830,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$958,000
ESTIMATE TOTAL PROJECT COST					\$4,788,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Raf Burnette Rd 12" WL Improvements

Date: August 2024

Project Number: 2030-W2

Project Category: Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 1,750 LF of 12" along Raf Burnette east of Authority Ln.

Justification:

Supplies new service area.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	1,750	\$ 170	\$297,500
2	Gate Valve	EA	4	\$ 8,900	\$35,600
3	Fire Hydrant	EA	4	\$ 10,700	\$42,800
4	Surface Replacement	LF	1,750	\$ 247	\$432,000
5	Traffic Control	LS	1	\$ 7,000	\$7,000
6	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$847,000
MOBILIZATION (5%)					\$43,000
CONTINGENCY (30%)					\$255,000
TOTAL CONSTRUCTION					\$1,150,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$288,000
ESTIMATE TOTAL PROJECT COST					\$1,438,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: 8" WL from Ray Corbett Dr to Lower Seguin Rd	Date: August 2024
Project Number: 2030-W3	
Project Category: Water	Phase: 2030
CIP Type: Growth	

Project Description: New 8" loop north of Lower Seguin Rd, east of Ray Corbett Dr (approximately 5,590 LF).	Justification: Supplies new service area.
--	--

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	5,590	\$ 110	\$614,900
2	Gate Valve	EA	12	\$ 3,800	\$45,600
3	Fire Hydrant	EA	12	\$ 10,700	\$128,400
4	Surface Replacement	LF	5,590	\$ 239	\$1,337,000
5	Traffic Control	LS	1	\$ 20,000	\$20,000
6	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$2,178,000
MOBILIZATION (5%)					\$109,000
CONTINGENCY (30%)					\$654,000
TOTAL CONSTRUCTION					\$2,950,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$738,000
ESTIMATE TOTAL PROJECT COST					\$3,688,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Trainer Hale Rd 2" WL Replacement & 8" WL Improvement

Date: August 2024

Project Number: 2030-W4**

Project Category: Water

Phase: 2030

CIP Type: Growth

Project Description:

Upsize approximately 2,960 LF of 2" to 12" along Trainer Hale Rd east of FM 1518; and 9,650 LF of new 8" loop north of Trainer Hale Rd, east of FM 1518.

Justification:

Upgrades distribution system to current min. pipe size (8") to supply new service area.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	2,960	\$ 170	\$503,200
2	8" Water Line	LF	9,650	\$ 110	\$1,061,500
3	12" Gate Valve	EA	6	\$ 8,900	\$53,400
4	8" Gate Valve	EA	20	\$ 3,800	\$76,000
5	Fire Hydrant	EA	26	\$ 10,700	\$278,200
6	Service & System Connections	EA	253	\$ 2,650	\$670,450
7	Surface Replacement	LF	12,610	\$ 247	\$3,112,000
8	Traffic Control	LS	1	\$ 46,000	\$46,000
9	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$5,833,000
MOBILIZATION (5%)					\$292,000
CONTINGENCY (30%)					\$1,750,000
TOTAL CONSTRUCTION					\$7,880,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,970,000
ESTIMATE TOTAL PROJECT COST					\$9,850,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Boenig Dr S 6" WL Replacement & 8" WL Improvement

Date: August 2024

Project Number: 2030-W5**

Project Category: Water

Phase: 2030

CIP Type: Growth

Project Description:

Upsize approximately 5,300 LF of 6" to 8" along Boenig Dr south of N Graytown Rd, and 3,300 LF new 8" along future Binz-Engleman Rd.

Justification:

Needed to meet growth in area and provide fire flow.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	8,600	\$ 110	\$946,000
2	Gate Valve	EA	18	\$ 3,800	\$68,400
3	Fire Hydrant	EA	18	\$ 10,700	\$192,600
4	Service & System Connections	EA	172	\$ 2,650	\$455,800
5	Surface Replacement	LF	8,600	\$ 239	\$2,057,000
6	Traffic Control	LS	1	\$ 31,000	\$31,000
7	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$3,783,000
MOBILIZATION (5%)					\$190,000
CONTINGENCY (30%)					\$1,135,000
TOTAL CONSTRUCTION					\$5,110,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,278,000
ESTIMATE TOTAL PROJECT COST					\$6,388,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Live Oak to IH-35 24" Transmission Main

Date: August 2024

Project Number: 2030-W6

Project Category: Water

Phase: 2030

CIP Type: Growth

Project Description:

Live Oak to IH-35 24" transmission line (approximately 20,000 LF).

Justification:

In progress, pending easement acquisition. Needed to meet growth and provide redundancy.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	24" Water Line	LF	20,000	\$ 570	\$11,400,000
2	Gate Valve	EA	40	\$ 25,700	\$1,028,000
3	Fire Hydrant	EA	40	\$ 10,700	\$428,000
4	ARV (1")	EA	16	\$ 17,700	\$283,200
5	CAV (3")	EA	16	\$ 23,200	\$371,200
6	Surface Replacement	LF	20,000	\$ 269	\$5,388,000
7	Traffic Control	LS	1	\$ 72,000	\$72,000
8	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$19,003,000
MOBILIZATION (5%)					\$951,000
CONTINGENCY (30%)					\$5,701,000
TOTAL CONSTRUCTION					\$25,660,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$6,415,000
ESTIMATE TOTAL PROJECT COST					\$32,075,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Pump Station Expansion Phase 1	Date: August 2024
Project Number: 2030-W7	
Project Category: Water	Phase: 2030
CIP Type: Growth	

Project Description: Ware Seguin Pump Station Improvements Phase 1 - Expand Ware Seguin to firm pumping capacity of 1,000 gpm, 105 TDH; and new groundwater well to provide supply to Ware Seguin.	Justification: Needed to meet new growth in Ware Seguin area.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	1,000 GPM GW Well	LS	1	\$ 2,518,000	\$2,518,000
2	1,000 GPM Pump for PS	EA	2	\$ 189,000	\$378,000
3	VFD	EA	1	\$ 126,000	\$126,000
4	Yard Piping & Other Appurtenances	LS	1	\$ 63,000	\$63,000
SUBTOTAL					\$3,085,000
MOBILIZATION (5%)					\$155,000
CONTINGENCY (30%)					\$926,000
TOTAL CONSTRUCTION					\$4,170,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,043,000
ESTIMATE TOTAL PROJECT COST					\$5,213,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: IH-10 8" WL Improvements Project Number: 2030-W8 Project Category: Water CIP Type: Growth			Date: August 2024
Phase: 2030			
Project Description: 4,300 LF of new 8" along IH-10 and Scenic Lake Dr.		Justification: Needed to meet growth in area.	

