MEETING AGENDA
Schertz Capital Improvement Advisory Committee
January 8, 2025

HAL BALDWIN MUNICIPAL COMPLEX COUNCIL CHAMBERS
1400 SCHERTZ PARKWAY BUILDING #4
SCHERTZ, TEXAS 78154

CITY OF SCHERTZ CORE VALUES
Do the right thing
Do the best you can
Treat others the way you want to be treated
Work cooperatively as a team

AGENDA
WEDNESDAY, JANUARY 8, 2025 at 6:00 p.m.

The Capital Improvement Advisory Committee will hold the scheduled meeting at 6:00p.m., Wednesday, January 8, 2025, at the City Council Chambers. In lieu of attending the meeting in person, residents will have the opportunity to watch the meeting via live stream on the City's YouTube Channel.

1. CALL TO ORDER / ROLL CALL THE CAPITAL IMPROVEMENT ADVISORY COMMITTEE MEETING

2. SEAT ALTERNATE TO ACT IF REQUIRED

3. HEARING OF RESIDENTS

This time is set aside for any person who wishes to address the Capital Improvement Advisory Committee. Each person should fill out the Speaker's register prior to the meeting. Presentations should be limited to no more than three (3) minutes. Discussion by the Committee of any item not on the agenda shall be limited to statements of specific factual information given in response to any inquiry, a recitation of existing policy in response to an inquiry, and/or a proposal to place the item on a future agenda. The presiding officer, during the Hearing of Residents portion of the agenda, will call on those persons who have signed up to speak in the order they have registered.

4. WORKSHOP AND DISCUSSION:

A. Workshop presentation and discussion regarding a pending update to the City of Schertz Water and Wastewater Master Plans, Land Use Assumptions, and Capital Improvements Plans that establish the basis for an update to the City's Water and Wastewater Impact Fees.

5. ADJOURNMENT OF THE CAPITAL IMPROVEMENT ADVISORY COMMITTEE MEETING

CERTIFICATION
I, Daisy Marquez, Planner, of the City of Schertz, Texas, do hereby certify that the above agenda was posted on the official bulletin boards on this the 2nd day of January, 2025 at 3:00 p.m., which is a place readily accessible to the public at all times and that said notice was posted in accordance with chapter 551, Texas Government Code.

Daisy Marquez, Planner

I certify that the attached notice and agenda of items to be considered by the Schertz Capital Improvement Advisory Committee was removed from the official bulletin board on _____day of _______________, 2025. _______________title:_____________

This facility is accessible in accordance with the Americans with Disabilities Act. Handicapped parking spaces are available. If you require special assistance or have a request for sign interpretative services or other services please call 619-1030 at least 24 hours in advance of meeting.

The Planning and Zoning Commission for the City of Schertz reserves the right to adjourn into executive session at any time during the course of this meeting to discuss any of the matters listed above, as authorized by the Texas Open Meetings Act.

Executive Sessions Authorized: This agenda has been reviewed and approved by the City's legal counsel and presence of any subject in any Executive Session portion of the agenda constitutes a written interpretation of Texas Government Code Chapter 551 by legal counsel for the governmental body and constitutes an opinion by the attorney that the items discussed therein may be legally discussed in the closed portion of the meeting considering available opinions of a court of record and opinions of the Texas Attorney General known to the attorney. This provision has been added to this agenda with the intent to meet all elements necessary to satisfy Texas Government Code Chapter 551.144(c) and the meeting is conducted by all participants in reliance on this opinion.

SCHERTZ
COMMUNITY ★ SERVICE ★ OPPORTUNITY

CAPITAL IMPROVEMENT ADVISORY COMMITTEE: 01/08/2025
Agenda Item 4 A

TO:	Planning and Zoning Commission
PREPARED BY:	Kathryn Woodlee, City Engineer
SUBJECT:	Workshop presentation and discussion regarding a pending update to the City of Schertz Water and Wastewater Master Plans, Land Use Assumptions, and Capital Improvements Plans that establish the basis for an update to the City's Water and Wastewater Impact Fees.

GENERAL INFORMATION

The City desires to update its capital recovery fees, or impact fees, in order to appropriately fund construction of new facilities and expand existing facilities to serve future development. The fees consider and apply to water and wastewater projects identified on the City's Water and Wastewater Master Plans necessary to support growth and development. To formulate the fees to be assessed, land use assumptions that project growth over a planning period must be established. Additionally, Capital Improvement Plans that address the needs of that growth must be prepared and approved.

The purpose of the impact fee is to provide a funding mechanism for the implementation of the water and wastewater capital improvements over a planning period. The impact fee program facilitates the funding participation of new development at a fair rate based on the demand placed on the City's water transmission and distribution and wastewater collection and conveyance systems by the development.

An initial step in the update of the impact fee is the establishment of land use assumptions including population and employment projections over the 30-year planning period (2020-2050). The assumptions include the type, location, quantity, and timing of land uses. The Land Use Assumptions report (LUA) includes a description of the methodology used in preparation, explanation of the data considered, and presentation of historical and projected growth trends.

The other major step in the update of the impact fee is the preparation of Water and Wastewater Capital Improvement Plans (CIPs). The proposed CIP for water was developed based on a hydraulic model of the existing water system, application of growth projections to that model, and identification of improvement projects needed to meet TCEQ minimum requirements for water service. The proposed CIP for wastewater was developed based on a hydraulic model of the existing collection and conveyance system, application of growth projections to that model, and identification of improvement projects needed to provide required capacity within the sewer system. Individual projects are identified and are spread as appropriate over the planning period into the categories of near term, 2030, and 2050 projects for planning purposes. Projects may shift in time based on actual patterns of development and the plan should be reviewed and updated as needed in five years. The projects that make up the Capital Improvement Plans will also be configured in such a way to serve as updated Water and Wastewater Master Plans for development.

STAFF ANALYSIS AND RECOMMENDATION

The goal of this workshop is to familiarize members of the Capital Improvement Advisory Committee (CIAC) and Planning and Zoning Commission (P&Z) with the proposed Water and Wastewater Master Plan Updates, updated Land Use Assumptions, and Capital Improvement Plans that establish the basis for calculation of updated maximum assessable water and wastewater impact fees.

At the next meeting of the P&Z, a public hearing will be held and Staff will recommend that the Commission recommend to Council adoption of the updated Water and Wastewater Master Plans as an amendment to the City's Comprehensive Plan.

At the next meeting of the CIAC, Staff will guide the Committee to make comments to City Council regarding the LUA, CIPs, and updated impact fees to be assessed.

Attachments

2024 Water and Wastewater Impact Fee Update

City of Schertz 2024 Water & Wastewater Master Plan, CIP, & Impact Fee Update

Prepared By: Lockwood, Andrews, and Newnam Inc,
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254-753-9585

TBPE Firm No. 2614

SCHERTZ
COMMUNITY ★ SERVICE ★ OPPORTUNITY

EXECUTIVE SUMMARY

The City of Schertz (City) contracted Lockwood, Andrews, and Newnam Inc. (LAN) to analyze and update the Water and Wastewater Impact Fees. This report summarizes the process used to calculate the water and wastewater impact fees for the 2020 – 2030 planning period, which was done in accordance with Texas Local Government Code (TLGC) Section 395.

This study included the development of land use assumptions and growth projections, which were used to estimate future water and wastewater demands. Hydraulic models for both the water and wastewater systems were created by LAN based on data obtained from the City and the estimated future demands. The results of these models highlighted areas in both systems with insufficient capacity or would be throughout the planning period. Capital improvement plans for both systems were then developed and broken out into three separate groups: Near Term, 2030, and 2050. Projects included in the 2050 CIP are not eligible to be included in this impact fee update as TLGC Section 395 limits the planning period to 10 years. Estimated costs were developed for each project and can be found in Appendix 29. The 2030 and 2050 costs were multiplied by an average construction inflation factor to ensure estimates accurately captured the project costs in the future. Only the percentage of each project being utilized during the 10-year planning period was included to calculate the total impact fee eligible costs. Additionally, only the projects or portions of projects needed due to growth are included in the total impact fee eligible costs.

The increase in Living Unit Equivalents (LUEs) for the water and wastewater system were determined by comparing the flow results from the two hydraulic models to the existing system flows. The City of Schertz is unique in that the water and wastewater Certificates of Convenience and Necessity (CCN) do not match exactly, so the increase in LUEs for the two systems are slightly different. To obtain the maximum allowable impact fee for both systems, the total impact fee eligible costs were divided by the respective growth in LUEs. The tables below show this process for each system.

Maximum Allowable Water Impact Fee

Water Impact Fee	
Impact Fee Eligible Costs	$65,943,379
Credit (Calculated: 5.1%)	($3,365,530)
Total Impact Fee Eligible Costs	$62,577,849
Growth in LUEs	7,100
Maximum Allowable Water Impact Fee per LUE	**$8,814**

Maximum Allowable Wastewater Impact Fee

Wastewater Impact Fee	
Impact Fee Eligible Costs	$53,822,665
Credit (Calculated: 8.6%)	($4,611,802)
Total Impact Fee Eligible Costs	$49,210,863
Growth in LUEs	7,217
Maximum Allowable Wastewater Impact Fee per LUE	**$6,819**

Part of the update to the impact fees included updating the water meter types and characteristics to correspond with the new meters that the City will now be utilizing. The maximum allowable impact fees by meter type were calculated by multiplying the LUE per meter size by the maximum allowable water and wastewater impact fees shown in the tables above. The table below reflects both the update to the impact fees by meter type and the new meter characteristics.

Maximum Allowable Impact Fee by Meter Size

Meter Size	Meter Type	Maximum Flow Rate for Continuous Duty (gpm)	Proposed LUE	Maximum Allowable Water Impact Fee	Maximum Allowable Wastewater Impact Fee
5/8"	MULTI-JET	15	1.0	$8,814	$6,819
3/4"	MULTI-JET	20	1.3	$11,810	$9,137
1"	MULTI-JET	30	2.0	$17,627	$13,638
2"	ULTRASONIC	250	16.7	$146,924	$113,671
3"	ULTRASONIC	500	33.3	$293,848	$227,341
4"	ULTRASONIC	1,000	66.7	$587,607	$454,615
6"	ULTRASONIC	1,600	106.7	$940,154	$727,370
8"	ULTRASONIC	2,800	186.7	$1,645,248	$1,272,880
10"	ULTRASONIC	5,500	366.7	$3,231,708	$2,500,279
12"	ULTRASONIC	5,500	366.7	$3,231,708	$2,500,279

STATE OF TEXAS
LEE B. HAMM
106029
LICENSED
PROFESSIONAL ENGINEER

12/16/2024

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

F-2614

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1. BACKGROUND & REGULATIONS

Texas Local Government Code (TLGC) Section 395 provides provisions to “generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to the new development”. Impact fees cannot be applied to existing customers. The City of Schertz (City) contracted Lockwood, Andrews, and Newnam Inc. (LAN) to analyze and update the Water and Wastewater Impact Fees. This report summarizes the process used to calculate water and wastewater impact fees for the 2020 – 2050 planning period, which was done in accordance with TLGC Section 395.

Within Section 395 there are procedures and regulations for adopting and updating water and wastewater impact fees that require an impact fee analysis be performed before the new or updated impact fees can be imposed. In accordance with Section 395, only the following items are payable by the impact fee:

- Construction Contract Price
- Surveying & Engineering Fees
- Land acquisition costs, including land purchases, court awards and costs, attorney’s fees, and expert witness fees.
- Fees actually paid or contracted to be paid to an independent qualified engineer or financial consultant preparing or updating the capital improvements plan who is not an employee of the political subdivision.
- Projected interest charges and other financing costs may be included in determining the amount of impact fees only if the impact fees are used for the payment of principal and interest on bonds, notes, or other obligations issued by or on behalf of the political subdivision to finance the capital improvements or facility expansions identified in the capital improvements plan and are not used to reimburse bond funds expended for facilities that are not identified in the capital improvements plan.

Additionally, Section 395 lists the items that are not payable by the impact fee:

- Construction, acquisition, or expansion of public facilities or assets other than capital improvements or facility expansions identified in the capital improvements plan.
- Repair, operation, or maintenance of existing or new capital improvements or facility expansions.
- Upgrading, updating, expanding, or replacing existing capital improvements to serve existing development in order to meet stricter safety, efficiency, environmental, or regulatory standards.
- Upgrading, updating, expanding, or replacing existing capital improvements to provide better service to existing development.
- Administrative and operating costs of the political subdivision, except the Edwards Underground Water District or a river authority that is authorized elsewhere by state law to charge fees that function as impact fees may use impact fees to pay its administrative and operating costs.
- Principal payments and interest or other finance charges on bonds or other indebtedness, except as allowed by Section 395.012.

With these regulations in mind, LAN updated the City's land use assumptions, developed hydraulic water and wastewater models, identified capital improvement projects and their usage attributable to new development, and calculated the updated water and wastewater impact fees.

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 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.

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	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

(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	5-Year	10-Year	15-Year	20-Year	25-Year	30-year
	2020	2025	2030	2035	2040	2045	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

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

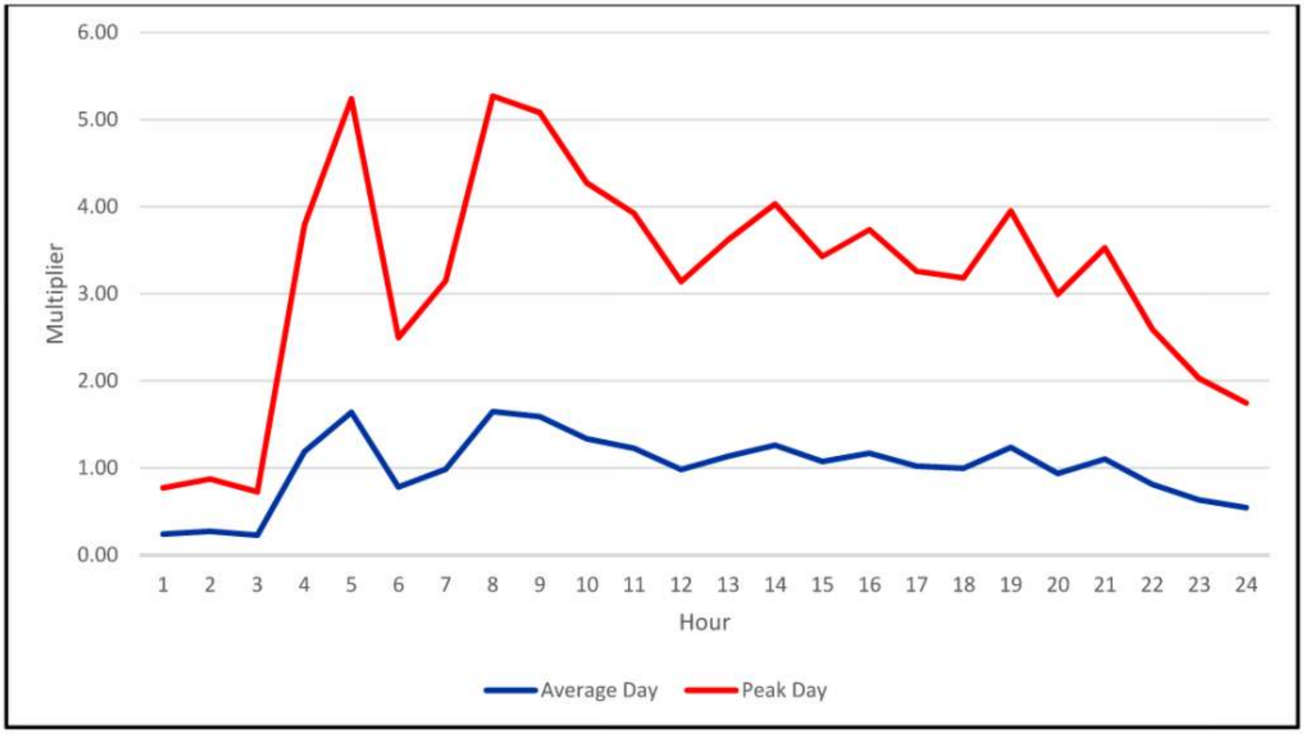
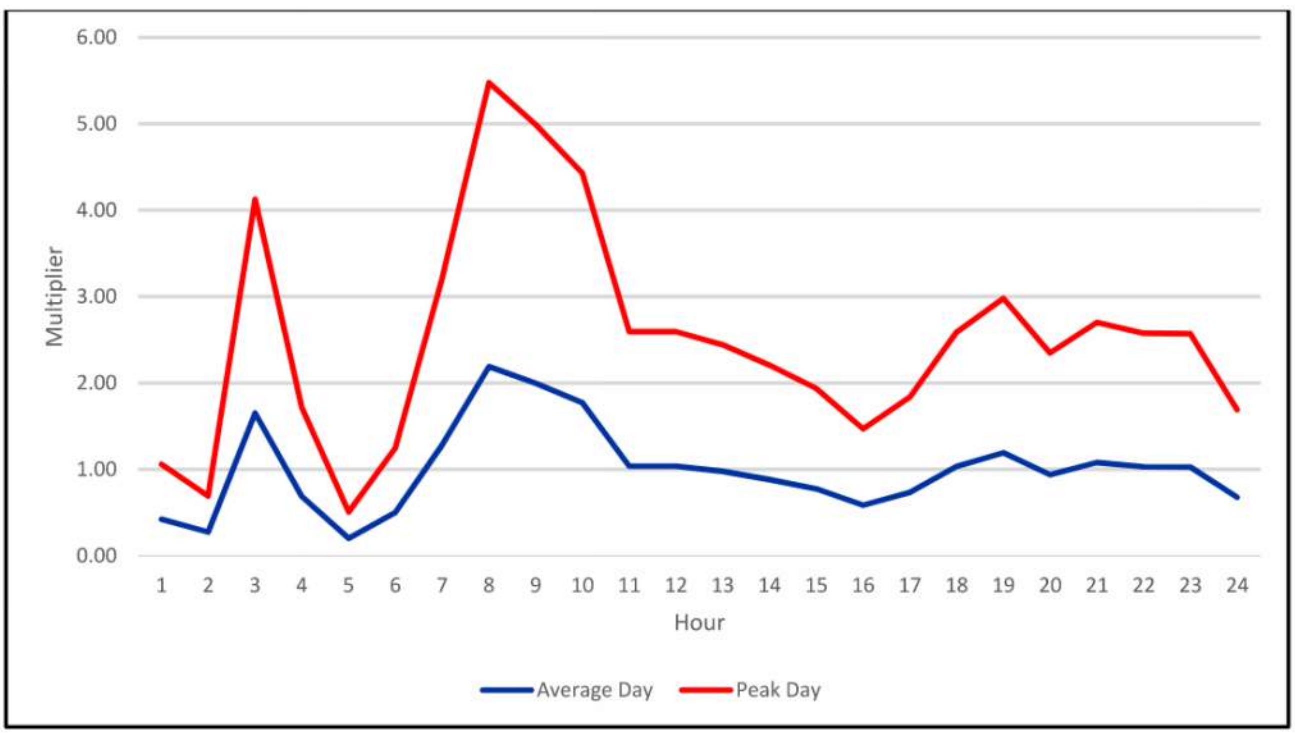


Figure 2: Average & Peak Day Diurnal Patterns for Multi-Family Residential Meters

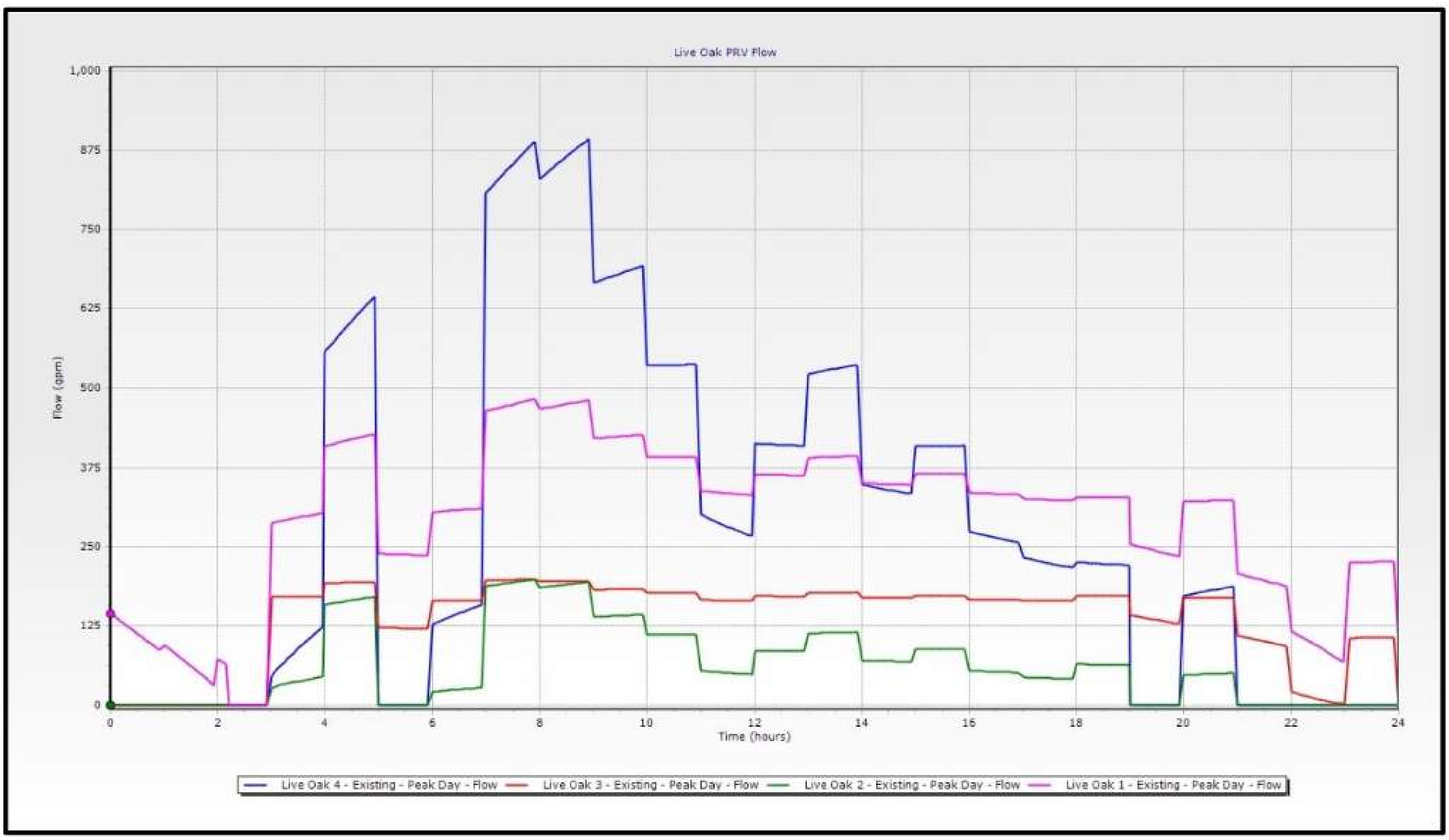


3.1.1.3 Live Oak Pressure Reducing Valve Settings

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.

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	290.45.a & 290.45.f	Sources of water supply can supply maximum daily demands during extended peak usage.	Field Verification Needed
	3.2.2	290.45.e.3 & 290.45.e.1	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	290.45.b.1.D.i-iii	System must have a minimum total storage capacity of 200 gpm gallons per connection.	**Meets Minimum Criteria**
	3.2.4	290.45.b.1.D.iv	System must have a minimum total elevated storage capacity of 100 gallons per connection.	**Meets Minimum Criteria**
System Service Capacity	3.2.5	290.45.b.1.D.iii & 290.45.b.1.D.i	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	290.44.d	System must maintain a minimum pressure of 35-psi under normal conditions.	Field Verification Needed
	3.2.7	290.44.d	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 has not indicated issues filling the Live Oak EST or GST as severely as seen in the existing system model. These results will be discussed in more detail with City staff during the existing system evaluation meeting to reconcile.

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

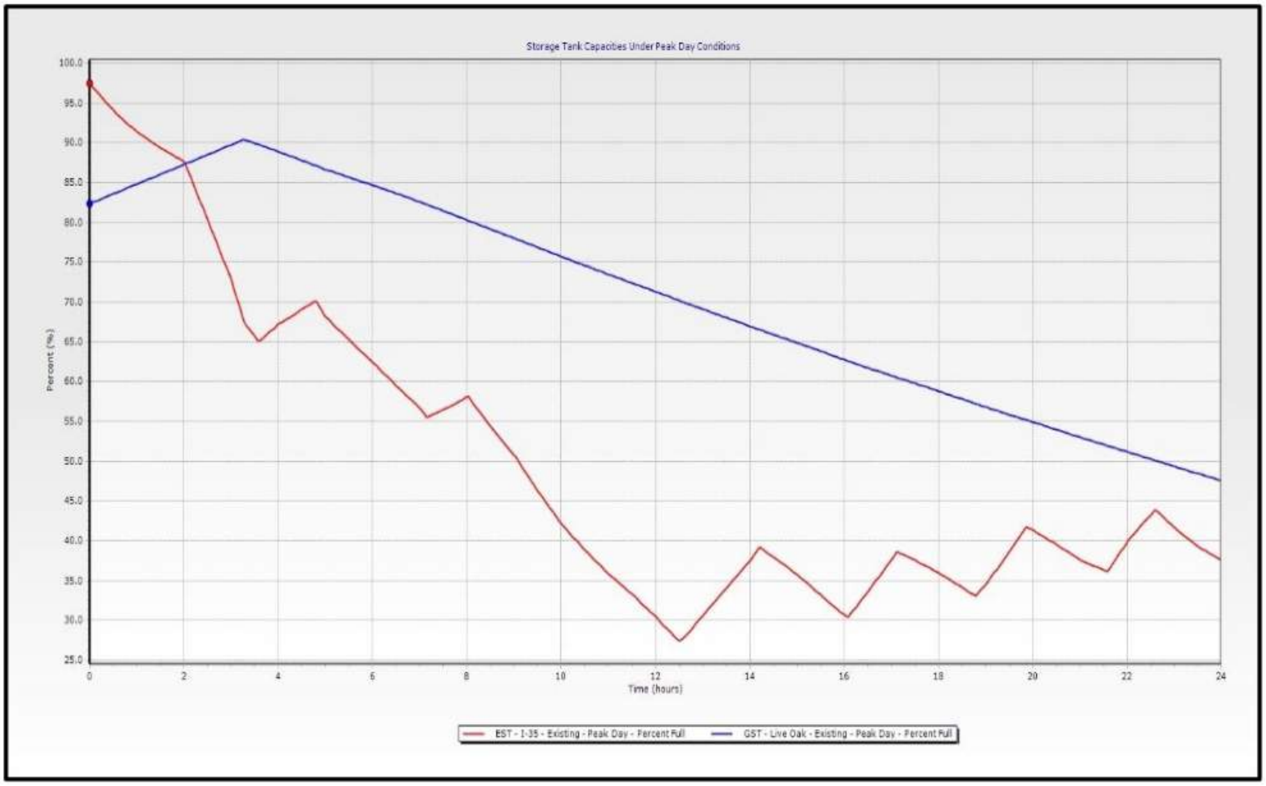


Figure 6: Live Oak GST & I-35 EST Percent Full Over 48 Hours

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 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 *Goulds*
Live Oak - HS3	2,800 gpm, 295 TDH *Fairbanks Morse*
Live Oak - HS2	2,400 gpm, 295 TDH *Fairbanks Morse*
Live Oak - HS1	2,400 gpm, 295 TDH *Fairbanks Morse*
Live Oak - LS3	2,200 gpm, 145 TDH *Goulds*
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.

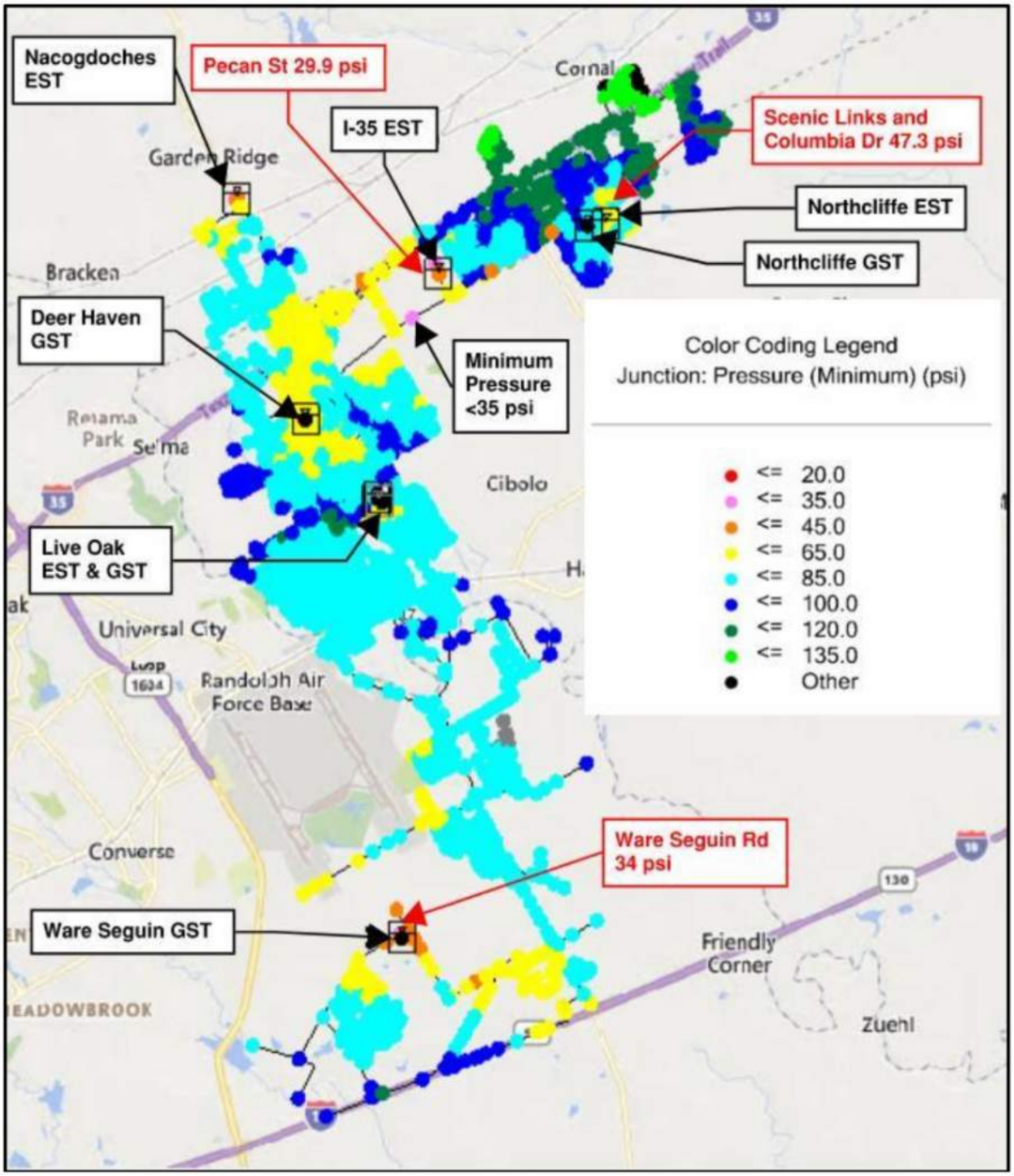
Average Day Conditions

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

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

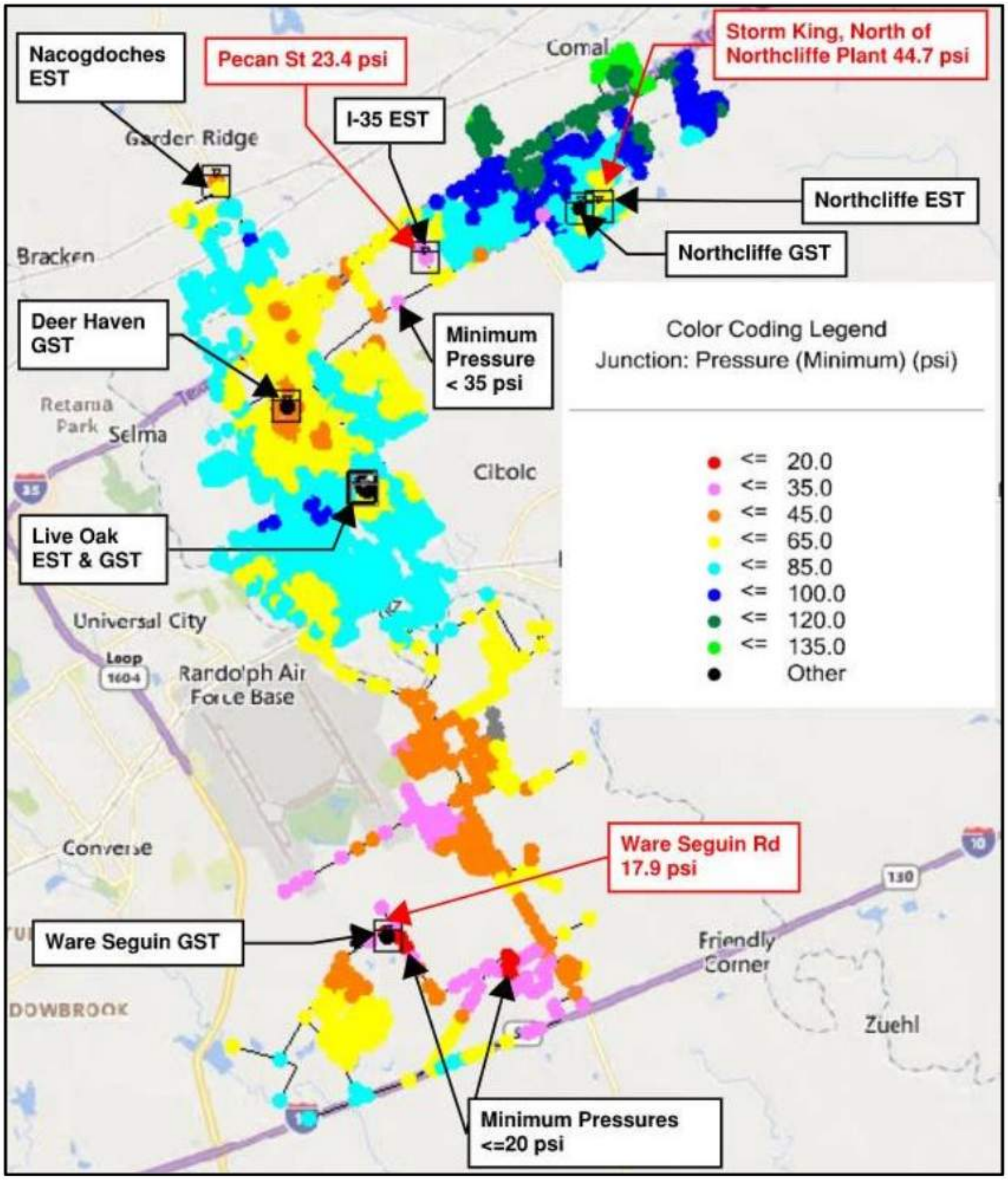
Under peak day conditions, the majority of the system does meet the minimum 35-psi. This is illustrated on Figure 8 which summarizes the observed minimum system pressures across the existing water system under peak day demand conditions. However, there were locations in the existing system model where 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

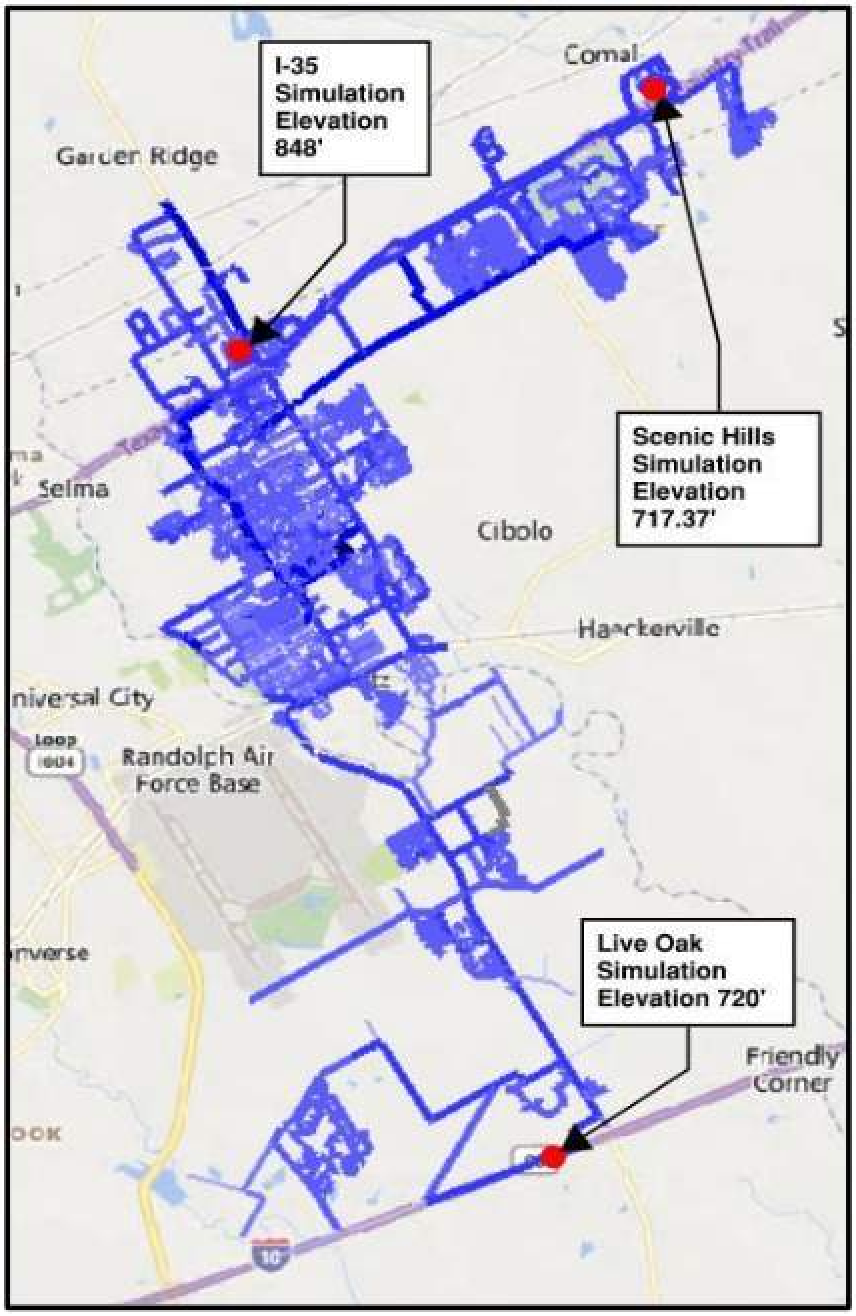
<u>*TAC 290.44.d.*</u>

"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 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



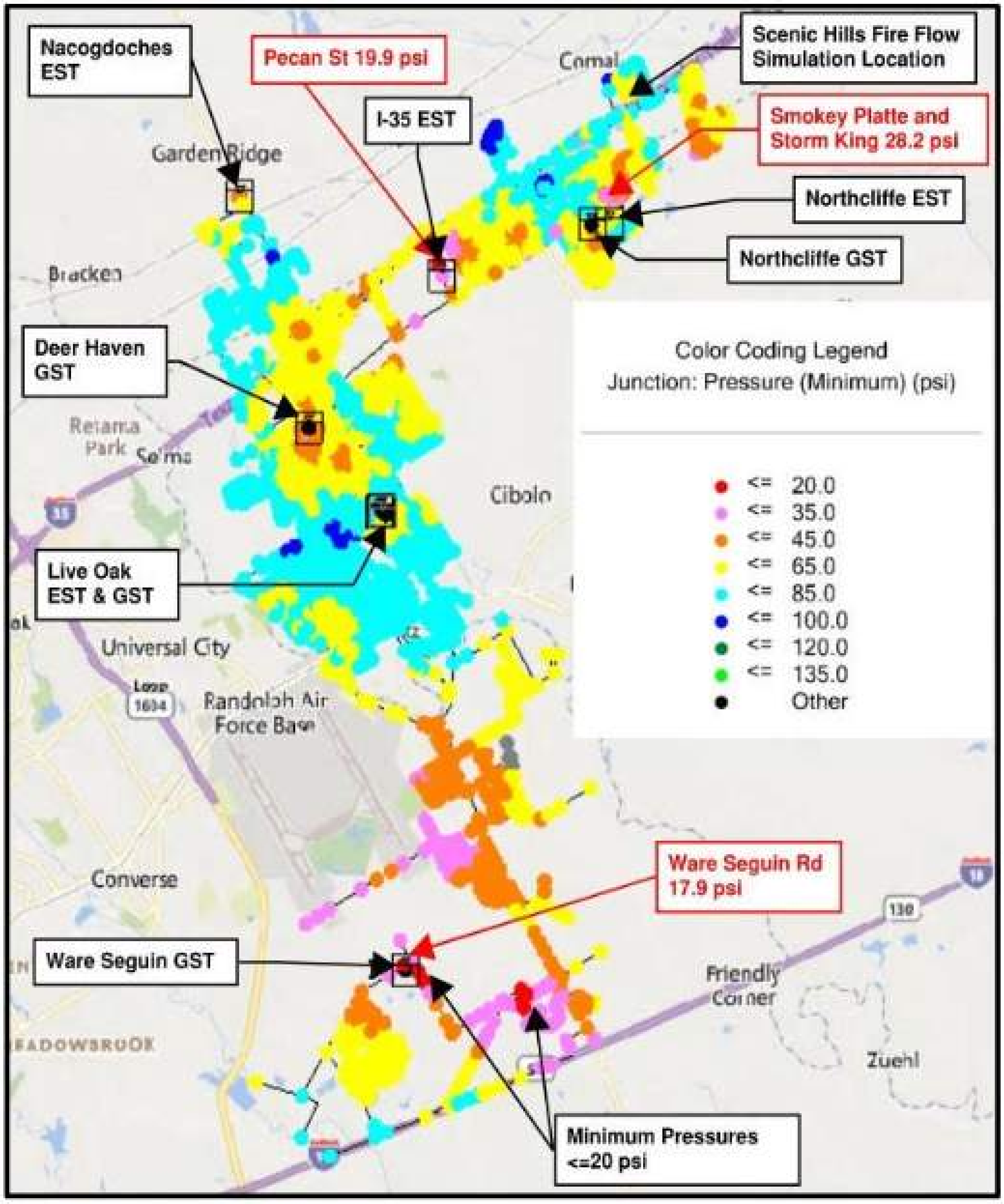
The Scenic Hills Fire Flow simulation was placed off I-35 at a commercial meter south of Baugh Lane. For the Scenic Hills Peak Day plus Fire Flow simulation, the majority of the system does meet the minimum 20-psi. However, there were locations in the existing system model where pressures below the minimum 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

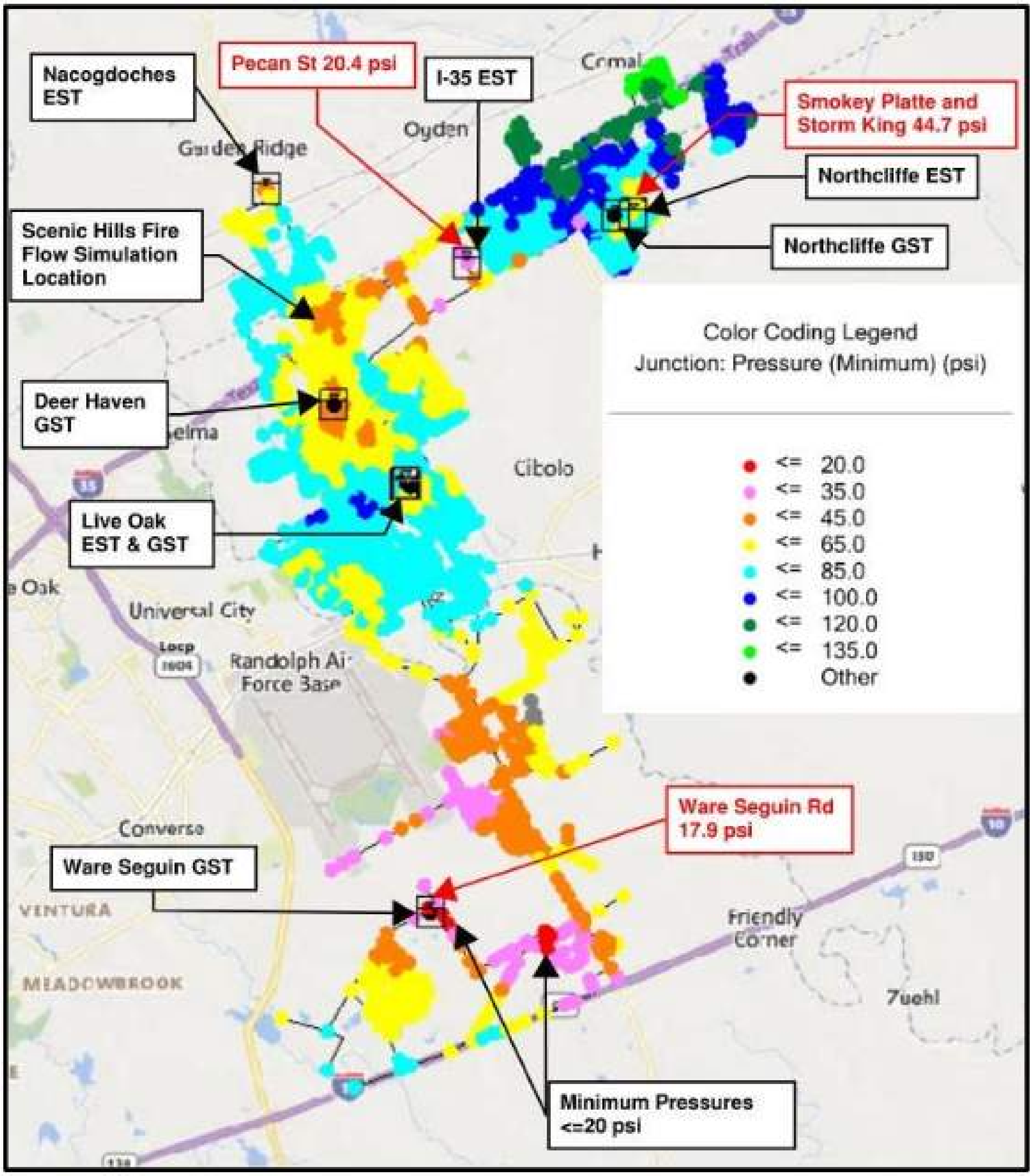


The I-35 Fire Flow simulation was placed near the intersection of I-35 and FM 3009 at a commercial meter adjacent to Corridor Parkway. For the I-35 Peak Day plus Fire Flow simulation, the majority of the system does meet the minimum 20-psi. However, there were locations in the existing system model where 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

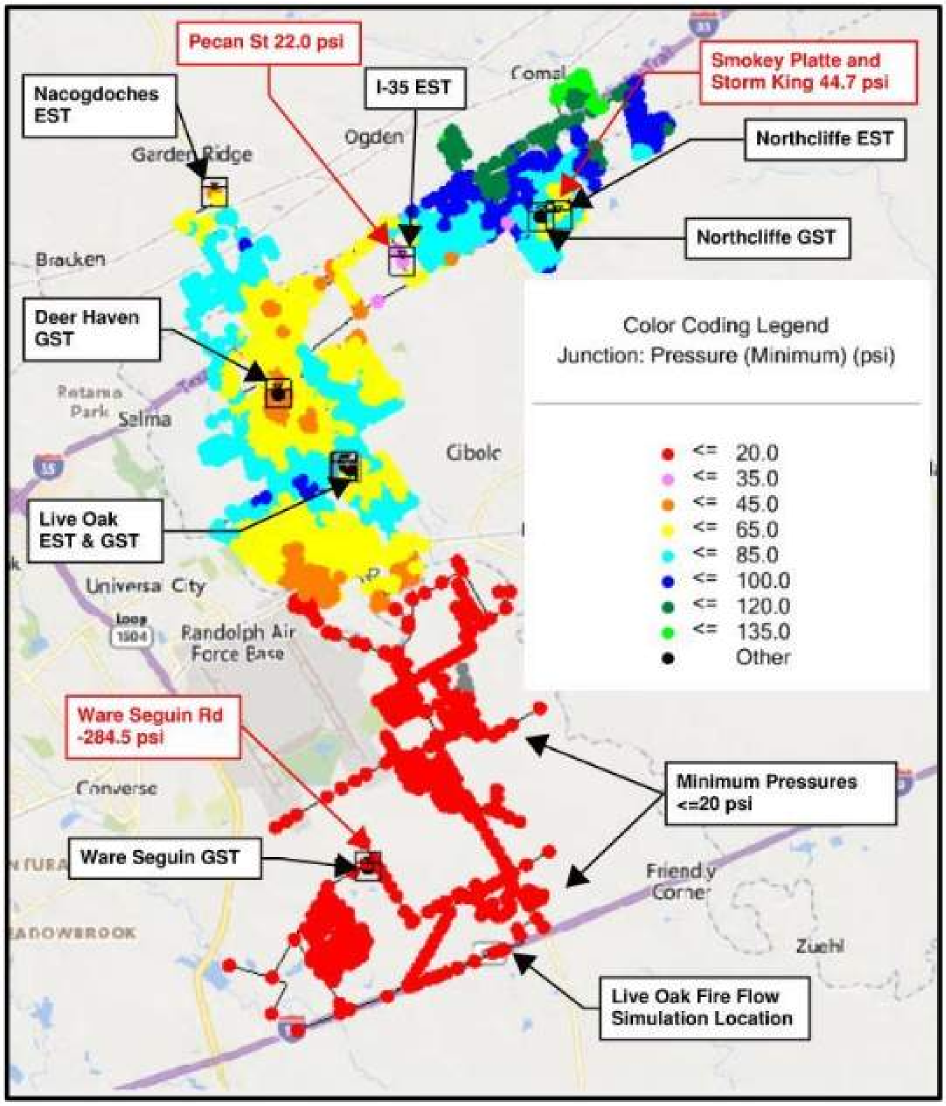


The Live Oak Fire Flow simulation was located at a commercial meter approximately 0.6 miles west of the intersection of I-10 and FM 1518. For the Live Oak Peak Day plus Fire Flow simulation, the majority of the I-35 and Scenic Hills Pressure Planes do meet the minimum 20-psi. However, the observed system 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 were 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 (≤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 ≤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

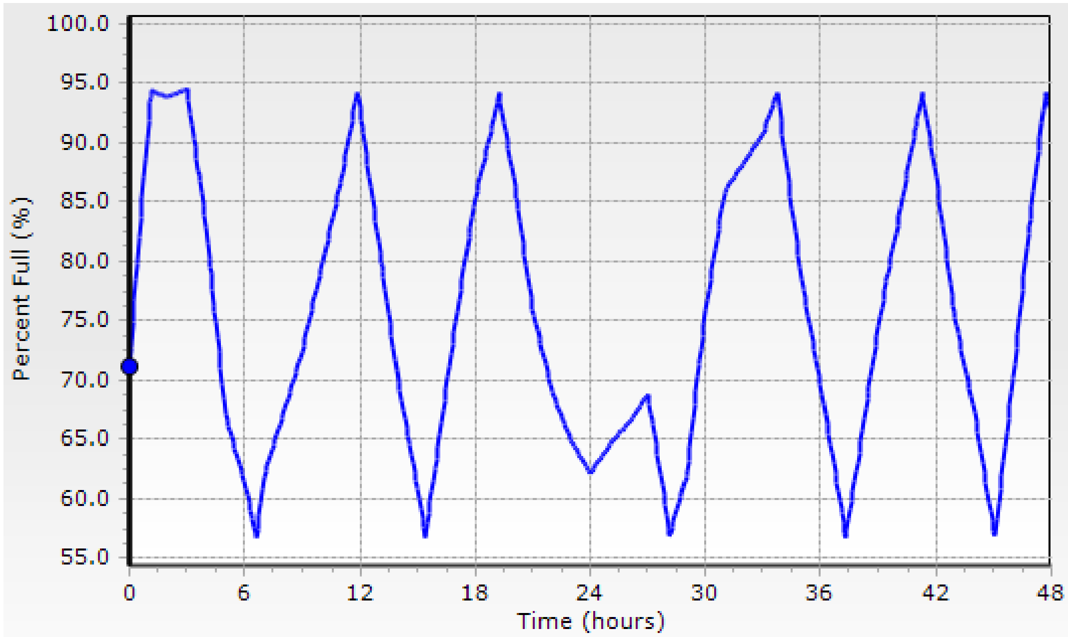
	Live Oak Pressure Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	4,431	8,855	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	738,500	2,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	1,477,000	2,500,000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

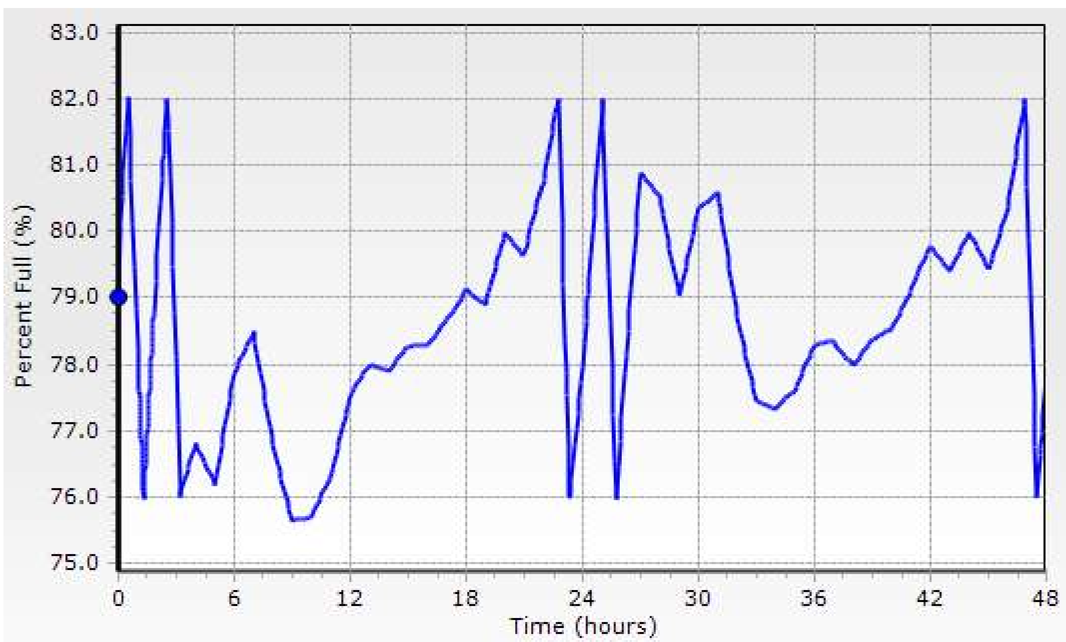
The Corbett EST is filled by the new Corbett pump station and is able to easily fill when the pump station is running. The lower water level can easily be manipulated based on the pump controls.

Figure 13: 2030 Peak Day Corbett EST Levels



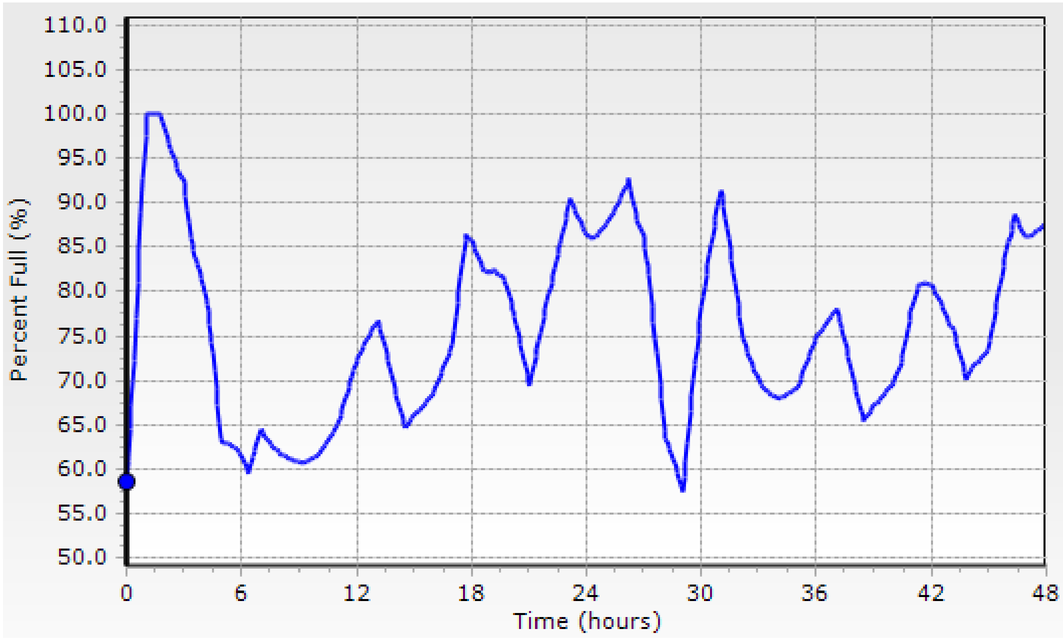
The Live Oak EST drains slightly during peak demand times of the day but is able to recover.