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	4,300	\$ 230	\$991,000
2	Gate Valve	EA	9	\$ 8,200	\$73,800
3	Fire Hydrant	EA	9	\$ 23,100	\$207,900
4	Surface Replacement	LF	4,300	\$ 515	\$2,215,000
5	Traffic Control	LS	1	\$ 34,000	\$34,000
6	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$3,590,000
MOBILIZATION (5%)					\$180,000
CONTINGENCY (30%)					\$1,077,000
TOTAL CONSTRUCTION					\$4,850,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,213,000
ESTIMATE TOTAL PROJECT COST					\$6,063,000

Project Location:



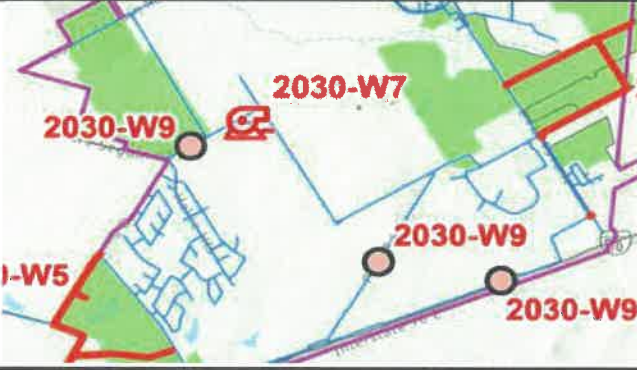


Capital Improvement Plan Estimate of Probable Cost

Project Name: PRV Installation for Proposed Southwest Pressure Plane	Date: August 2024
Project Number: 2030-W9	
Project Category: Water	Phase: 2030
CIP Type: System Improvement	

Project Description: 3 new PRVs (2-6", 1-8") to create new pressure zone in southwest part of system.	Justification: Avoids high pressures and improves performance of Ware Seguin Pump Station.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	6" PRV	EA	2	\$ 70,000	\$140,000
2	8" PRV	EA	1	\$ 80,000	\$80,000
3	Connection/Operations Expenses	LS	1	\$ 19,000	\$19,000
SUBTOTAL					\$239,000
MOBILIZATION (5%)					\$12,000
CONTINGENCY (30%)					\$72,000
TOTAL CONSTRUCTION					\$330,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$83,000
ESTIMATE TOTAL PROJECT COST					\$413,000

Project Location:	
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Capital Improvement Plan Estimate of Probable Cost

Project Name: River Rd 6" WL Replacement	Date: August 2024
Project Number: 2030-W10**	
Project Category: Water	Phase: 2030
CIP Type: System Improvement	

Project Description: Upsize 2,590 LF of ex. 6" to 12" along River Rd from FM 78 to Bubbling Springs Rd to remove bottleneck.	Justification: Removes system bottleneck.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	2,590	\$ 170	\$440,300
2	Gate Valve	EA	6	\$ 8,900	\$53,400
3	Fire Hydrant	EA	6	\$ 10,700	\$64,200
4	Service & System Connections	EA	52	\$ 2,650	\$137,800
5	Surface Replacement	LF	2,590	\$ 247	\$639,000
6	Traffic Control	LS	1	\$ 10,000	\$10,000
7	SWPPP	LS	1	\$ 32,000	\$32,000
SUBTOTAL					\$1,377,000
MOBILIZATION (5%)					\$69,000
CONTINGENCY (30%)					\$414,000
TOTAL CONSTRUCTION					\$1,860,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$465,000
ESTIMATE TOTAL PROJECT COST					\$2,325,000

Project Location:



2050 WATER CIP PROJECTS



Capital Improvement Plan Estimate of Probable Cost

Project Name: Corbett Pump Station Expansion	Date: August 2024
Project Number: 2050-W1	
Project Category: Water	Phase: 2050
CIP Type: System Improvement	

Project Description: Corbett Pump Station Expansion - Expand Corbett to 4,000 gpm, 183 TDH firm capacity.	Justification: Prevents low pressures throughout southern part of system.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	2,000 GPM Pump	EA	1	\$ 543,000	\$543,000
2	VFD	EA	1	\$ 272,000	\$272,000
3	Yard Piping & Other Appurtenances	LS	1	\$ 163,000	\$163,000
SUBTOTAL					\$978,000
MOBILIZATION (5%)					\$49,000
CONTINGENCY (30%)					\$294,000
TOTAL CONSTRUCTION					\$1,330,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$333,000
ESTIMATE TOTAL PROJECT COST					\$1,663,000

Project Location:	
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Capital Improvement Plan Estimate of Probable Cost

Project Name: FM 2252 8" WL Improvements		Date: August 2024
Project Number: 2050-W2		
Project Category: Water		Phase: 2050
CIP Type: System Improvement		
Project Description: Approximately 6,290 LF of 8" along FM 2252 and new loop.		Justification: Supplies new service area.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	6,290	\$ 230	\$1,450,000
2	Gate Valve	EA	13	\$ 8,200	\$106,600
3	Fire Hydrant	EA	13	\$ 23,100	\$300,300
4	Surface Replacement	LF	6,290	\$ 515	\$3,240,000
5	Traffic Control	LS	1	\$ 49,000	\$49,000
6	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$5,214,000
MOBILIZATION (5%)					\$261,000
CONTINGENCY (30%)					\$1,565,000
TOTAL CONSTRUCTION					\$7,040,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,760,000
ESTIMATE TOTAL PROJECT COST					\$8,800,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Pump Station Expansion Phase 2	Date: August 2024
Project Number: 2050-W3	
Project Category: Water	Phase: 2050
CIP Type: System Improvement	

Project Description: Ware Seguin Pump Station Improvements Phase 2 - Expand Ware Seguin to 1,200 gpm, 123 TDH firm capacity.	Justification: Prevents low pressures in Ware Seguin area.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	1,200 GPM Pump	EA	2	\$ 461,000	\$922,000
2	VFD	EA	2	\$ 272,000	\$544,000
3	Yard Piping & Other Appurtenances	LS	1	\$ 147,000	\$147,000
SUBTOTAL					\$1,613,000
MOBILIZATION (5%)					\$81,000
CONTINGENCY (30%)					\$484,000
TOTAL CONSTRUCTION					\$2,180,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$545,000
ESTIMATE TOTAL PROJECT COST					\$2,725,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Beck St 6" WL Replacement	Date: August 2024
Project Number: 2050-W4	
Project Category: Water	Phase: 2050
CIP Type: System Improvement	

Project Description: Upsize 1,590 LF of 6" to 8" along Beck St east of Schertz Pkwy, 1,680 LF of new 8".	Justification: Upgrades distribution system to current min. pipe size (8") to serve new service area.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	3,270	\$ 230	\$754,000
2	Gate Valve	EA	7	\$ 8,200	\$57,400
3	Fire Hydrant	EA	7	\$ 23,100	\$161,700
4	Service & System Connections	EA	66	\$ 5,700	\$376,200
5	Surface Replacement	LF	3,270	\$ 515	\$1,685,000
6	Traffic Control	LS	1	\$ 26,000	\$26,000
7	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$3,129,000
MOBILIZATION (5%)					\$157,000
CONTINGENCY (30%)					\$939,000
TOTAL CONSTRUCTION					\$4,230,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,058,000
ESTIMATE TOTAL PROJECT COST					\$5,288,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Raf Burnette Rd 8" WL Improvements	Date: August 2024
Project Number: 2050-W5	
Project Category: Water	Phase: 2050
CIP Type: Growth	

Project Description: 3,100 LF of new 8" along Raf Burnette east of Authority Ln.	Justification: Needed to meet growth in area.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	3,100	\$ 230	\$715,000
2	Gate Valve	EA	7	\$ 8,200	\$57,400
3	Fire Hydrant	EA	7	\$ 23,100	\$161,700
4	Surface Replacement	LF	3,100	\$ 515	\$1,597,000
5	Traffic Control	LS	1	\$ 24,000	\$24,000
6	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$2,624,000
MOBILIZATION (5%)					\$132,000
CONTINGENCY (30%)					\$788,000
TOTAL CONSTRUCTION					\$3,550,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$888,000
ESTIMATE TOTAL PROJECT COST					\$4,438,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: IH-35 Pump Station & 3.0 MG GST	Date: August 2024
Project Number: 2050-W6	
Project Category: Water	Phase: 2050
CIP Type: Growth	

Project Description: IH-35 Pump Station (4,000 gpm, 183 TDH firm capacity) and 3.0 MG GST, new connection from SSLGC transmission main to the Live Oak to IH-35 24" transmission main.	Justification: Needed to meet growth in area.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	3.0 MG GST	EA	1	\$ 14,232,000	\$14,232,000
2	Yard Piping & Pumps for GST	LS	1	\$ 3,031,000	\$3,031,000
3	Foundation for GST	LS	1	\$ 922,000	\$922,000
4	Connect to 24" Main	LS	1	\$ 85,000	\$85,000
5	Pump Station	LS	1	\$ 6,723,000	\$6,723,000
SUBTOTAL					\$24,993,000
MOBILIZATION (5%)					\$1,250,000
CONTINGENCY (30%)					\$7,498,000
TOTAL CONSTRUCTION					\$33,750,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$8,438,000
ESTIMATE TOTAL PROJECT COST					\$42,188,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: IH-10 & FM 1518 8" WL Improvements			Date:	August 2024
Project Number: 2050-W7				
Project Category: Water			Phase:	2050
CIP Type: Growth				
Project Description: 2,110 LF of new 8" along IH-10 and FM 1518.			Justification: Needed to meet growth in area.	

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Water Line	LF	2,110	\$ 230	\$487,000
2	Gate Valve	EA	5	\$ 8,200	\$41,000
3	Fire Hydrant	EA	5	\$ 23,100	\$115,500
4	Surface Replacement	LF	2,110	\$ 515	\$1,087,000
5	Traffic Control	LS	1	\$ 17,000	\$17,000
6	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$1,816,000
MOBILIZATION (5%)					\$91,000
CONTINGENCY (30%)					\$545,000
TOTAL CONSTRUCTION					\$2,460,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$615,000
ESTIMATE TOTAL PROJECT COST					\$3,075,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Lower Seguin Rd 8" WL Replacement	Date: August 2024
Project Number: 2050-W8	
Project Category: Water	Phase: 2050
CIP Type: Capacity	

Project Description: Upsize 2,500 LF of 8" to 12" along Lower Seguin Rd.	Justification: Needed for fire flow.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Water Line	LF	2,500	\$ 366	\$915,000
2	Gate Valve	EA	5	\$ 19,000	\$95,000
3	Fire Hydrant	EA	5	\$ 23,100	\$115,500
4	Service & System Connections	EA	50	\$ 5,700	\$285,000
5	Surface Replacement	LF	2,500	\$ 531	\$1,329,000
6	Traffic Control	LS	1	\$ 20,000	\$20,000
7	SWPPP	LS	1	\$ 68,000	\$68,000
SUBTOTAL					\$2,828,000
MOBILIZATION (5%)					\$142,000
CONTINGENCY (30%)					\$849,000
TOTAL CONSTRUCTION					\$3,820,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$955,000
ESTIMATE TOTAL PROJECT COST					\$4,775,000

Project Location:



NEAR TERM WASTEWATER CIP PROJECTS



Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase IV 24" - Section 1

Date: August 2024

Project Number: NT-S1

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Town Creek Phase IV (section 1) with approximately 6,600 LF of 24-inch gravity line.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	24" Gravity Line	LF	6,600	\$ 360	\$ 2,376,000
2	Standard Manhole (60" DIA.)	EA	14	\$ 17,000	\$ 238,000
3	Surface Replacement	LF	6,600	\$ 214	\$ 1,413,000
4	Traffic Control	LS	1	\$ 19,000	\$ 19,000
5	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 4,071,000
MOBILIZATION (5%)					\$204,000
CONTINGENCY (30%)					\$1,222,000
TOTAL CONSTRUCTION					\$5,500,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,375,000
ESTIMATE TOTAL PROJECT COST					\$6,875,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase IV 12" - Section 2

Date: August 2024

Project Number: NT-S2

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Town Creek Phase IV (section 2) with approximately 4,470 LF of 12-inch gravity line.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Gravity Line	LF	4,470	\$ 130	\$ 582,000
2	Standard Manhole (60" DIA.)	EA	9	\$ 17,000	\$ 153,000
3	Surface Replacement	LF	4,470	\$ 214	\$ 957,000
4	Traffic Control	LS	1	\$ 13,000	\$ 13,000
5	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 1,730,000
MOBILIZATION (5%)					\$87,000
CONTINGENCY (30%)					\$519,000
TOTAL CONSTRUCTION					\$2,340,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$585,000
ESTIMATE TOTAL PROJECT COST					\$2,925,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase V 24"

Date: August 2024

Project Number: NT-S3

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Town Creek Phase V with approximately 10,060 LF of 24-inch gravity line.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	24" Gravity Line	LF	10,060	\$ 360	\$ 3,622,000
2	Standard Manhole (60" DIA.)	EA	20	\$ 17,000	\$ 343,000
3	Surface Replacement	LF	10,060	\$ 214	\$ 2,153,000
4	Traffic Control	LS	1	\$ 29,000	\$ 29,000
5	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 6,172,000
MOBILIZATION (5%)					\$309,000
CONTINGENCY (30%)					\$1,852,000
TOTAL CONSTRUCTION					\$8,340,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$2,085,000
ESTIMATE TOTAL PROJECT COST					\$10,425,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Upsize Lookout Line

Date: August 2024

Project Number: NT-S4**

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Lookout Line (8") upsized to 18-inch gravity line (~ 3,910 LF).

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	3,910	\$ 200	\$ 782,000
2	Standard Manhole (60" DIA.)	EA	8	\$ 17,000	\$ 133,000
3	Lateral Lines	LF	3,128	\$ 100	\$ 313,000
4	Operational Expenses	LS	1	\$ 203,000	\$ 203,000
5	Surface Replacement	LF	3,910	\$ 205	\$ 802,000
6	Traffic Control	LS	1	\$ 12,000	\$ 12,000
7	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 2,270,000
MOBILIZATION (5%)					\$114,000
CONTINGENCY (30%)					\$681,000
TOTAL CONSTRUCTION					\$3,070,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$768,000
ESTIMATE TOTAL PROJECT COST					\$3,838,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Upsize Tri County Line

Date: August 2024

Project Number: NT-S5**

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Tri County Line upsized from 8-inch gravity line to 18-inch gravity line (~ 1,760 LF).

Justification:

Anticipated growth based on Land Use Plan.

Note: Costs provided by City.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	3,910	\$ 234	\$ 916,000
2	Remaining Costs	LS	1	\$ 1,168,800	\$ 1,168,800
ESTIMATE TOTAL PROJECT COST					\$2,084,800

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Cibolo West Main

Date: August 2024

Project Number: NT-S6

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Cibolo West Main with approximately 21,680 LF of 18-inch gravity line.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	21,680	\$ 200	\$ 4,336,000
2	Standard Manhole (60" DIA.)	EA	43	\$ 17,000	\$ 738,000
3	Surface Replacement	LF	21,680	\$ 205	\$ 4,445,000
4	Traffic Control	LS	1	\$ 62,000	\$ 62,000
5	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 9,606,000
MOBILIZATION (5%)					\$481,000
CONTINGENCY (30%)					\$2,882,000
TOTAL CONSTRUCTION					\$12,970,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$3,243,000
ESTIMATE TOTAL PROJECT COST					\$16,213,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Woman Hollering Creek Lift Station, Gravity Lines, and Force Main

Date: August 2024

Project Number: NT-S7

Project Category: Waste Water

Phase: Near Term

CIP Type: Growth

Project Description:

Approximately 1,940 LF of 18-inch gravity line serving Hallie's Cove.
Approximately 12,550 LF of 30-inch gravity line, approximately 5,990 LF of 14-inch force main, and WHC lift station. Costs provided by the City.