Figure 14: 2030 Peak Day Live Oak EST Levels



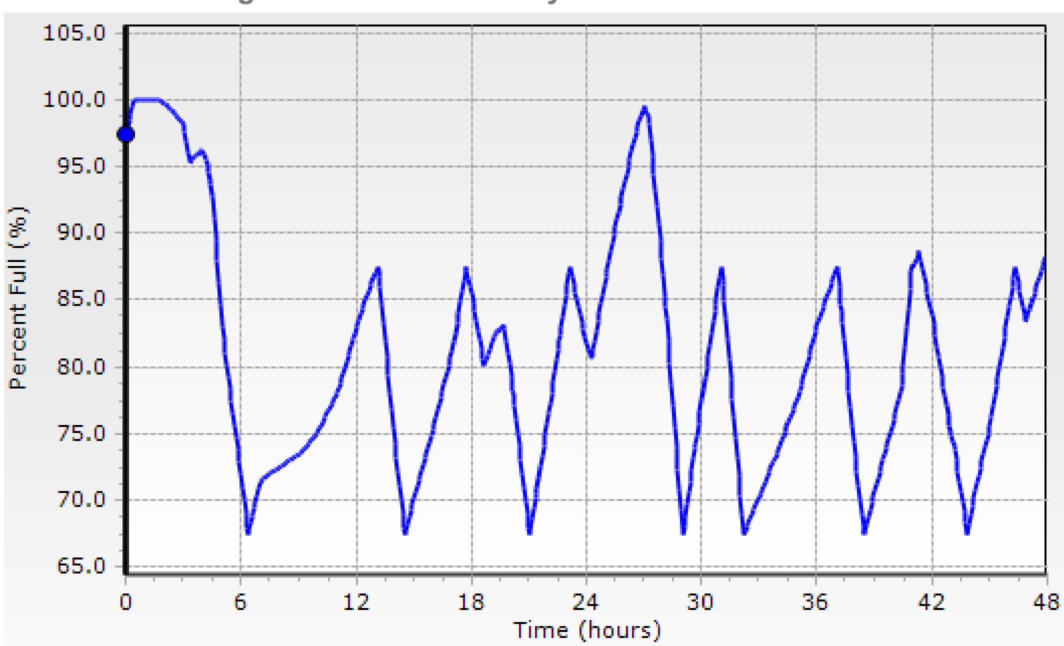
The Nacogdoches EST level fluctuates throughout the peak day simulation but is able to be filled with the well.

Figure 15: 2030 Peak Day Nacogdoches EST Levels



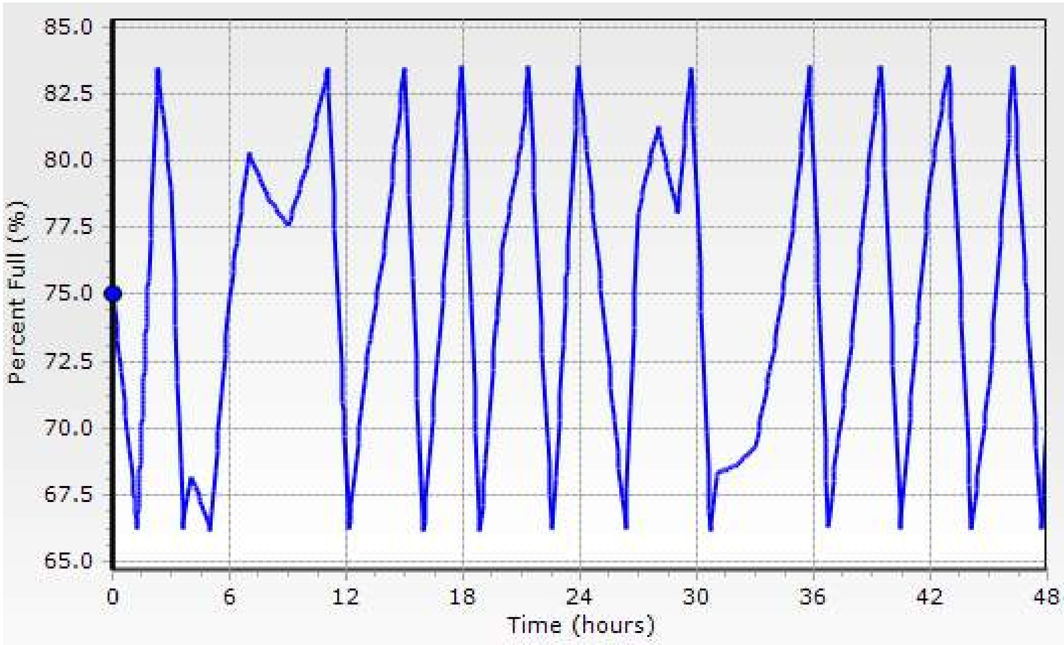
The IH-35 EST drains during the peak day simulation but is able to recover to initial levels around hour 27.

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.

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 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

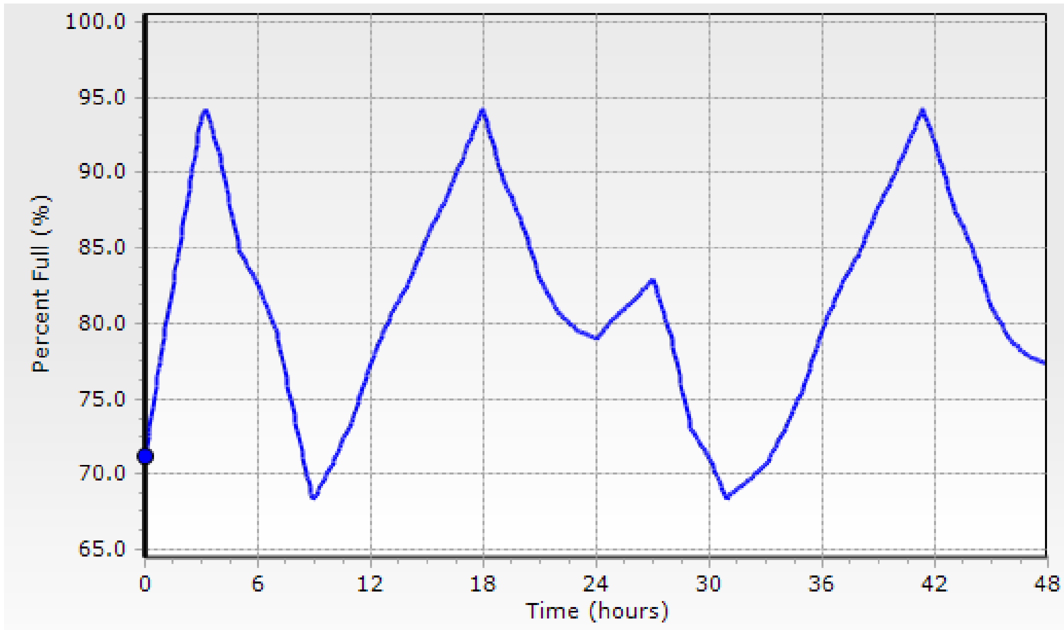
	Live Oak Pressure Plane Evaluation				
	TCEQ Requirements			System Check	
Total Supply Capacity [gpm]	0.6	gpm/conn	6,239	9,400	MEETS TCEQ REQUIREMENTS
Elevated Storage Capacity [gal]	100	gal/conn	1,039,700	2,500,000	MEETS TCEQ REQUIREMENTS
Elevated Storage Credit [gal]	200	gal/conn	2,079,400	2,500,000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

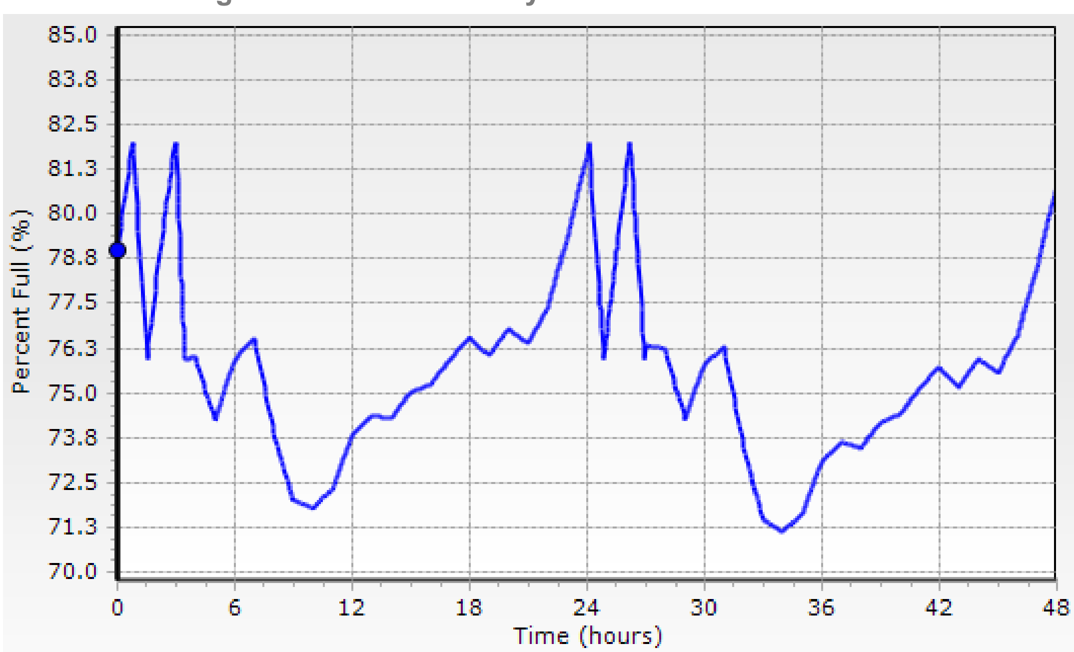
The Corbett EST is filled by the Corbett pump station and is able to easily fill when the pump station is running. The lower water level can easily be manipulated based on the pump controls.

Figure 18: 2050 Peak Day Corbett EST Levels



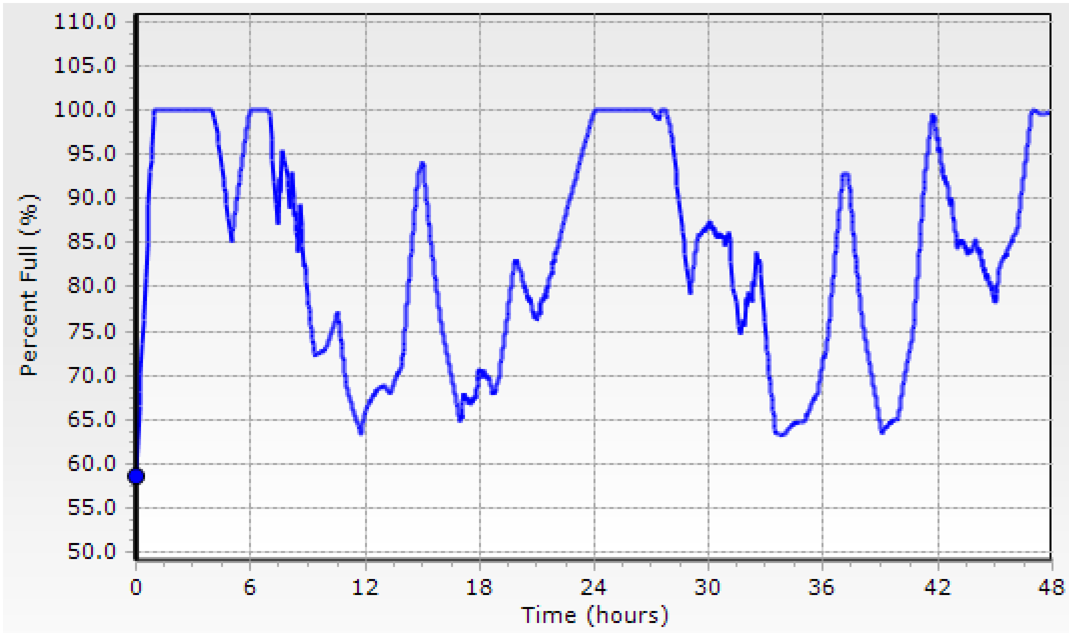
The Live Oak EST levels drop in the peak demand times but are able to recover to initial levels within 24 hours.

Figure 19: 2050 Peak Day LIve Oak EST Levels



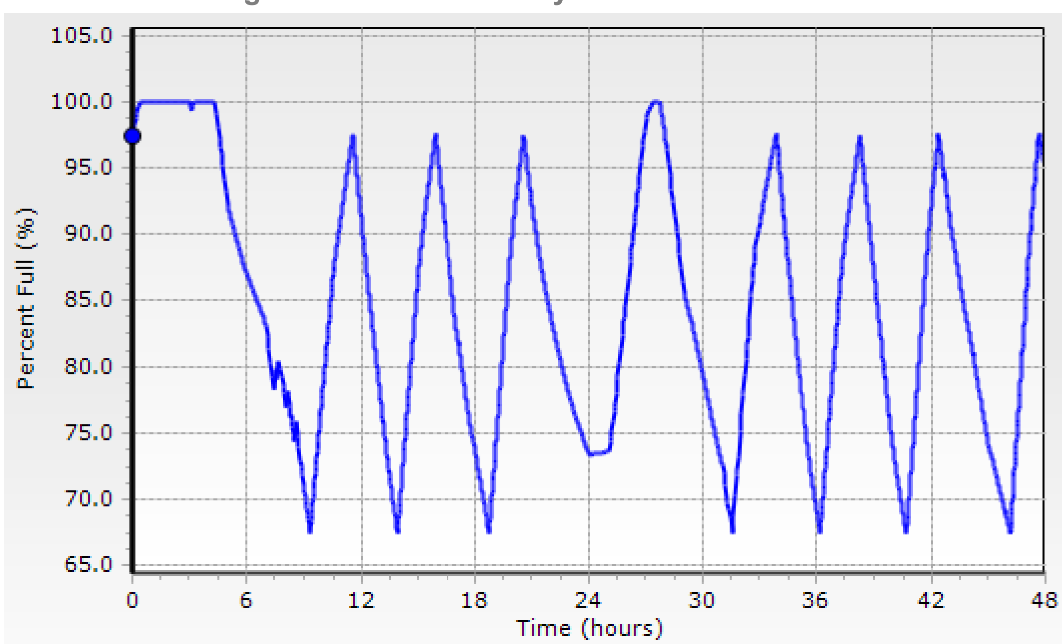
The Nacogdoches EST levels fluctuate throughout the peak day simulation but are able to easily recover.

Figure 20: 2050 Peak Day Nacogdoches EST Levels



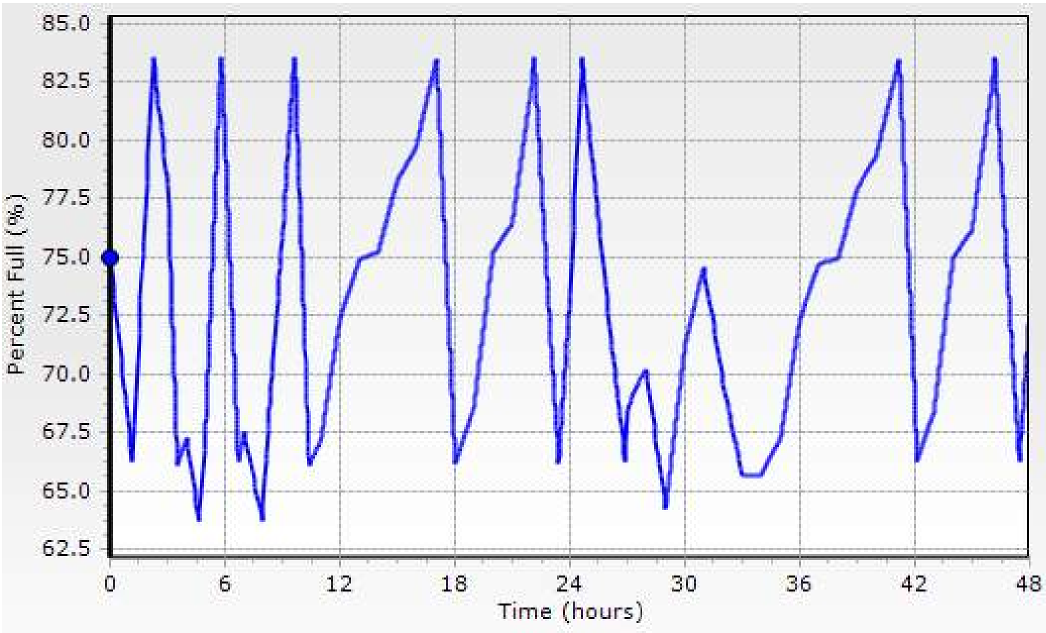
The IH-35 EST is fed by the new 2050 IH-35 pump station and is easily able to fill based on running the proposed pump station.

Figure 21: 2050 Peak Day IH-35 EST Levls



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.

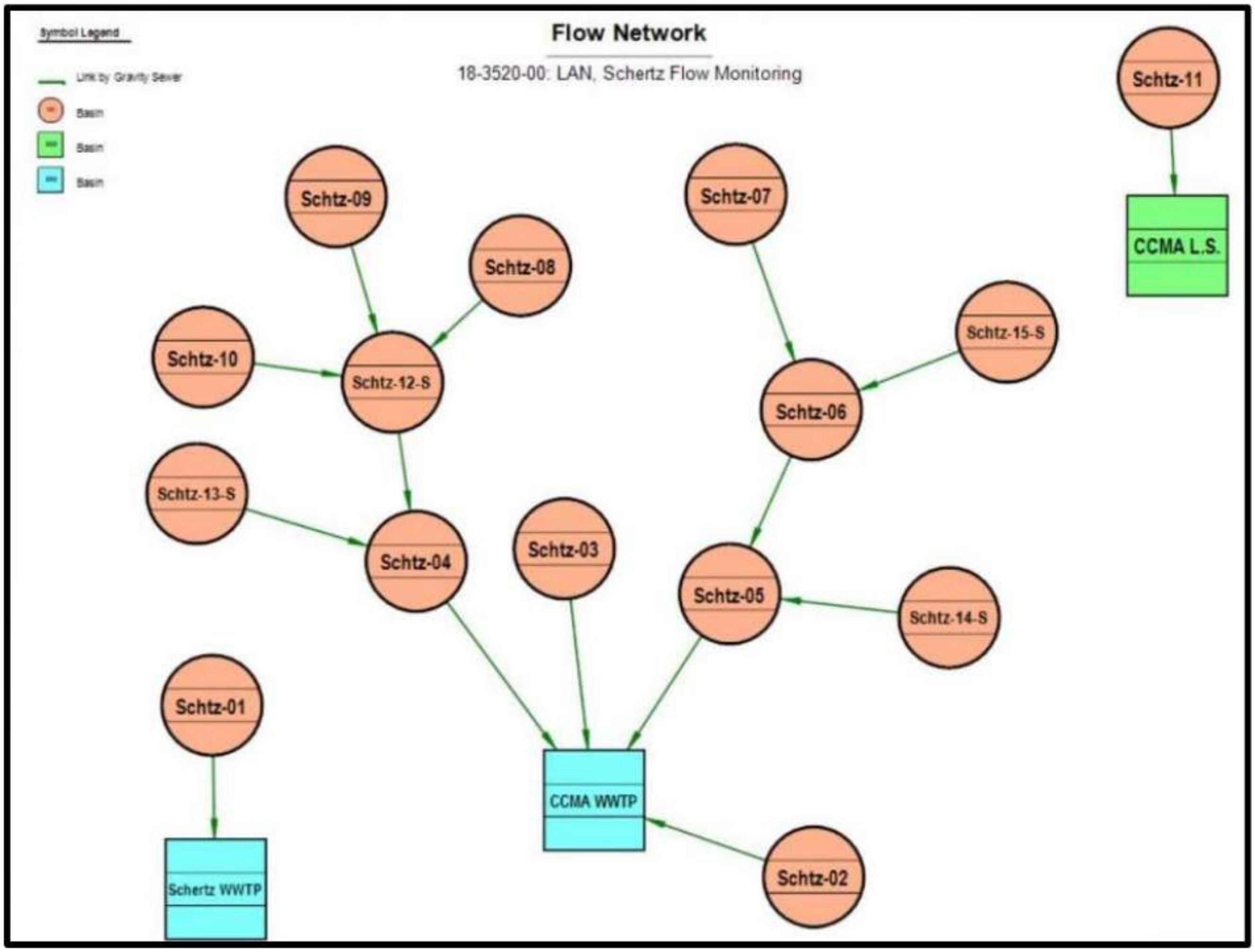
To evaluate the existing wastewater system, a reliable hydraulic model is needed. Model reliability is developed through hydraulic model calibration. Model calibration and simulation were performed using Sewer GEMS software which provided the tool and results necessary to assess the existing wastewater 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.

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.

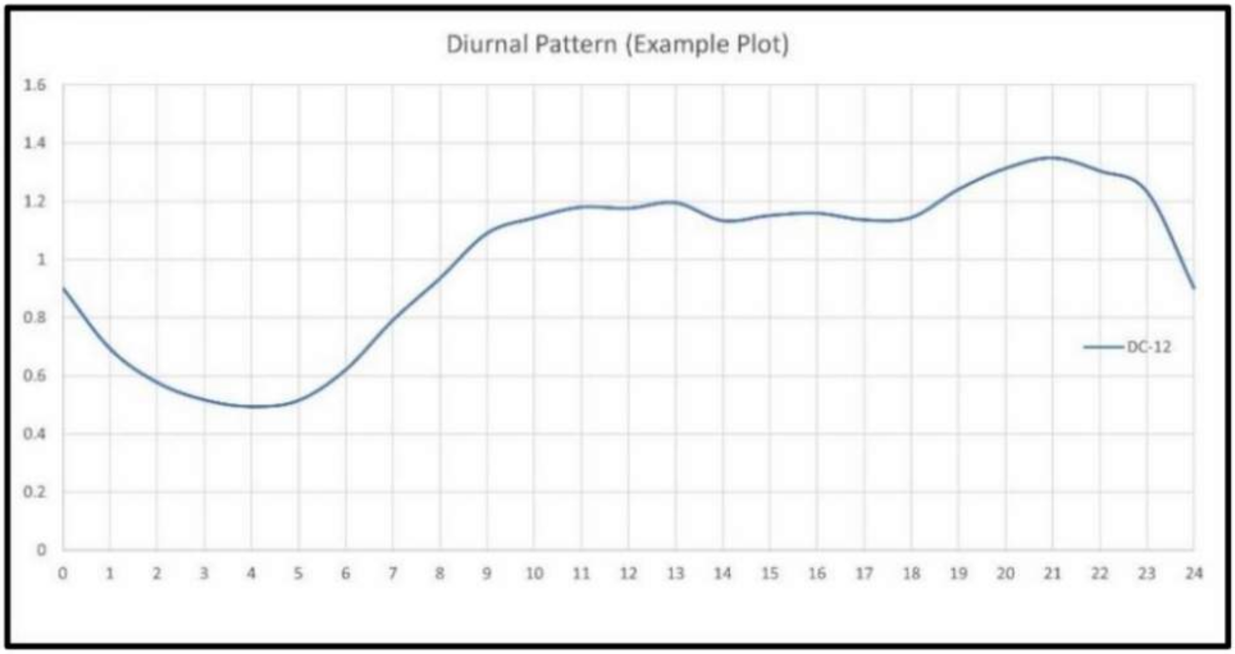
Some adjustments to the preliminary sanitary loading were significant because the TAZ polygon data which were used to calculate the initial base load estimates are on a large scale. These adjustments were needed to represent the density of load distribution more accurately in the system. To further refine 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

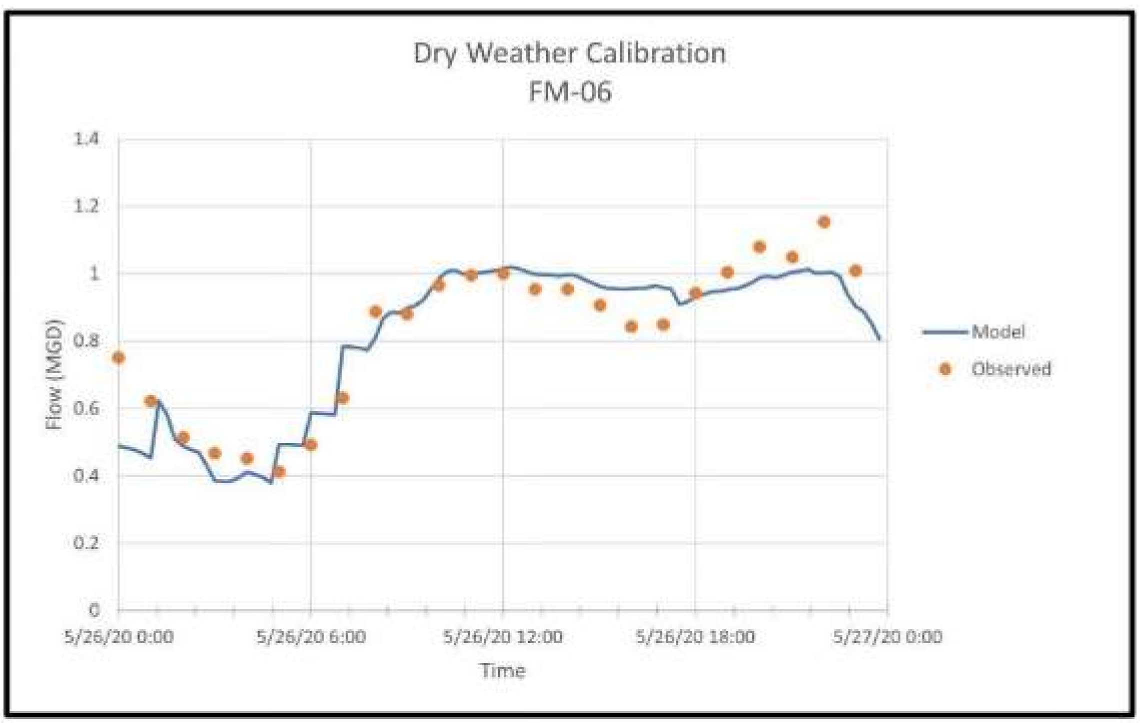


Table 30 shows the dry weather calibration results for the 15 flow monitoring locations.

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 WW 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-O1
FM-03	RG-02 & RG-05
FM-04	RG-02 & RG-05
FM-05	RG-02
FM-06	RG-04 & RG-06
FM-07	RG06
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.

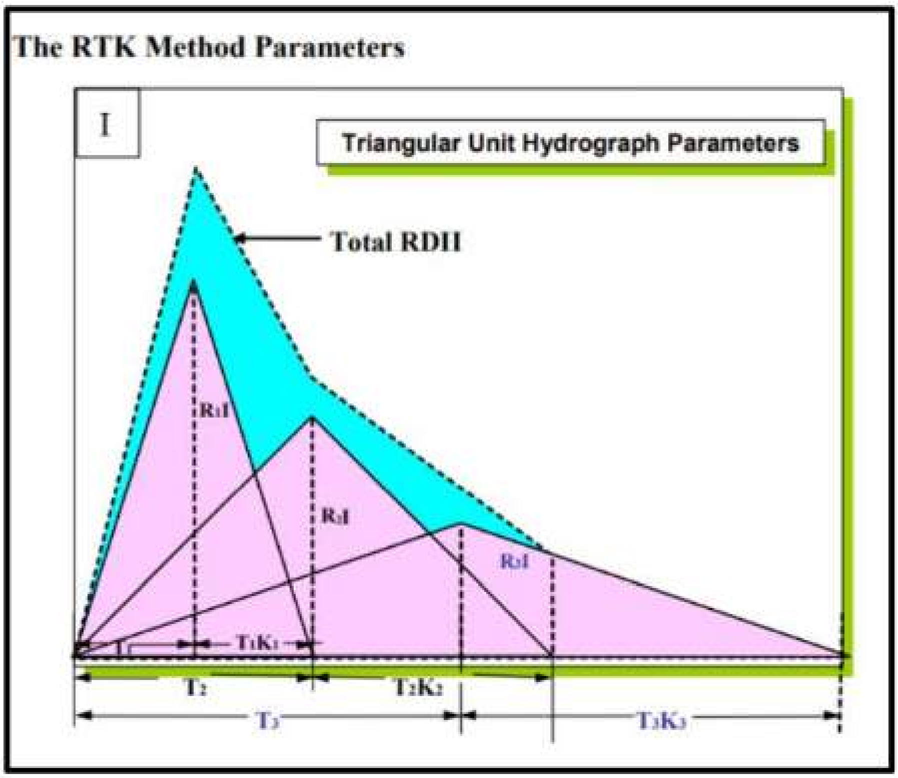
4.1.7 Wet Weather Flow Characterization

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

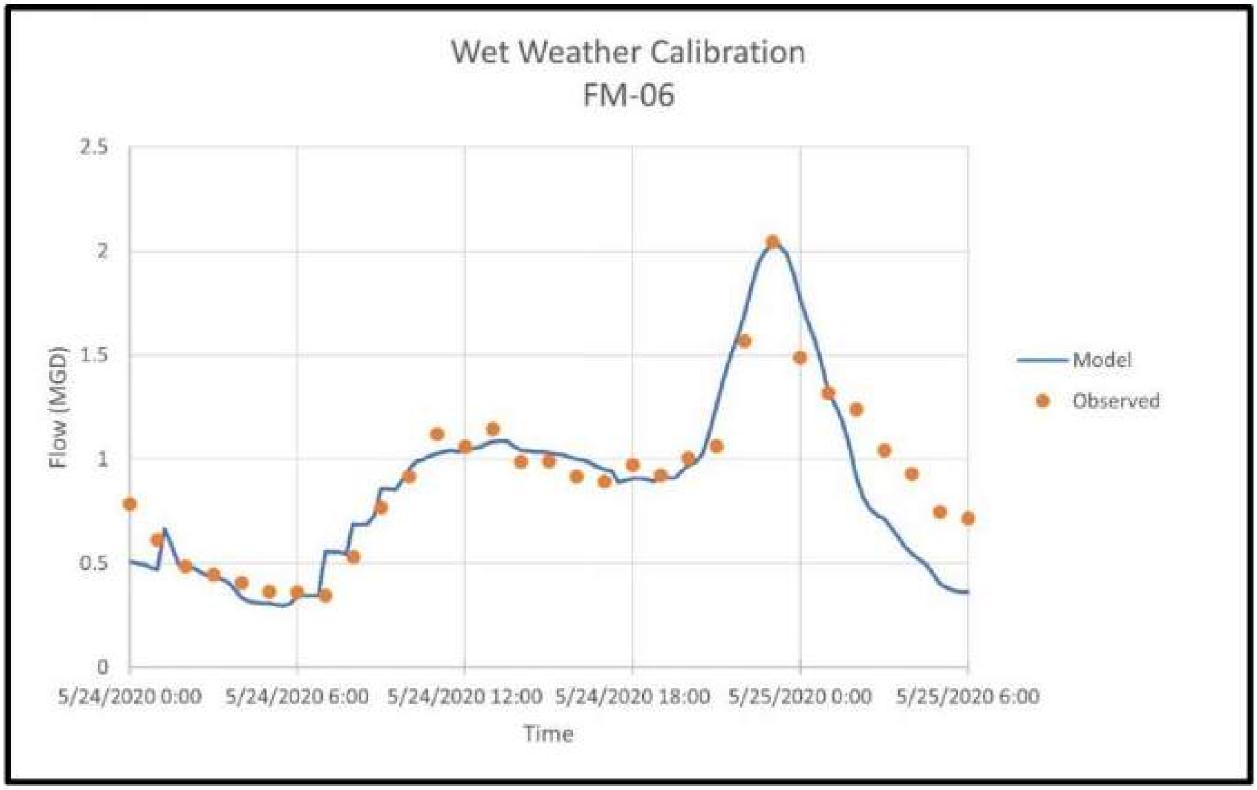


Table 34 documents the results of the wet weather calibration for all 15 flowmeter basins.

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.

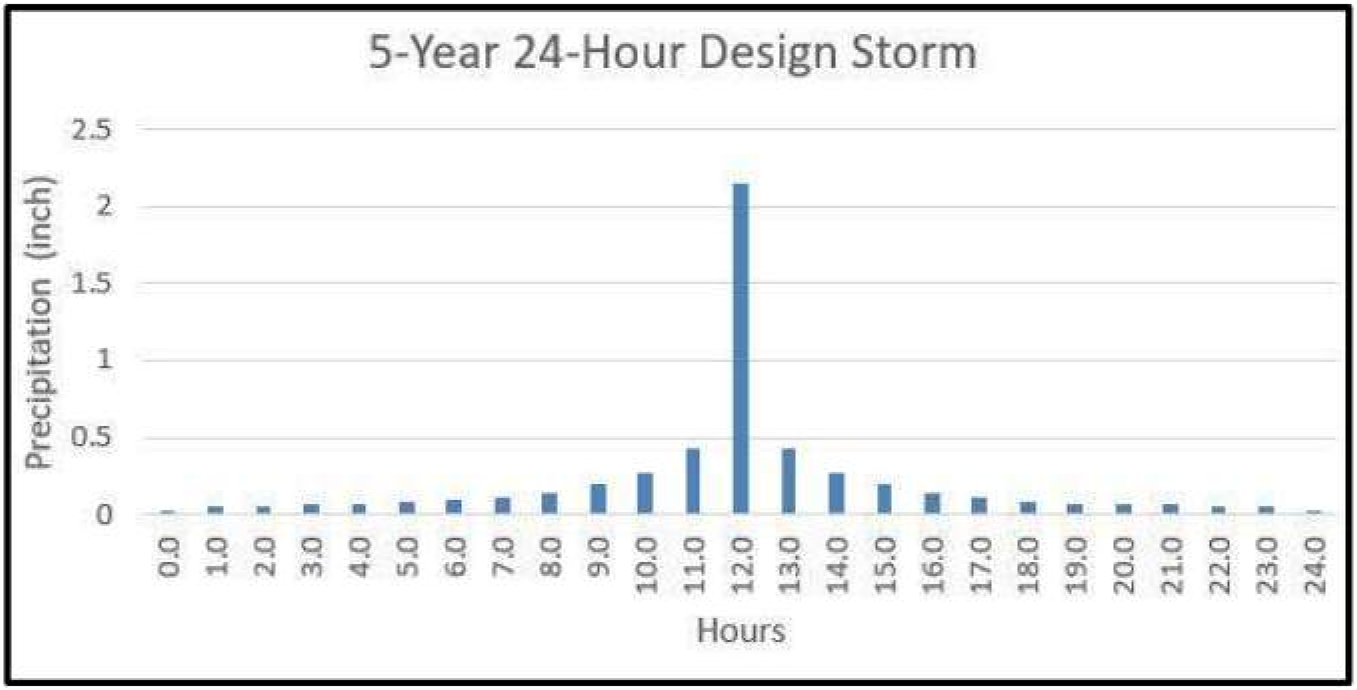
4.2 Existing Wastewater System Evaluation

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) 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.

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.

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.

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.

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.

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 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. IMPACT FEE DEVELOPMENT

5.1 Living Unit Equivalent

Living unit or service unit equivalents (LUEs) are "a standardized measure of consumption, use, generation, or discharge attributable to an individual unit of development calculated in accordance with generally accepted engineering or planning standards and based on historical data and trends applicable to the political subdivision in which the individual unit of development is located during the previous 10 years". Standard engineering practices equate one water LUE to a single, typical residential water meter's usage. The wastewater LUE is assumed to be 70% of a single residential water meter's usage to account for irrigation, evaporation, and other water losses associated with the wastewater system.

An analysis of the existing water and wastewater system hydraulic models determined that the water LUE is 0.17 gpm, and the wastewater LUE is 0.119 gpm. From the hydraulic water model, the total existing and future 2030 system flows for residential and "other" uses were calculated. These total flow values were divided by their respective LUE to determine the growth in each system. "Growth" in this case refers to the difference between the 2030 value and the existing value. It is important to note that the CCN boundaries for the Schertz water and wastewater system are not the same, so the growth in the respective systems is slightly different. Table 48 & Table 49 below show the process of determining the growth in LUEs for the water and wastewater systems.

Table 48: Calculations for Growth in Water LUEs

Growth in Water LUEs			
Scenario	Total Flow (gpm)	Living Unit Equivalent (gpm)	# of LUEs
Existing Residential	2,225	0.17	13,089
Existing Other	2,485		14,620
2030 Residential	3,372		19,838
2030 Other	2,545		14,971
		Growth In Residential:	***6,749***
		Growth In Other:	***351***

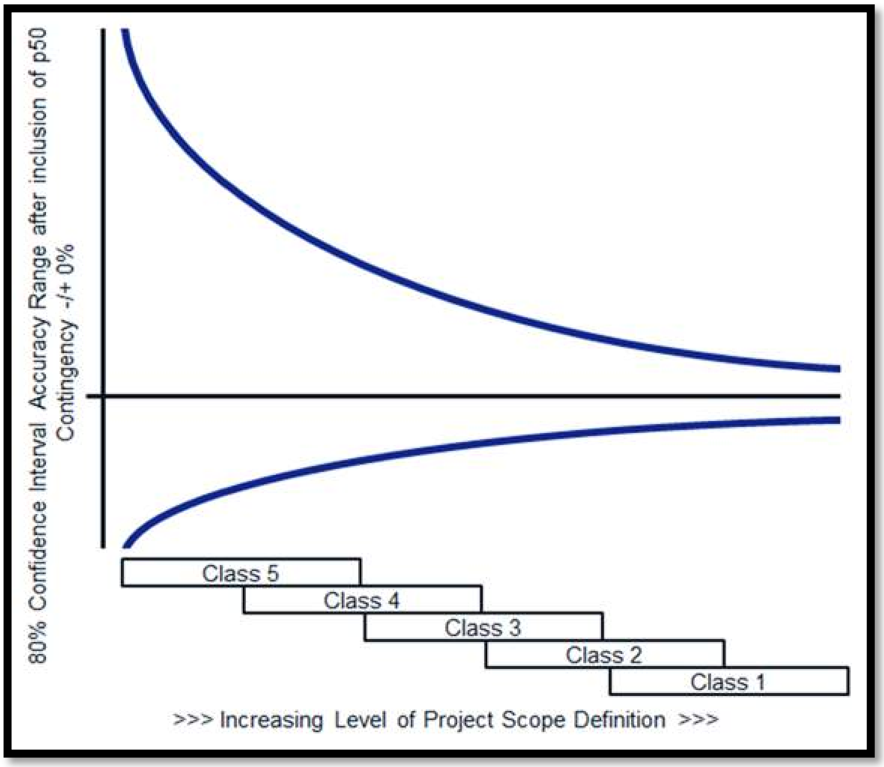
Table 49: Calculations for Growth in Wastewater LUEs

Growth in Wastewater LUEs			
Scenario	Total Flow (gpm)	Living Unit Equivalent (gpm)	# of LUEs
Existing Business	113	0.119	951
Existing Other	3,483		29,269
2030 Business	123		1,034
2030 Other	4,332		36,403
		Growth in Business:	***82***
		Growth In Other:	***7,134***

5.2 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 Clases



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.

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 costs 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.

5.3 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 50 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 50: 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%**

5.4 Project Costs Eligibility

Estimates of total construction cost for the proposed water and wastewater CIP projects were developed. However, TLGC Section 395 stipulates that only certain types of projects and only the portion of the project utilized during the 10-year planning period can be included in the impact fee eligible total.

5.4.1 Eligible Project Types

There are defined items payable by the impact fee per TGLC Section 395, and these items are listed in Section 1 of this report. The proposed CIP projects were divided into "Growth" projects and "System Improvement" projects to assist in clearly identifying those projects that are eligible. Some of the projects only have a portion of the project costs listed as eligible because they serve both new growth and provide system improvements. Only the growth portions of those projects are eligible to be included in the total impact fee costs. The following types of projects are **not eligible** to be included in the total impact fee costs:

- All 2050 Projects
- Cibolo Creek Municipal Authority Projects (CCMA)

In the tables below, the projects, costs and their impact fee eligible costs are shown for the Water CIP, Wastewater CIP, and the recommended CCMA System Improvement projects. Projects denoted by two asterisks indicate that only a portion of the project costs are impact fee eligible. See Appendix 29 for individual project cost estimates.

5.4.2 Project Utilization During 10-Year Planning Period

This water and wastewater master plan includes three phases of projects: near term, 2030, and 2050. Only the projects within the 10-year planning period of 2020-2030 are eligible to be paid by impact fees in this analysis. TLGC also stipulates that only the portion of a project that is utilized during the 10-year period may be considered for impact fee eligibility. The utilization is determined by the following equation:

$$\%\,Utilization = \frac{2030\ Peak\ Flow - 2020\ Peak\ Flow}{2050\ Peak\ Flow}$$

There are some cases where proposed 2030 CIP projects utilize 100% of their build out capacity in 2030 and then in 2050 use less than the build out capacity. This occurs due to additional infrastructure being added in 2050 which takes on some of the capacity burden from those 2030 CIP projects. In these cases, the utilization is determined using the same equation as above, but with 2030 Peak Flow in the denominator:

$$\%\,Utilization\ (special\ case) = \frac{2030\ Peak\ Flow - 2020\ Peak\ Flow}{2030\ Peak\ Flow}$$

See Appendix 30 for utilization calculations.

Table 51: Near Term Water CIP Projects Estimate of Probable Costs

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**

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

Table 52: 2030 Water CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
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**

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

Table 53: 2050 Water CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
Proposed 2050 CIP				
Growth Projects				
2050-W1	Corbett Pump Station Expansion	$1,663,000	2050 CIP Projects are not eligible to be 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**		

Table 54: Near Term Wastewater CIP Projects Estimate of Probable Costs

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	$13,000,000	89%	$11,632,450
Near Term Growth Subtotal:		**$55,360,800**	-	**$30,274,324**
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:	**$57,123,800**	-	**$30,274,324**

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

Table 55: 2030 Wastewater CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
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**

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

Table 56: 2050 Wastewater CIP Projects Estimate of Probable Costs

Project Number	Project Name	Total Project Cost	2020-2030 Growth Utilization	Impact Fee Eligible Portion
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 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**		

Table 57: CCMA 2030 System Improvement Projects Estimate of Probable Costs

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**

5.5 Water Meter Updates

Part of the update to the impact fees included updating the water meter types and characteristics to correspond with the new meters that the City will now be utilizing. The City was previously using simple, compound, and turbine type meters. Going forward, the City will be using multi-jet and ultrasonic meters. The maximum allowable impact fees by meter size were calculated by multiplying the LUE per meter by the maximum allowable water and wastewater impact fees. Table 58 shows the difference in the existing and proposed meter characteristics.

Table 58: Existing & Proposed Meter Characteristics

Meter Size	Meter Type	Maximum Flow Rate (gpm)	Normal Flow Range (gpm)	Maximum Flow Rate for Continuous Duty (gpm)	Existing LUE by Meter Size	Proposed LUE by Meter Size
5/8"	MULTI-JET	20	1-20	15	1.0	1.0
3/4"	MULTI-JET	30	2-30	20	1.5	1.3
1"	MULTI-JET	50	3-50	30	2.5	2.0
2"	ULTRASONIC	250	0.5-250	250	10.0	16.7
3"	ULTRASONIC	500	1-500	500	24.0	33.3
4"	ULTRASONIC	1,000	1.5-1,000	1,000	42.0	66.7
6"	ULTRASONIC	1,600	3-1,600	1,600	92.0	106.7
8"	ULTRASONIC	2,800	5-2,800	2,800	80.0	186.7
10"	ULTRASONIC	5,500	14-5,500	5,500	250.0	366.7
12"	ULTRASONIC	5,500	14-5,500	5,500	330.0	366.7

These meter type changes affected the maximum flow rate for continuous duty for each meter size, which established the updated LUE per meter. The LUE per meter size corresponds to the equivalent impact fees for each meter size.

See Appendix 31 for the new multi-jet and ultrasonic meter characteristics.

5.6 Maximum Allowable Impact Fees

TLGC requires that the maximum allowable impact fee may not exceed the value of the total impact fee eligible costs (identified in Section 5.4 of this report) less the required credit that reduces the overall impact fee eligible costs, divided by the growth in LUEs. This credit to the growth-related cost component of the impact fee calculation is required under Local Government Code Chapter 395 to ensure that new service units are not double charged for impact fee related capital improvements. The credit can be determined in the following ways:

- A credit for the portion of ad valorem tax and utility service revenues generated by new service units during the program period that is used for the payment of improvements, including the payment of debt, that are included in the capital improvements plan.
- In the alternative, a credit equal to 50 percent of the total projected cost of implementing the capital improvements plan.

5.6.1 Credit Analysis

The first method was used to calculate the credit and was applied as shown in Table 59 and Table 60. This credit calculation method was performed by the City's financial consultant, Willdan Financial Services. According to Wildan's report, there were seven critical assumptions made in order to determine the credits:

1) Willdan assumed a ten-year period for the calculation, FY 2025 – FY 2034, consistent with guidelines set by Chapter 395.
2) Willdan utilized Capital Improvement Plan cost estimates and percentages of each project allocable to growth developed by City staff and its consulting engineers (LAN).

3) Growth estimates were based on the latest forecasts as presented by the City's consulting engineers (LAN).
4) Terms and interest rates for new debt forecast to be issued for growth-related improvements were based on estimates used in the City's 2023 water and wastewater rate study.
5) Willdan is interpreting Chapter 395 so that the debt allocable to growth-related projects includes both principal and interest.
6) Current debt allocable to growth-related projects was based on estimates provided by City staff.
7) The totals represent Net Present Values of the ten-year cash flows utilizing a discount rate of 6.0%.

From these assumptions, the following values were calculated:

WATER Revenue Credit -- $3,365,530

WASTEWATER Revenue Credit -- $4,611,802

The full report and detailed credit calculations can be found in Appendix 32.

5.6.2 Maximum Allowable Impact Fee

After the calculated credit is applied, the total impact fee eligible costs are divided by the growth in LUEs (discussed in Sections 2 & 5.1 of this report) to obtain the maximum allowable impact fee per LUE. Table 59 and Table 60 summarize the maximum allowable impact fee calculations, including credits.

Table 59: Maximum Allowable Water Impact Fee

Water Impact Fee	
Impact Fee Eligible Costs	$65,943,379
Credit (Calculated: 5.1%)	($3,365,530)
Total Impact Fee Eligible Costs	$62,577,849
Growth in LUEs	7,100
Maximum Allowable Water Impact Fee per LUE	**$8,814**

Table 60: Maximum Allowable Wastewater Impact Fee

Wastewater Impact Fee	
Impact Fee Eligible Costs	$53,822,665
Credit (Calculated: 8.6%)	($4,611,802)
Total Impact Fee Eligible Costs	$49,210,863
Growth in LUEs	7,217
Maximum Allowable Wastewater Impact Fee per LUE	**$6,819**

As discussed in the previous section, updates were made to the meter types that the City will be using. Table 61 reflects both the update to the impact fees by meter type and the new meter characteristics. The impact fee by meter size was calculated by multiplying the proposed LUE by the maximum allowable water or wastewater impact fee for per LUE (identified in the tables above). In the last two columns of Table 61, the maximum allowable water and wastewater impact fees by meter size are presented.

Table 61: Maximum Allowable Impact Fee by Meter Size

Meter Size	Meter Type	Maximum Flow Rate for Continuous Duty (gpm)	Proposed LUE	Maximum Allowable Water Impact Fee	Maximum Allowable Wastewater Impact Fee
5/8"	MULTI-JET	15	1.0	$8,814	$6,819
3/4"	MULTI-JET	20	1.3	$11,810	$9,137
1"	MULTI-JET	30	2.0	$17,627	$13,638
2"	ULTRASONIC	250	16.7	$146,924	$113,671
3"	ULTRASONIC	500	33.3	$293,848	$227,341
4"	ULTRASONIC	1,000	66.7	$587,607	$454,615
6"	ULTRASONIC	1,600	106.7	$940,154	$727,370
8"	ULTRASONIC	2,800	186.7	$1,645,248	$1,272,880
10"	ULTRASONIC	5,500	366.7	$3,231,708	$2,500,279
12"	ULTRASONIC	5,500	366.7	$3,231,708	$2,500,279

5.7 Comparison of Local Impact Fees

Since the last water and wastewater impact fee update was performed in 2011, the City expressed interest in comparing the 2024 proposed fees with other municipalities and utility providers in the area. Table 62 provides a comparison of the impact fees imposed by local municipalities and utility providers, and the City of Schertz 2024 proposed impact fees. The City can decide to adopt lower impact fees than those established by this report, typically to spur more development, but should have a means to recoup the costs building the infrastructure to serve the developments.

Table 62: Local Impact Fee Comparison

City/Utility	Total	Water	Wastewater	Population Served (At the Time of Individual Analysis)
Pflugerville (2023)	$29,849	$14,713	$15,136	65,191
NBU (2022)	$25,692	$19,448	$6,244	90,403
Seguin (2023)	$16,558	$7,308	$9,250	29,470
Schertz (Proposed 2024)	**$15,633**	**$8,814**	**$6,819**	**45,719**
SAWS (2024)	$9,350	$5,987	$3,363	2,000,000
Austin (2023)	$7,700	$4,800	$2,900	961,000
Boerne (2023)	$7,629	$2,509	$5,120	18,232
San Marcos (2018)	$6,485	$3,801	$2,684	68,217
Schertz (Current from 2011)	**$4,603**	**$2,934**	**$1,669**	**34,754**
Cibolo (2021)	$2,712	$1,839	$873	34,000

Sources can be found in Appendix 33.

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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 5

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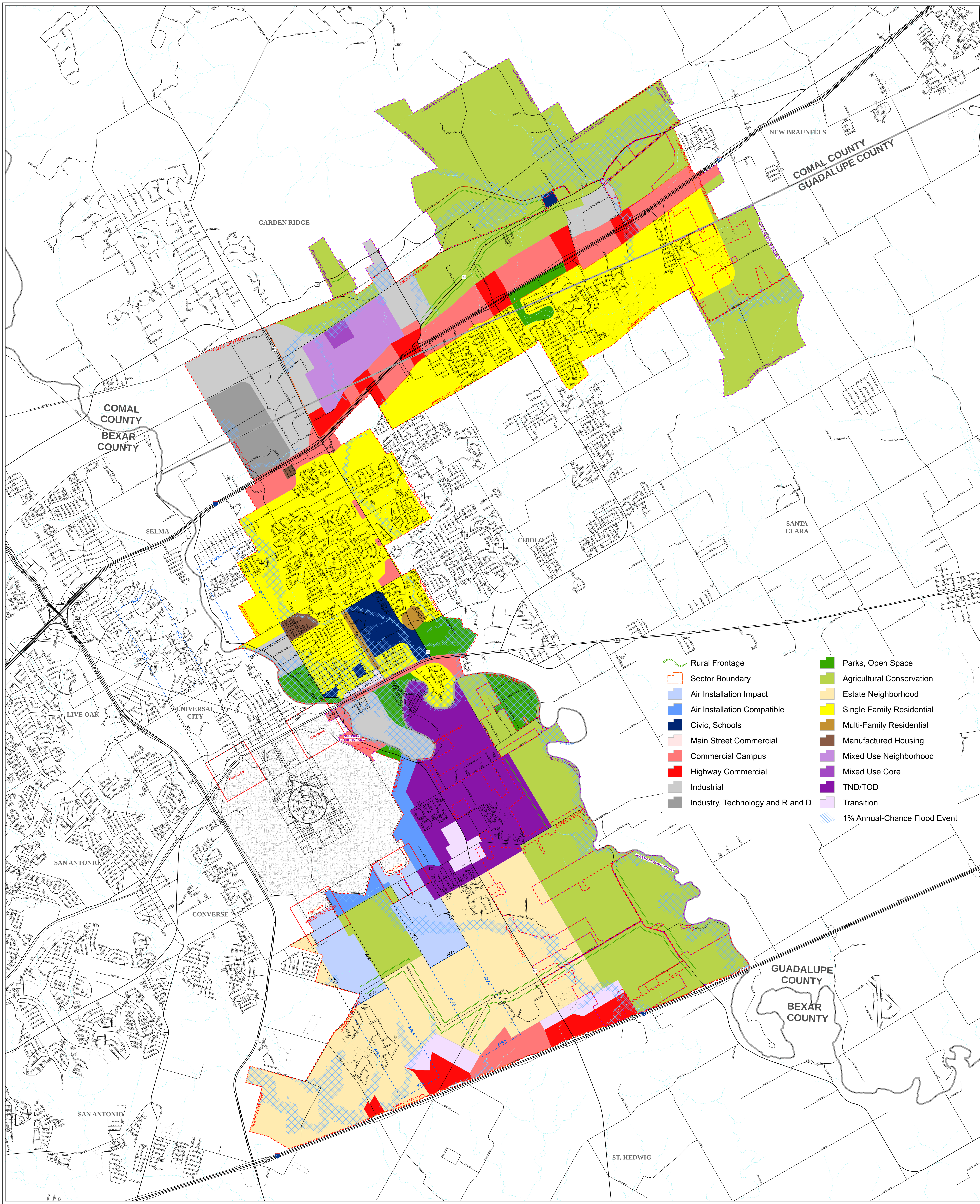
APPENDIX 1 - 2018 COMPREHENSIVE LAND USE PLAN



SCHERTZ

COMMUNITY ★ SERVICE ★ OPPORTUNITY

Last Update: February 20, 2018

City of Schertz, GIS Coordinator: Tony McFalls, gis@schertz.com (210) 619-1184

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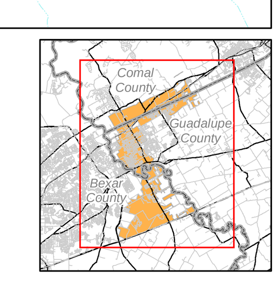
Comprehensive Land Use Plan

Schertz Municipal Boundary
Schertz ETJ Boundary

County Boundaries
Railroads

Air Installation Compatible Use Zone
APZ I
APZ II
Clear Zone

Major Roads
Minor Roads
Proposed Roads



0 ¼ ½ 1 1½ 2 Miles

APPENDIX 2 - ZONING MAP

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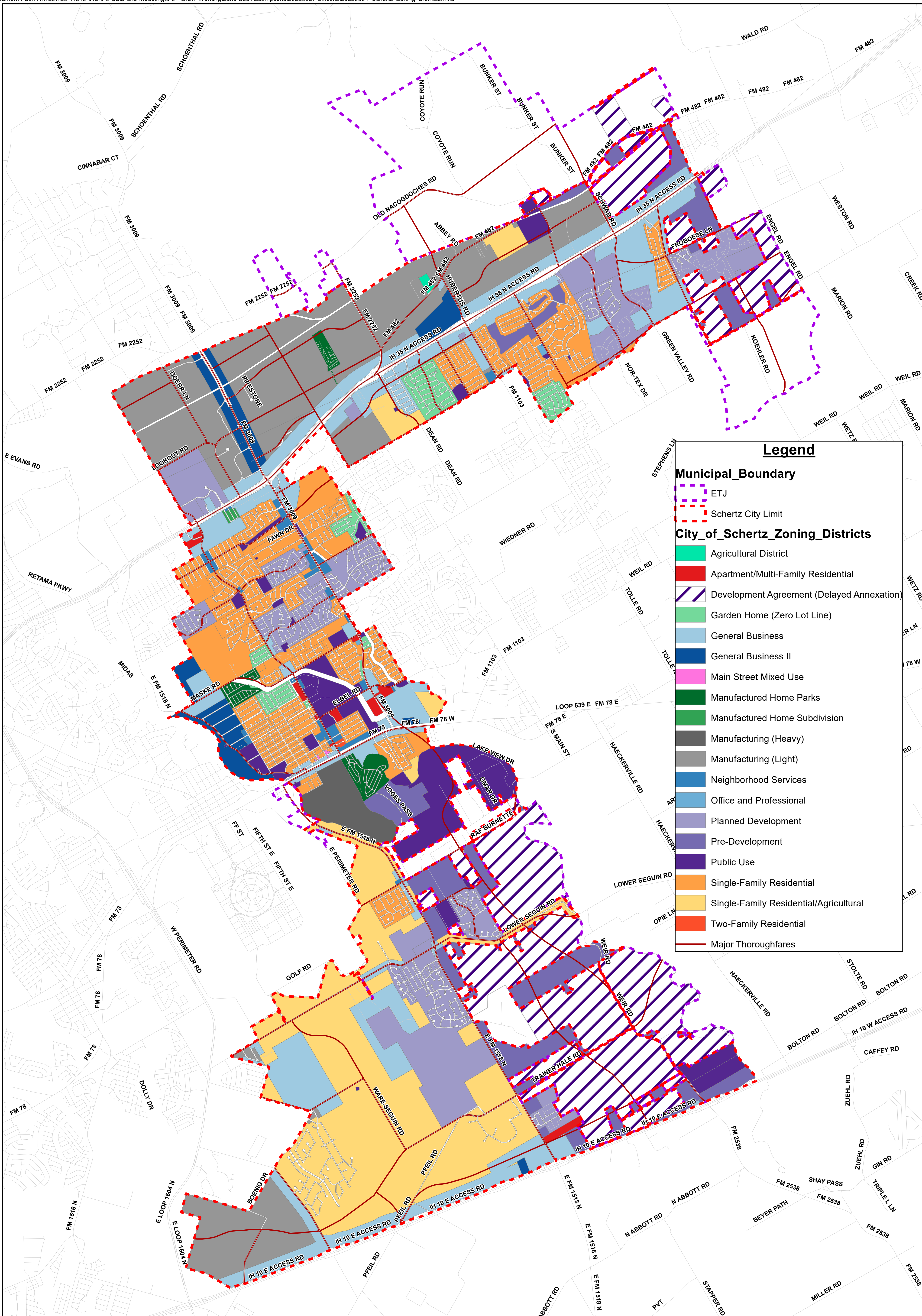

City of Schertz Zoning Map

8/4/2022

Lockwood, Andrews & Newnam, Inc.

A LEO A DALY COMPANY

APPENDIX 3 - 30 YEAR POPULATION DISTRIBUTION PROJECTIONS

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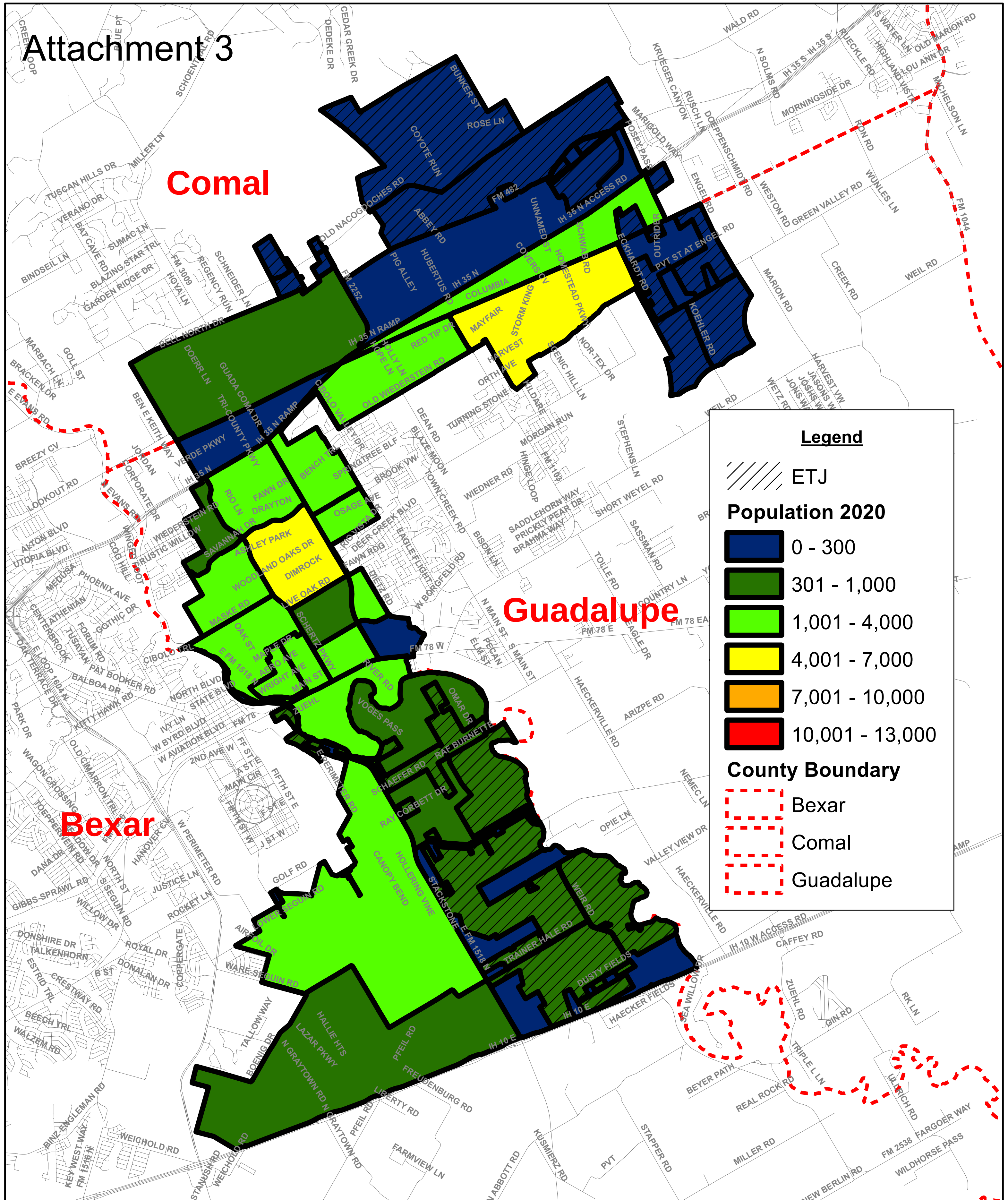
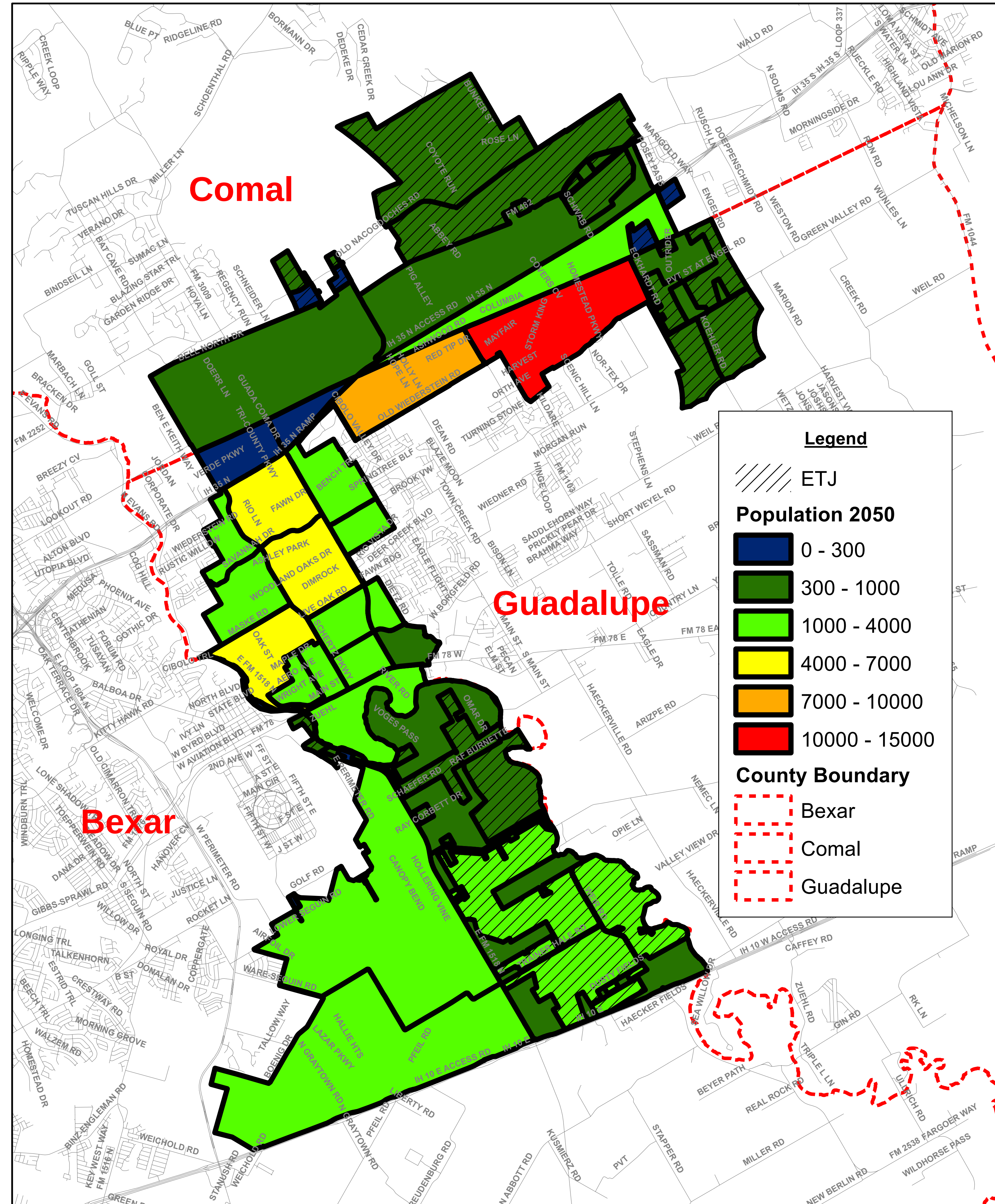
Attachment 3



Schertz 2020 Population Distribution

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

0 5,000 10,000 Feet



Schertz 2050 Population Distribution

8/4/2022

N S E W

0 5,000 10,000 Feet

APPENDIX 4 - 30 YEAR HOUSING DISTRIBUTION PROJECTIONS

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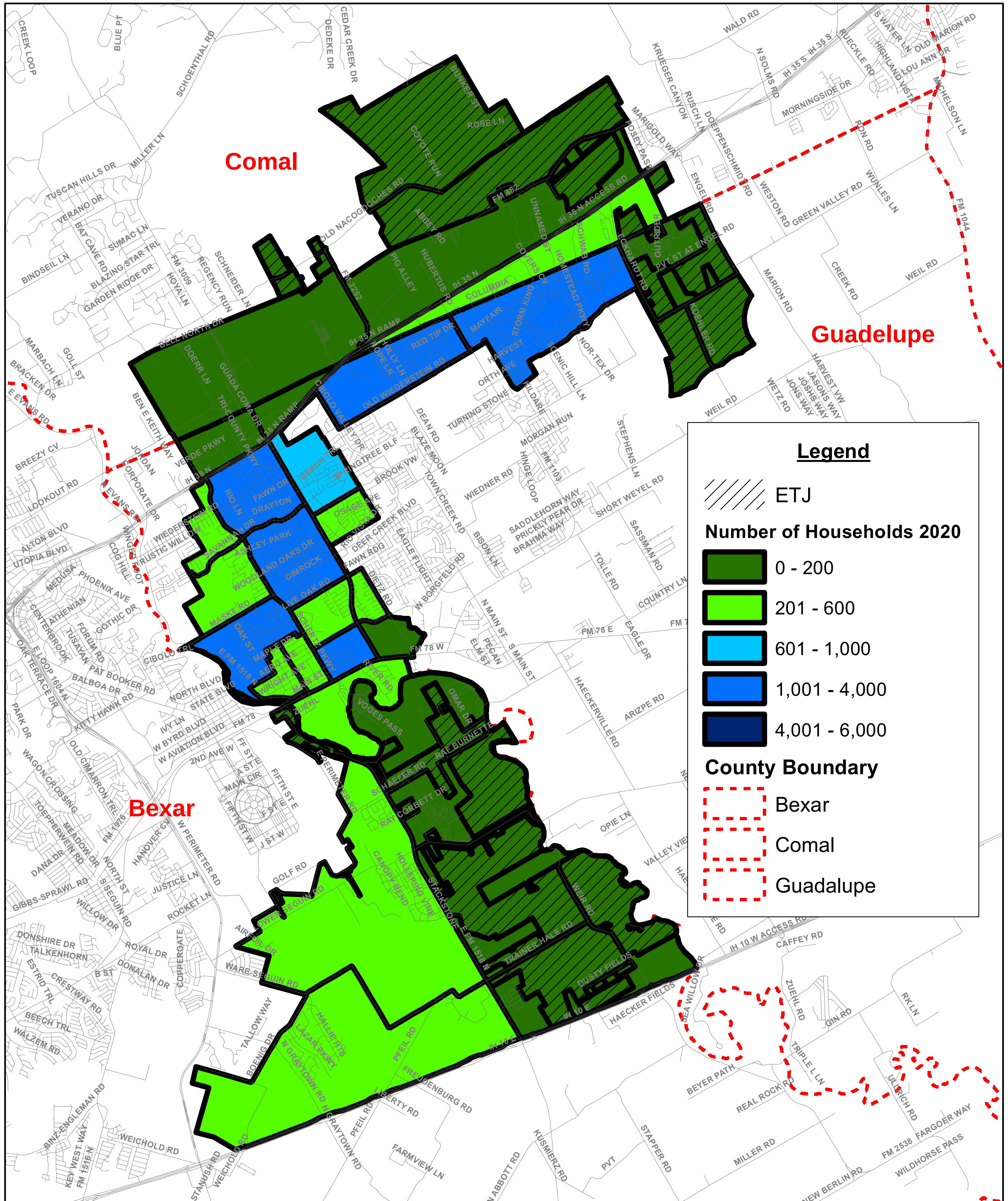
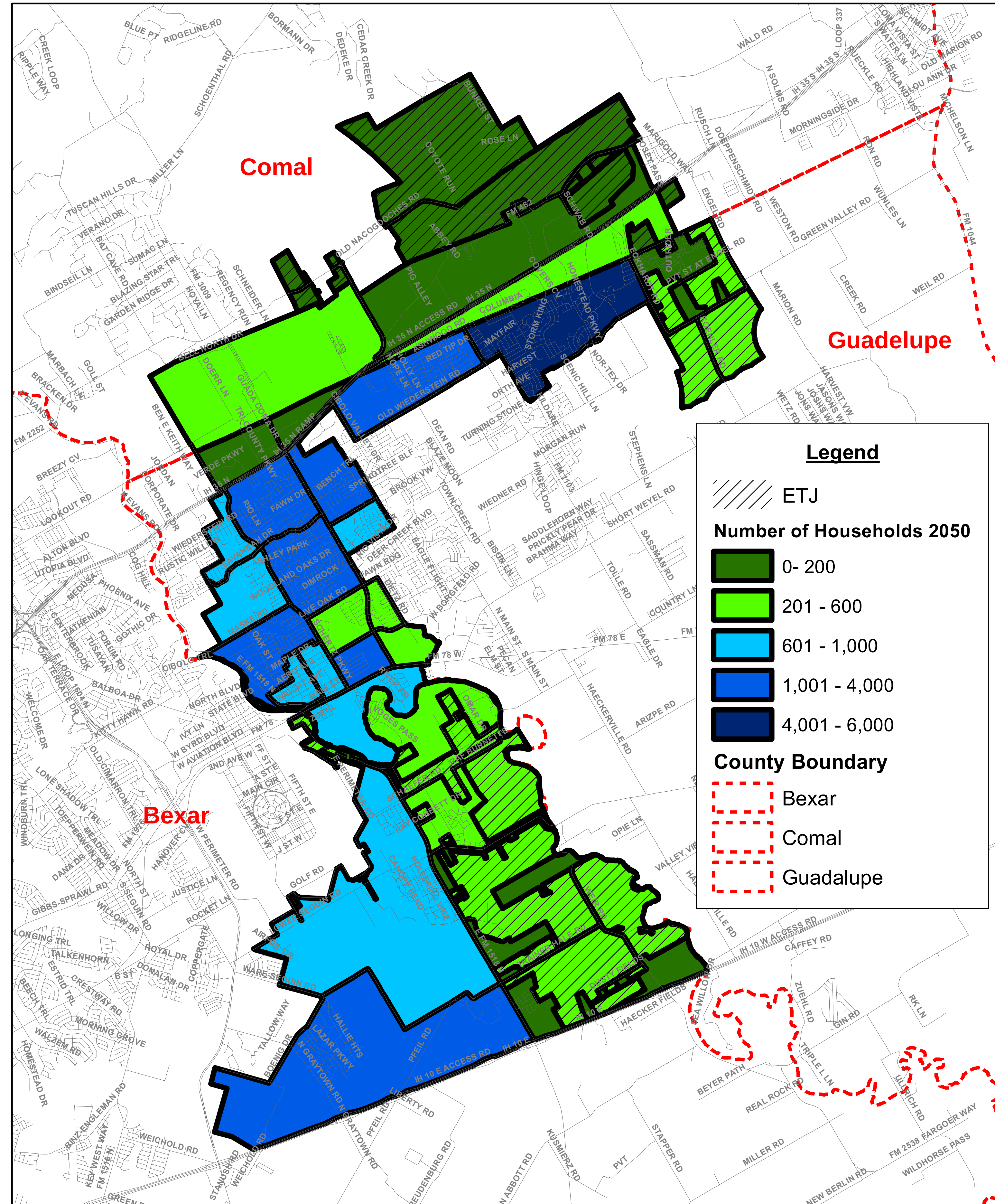


Schertz 2020 Residential Housing Distribution

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



Schertz 2050 Residential Housing Distribution
1/11/2022

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

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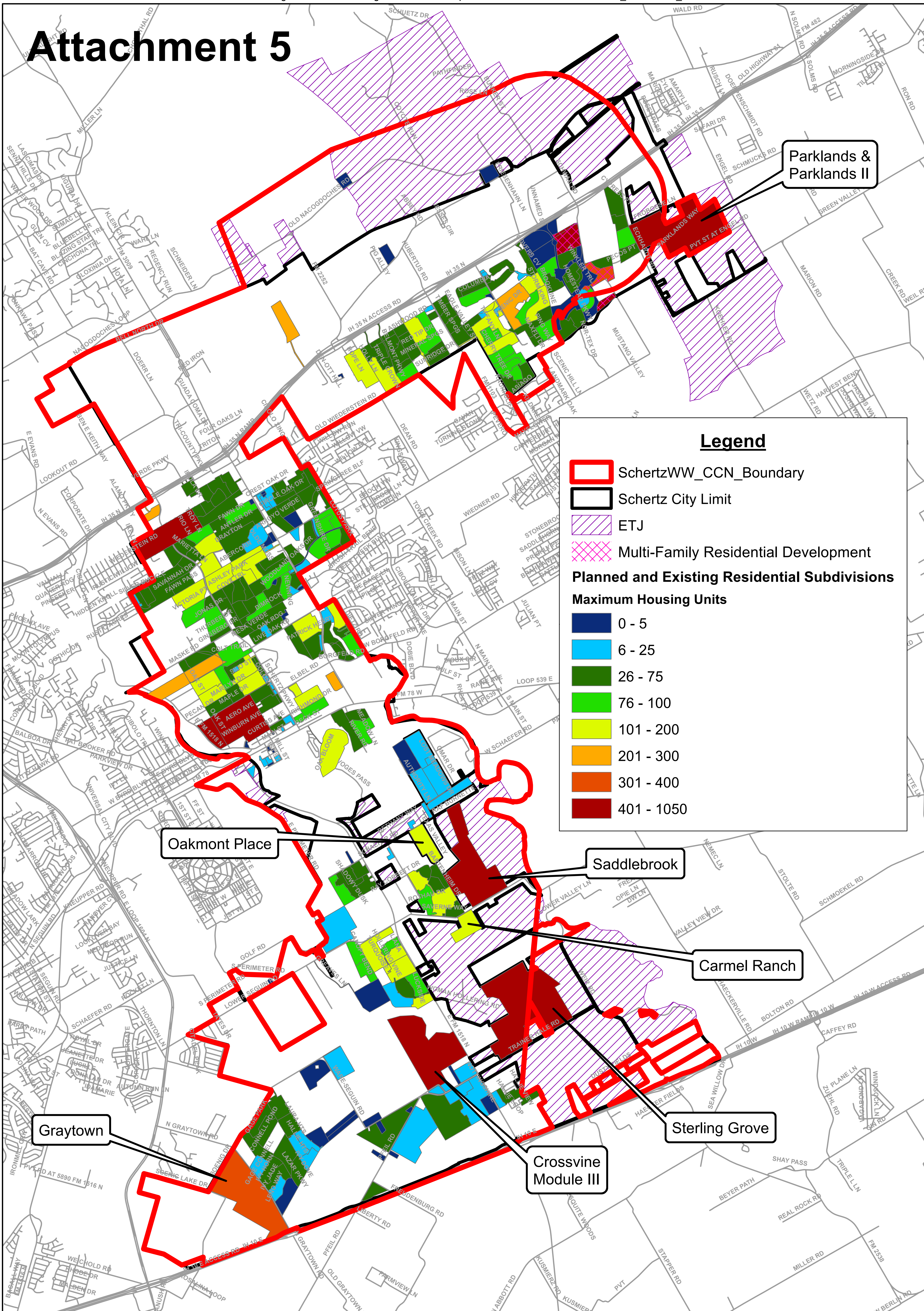

Schertz Planned and Existing Residential Developments
Comparison to Wastewater CCN Service Area
8/8/2022

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

N W E S

0 5,000 10,000 Feet

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

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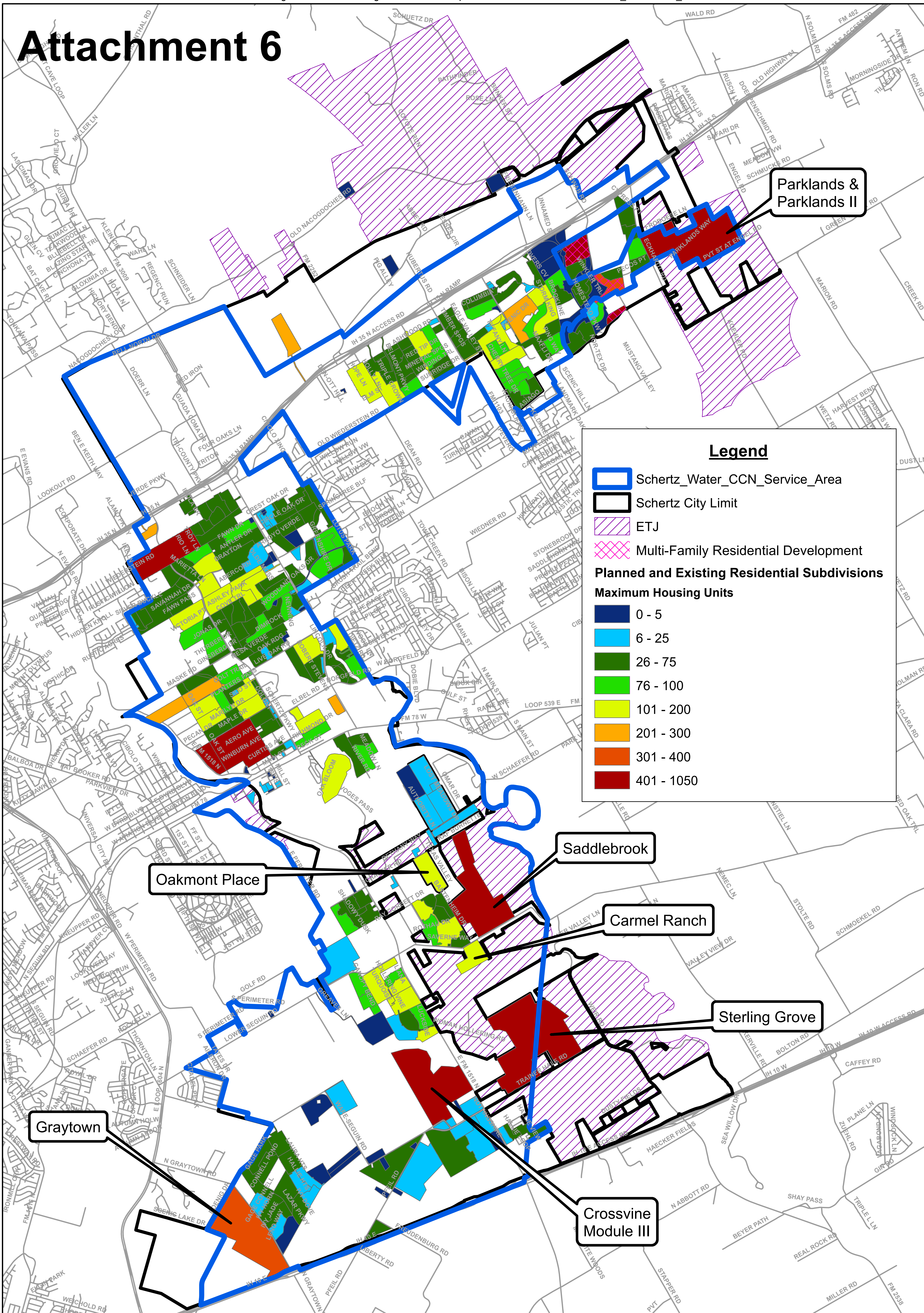

Schertz Planned and Existing Residential Developments
Comparison to Water CCN Service Area
8/8/2022

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

N W E S

0 5,000 10,000 Feet

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

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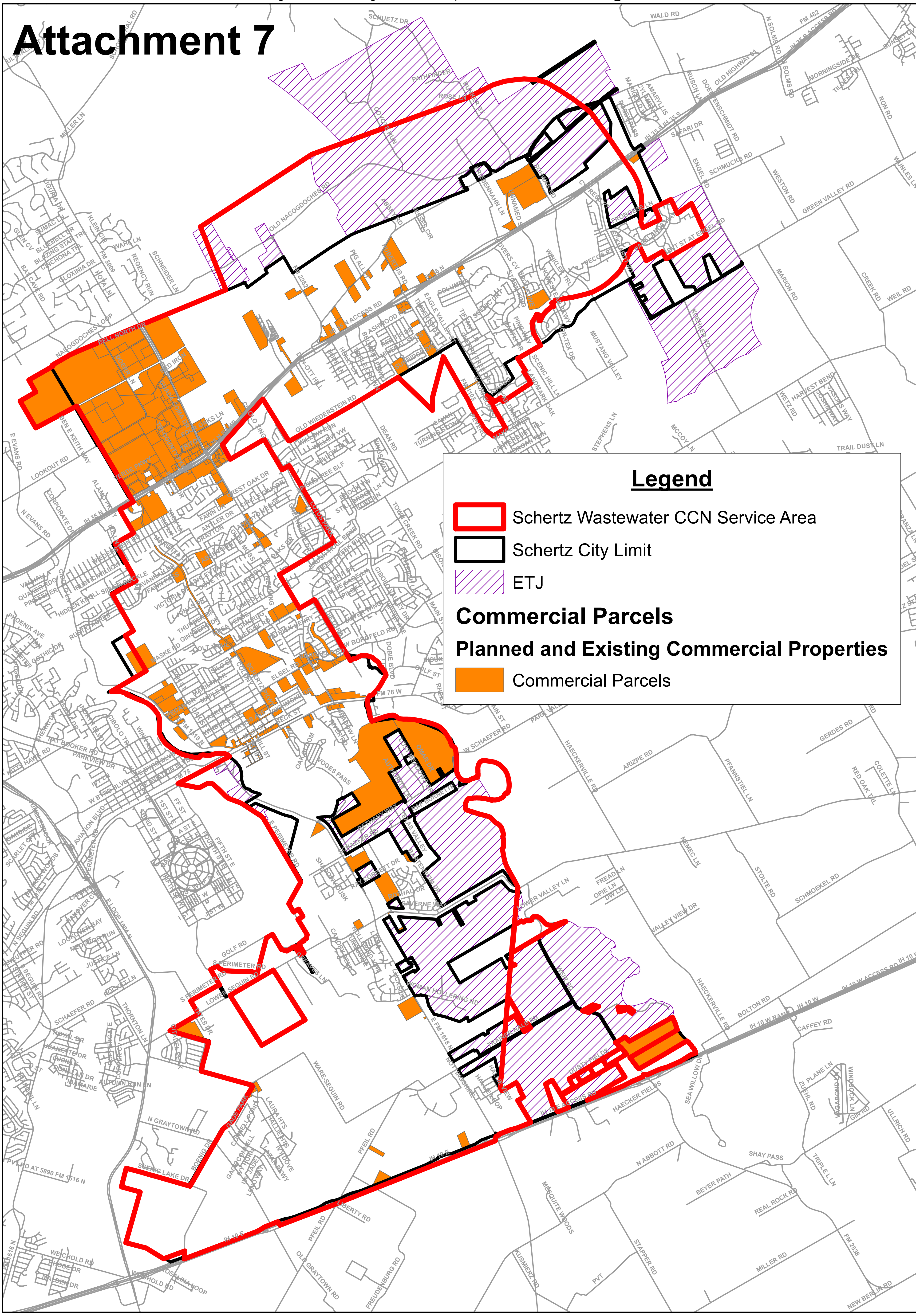

Schertz Planned and Existing Commericial Developments
Comparison to Wastewater CCN Service Area
8/16/2022

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

N W E S

0 5,000 10,000 Feet

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

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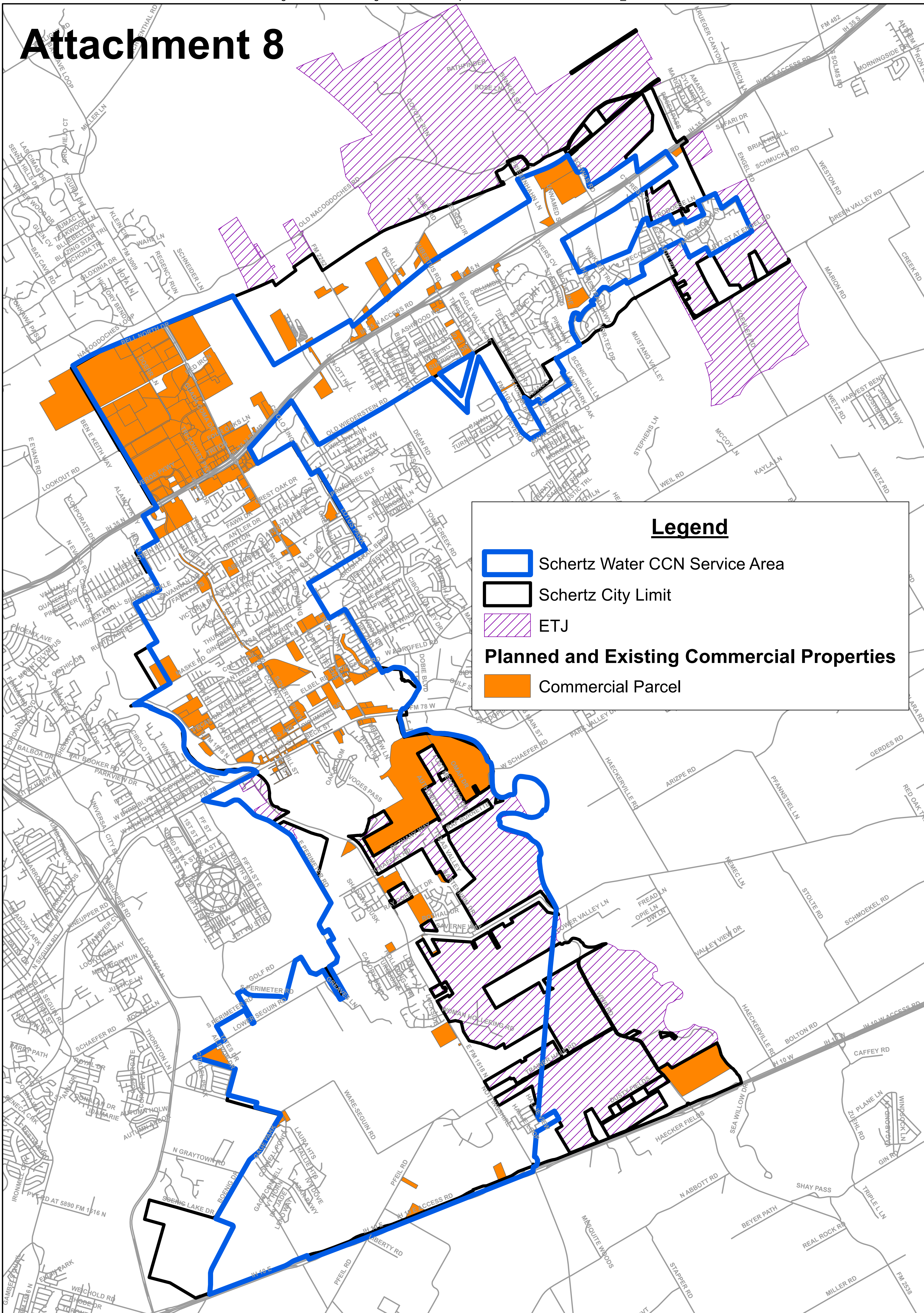

Schertz Planned and Existing Commericial Developments
Comparison to Water CCN Service Area
8/16/2022

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

N
W E
S

0 5,000 10,000
Feet

APPENDIX 9 - WASTEWATER CCN SERVICE AREA & COMPREHENSIVE LAND USE

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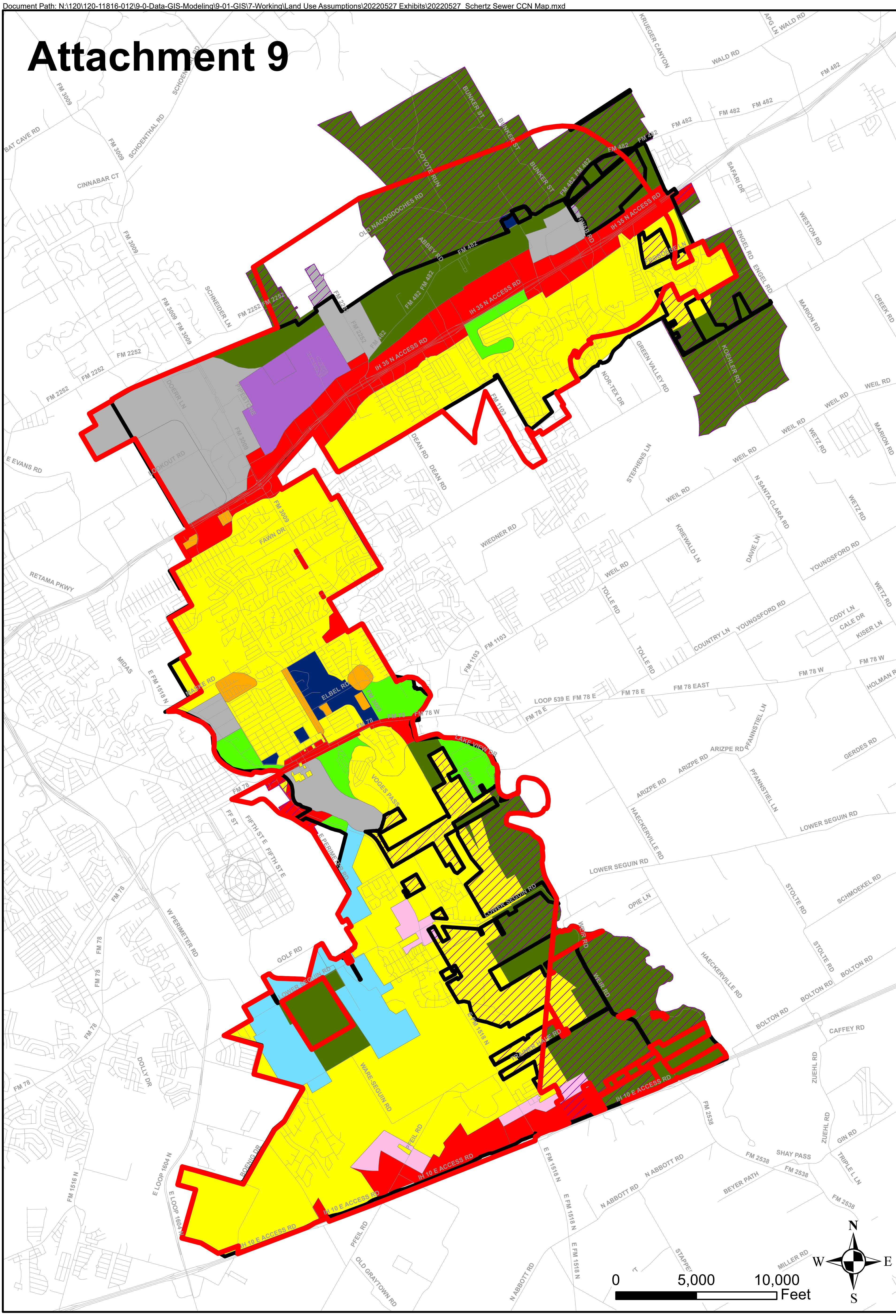
Attachment 9



Legend

ETJ

Schertz City Limit

Schertz Sewer CCN Service Area

Schertz Sewer CCN Service Area

Future Land Use

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

Schertz
CCN Sewer Service Area Map
Supported Land Uses

8/8/2022

Lockwood, Andrews & Newnam, Inc.
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APPENDIX 10 - WATER CCN SERVICE AREA & COMPREHENSIVE LAND USE

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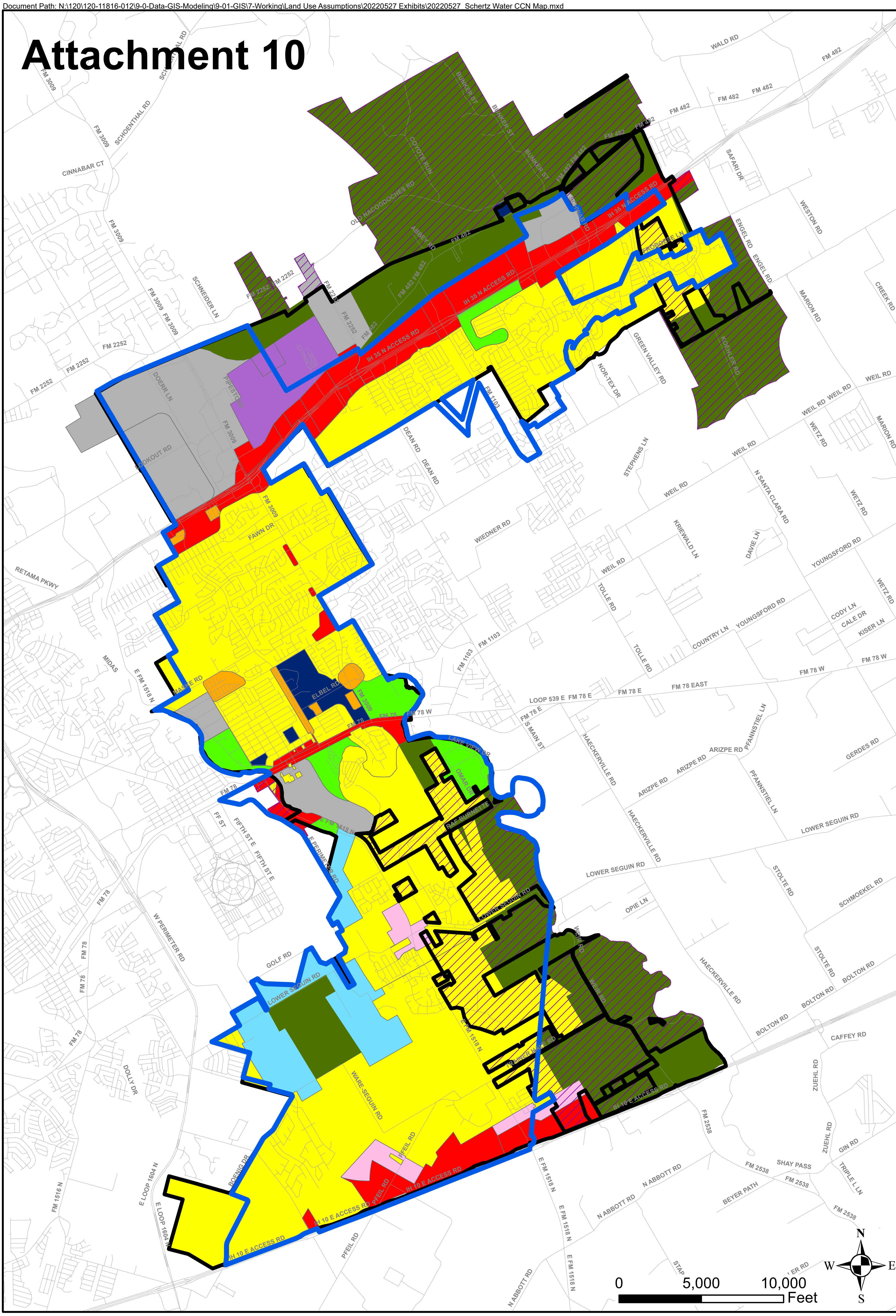


Legend

ETJ

Schertz City Limit

Schertz Water CCN Service Area

Schertz Water CCN Service Area

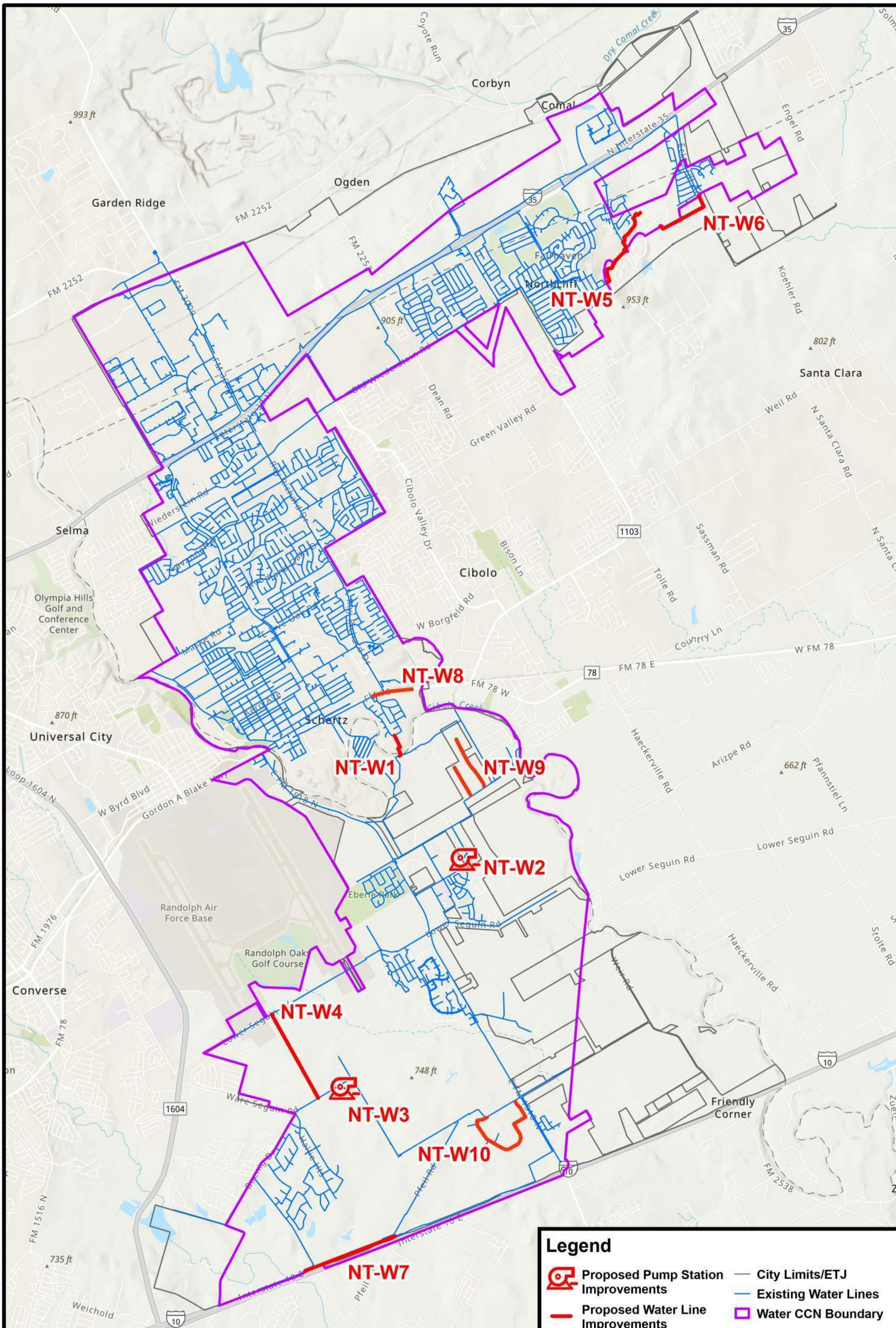
Future Land Use

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

Schertz
CCN Water Service Area Map
Supported Land Uses
8/8/2022

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

APPENDIX 11 - NEAR TERM WATER CIP MAP



NEAR TERM WATER CIP MAP

LAN
Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N
W E
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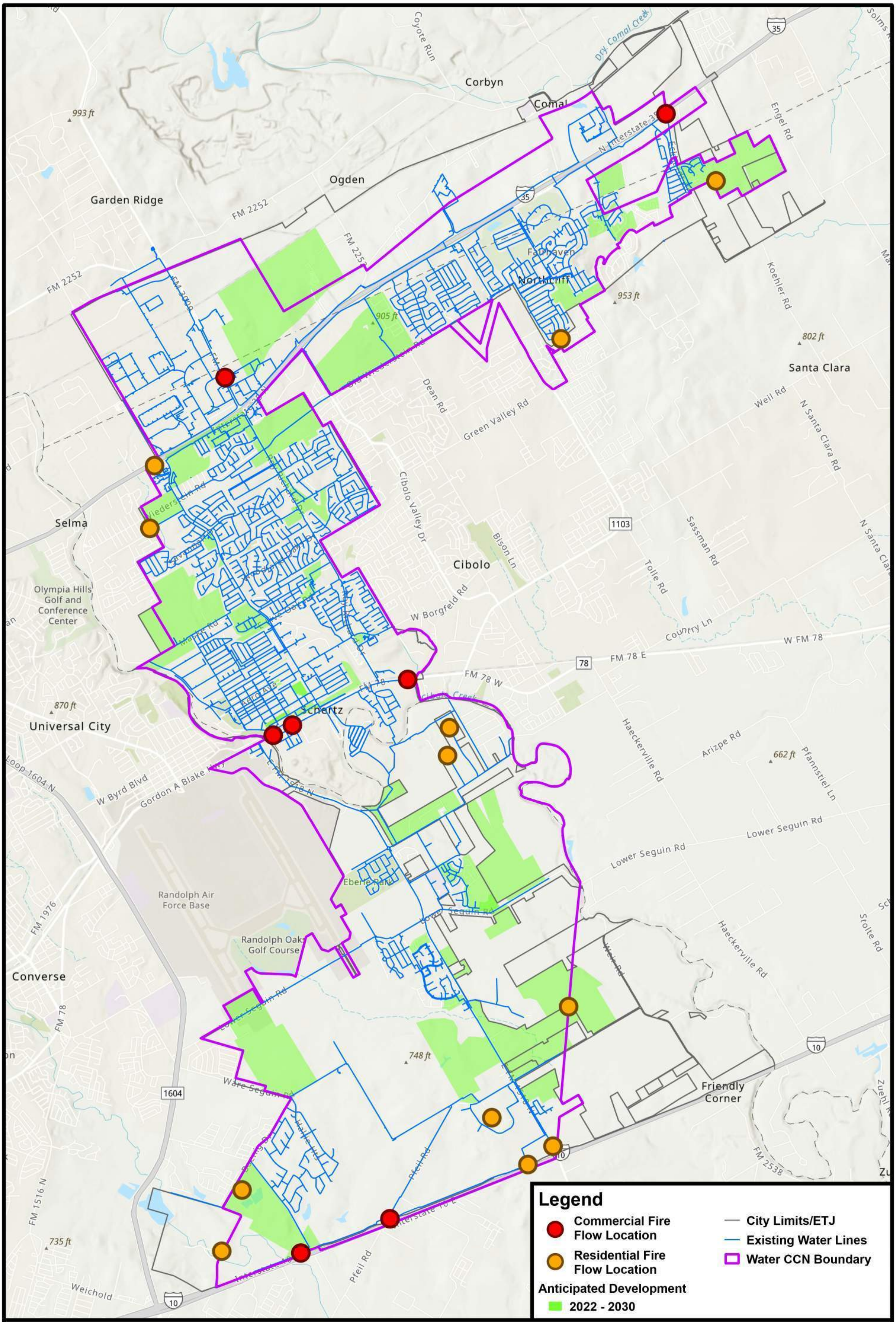
0 3,500 7,000 14,000
Feet

APPENDIX 12 - 2030 FIRE FLOW ANALYSIS LOCATIONS

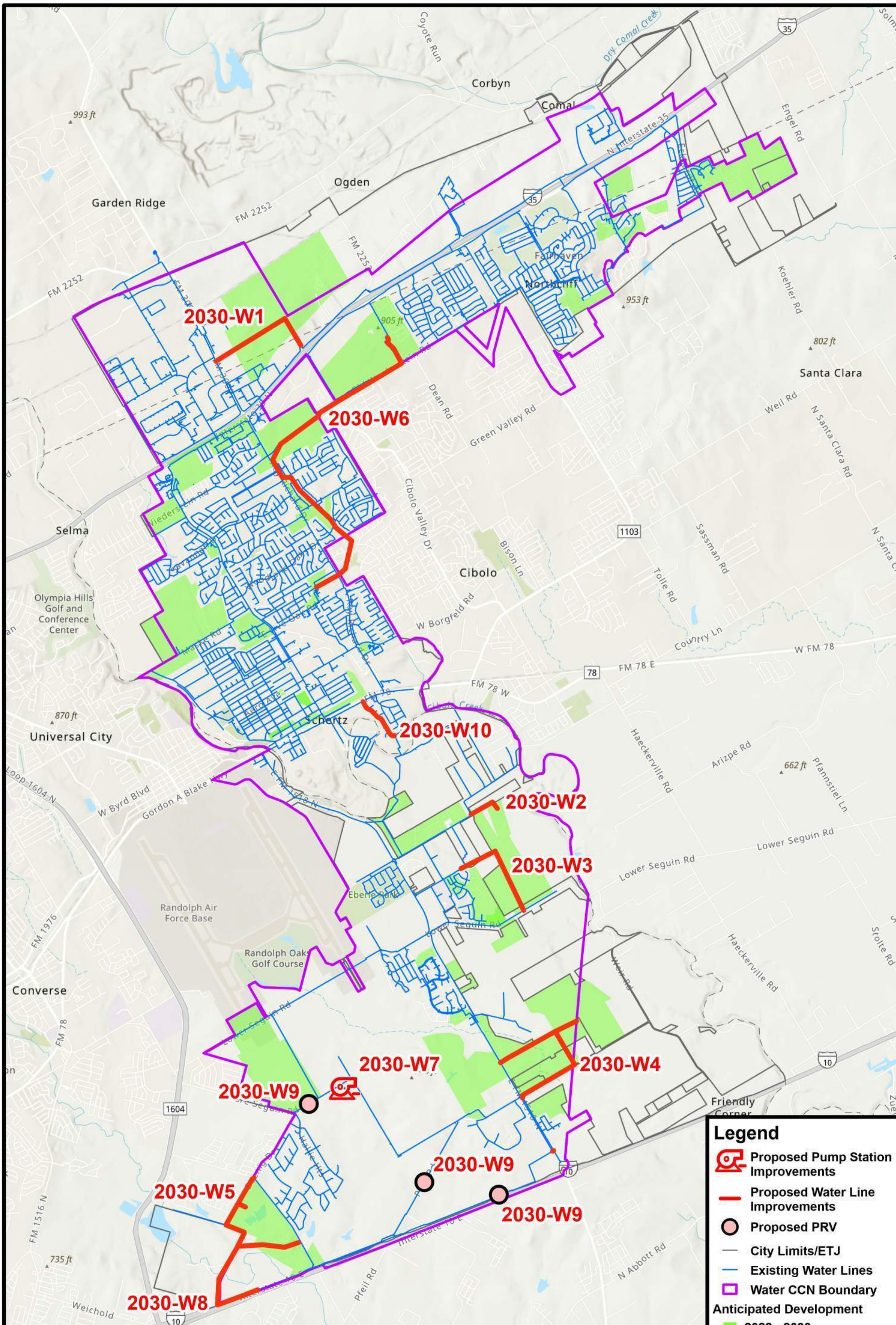


FIRE FLOW ANALYSIS LOCATIONS

LAN
Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 13 - 2030
WATER CIP MAP



2030 WATER CIP MAP

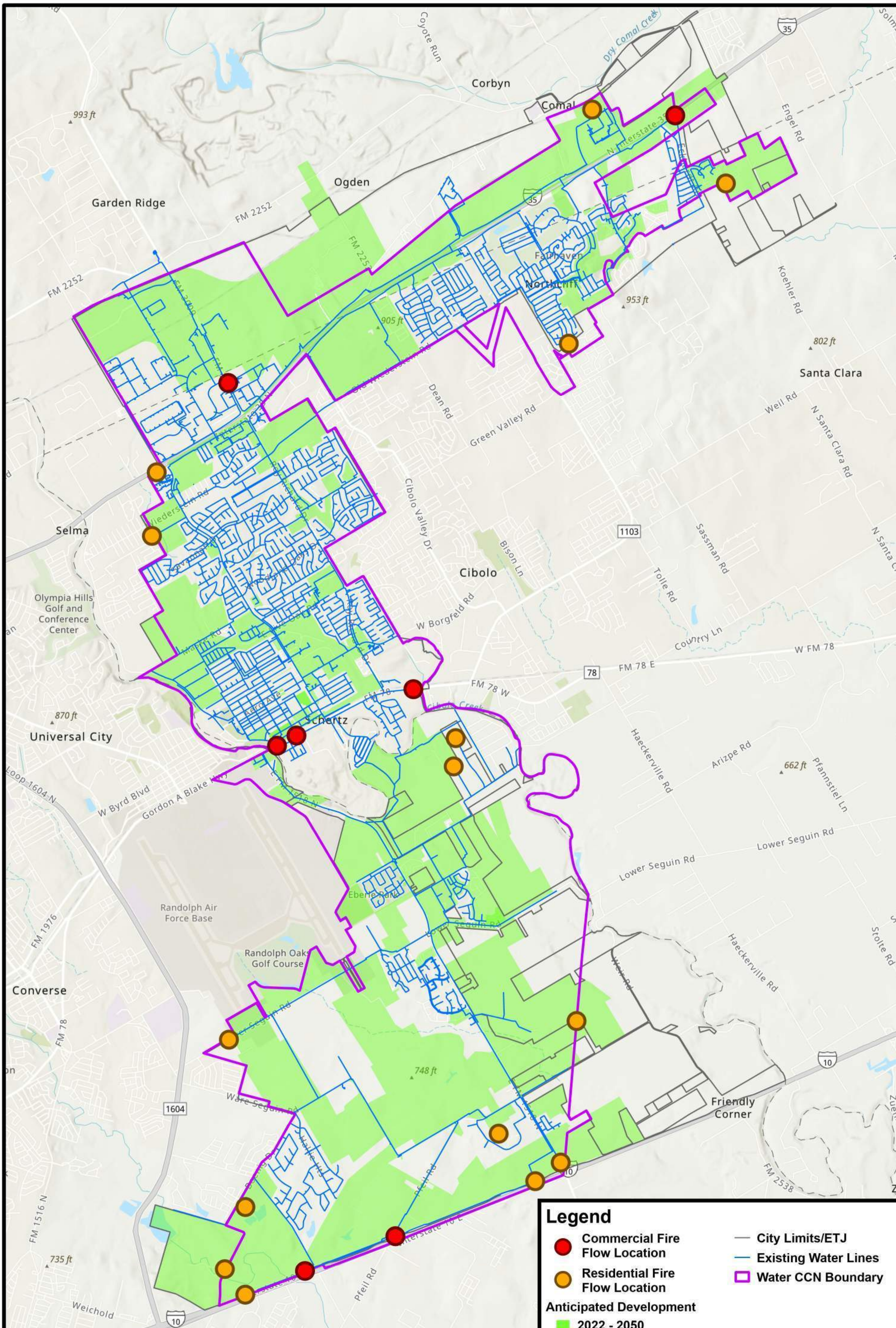
LAN Planning Engineering Program Management

SCHERTZ COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 3,500 7,000 14,000 Feet

APPENDIX 14 - 2050 FIRE FLOW ANALYSIS LOCATIONS



2050 FIRE FLOW ANALYSIS LOCATIONS

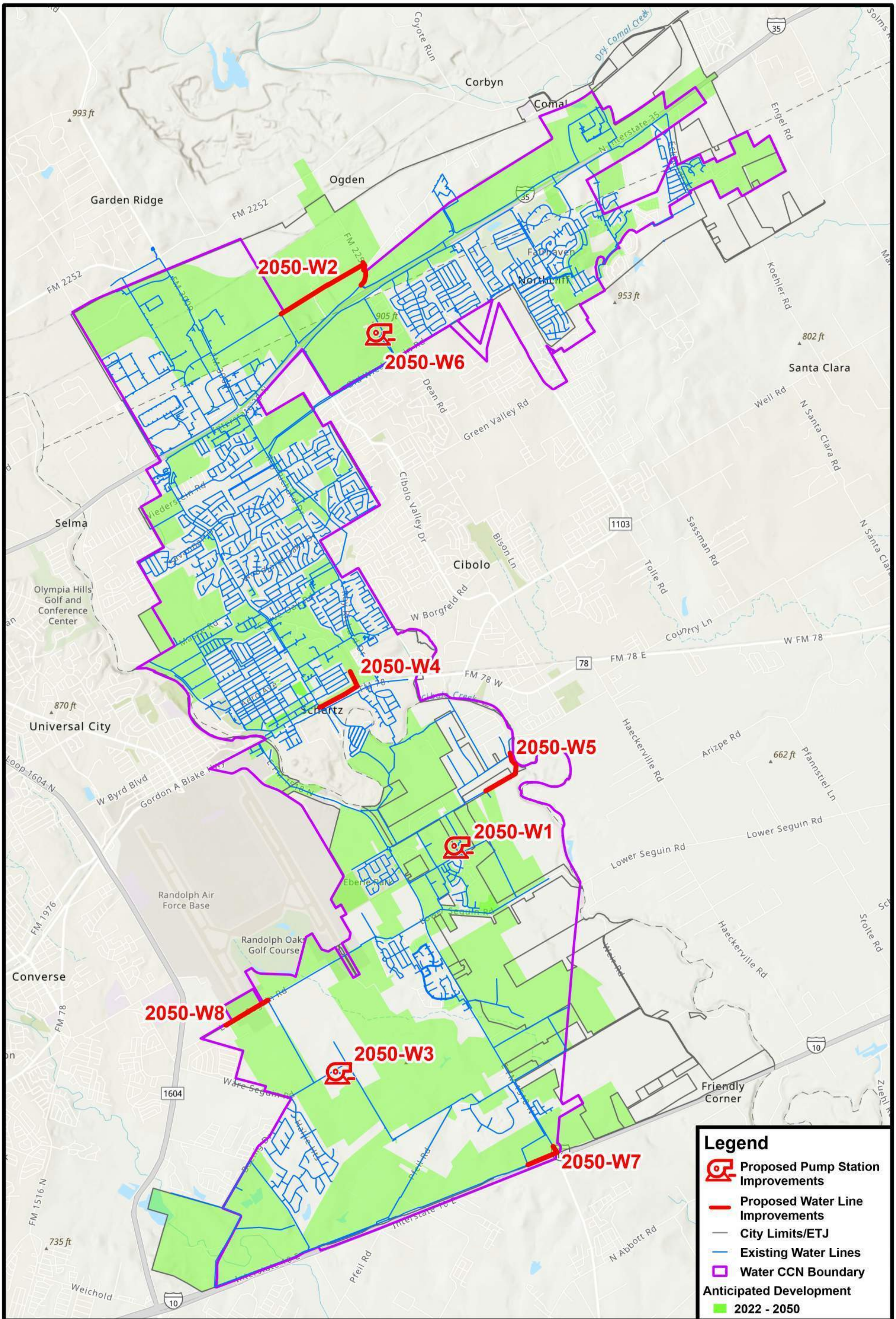
Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 3,500 7,000 14,000 Feet