Justification:

Anticipated growth based on Land Use Plan.

*Only the cost increase between 2011 & 2024 is eligible to be included in the impact fee total.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
ESTIMATE TOTAL PROJECT COST (2011)					\$9,600,000
ACTUAL CONSTRUCTION COST (2024)					\$13,000,000
ESTIMATE TOTAL ELIGIBLE* PROJECT COST					\$3,400,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Tri County Lift Station

Date: August 2024

Project Number: NT SI-1

Project Category: Waste Water

Phase: Near Term

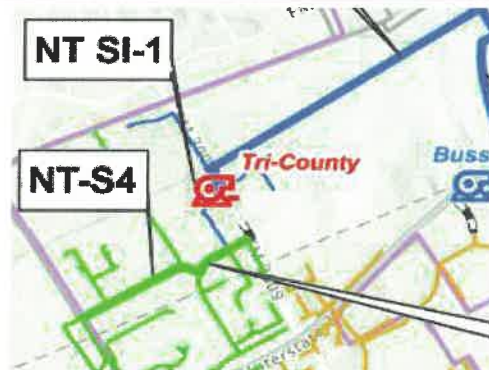
CIP Type: Lift Station Removal

Project Description:
Tri County LS to go offline.

Justification:
Per City request.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 50,000	\$ 50,000
SUBTOTAL					\$ 50,000
MOBILIZATION (5%)					\$3,000
CONTINGENCY (30%)					\$15,000
TOTAL CONSTRUCTION					\$70,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$18,000
ESTIMATE TOTAL PROJECT COST					\$88,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Corbett Lift Station
Project Number: NT SI-2
Project Category: Waste Water
CIP Type: Lift Station Removal

Date: August 2024

Phase: Near Term

Project Description:
Corbett LS to go offline. Approximately 2,410 LF of 10-inch gravity line installed to connect to existing system.

Justification:
Part of the lift station elimination plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 50,000	\$ 50,000
2	10" Gravity Line	LF	2,410	\$ 105	\$ 254,000
3	Standard Manhole (60" DIA.)	EA	5	\$ 17,000	\$ 85,000
4	Surface Replacement	LF	2,410	\$ 193	\$ 466,000
5	Traffic Control	LS	1	\$ 8,000	\$ 8,000
6	SWPPP	LS	1	\$ 25,000	\$ 25,000
SUBTOTAL					\$ 888,000
MOBILIZATION (5%)					\$45,000
CONTINGENCY (30%)					\$267,000
TOTAL CONSTRUCTION					\$1,200,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$300,000
ESTIMATE TOTAL PROJECT COST					\$1,500,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Sedona Lift Station & Woman Hollering Creek WWTP

Date: August 2024

Project Number: NT SI-3

Project Category: Waste Water

Phase: Near Term

CIP Type: Lift Station & WWTP Removal

Project Description:

Sedona LS to go offline and Woman Hollering Creek (WHC) WWTP decommissioned.

Justification:

Part of the lift station elimination plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 50,000	\$ 50,000
2	Decommission WWTP	LS	1	\$ 50,000	\$ 50,000
SUBTOTAL					\$ 100,000
MOBILIZATION (5%)					\$5,000
CONTINGENCY (30%)					\$30,000
TOTAL CONSTRUCTION					\$140,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$35,000
ESTIMATE TOTAL PROJECT COST					\$175,000

Project Location:



**2030
WASTEWATER
CIP PROJECTS**



Capital Improvement Plan Estimate of Probable Cost

Project Name: Hope Lane 8" Gravity Line

Date: August 2024

Project Number: 2030-S1

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 2,950 LF of 8-inch gravity line north of Old Wiederstein Rd and along Hope Ln.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	2,950	\$ 107	\$ 316,000
2	Standard Manhole (60" DIA.)	EA	6	\$ 21,400	\$ 129,000
3	Surface Replacement	LF	2,950	\$ 239	\$ 706,000
4	Traffic Control	LS	1	\$ 11,000	\$ 11,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,194,000
MOBILIZATION (5%)					\$60,000
CONTINGENCY (30%)					\$359,000
TOTAL CONSTRUCTION					\$1,620,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$405,000
ESTIMATE TOTAL PROJECT COST					\$2,025,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Old Wiederstein Road 8"

Date: August 2024

Project Number: 2030-S2

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 1,900 LF of 8-inch gravity line along Old Wiederstein Rd from Dean Rd to vicinity of Kaylee Chase.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	1,900	\$ 107	\$ 204,000
2	Standard Manhole (60" DIA.)	EA	4	\$ 21,400	\$ 86,000
3	Surface Replacement	LF	1,900	\$ 239	\$ 455,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$785,000
MOBILIZATION (5%)					\$40,000
CONTINGENCY (30%)					\$236,000
TOTAL CONSTRUCTION					\$1,070,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$268,000
ESTIMATE TOTAL PROJECT COST					\$1,338,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Union Pacific Railroad 8" - Section 1

Date: August 2024

Project Number: 2030-S3

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 3,750 LF of 8-inch gravity line south of Union Pacific Rail Road.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	3,750	\$ 107	\$ 402,000
2	Standard Manhole (60" DIA.)	EA	8	\$ 21,400	\$ 172,000
3	Surface Replacement	LF	3,750	\$ 239	\$ 897,000
4	Traffic Control	LS	1	\$ 14,000	\$ 14,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,517,000
MOBILIZATION (5%)					\$76,000
CONTINGENCY (30%)					\$456,000
TOTAL CONSTRUCTION					\$2,050,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$513,000
ESTIMATE TOTAL PROJECT COST					\$2,563,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Union Pacific Railroad 8" - Section 2

Date: August 2024

Project Number: 2030-S4

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 500 LF of 8-inch gravity line south of Union Pacific Rail Road.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	500	\$ 107	\$ 54,000
2	Standard Manhole (60" DIA.)	EA	1	\$ 21,400	\$ 22,000
3	Surface Replacement	LF	500	\$ 239	\$ 120,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$236,000
MOBILIZATION (5%)					\$12,000
CONTINGENCY (30%)					\$71,000
TOTAL CONSTRUCTION					\$320,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$80,000
ESTIMATE TOTAL PROJECT COST					\$400,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Wiederstein Road 8"

Date: August 2024

Project Number: 2030-S5

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 2,400 LF of 8-inch gravity line along Wiederstein Rd between Jupe and Quail Ln.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	2,400	\$ 107	\$ 257,000
2	Standard Manhole (60" DIA.)	EA	5	\$ 21,400	\$ 107,000
3	Surface Replacement	LF	2,400	\$ 239	\$ 574,000
4	Traffic Control	LS	1	\$ 9,000	\$ 9,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$979,000
MOBILIZATION (5%)					\$49,000
CONTINGENCY (30%)					\$294,000
TOTAL CONSTRUCTION					\$1,330,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$333,000
ESTIMATE TOTAL PROJECT COST					\$1,663,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Schaefer Road 8" - Section 1

Date: August 2024

Project Number: 2030-S6

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 7,300 LF of 8-inch gravity line, along Schaefer Rd , Lisa Meadows and Voges pass.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	7,300	\$ 107	\$ 782,000
2	Standard Manhole (60" DIA.)	EA	15	\$ 21,400	\$ 321,000
3	Surface Replacement	LF	7,300	\$ 239	\$ 1,746,000
4	Traffic Control	LS	1	\$ 27,000	\$ 27,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$2,908,000
MOBILIZATION (5%)					\$146,000
CONTINGENCY (30%)					\$873,000
TOTAL CONSTRUCTION					\$3,930,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$983,000
ESTIMATE TOTAL PROJECT COST					\$4,913,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Schaefer Road 8" - Section 2

Date: August 2024

Project Number: 2030-S7

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 2,800 LF of 8-inch gravity line along Schaefer Rd west of FM 1518.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	2,800	\$ 107	\$ 300,000
2	Standard Manhole (60" DIA.)	EA	6	\$ 21,400	\$ 129,000
3	Surface Replacement	LF	2,800	\$ 239	\$ 670,000
4	Traffic Control	LS	1	\$ 11,000	\$ 11,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,142,000
MOBILIZATION (5%)					\$58,000
CONTINGENCY (30%)					\$343,000
TOTAL CONSTRUCTION					\$1,550,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$388,000
ESTIMATE TOTAL PROJECT COST					\$1,938,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Aranda 8"

Date: August 2024

Project Number: 2030-S8

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

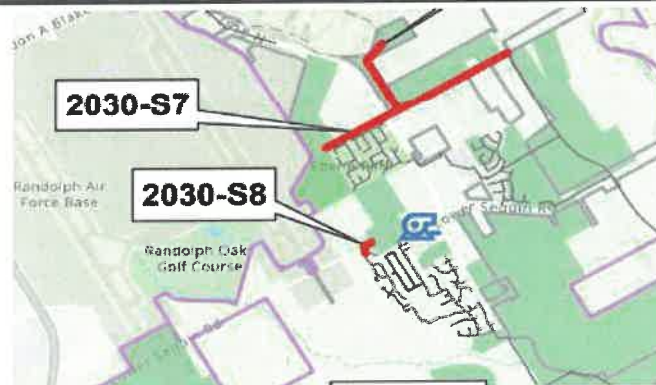
Approximately 550 LF of 8-inch gravity line along Aranda, north of Chalk Stem.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	550	\$ 107	\$ 59,000
2	Standard Manhole (60" DIA.)	EA	2	\$ 21,400	\$ 43,000
3	Surface Replacement	LF	550	\$ 239	\$ 132,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$274,000
MOBILIZATION (5%)					\$14,000
CONTINGENCY (30%)					\$83,000
TOTAL CONSTRUCTION					\$380,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$95,000
ESTIMATE TOTAL PROJECT COST					\$475,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Weir Road 10"

Date: August 2024

Project Number: 2030-S9

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 3,500 LF of 10-inch gravity line west of Weir Rd and north of Trainer Hale Rd.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	10" Gravity Line	LF	3,500	\$ 132	\$ 463,000
2	Standard Manhole (60" DIA.)	EA	7	\$ 21,400	\$ 150,000
3	Surface Replacement	LF	3,500	\$ 239	\$ 838,000
4	Traffic Control	LS	1	\$ 13,000	\$ 13,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,496,000
MOBILIZATION (5%)					\$75,000
CONTINGENCY (30%)					\$449,000
TOTAL CONSTRUCTION					\$2,020,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$505,000
ESTIMATE TOTAL PROJECT COST					\$2,525,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Trainer Hale Road 10"

Date: August 2024

Project Number: 2030-S10

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 1,350 LF of 10-inch gravity line along Trainer Hale Rd, east of E FM 1518 N.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	10" Gravity Line	LF	1,350	\$ 132	\$ 179,000
2	Standard Manhole (60" DIA.)	EA	3	\$ 21,400	\$ 65,000
3	Surface Replacement	LF	1,350	\$ 239	\$ 323,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$607,000
MOBILIZATION (5%)					\$31,000
CONTINGENCY (30%)					\$183,000
TOTAL CONSTRUCTION					\$830,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$208,000
ESTIMATE TOTAL PROJECT COST					\$1,038,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Road 8"

Date: August 2024

Project Number: 2030-S11

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

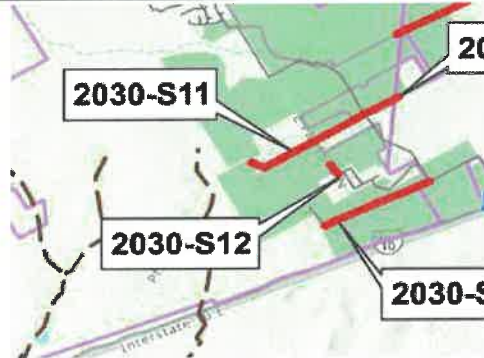
Approximately 4,550 LF of 8-inch gravity line along Ware Seguin Rd west of FM 1518.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	4,550	\$ 107	\$ 487,000
2	Standard Manhole (60" DIA.)	EA	10	\$ 21,400	\$ 214,000
3	Surface Replacement	LF	4,550	\$ 239	\$ 1,089,000
4	Traffic Control	LS	1	\$ 17,000	\$ 17,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,839,000
MOBILIZATION (5%)					\$92,000
CONTINGENCY (30%)					\$552,000
TOTAL CONSTRUCTION					\$2,490,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$623,000
ESTIMATE TOTAL PROJECT COST					\$3,113,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: FM 1518 8"

Date: August 2024

Project Number: 2030-S12

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

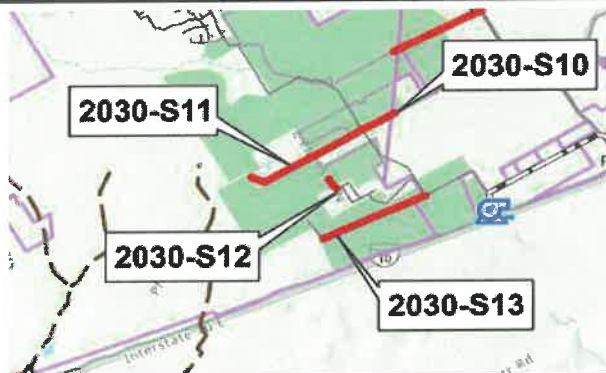
Approximately 500 LF of 8-inch gravity line along E FM 1518 N.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	500	\$ 107	\$ 54,000
2	Standard Manhole (60" DIA.)	EA	1	\$ 21,400	\$ 22,000
3	Surface Replacement	LF	500	\$ 239	\$ 120,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$236,000
MOBILIZATION (5%)					\$12,000
CONTINGENCY (30%)					\$71,000
TOTAL CONSTRUCTION					\$320,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$80,000
ESTIMATE TOTAL PROJECT COST					\$400,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: I-10 8" - Section 1

Date: August 2024

Project Number: 2030-S13

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 4,000 LF of 8-inch gravity line north of I-10 E.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	4,000	\$ 107	\$ 428,000
2	Standard Manhole (60" DIA.)	EA	8	\$ 21,400	\$ 172,000
3	Surface Replacement	LF	4,000	\$ 239	\$ 957,000
4	Traffic Control	LS	1	\$ 15,000	\$ 15,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,604,000
MOBILIZATION (5%)					\$81,000
CONTINGENCY (30%)					\$482,000
TOTAL CONSTRUCTION					\$2,170,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$543,000
ESTIMATE TOTAL PROJECT COST					\$2,713,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Boenig Drive 8"