APPENDIX 15 - 2050 WATER CIP MAP



2050 WATER CIP MAP

LAN
Planning
Engineering
Program Management

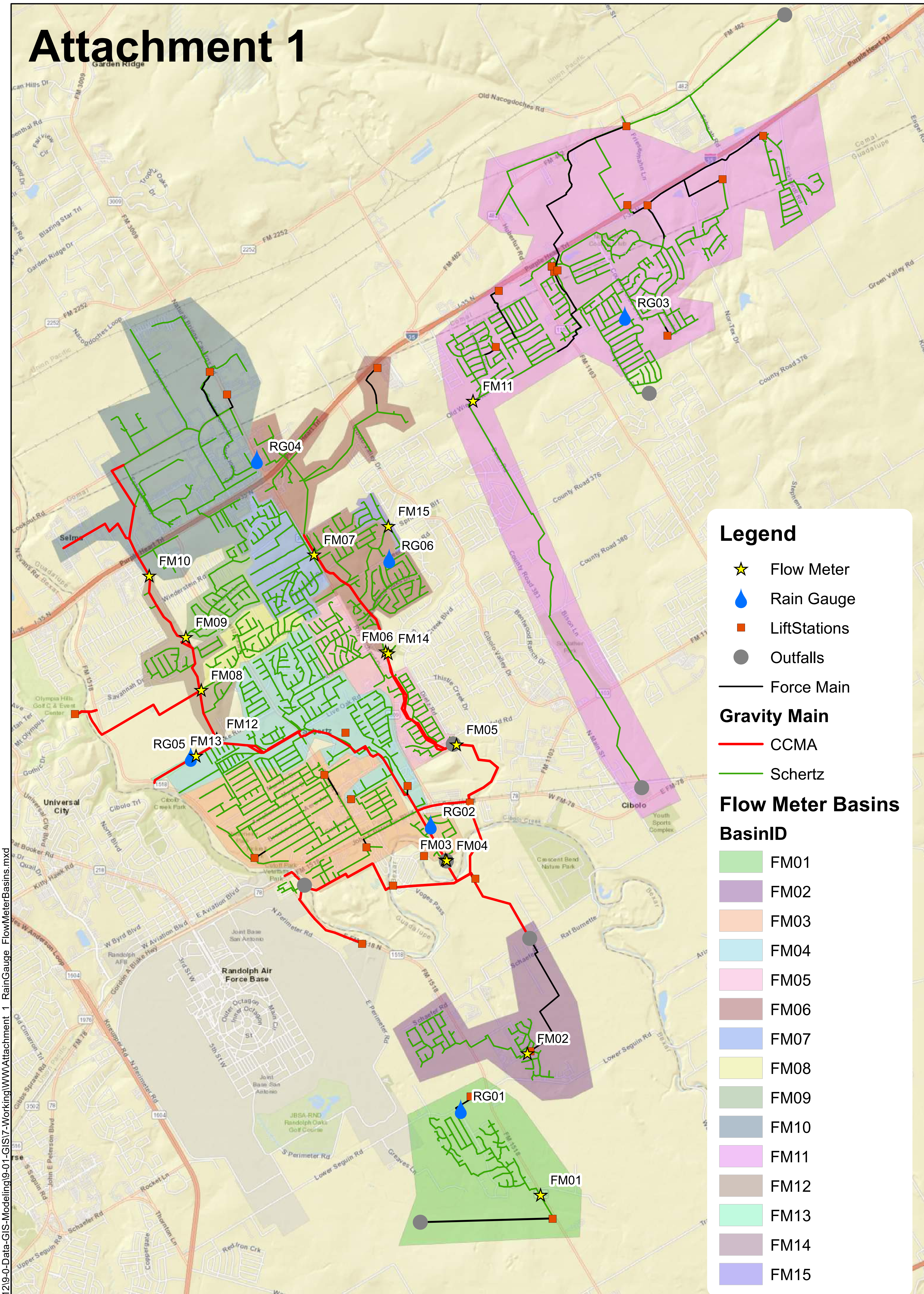
SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N
W E
S

0 3,500 7,000 14,000
Feet

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

Attachment 1



Flow Meter, Meter Basin, and Rain Gauge Location

8/26/2022

Lockwood, Andrews & Newnam, Inc.
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SCHERTZ
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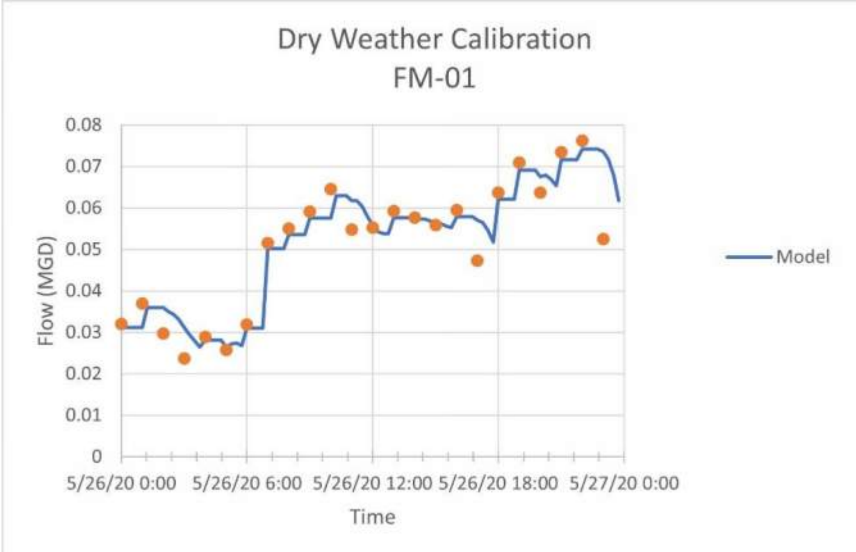
N S W E

0 1 2 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 1_RainGauge_FlowMeterBasins.mxd

APPENDIX 17 - DRY WEATHER CALIBRATION GRAPHS


Dry Weather Calibration
FM-01
Flow (MGD)
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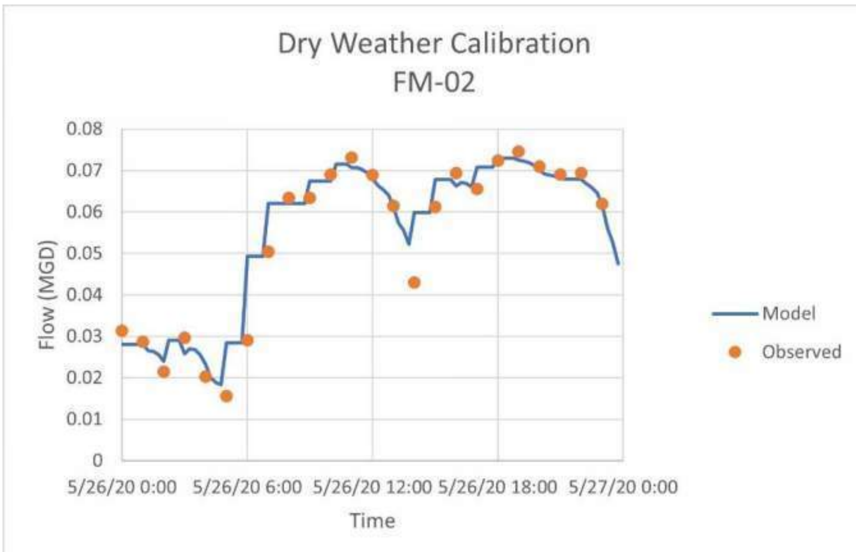
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model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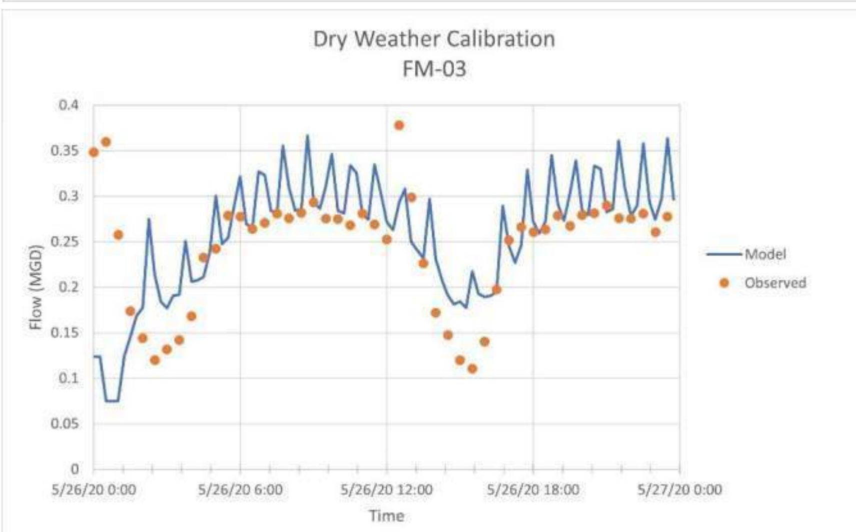
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed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0.3
0.25
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0.15
0.1
0.05
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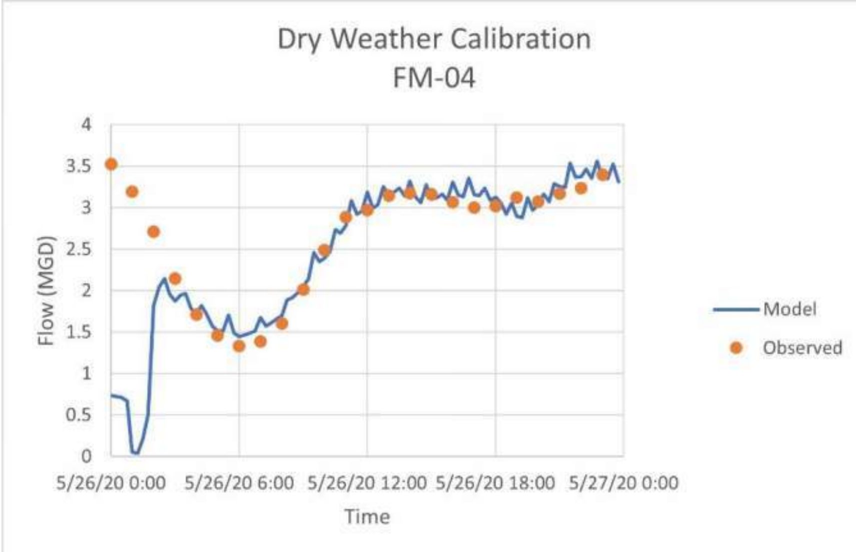
Time
Model
Observed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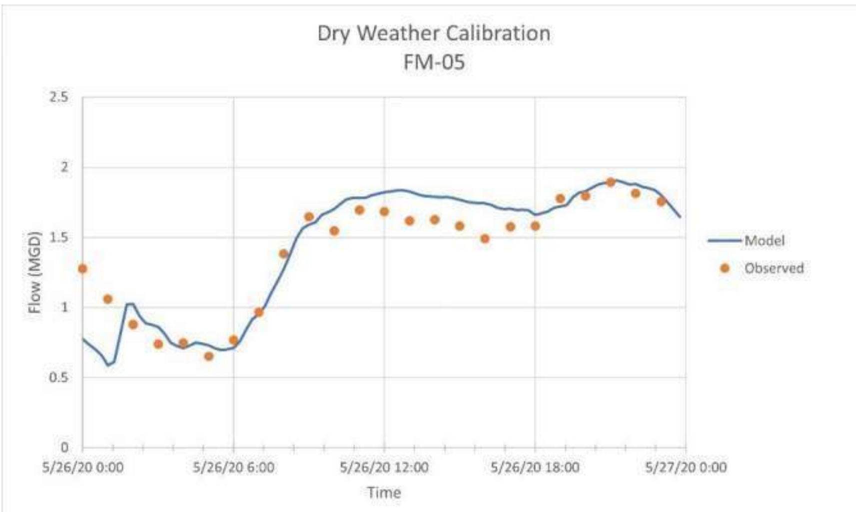
Time
Model
Observed


Dry Weather Calibration
FM-05
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1
0.5
0
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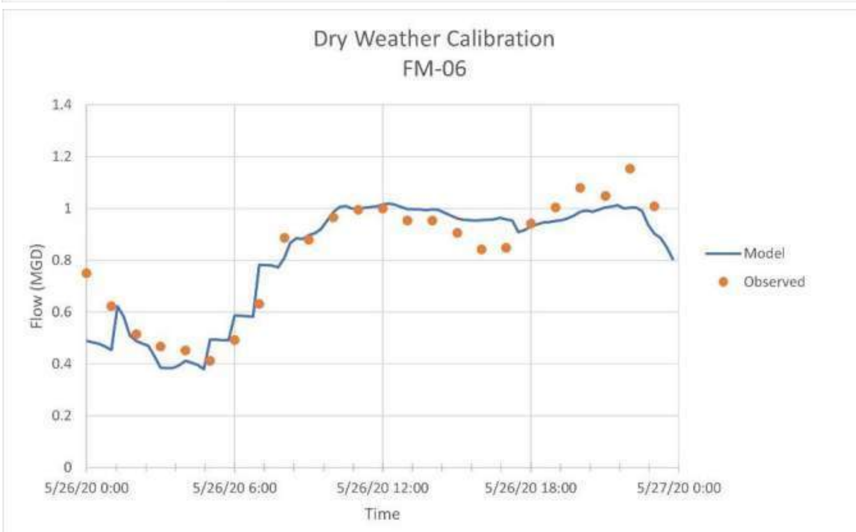
Time
Model
Observed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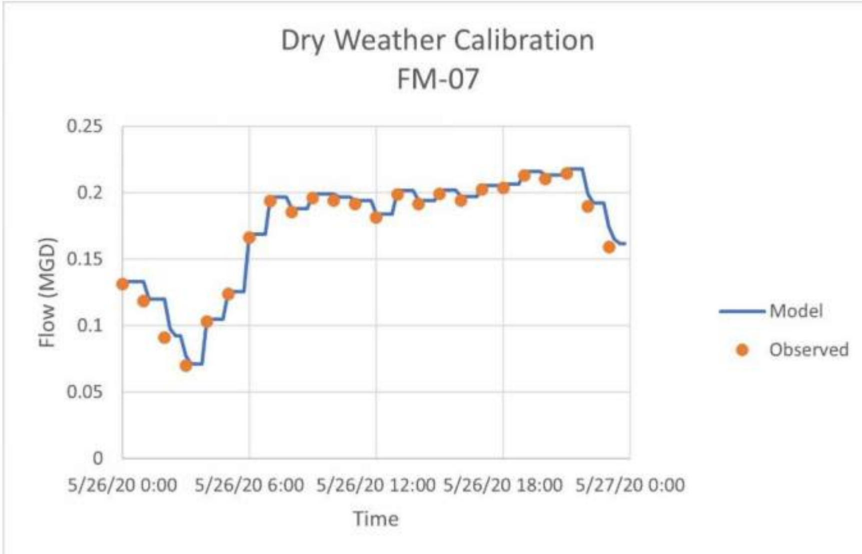
Model
Observed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0.05
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Flow (MGD)
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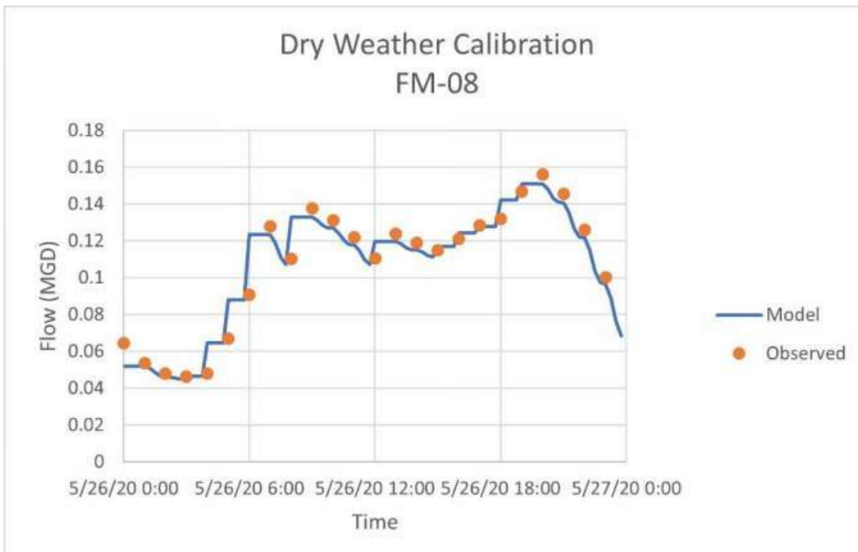
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed


Dry Weather Calibration
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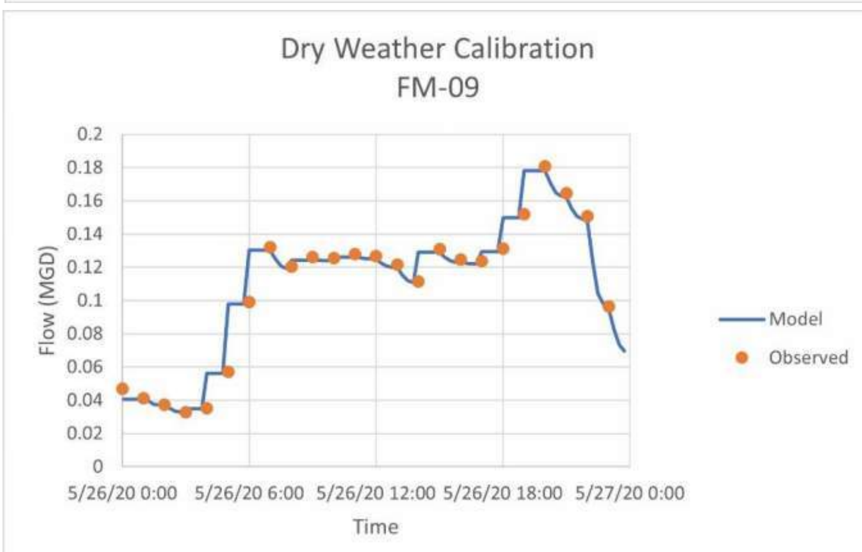
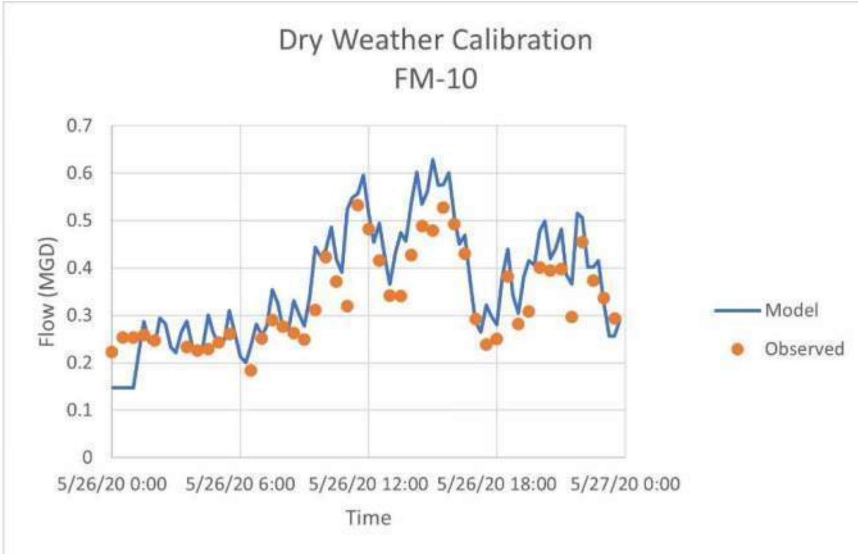
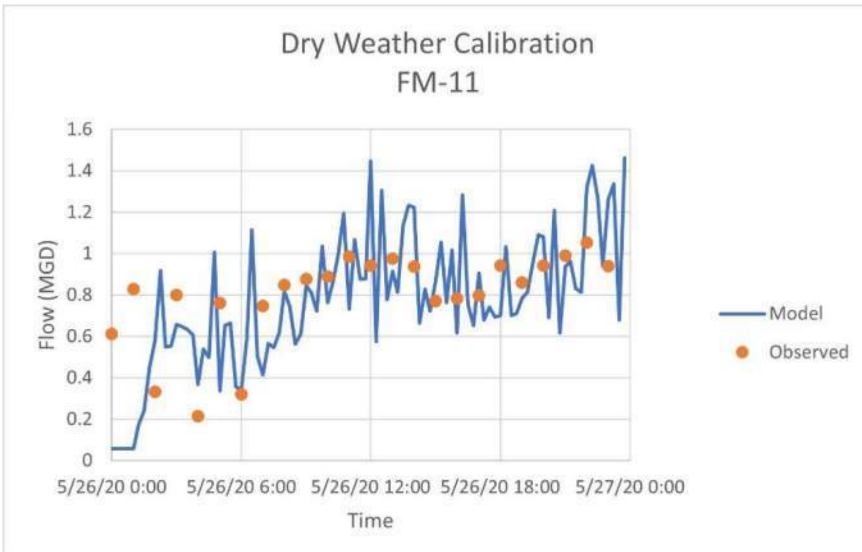
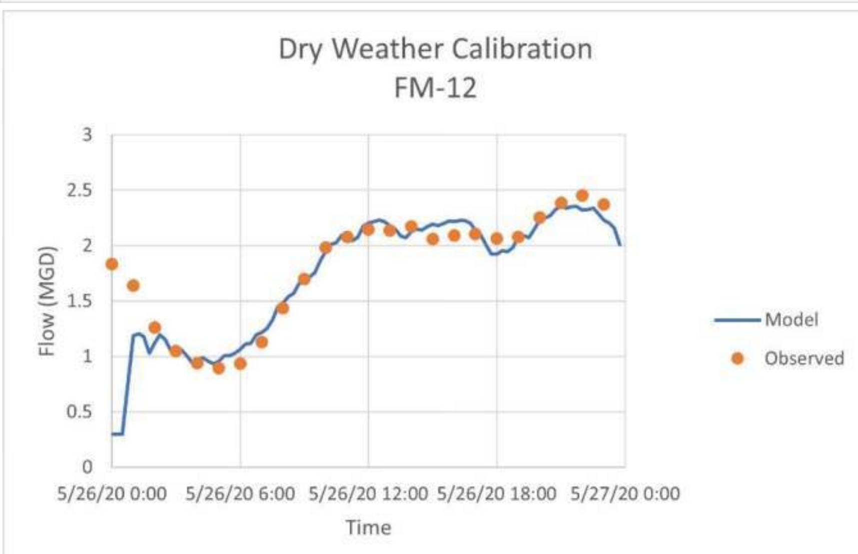
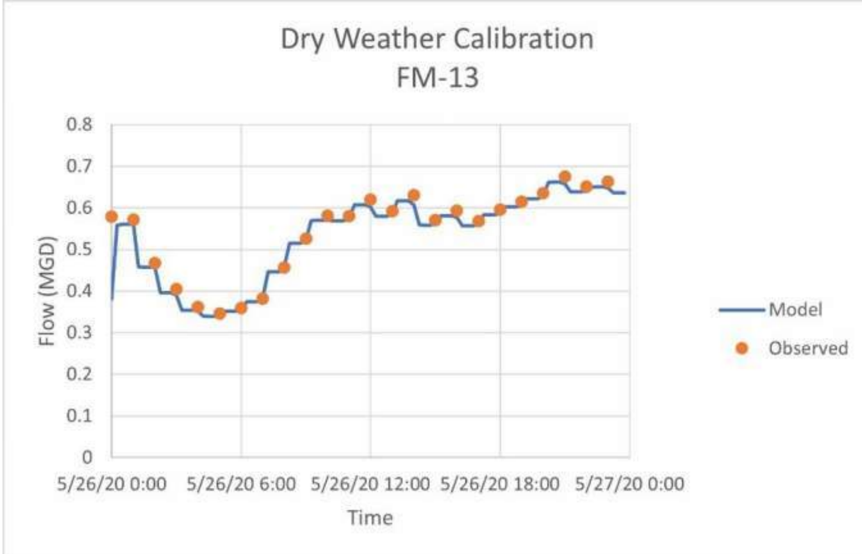
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed


Dry Weather Calibration
FM-09
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed

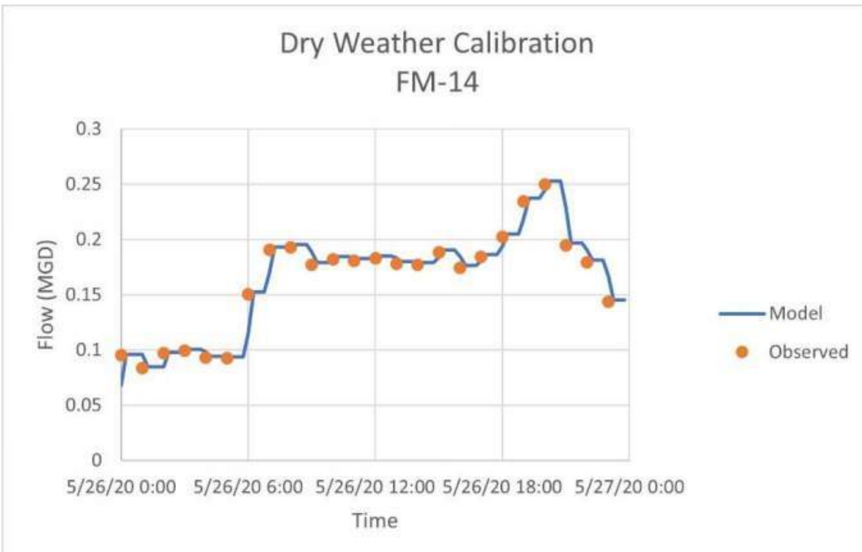

Dry Weather Calibration
FM-10
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed


Dry Weather Calibration
FM-11
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed

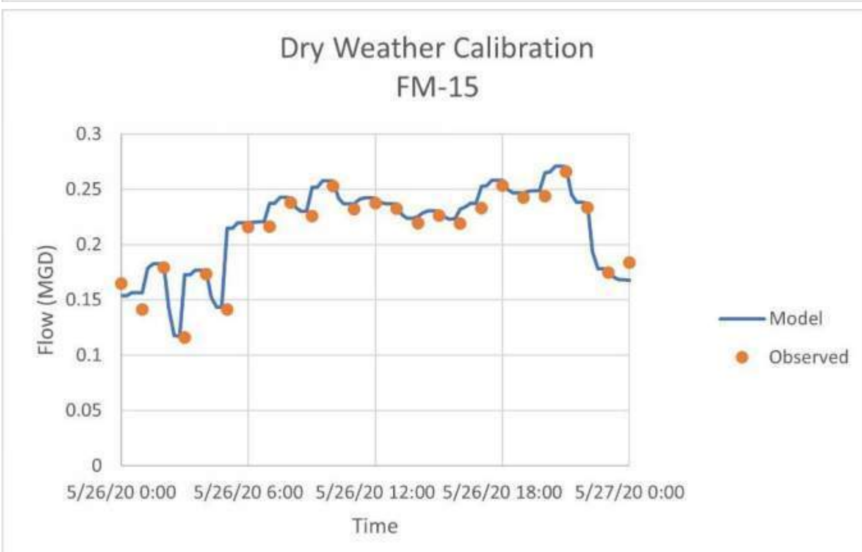

Dry Weather Calibration
FM-12
3
2.5
2
1.5
1
0.5
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed



Dry Weather Calibration
FM-13
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed

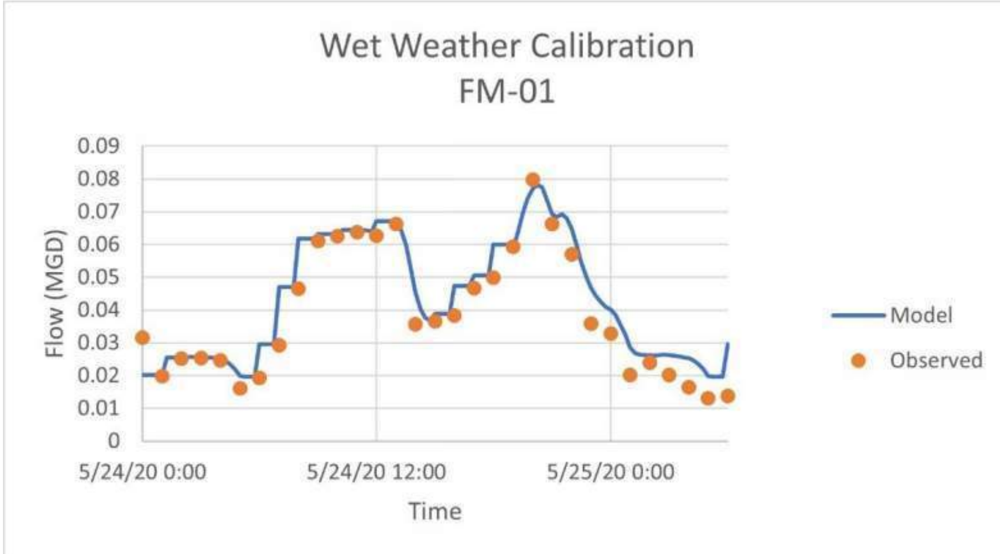


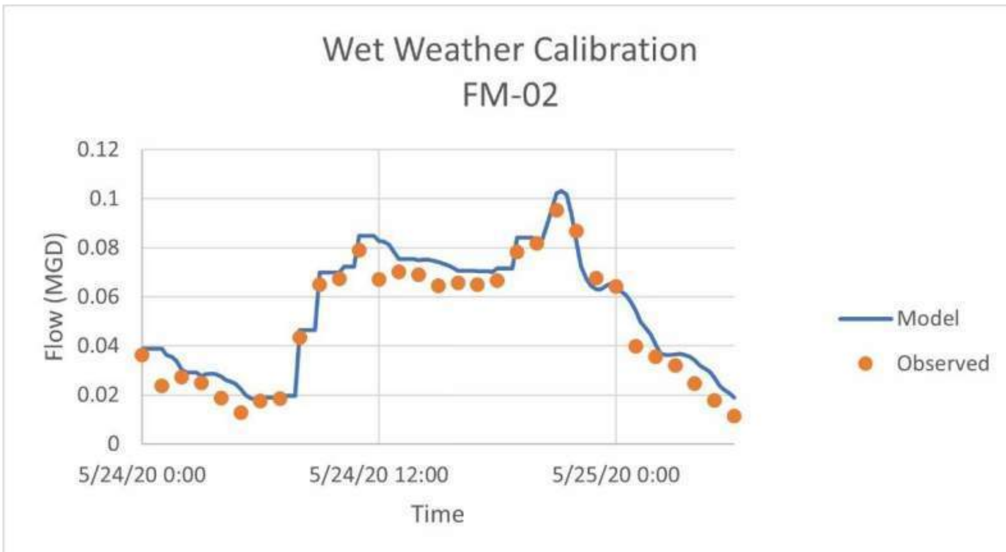
Dry Weather Calibration
FM-14
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed

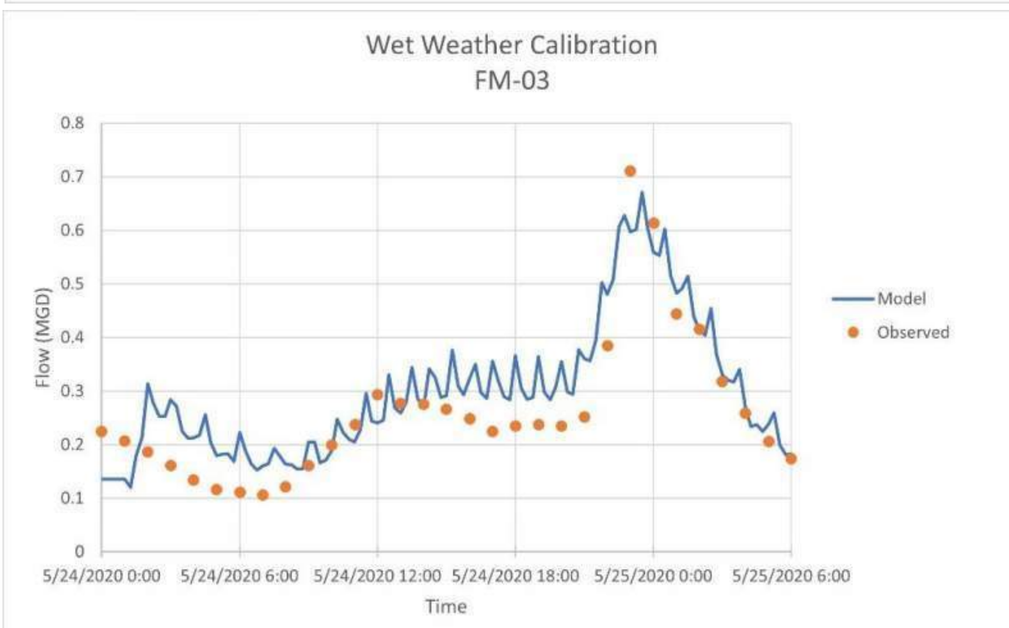


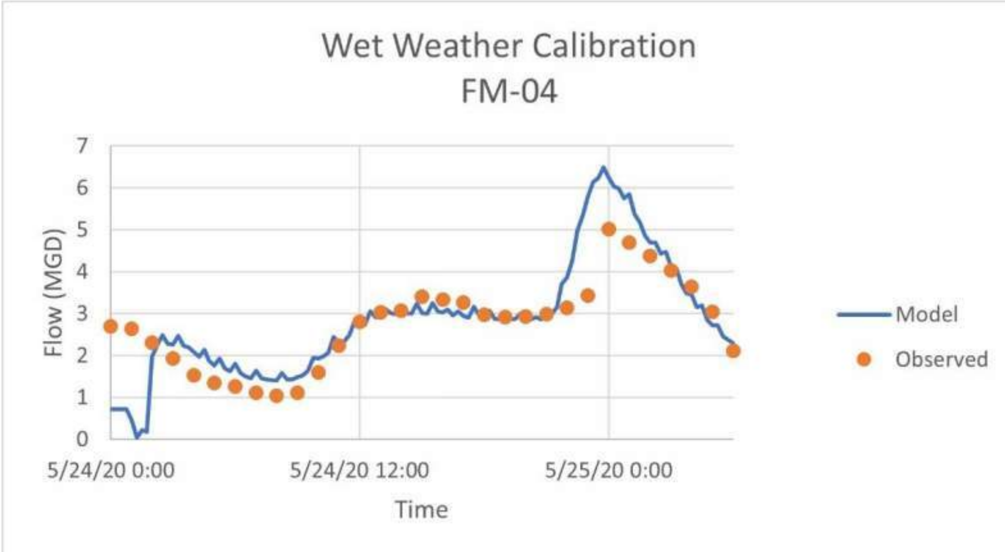
Dry Weather Calibration
FM-15
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (MGD)
5/26/20 0:00
5/26/20 6:00
5/26/20 12:00
5/26/20 18:00
5/27/20 0:00
Time
Model
Observed

APPENDIX 18 - WET WEATHER CALIBRATION GRAPHS

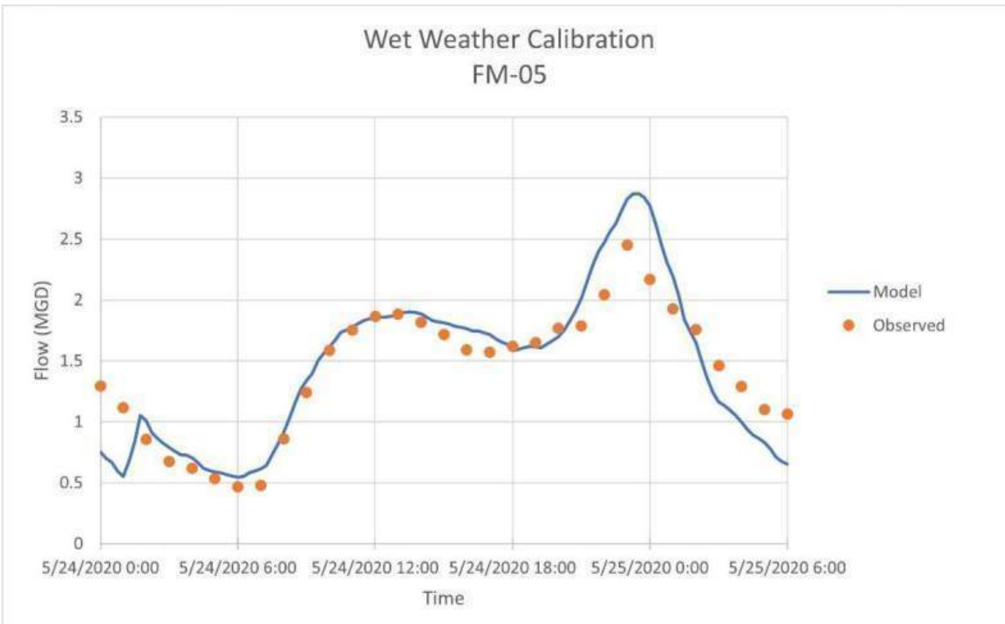

Wet Weather Calibration
FM-01
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed


Wet Weather Calibration
FM-02
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed

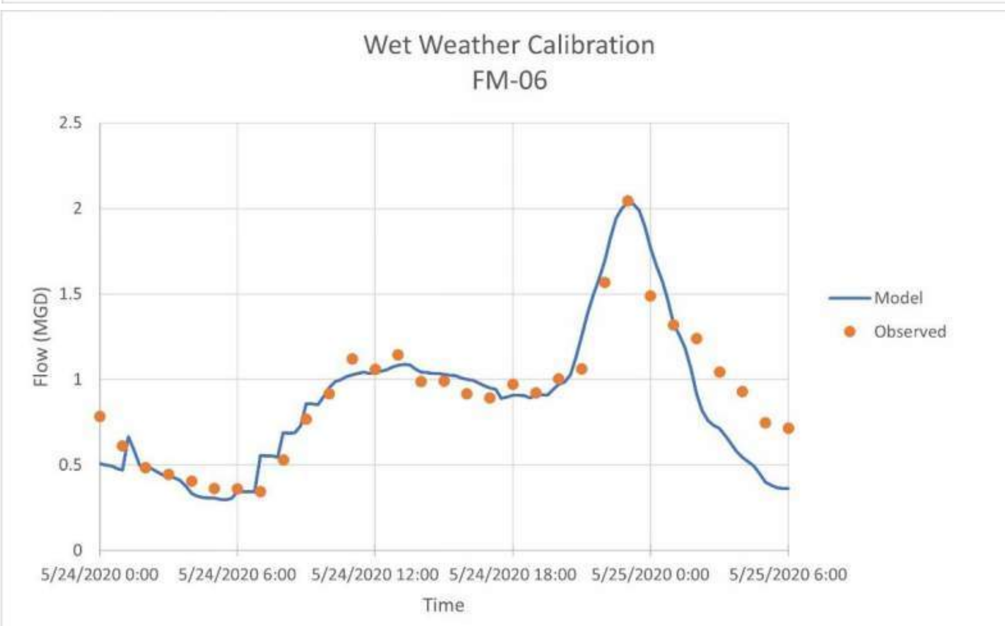

Wet Weather Calibration
FM-03
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Flow (MGD)
5/24/2020 0:00
5/24/2020 6:00
5/24/2020 12:00
5/24/2020 18:00
5/25/2020 0:00
5/25/2020 6:00
Time
Model
Observed



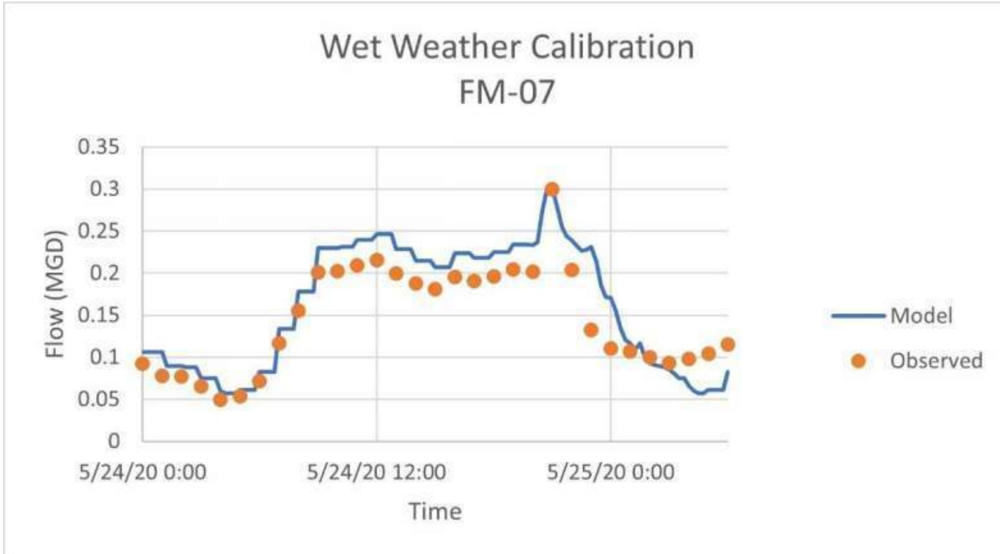
Wet Weather Calibration
FM-04
Flow (MGD)
0
1
2
3
4
5
6
7
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed

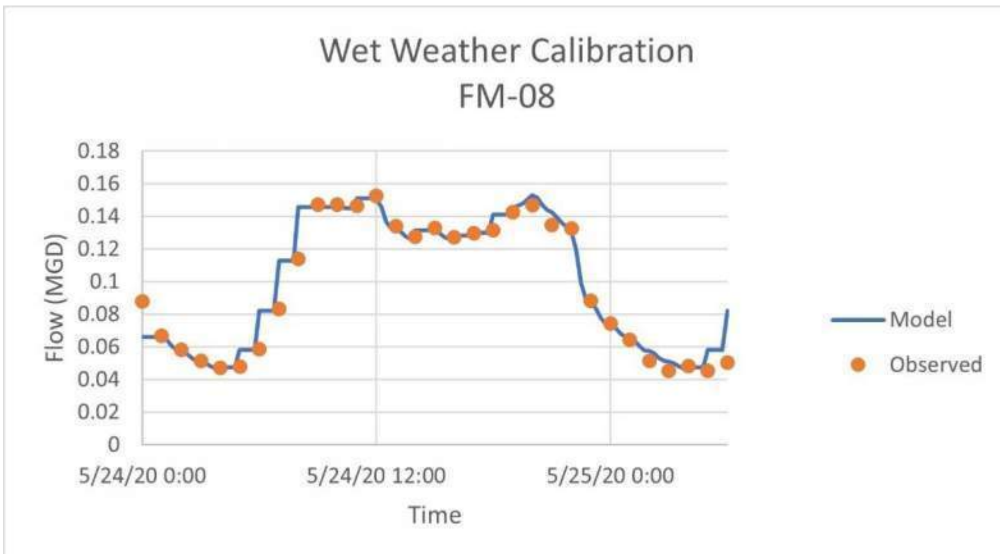


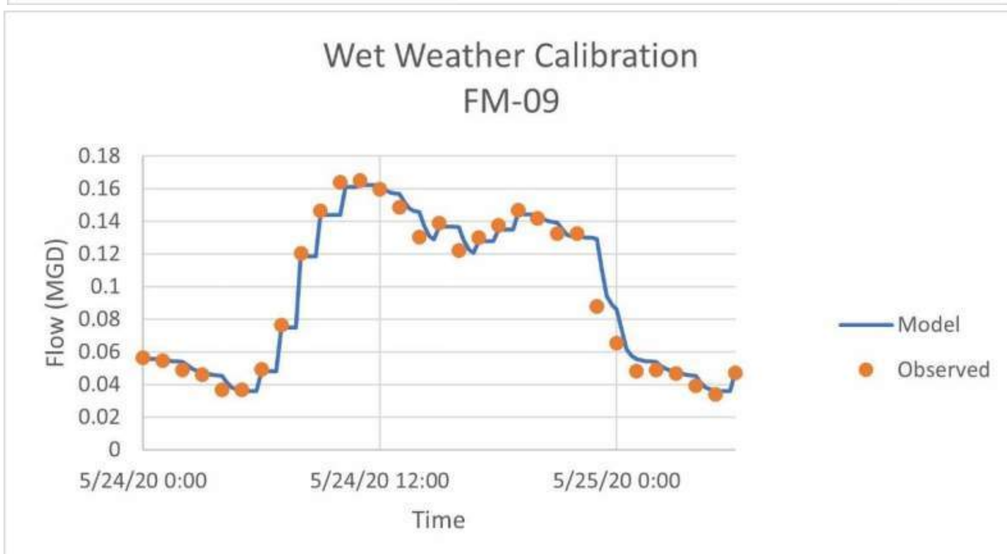
Wet Weather Calibration
FM-05
Flow (MGD)
0
0.5
1
1.5
2
2.5
3
3.5
5/24/2020 0:00
5/24/2020 6:00
5/24/2020 12:00
5/24/2020 18:00
5/25/2020 0:00
5/25/2020 6:00
Time
Model
Observed

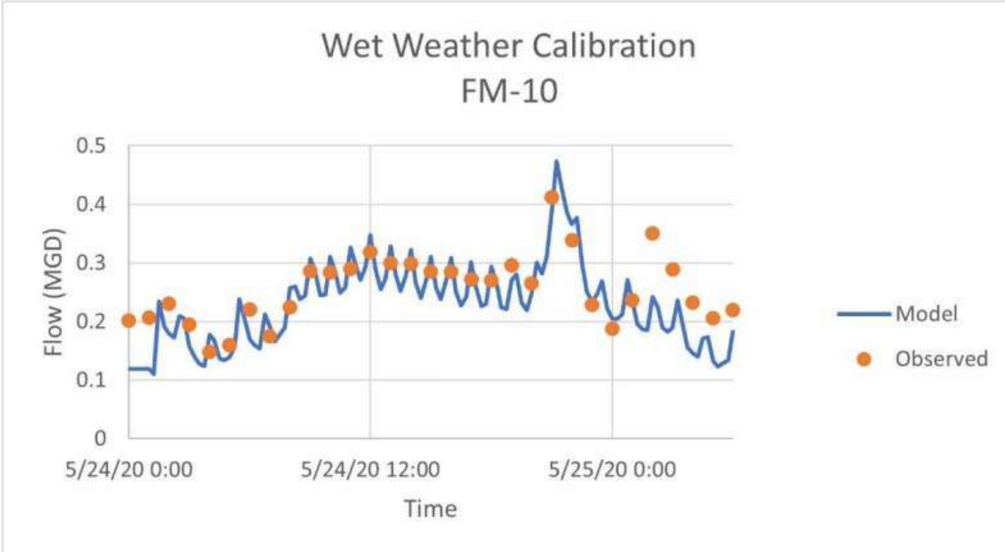


Wet Weather Calibration
FM-06
Flow (MGD)
0
0.5
1
1.5
2
2.5
5/24/2020 0:00
5/24/2020 6:00
5/24/2020 12:00
5/24/2020 18:00
5/25/2020 0:00
5/25/2020 6:00
Time
Model
Observed

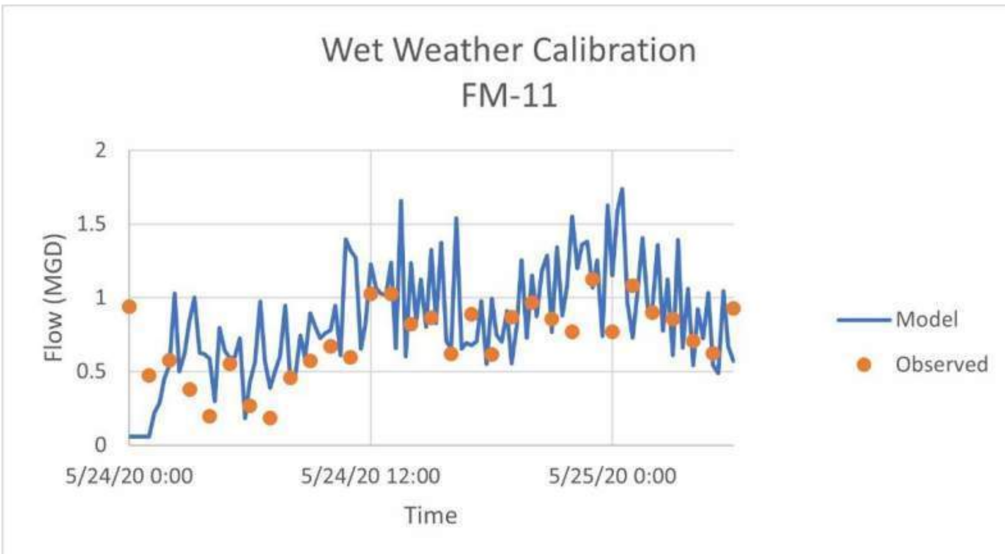

Wet Weather Calibration
FM-07
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed


Wet Weather Calibration
FM-08
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed

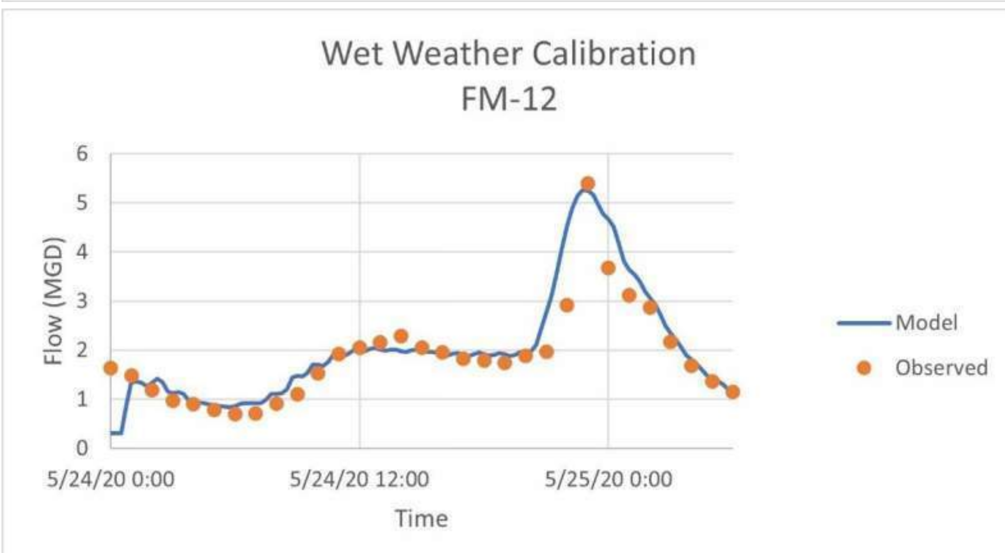

Wet Weather Calibration
FM-09
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed



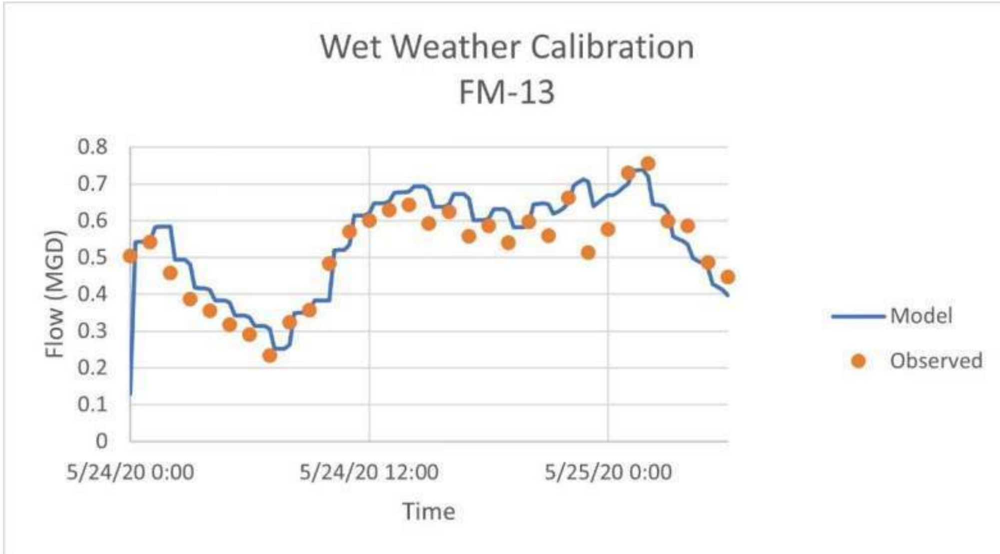
Wet Weather Calibration
FM-10
0.5
0.4
0.3
0.2
0.1
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed



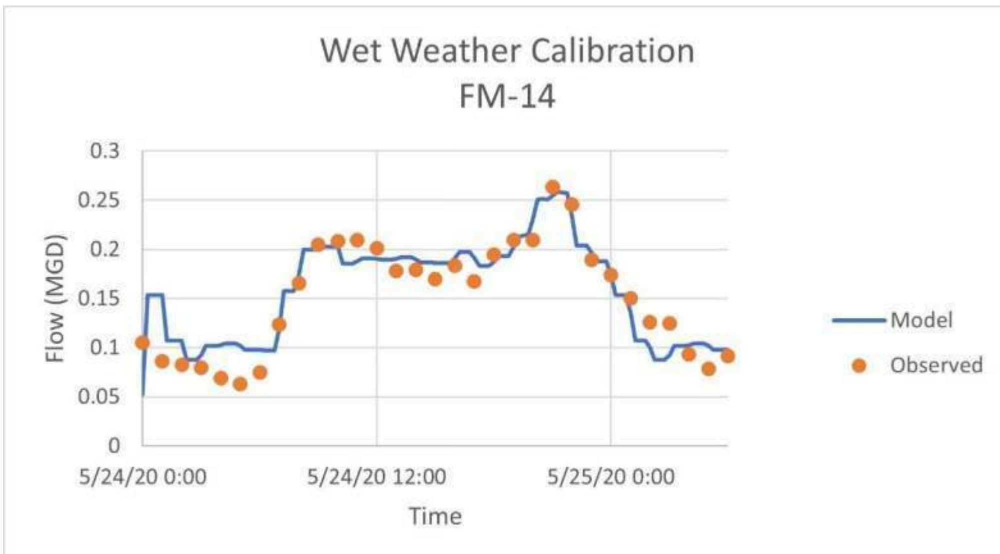
Wet Weather Calibration
FM-11
2
1.5
1
0.5
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed



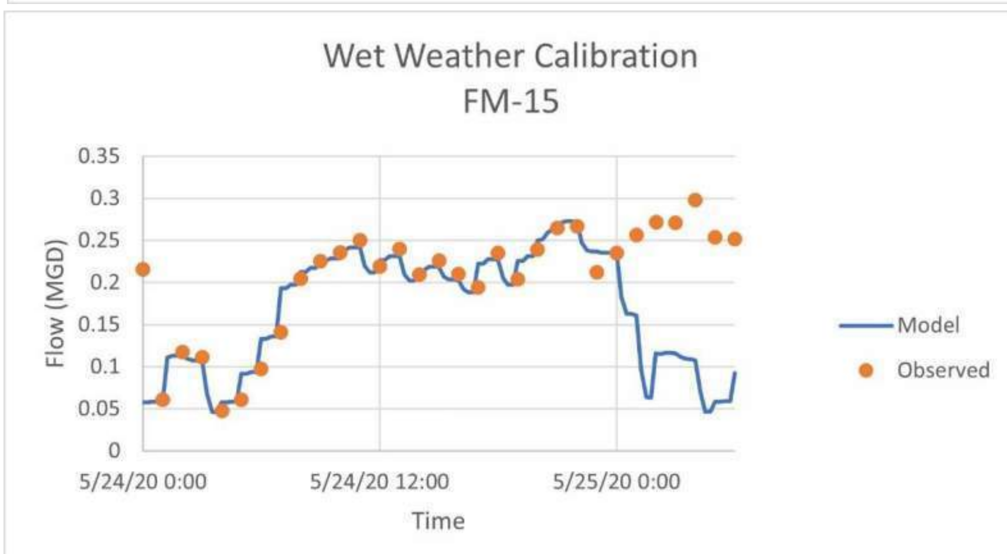
Wet Weather Calibration
FM-12
6
5
4
3
2
1
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed



Wet Weather Calibration
FM-13
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed

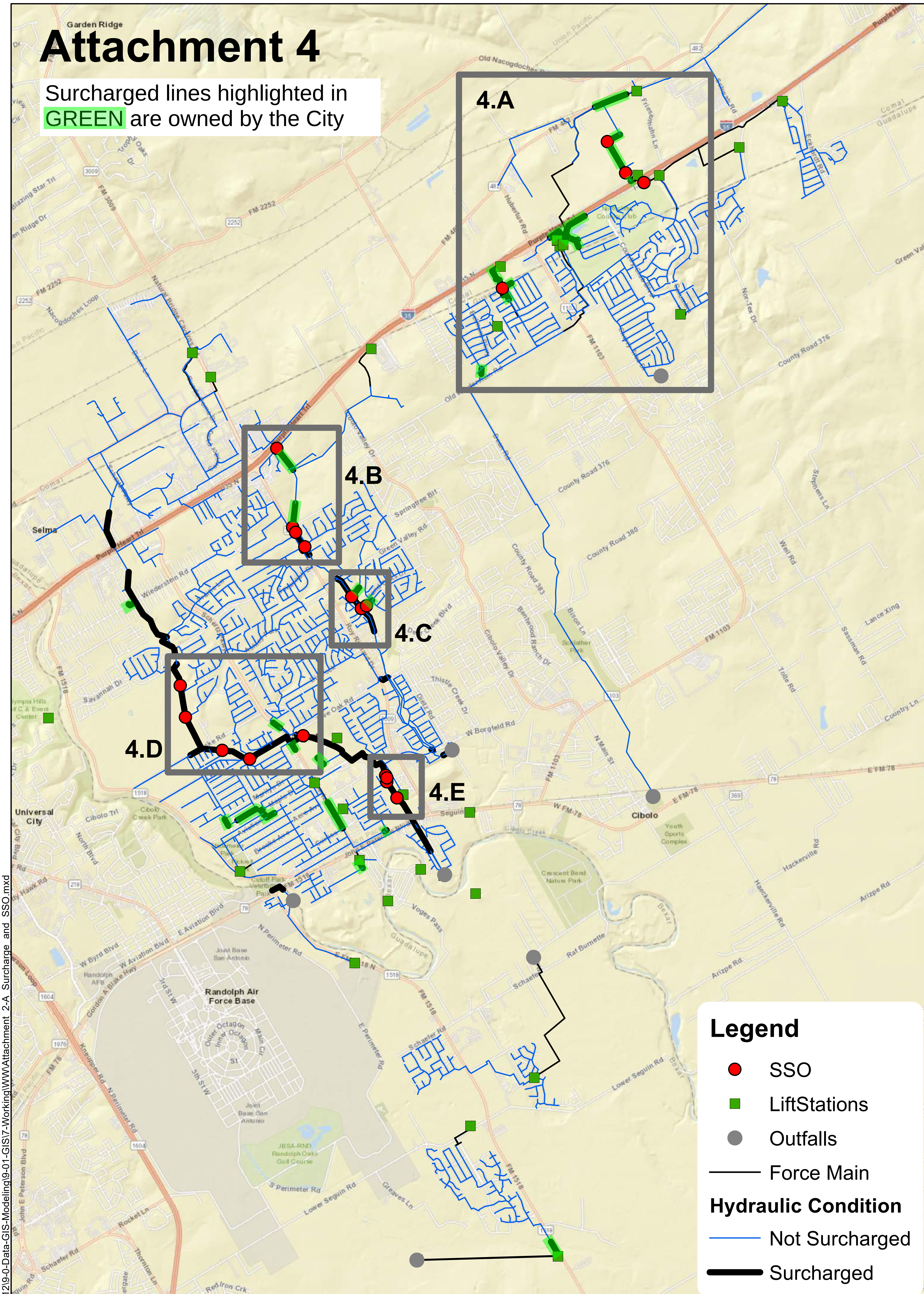


Wet Weather Calibration
FM-14
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed



Wet Weather Calibration
FM-15
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow (MGD)
5/24/20 0:00
5/24/20 12:00
5/25/20 0:00
Time
Model
Observed

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



Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022

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

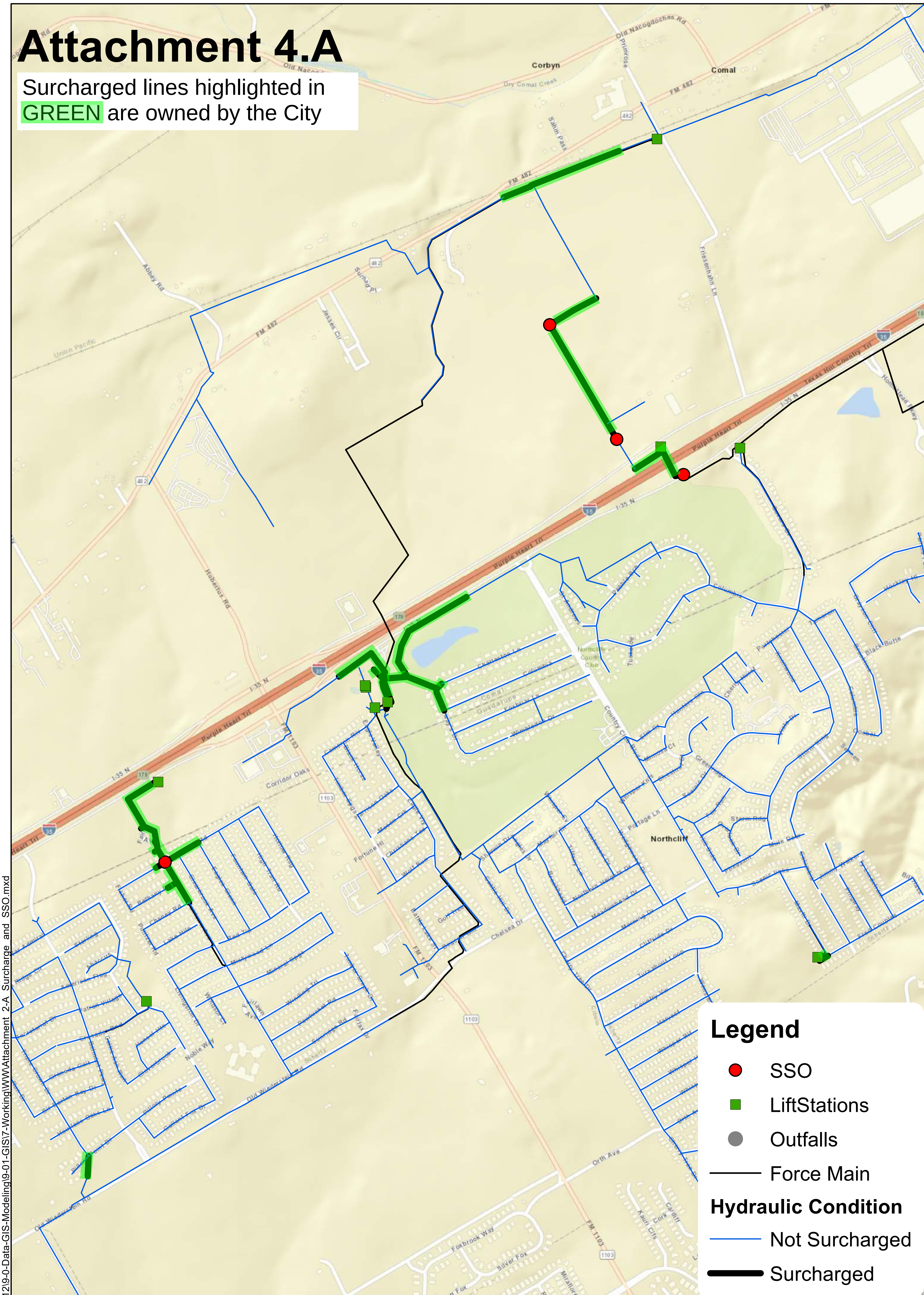
SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

0 1 2 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 2-A Surcharge and SSO.mxd

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

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N S W E

0 0.275 0.55 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 2-A Surcharge and SSO.mxd

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.
A LEO A DALY COMPANY

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 0.1 0.2 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 2-A Surcharge and SSO.mxd

Attachment 4.C

Surcharged lines highlighted in GREEN are owned by the City

Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022

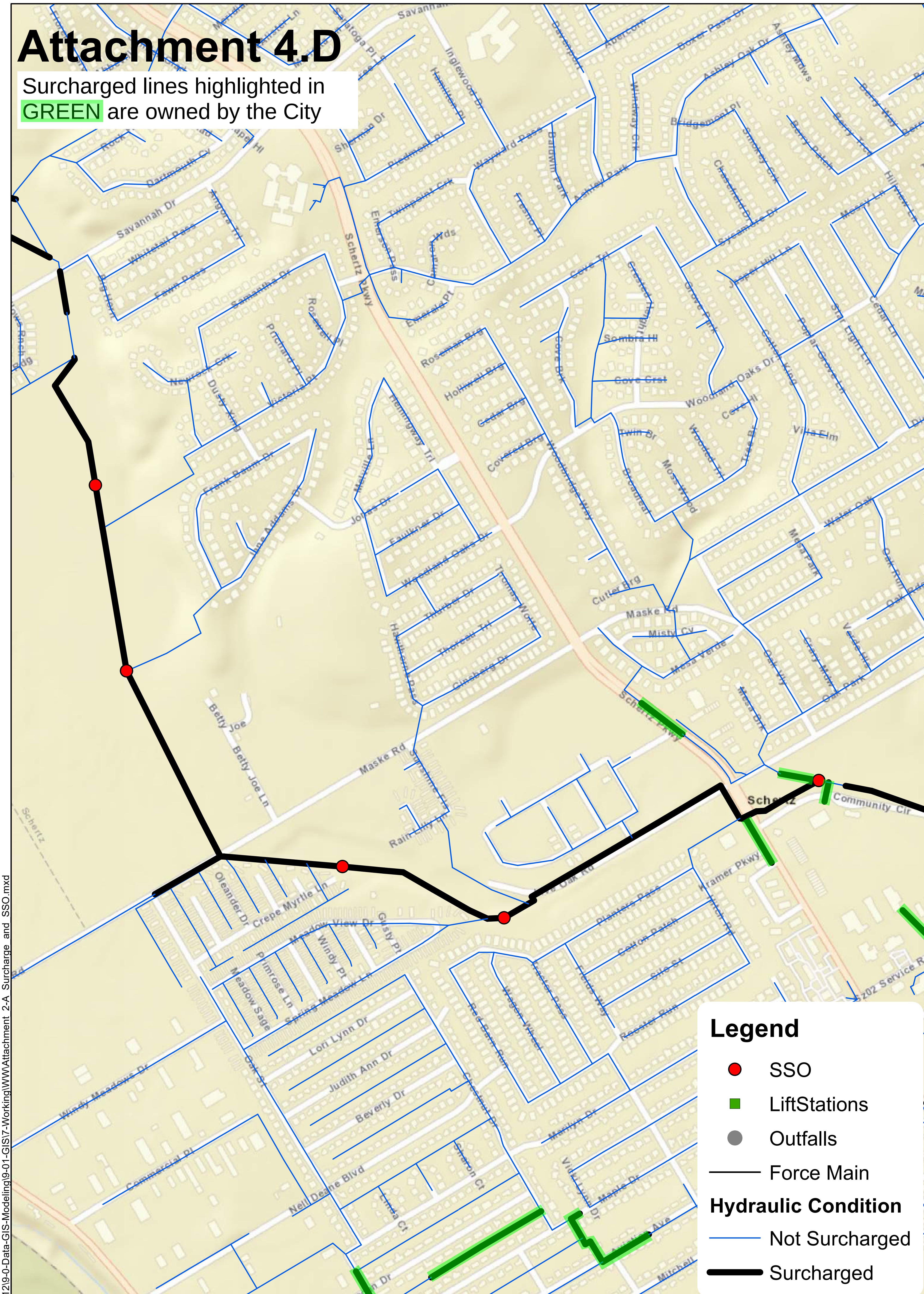
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 0.05 0.1 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 2-A Surcharge and SSO.mxd



Existing System Evaluation Results - Surcharge and SSO Locations

8/26/2022

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

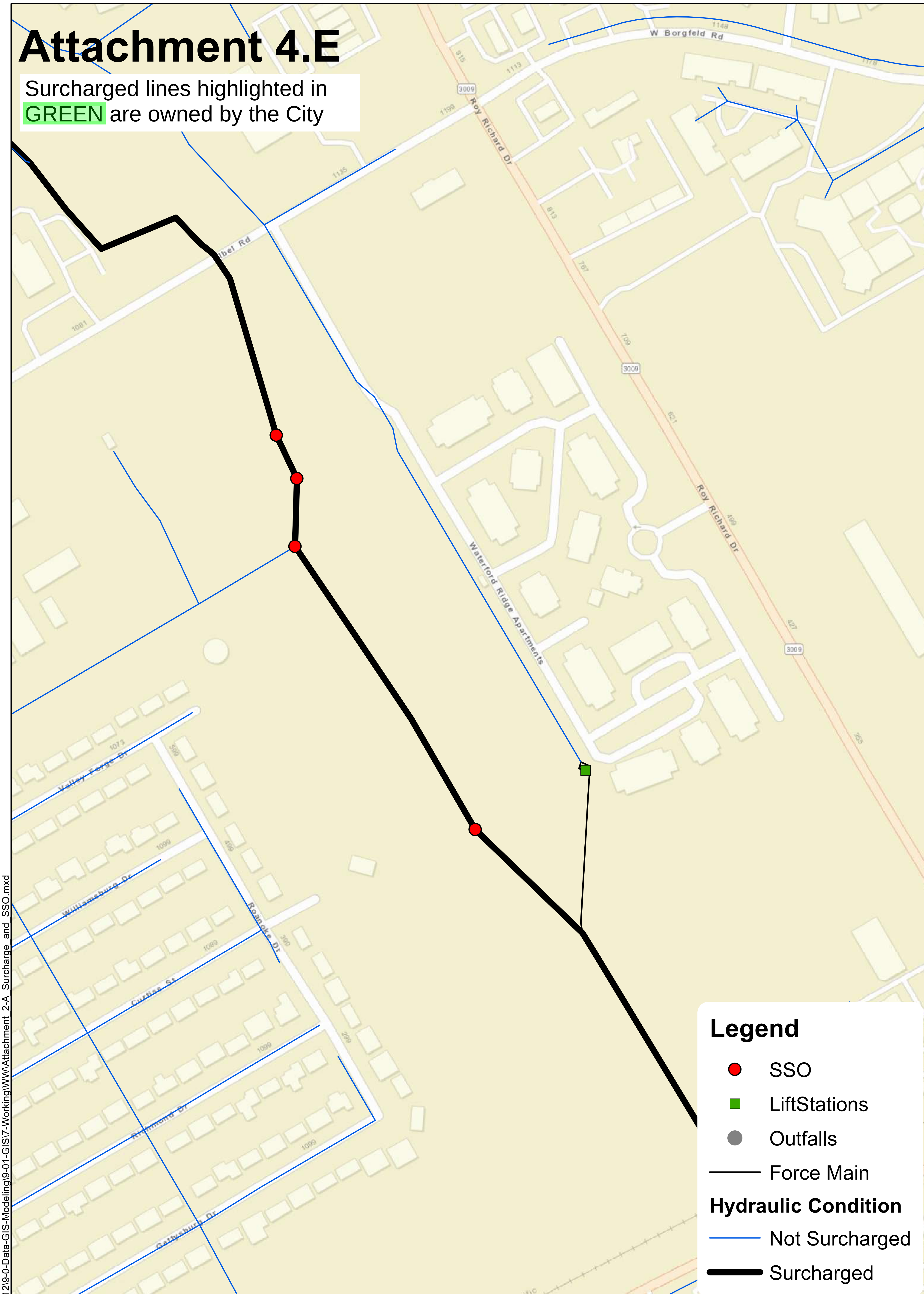
SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 0.15 0.3 Miles

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

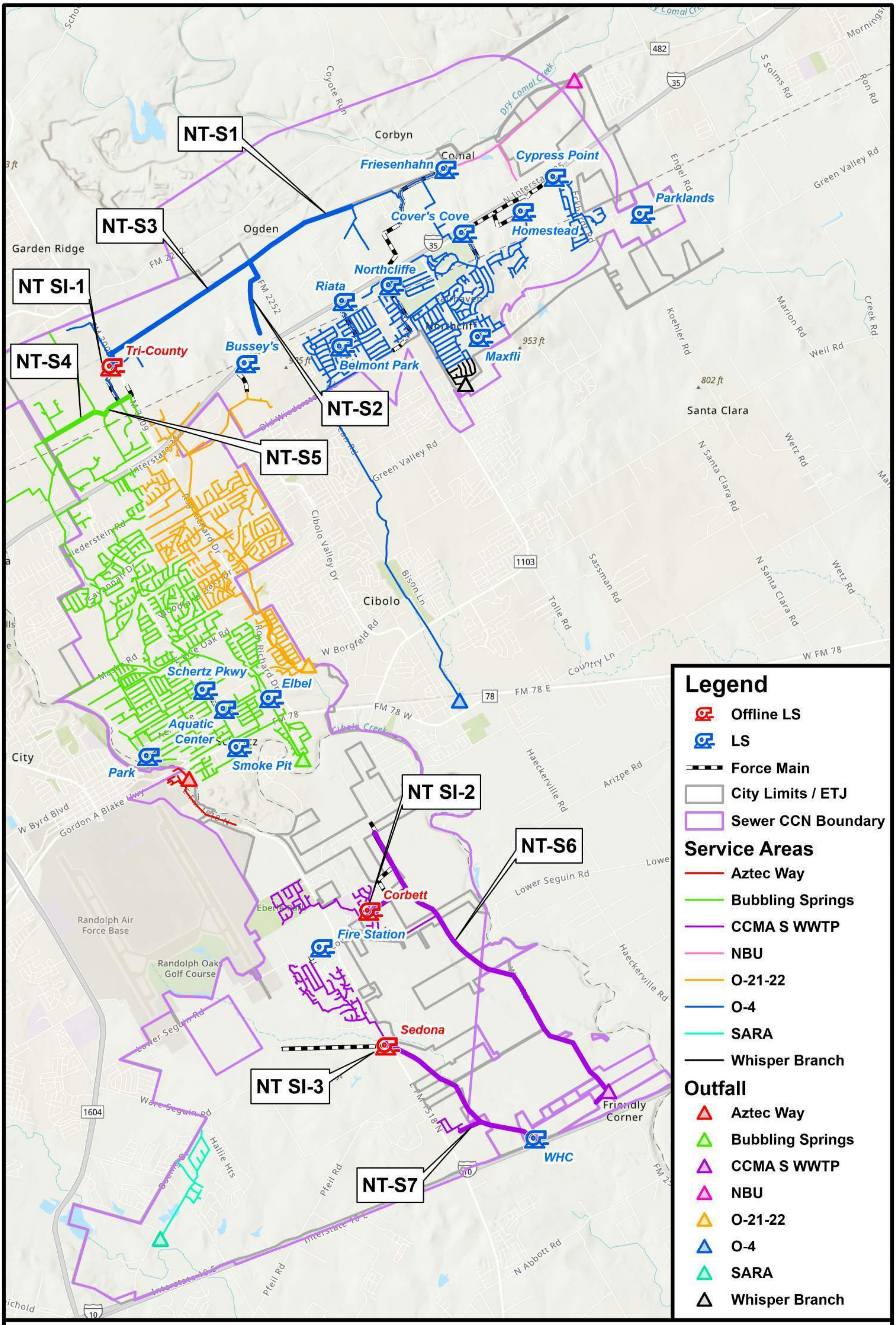
SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

N W E S

0 0.05 0.1 Miles

Document Path: N:\120\120-11816-012\9-0-Data-GIS-Modeling\9-01-GIS\7-Working\WW\Attachment 2-A Surcharge and SSO.mxd

APPENDIX 20 - NEAR TERM WASTEWATER GROWTH & SYSTEM IMPROVEMENT PROJECTS



NEAR TERM WASTE WATER GROWTH & SYSTEM IMPROVEMENT PROJECTS

LAN Planning Engineering Program Management

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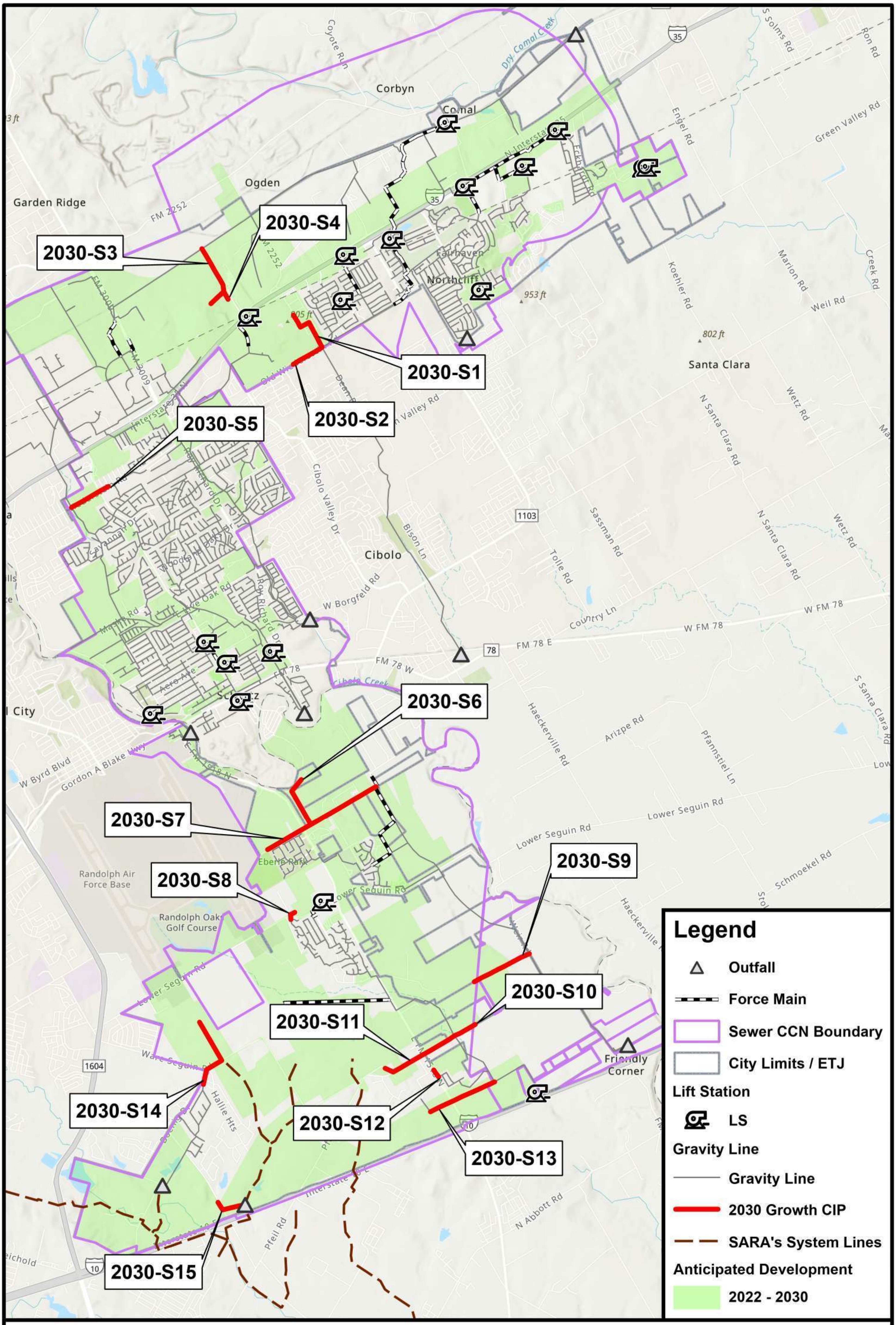
APPENDIX 21 - 2030 WASTEWATER SYSTEM GROWTH PROJECTS



2030 WASTE WATER SYSTEM GROWTH PROJECTS

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Engineering
Program Management

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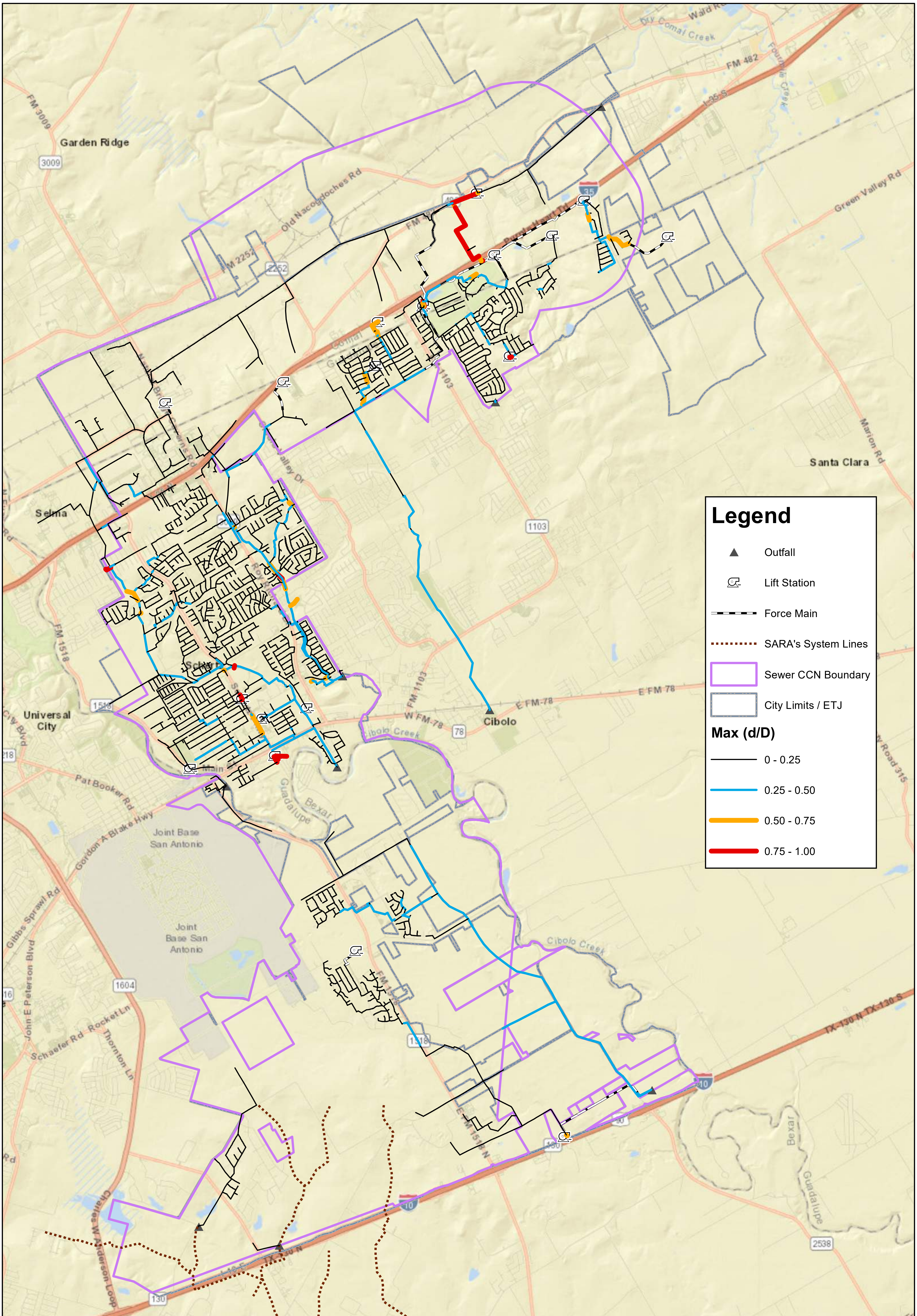
COMMUNITY. SERVICE. OPPORTUNITY.

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



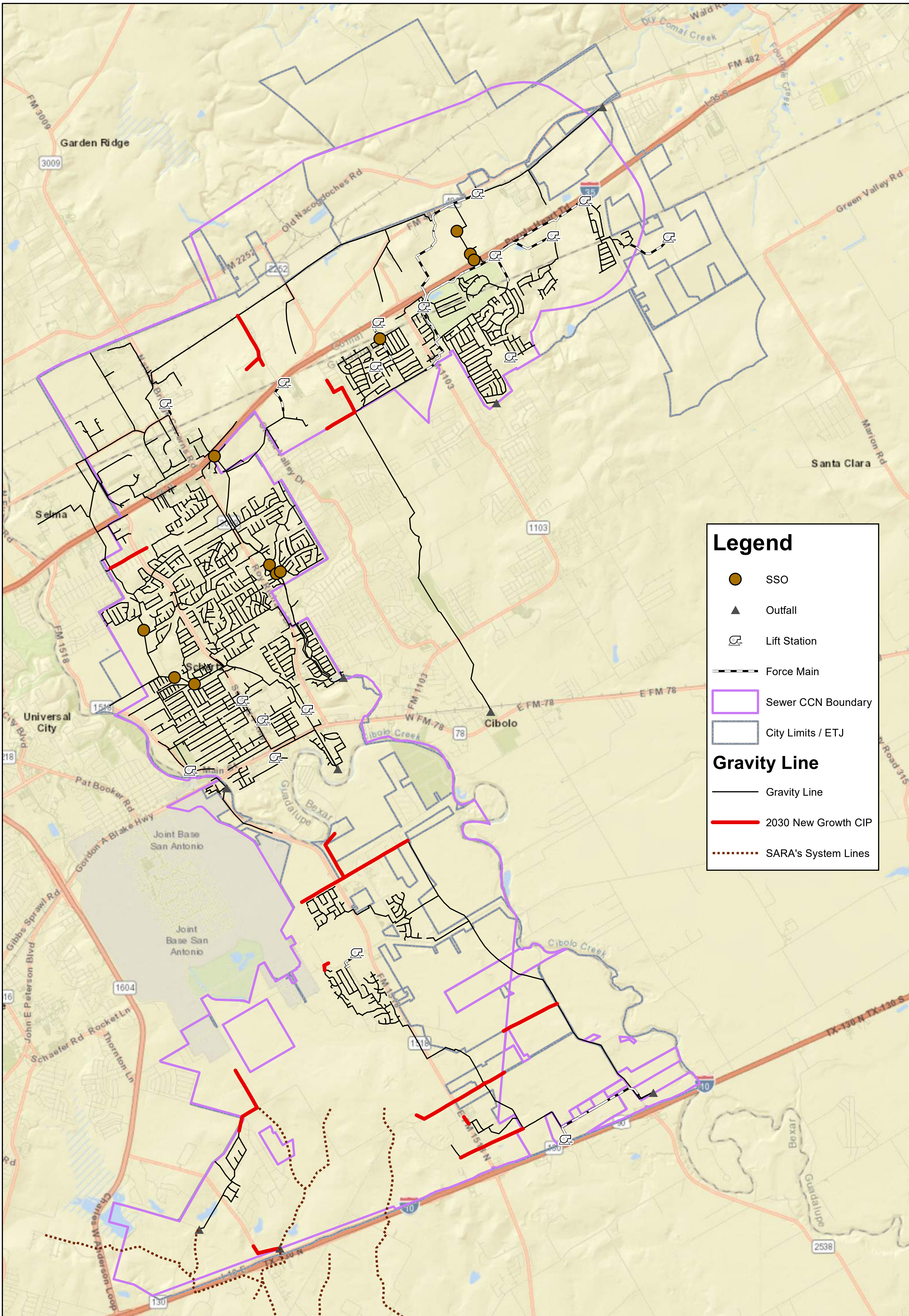
MAX DEPTH-DIAMETER (d/D) WITH 2030 DRY WEATHER FLOW

LAN

Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 23 - SANITARY SEWER OVERFLOWS WITH 2030 WET WEATHER FLOWS

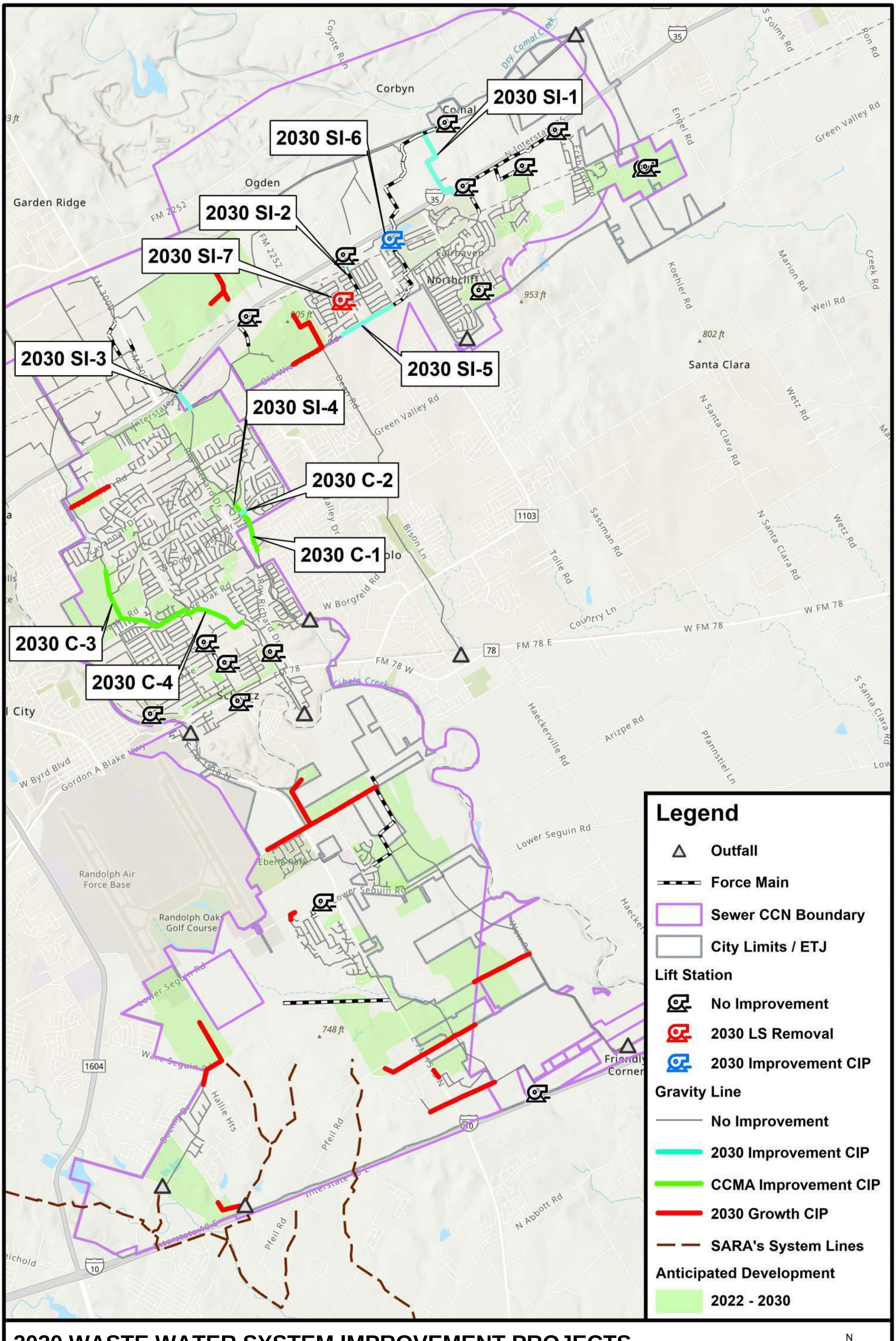


SANITARY SEWER OVERFLOWS (SSO) WITH 2030 WET WEATHER FLOWS

LAN
Planning
Engineering
Program Management

SCHERTZ
COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 24 - 2030 WASTEWATER SYSTEM IMPROVEMENT PROJECTS

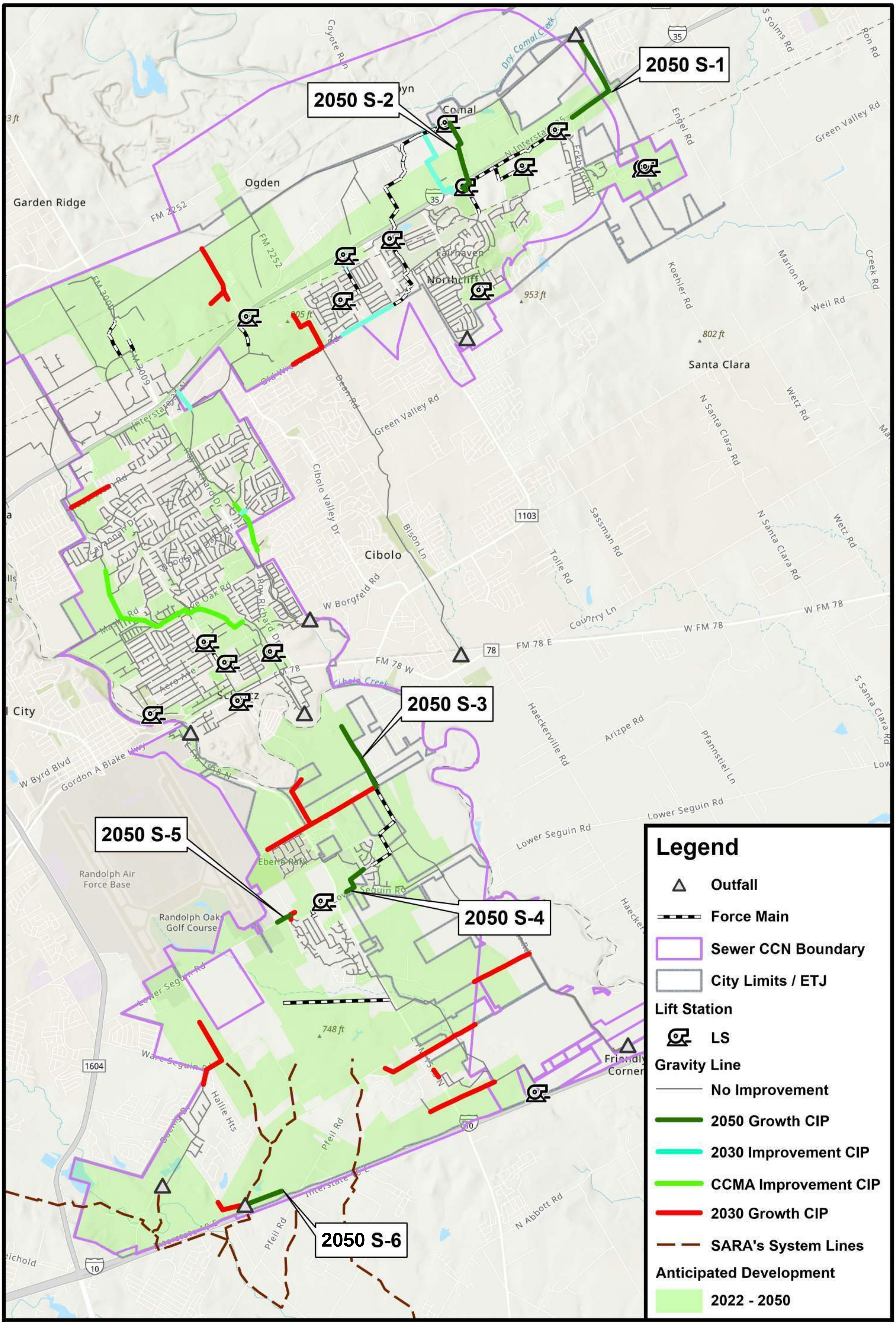


2030 WASTE WATER SYSTEM IMPROVEMENT PROJECTS

LAN Planning Engineering Program Management

SCHERTZ COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 25 - 2050 WASTEWATER SYSTEM GROWTH PROJECTS

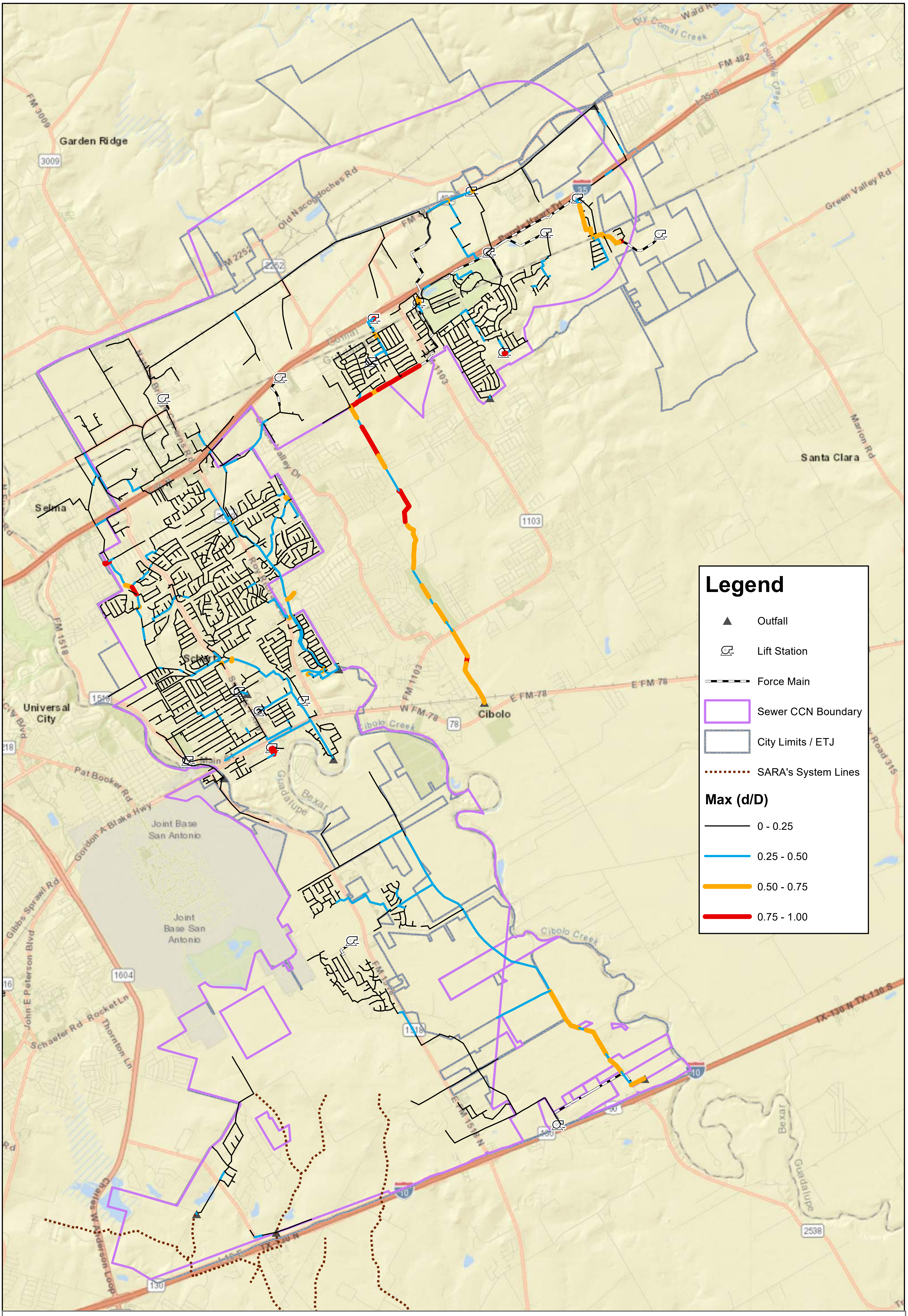


2050 WASTE WATER SYSTEM GROWTH PROJECTS

LAN Planning Engineering Program Management

SCHERTZ COMMUNITY. SERVICE. OPPORTUNITY.

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

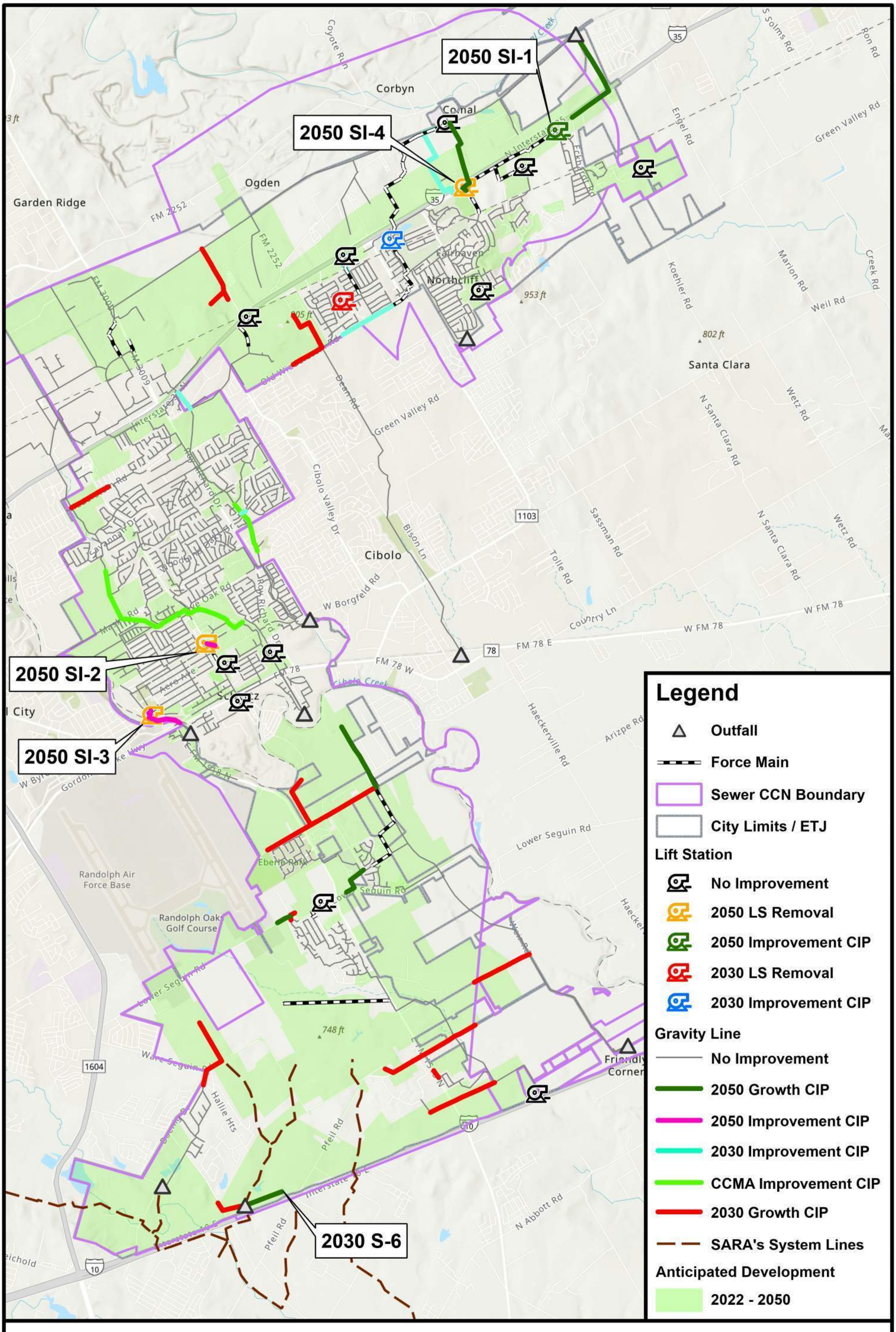


MAX DEPTH-TO-DIAMETER (d/D) WITH 2050 DRY WEATHER FLOW

LAN Planning Engineering Program Management

SCHERTZ COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 27 - 2050 WASTEWATER SYSTEM IMPROVEMENT PROJECTS



WASTE WATER SYSTEM IMPROVEMENT PROJECTS

LAN Planning Engineering Program Management

SCHERTZ COMMUNITY. SERVICE. OPPORTUNITY.

APPENDIX 28 - INFLATION RATE CALCULATION SOURCES

RSMeans 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%

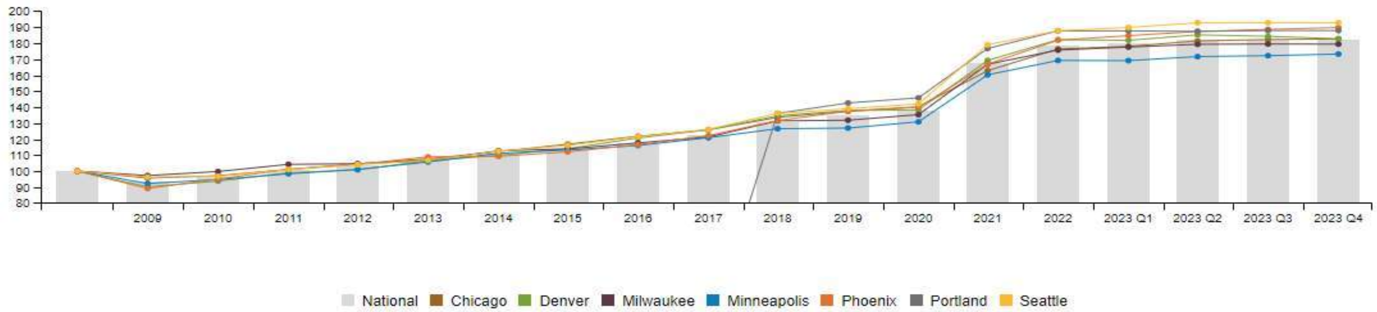
Year	National 30 City Average	Texas													
		Abilene	Amarillo	Austin	Beaumont	Corpus Christi	Dallas	El Paso	Fort Worth	Houston	Lubbock	Odessa	San Antonio	Waco	Wichita Falls
Jan 2024	295.6	246.8	252.5	253	249.3	254.9	253.4	248.8	251.3	254	252.1	251.5	249.7	251.6	245.2
2023	299.4	250.1	254.6	254.9	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	39.0	39.6	38.1	40.7	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

Mortenson Historical Inflation Indexes (Base 2009)		
Year	National Index	Difference
2023 Q4	182.5	0.1
2023 Q3	182.4	0.4
2023 Q2	182	2.3
2023 Q1	179.7	1.1
2022	178.6	11.2
2021	167.4	29.6
2020	137.8	2.8
2019	135	4.2
2018	130.8	8.5
2017	122.3	4.8
2016	117.5	3.6
2015	113.9	3
2014	110.9	3.6
2013	107.3	3.7
2012	103.6	2.6
2011	101	4.6
2010	96.4	2.6
2009	93.8	-

Time Frame	Total Inflation Rate	Yearly Inflation Rate
2020 to 2023	132%	9.65%
2010 to 2023	188%	5.93%

Overall Construction Cost Index Q4 2023

(JANUARY 2009 = 100)



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	-

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%

Quarter	Index	△%
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	△%
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

APPENDIX 29 - CIP PROJECTS COST ESTIMATES

SCHERTZ

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

Project Number	Project Name	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%	$1,438,000
2030-W3	8" WL from Ray Corbett Dr to Lower Seguin Rd	$3,688,000	97%	$3,688,000
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%	$5,213,000
2030-W8	IH-10 8" WL Improvements	$6,063,000	100%	$6,063,000
	2030 Growth Subtotal:	**$69,503,000**	-	**$66,869,073**
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%	$0
	2030 System Improvement Projects Subtotal:	**$2,738,000**	-	**$0**
	2030 TOTAL:	**$72,241,000**	-	**$68,347,606**
Proposed 2050 CIP				
Growth Projects				
2050-W1	Corbett Pump Station Expansion	$1,663,000	2050 CIP Projects are not eligible to be 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**		**$69,826,138**

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

SCHERTZ

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	$13,000,000	89%	$11,632,450
	Near Term Growth Subtotal:	**$55,360,800**	-	**$30,274,324**
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:	**$57,123,800**	-	**$30,274,324**
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 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:	**$145,459,800**		**$53,822,665**

** - 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

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Bubbling Springs 6" WL Replacement
Project Number: NT-W1**
Project Category: Water
CIP Type: System Improvement

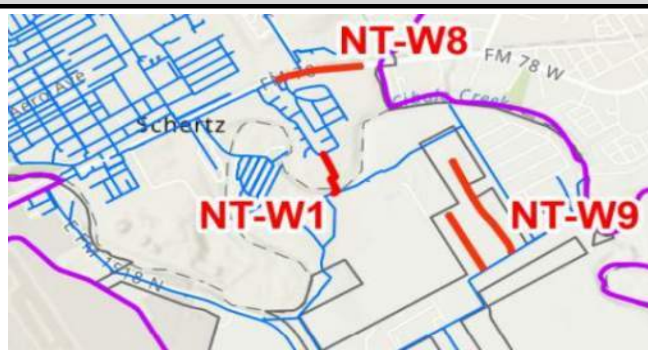
Date: August 2024
Phase: Near Term

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
Project Number: NT-W2
Project Category: Water
CIP Type: System Improvement

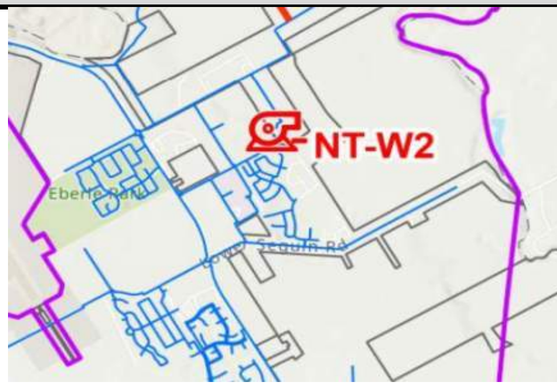
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Pump Station Operational Improvement
Project Number: NT-W3
Project Category: Water
CIP Type: System Improvement

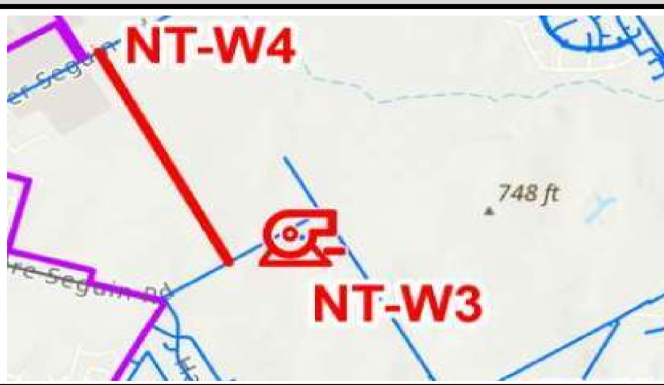
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: 12" WL from Ware Seguin to Lower Seguin
Project Number: NT-W4
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: Near Term

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Fred Couples to Schwab

Project Number: NT-W5

Project Category: Water

CIP Type: Growth

Date: August 2024

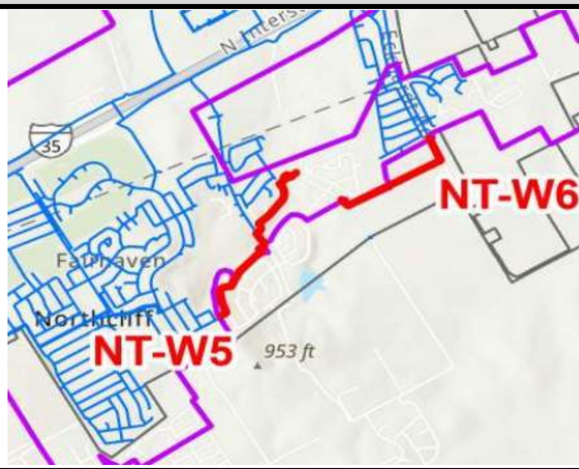
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Schwab to Eckhardt
Project Number: NT-W6
Project Category: Water
CIP Type: Growth

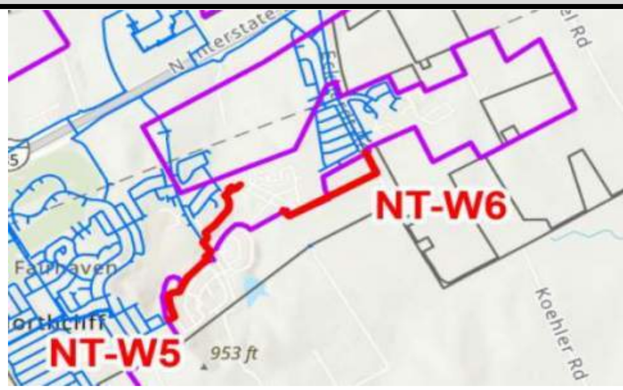
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Graytown to Pfeil
Project Number: NT-W7**
Project Category: Water
CIP Type: System Improvement

Date: August 2024
Phase: Near Term

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: FM 78 Water Line Replacement
Project Number: NT-W8**
Project Category: Water
CIP Type: System Improvement

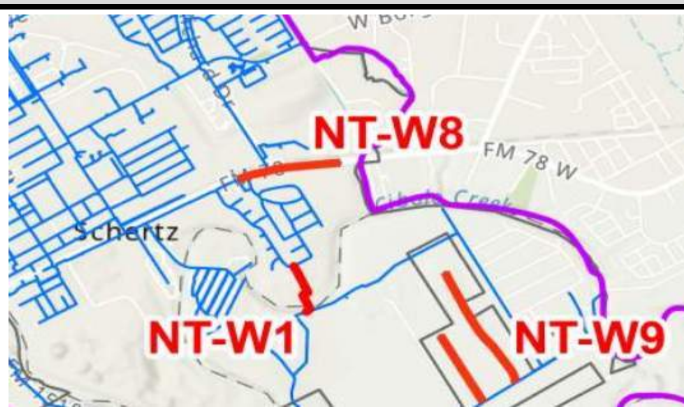
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Moonlight Meadow Dr & Lost Meadow Dr WL Replacement
Project Number: NT-W9**
Project Category: Water
CIP Type: System Improvement

Date: August 2024
Phase: Near Term

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Robinhood Way WL Replacement
Project Number: NT-W10**
Project Category: Water
CIP Type: System Improvement

Date: August 2024
Phase: Near Term

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

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: 12" WL from Tri-County Extension to Cibolo Valley Drive
Project Number: 2030-W1
Project Category: Water
CIP Type: Growth

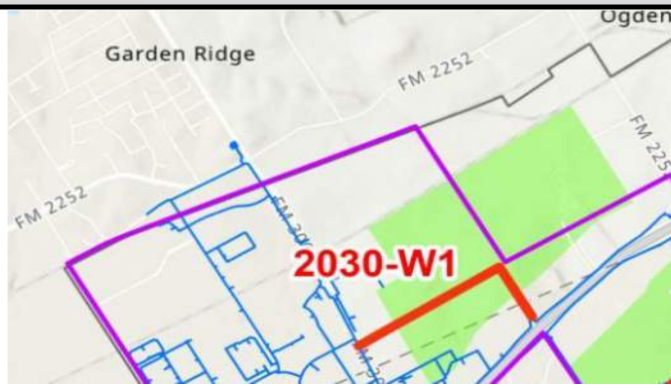
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Raf Burnette Rd 12" WL Improvements
Project Number: 2030-W2
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

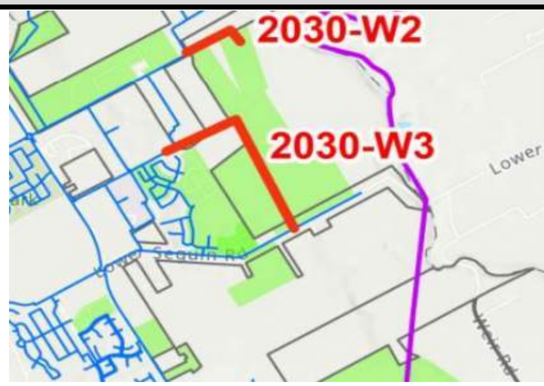
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Trainer Hale Rd 2" WL Replacement & 8" WL Improvement
Project Number: 2030-W4**
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Boenig Dr S 6" WL Replacement & 8" WL Improvement
Project Number: 2030-W5**
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Live Oak to IH-35 24" Transmission Main
Project Number: 2030-W6
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

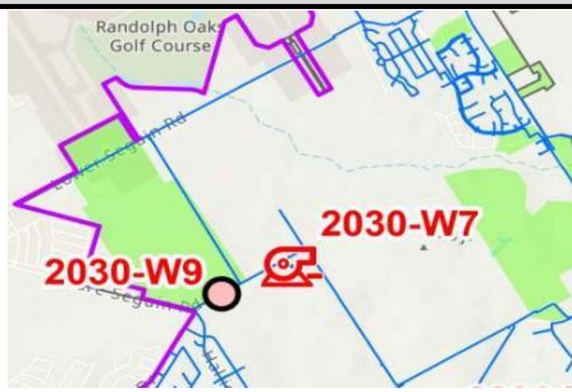
Date: August 2024
Phase: 2030

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.

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:



SCHERTZ

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

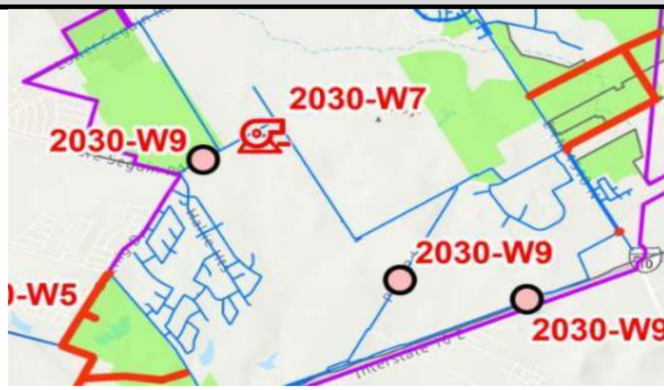
Date: August 2024
Phase: 2030

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.

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

Date: August 2024
Phase: 2030

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.

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

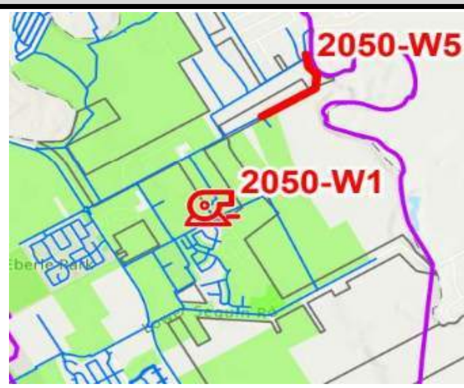
Project Name:	**Corbett Pump Station Expansion**	**Date:**	**August 2024**
Project Number:	**2050-W1**		
Project Category:	**Water**	**Phase:**	**2050**
CIP Type:	**System Improvement**		

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.

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: FM 2252 8" WL Improvements
Project Number: 2050-W2
Project Category: Water
CIP Type: System Improvement

Date: August 2024
Phase: 2050

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:

SCHERTZ

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.