Date: August 2024

Project Number: 2030-S14

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 4,350 LF of 8-inch gravity line along Boenig Dr and Ware Seguin Rd going north.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	4,350	\$ 107	\$ 466,000
2	Standard Manhole (60" DIA.)	EA	9	\$ 21,400	\$ 193,000
3	Surface Replacement	LF	4,350	\$ 239	\$ 1,041,000
4	Traffic Control	LS	1	\$ 16,000	\$ 16,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$1,748,000
MOBILIZATION (5%)					\$88,000
CONTINGENCY (30%)					\$525,000
TOTAL CONSTRUCTION					\$2,370,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$593,000
ESTIMATE TOTAL PROJECT COST					\$2,963,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: N Greytown Road 8"

Date: August 2024

Project Number: 2030-S15

Project Category: Waste Water

Phase: 2030

CIP Type: Growth

Project Description:

Approximately 1,800 LF of 8-inch gravity line north of I-10 E and along N Greytown Rd.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	1,800	\$ 107	\$ 193,000
2	Standard Manhole (60" DIA.)	EA	4	\$ 21,400	\$ 86,000
3	Surface Replacement	LF	1,800	\$ 239	\$ 431,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$750,000
MOBILIZATION (5%)					\$38,000
CONTINGENCY (30%)					\$225,000
TOTAL CONSTRUCTION					\$1,020,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$255,000
ESTIMATE TOTAL PROJECT COST					\$1,275,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Friesenhahn West Line WW Upsize

Date: August 2024

Project Number: 2030 SI-1**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

Replacing an existing 8-inch with 18-inch gravity line (~4,900 LF), parallel to Friesenhahn Ln and an existing 12-inch with 18-inch gravity line (~1,600 LF) immediately upstream of the Friesenhahn LS.

Justification:

To resolve 4 SSOs upstream of Friesenhahn LS.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	6,500	\$ 252	\$ 1,637,000
2	Standard Manhole (60" DIA.)	EA	13	\$ 21,400	\$ 279,000
3	Lateral Lines	LF	5,200	\$ 126	\$ 655,000
4	Operational Expenses	LS	1	\$ 535,000	\$ 535,000
5	Surface Replacement	LF	6,500	\$ 258	\$ 1,678,000
6	Traffic Control	LS	1	\$ 24,000	\$ 24,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 4,840,000
MOBILIZATION (5%)					\$242,000
CONTINGENCY (30%)					\$1,452,000
TOTAL CONSTRUCTION					\$6,540,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,635,000
ESTIMATE TOTAL PROJECT COST					\$8,175,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Fairlawn WW Upsize

Date: August 2024

Project Number: 2030 SI-2**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

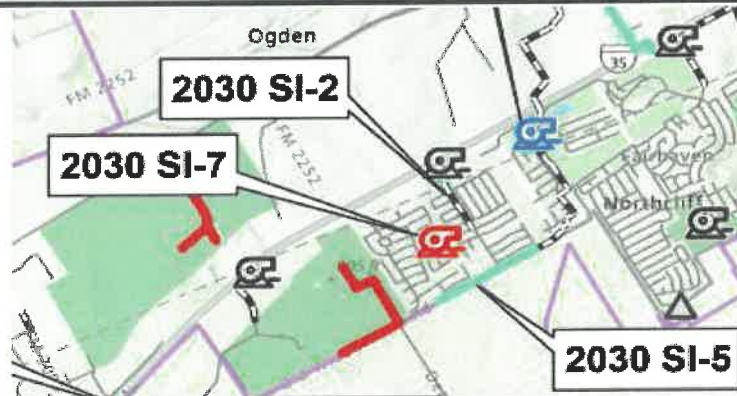
Replacing an existing 8-inch with 10-inch gravity line (~1,320 LF) along Fairlawn Ave from Ashwood Rd to Riata LS.

Justification:

To resolve an SSO upstream of Riata LS.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	10" Gravity Line	LF	1,320	\$ 132	\$ 175,000
2	Standard Manhole (60" DIA.)	EA	3	\$ 21,400	\$ 57,000
3	Lateral Lines	LF	1,056	\$ 126	\$ 133,000
4	Operational Expenses	LS	1	\$ 87,000	\$ 87,000
5	Surface Replacement	LF	1,320	\$ 243	\$ 321,000
6	Traffic Control	LS	1	\$ 8,000	\$ 8,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 813,000
MOBILIZATION (5%)					\$41,000
CONTINGENCY (30%)					\$244,000
TOTAL CONSTRUCTION					\$1,100,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$275,000
ESTIMATE TOTAL PROJECT COST					\$1,375,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Cibolo Crossing WW Line Upsize

Date: August 2024

Project Number: 2030 SI-3**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

Replacing an existing 10-inch with 12-inch gravity line (~1,150 LF), south of I-35 N and east of Hampton Inn & Suites of Schertz.

Justification:

To resolve an SSO near I 35 N.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Gravity Line	LF	1,150	\$ 164	\$ 189,000
2	Standard Manhole (60" DIA.)	EA	2	\$ 21,400	\$ 50,000
3	Lateral Lines	LF	920	\$ 126	\$ 116,000
4	Operational Expenses	LS	1	\$ 81,000	\$ 81,000
5	Surface Replacement	LF	1,150	\$ 247	\$ 284,000
6	Traffic Control	LS	1	\$ 8,000	\$ 8,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 760,000
MOBILIZATION (5%)					\$38,000
CONTINGENCY (30%)					\$228,000
TOTAL CONSTRUCTION					\$1,030,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$258,000
ESTIMATE TOTAL PROJECT COST					\$1,288,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Woodland Oak Drive Replacements

Date: August 2024

Project Number: 2030 SI-4**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

Replacing an existing 8-inch with 12-inch gravity line (~250 LF), near Woodland Oak Dr.

Justification:

To resolve an SSO near Woodland Oak Dr.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	12" Gravity Line	LF	250	\$ 164	\$ 41,000
2	Standard Manhole (60" DIA.)	EA	1	\$ 21,400	\$ 11,000
3	Lateral Lines	LF	200	\$ 126	\$ 26,000
4	Operational Expenses	LS	1	\$ 18,000	\$ 18,000
5	Surface Replacement	LF	250	\$ 247	\$ 62,000
6	Traffic Control	LS	1	\$ 8,000	\$ 8,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 198,000
MOBILIZATION (5%)					\$10,000
CONTINGENCY (30%)					\$60,000
TOTAL CONSTRUCTION					\$270,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$68,000
ESTIMATE TOTAL PROJECT COST					\$338,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Old Wiederstein WW Upsize

Date: August 2024

Project Number: 2030 SI-5**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

Replacing an existing 18-inch with 21-inch gravity line (~3,330 LF), along Old Wiederstein Rd.

Justification:

To increase line capacity.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	21" Gravity Line	LF	3,330	\$ 378	\$ 1,258,000
2	Standard Manhole (60" DIA.)	EA	7	\$ 21,400	\$ 143,000
3	Lateral Lines	LF	2,664	\$ 126	\$ 336,000
4	Operational Expenses	LS	1	\$ 330,000	\$ 330,000
5	Surface Replacement	LF	3,330	\$ 263	\$ 877,000
6	Traffic Control	LS	1	\$ 12,000	\$ 12,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 2,988,000
MOBILIZATION (5%)					\$150,000
CONTINGENCY (30%)					\$897,000
TOTAL CONSTRUCTION					\$4,040,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,010,000
ESTIMATE TOTAL PROJECT COST					\$5,050,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Northcliffe Lift Station Upgrade

Date: August 2024

Project Number: 2030 SI-6**

Project Category: Waste Water

Phase: 2030

CIP Type: System Improvement

Project Description:

Northcliffe LS uprgade to firm capacity of 4,500 gpm.