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

Date: August 2024
Phase: 2050

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.

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

Date: August 2024
Phase: 2050

Project Description:
3,100 LF of new 8" along Raf Burnette east of Authority Ln.

Justification:
Needed to meet growth in area.

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

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.

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: IH-10 & FM 1518 8" WL Improvements
Project Number: 2050-W7
Project Category: Water
CIP Type: Growth

Date: August 2024
Phase: 2050

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

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

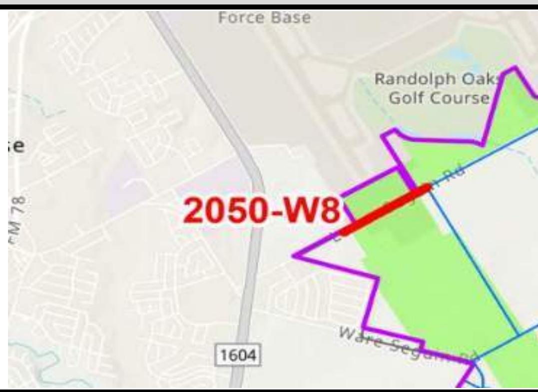
Date: August 2024
Phase: 2050

Project Description:
Upsize 2,500 LF of 8" to 12" along Lower Seguin Rd.

Justification:
Needed for fire flow.

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

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase IV 24" - Section 1
Project Number: NT-S1
Project Category: Waste Water
CIP Type: Growth

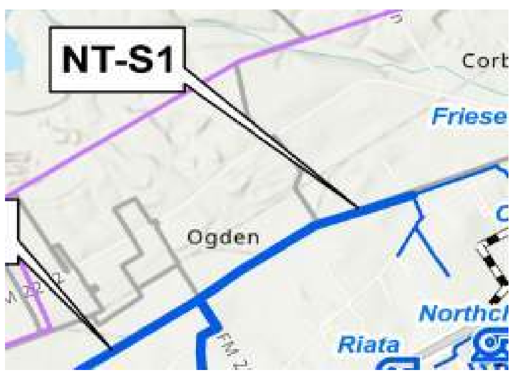
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase IV 12" - Section 2
Project Number: NT-S2
Project Category: Waste Water
CIP Type: Growth

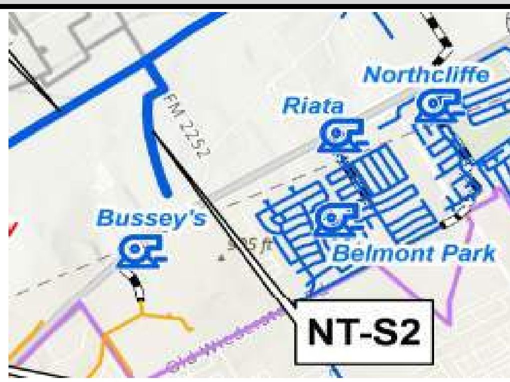
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Town Creek Phase V 24"
Project Number: NT-S3
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: Near Term

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Upsize Lookout Line
Project Number: NT-S4**
Project Category: Waste Water
CIP Type: Growth

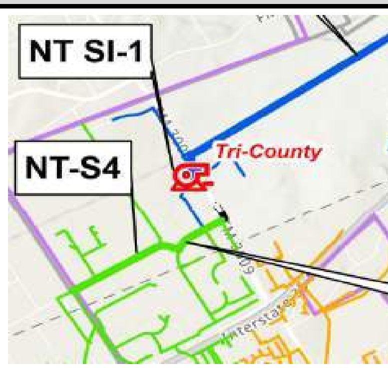
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Upsize Tri County Line
Project Number: NT-S5**
Project Category: Waste Water
CIP Type: Growth

Date: August 2024

Phase: Near Term

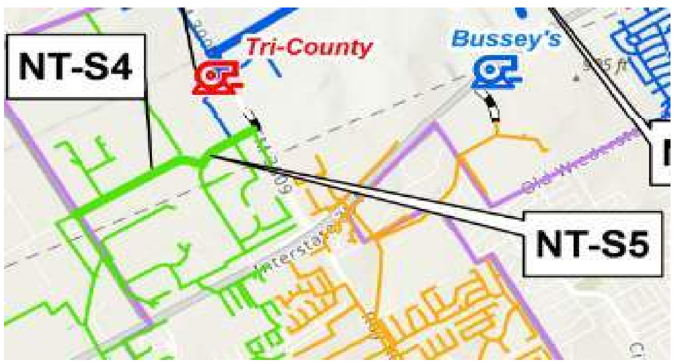
Project Description:
Tri County Line upsized from 8-inch gravity line to 18-inch gravity line (~ 1,760 LF).

Note: Costs provided by City.

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	$ 234	$ 916,000
2	Remaining Costs	LS	1	$ 1,168,800	$ 1,168,800
				ESTIMATE TOTAL PROJECT COST	$2,084,800

Project Location:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Cibolo West Main
Project Number: NT-S6
Project Category: Waste Water
CIP Type: Growth

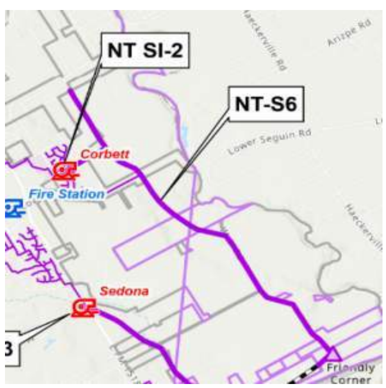
Date: August 2024
Phase: Near Term

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
Project Number: NT-S7
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: Near Term

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. Cost provided by the City.

Justification:
Anticipated growth based on Land Use Plan.

ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	TOTAL
			ESTIMATE TOTAL PROJECT COST		$13,000,000

Project Location:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Tri County Lift Station
Project Number: NT SI-1
Project Category: Waste Water
CIP Type: Lift Station Removal

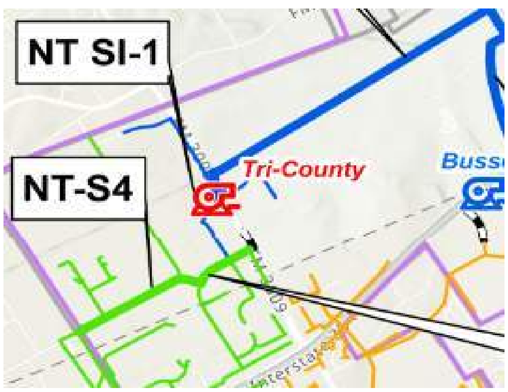
Date: August 2024
Phase: Near Term

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:



SCHERTZ

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

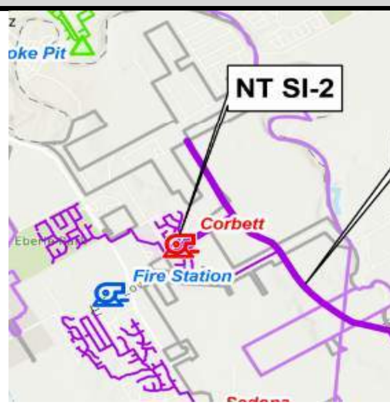
Date: August 2024
Phase: Near Term

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Sedona Lift Station & Woman Hollering Creek WWTP
Project Number: NT SI-3
Project Category: Waste Water
CIP Type: Lift Station & WWTP Removal

Date: August 2024
Phase: Near Term

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

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Hope Lane 8" Gravity Line
Project Number: 2030-S1
Project Category: Waste Water
CIP Type: Growth

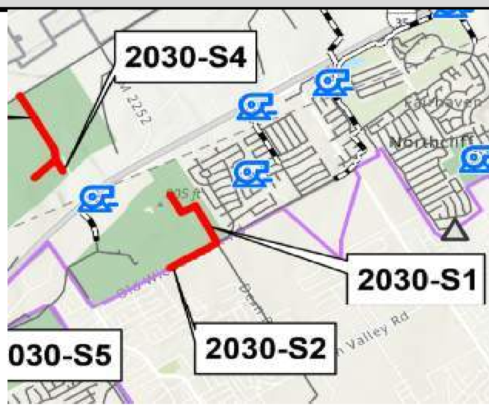
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Old Wiederstein Road 8"
Project Number: 2030-S2
Project Category: Waste Water
CIP Type: Growth

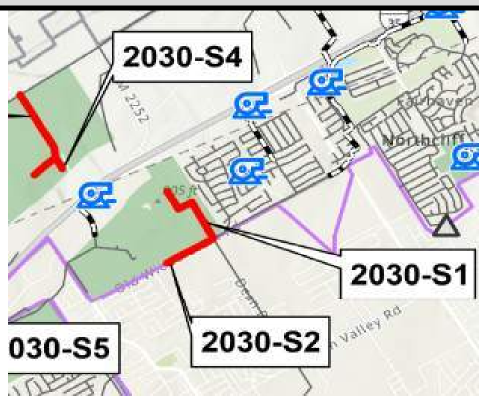
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Union Pacific Railroad 8" - Section 1
Project Number: 2030-S3
Project Category: Waste Water
CIP Type: Growth

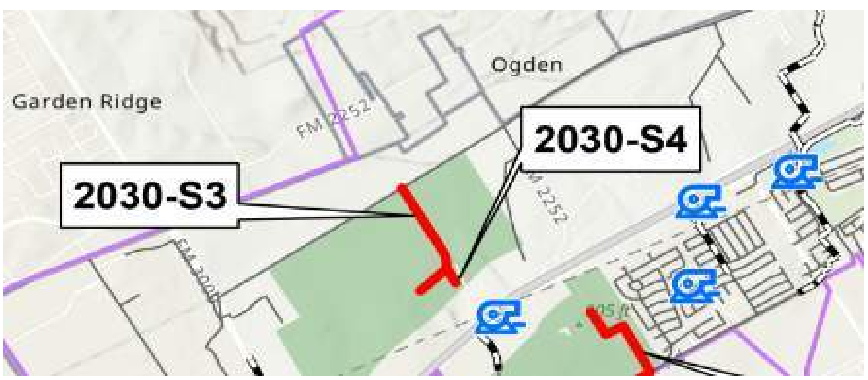
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Union Pacific Railroad 8" - Section 2
Project Number: 2030-S4
Project Category: Waste Water
CIP Type: Growth

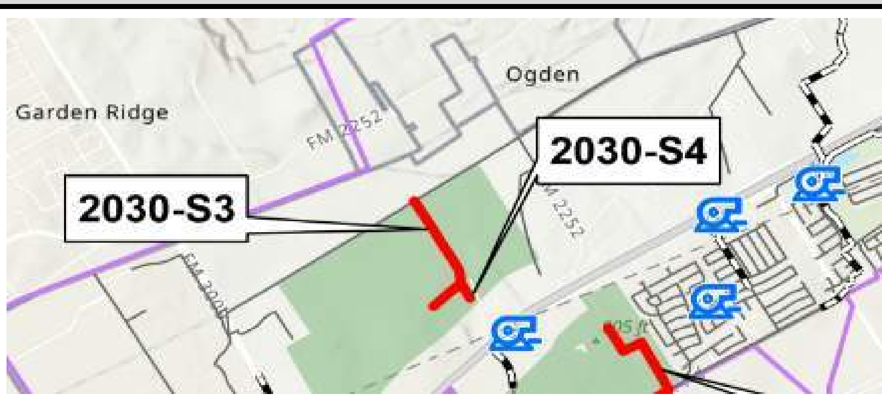
Date: August 2024
Phase: 2030

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:



SCHERTZ

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Schaefer Road 8" - Section 1
Project Number: 2030-S6
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Schaefer Road 8" - Section 2
Project Number: 2030-S7
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Aranda 8"
Project Number: 2030-S8
Project Category: Waste Water
CIP Type: Growth

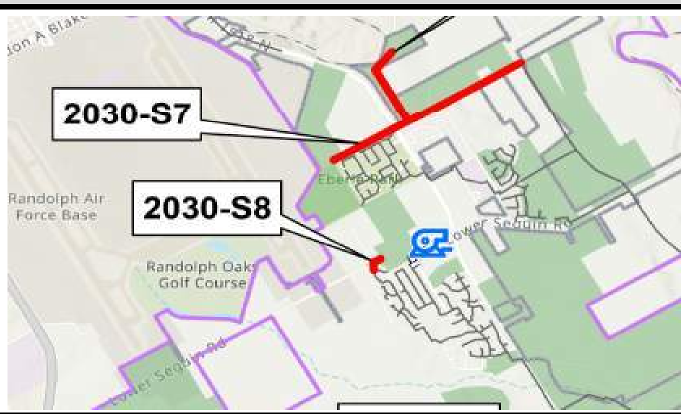
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Weir Road 10"
Project Number: 2030-S9
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: 2030

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Trainer Hale Road 10"
Project Number: 2030-S10
Project Category: Waste Water
CIP Type: Growth

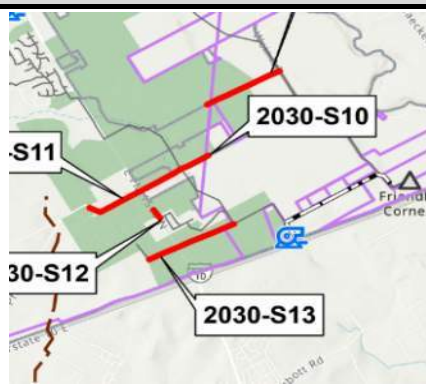
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Ware Seguin Road 8"
Project Number: 2030-S11
Project Category: Waste Water
CIP Type: Growth

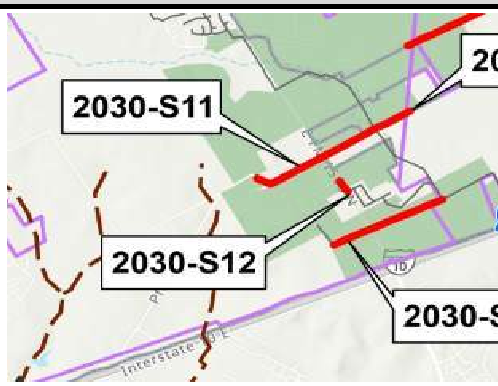
Date: August 2024
Phase: 2030

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"
Project Number: 2030-S12
Project Category: Waste Water
CIP Type: Growth

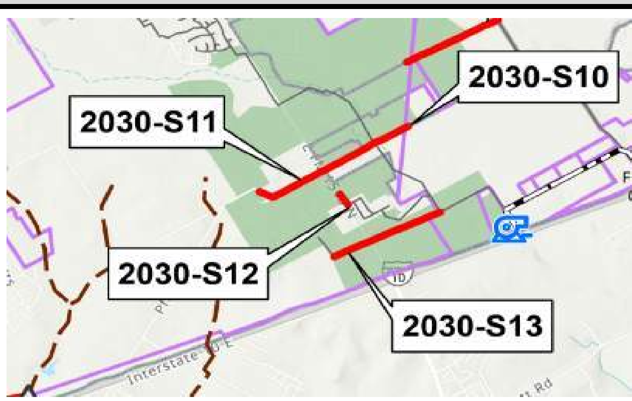
Date: August 2024
Phase: 2030

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
Project Number: 2030-S13
Project Category: Waste Water
CIP Type: Growth

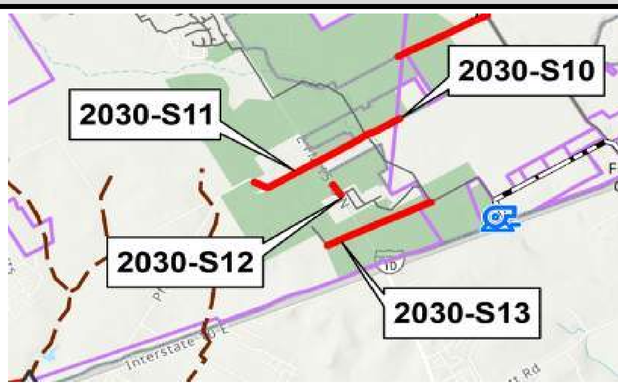
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Boenig Drive 8"
Project Number: 2030-S14
Project Category: Waste Water
CIP Type: Growth

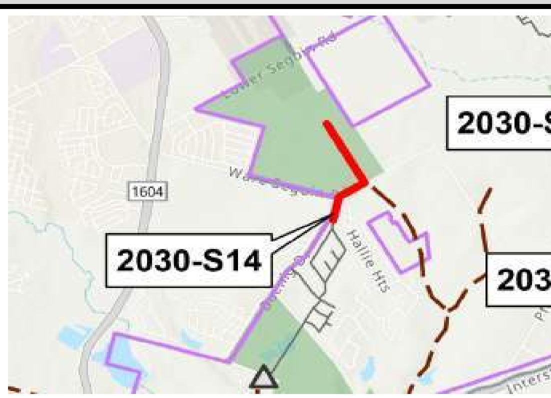
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: N Greytown Road 8"
Project Number: 2030-S15
Project Category: Waste Water
CIP Type: Growth

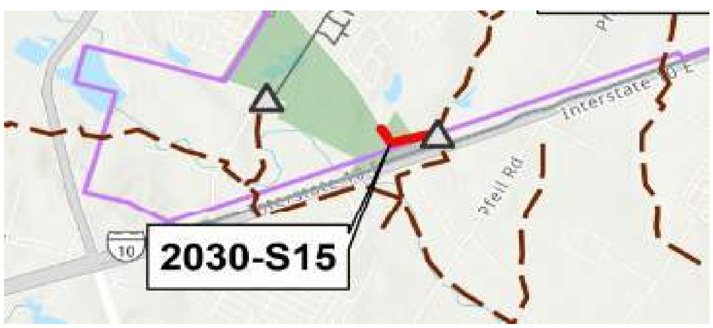
Date: August 2024
Phase: 2030

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:



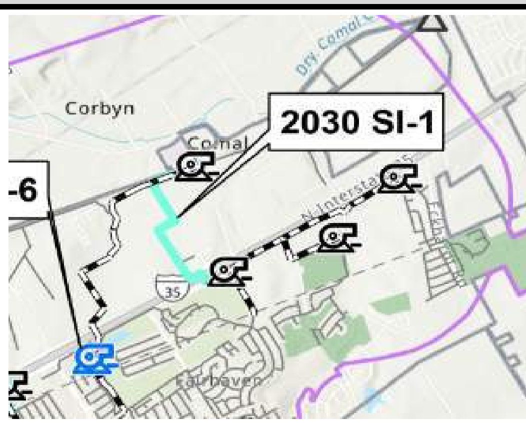
Capital Improvement Plan Estimate of Probable Cost

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:	**Justification:**
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.	**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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Fairlawn WW Upsize
Project Number: 2030 SI-2**
Project Category: Waste Water
CIP Type: System Improvement

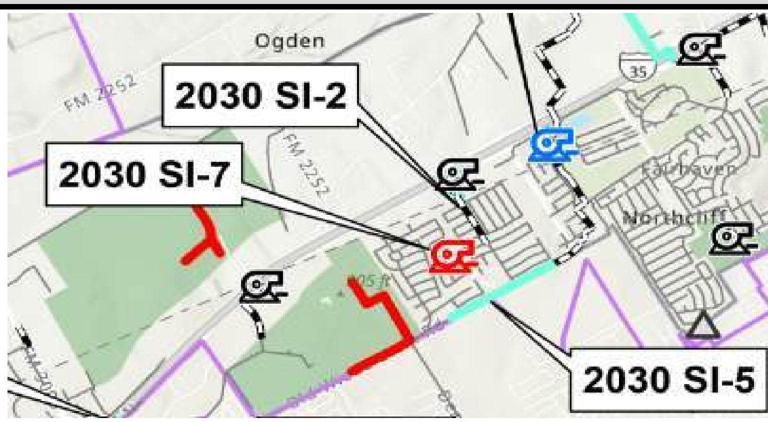
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Cibolo Crossing WW Line Upsize
Project Number: 2030 SI-3**
Project Category: Waste Water
CIP Type: System Improvement

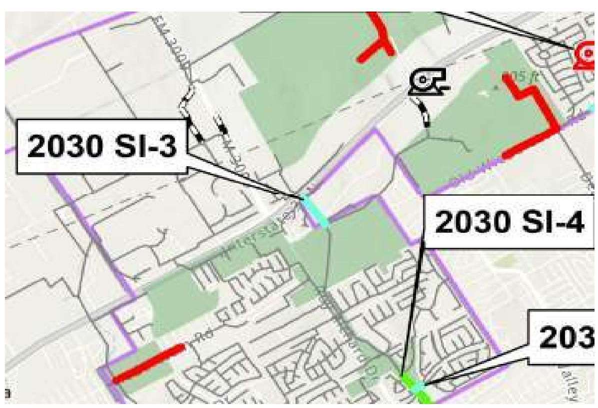
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

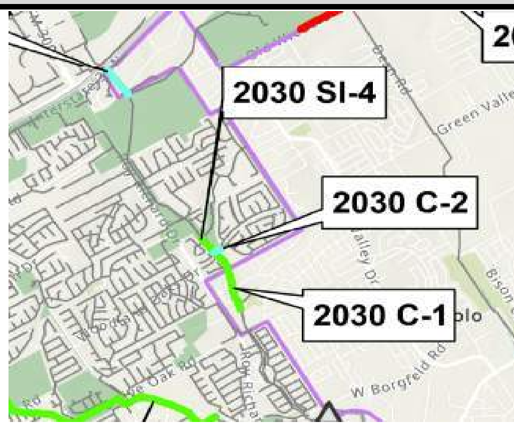
Project Name:	Woodland Oak Drive Replacements	Date:	August 2024
Project Number:	2030 SI-4**		
Project Category:	Waste Water	Phase:	2030
CIP Type:	System Improvement		

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
Project Number: 2030 SI-5**
Project Category: Waste Water
CIP Type: System Improvement

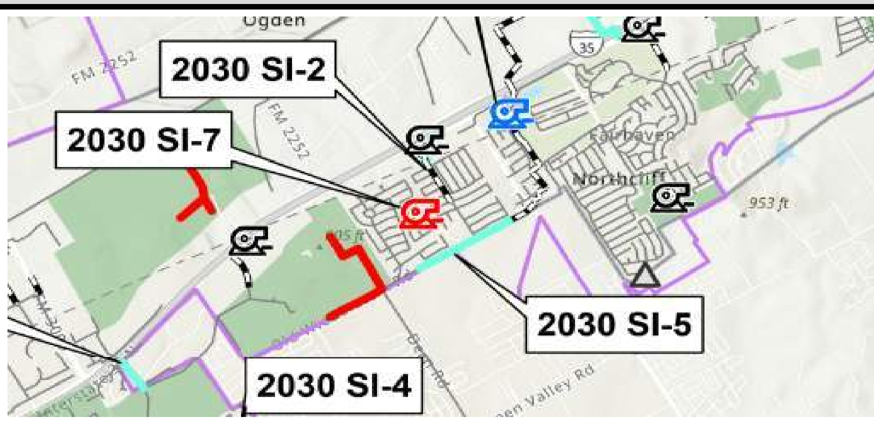
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Northcliffe Lift Station Upgrade
Project Number: 2030 SI-6**
Project Category: Waste Water
CIP Type: System Improvement

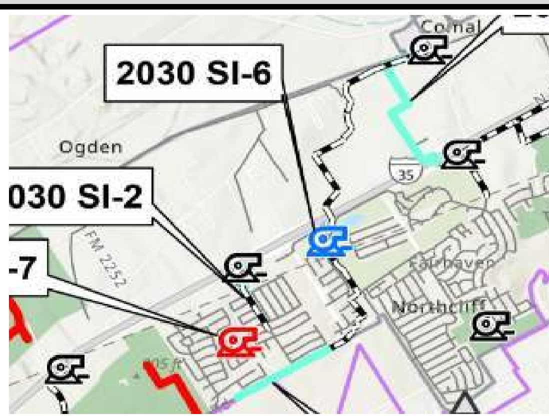
Date: August 2024
Phase: 2030

Project Description:
Northcliffe LS upgrade 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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Belmont Park Lift Station
Project Number: 2030 SI-7
Project Category: Waste Water
CIP Type: Lift Station Removal

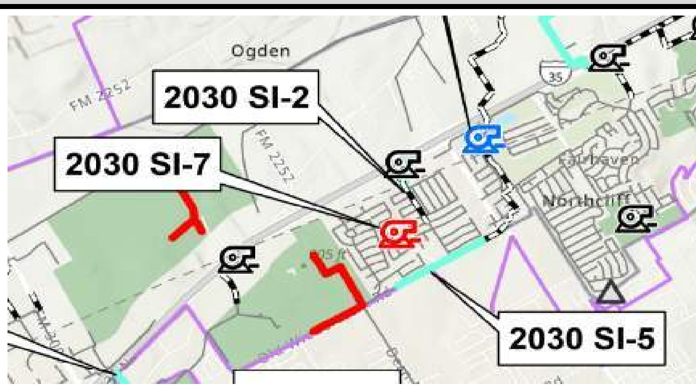
Date: August 2024
Phase: 2030

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
Project Number: 2030 C-1
Project Category: Waste Water
CIP Type: CCMA System Capacity

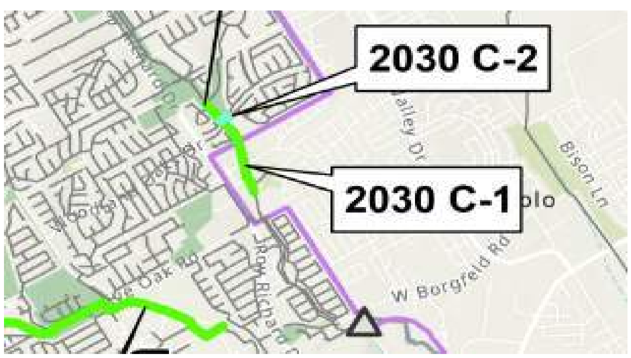
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Valencia Lane Replacements
Project Number: 2030 C-2
Project Category: Waste Water
CIP Type: CCMA System Capacity

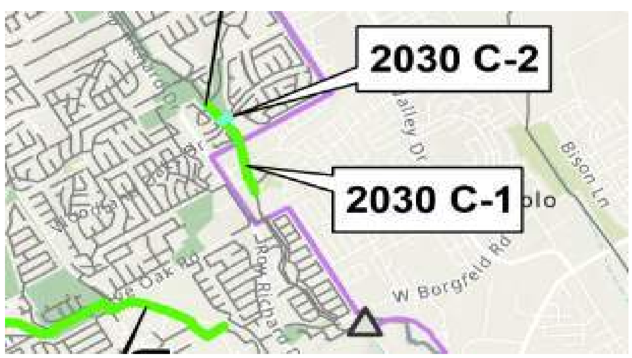
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Savannah Drive Replacements
Project Number: 2030 C-3
Project Category: Waste Water
CIP Type: CCMA System Capacity

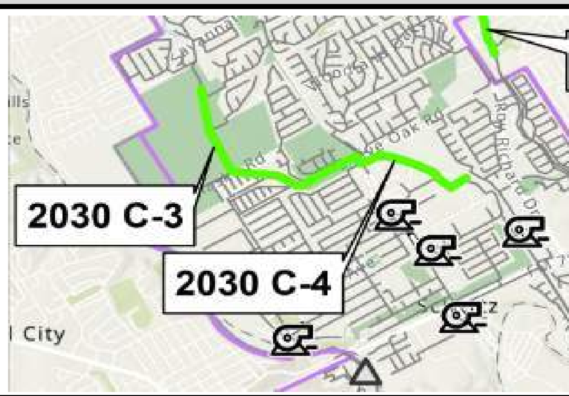
Date: August 2024
Phase: 2030

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Build Out Project 25 - 36" Schertz Line
Project Number: 2030 C-4
Project Category: Waste Water
CIP Type: CCMA System Capacity

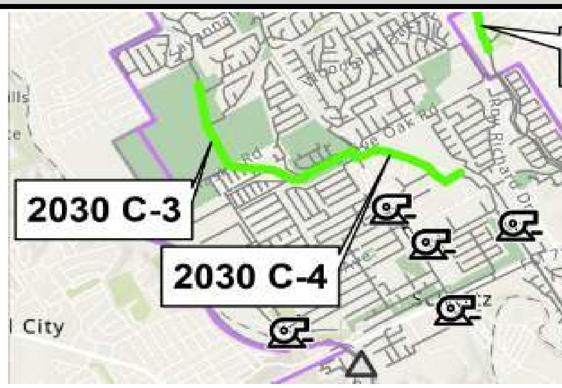
Date: August 2024
Phase: 2030

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

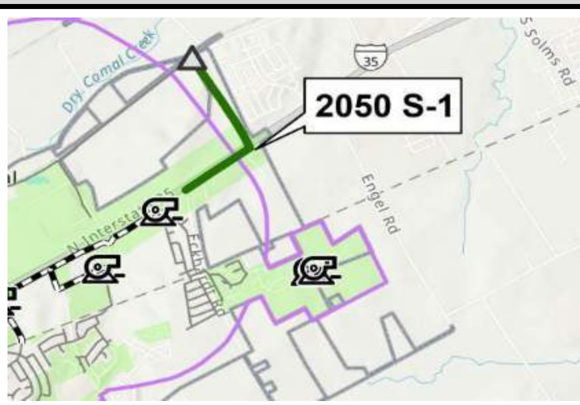
Project Name:	I-35 N 8"
Project Number:	2050-S1
Project Category:	Waste Water
CIP Type:	Growth
Date:	August 2024
Phase:	2050

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Friesenhahn Lane 8"
Project Number: 2050-S2
Project Category: Waste Water
CIP Type: Growth

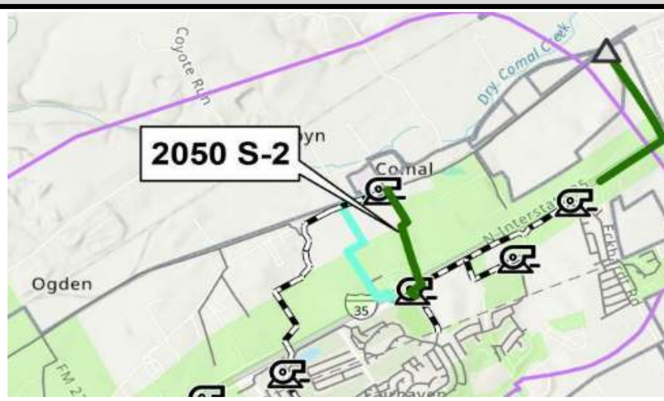
Date: August 2024
Phase: 2050

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
Project Number: 2050-S3
Project Category: Waste Water
CIP Type: Growth

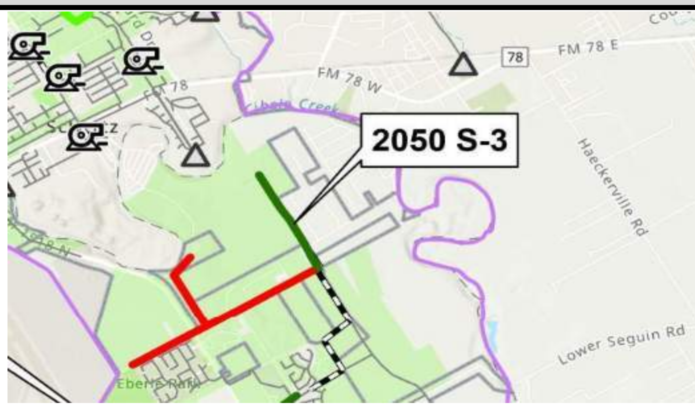
Date: August 2024
Phase: 2050

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Corbett JH 8"
Project Number: 2050-S4
Project Category: Waste Water
CIP Type: Growth

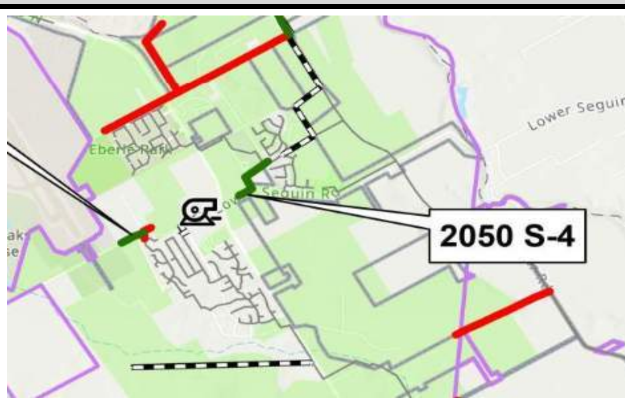
Date: August 2024
Phase: 2050

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Lower Seguin Road 8"
Project Number: 2050-S5
Project Category: Waste Water
CIP Type: Growth

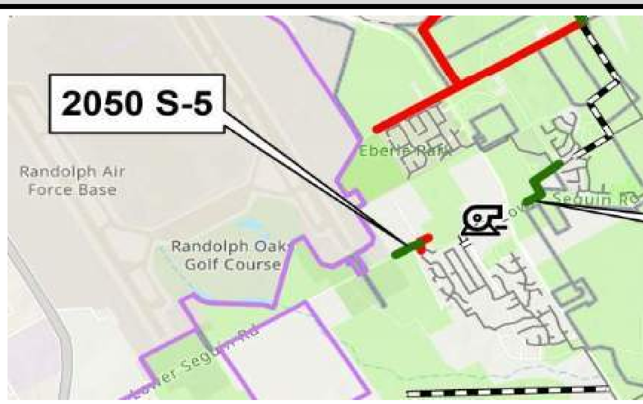
Date: August 2024
Phase: 2050

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
Project Number: 2050-S6
Project Category: Waste Water
CIP Type: Growth

Date: August 2024
Phase: 2050

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:

SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Cypress Point Lift Station Upgrade
Project Number: 2050 SI-1
Project Category: Waste Water
CIP Type: System Improvement

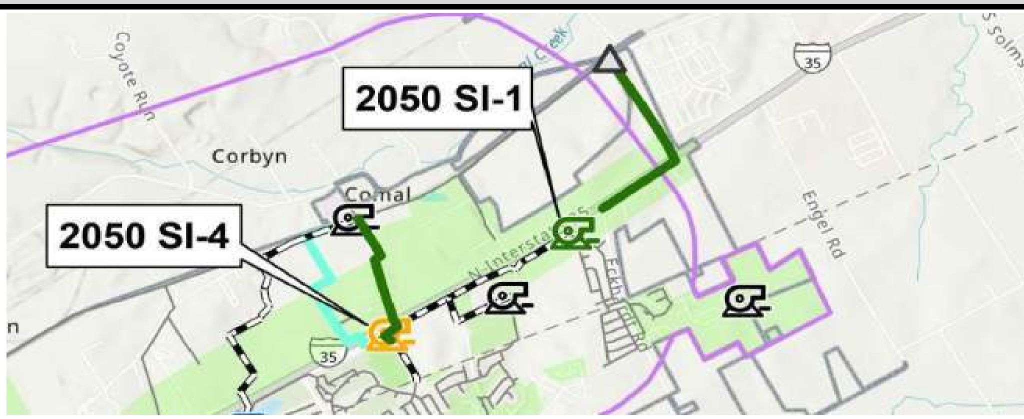
Date: August 2024
Phase: 2050

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:



SCHERTZ

Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Schertz Parkway Lift Station

Project Number: 2050 SI-2

Project Category: Waste Water

CIP Type: Lift Station Removal

Date: August 2024

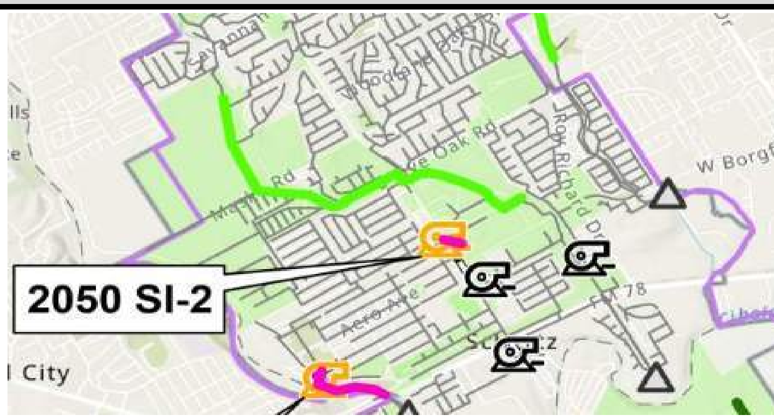
Phase: 2050

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:



SCHERTZ

LAN

Capital Improvement Plan Estimate of Probable Cost

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

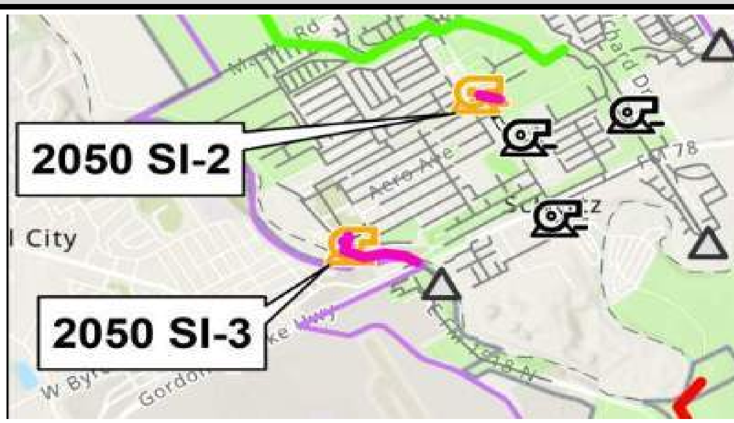
Date: August 2024
Phase: 2050

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.

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:



Capital Improvement Plan Estimate of Probable Cost

Project Name: Decommission Cover's Cove Lift Station
Project Number: 2050 SI-4
Project Category: Waste Water
CIP Type: Lift Station Removal

Date: August 2024
Phase: 2050

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:

APPENDIX 30 - CIP PROJECTS UTILIZATION CALCULATIONS

City of Schertz 2024 Impact Fee Update Water CIP Project Growth Utilization Calculations					
Project Number	**Project Name**	**Existing Peak Flow (gpm)**	**2030 Peak Flow (gpm)**	**2050 Peak Flow (gpm)**	**2020-2030 % Utilization**
Near Term CIP					
System Improvement Projects					
NT-W1**	Bubbling Springs 6" WL Replacement	185.86	269.83	309.94	27%
NT-W2	Corbett Pump Station & 3.0 MG GST	N/A	N/A	N/A	N/A
NT-W3	Ware Seguin Pump Station Operational Improvement	N/A	N/A	N/A	N/A
NT-W4	12" WL from Ware Seguin to Lower Seguin	N/A	N/A	N/A	N/A
NT-W5	Fred Couples to Schwab	N/A	N/A	N/A	N/A
NT-W6	Schwab to Eckhardt	N/A	N/A	N/A	N/A
NT-W7**	Graytown to Pfeil	-	32.61	46.93	69%
NT-W8**	FM 78 Water Line Replacement	369.10	500.30	589.39	22%
NT-W9**	Moonlight Meadow Dr & Lost Meadow Dr WL Replacement	18.83	18.83	18.83	0%
NT-W10**	Robinhood Way WL Replacement	46.06	46.06	46.06	0%
Proposed 2030 CIP					
Growth Projects					
2030-W1	12" WL from Tri-County Extension to Cibolo Valley Drive	-	316.47	229.95	100%
2030-W2	Raf Burnette Rd 12" WL Improvements	-	177.06	200.02	89%
2030-W3	8" WL from Ray Corbett Dr to Lower Seguin Rd	-	594.20	613.97	97%
2030-W4**	Trainer Hale Rd 2" WL Replacement & 8" WL Improvement	-	530.42	568.37	93%
2030-W5**	Boenig Dr S 6" WL Replacement & 8" WL Improvement	2.43	117.51	166.63	69%
2030-W6	Live Oak to IH-35 24" Transmission Main	-	5,346.49	4,000.00	100%
2030-W7	Ware Seguin Pump Station Expansion Phase 1	600.00	1,000.00	1,200.00	33%
2030-W8	IH-10 8" WL Improvements	-	15.11	11.35	100%
System Improvement Projects					
2030-W9	PRV Installation for Proposed Southwest Pressure Plane	N/A	N/A	N/A	N/A
2030-W10**	River Rd 6" WL Replacement	115.65	311.01	335.23	58%

N/A indicates that the project is not eligible to be included for impact fees.

Utilizations in red indicate that it is an adjusted value because it was over 100% due to the build out flow occuring in 2030 instead of 2050.

City of Schertz 2024 Impact Fee Update Wastewater CIP Project Growth Utilization Calculations					
Project Number	**Project Name**	**Existing Peak Flow (gpm)**	**2030 Peak Flow (gpm)**	**2050 Peak Flow (gpm)**	**2020-2030 % Utilization**
Near Term CIP					
Growth Projects					
NT-S1	Town Creek Phase IV 24" - Section 1	-	33.20	158.4	21%
NT-S2	Town Creek Phase IV 12" - Section 2	-	-	11.6	0%
NT-S3	Town Creek Phase V 24"	-	33.20	145.5	23%
NT-S4**	Upsize Lookout Line	275.40	223.80	256.6	20%
NT-S5**	Upsize Tri County Line	273.90	216.00	229.1	25%
NT-S6	Cibolo West Main	-	1,052.90	1,262.3	83%
NT-S7	Woman Hollering Creek Lift Station, Gravity Lines, and Force Main	-	702.60	785.2	89%
System Improvement Projects					
NT SI-1	Decommission Tri County Lift Station	N/A	N/A	N/A	N/A
NT SI-2	Decommission Corbett Lift Station	N/A	N/A	N/A	N/A
NT SI-3	Decommission Sedona Lift Station & Woman Hollering Creek WWTP	N/A	N/A	N/A	N/A
Proposed 2030 CIP					
Growth Projects					
2030-S1	Hope Lane 8" Gravity Line	-	59.40	88.50	67%
2030-S2	Old Wiederstein Road 8"	-	0.53	10.30	5%
2030-S3	Union Pacific Railroad 8" - Section 1	-	11.60	119.30	10%
2030-S4	Union Pacific Railroad 8" - Section 2	-	5.50	46.10	12%
2030-S5	Wiederstein Road 8"	-	160.90	195.00	83%
2030-S6	Schaefer Road 8" - Section 1	-	42.30	128.80	33%
2030-S7	Schaefer Road 8" - Section 2	-	7.20	7.20	100%
2030-S8	Aranda 8"	-	3.20	3.20	100%
2030-S9	Weir Road 10"	-	597.00	597.60	100%
2030-S10	Trainer Hale Road 10"	-	31.90	32.00	100%
2030-S11	Ware Seguin Road 8"	-	122.60	126.70	97%
2030-S12	FM 1518 8"	-	9.80	24.50	40%
2030-S13	I-10 8" - Section 1	-	67.20	68.10	99%
2030-S14	Boenig Drive 8"	-	12.30	42.90	29%
2030-S15	N Greytown Road 8"	-	45.70	88.10	52%
System Improvement Projects					
2030 SI-1**	Friesenhahn West Line WW Upsize	769.20	1,114.10	1,538.10	22%
2030 SI-2**	Fairlawn WW Upsize	658.40	722.70	727.20	9%
2030 SI-3**	Cibolo Crossing WW Line Upsize	1,439.40	1,382.60	1,576.50	4%
2030 SI-4**	Woodland Oak Drive Replacements	784.00	820.60	900.30	4%
2030 SI-5**	Old Wiederstein WW Upsize	1,908.30	5,034.00	5,092.50	61%
2030 SI-6**	Northcliffe Lift Station Upgrade	3,824.00	4,048.70	4,485.00	5%
2030 SI-7	Decommission Belmont Park Lift Station	N/A	N/A	N/A	N/A
N/A indicates that the project is not eligble to be included for impact fees.					
Utilizations in red indicate that it is an adjusted value because it was over 100% due to the build out flow occuring in 2030 instead of 2050.					

APPENDIX 31 - OCTAVE METER SPECIFICATIONS

Master Meter's Multi-Jet meter exceeds the AWWA C708 standard. With sensitivity to measure water flowing as low as 1/8 gallon per minute and accuracy unaffected by common particulates and build-up that would freeze other types, you can count on our Multi-Jet technology.

Technical Specifications:

AWWA Standard -Meets or exceeds all sections of AWWA Standard C-708, most recent revision. Compliant with SDWA, NSF ANSI 372 and NSF ANSI 61 standards.

Register - Standard Direct Read, DIALOG® 3G AMR System registers, AccuLinx Encoder, and IP 68 Electrical Output registers available. Together, an integrated and migratable technology environment is attained; direct, proximity (touch), mobile AMR, and Fixed Network AMI.

Register Sealing - Direct Read and DIALOG registers are permanently sealed with a scratch resistant glass lens, stainless steel base and wrap-around gasket to prevent intrusion of dirt or moisture.

Features & Benefits:

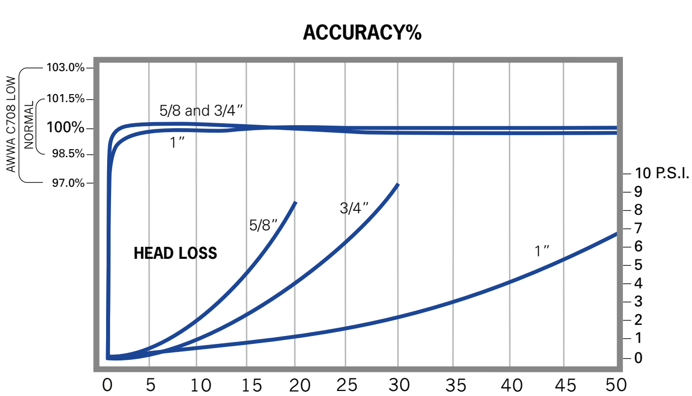
- Rugged basket strainer built from advanced polymer materials for superior wear mitigation.
- Proprietary design produces smooth, laminar flow profile for improved accuracy
- Award-winning DIALOG 3G register design houses all vital components — encoder, RF transmitter, battery and antennae — safely within the register's stainless steel and tempered glass enclosure. Free of external wires, components and connections — the #1 cause of field related issues on competitive designs.
- Assures compliance with the Safe Drinking Water Act (SDWA).
- Measures with only one moving part that is hydro-dynamically balanced on a sapphire bearing to preserve accuracy and promote a positive bottom line.
- Exceptional performance in passing entrained solids and operating in environments with high mineral content.
- Clean, elegant measurement design is highly sensitive to leaks and low flow while limiting wear for excellent revenue protection.

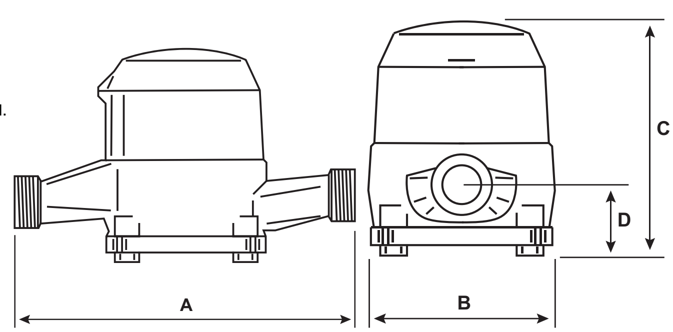
Technical Specs (Cont'd):

- **Register Unit** - Registration available in U.S. gallons, cubic feet or cubic meters.
- **Test Circle** - Large center sweep hand with one hundred (100) clearly marked gradations on the periphery of the dial face (available on Direct Read and DIALOG 3G registers).
- **Design/Operation** - Velocity-type flow measurement. Water that is evenly distributed by multiple converging inlet ports flows past an impeller in the measuring chamber, creating an impeller velocity directly proportional to water flow rate. The meter's register integrates that velocity into totalized flow.
  An inherent advantage for this design is unparalleled wear mitigation leading to sustained revenues.
  The register assembly is removable under line pressure permitting seamless, simplified upgrades in reading technology.
- **Strainer** - A rugged, 360-degree advance polymer basket strainer protects the critical measuring element from damage. The unique strainer design smoothes the flow of water entering into the meter creating a laminar flow that is gentle on the meter's internal components. Tough materials operating in a smooth, balanced environment enable the meters to perform more accurately over time. Utilities' investments last longer while capturing more revenue.
- **Measuring Chamber -** The measuring chamber housing and measurement element are built with an advanced synthetic polymer. Measurement surfaces are not wear surfaces, providing sustained accuracy despite the presence of entrained solids in the water. A long life, synthetic sapphire bearing serves as a wear surface with radially balanced water flows. The chamber housing is constructed in two parts to allow access to the impeller. Bottom plates available in Bronze, Cast Iron (CI) or Engineered Plastic.

METER OPERATING CHARACTERISTIC/DIMENSION	*5/8"*	*3/4" x 7-1/2"*	*3/4" x 9"*	*3/4" x 9" x 1"*	*1"*
Flow Rating (gpm)	**20**	**30**	**30**	**30**	**50**
Continuous Flow (gpm)	**15**	**20**	**20**	**20**	**30**
Normal Flow Range (gpm)	**1-20**	**2-30**	**2-30**	**2-30**	**3-50**
Extended Low Flow (gpm)	**1/4**	**1/2**	**1/2**	**1/2**	**3/4**
Maximum Working Pressure (psi)	**150**	**150**	**150**	**150**	**150**
Maximum Working Temperature (F)	**120**	**120**	**120**	**120**	**120**
Length (A below)	**7-1/2"**	**7-1/2"**	**9"**	**9"**	**10-3/4"**
Width (B below)	**3-5/8"**	**3-5/8"**	**3-5/8"**	**3-5/8"**	**4"**
Height, standard register with lid (C below)	**5"**	**5"**	**5"**	**5"**	**5-1/4"**
Height, bottom to center line (D below)	**1-1/2"**	**1-1/2"**	**1-1/2"**	**1-1/2"**	**1-3/4"**
Weight (lbs)	**3.95**	**4.0**	**4.1**	**4.6**	**5.25**
Packed To Carton	**6**	**6**	**6**	**4**	**4**
Carton Weight (lbs)	**25.1**	**25.4**	**26**	**19.8**	**22.4**

Accuracy and Head Loss Chart





Available in sizes 1.5", 2", 3", 4", 6", 8", 10", and 12"

UL Certification is available on 1.5" through 8" only.
FM Approval is available on all sizes.

Octave brings the latest in ultrasonic metering technology to Commercial/Industrial (C&I) water meters and puts precise measurement where the real flows exist. An excellent alternative to mechanical compound, single-jet, floating ball, fire-service type and turbine meters, Octave excels at maintaining sustained accuracy for the life of the meter while providing smart AMR capabilities.

Technical Specifications:

Working Pressure - 175 PSI

Liquid Temperature - 33° - 122 °F

Metrological Characteristics - Meets ANSI/AWWA Standards C715-18, C750-19, ISO 4064 rev. 2014

Configuration - Compact-Display built into unit

Power Source - 2 x D Size Lithium Thionyl Chloride batteries - 10 year warranted life time

Environmental Protection - NEMA 6P+ (IP68+), Ambient operation temp. -13 °F / +131 °F for the display

Display Units - Multi line 12 digit LCD (Programmable USG, Cubic Feet, Cubic Meters, Acre Feet for volume and GPM, Lt/s, or M³/h for rate of flow)

Output - Programmable Encoder, Pulse, 4-20, or Modbus; Optional dual output available in encoder + pulse

Features & Benefits:

- Grade 316 Stainless Steel (2"-8") or Epoxy Coated Ductile Iron (10"-12") body design provides full compliance with ANSI/NSF 372 (AB1953 or NSF61G).
- No moving parts. Minimal flow intrusion. Enduring accuracy.
- Easy to install Floating Flanges on 2"-8" and Integrated Flanges on 10"-12".
- No required strainer.
- Wide beam ultrasonic measurement sensors for high accuracy and reliable operation.
- Industry standard communication protocol for integration with most third-party AMR/AMI systems.
- Active leak, burst, reverse flow, empty pipe, measurement failure, and low battery. LCD also displays rate of flow and water temperature.
- Ruggedized NEMA 6P/IP-68+ construction; fully submersible design.
- Designed to meet standards for both North American and International C&I water meters.
- Optional flow measurements; Forward Only, Net Volume or Alternating Display (Forward and Reverse Consumption displayed separately).

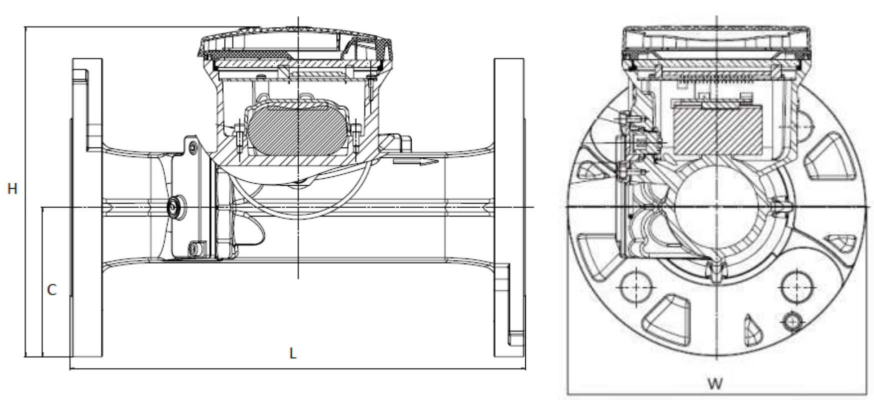
Performance Data & Dimensions

Octave Operating Characteristics and Dimensions	1.5"x13" (40 mm)	2"x10" (50 mm)	2"x15.25" (50 mm)	2"x17" (50 mm)
Safe Maximum Operating Capacity	250 GPM (57 m^3/h)	250 GPM (57 m^3/h)	250 GPM (57 m^3/h)	250 GPM (57 m^3/h)
Normal Operating Range (98.5% - 101.5% Accuracy)*	0.50 – 250 GPM (0.11 – 57 m^3/h)	0.50 – 250 GPM (0.11 – 57 m^3/h)	0.50 – 250 GPM (0.11 – 57 m^3/h)	0.50 – 250 GPM (0.11 – 57 m^3/h)
Extended Low Flow (95% - 105% Accuracy)	0.25 GPM (0.06 m^3/h)	0.25 GPM (0.06 m^3/h)	0.25 GPM (0.06 m^3/h)	0.25 GPM (0.06 m^3/h)
Length	13" (330 mm)	10" (250 mm)	15.25" (390 mm)	17" (432 mm)
Width	5-3/4" (146 mm)	5-3/4" (146 mm)	5-3/4" (146 mm)	5-3/4" (146 mm)
Height	6-3/4" (172 mm)	6-3/4" (172 mm)	6-3/4" (172 mm)	6-3/4" (172 mm)
Height from Center Pipe	2-1/8" (54 mm)	2-1/8" (54 mm)	2-1/8" (54 mm)	2-1/8" (54 mm)
Weight	20 lbs (9 kg)	15 lbs (7 kg)	22 lbs (10 kg)	24 lbs (11 kg)

* In the water temperature of 45° to 85° F (7° to 30° C), meter consumption is accurately measured at:
- +/- 1.5% in the Normal Operating Range
- +/- 5% in the Extended Low Flow

Octave Operating Characteristics and Dimensions	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
Safe Maximum Operating Capacity	500 GPM (114 m^3/h)	1,000 GPM (227 m^3/h)	1,600 GPM (363 m^3/h)	2,800 GPM (636 m^3/h)	5,500 GPM (1,250 m^3/h)	5,500 GPM (1,250 m^3/h)
Normal Operating Range (98.5% - 101.5% Accuracy)*	1 – 500 GPM (0.23 – 114 m3/h)	1.5 – 1,000 GPM (0.34 – 227 m^3/h)	3 – 1,600 GPM (0.68 – 363 m^3/h)	5 – 2,800 GPM (1.5 – 636 m^3/h)	14 – 5,500 GPM (3.2 – 1,250 m^3/h)	14 – 5,500 GPM (3.2 – 1,250 m^3/h)
Extended Low Flow (95% - 105% Accuracy)	0.5 GPM (0.11 m^3/h)	0.75 GPM (0.17 m^3/h)	2 GPM (0.45 m^3/h)	4 GPM (0.9 m3/h)	8 GPM (1.8 m3/h)	8 GPM (1.8 m3/h)
Length	12" (305 mm)	14" (356 mm)	18" (457 mm)	20" (508 mm)	17-3/4" (451 mm)	19-3/4" (502 mm)
Width	7-1/2" (190 mm)	9" (229 mm)	11" (280 mm)	13-1/2" (343 mm)	16" (406 mm)	19-3/4" (502 mm)
Height	8-1/2" (216 mm)	9-7/8" (250 mm)	10-7/8" (276 mm)	12-7/8" (327 mm)	16-1/2" (419 mm)	19-3/4" (502 mm)
Height from Center Pipe	3-1/2" (90 mm)	4-1/2" (115 mm)	5-1/8" (130 mm)	6-3/8" (162 mm)	8" (203 mm)	9-7/8" (251 mm)
Weight	23 lbs (10.5 kg)	35 lbs (16 kg)	51 lbs (23 kg)	78 lbs (35 kg)	150 lbs (68 kg)	210 lbs (96 kg)

* In the water temperature of 45° to 85° F (7° to 30° C), meter consumption is accurately measured at:
- +/- 1.5% in the Normal Operating Range
- +/- 5% in the Extended Low Flow



NOTE — For Performance charts please see **Engineering Document - Octave | Version 10.17**.

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MASTER METER

The Octave vs. Compounds & Turbines

Product Comparison Sheet

The origin of the modern day turbine meter dates back to the late 18th century and has evolved into a reliable way of measuring high volumes of water. Since 1914 compound meters have served a place in the market by capturing unaccounted for water in many applications when compared to traditional turbine meters.

While changes in both designs have improved meter accuracy there is still room for improvement due to poor low flow registration (in turbines), costly repairs, head loss, decreased accuracy in the changeover flow rates (in compounds), and short term sustained accuracy. With the introduction of the Octave ultrasonic water meter, the industry now has a meter capable of accurately measuring both high volume water usage while still capturing low flows and providing leakage alerts with none of the limitations of a compound or turbine.

Benefits:

1. **No moving parts:** Compound meters require water to be measured through 2 separate measuring elements; one for high flows and a secondary meter for low flows. In addition the compound meter requires an automatic valve mechanism for diverting flow through the appropriate measuring device. **Traditional compound meters can have upwards of 50-75 moving parts**. Turbine meters have one measuring element for capturing intermediate and high flows. **Most turbine meters can have upwards of 25 moving parts.**

   The Octave meter has absolutely no moving parts and thus eliminates the need of any maintenance or repair or the requirement of installing a strainer. However if the utility would like to prevent larger suspended particles from entering the customer's line a strainer may be installed without adversely affecting the meter.

2. **Sustained meter accuracy:** As with all mechanical devices, compound and turbine meters are subject to damage or wear which has a negative effect on meter accuracy and the utility's revenue. Using the latest in ultrasonic transit time technology **the Octave meter is capable of maintaining new meter accuracy for the life of the meter** without the need for calibration or routine maintenance.

3. **Low flow accuracy & starting flow:** With flow sensitivity starting as low as 1/16 gpm, the Octave is the only solid state meter capable of matching the minimum test flow rates of the AWWA standard for compound meters (2" – 4") and far exceeds the low flow rates of the AWWA standard for typical turbines (all sizes).

Size	Octave Low Flow	*C701 Low Flow	** C702 Low Flow
2"	¼ gpm @ 95%	4 gpm @ 98.5%	¼ gpm @ 95%
3"	½ gpm @95%	8 gpm @ 98.5%	½ gpm @ 95 %
4"	¾ gpm @95%	15 gpm @ 98.5%	¾ gpm @ 95%
6"	2 gpm @ 95%	30 gpm @ 98.5%	1 ½ gpm @ 95%
8"	4 gpm @ 95%	50 gpm @ 98.5%	2 gpm @ 95%

**C701 is the AWWA Standard for Cold Water Meters, Turbine Type*
***C702 is the AWWA Standard for Cold Water Meters, Compound Type*

4. **No changeover:** An inherent weakness with compound meters is the point when flow begins to changeover from one chamber to the other. Depending on the make and model, **meter accuracy can drop as low as 90% on older compound models and approximately 94% - 97% on newer compound models. The Octave eliminates changeover** and provides optimal meter accuracy at all flow that should result in more revenue for the utility.

5. **High flow:** Occasionally a compound is not the right meter for the job when a customer's flow demand exceeds the meter's safe maximum flow. To prevent unwanted wear to the compound the utility would typically install a turbine meter and hope the customer was not also operating below the meter's low flow capacity during non-peak demand.

   The Octave meter allows you to accurately measure both low and high flows without sacrificing meter accuracy.

Size	Octave Safe Maximum Flow	*C701 Safe Maximum Flow	*C701 % of Improvement	**C702 Safe Maximum Flow	**C702 % of Improvement
2"	250 gpm	190 gpm	24%	160 gpm	36%
3"	500 gpm	435 gpm	13%	350 gpm	30%
4"	1,000 gpm	750 gpm	25%	600 gpm	40%
6"	1,600 gpm	1,600 gpm	20%	1,350 gpm	32.5%
8"	2,800 gpm	2,800 gpm	20%	1,600 gpm	54.3%

C701 is the AWWA Standard for Cold Water Meters, Turbine Type
***C702 is the AWWA Standard for Cold Water Meters, Compound Type*

6. **Head loss:** With no internal parts to cause friction the Octave by design decreases head loss which in turn **lowers pumping costs for the utility and decreases the number of complaints of poor pressure by the customer.** Compared to a typical compound meter, the head loss of the Octave can decrease head loss by up to 93% at comparable flow rates and up to 90% in turbines.

Size	At C701 Safe Max Flow Turbines vs.	Octave	Improvement vs. Turbines	At C702 Safe Max Flow Compounds vs.	Octave	Improvement vs. Compounds
2"	5.08 PSI	0.80 PSI	84%	7.05 PSI	0.74 PSI	90%
3"	5.44 PSI	2.00 PSI	63%	6.88 PSI	1.15 PSI	83%
4"	7.30 PSI	3.00 PSI	59%	8.90 PSI	1.89 PSI	79%
6"	6.14 PSI	0.69 PSI	89%	8.32 PSI	0.55 PSI	93%
8"	3.48 PSI	1.87 PSI	46%	7.70 PSI	0.66 PSI	91%

#Head loss improvements are determined by taking an average head loss for each meter type at the Safe Maximum Flow per the applicable standard then comparing it to the Octave at the same rate of flow. Results vary based on the specific model when compared to the Octave.

7. **Meter Oversizing / Undersizing / Improper Application:** Lost revenue and/or meter damage can occur if the meter is not sized properly or if the meter installed is not best suited for the customer's usage profile. **The Octave operates well in almost every application, eliminating the question of which meter to use or what size to use.**

8. **Technology:** The Octave comes with built in standard display alerts such as **leak detection, flow direction, empty pipe, and battery level icon**, and offers the scalability to include **data logging, impact alerts such as tampering, backflow, theft and zero consumption** when connected to Master Meter's XTR endpoint. The technology advantages of the Octave far exceed the capabilities of today's compound and turbine meters.

9. **Weight:** Less parts needed to build a meter equates to manufacturing a meter that weighs considerably less than compounds and turbines resulting in **reducing the number of field staff and equipment needed to install or replace meters and environmental benefits such as reducing your carbon footprint.**

Size	Octave Weight	##Turbine Avg. Weight	Improvement vs. Turbine	##Compound Avg. Weight	Improvement vs. Compound
2"	26 lbs	25 lbs	+4%	39 lbs	33%
3"	36 lbs	40 lbs	10%	68 lbs	47%
4"	48.5 lbs	54 lbs	10%	86 lbs	44%
6"	99 lbs	108 lbs	8%	155 lbs	36%
8"	136 lbs	186 lbs	27%	379 lbs	64%

Comparisons of weight are between various compound and turbine models. The level of improvement was based on average weight per size and type. Results vary based on the specific model when compared to the Octave.

10. **Price:** For all of these added features you would expect to pay much more for a superior product but that is not the case. **Priced between a turbine and a compound the Octave exceeds all the advantages of a traditional compound or turbine**.

Octave Installation Guide

Category: C & I Metering

Type: Installation Manual

Issue: Operation

Version 01.19

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1.1 Introduction

Thank you for choosing Master Meter's Octave Ultrasonic Meter. This unique design delivers precise flow measurement without any moving parts for long life, sustained accuracy and exceptional performance. The following information within this guide will help you gain a better understanding of the many features and capabilities your new Octave Ultrasonic meter has to offer.

1.2 Package Contents and Documentation

- One complete Octave Ultrasonic Flow Meter (meter body with integral electronics), size as indicated on the packaging box.
- Octave User Installation Guide
- Certificate of calibration data (adhered to the inside of the meter lid)
- (Optional) If specified at the time of order; one output module

1.3 General Safety

Prior to installation of your new Octave Ultrasonic Meter please consider the following;

- Do not install, operate or maintain this flow meter without reading, understanding and following the factory-supplied instructions. Otherwise, injury or damage may result.
- Read instructions carefully before beginning installation and save them for future reference.
- Observe all warnings and instructions marked on the product.
- Consider handling and lifting instructions to avoid damage.
- If the product does not operate normally, refer to the service instructions or to a qualified Master Meter representative.
- There are no operator-serviceable parts inside this product.

1.4 Unpacking Instructions and Inspection

This product has been thoroughly inspected and tested prior to shipment and is ready for operation. After carefully unpacking the meter, inspect all contents for shipping damage before attempting to install. If here is any indication of physical damage found, immediately contact the responsible transportation service and your local Master Meter representative. **Note**: *The LCD display remains active for the life of the meter. If the display is not on, this may be an indication of damage during shipment.*

2.1 Measurement Method

The Octave's measurement method is based on an ultrasonic, transit time, dual beam sensor array which determines the length of time it takes an ultrasonic sound wave to travel the distance between the two sensors located in the meter's body. The two sensors function as both the transmitter and the receiver, each one alternating these functions so that the ultrasonic wave travels both with and against the direction of the flow. Ultrasonic waves travel slower against the flow than with the flow, thus the time difference of two waves traveling with and against the flow leads to determining the velocity and volume of the water.

Note: These sensors are ultra-sensitive; they are not designed to be modified by the user. Any modifications void warranty on this product.

- The Octave ultrasonic flow meter is a battery-powered, precision flow meter designed for linear, bidirectional flow measurement of water.
- Flow measurement data is communicated through the output module.
- The Octave can be set up for a wide range of applications.

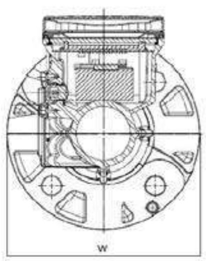
2.2 Mechanical Data

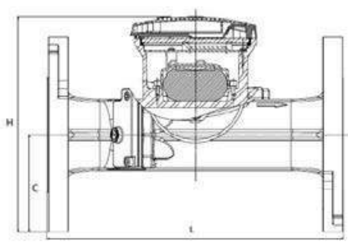
Maximum Working Pressure	175 PSI
Liquid Temperature	32.1° F - 122° F (0.1° C to 50° C)
Referenced Standards	Meets ANSI / AWWA Standard C715-18 & C750-10; ISO 4064 rev. 2005
Configuration	Compact - Display built into unit
Power Source	2 x D size Lithium Thionyl Chloride batteries - 10 year warranted life time
Environmental Protection	NEMA 6P (IP68), Ambient operation temperature -13° F to 131° F (- 25° C to 55° C)
Data Units	Multi-line 12 digit Liquid Crystal Display (LCD) - *Programmable USG, Imperial Gallons, Cubic Feet, Cubic Meters, Barrels, Acre Feet or Acre Inch for Volume and GPM, Lt/s,Lt/m or M^3/h for rate of flow.*
Volume Display Options	1. Net Volume (Forward measurement minus reverse) 2. Forward Only 3. Alternating Flow (Forward and Reverse flow displayed separately)
Flanges	ANSI / AWWA C702 • 2" Oval Type – Cast Iron Floating Flange • 3" – 8" Round Type – Cast Iron Floating Flange • 8 – 12" Round Type – Cast Iron Fixed Flange
Meter Body Construction	2" – 8" Grade 316 Stainless Steel 10" – 12" Ductile Iron Epoxy Coated
Output (optional)	1. Dual Digital Pulses (Open Drain or Dry Contact) 2. 4-20 mA (Powered loop) 3. Encoder Output (up to 8 digit encoded readings)
Certifications/Listings	• UL Certified – Safety US EX29710 on 2" – 8" Stainless Steel Floating Flange • FM Approved on 2" – 12" Stainless Steel and Ductile Iron • ANSI / NSF 372 (AB1953 or NSF61G)

2.3 Dimensions

Octave										
Model	**Floating Flanges**								**Solid Flange**	
Nominal Size	2" x 10" (50 mm)	2"x13" (50 mm)	2"x15.25" (50 mm)	2"x17" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
L - Length	10" (250 mm)	13" (330 mm)	15.25" (390 mm)	17" (432 mm)	12" (305 mm)	14" (356 mm)	18" (457 mm)	20" (508 mm)	17 3/4" (451 mm)	19 3/4" (502 mm)
W - Width	5 3/4" (146 mm)	5 3/4" (146 mm)	5 3/4" (146 mm)	5 3/4" (146 mm)	7 1/2" (190 mm)	9" (229 mm)	11" (280 mm)	13 1/2" (343 mm)	16" (406 mm)	19 3/4" (502 mm)
H - Height	6 3/4" (172 mm)	6 3/4" (172 mm)	6 3/4" (172 mm)	6 3/4" (172 mm)	8 1/2" (216 mm)	9 7/8" (250 mm)	10 7/8" (276 mm)	12 7/8" (327 mm)	16 1/2" (419 mm)	19 3/4" (502 mm)
C - Center Pipe Height	2 1/8" (54 mm)	2 1/8" (54 mm)	2 1/8" (54 mm)	2 1/8" (54 mm)	3 1/2" (90 mm)	4 1/2" (115 mm)	5 1/8" (130 mm)	6 3/8" (162 mm)	8" (203 mm)	9 7/8" (251 mm)
Weight - Ductile Iron	-	-	-	-	-	-	-	-	150 lbs. (68 kg)	210 lbs. (96 kg)
Weight - Stainless Steel	15 lbs (7 kg)	20 lbs (9 kg)	22 lbs (10 kg)	24 lbs (11 kg)	23 lbs (10.5 kg)	35 lbs. (16 kg)	51 lbs. (23 kg)	78 lbs. (35 kg)	-	-

2" Octave is offered in 10" length with an optional add-on of a 3", a 5.25" or a 7" spool. Gaskets, nuts, bots, & washers are included in weights of 13", 15.25" and 17".



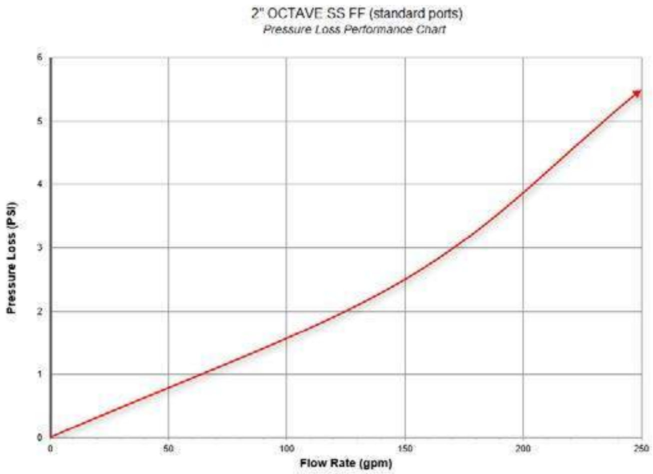


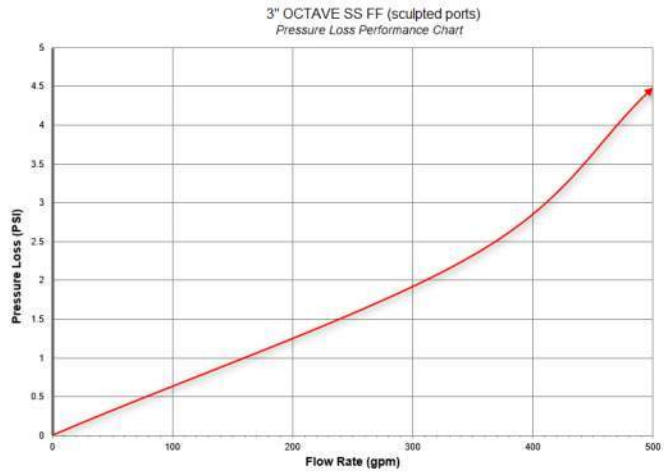
2.4 Performance Data

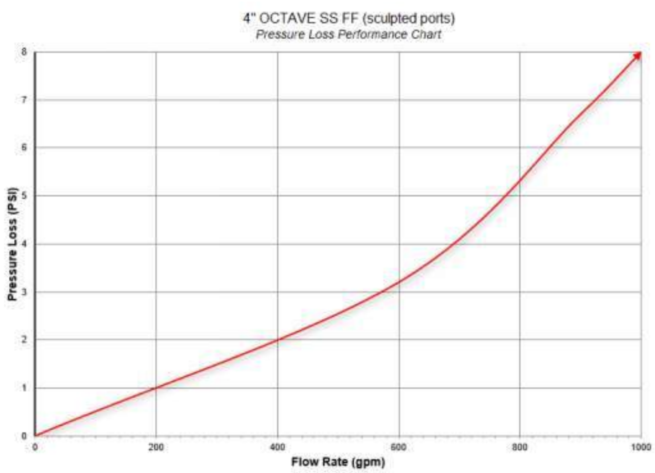
Octave Nominal Size inch (mm)	Extended Low Flow 95% - 105% Accuracy GPM (Lt/s)	Normal Flow Range 98.5% - 101.5% Accuracy GPM (Lt/s)	‡ Continuous Safe Max Flow GPM (Lt/s)	Linearity Range +/- 0.5% Maximum Deviation GPM (Lt/s)
2" (50mm)	1/4 (.016)	1/2 - 250 (.032 - 15.77)	250 (15.77)	4 - 200 (.25 - 12.62)
3" (80 mm)	1/2 (.032)	1 - 500 (.06 - 31.54)	500 (31.54)	5 - 350 (.32 - 22.08)
4" (100 mm)	3/4 (.047)	1-1/2 - 1,000 (.09 - 63.09)	1000 (63.09)	15 - 700 (.94 - 44.16)
6" (150 mm)	2 (.13)	3 - 1,600 (.19 - 100.94)	1,600 (100.94)	20 - 1,150 (1.26 - 72.55)
8" (200 mm)	4 (.25)	5 - 2,800 (.32 - 176.65)	2,800 (176.65)	50 - 2,000 (3.15 - 126.18)
10" (250 mm)	8 (.50)	14 - 5,500 (.88 - 346.99)	5,500 (346.99)	400 - 4,000 (25.24 - 252.36)
12" (300 mm)	8 (.50)	14 - 5,500 (.88 - 346.99)	5,500 (346.99)	400 - 4,000 (25.24 - 252.36)

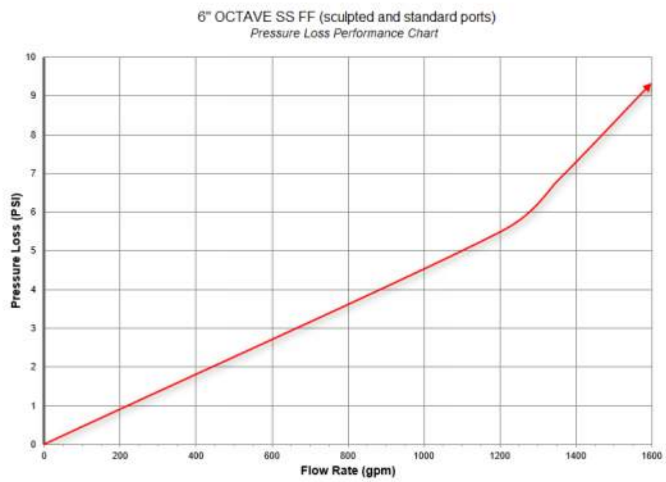
‡ Continuous Safe Max Flow ranges listed for the Octave are for accurate flow measurement only and do not limit the Octave from meeting the Short-term Deluge Flow for fire services.

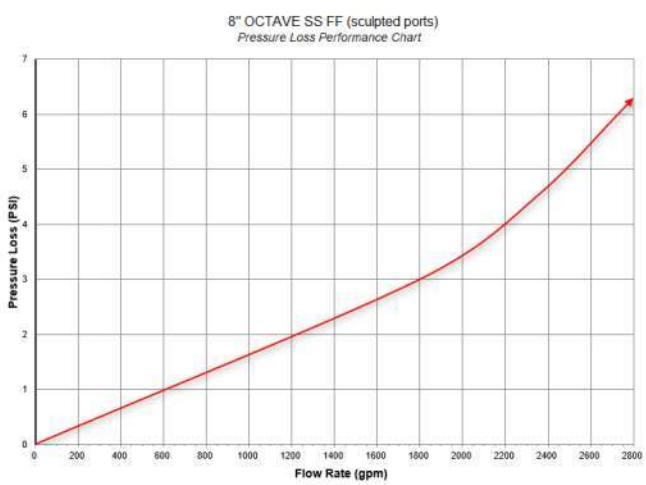
2.5 Pressure Loss Charts

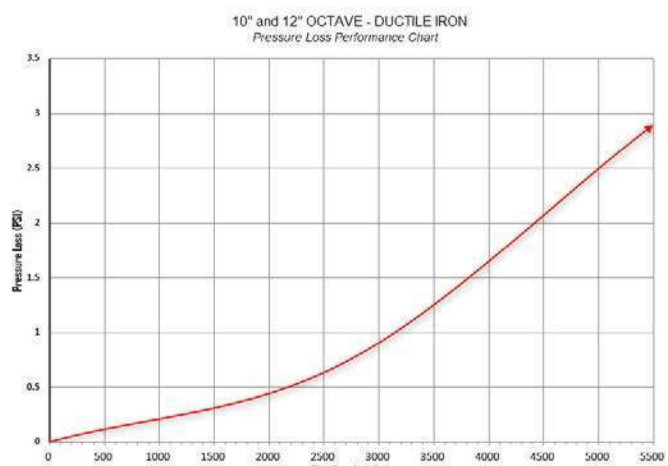












3.1 Pre-Installation

Prior to installation check the following:

- Flow rate and volume units are correctly programmed.
- The flow meter is correctly installed per the installation location and position recommendations.
- Output modules are correctly attached.

3.2 Handling of Octave

IMPORTANT:

- **DO NOT** use chains or wire cable to lift the Octave. To protect the epoxy coating, *only use a nylon lifting strap* with appropriate weight capacity.
- **DO NOT** lift the Octave by the electronic housing unit.
- **DO NOT** carry the Octave by its lid.
- **DO NOT** use bolt holes for grip when carrying the Octave.
- **DO NOT** position the flow meter on its electronic housing unit.
- When bolting the meter to pipe flanges, **use washers on both nuts and bolts** to protect the epoxy coating of the Octave.
- When handling the flow meter **avoid hard blows**, jolts or impact.

3.3 Installation Notes

The measuring tube should be completely full at all times for proper flow measurements. When sensors are not wet this will show a loss of signal. Though this will not cause damage to the meter, it will however not measure flow.

FLOW DIRECTION: The Octave is a bi-directional flow meter. **Note** the indicating arrow for forward and backward flows.

Master Meter recommends keeping the lid closed in case of direct sunlight exposure. However, no direct damage will occur while the lid is open temporarily.

Do not expose the meter to excessive vibration. To prevent this from occurring, support the connection pipe spools on both ends of the flow meter.

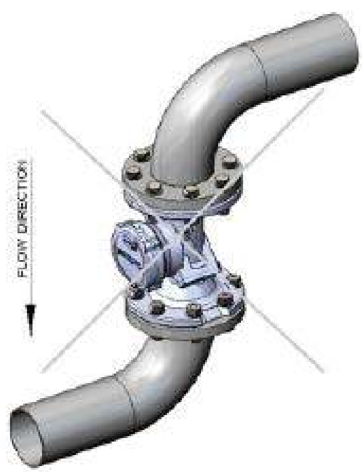
To avoid measuring errors due to air or an empty pipe, please observe the following precautions:

- Installation of the flow meter should be at the lowest point of the system, if possible, since air will be collected at the highest point of a system.
- If possible, maintain positive back pressure in meter outlet piping.
- In order to avoid cavitation, always install control valves downstream of the flow meter and never install the flow meter on a pump suction side.

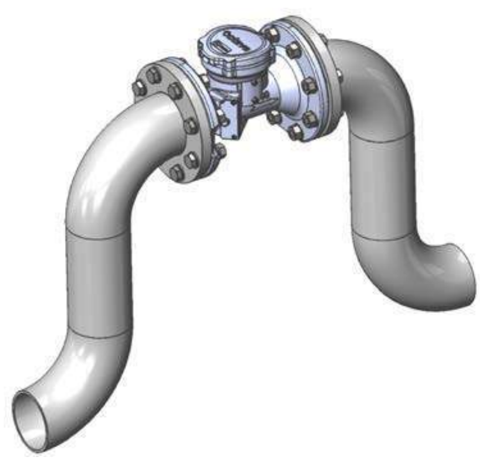
3.4 Installation Location & Position

Proper Installation

Improper Installation



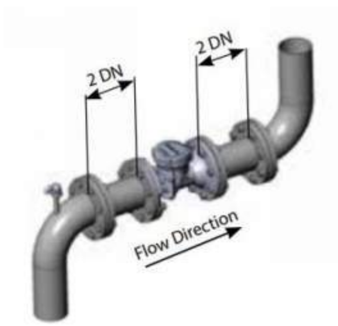
Conditional Installation



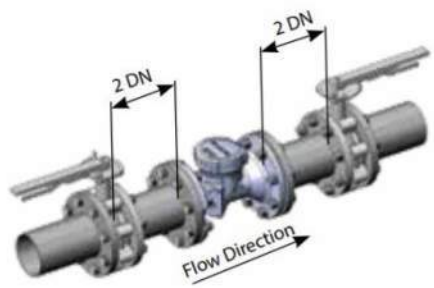
Recommended: If this is not the highest point in the system or a hydraulic jump has been installed to keep the flow meter full. **T**he system has back pressured.

Not recommended: If this is the highest point in a system or if pipeline and/or flow meter is subject to being emptied between uses avoid this installation.

3.5 Additional installation requirements



[redacted]



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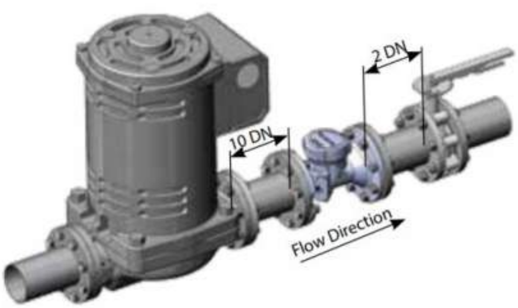

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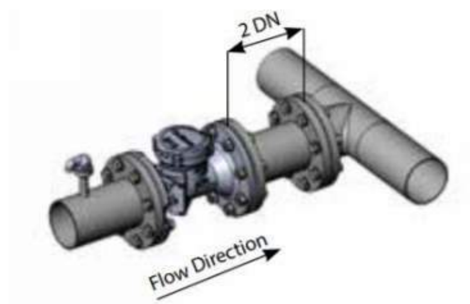

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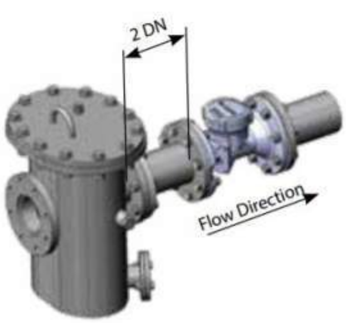

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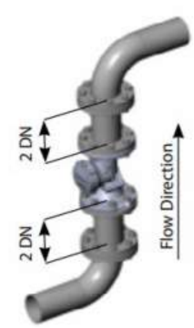
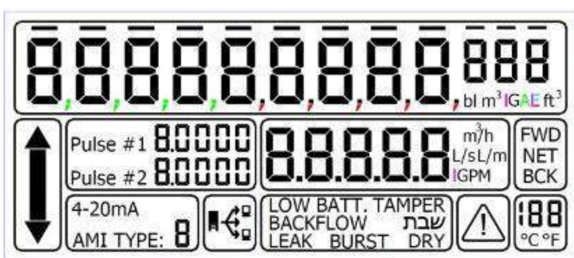


[redacted]

4.1 Digital Display

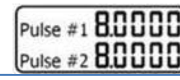
The Octave meter comes with a factory programmable digital display built to your specifications. At the time of order you can select:

- **Volume units** in US gallons, Imperial gallons, Cubic Feet, Cubic Meters, Barrels, Acre Feet or Acre Feet
    - o US Gallons will display a constant GAL on the LCD
    - o Imperial Gallons will display a constant IGAL on the LCD
- **Rate of flow measurement** in US Gallons per Minute, Imperial Gallons per Minute, Liters per Second, Liters per Minute or Cubic Meters per Hour
- **A programmable decimal** with flow measurement as low as 1/1000th of a measurement unit.
- **Single output mode** in either encoder (UI1203), digital pulse (open drain or dry contact), 4-20 mA, or no output mode
- **Dual output mode** (optional) in encoder + open drain digital pulse
- **Volume Display Option** in either Net Flow, Forward Only, or Alternating.
    - o **Net Volume** – The meter measures both forward and reverse flow. If backward flow is detected, the totalizer will begin to decrease.
    - o **Forward Flow Only** – The meter measures forward flow only. Reverse flow is disregarded.
    - o **Alternating Flow** – The totalizer will display only forward flow, then toggle to display only reverse flow. The timing of the how long each measurement is displayed is programmable with this software version.

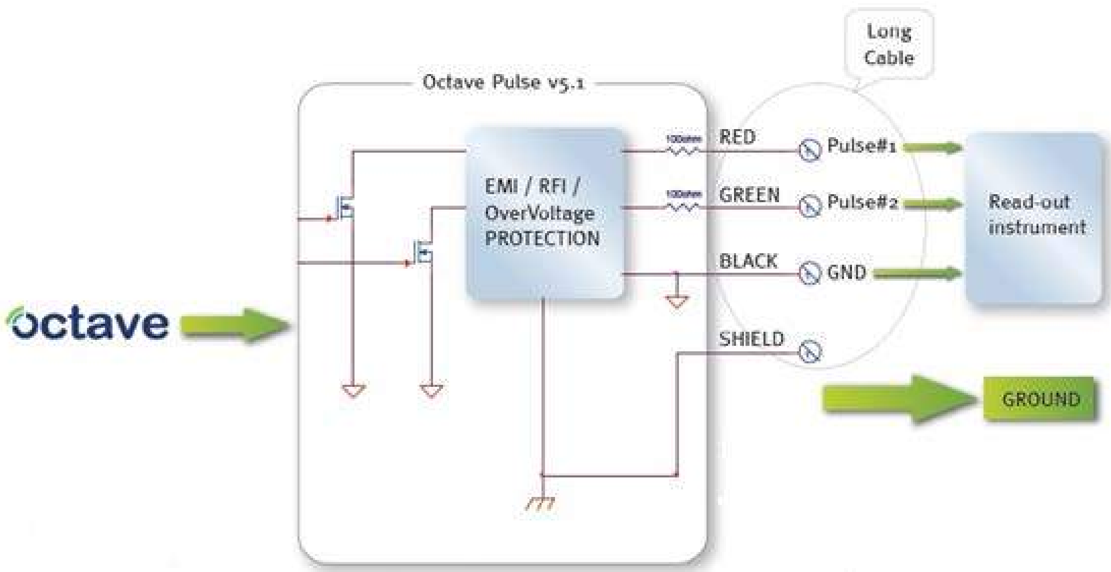


[redacted]

4.2 Pulse Output (Open Drain)



Pulse Type: Open Drain that allows current loading of 200 mA, and up to 30 VDC.



[redacted]

	Wire Color	Function
Long cable	Red	Pulse Out #1
	Green	Pulse Out #2
	Black	Common
	Bare Wire	Shield

Warning: Signal connection polarity is mandatory

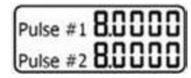
[redacted]

[redacted]

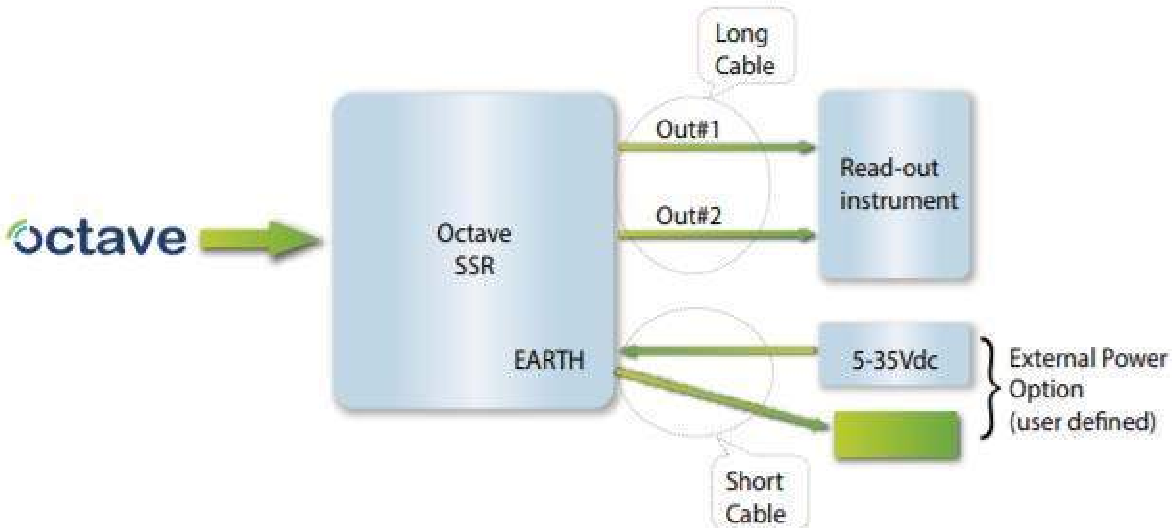
Output Type	Open drain
Cable Length - Supplied	9 feet
Maximum Cable Length*	1,640 feet
Maximum Supply Voltage	30 VDC

[redacted]

4.3 Pulse Output (SSR Dry Contact)



Pulse Type: Dry Contact that allows current loading of 120 mA, and up to 35 volts.



[redacted]

	Wire Color	Function
Long cable	Red	Output #1
	Orange	Output #1
	Black	Output #2
	Brown	Output #2
Short cable	Red	24V +
	Black	24V -
	Yellow	GROUND

Warning: Signal Polarity is mandatory on Short Cable wires but is not mandatory on Long Cable wires.

[redacted]

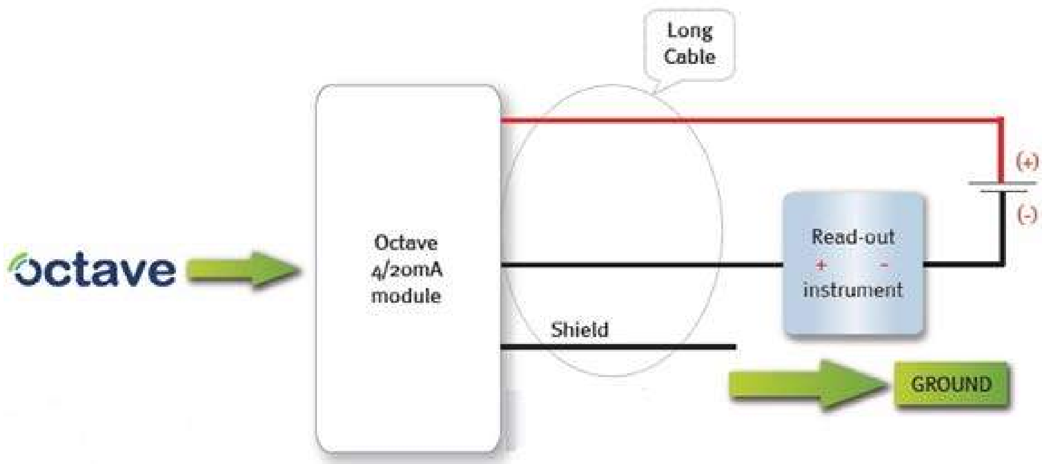
Output Type	SSR Dry Contact
Cable Length - Supplied	9 feet
Maximum Cable Length*	1,640 feet
Output Voltage max.	± 400 (V)
Output Current max.	120 mA (.12 A)
Supply Voltage	3-35 VDC

[redacted]

4.4 4-20 mA Output (Analog Communication)

4-20mA

The current output is a passive 4-20 mA. Power must be provided by the customer. 4 mA is always “0” (zero) flow and the 20 mA is factory programmable according to the customer’s requirements. (If the customer has not specified the 20 mA at the time of order, the Octave will be programmed with the 20 mA at the max flow of the meter.)



[redacted]

	Wire Color	Function
Long cable	Red	Current loop +
	Black	Current loop -
	Bare Wire	Shield

Warning: Signal connection polarity is mandatory

[redacted]

Output Type	4-20 mA passive current output
Cable Length - Supplied	9 feet
Maximum Cable Length*	1,640 feet
Loop Supply Voltage	12 - 24 VDC
Output Impedance	25 (mΩ) typ.

* The maximum cable length depends on: cable type, controller, and electrical noise level.

4.5 Encoder Output

AMI TYPE: 8

- UI1203 encoder open communication, with a maximum reading up to 8 digits, depending on the programming of the attached output module
- Encoder digits are represented by lines above each digit transmitted to an AMR or AMI on the volume totalizer.
- Serial communication collector
- Data output line is a solid state switch requiring external pull-up
- AMI Type for Encoder is : 0

[redacted]

Wire	Function
Red	Power
Green	Data
Black	Ground

[redacted]

Output Type	Encoder
Cable Length - Supplied	9 feet
Maximum Supply Voltage	15 Vdc
Maximum Power Load	.04 Vdc

4.6 No Output (Manual Read)

The Octave meter can be programmed to not send a communication signal at the customer's request; however Master Meter recommends selecting a communication mode for future migration to AMR or AMI.

4.7 Output Module Installation (Optional)

All Octave water meters are shipped with either a cover plate or communication module installed on the side of each meter. Even if the meter is not going to be read by radio or some other electronic unit, it is important to leave one of these devices installed on the Octave to prevent damage to the communication port. **Installing an Octave without a cover plate or communication module would void any warranty.**

If you received an Output Module separate from your Octave meter, please follow the steps below to ensure proper installation of the module. Read through these instructions before attempting to remove the cover plate. Your module came as a complete installation kit with the supplies shown in Pic. 1.

<u>Octave Output Module Installation Parts</u>

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Step 1: Remove the Sealing Cap from the cover plate (Pic. 2).

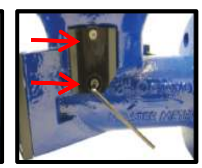
Step 2: Using the 3mm Allen Key provided, remove the cover plate (Pic. 3). Keep the cover plate and 3mm x 15mm screws for future use. The communication port is now exposed. (Pic. 4)

Step 3: Place washer around the 4-prong plug of the output module. (Pic. 5 & 6)

Step 4: Insert Output Module into the communication port (Pic. 7), with the cable pointing down. This will allow the slot inside the communication port to align with the groove on the module. Do not force the module into the communication port. This may cause damage to the pins. Secure into place using the 3mm x 20mm screws provided. Tighten until the screws stop. (Pic. 8)

Step 5: Push the Sealing Cap into the lower screw hole (Pic. 9). Lock the Sealing Cap in place by firmly pushing in into place or gently tapping it in with a small hammer.

Note: If at any time the module needs to be removed, take caution not to allow dirt or water into the communication port. If the module is going to be removed for an extended period of time, reinstall the cover plate and the 3mm x 15mm screws.



[redacted]

[redacted]

[redacted]

[redacted]

4.8 Wire Connectivity Chart

The following chart is designed to assist in wiring the Octave module to various AMR/AMI Radios. The Octave transmits up to 8 digit output encoder output. Pulse output resolution is available in resolutions of x0.1, x1, x10, x1,000, or x10,000.

By default Octave encoder modules are provided with Nicor connectors, however you may also select Itron Connectors, magnetic inductor coils for wall or pit mount, for bare wire. Nicor connectors are factory potted. All other connectors are spliced with water resistant heat shrink wrap.

Manufacturer	Model	Communication Type	Octave Red Wire	Octave Green Wire	Octave Black Wire
Aclara	Star 3000 Series	Encoder	Red	White	Black
	Star 3000 Series	Pulse	Red	N/A	Black or White
Badger	Orion	Encoder	Red	Green	Black
Datamatic	Firefly	Encoder	Red	White	Black
	Mosaic	Encoder	Red	Green	Black
Elster	MTU	Encoder	White	Red	Black
	MTU	Pulse	Red	White	Green
Hersey	Hot Rod	Encoder	Red	Green or White	Black
Itron	60w	Encoder	Green	Red	Unshielded
	60wp	Pulse	Red	N/A	White
	100w	Encoder	Grey	Brown	Yellow
Kemp Meeks	Visu-Link VL-9S	Pulse	Polarity does not matter - Connect Red and Black Wires to either terminal, disregard green wire		
	Visu-Link VL-9	Encoder	Red	Green	Black
Master Meter	Allegro PT	Encoder	Red	Green	Black
	Universal XTR	Encoder	Red	Green	Black
	Fast Pulse XTR	Pulse	Red	N/A	Black
Metron Farnier (T2)	T2 M2w	Encoder	Red	Green	Black
Neptune	R900	Encoder	Black	Red	Green
Sensus	MXU Pit Unit	Encoder	Red	Green	Black
	MXU Wall Unit	Encoder	Red	Green	Black
	Touch Pad	Encoder	Red	Green	Black

**Note – when connecting to Master Meter's Allegro PT or 3G XTR, the Octave will typically output an 8 digit reading, unless otherwise specified. When connecting to another manufacturer's radio or read device, it is recommended to confirm with that provider what the actual reading resolution of the connecting device is.*

APPENDIX 32 - WILLDAN REVENUE CREDIT CALCULATIONS & SUMMARY

November 25 2024

Mr. James Walters
Finance Director
City of Schertz
1400 Schertz Parkway Bldg. 2
Schertz TX 78154

Dear Mr. Walters:

Per your request, we have completed a calculation of the credit from utility revenues that would be generated by new service units during the ten-year period of the City's proposed water and wastewater impact fees. This credit to the growth-related cost component of the impact fee calculation is required under Local Government Code Chapter 395 to ensure that new service units are not double-charged for impact fee related capital improvements. Our scope of services is limited to this credit calculation; the City's total water and wastewater impact fees are calculated by its consulting engineers.

Summary Calculation

Our credit calculation is summarized in the model presented as **Appendix A** to this letter. As shown in the appendix, we calculate the following impact-fee direct revenue credits:

WATER Revenue Credit	--	**$3,365,530**
WASTEWATER Revenue Credit	--	**$4,611,802**

Key Assumptions

As stated above, our contribution to the City's impact fee calculations is limited to the water and wastewater revenue credit only; we bear no responsibility for the overall impact fee calculations. However, we coordinated our assumptions and calculations with City staff and the City's consulting engineers. Specifically, we relied on the following critical assumptions in developing our revenue credits:

1) We assumed a ten-year period for the calculation, FY 2025 – FY 2034, consistent with guidelines set by Chapter 395.

2) We utilized Capital Improvement Plan cost estimates and percentages of each project allocable to growth developed by City staff and its consulting engineers.

3) Growth estimates were based on the latest forecasts as presented by the City's consulting engineers.

4) Terms and interest rates for new debt forecast to be issued for growth-related improvements were based on estimates used in the City's 2023 water and wastewater rate study.

5) We are interpreting Chapter 395 so that the debt allocable to growth-related projects includes both principal and interest.

6) Current debt allocable to growth-related projects was based on estimates provided by City staff.

7) The totals represent Net Present Values of the ten year cash flows utilizing a discount rate of 6.0%.

In summary, we believe that the use of the revenue credits estimated in this summary letter and detailed in Appendix A are reasonable and in accordance with Chapter 395 guidelines.

Thank you for this opportunity to serve you and the City of Schertz. Please let me know if you have any comments or questions.

Respectfully submitted,
WILLDAN FINANCIAL SERVICES

Dan V Jackson

Dan V. Jackson
Vice President

APPENDIX A

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Revenue Credit Summary Calculation
Scenario: 2023 11 21 -- Scenario 1

WATER REVENUE CREDIT CALCULATION

			1	2	3	4	5	6	7	8	9	10
			2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WATER LUEs												
Total LUEs			30,182	31,054	31,951	32,875	33,825	34,802	35,808	36,843	37,908	39,003
New LUEs												
Annual			848	872	897	923	950	978	1,006	1,035	1,065	1,096
Cumulative			848	1,720	2,617	3,541	4,491	5,468	6,474	7,509	8,574	9,669
WATER Debt Service												
Current												
Principal			$ 1,057,500	$ 880,000	$ 450,000	$ 470,000	$ 492,500	$ 515,000	$ 537,500	$ 560,000	$ 562,500	$ 495,000
Interest			382,755	338,481	306,869	286,019	265,281	243,956	221,931	200,019	178,519	157,806
Reserve			-	-	-	-	-	-	-	-	-	-
Total			1,440,255	1,218,481	756,869	756,019	757,781	758,956	759,431	760,019	741,019	652,806
Future												
Principal			-	185,227	190,784	884,493	911,028	2,049,721	2,111,213	2,174,549	2,239,786	2,306,979
Interest			-	149,314	143,757	692,627	666,092	1,534,643	1,473,151	1,409,814	1,344,578	1,277,384
Reserve			-	-	-	-	-	-	-	-	-	-
Total			-	334,541	334,541	1,577,120	1,577,120	3,584,364	3,584,364	3,584,364	3,584,364	3,584,364
Total												
Principal			1,057,500	1,065,227	640,784	1,354,493	1,403,528	2,564,721	2,648,713	2,734,549	2,802,286	2,801,979
Interest			382,755	487,795	450,625	978,645	931,373	1,778,599	1,695,082	1,609,833	1,523,097	1,435,190
Reserve			-	-	-	-	-	-	-	-	-	-
Total			1,440,255	1,553,022	1,091,409	2,333,139	2,334,901	4,343,320	4,343,795	4,344,382	4,325,382	4,237,170
Utility Revenue Credit Calculation												
Total Debt Service			$ 1,440,255	$ 1,553,022	$ 1,091,409	$ 2,333,139	$ 2,334,901	$ 4,343,320	$ 4,343,795	$ 4,344,382	$ 4,325,382	$ 4,237,170
Total LUEs			30,182	31,054	31,951	32,875	33,825	34,802	35,808	36,843	37,908	39,003
Debt Service Per LUE												
Annual			$ 47.72	$ 50.01	$ 34.16	$ 70.97	$ 69.03	$ 124.80	$ 121.31	$ 117.92	$ 114.10	$ 108.64
Monthly			$ 3.98	$ 4.17	$ 2.85	$ 5.91	$ 5.75	$ 10.40	$ 10.11	$ 9.83	$ 9.51	$ 9.05
New LUEs -- Cumulative			848	1,720	2,617	3,541	4,491	5,468	6,474	7,509	8,574	9,669
Water Revenue Credit												
Current Dollars		**$ 4,108,768**	$ 40,454	$ 86,018	$ 89,408	$ 251,296	$ 310,005	$ 682,462	$ 785,375	$ 885,445	$ 978,303	$ 1,050,448
Net Present Value	6.0%	**$ 3,365,530**										

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Revenue Credit Summary Calculation
Scenario: *2023 11 21 -- Scenario 1*

WASTEWATER REVENUE CREDIT CALCULATION

		1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
WASTEWATER LUEs											
Total LUEs		32,744	33,631	34,543	35,479	36,440	37,428	38,442	39,484	40,554	41,653
New LUEs											
Annual		864	887	911	936	961	988	1,014	1,042	1,070	1,099
Cumulative		864	1,751	2,663	3,599	4,560	5,548	6,562	7,604	8,674	9,773
WASTEWATER Debt Service											
Current											
Principal		$ 642,500	$ 680,000	$ 710,000	$ 745,000	$ 782,500	$ 815,000	$ 847,500	$ 880,000	$ 892,500	$ 835,000
Interest		508,655	477,156	444,043	409,818	374,955	340,380	307,705	276,343	244,887	213,493
Reserve		-	-	-	-	-	-	-	-	-	-
Total		1,151,155	1,157,156	1,154,043	1,154,818	1,157,455	1,155,380	1,155,205	1,156,343	1,137,387	1,048,493
Future											
Principal		-	846,752	872,155	1,771,533	1,824,679	2,726,171	2,807,956	2,892,195	2,978,961	3,068,330
Interest		-	682,576	657,174	1,334,916	1,281,770	1,909,606	1,827,821	1,743,582	1,656,817	1,567,448
Reserve		-	-	-	-	-	-	-	-	-	-
Total		-	1,529,329	1,529,329	3,106,449	3,106,449	4,635,777	4,635,777	4,635,777	4,635,777	4,635,777
Total											
Principal		642,500	1,526,752	1,582,155	2,516,533	2,607,179	3,541,171	3,655,456	3,772,195	3,871,461	3,903,330
Interest		508,655	1,159,732	1,101,216	1,744,734	1,656,725	2,249,986	2,135,526	2,019,925	1,901,703	1,780,941
Reserve		-	-	-	-	-	-	-	-	-	-
Total		1,151,155	2,686,485	2,683,371	4,261,266	4,263,904	5,791,157	5,790,982	5,792,120	5,773,164	5,684,270
Utility Revenue Credit Calculation											
Total Debt Service		$ 1,151,155	$ 2,686,485	$ 2,683,371	$ 4,261,266	$ 4,263,904	$ 5,791,157	$ 5,790,982	$ 5,792,120	$ 5,773,164	$ 5,684,270
Total LUEs		32,744	33,631	34,543	35,479	36,440	37,428	38,442	39,484	40,554	41,653
Debt Service Per LUE											
Annual		$ 35.16	$ 79.88	$ 77.68	$ 120.11	$ 117.01	$ 154.73	$ 150.64	$ 146.70	$ 142.36	$ 136.47
Monthly		$ 2.93	$ 6.66	$ 6.47	$ 10.01	$ 9.75	$ 12.89	$ 12.55	$ 12.22	$ 11.86	$ 11.37
New LUEs -- Cumulative		864	1,751	2,663	3,599	4,560	5,548	6,562	7,604	8,674	9,773
Wastewater Revenue Credit											
Current Dollars	**$ 5,540,163**	$ 30,373	$ 139,895	$ 206,847	$ 432,245	$ 533,604	$ 858,409	$ 988,529	$ 1,115,461	$ 1,234,800	$ 1,333,688
Net Present Value 6.0%	**$ 4,611,802**										

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

LUE and Account Totals
Scenario: 2023 11 21 -- Scenario 1

	Current	1	2	3	4	5	6	7	8	9	10
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WATER LUES											
Forecast Annual Growth Rate		2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%
Total LUEs	29,334	30,182	31,054	31,951	32,875	33,825	34,802	35,808	36,843	37,908	39,003
Annual New LUEs											
New LUEs		848	872	897	923	950	978	1,006	1,035	1,065	1,096
Cumulative		848	1,720	2,617	3,541	4,491	5,468	6,474	7,509	8,574	9,669
Monthly Bills	352,008	362,181	372,648	383,418	394,498	405,899	417,630	429,699	442,118	454,895	468,041
WASTEWATER LUES											
Forecast Annual Growth Rate		2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%
Total LUEs	31,880	32,744	33,631	34,543	35,479	36,440	37,428	38,442	39,484	40,554	41,653
Annual New LUEs											
New LUEs		864	887	911	936	961	988	1,014	1,042	1,070	1,099
Cumulative		864	1,751	2,663	3,599	4,560	5,548	6,562	7,604	8,674	9,773
Monthly Bills	382,561	392,929	403,577	414,514	425,747	437,285	449,136	461,307	473,809	486,649	499,837

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service
Scenario: 2023 11 21 -- Scenario 1

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
1 Series: 2013 GO Refunding Bonds											
1A Total Bond	$ 2,160,000										
Principal	$ 215,000	$ 215,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest		2,774	-	-	-	-	-	-	-	-	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 217,774	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
1B Percent Water/WW											
Water		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Wastewater		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1C Water Debt Service											
Principal		$ 215,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest		2,774	-	-	-	-	-	-	-	-	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 217,774	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
1D Water Percent Growth and Replacement											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1E Water Growth-Related Debt Service											
Principal		$ 215,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest		2,774	-	-	-	-	-	-	-	-	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		217,774	-	-	-	-	-	-	-	-	-
1F Wastewater Debt Service											
Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest		-	-	-	-	-	-	-	-	-	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
1G Wastewater Percent Growth and Replacement											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
1H Wastewater Growth-Related Debt Service											
Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest		-	-	-	-	-	-	-	-	-	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		-	-	-	-	-	-	-	-	-	-

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service

Scenario: 2023 11 21 -- Scenario 1

		Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
2	**Series: 2018 CO's**											
2A	Total Bond	$ 10,440,000										
	Principal	$ 2,910,000	$ 235,000	$ 250,000	$ 260,000	$ 275,000	$ 290,000	$ 300,000	$ 310,000	$ 320,000	$ 330,000	$ 340,000
	Interest		162,049	149,925	137,174	123,799	109,674	96,424	85,774	76,324	66,368	55,687
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ 397,049	$ 399,925	$ 397,174	$ 398,799	$ 399,674	$ 396,424	$ 395,774	$ 396,324	$ 396,368	$ 395,687
2B	Percent Water/WW											
	Water		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Wastewater		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2C	Water Debt Service											
	Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		-	-	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2D	Water Allocation Percentages											
	Growth		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Replacement		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2E	Water Growth-Related Debt Service											
	Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		-	-	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		-	-	-	-	-	-	-	-	-	-
2F	Wastewater Debt Service											
	Principal		$ 235,000	$ 250,000	$ 260,000	$ 275,000	$ 290,000	$ 300,000	$ 310,000	$ 320,000	$ 330,000	$ 340,000
	Interest		162,049	149,925	137,174	123,799	109,674	96,424	85,774	76,324	66,368	55,687
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ 397,049	$ 399,925	$ 397,174	$ 398,799	$ 399,674	$ 396,424	$ 395,774	$ 396,324	$ 396,368	$ 395,687
2G	Wastewater Allocation Percentages											
	Growth		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Replacement		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2H	Wastewater Growth-Related Debt Service											
	Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		-	-	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		-	-	-	-	-	-	-	-	-	-

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service
Scenario: 2023 11 21 -- Scenario 1

3 Series: 2018 GO and Refunding Bonds

		Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
3A	Total Bond	$ 8,570,000										
	Principal	$ 885,000	$ 435,000	$ 450,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		33,375	11,250	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ 468,375	$ 461,250	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3B	Percent Water/WW											
	Water		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Wastewater		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3C	Water Debt Service											
	Principal		$ 435,000	$ 450,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		33,375	11,250	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ 468,375	$ 461,250	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3D	Water Allocation Percentages											
	Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3E	Water Growth-Related Debt Service											
	Principal		$ 435,000	$ 450,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		33,375	11,250	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		468,375	461,250	-	-	-	-	-	-	-	-
3F	Wastewater Debt Service											
	Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		-	-	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
3G	Wastewater Allocation Percentages											
	Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
3H	Wastewater Growth-Related Debt Service											
	Principal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Interest		-	-	-	-	-	-	-	-	-	-
	Reserve		-	-	-	-	-	-	-	-	-	-
	Total		-	-	-	-	-	-	-	-	-	-

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Current Debt Service											
Scenario: ***2023 11 21 -- Scenario 1***											
4 Series: 2019 CO's											
4A Total Bond	$ 7,495,000										
Principal	$ 1,730,000	$ 145,000	$ 155,000	$ 160,000	$ 165,000	$ 170,000	$ 175,000	$ 180,000	$ 185,000	$ 195,000	$ 200,000
Interest		87,100	81,100	74,800	68,300	62,875	58,125	52,800	47,325	41,625	35,700
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 232,100	$ 236,100	$ 234,800	$ 233,300	$ 232,875	$ 233,125	$ 232,800	$ 232,325	$ 236,625	$ 235,700
4B Percent Water/WW											
Water		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Wastewater		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
4C Water Debt Service											
Principal		$ 72,500	$ 77,500	$ 80,000	$ 82,500	$ 85,000	$ 87,500	$ 90,000	$ 92,500	$ 97,500	$ 100,000
Interest		43,550	40,550	37,400	34,150	31,438	29,063	26,400	23,663	20,813	17,850
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 116,050	$ 118,050	$ 117,400	$ 116,650	$ 116,438	$ 116,563	$ 116,400	$ 116,163	$ 118,313	$ 117,850
4D Water Allocation Percentages											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
4E Water Growth-Related Debt Service											
Principal		$ 72,500	$ 77,500	$ 80,000	$ 82,500	$ 85,000	$ 87,500	$ 90,000	$ 92,500	$ 97,500	$ 100,000
Interest		43,550	40,550	37,400	34,150	31,438	29,063	26,400	23,663	20,813	17,850
Reserve		-	-	-	-	-	-	-	-	-	-
Total		116,050	118,050	117,400	116,650	116,438	116,563	116,400	116,163	118,313	117,850
4F Wastewater Debt Service											
Principal		$ 72,500	$ 77,500	$ 80,000	$ 82,500	$ 85,000	$ 87,500	$ 90,000	$ 92,500	$ 97,500	$ 100,000
Interest		43,550	40,550	37,400	34,150	31,438	29,063	26,400	23,663	20,813	17,850
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 116,050	$ 118,050	$ 117,400	$ 116,650	$ 116,438	$ 116,563	$ 116,400	$ 116,163	$ 118,313	$ 117,850
4G Wastewater Allocation Percentages											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
4H Wastewater Growth-Related Debt Service											
Principal		$ 72,500	$ 77,500	$ 80,000	$ 82,500	$ 85,000	$ 87,500	$ 90,000	$ 92,500	$ 97,500	$ 100,000
Interest		43,550	40,550	37,400	34,150	31,438	29,063	26,400	23,663	20,813	17,850
Reserve		-	-	-	-	-	-	-	-	-	-
Total		116,050	118,050	117,400	116,650	116,438	116,563	116,400	116,163	118,313	117,850

CITY OF SCHERTZ

WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service

Scenario: 2023 11 21 -- Scenario 1

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
5 Series: 2021 GO Refunding Bonds											
5A Total Bond	$ 6,015,000										
Principal	$ 1,650,000	$ 160,000	$ 165,000	$ 175,000	$ 180,000	$ 190,000	$ 195,000	$ 205,000	$ 210,000	$ 170,000	$ -
Interest		45,450	38,950	32,150	25,950	20,400	14,625	9,650	5,500	1,700	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 205,450	$ 203,950	$ 207,150	$ 205,950	$ 210,400	$ 209,625	$ 214,650	$ 215,500	$ 171,700	$ -
5B Percent Water/WW											
Water		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Wastewater		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
5C Water Debt Service											
Principal		$ 80,000	$ 82,500	$ 87,500	$ 90,000	$ 95,000	$ 97,500	$ 102,500	$ 105,000	$ 85,000	$ -
Interest		22,725	19,475	16,075	12,975	10,200	7,313	4,825	2,750	850	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 102,725	$ 101,975	$ 103,575	$ 102,975	$ 105,200	$ 104,813	$ 107,325	$ 107,750	$ 85,850	$ -
5D Water Allocation Percentages											
Growth		33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%
Replacement		67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
5E Water Growth-Related Debt Service											
Principal		$ 26,400	$ 27,225	$ 28,875	$ 29,700	$ 31,350	$ 32,175	$ 33,825	$ 34,650	$ 28,050	$ -
Interest		7,499	6,427	5,305	4,282	3,366	2,413	1,592	908	281	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		33,899	33,652	34,180	33,982	34,716	34,588	35,417	35,558	28,331	-
5F Wastewater Debt Service											
Principal		$ 80,000	$ 82,500	$ 87,500	$ 90,000	$ 95,000	$ 97,500	$ 102,500	$ 105,000	$ 85,000	$ -
Interest		22,725	19,475	16,075	12,975	10,200	7,313	4,825	2,750	850	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 102,725	$ 101,975	$ 103,575	$ 102,975	$ 105,200	$ 104,813	$ 107,325	$ 107,750	$ 85,850	$ -
5G Wastewater Allocation Percentages											
Growth		33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%	33.0%
Replacement		67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
5H Wastewater Growth-Related Debt Service											
Principal		$ 26,400	$ 27,225	$ 28,875	$ 29,700	$ 31,350	$ 32,175	$ 33,825	$ 34,650	$ 28,050	$ -
Interest		7,499	6,427	5,305	4,282	3,366	2,413	1,592	908	281	-
Reserve		-	-	-	-	-	-	-	-	-	-
Total		33,899	33,652	34,180	33,982	34,716	34,588	35,417	35,558	28,331	-