Justification:

To follow TCEQ requirement of peak flow not to exceed firm capacity. This upgrade is based on buildout flow of 4,485 gpm.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Upgrade Lift Station (2,750 gpm)	LS	1	\$ 4,637,000	\$ 4,637,000
SUBTOTAL					\$4,637,000
MOBILIZATION (5%)					\$232,000
CONTINGENCY (30%)					\$1,392,000
TOTAL CONSTRUCTION					\$6,270,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,568,000
ESTIMATE TOTAL PROJECT COST					\$7,838,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Belmont Park Lift Station

Date: August 2024

Project Number: 2030 SI-7

Project Category: Waste Water

Phase: 2030

CIP Type: Lift Station Removal

Project Description:

Belmont Park LS to go offline; install approximately 420 LF of 8-inch gravity line to connect to the line along Livingston Dr.

Justification:

Per City request.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 63,000	\$ 63,000
2	8" Gravity Line	LF	420	\$ 107	\$ 45,000
3	Standard Manhole (60" DIA.)	EA	1	\$ 21,400	\$ 22,000
4	Surface Replacement	LF	420	\$ 239	\$ 101,000
5	Traffic Control	LS	1	\$ 8,000	\$ 8,000
6	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 271,000
MOBILIZATION (5%)					\$14,000
CONTINGENCY (30%)					\$82,000
TOTAL CONSTRUCTION					\$370,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$93,000
ESTIMATE TOTAL PROJECT COST					\$463,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Roy Richard Drive Replacements

Date: August 2024

Project Number: 2030 C-1

Project Category: Waste Water

Phase: 2030

CIP Type: CCMA System Capacity

Project Description:

Replacing an existing 15-inch with 18-inch gravity line (~1,220 LF), east of Roy Richard Dr and south of Woodland Oaks Dr.

Justification:

To resolve 2 SSOs near Woodland Oak Dr and Valencia Ln.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	1,220	\$ 252	\$ 308,000
2	Standard Manhole (60" DIA.)	EA	2	\$ 21,400	\$ 53,000
3	Lateral Lines	LF	976	\$ 126	\$ 123,000
4	Operational Expenses	LS	1	\$ 101,000	\$ 101,000
5	Surface Replacement	LF	1,220	\$ 258	\$ 315,000
6	Traffic Control	LS	1	\$ 8,000	\$ 8,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 940,000
MOBILIZATION (5%)					\$47,000
CONTINGENCY (30%)					\$282,000
TOTAL CONSTRUCTION					\$1,270,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$318,000
ESTIMATE TOTAL PROJECT COST					\$1,588,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Valencia Lane Replacements

Date: August 2024

Project Number: 2030 C-2

Project Category: Waste Water

Phase: 2030

CIP Type: CCMA System Capacity

Project Description:

Replacing an existing 10-inch with 18-inch gravity line (~1,780 LF), north of Woodland Oaks Dr and east of Valencia Ln.

Justification:

To resolve 2 SSOs near Woodland Oak Dr and Valencia Ln.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	18" Gravity Line	LF	1,780	\$ 252	\$ 449,000
2	Standard Manhole (60" DIA.)	EA	4	\$ 21,400	\$ 77,000
3	Lateral Lines	LF	1,424	\$ 126	\$ 180,000
4	Operational Expenses	LS	1	\$ 147,000	\$ 147,000
5	Surface Replacement	LF	1,780	\$ 258	\$ 460,000
6	Traffic Control	LS	1	\$ 8,000	\$ 8,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 1,353,000
MOBILIZATION (5%)					\$68,000
CONTINGENCY (30%)					\$406,000
TOTAL CONSTRUCTION					\$1,830,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$458,000
ESTIMATE TOTAL PROJECT COST					\$2,288,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Savannah Drive Replacements

Date: August 2024

Project Number: 2030 C-3

Project Category: Waste Water

Phase: 2030

CIP Type: CCMA System Capacity

Project Description:

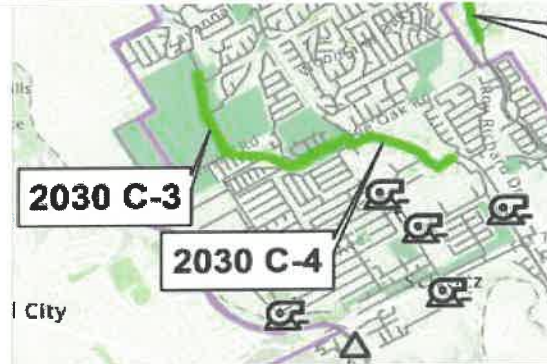
Replacing an existing 30-inch with 36-inch gravity line (~5,230 LF), south of Savannah Dr and north of Live Oak Rd.

Justification:

To resolve an SSO near Maske Rd.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	36" Gravity Line	LF	5,230	\$ 806	\$ 4,214,000
2	Standard Manhole (60" DIA.)	EA	10	\$ 21,400	\$ 224,000
3	Lateral Lines	LF	4,184	\$ 126	\$ 527,000
4	Operational Expenses	LS	1	\$ 818,000	\$ 818,000
5	Surface Replacement	LF	5,230	\$ 292	\$ 1,528,000
6	Traffic Control	LS	1	\$ 19,000	\$ 19,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 7,362,000
MOBILIZATION (5%)					\$369,000
CONTINGENCY (30%)					\$2,209,000
TOTAL CONSTRUCTION					\$9,940,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$2,485,000
ESTIMATE TOTAL PROJECT COST					\$12,425,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Build Out Project 25 - 36" Schertz Line

Date: August 2024

Project Number: 2030 C-4

Project Category: Waste Water

Phase: 2030

CIP Type: CCMA System Capacity

Project Description:

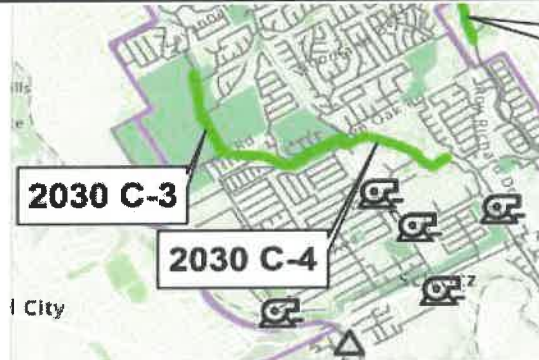
Replacing an existing 30-inch with 36-inch gravity line (~5,450 LF), near Community Cir, from Buffalo Dr to Live Oak Rd.

Justification:

To resolve 2 SSOs near Maske Rd.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	36" Gravity Line	LF	5,450	\$ 806	\$ 4,391,000
2	Standard Manhole (60" DIA.)	EA	11	\$ 21,400	\$ 234,000
3	Lateral Lines	LF	4,360	\$ 126	\$ 549,000
4	Operational Expenses	LS	1	\$ 852,000	\$ 852,000
5	Surface Replacement	LF	5,450	\$ 292	\$ 1,592,000
6	Traffic Control	LS	1	\$ 20,000	\$ 20,000
7	SWPPP	LS	1	\$ 32,000	\$ 32,000
SUBTOTAL					\$ 7,670,000
MOBILIZATION (5%)					\$384,000
CONTINGENCY (30%)					\$2,301,000
TOTAL CONSTRUCTION					\$10,360,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$2,590,000
ESTIMATE TOTAL PROJECT COST					\$12,950,000

Project Location:



**2050
WASTEWATER
CIP PROJECTS**



Capital Improvement Plan Estimate of Probable Cost

Project Name: I-35 N 8"

Date: August 2024

Project Number: 2050-S1

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:

Approximately 6,250 LF of 8-inch gravity line north of and along I-35 N.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	6,250	\$ 230	\$ 1,441,000
2	Standard Manhole (60" DIA.)	EA	13	\$ 46,100	\$ 600,000
3	Surface Replacement	LF	6,250	\$ 515	\$ 3,220,000
4	Traffic Control	LS	1	\$ 49,000	\$ 49,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 5,378,000
MOBILIZATION (5%)					\$269,000
CONTINGENCY (30%)					\$1,614,000
TOTAL CONSTRUCTION					\$7,270,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,818,000
ESTIMATE TOTAL PROJECT COST					\$9,088,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Friesenhahn Lane 8"

Date: August 2024

Project Number: 2050-S2

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:
Approximately 4,460 LF of 8-inch gravity line, along Friesenhahn Ln.