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service
Scenario: 2023 11 21 -- Scenario 1

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
6 Series: 2022 CO's											
6A Total Bond	$ 9,390,000										
Principal	$ 2,095,000	$ 165,000	$ 175,000	$ 185,000	$ 195,000	$ 205,000	$ 215,000	$ 225,000	$ 235,000	$ 245,000	$ 250,000
Interest		141,837	133,337	124,337	114,837	104,837	94,337	83,337	73,012	64,637	57,212
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 306,837	$ 308,337	$ 309,337	$ 309,837	$ 309,837	$ 309,337	$ 308,337	$ 308,012	$ 309,637	$ 307,212
6B Percent Water/WW											
Water		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Wastewater		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6C Water Debt Service											
Principal		$ 82,500	$ 87,500	$ 92,500	$ 97,500	$ 102,500	$ 107,500	$ 112,500	$ 117,500	$ 122,500	$ 125,000
Interest		70,919	66,669	62,169	57,419	52,419	47,169	41,669	36,506	32,319	28,606
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 153,419	$ 154,169	$ 154,669	$ 154,919	$ 154,919	$ 154,669	$ 154,169	$ 154,006	$ 154,819	$ 153,606
6D Water Allocation Percentages											
Growth		42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%
Replacement		57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6E Water Growth-Related Debt Service											
Principal		$ 35,144	$ 37,274	$ 39,404	$ 41,534	$ 43,663	$ 45,793	$ 47,923	$ 50,053	$ 52,183	$ 53,248
Interest		30,210	28,400	26,483	24,459	22,329	20,093	17,750	15,551	13,767	12,186
Reserve		-	-	-	-	-	-	-	-	-	-
Total		65,354	65,673	65,886	65,993	65,993	65,886	65,673	65,604	65,950	65,434
6F Wastewater Debt Service											
Principal		$ 82,500	$ 87,500	$ 92,500	$ 97,500	$ 102,500	$ 107,500	$ 112,500	$ 117,500	$ 122,500	$ 125,000
Interest		70,919	66,669	62,169	57,419	52,419	47,169	41,669	36,506	32,319	28,606
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 153,419	$ 154,169	$ 154,669	$ 154,919	$ 154,919	$ 154,669	$ 154,169	$ 154,006	$ 154,819	$ 153,606
6G Wastewater Allocation Percentages											
Growth		42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%	42.6%
Replacement		57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%	57.4%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6H Wastewater Growth-Related Debt Service											
Principal		$ 35,144	$ 37,274	$ 39,404	$ 41,534	$ 43,663	$ 45,793	$ 47,923	$ 50,053	$ 52,183	$ 53,248
Interest		30,210	28,400	26,483	24,459	22,329	20,093	17,750	15,551	13,767	12,186
Reserve		-	-	-	-	-	-	-	-	-	-
Total		65,354	65,673	65,886	65,993	65,993	65,886	65,673	65,604	65,950	65,434

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service
Scenario: *2023 11 21 -- Scenario 1*

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
7 Series: 2022A CO's											
7A Total Bond	$ 18,530,000										
Principal	$ 4,365,000	$ 345,000	$ 365,000	$ 380,000	$ 400,000	$ 420,000	$ 445,000	$ 465,000	$ 490,000	$ 515,000	$ 540,000
Interest		418,825	401,075	382,450	362,950	342,450	320,825	298,075	274,200	249,075	222,700
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 763,825	$ 766,075	$ 762,450	$ 762,950	$ 762,450	$ 765,825	$ 763,075	$ 764,200	$ 764,075	$ 762,700
7B Percent Water/WW											
Water		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Wastewater		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
7C Water Debt Service											
Principal		$ 172,500	$ 182,500	$ 190,000	$ 200,000	$ 210,000	$ 222,500	$ 232,500	$ 245,000	$ 257,500	$ 270,000
Interest		209,413	200,538	191,225	181,475	171,225	160,413	149,038	137,100	124,538	111,350
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 381,913	$ 383,038	$ 381,225	$ 381,475	$ 381,225	$ 382,913	$ 381,538	$ 382,100	$ 382,038	$ 381,350
7D Water Allocation Percentages											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6E Water Growth-Related Debt Service											
Principal		$ 172,500	$ 182,500	$ 190,000	$ 200,000	$ 210,000	$ 222,500	$ 232,500	$ 245,000	$ 257,500	$ 270,000
Interest		209,413	200,538	191,225	181,475	171,225	160,413	149,038	137,100	124,538	111,350
Reserve		-	-	-	-	-	-	-	-	-	-
Total		381,913	383,038	381,225	381,475	381,225	382,913	381,538	382,100	382,038	381,350
7E Wastewater Debt Service											
Principal		$ 172,500	$ 182,500	$ 190,000	$ 200,000	$ 210,000	$ 222,500	$ 232,500	$ 245,000	$ 257,500	$ 270,000
Interest		209,413	200,538	191,225	181,475	171,225	160,413	149,038	137,100	124,538	111,350
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 381,913	$ 383,038	$ 381,225	$ 381,475	$ 381,225	$ 382,913	$ 381,538	$ 382,100	$ 382,038	$ 381,350
7F Wastewater Allocation Percentages											
Growth		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Replacement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
6H Wastewater Growth-Related Debt Service											
Principal		$ 172,500	$ 182,500	$ 190,000	$ 200,000	$ 210,000	$ 222,500	$ 232,500	$ 245,000	$ 257,500	$ 270,000
Interest		209,413	200,538	191,225	181,475	171,225	160,413	149,038	137,100	124,538	111,350
Reserve		-	-	-	-	-	-	-	-	-	-
Total		381,913	383,038	381,225	381,475	381,225	382,913	381,538	382,100	382,038	381,350

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Current Debt Service
Scenario: 2023 11 21 -- Scenario 1

11 Series: Total Current Debt Service

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
11A Total Current Debt Service											
Principal		$ 1,700,000	$ 1,560,000	$ 1,160,000	$ 1,215,000	$ 1,275,000	$ 1,330,000	$ 1,385,000	$ 1,440,000	$ 1,455,000	$ 1,330,000
Interest		891,410	815,637	750,911	695,836	640,236	584,336	529,636	476,361	423,405	371,299
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 2,591,410	$ 2,375,637	$ 1,910,911	$ 1,910,836	$ 1,915,236	$ 1,914,336	$ 1,914,636	$ 1,916,361	$ 1,878,405	$ 1,701,299
Water Total Debt Service											
Principal		$ 1,057,500	$ 880,000	$ 450,000	$ 470,000	$ 492,500	$ 515,000	$ 537,500	$ 560,000	$ 562,500	$ 495,000
Interest		382,755	338,481	306,869	286,019	265,281	243,956	221,931	200,019	178,519	157,806
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 1,440,255	$ 1,218,481	$ 756,869	$ 756,019	$ 757,781	$ 758,956	$ 759,431	$ 760,019	$ 741,019	$ 652,806
Water Growth-Related Debt Service											
Principal		$ 956,544	$ 774,499	$ 338,279	$ 353,734	$ 370,013	$ 387,968	$ 404,248	$ 422,203	$ 435,233	$ 423,248
Interest		326,821	287,164	260,413	244,366	228,358	211,981	194,780	177,221	159,398	141,386
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 1,283,365	$ 1,061,663	$ 598,691	$ 598,100	$ 598,371	$ 599,950	$ 599,028	$ 599,424	$ 594,631	$ 564,634
Wastewater Total Debt Service											
Principal		$ 642,500	$ 680,000	$ 710,000	$ 745,000	$ 782,500	$ 815,000	$ 847,500	$ 880,000	$ 892,500	$ 835,000
Interest		508,655	477,156	444,043	409,818	374,955	340,380	307,705	276,343	244,887	213,493
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 1,151,155	$ 1,157,156	$ 1,154,043	$ 1,154,818	$ 1,157,455	$ 1,155,380	$ 1,155,205	$ 1,156,343	$ 1,137,387	$ 1,048,493
Wastewater Growth-Related Debt Service											
Principal		$ 306,544	$ 324,499	$ 338,279	$ 353,734	$ 370,013	$ 387,968	$ 404,248	$ 422,203	$ 435,233	$ 423,248
Interest		290,672	275,914	260,413	244,366	228,358	211,981	194,780	177,221	159,398	141,386
Reserve		-	-	-	-	-	-	-	-	-	-
Total		$ 597,216	$ 600,413	$ 598,691	$ 598,100	$ 598,371	$ 599,950	$ 599,028	$ 599,424	$ 594,631	$ 564,634

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- UNFUNDED Capital Improvement Plan
Scenario: 2023 11 21 -- Scenario 1

WATER CIP

		Percent Growth	Percent Replacement	Total CIP/ Project	Total Growth	Total Replacement	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
NT-W1	Bubbling Springs 6" WL Replacement	27.0%	73.0%	$ 763,000	$ 206,010	$ 556,990	$ 254,333	$ 254,333	$ 254,333	$ -	$ -	$ -	$ -	$ -	$ -	$ -
NT-W2	Corbett Pump Station and 3.0 MGD GST	0.0%	100.0%	8,600,000	-	8,600,000	2,866,667	2,866,667	2,866,667	-	-	-	-	-	-	-
NT-W3	Ware - Seguin and Pump Station Operation Ir	0.0%	100.0%	175,000	-	175,000	58,333	58,333	58,333	-	-	-	-	-	-	-
NT-W4	12" WL from Ware Seguin to Lower Seguin	0.0%	100.0%	1,538,000	-	1,538,000	512,667	512,667	512,667	-	-	-	-	-	-	-
NT-W5	Fred Couples to Schwab	0.0%	100.0%	455,556	-	455,556	151,852	151,852	151,852	-	-	-	-	-	-	-
NT-W6	Schwab to Eckhardt	0.0%	100.0%	1,600,000	-	1,600,000	533,333	533,333	533,333	-	-	-	-	-	-	-
NT-W7	Graytown to Pfeil	69.0%	31.0%	1,550,000	1,069,500	480,500	516,667	516,667	516,667	-	-	-	-	-	-	-
NT-W8	FM 78 Water Line Replacement	22.0%	78.0%	875,000	192,500	682,500	291,667	291,667	291,667	-	-	-	-	-	-	-
NT-W9	Moonlight Meadow Dr & Lost Meadow WL Re	0.0%	100.0%	3,000,000	-	3,000,000	1,000,000	1,000,000	1,000,000	-	-	-	-	-	-	-
NT-W10	Robinhood Way WL Replacement	0.0%	100.0%	4,650,000	-	4,650,000	1,550,000	1,550,000	1,550,000	-	-	-	-	-	-	-
2030-W1	12" WL from Tri-County Extension	100.0%	0.0%	4,788,000	4,788,000	-	-	-	-	1,596,000	1,596,000	1,596,000	-	-	-	-
2030-W2	Raf Burnette Rd 12" WL Imp	89.0%	11.0%	1,438,000	1,279,820	158,180	-	-	-	479,333	479,333	479,333	-	-	-	-
2030-W3	8" WL from Ray Corbett DL to Lower Seguin	97.0%	3.0%	3,688,000	3,577,360	110,640	-	-	-	1,229,333	1,229,333	1,229,333	-	-	-	-
2030-W4	Trainer Hale Rd 2" WL Replace & Imp	93.0%	7.0%	9,850,000	9,160,500	689,500	-	-	-	3,283,333	3,283,333	3,283,333	-	-	-	-
2030-W5	Boenig Dr 6" WL Replace & Imp	69.0%	31.0%	6,388,000	4,407,720	1,980,280	-	-	-	2,129,333	2,129,333	2,129,333	-	-	-	-
2030-W6	Live Oak to IH-35 24" Trans Main	100.0%	0.0%	32,075,000	32,075,000	-	-	-	-	10,691,667	10,691,667	10,691,667	-	-	-	-
2030-W7	Ware Seguin Pump Station Expansion I	33.0%	67.0%	5,213,000	1,720,290	3,492,710	-	-	-	1,737,667	1,737,667	1,737,667	-	-	-	-
2030-W8	IH-10 8" WL Imp	100.0%	0.0%	6,063,000	6,063,000	-	-	-	-	2,021,000	2,021,000	2,021,000	-	-	-	-
2030-W9	PRV Installation for SW Pressure Plane	0.0%	100.0%	413,000	-	413,000	-	-	-	137,667	137,667	137,667	-	-	-	-
2030-W10	River Rd WL Replace	58.0%	42.0%	2,325,000	1,348,500	976,500	-	-	-	775,000	775,000	775,000	-	-	-	-
2030-W11	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
2030-W12	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
2030-W13	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
2030-W14	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
2030-W15	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
2030-W16	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	100.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Unfunded Water CIP			**95,447,556**	**65,888,200**	**29,559,356**	**7,735,519**	**7,735,519**	**7,735,519**	**24,080,333**	**24,080,333**	**24,080,333**	**-**	**-**	**-**	**-**
					69.0%	**31.0%**										
				95,447,556	68,347,605											

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- UNFUNDED Capital Improvement Plan
Scenario: 2023 11 21 -- Scenario 1

	Percent Growth	Percent Replacement	Total CIP/ Project	Total Growth	Total Replacement	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Water and Sewer Fund 202 -- Financing															
Beginning Balance						$ 3,320,378	$ 5,171,777	$ 150,601	$ 21,052,750	$ 313,247	$ 21,029,856	$ 448,524	$ 3,412,973	$ 6,551,639	$ 9,872,214
Plus Interest						99,611	155,153	4,518	631,582	9,397	630,896	13,456	102,389	196,549	296,166
Impact Fee Revenue															
Estimated Impact Fee						$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934	$ 2,934
Annual LUEs						848	872	897	923	950	978	1,006	1,035	1,065	1,096
Total Impact Fees						2,487,306	2,559,189	2,633,150	2,709,248	2,787,545	2,868,105	2,950,993	3,036,277	3,124,026	3,214,310
Plus Contributions from Developers						-	-	-	-	-	-	-	-	-	-
Plus ARP						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Water Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Sewer Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Conributions from Water Reserves						-	-	-	-	-	-	-	-	-	-
Plus Conributions from Sewer Reserves						-	-	-	-	-	-	-	-	-	-
Plus Amount Funded by W/WW Rate Revenue						-	-	-	-	-	-	-	-	-	-
Plus Funded from EDC						-	-	-	-	-	-	-	-	-	-
Plus Funded from TxDOT						-	-	-	-	-	-	-	-	-	-
Sub-Total						5,907,295	7,886,119	2,788,269	24,393,580	3,110,190	24,528,857	3,412,973	6,551,639	9,872,214	13,382,690
Plus Amount Funded by Long-Term Debt						7,000,000	-	26,000,000	-	42,000,000	-	-	-	-	-
Total Funds Available						12,907,295	7,886,119	28,788,269	24,393,580	45,110,190	24,528,857	3,412,973	6,551,639	9,872,214	13,382,690
Less Capital Improvement Plan			**95,447,556**	**65,888,200**	**29,559,356**	**7,735,519**	**7,735,519**	**7,735,519**	**24,080,333**	**24,080,333**	**24,080,333**	**-**	**-**	**-**	**-**
Ending Balance						5,171,777	150,601	21,052,750	313,247	21,029,856	448,524	3,412,973	6,551,639	9,872,214	13,382,690

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- UNFUNDED Capital Improvement Plan
Scenario: 2023 11 21 -- Scenario 1

WASTEWATER CIP

		Percent Growth	Percent Replacement	Total CIP/ Project	Total Growth	Total Replacement	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
NT-S1	Town Creek Phase IV 24" Section 1	21.0%	79.0%	$ 6,875,000	$ 1,443,750	$ 5,431,250	$ 2,291,667	$ 2,291,667	$ 2,291,667	$ -	$ -	$ -	$ -	$ -	$ -	$ -
NT-S2	Town Creek Phase IV 12" Section 2	0.0%	100.0%	2,925,000	-	2,925,000	975,000	975,000	975,000	-	-	-	-	-	-	-
NT-S3	Town Creek V 24"	23.0%	77.0%	10,425,000	2,397,750	8,027,250	3,475,000	3,475,000	3,475,000	-	-	-	-	-	-	-
NT-S4	Upsize Lookout Line	20.0%	80.0%	3,838,000	767,600	3,070,400	1,279,333	1,279,333	1,279,333	-	-	-	-	-	-	-
NT-S5	Upsize Tri County Line	25.0%	75.0%	2,084,800	521,200	1,563,600	694,933	694,933	694,933	-	-	-	-	-	-	-
NT-S6	Cibolo West Main	83.0%	17.0%	16,213,000	13,456,790	2,756,210	5,404,333	5,404,333	5,404,333	-	-	-	-	-	-	-
NT-S7	Woman Hollering Creek Lift Station, Gravity Li	89.0%	11.0%	13,000,000	11,570,000	1,430,000	4,333,333	4,333,333	4,333,333	-	-	-	-	-	-	-
NT-SI-1	Decommission Tri County Lift Station	0.0%	100.0%	88,000	-	88,000	29,333	29,333	29,333	-	-	-	-	-	-	-
NT-SI-2	Decommission Corbett Lift Station	0.0%	100.0%	1,500,000	-	1,500,000	500,000	500,000	500,000	-	-	-	-	-	-	-
NT-SI-3	Decommission Sedona Lift Station	0.0%	100.0%	175,000	-	175,000	58,333	58,333	58,333	-	-	-	-	-	-	-
2030-S1	Hope Lane 8" Gravity Line	67.0%	33.0%	2,025,000	1,356,750	668,250	-	-	-	675,000	675,000	675,000	-	-	-	-
2030-S2	Old Wiederstein Rd 8"	5.0%	95.0%	1,338,000	66,900	1,271,100	-	-	-	446,000	446,000	446,000	-	-	-	-
2030-S3	Union Pacific RR 8" - Sec 1	10.0%	90.0%	2,563,000	256,300	2,306,700	-	-	-	854,333	854,333	854,333	-	-	-	-
2030-S4	Union Pacific RR 8" - Sec 2	12.0%	88.0%	400,000	48,000	352,000	-	-	-	133,333	133,333	133,333	-	-	-	-
2030-S5	Wiederstein Rd -- 8"	83.0%	17.0%	1,663,000	1,380,290	282,710	-	-	-	554,333	554,333	554,333	-	-	-	-
2030-S6	Schaefer Rd 8" Sec 1	33.0%	67.0%	4,913,000	1,621,290	3,291,710	-	-	-	1,637,667	1,637,667	1,637,667	-	-	-	-
2030-S7	Schaefer Rd 8" Sec 2	100.0%	0.0%	1,938,000	1,938,000	-	-	-	-	646,000	646,000	646,000	-	-	-	-
2030-S8	Aranda 8"	100.0%	0.0%	475,000	475,000	-	-	-	-	158,333	158,333	158,333	-	-	-	-
2030-S9	Weir Rd 10"	100.0%	0.0%	2,525,000	2,525,000	-	-	-	-	841,667	841,667	841,667	-	-	-	-
2030-S10	Trainer Hale Rd 10"	100.0%	0.0%	1,038,000	1,038,000	-	-	-	-	346,000	346,000	346,000	-	-	-	-
2030-S11	Ware Seguin Rd 8"	97.0%	3.0%	3,113,000	3,019,610	93,390	-	-	-	1,037,667	1,037,667	1,037,667	-	-	-	-
2030-S12	FM 1518 8"	40.0%	60.0%	400,000	160,000	240,000	-	-	-	133,333	133,333	133,333	-	-	-	-
2030-S13	I-10 8" Section 1	99.0%	1.0%	2,713,000	2,685,870	27,130	-	-	-	904,333	904,333	904,333	-	-	-	-
2030-S14	Boenig Drive 8"	29.0%	71.0%	2,963,000	859,270	2,103,730	-	-	-	987,667	987,667	987,667	-	-	-	-
2030-S15	N Greytown Rd 8"	52.0%	48.0%	1,275,000	663,000	612,000	-	-	-	425,000	425,000	425,000	-	-	-	-
2030-SI - 1	Friesenhahn West Line WW Upsize	22.0%	78.0%	8,175,000	1,798,500	6,376,500	-	-	-	2,725,000	2,725,000	2,725,000	-	-	-	-
2030-SI - 2	Fairlawn WW Upsize	9.0%	91.0%	1,375,000	123,750	1,251,250	-	-	-	458,333	458,333	458,333	-	-	-	-
2030-SI - 3	Cibolo Crossing WW Line Upsize	4.0%	96.0%	1,288,000	51,520	1,236,480	-	-	-	429,333	429,333	429,333	-	-	-	-
2030-SI - 4	Woodland Oak Drive Replacement	4.0%	96.0%	338,000	13,520	324,480	-	-	-	112,667	112,667	112,667	-	-	-	-
2030-SI - 5	Old Wiederstein WW Upsize	61.0%	39.0%	5,050,000	3,080,500	1,969,500	-	-	-	1,683,333	1,683,333	1,683,333	-	-	-	-
2030-SI - 6	Northcliffe Lift Station Upgrade	5.0%	95.0%	7,838,000	391,900	7,446,100	-	-	-	2,612,667	2,612,667	2,612,667	-	-	-	-
2030-SI - 7	Decommission Belmont Park Lift Station	0.0%	100.0%	463,000	-	463,000	-	-	-	154,333	154,333	154,333	-	-	-	-
	Future Project	0.0%	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	0.0%	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Future Project	0.0%	100.0%	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Unfunded Wastewater CIP			**110,992,800**	**53,710,060**	**57,282,740**	**19,041,267**	**19,041,267**	**19,041,267**	**17,956,333**	**17,956,333**	**17,956,333**	**-**	**-**	**-**	**-**
				110,992,800												

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- UNFUNDED Capital Improvement Plan
Scenario: 2023 11 21 -- Scenario 1

	Percent Growth	Percent Replacement	Total CIP/ Project	Total Growth	Total Replacement	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Water and Sewer Fund 202 -- Financing															
Beginning Balance						$ 3,320,378	$ 17,819,793	$ 793,244	$ 16,296,010	$ 389,990	$ 16,049,104	$ 221,454	$ 1,919,947	$ 3,715,243	$ 5,611,490
Plus Interest						99,611	534,594	23,797	488,880	11,700	481,473	6,644	57,598	111,457	168,345
Impact Fee Revenue															
Estimated Impact Fee						$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668	$ 1,668
Annual LUEs						864	887	911	936	961	988	1,014	1,042	1,070	1,099
Total Impact Fees						1,441,071	1,480,124	1,520,235	1,561,433	1,603,748	1,647,210	1,691,849	1,737,698	1,784,790	1,833,158
Plus Contributions from Developers						-	-	-	-	-	-	-	-	-	-
Plus ARP						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Water Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Sewer Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Conributions from Water Reserves						-	-	-	-	-	-	-	-	-	-
Plus Conributions from Sewer Reserves						-	-	-	-	-	-	-	-	-	-
Plus Amount Funded by W/WW Rate Revenue						-	-	-	-	-	-	-	-	-	-
Plus Funded from EDC						-	-	-	-	-	-	-	-	-	-
Plus Funded from TxDOT						-	-	-	-	-	-	-	-	-	-
Sub-Total						4,861,060	19,834,511	2,337,276	18,346,323	2,005,438	18,177,787	1,919,947	3,715,243	5,611,490	7,612,993
Plus Amount Funded by Long-Term Debt						32,000,000	-	33,000,000	-	32,000,000	-	-	-	-	-
Total Funds Available						36,861,060	19,834,511	35,337,276	18,346,323	34,005,438	18,177,787	1,919,947	3,715,243	5,611,490	7,612,993
Less Capital Improvement Plan			**110,992,800**	**53,710,060**	**57,282,740**	**19,041,267**	**19,041,267**	**19,041,267**	**17,956,333**	**17,956,333**	**17,956,333**	**-**	**-**	**-**	**-**
Ending Balance						17,819,793	793,244	16,296,010	389,990	16,049,104	221,454	1,919,947	3,715,243	5,611,490	7,612,993

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Percent Growth	Percent Replacement	Total CIP/ Project	Total Growth	Total Replacement	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- UNFUNDED Capital Improvement Plan															
Scenario: 2023 11 21 -- Scenario 1															
Total CIP															
Total Water Unfunded CIP			$ 95,447,556	$ 65,888,200	$ 29,559,356	$ 7,735,519	$ 7,735,519	$ 7,735,519	$ 24,080,333	$ 24,080,333	$ 24,080,333	$ -	$ -	$ -	$ -
Total Wastewater Unfunded CIP			110,992,800	53,710,060	57,282,740	19,041,267	19,041,267	19,041,267	17,956,333	17,956,333	17,956,333	-	-	-	-
Total Unfunded CIP			**206,440,356**	**119,598,260**	**86,842,096**	**26,776,785**	**26,776,785**	**26,776,785**	**42,036,667**	**42,036,667**	**42,036,667**	**-**	**-**	**-**	**-**
Water and Sewer Fund 202 -- Financing															
Beginning Balance						$ 6,640,756	$ 22,991,570	$ 943,845	$ 37,348,760	$ 703,237	$ 37,078,961	$ 669,978	$ 5,332,920	$ 10,266,883	$ 15,483,704
Plus Interest						199,223	689,747	28,315	1,120,463	21,097	1,112,369	20,099	159,988	308,006	464,511
Impact Fee Revenue															
Estimated Impact Fee						NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Annual LUEs						NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Impact Fees						3,928,377	4,039,313	4,153,385	4,270,681	4,391,293	4,515,315	4,642,843	4,773,975	4,908,815	5,047,468
Plus Contributions from Developers						-	-	-	-	-	-	-	-	-	-
Plus ARP						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Water Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Contributions from Sewer Impact Fees						-	-	-	-	-	-	-	-	-	-
Plus Conributions form Water Reserves						-	-	-	-	-	-	-	-	-	-
Plus Conributions form Sewer Reserves						-	-	-	-	-	-	-	-	-	-
Plus Amount Funded by W/WW Rate Revenue						-	-	-	-	-	-	-	-	-	-
Plus Funded from EDC						-	-	-	-	-	-	-	-	-	-
Plus Funded from TxDOT						-	-	-	-	-	-	-	-	-	-
Sub-Total						10,768,355	27,720,630	5,125,545	42,739,904	5,115,627	42,706,644	5,332,920	10,266,883	15,483,704	20,995,683
Plus Amount Funded by Long-Term Debt						**39,000,000**	**-**	**59,000,000**	**-**	**74,000,000**	**-**	**-**	**-**	**-**	**-**
Total Funds Available						49,768,355	27,720,630	64,125,545	42,739,904	79,115,627	42,706,644	5,332,920	10,266,883	15,483,704	20,995,683
Less Capital Improvement Plan			206,440,356	119,598,260	86,842,096	26,776,785	26,776,785	26,776,785	42,036,667	42,036,667	42,036,667	-	-	-	-
Ending Balance						**22,991,570**	**943,845**	**37,348,760**	**703,237**	**37,078,961**	**669,978**	**5,332,920**	**10,266,883**	**15,483,704**	**20,995,683**

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Debt Financing Variables											
Issuing Cost Percentage	1.0%										
Initial Reserve Cost Percentage	2.0%										
Interest Rate	3.00%										
Term (Years)	20										
Annual Reserve Years Funded	-										
Debt Issues											
Total											
Water	$ 75,000,000	$ 7,000,000	$ -	$ 26,000,000	$ -	$ 42,000,000	$ -	$ -	$ -	$ -	$ -
Wastewater	97,000,000	32,000,000	-	33,000,000	-	32,000,000	-	-	-	-	-
Total	172,000,000	39,000,000	-	59,000,000	-	74,000,000	-	-	-	-	-
Percent Growth-Related		69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%
Growth-Related Debt Issues											
Water	$ 51,773,091	$ 4,832,155	$ -	$ 17,948,005	$ -	$ 28,992,931	$ -	$ -	$ -	$ -	$ -
Wastewater	66,959,864	22,089,852	-	22,780,160	-	22,089,852	-	-	-	-	-
Total	**118,732,955**	**26,922,007**	**-**	**40,728,165**	**-**	**51,082,783**	**-**	**-**	**-**	**-**	**-**

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

Input Area -- Future Debt Service

Scenario: 2023 11 21 -- Scenario 1

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Series: **2025**											
Principal	$ 26,922,007	$ -									
Issuing/Initial Reserve Costs	807,660										
Total Debt	27,729,668										
Interest Rate	3.0%										
Term	20										
P&I	1,863,869										
			1	2	3	4	5	6	7	8	9
Beginning Principal			27,729,668	26,697,688	25,634,750	24,539,923	23,412,251	22,250,750	21,054,403	19,822,166	18,552,962
Interest			831,890	800,931	769,042	736,198	702,368	667,522	631,632	594,665	556,589
Principal			$ 1,031,979	$ 1,062,939	$ 1,094,827	$ 1,127,672	$ 1,161,502	$ 1,196,347	$ 1,232,237	$ 1,269,204	$ 1,307,280
Interest			831,890	800,931	769,042	736,198	702,368	667,522	631,632	594,665	556,589
Annual Reserve			-	-	-	-	-	-	-	-	-
Total			$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869	$ 1,863,869
Percent Water/WW											
Water			17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%	17.9%
Wastewater			82.1%	82.1%	82.1%	82.1%	82.1%	82.1%	82.1%	82.1%	82.1%
Total			100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal			$ 185,227	$ 190,784	$ 196,507	$ 202,403	$ 208,475	$ 214,729	$ 221,171	$ 227,806	$ 234,640
Interest			149,314	143,757	138,033	132,138	126,066	119,812	113,370	106,735	99,901
Annual Reserve			-	-	-	-	-	-	-	-	-
Total			$ 334,541	$ 334,541	$ 334,541	$ 334,541	$ 334,541	$ 334,541	$ 334,541	$ 334,541	$ 334,541
Wastewater Debt Service											
Principal			$ 846,752	$ 872,155	$ 898,319	$ 925,269	$ 953,027	$ 981,618	$ 1,011,066	$ 1,041,398	$ 1,072,640
Interest			682,576	657,174	631,009	604,060	576,302	547,711	518,262	487,930	456,688
Annual Reserve			-	-	-	-	-	-	-	-	-
Total			$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329
Total Less Principal			682,576	657,174	631,009	604,060	576,302	547,711	518,262	487,930	456,688

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2026											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
				1	2	3	4	5	6	7	8
Beginning Principal				-	-	-	-	-	-	-	-
Interest				-	-	-	-	-	-	-	-
Principal				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest				-	-	-	-	-	-	-	-
Annual Reserve				-	-	-	-	-	-	-	-
Total				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Percent Water/WW											
Water				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wastewater				100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total				100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest				-	-	-	-	-	-	-	-
Annual Reserve				-	-	-	-	-	-	-	-
Total				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Debt Service											
Principal				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest				-	-	-	-	-	-	-	-
Annual Reserve				-	-	-	-	-	-	-	-
Total				$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Less Principal			-	-	-	-	-	-	-	-	-

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CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input	1	2	3	4	5	6	7	8	9	10
	Area	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2027											
Principal	$ 40,728,165										
Issuing/Initial Reserve Costs	1,221,845										
Total Debt	41,950,010										
Interest Rate	3.0%										
Term	20										
P&I	2,819,700										
					1	2	3	4	5	6	7
Beginning Principal					41,950,010	40,388,811	38,780,775	37,124,499	35,418,534	33,661,391	31,851,533
Interest					1,258,500	1,211,664	1,163,423	1,113,735	1,062,556	1,009,842	955,546
Principal					$ 1,561,199	$ 1,608,035	$ 1,656,276	$ 1,705,965	$ 1,757,144	$ 1,809,858	$ 1,864,154
Interest					1,258,500	1,211,664	1,163,423	1,113,735	1,062,556	1,009,842	955,546
Annual Reserve					-	-	-	-	-	-	-
Total					$ 2,819,700	$ 2,819,700	$ 2,819,700	$ 2,819,700	$ 2,819,700	$ 2,819,700	$ 2,819,700
Percent Water/WW											
Water					44.1%	44.1%	44.1%	44.1%	44.1%	44.1%	44.1%
Wastewater					55.9%	55.9%	55.9%	55.9%	55.9%	55.9%	55.9%
Total					100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal					$ 687,986	$ 708,626	$ 729,884	$ 751,781	$ 774,334	$ 797,564	$ 821,491
Interest					554,593	533,954	512,695	490,798	468,245	445,015	421,088
Annual Reserve					-	-	-	-	-	-	-
Total					$ 1,242,579	$ 1,242,579	$ 1,242,579	$ 1,242,579	$ 1,242,579	$ 1,242,579	$ 1,242,579
Wastewater Debt Service											
Principal					$ 873,213	$ 899,410	$ 926,392	$ 954,184	$ 982,809	$ 1,012,293	$ 1,042,662
Interest					703,907	677,711	650,728	622,937	594,311	564,827	534,458
Annual Reserve					-	-	-	-	-	-	-
Total					$ 1,577,120	$ 1,577,120	$ 1,577,120	$ 1,577,120	$ 1,577,120	$ 1,577,120	$ 1,577,120
Total Less Principal					703,907	677,711	650,728	622,937	594,311	564,827	534,458

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2028											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
						1	2	3	4	5	6
Beginning Principal						-	-	-	-	-	-
Interest						-	-	-	-	-	-
Principal						$ -	$ -	$ -	$ -	$ -	$ -
Interest						-	-	-	-	-	-
Annual Reserve						-	-	-	-	-	-
Total						$ -	$ -	$ -	$ -	$ -	$ -
Percent Water/WW											
Water						0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wastewater						100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total						100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal						$ -	$ -	$ -	$ -	$ -	$ -
Interest						-	-	-	-	-	-
Annual Reserve						-	-	-	-	-	-
Total						$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Debt Service											
Principal						$ -	$ -	$ -	$ -	$ -	$ -
Interest						-	-	-	-	-	-
Annual Reserve						-	-	-	-	-	-
Total						$ -	$ -	$ -	$ -	$ -	$ -
Total Less Principal						-	-	-	-	-	-

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2029											
Principal	$ 51,082,783										
Issuing/Initial Reserve Costs	1,532,483										
Total Debt	52,615,267										
Interest Rate	3.0%										
Term	20										
P&I	3,536,572										
							1	2	3	4	5
Beginning Principal							52,615,267	50,657,152	48,640,294	46,562,931	44,423,246
Interest							1,578,458	1,519,715	1,459,209	1,396,888	1,332,697
Principal							$ 1,958,114	$ 2,016,858	$ 2,077,364	$ 2,139,684	$ 2,203,875
Interest							1,578,458	1,519,715	1,459,209	1,396,888	1,332,697
Annual Reserve							-	-	-	-	-
Total							$ 3,536,572	$ 3,536,572	$ 3,536,572	$ 3,536,572	$ 3,536,572
Percent Water/WW											
Water							56.8%	56.8%	56.8%	56.8%	56.8%
Wastewater							43.2%	43.2%	43.2%	43.2%	43.2%
Total							100.0%	100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal							$ 1,111,362	$ 1,144,703	$ 1,179,044	$ 1,214,415	$ 1,250,848
Interest							895,882	862,541	828,200	792,828	756,396
Annual Reserve							-	-	-	-	-
Total							$ 2,007,244	$ 2,007,244	$ 2,007,244	$ 2,007,244	$ 2,007,244
Wastewater Debt Service											
Principal							$ 846,752	$ 872,155	$ 898,319	$ 925,269	$ 953,027
Interest							682,576	657,174	631,009	604,060	576,302
Annual Reserve							-	-	-	-	-
Total							$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329	$ 1,529,329
Total Less Principal							682,576	657,174	631,009	604,060	576,302

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2030											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
								1	2	3	4
Beginning Principal								-	-	-	-
Interest								-	-	-	-
Principal								$ -	$ -	$ -	$ -
Interest								-	-	-	-
Annual Reserve								-	-	-	-
Total								$ -	$ -	$ -	$ -
Percent Water/WW											
Water								0.0%	0.0%	0.0%	0.0%
Wastewater								100.0%	100.0%	100.0%	100.0%
Total								100.0%	100.0%	100.0%	100.0%
Water Debt Service											
Principal								$ -	$ -	$ -	$ -
Interest								-	-	-	-
Annual Reserve								-	-	-	-
Total								$ -	$ -	$ -	$ -
Wastewater Debt Service											
Principal								$ -	$ -	$ -	$ -
Interest								-	-	-	-
Annual Reserve								-	-	-	-
Total								$ -	$ -	$ -	$ -
Total Less Principal								-	-	-	-

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2031											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
									1	2	3
Beginning Principal									-	-	-
Interest									-	-	-
Principal									$ -	$ -	$ -
Interest									-	-	-
Annual Reserve									-	-	-
Total									$ -	$ -	$ -
Percent Water/WW											
Water									0.0%	0.0%	0.0%
Wastewater									100.0%	100.0%	100.0%
Total									100.0%	100.0%	100.0%
Water Debt Service											
Principal									$ -	$ -	$ -
Interest									-	-	-
Annual Reserve									-	-	-
Total									$ -	$ -	$ -
Wastewater Debt Service											
Principal									$ -	$ -	$ -
Interest									-	-	-
Annual Reserve									-	-	-
Total									$ -	$ -	$ -
Total Less Principal									-	-	-

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input	1	2	3	4	5	6	7	8	9	10
	Area	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2032											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
										1	2
Beginning Principal										-	-
Interest										-	-
Principal										$ -	$ -
Interest										-	-
Annual Reserve										-	-
Total										$ -	$ -
Percent Water/WW											
Water										0.0%	0.0%
Wastewater										100.0%	100.0%
Total										100.0%	100.0%
Water Debt Service											
Principal										$ -	$ -
Interest										-	-
Annual Reserve										-	-
Total										$ -	$ -
Wastewater Debt Service											
Principal										$ -	$ -
Interest										-	-
Annual Reserve										-	-
Total										$ -	$ -
Total Less Principal										-	-

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: 2033											
Principal	$ -										
Issuing/Initial Reserve Costs	-										
Total Debt	-										
Interest Rate	3.0%										
Term	20										
P&I	-										
											1
Beginning Principal											-
Interest											-
Principal											$ -
Interest											-
Annual Reserve											-
Total											$ -
Percent Water/WW											
Water											0.0%
Wastewater											100.0%
Total											100.0%
Water Debt Service											
Principal											$ -
Interest											-
Annual Reserve											-
Total											$ -
Wastewater Debt Service											
Principal											$ -
Interest											-
Annual Reserve											-
Total											$ -
Total Less Principal											-

Date: 11/25/2024

CITY OF SCHERTZ
WATER/WW IMPACT FEE UTILITY REVENUE CREDIT CALCULATION

	Input Area	1 2025	2 2026	3 2027	4 2028	5 2029	6 2030	7 2031	8 2032	9 2033	10 2034
Input Area -- Future Debt Service											
Scenario: 2023 11 21 -- Scenario 1											
Series: Total Future Debt Service											
Water Future Debt Service											
Total											
Principal		$ -	$ 185,227	$ 190,784	$ 884,493	$ 911,028	$ 2,049,721	$ 2,111,213	$ 2,174,549	$ 2,239,786	$ 2,306,979
Interest		-	149,314	143,757	692,627	666,092	1,534,643	1,473,151	1,409,814	1,344,578	1,277,384
Annual Reserve		-	-	-	-	-	-	-	-	-	-
Total		-	334,541	334,541	1,577,120	1,577,120	3,584,364	3,584,364	3,584,364	3,584,364	3,584,364
Wastewater Future Debt Service											
Total											
Principal		$ -	$ 846,752	$ 872,155	$ 1,771,533	$ 1,824,679	$ 2,726,171	$ 2,807,956	$ 2,892,195	$ 2,978,961	$ 3,068,330
Interest		-	682,576	657,174	1,334,916	1,281,770	1,909,606	1,827,821	1,743,582	1,656,817	1,567,448
Annual Reserve		-	-	-	-	-	-	-	-	-	-
Total		-	1,529,329	1,529,329	3,106,449	3,106,449	4,635,777	4,635,777	4,635,777	4,635,777	4,635,777

APPENDIX 33 - IMPACT FEE COMPARISON SOURCES

CITY OF BOERNE - 2023

EXHIBIT C

SCHEDULE OF MAXIMUM IMPACT FEES

UTILITY	CALCULATED FEE	RATE CREDIT	MAXIMUM FEE
WATER	$3,294	$786	$2,509
WASTEWATER	$5,637	$517	$5,120

EXHIBIT C1
IMPACT FEES BY METER SIZE
ASSESSED BEGINNING May 23, 2023

METER SIZE	LUE'S PER METER	WATER FEE	WASTEWATER FEE	TOTAL FEE
5/8"	1.0	$2,509.00	$5,120.00	$7,629.00
3/4"	1.5	$3,763.50	$7,680.00	$11,443.50
1"	2.5	$6,272.50	$12,800.00	$19,072.50
1 1/2"	5.0	$12,545.00	$25,600.00	$38,145.00
2" Non-turbine	8.0	$20,072.00	$40,960.00	$61,032.00
2" Compound	8.0	$20,072.00	$40,960.00	$61,032.00
2" Turbine	10.0	$25,090.00	$51,200.00	$76,290.00
3" Compound	16.0	$40,144.00	$81,920.00	$122,064.00
3" Turbine	25.0	$62,725.00	$128,000.00	$190,725.00
4" Compound	25.0	$62,725.00	$128,000.00	$190,725.00
4" Turbine	42.0	$105,378.00	$215,040.00	$320,418.00
6" Compound	50.0	$125,450.00	$256,000.00	$381,450.00
6" Turbine	92.0	$230,828.00	$471,040.00	$701,868.00
8" Turbine	160.0	$401,440.00	$819,200.00	$1,220,640.00
10" Turbine	250.0	$627,250.00	$1,280,000.00	$1,907,250.00
12" Turbine	330.0	$827,970.00	$1,689,600.00	$2,517,570.00

EXHIBIT C2
IMPACT FEES BY METER SIZE
ASSESSED DECEMBER 10, 2019, to May 22, 2023

METER SIZE	LUE'S PER METER	WATER FEE	WASTEWATER FEE	TOTAL FEE
5/8"	1.0	$5,743.00	$3,814.00	$9,557.00
3/4"	1.5	$8,614.50	$5,721.00	$14,335.50
1"	2.5	$14,357.50	$9,535.00	$23,892.50
1 1/2"	5.0	$28,715.00	$19,070.00	$47,785.00
2" Non-turbine	8.0	$45,944.00	$30,512.00	$76,456.00
2" Compound	8.0	$45,944.00	$30,512.00	$76,456.00
2" Turbine	10.0	$57,430.00	$38,140.00	$95,570.00

NEW BRAUNFELS UTILITIES - 2022

EXECUTIVE SUMMARY

In 2021, New Braunfels Utilities (NBU), authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the water and wastewater systems. The purpose of this report is to summarize the methodology used in the development and calculation of water and wastewater impact fees for NBU. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the update of water and wastewater impact fees.

As part of this study, land use assumptions, growth projections, and water/wastewater loading criteria from the *2021 Water & Wastewater Master Plan Update* by FNI were used to develop 10-year load projections for both the water and wastewater systems. Impact fee capital improvements plans (CIP) were developed for both systems to serve projected growth through 2032. The hydraulic models of the water and wastewater systems, along with pumping and storage planning criteria developed by FNI, were employed to calculate the percentage of each project's capacity projected to be utilized in the 10-year planning period (2022-2032). A summation of each project's estimated cost, including financing costs less credits for existing projects partially funded through rate increases, multiplied by the percentage of that project being utilized in the 10-year planning period was used to calculate a total impact fee eligible CIP cost for both water and wastewater. These costs were divided by the projected growth in living unit equivalents (LUE) for water and wastewater, respectively, to determine the maximum allowable impact fees. **Table ES-1** and **Table ES-2** summarize the maximum allowable impact fee calculations for water and wastewater, respectively. **Table ES-3** shows the maximum allowable impact fee for each meter size distributed by NBU.

Table ES-1 Maximum Water Impact Fee Calculation

Water Impact Fee	
Total Eligible Capital Improvement Costs	$228,540,978
Total Eligible Financing Costs	$168,389,936
Total Eligible Impact Fee Costs	$396,930,914
Total Impact Fee Credits	($837,433)
Maximum Allowable Cost	$396,093,481
Growth in Service Units	20,367
Maximum Allowable Water Impact Fee	**$19,448**

Table ES-2 Maximum Wastewater Impact Fee Calculation

Wastewater Impact Fee	
Total Eligible Capital Improvement Costs	$85,710,012
Total Eligible Financing Costs	$37,415,837
Total Eligible Impact Fee Costs	$123,125,849
Total Impact Fee Credits	($2,813,220)
Maximum Allowable Cost	$120,312,629
Growth in Service Units	19,269
Maximum Allowable Wastewater Impact Fee	**$6,244**

Table ES-3 Maximum Allowable Impact Fee by Meter Size

Meter Size	Maximum Flow Rate for Continuous Duty (gallons per minute)	Service Unit Equivalent	Maximum Allowable Water	Maximum Allowable Wastewater	Maximum Allowable Total
5/8"	10	1.0	$19,448	$6,244	$25,692
1"	25	2.5	$48,620	$15,610	$64,230
1 1/2"	50	5.0	$97,240	$31,220	$128,460
2"	80	8.0	$155,584	$49,952	$205,536
3"	175	17.5	$340,340	$109,270	$449,610
4"	300	30.0	$583,440	$187,320	$770,760
6"	675	67.5	$1,312,740	$421,470	$1,734,210
8"	2,400	240.0	$4,667,520	$1,498,560	$6,166,080
10"	3,500	350.0	$6,806,800	$2,185,400	$8,992,200

CITY OF SEGUIN - 2023

EXECUTIVE SUMMARY

1.0 Background

In August 2022, the City of Seguin, Texas (City), authorized Freese and Nichols, Inc. (FNI) to perform an impact fee analysis on the City's water and wastewater systems, including a portion of the Spring Hills Water Supply Corporation (SHWSC) Service Area that will be transferred to the City as part of the ongoing Certificate of Convenience and Necessity (CCN) Transfer. The purpose of this report is to summarize the methodology used in the development and calculation of water and wastewater impact fees for the City of Seguin. The methodology used herein satisfies the requirements of the Texas Local Government Code Section 395 for the establishment and update of water and wastewater impact fees.

2.0 Land Use Assumptions

Population and land use are important elements in the analysis of water and wastewater systems. Through collaboration between FNI and the City, FNI developed growth projections using land use assumptions from the ongoing Seguin Comprehensive Plan and proposed development according to the City's Planning Department to estimate service connections for the 2023 and 2033 planning periods. **Table ES-1** presents the growth projections for the City of Seguin Water and Wastewater Service Areas including the CCN area to be transferred from SHWSC to the City, hereafter referred to as the "Transfer Area."

Table ES-1: Growth Projections

Service Area	2023 Connections	2033 Connections	Growth Rate
Existing Water	*8,272*	*11,012*	*2.90%*
Transfer Area	*1,305*	*7,370*	*18.90%*
Water Total	**9,577**	**18,382**	**6.74%**
Wastewater Total	**10,741**	**28,319**	**10.18%**

3.0 Capital Improvement Plan

Water and wastewater impact fee capital improvement plans (CIP) were developed for the City of Seguin based on the land use assumptions and growth projections. The recommended improvements will provide the required capacity to meet projected water demands and wastewater flows through 2033. The CIPs are based on recommendations from the 2022 Water and Wastewater Master Plans and include improvements identified to provide service to the Transfer Area. For each existing or proposed project, the impact fee eligible cost is calculated as a percentage of the project cost, based upon the portion of the project's capacity required to serve growth projected to occur between 2023 and 2033, the 10-year period used for impact fee analysis. The cost associated with the portion of projects required to serve growth beyond this 10-year period are not included in the current impact fee calculations but will be eligible for impact fee cost recovery in the next impact fee update. The total cost for each eligible project includes the project's capital cost to serve 10-year growth, the projected finance cost for the capital improvements, and the consultant cost for preparing and updating the CIP. **Table ES-2** shows a summary of the total capital cost and impact fee-eligible cost for all Impact Fee CIP projects for the Water and Wastewater Service Areas.

Table ES-2: CIP Cost Summary

Service Area	Total Capital Cost of Impact Fee Eligible Projects	Total 10-Year (2023-2032) Cost of Impact Fee Eligible Projects
Water	$173,881,062	$87,766,441
Wastewater	$339,567,626	$194,769,279

4.0 Impact Fee Analysis

According to Chapter 395 of the Texas Local Government Code, the maximum impact fee may not exceed the amount determined by dividing the cost of required capital improvements by the total number of service units attributed to new development during the impact fee eligibility period. A water service unit is defined as the service equivalent to a water-only connection or a water/wastewater connection for a single-family residence. A wastewater service unit is defined as the service unit equivalent to a water/wastewater connection for a single-family residence. The current impact fee ordinance was adopted in 2020. This ordinance set the water impact fee for a single-family meter at $1,386.86 including a pass-through fee of $354.54 from Schertz-Seguin Local Government Corporation (SSLGC) and the wastewater impact fee for a single-family meter at $7,757.77. This project is an update to the 2020 ordinance. **Table ES-3** displays the updated maximum allowable impact fee per service unit for the Water and Wastewater Service Areas, including the $354.54 SSLGC pass-through fee.

Table ES-3: Maximum Allowable Impact Fees

Service Area	Maximum Allowable Impact Fee Per Service Unit
Water	$7,308
Wastewater	$9,250
Sub-Total	**$16,558**
SSLGC Water Supply Impact Fee	$354
Total Maximum Allowable Impact Fee	**$16,912**

CITY OF SAN MARCOS - 2018

Table 8.
Derivation of Alternative Maximum Water and Wastewater Impact Fee Amounts

Item	Capital Cost of New Service per LUE	Optional Adjustments		Option A	Option B	Highest of Option A or B
		Option A Rate Credit	Option B 50% Cost Adjustment			
WATER						
Supply	$ 2,495	$ 208	$ 1,247	$ 2,287	$ 1,247	
Treatment	609	10	305	599	305	
Pumping	128	18	64	110	64	
Ground Storage	298	1	149	297	149	
Elevated Storage	163	8	82	155	82	
Transmission	455	113	228	342	228	
Allocated Impact Fee Study Cost	10			10	10	
Total Water	$4,159	$358	$2,074	$3,801	$2,085	**$3,801**
WASTEWATER						
Treatment	$ 1,470	$ 86	$ 735	$ 1,385	$ 735	
Pumping	705	78	352	627	352	
Interceptors	774	112	387	662	387	
Allocated Impact Fee Study Cost	10			10	10	
Total Wastewater	$2,960	$276	$1,475	$2,684	$1,485	**$2,684**
TOTAL WATER/WASTEWATER	$7,119	$634	$3,549	$6,485	$3,570	**$6,485**

The fee methodology was replicated for each major facility type in the utility system (e.g., supply, treatment, pumping, elevated storage, ground storage, and transmission) so that the total fee amount is the sum of the component facility fees. This provides a basis for extending the fee to wholesale customers of the City or granting fee offsets if a developer cost-participates with the City on CIP projects.

For comparison purposes, the current impact fees of other near-by cities are listed in Table 9.

CITY OF AUSTIN - 2023

I. INTRODUCTION

Austin Water (AW) has developed this periodic impact fee update in close collaboration with the Austin City Council appointed Impact Fee Advisory Committee (IFAC) and other City of Austin (City) departments in accordance with state law. This required 5-year update takes a fresh look at Land Use Assumptions (LUA) and the impact fee Capital Improvement Plan (CIP) that will serve new development in the next 10 years. The basic requirements for determining the costs “Necessitated by and attributed to” new development are prescribed in the Impact Fee Act, Section 395.016 of the Texas Local Government Code. These requirements state that facility capacity that will be used by new growth and its cost are determined by first projecting the demand on the system (the LUA), and then deriving the facility plan for serving that demand (the CIP). The end-products are the maximum allowable impact fees for water and wastewater, which reflect the calculated cost of serving new growth that is not recouped in new customer rate payments. The law also sets the terms of fee assessment for a given tract of land.

The actual fees collected, up to the maximum allowable fee, are the purview of the Austin City Council. AW is proposing new collected fees for consideration via the public hearing mandated by the impact fee regulations. These proposed fees are presented in Section III. Subsequent to the hearing, Austin City Council will consider enacting an ordinance adopting new fees and, if approved, that ordinance will be appended to this document.

As detailed in the LUA section of this report, Austin continues to be one of the fastest growing cities in the country, with the projected 10-year growth estimated to be approximately 88,000 service units, in an impact fee service area that has not changed significantly from the 2018 update.

As detailed in the CIP section of this report, Austin’s investments in infrastructure necessitated by and attributed to growth are planned to exceed $678M for water and $524M for wastewater, a combined increase of 24% over the 2018 10-year capital improvements program plan, which includes a notable investment in new wastewater treatment plant capacity.

An additional factor in calculating the new maximum allowable fees is a credit for growth project revenues AW is projected to collect from projected 10-year growth customers for receiving water and wastewater services, which, within the context of impact fees, may be referred to as a rate revenue credit. To avoid double charging new customers, the law requires that monies paid by new users toward the growth projects in the form of rates be subtracted from the 10-year growth project costs. Similar to the previous update in 2018, the rate revenue credit amount is calculated for Austin-specific conditions resulting in a credit of approximately 41% and is detailed in the CIP document.

The final maximum allowable fee for a single service unit was calculated to be $4,882 for water and $2,969 for wastewater.

II. ASSESSED FEES

The Impact Fee Act provides what is called fee assessment in order to set the timing for establishing fees for a given tract of land. It states that impact fees must be assessed on all property no later than the time of subdivision (with certain exceptions where development occurs without the need for subdivision). Accordingly, the assessed fees for a particular lot are those in effect at the time of subdivision recordation. After 1990 the impact fee update reports and ordinances included the assessed fee separate from the maximum allowable and collected fees. The assessed fee remained constant until the 2007 update. Since then, the assessed fee is deemed to be the maximum allowable amount, thereby keeping open the option of setting collected fees up to the maximum allowable fee in effect at the time a subdivision plat is recorded.

III. COLLECTED FEES

After the required public hearing and Austin City Council's adoption of the LUA and CIP periodic update, Council considers the adoption of the ordinance that sets the impact fees to be assessed and collected at the time of tap sale for water meter purchase and/or wastewater service. The collected fees are generally referred to as Austin's water and wastewater impact fees. Historically, the collected amounts have been set by ordinance at amounts lower than the maximum allowable fees. The collected fees are proposed to be $4,800 for water and $2,900 for wastewater.

SAWS - 2024

March 18, 2024

TO INTERESTED PARTIES:

Texas Local Government Code Chapter 395 necessitates the updating of the San Antonio Water System (SAWS) impact fees by June 2024. The Capital Improvements Advisory Committee (CIAC), SAWS staff, and consultant Carollo Engineers began the update process for all water and wastewater impact fees in July 2023, and the CIAC finalized its recommendations in a findings report on January 31, 2024. The findings report and all other CIAC meeting documents are available at: www.saws.org/CIAC .

The update involves a projection of increased demand and resulting increased capacity in the water and wastewater systems for the next ten-year planning period. The costs associated with the capacity necessary to serve the projected growth determine the impact fee rate. The CIAC recommended impact fees are show below.

SUMMARY OF RECOMMENDED IMPACT FEES

Impact Fee Component	Impact Fee ($/EDU)		Fee Change	
	Current	Recommended	$	%
Water Supply	$ 2,706	$ 2,592	$ (114)	-4%
Water Flow	$ 1,188	$ 1,368	$ 180	15%
Water System Development				
High Elevation	$ 1,203	$ 2,027	$ 824	68%
Middle Elevation	$ 1,014	$ 1,744	$ 730	72%
Low Elevation	$ 855	$ 1,510	$ 655	77%
Wastewater Treatment				
Medio Creek	$ 1,222	$ 1,527	$ 305	25%
Clouse / Leon Creek	$ 651	$ 1,105	$ 454	70%
Wastewater Collection				
Medio Creek	$ 861	$ 1,836	$ 976	113%
Upper Medina	$ 1,422	$ 1,702	$ 280	20%
Lower Medina	$ 520	$ 768	$ 248	48%
Upper Collection	$ 2,800	$ 4,436	$ 1,636	58%
Middle Collection	$ 2,013	$ 2,792	$ 779	39%
Lower Collection	$ 902	$ 1,138	$ 236	26%
Totals	**$ 7,227**	***$ 8,919***	***$ 1,692***	***23%***

The recommended impact fees were approved by the SAWS Board of Trustees on March 5, 2024. It is anticipated that the San Antonio City Council will hold a public hearing and consider adoption of the recommended impact fees on May 16, 2024. When the recommended impact fees are approved by the San Antonio City Council, they are expected to become effective on June 1, 2024.

The determination on whether current impact fees or the recommended impact fees will be charged for service to a particular property is based on the date of plat recordation. In accordance with current state law, the impact fees in effect at the time the plat is recorded are the fees that will be charged. An individual may pay current impact fees for a property prior to plat recordation under the following conditions:

- The plat has been approved by the Planning Commission,
- All impact fees are paid prior to the effective date of the new impact fees.

If you have any questions concerning the update process, please do not hesitate to contact me at tlehmann@saws.org, 210-233-3492, or Bob Johnson at bobby.johnson@saws.org, 210-233-3493.

Sincerely,

Tracey B. Lehmann, P.E.
Interim Vice President
Engineering and Construction

CITY OF PFLUGERVILLE - 2023

where quality meets life
PFLUGERVILLE
TEXAS

Impact Fees

Effective January 10, 2023

Reference Ordinance No. 1577-23-01-10

Listed below are the Water and Wastewater Impact Fees, the water meter deposits and the Water and Wastewater tap fees

Meter Size	Service Units
5/8" Displacement	1.0
3/4" Displacement	1.7
1" Displacement	2.7
1 1/2" Displacement	3.3
2" Displacement	6.7
3" Compound	21.3
4" Compound	33.3
4" Combination	46.7
6" Compound	66.7
6" Combination	106.7
8" Combination	186.7
10" Combination	293.3

Service Area	Maximum Allowable Impact Fee Per Service Unit
Water	$14,713
Wastewater Service Area 1	$1,316
Wastewater Service Area 2	$15,136
Total in Wastewater Service Area 1	**$16,029**
Total in Wastewater Service Area 2	**$29,849**

City of Pflugerville Water and Wastewater Tap Fees:

Water Meter Deposit	$ 125
Water Tap Fee	$ 250
Wastewater Tap Fee	$ 250