Justification:
Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	4,460	\$ 230	\$ 1,028,000
2	Standard Manhole (60" DIA.)	EA	9	\$ 46,100	\$ 415,000
3	Surface Replacement	LF	4,460	\$ 515	\$ 2,298,000
4	Traffic Control	LS	1	\$ 35,000	\$ 35,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 3,844,000
MOBILIZATION (5%)					\$193,000
CONTINGENCY (30%)					\$1,154,000
TOTAL CONSTRUCTION					\$5,200,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,300,000
ESTIMATE TOTAL PROJECT COST					\$6,500,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Schaefer Road 8" - Section 3

Date: August 2024

Project Number: 2050-S3

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:

Approximately 3,910 LF of 8-inch gravity line from Schaefer Rd north parallel to Authority Ln.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	3,910	\$ 230	\$ 901,000
2	Standard Manhole (60" DIA.)	EA	8	\$ 46,100	\$ 369,000
3	Surface Replacement	LF	3,910	\$ 515	\$ 2,014,000
4	Traffic Control	LS	1	\$ 31,000	\$ 31,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 3,383,000
MOBILIZATION (5%)					\$170,000
CONTINGENCY (30%)					\$1,015,000
TOTAL CONSTRUCTION					\$4,570,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$1,143,000
ESTIMATE TOTAL PROJECT COST					\$5,713,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Corbett JH 8"

Date: August 2024

Project Number: 2050-S4

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:

Approximately 1,930 LF of 8-inch gravity line, south of Corbett Junior High School and north of Lower Seguin Rd.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	1,930	\$ 230	\$ 445,000
2	Standard Manhole (60" DIA.)	EA	4	\$ 46,100	\$ 185,000
3	Surface Replacement	LF	1,930	\$ 515	\$ 995,000
4	Traffic Control	LS	1	\$ 15,000	\$ 15,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 1,708,000
MOBILIZATION (5%)					\$86,000
CONTINGENCY (30%)					\$513,000
TOTAL CONSTRUCTION					\$2,310,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$578,000
ESTIMATE TOTAL PROJECT COST					\$2,888,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Lower Seguin Road 8"

Date: August 2024

Project Number: 2050-S5

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:
Approximately 830 LF of 8-inch gravity line along Lower Seguin Rd.

Justification:
Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	830	\$ 230	\$ 192,000
2	Standard Manhole (60" DIA.)	EA	2	\$ 46,100	\$ 93,000
3	Surface Replacement	LF	830	\$ 515	\$ 428,000
4	Traffic Control	LS	1	\$ 8,000	\$ 8,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 789,000
MOBILIZATION (5%)					\$40,000
CONTINGENCY (30%)					\$237,000
TOTAL CONSTRUCTION					\$1,070,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$268,000
ESTIMATE TOTAL PROJECT COST					\$1,338,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: I-10 8" - Section 2

Date: August 2024

Project Number: 2050-S6

Project Category: Waste Water

Phase: 2050

CIP Type: Growth

Project Description:

Approximately 2,220 LF of 8-inch gravity line north of and parallel to IH-10.

Justification:

Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	8" Gravity Line	LF	2,220	\$ 230	\$ 512,000
2	Standard Manhole (60" DIA.)	EA	5	\$ 46,100	\$ 231,000
3	Surface Replacement	LF	2,220	\$ 515	\$ 1,144,000
4	Traffic Control	LS	1	\$ 18,000	\$ 18,000
5	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 1,973,000
MOBILIZATION (5%)					\$99,000
CONTINGENCY (30%)					\$592,000
TOTAL CONSTRUCTION					\$2,670,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$668,000
ESTIMATE TOTAL PROJECT COST					\$3,338,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Cypress Point Lift Station Upgrade

Date: August 2024

Project Number: 2050 SI-1

Project Category: Waste Water

Phase: 2050

CIP Type: System Improvement

Project Description:

Cypress Point LS upgrade to firm capacity of 1,250 gpm.

Justification:

To follow TCEQ requirement of Peak flow not to exceed firm capacity. This upgrade is based on buildout flow of 1,233 gpm.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Upgrade Lift Station (~250 gpm)	LS	1	\$ 865,000	\$ 865,000
SUBTOTAL					\$ 865,000
MOBILIZATION (5%)					\$44,000
CONTINGENCY (30%)					\$260,000
TOTAL CONSTRUCTION					\$1,170,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$293,000
ESTIMATE TOTAL PROJECT COST					\$1,463,000

Project Location:





Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Schertz Parkway Lift Station

Date: August 2024

Project Number: 2050 SI-2

Project Category: Waste Water

Phase: 2050

CIP Type: Lift Station Removal

Project Description:
Schertz Pkwy LS to go offline.

Justification:
To convey flow to a new CCMA's line which will be built by 2050.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 136,000	\$ 136,000
SUBTOTAL					\$ 136,000
MOBILIZATION (5%)					\$7,000
CONTINGENCY (30%)					\$41,000
TOTAL CONSTRUCTION					\$190,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$48,000
ESTIMATE TOTAL PROJECT COST					\$238,000

Project Location:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Park Lift Station	Date: August 2024
Project Number: 2050 SI-3	
Project Category: Waste Water	Phase: 2050
CIP Type: Lift Station Removal	

Project Description: Park LS to go offline; install approximately 2,300 LF of 8-inch gravity line to connect to the line along E Aviation Blvd.	Justification: Per City request.
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ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 136,000	\$ 136,000
2	8" Gravity Line	LF	2,300	\$ 230	\$ 530,000
3	Standard Manhole (60" DIA.)	EA	5	\$ 46,100	\$ 231,000
4	Surface Replacement	LF	2,300	\$ 515	\$ 1,185,000
5	Traffic Control	LS	1	\$ 18,000	\$ 18,000
6	SWPPP	LS	1	\$ 68,000	\$ 68,000
SUBTOTAL					\$ 2,168,000
MOBILIZATION (5%)					\$109,000
CONTINGENCY (30%)					\$651,000
TOTAL CONSTRUCTION					\$2,930,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$733,000
ESTIMATE TOTAL PROJECT COST					\$3,663,000

Project Location:	
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Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Cover's Cove Lift Station

Date: August 2024

Project Number: 2050 SI-4

Project Category: Waste Water

Phase: 2050

CIP Type: Lift Station Removal

Project Description:
Cover's Cove LS to go offline.

Justification:
Per City request.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
1	Decommission Lift Station	LS	1	\$ 136,000	\$ 136,000
SUBTOTAL					\$ 136,000
MOBILIZATION (5%)					\$7,000
CONTINGENCY (30%)					\$41,000
TOTAL CONSTRUCTION					\$190,000
PS&E & CONSTRUCTION MANAGEMENT (25%)					\$48,000
ESTIMATE TOTAL PROJECT COST					\$238,000

Project Location:



