THE CITY OF
Anna

Memorandum

Memorandum No: 24-123

Date: June 21, 2024

To: Honorable Mayor and City Council

From: Ryan Henderson, City Manager

Re: Northpointe Crossing Drainage Channel Erosion

Earlier this year the City of Anna met with the Homeowner's Association (HOA) President for Northpointe Crossing regarding concerns related to the existing drainage channel which traverses the neighborhood. The drainage channel was constructed by the original developer of Northpointe, which re-routed an existing creek into a new earthen channel with a different route. Anytime an existing creek is altered, there is an inherent risk of the creek banks moving over time, as the natural flows of water interact with the man-made alterations. When homes and private property are located very close to the creek, this can result in loss of land and potential negative impacts on the adjacent property, structures, and quality of life.

The drainage channel is located entirely within a drainage easement located on an HOA lot, which is owned and maintained by the Northpointe Homeowner's Association. Stormwater enters the channel from the surrounding residential neighborhood and from a large culvert system underneath County Road 1106. Approximately 35% of the total stormwater flow in the channel is from Northpointe Crossing, while the remaining 65% of the stormwater flow is from off-site properties north of County Road 1106.

In the recent past the HOA installed a temporary irrigation system between the fence line and the drainage channel. The remnants of the system may be seen in the attached site photos. It is our understanding that the purpose of the system was to establish vegetation, in the hopes of preventing further erosion.

At the request of the HOA President, our licensed engineering staff have conducted an analysis of the drainage channel to provide a better understanding of the history and status of the drainage channel. This memo is intended to provide the City Council with the history, background information, and findings of staff's analysis.

Based on a review of the record drawings, on the ground observations, and aerials from pre- and post-development, the man-made channel construction appears to have included the following alterations to the existing creek:

- straightened sections of the existing creek
- sharpening the angle of a natural bend in the creek

- steepening the slope of the channel banks to narrow the channel

These changes may have been made to increase the number of buildable lots in the neighborhood. It is important to note that the channel construction did not appear to include the following items which are commonly used to stabilize the banks of open drainage systems and protect against erosion:

- irrigation of the top of bank to preserve vegetation
- planting of erosion-resistant plant species, like certain species of juniper, jasmine, muhly grass, gardenias, and others
- installation of armor in channel bends and areas of steep grade, including gabions, grouted rock rip-rap, and concrete retaining walls

Without adequate vegetation or permanent armoring of the banks, over time the flowing water has visibly eroded the banks along multiple sections of the channel. The steep channel bend is one location where the creek appears to be pushing the banks toward their pre-development alignment. In some locations, the top of bank has moved very close to fence lines. It is likely that the erosion will eventually result in the loss of residential property and fencing in the future if the banks are not stabilized. Unfortunately, the temporary irrigation system installed by the HOA does not seem to have been effective in preventing further erosion.

Temporary low-cost improvements could be made along the channel to slow the erosion and possibly stop erosion in targeted areas where it is of greatest risk to the adjacent residential properties. However, it is the opinion of City staff that a long-term solution can only be accomplished through the implementation of a major construction project.

In an effort to determine the cost implications of such a project, the City sought a proposal for engineering design of a permanent solution. In April, the City received a proposal from GEI Consultants, Incorporated. GEI was selected by the City during the multi-disciplinary Request for Qualifications process as one of the pre-selected consulting firms for drainage projects. GEI provided the City with a proposal for the surveying and engineering design services necessary to produce construction plans for a permanent solution. The total cost of the proposed design services is $226,361. Staff has shared the proposal with the HOA President for his review.

Based on the proposal, staff has extrapolated a potential construction cost of $1,500,000 - $1,750,000 to construct the improvements if the design is completed soon. This brings the total project cost to approximately $2,000,000.

As you are aware, the City adopted Ordinance 971-2022 on April 12, 2022, establishing a Stormwater Utility for the City of Anna in 2022. A copy of the ordinance is attached for your information. Currently the Stormwater Utility rates are $3.20/month/single family residential property. The rate for commercial properties is $10.94/acre. The utility generates approximately $350,000 per year in revenues, which has primarily been spent on in-house maintenance projects across the city, including culvert repair/replacement, bar ditch grading, replacement of headwalls, and minor erosion control projects within public rights-of-way and at road crossings.

The city ordinance includes specific information regarding the responsibilities of both the City and landowners, including Section 12.09.008, which in part, states:

a) The establishment of the drainage utility by the City does not relieve users, private landowners, developers, other individuals or entities from responsibility for providing drainage improvements in connection with land development pursuant to the other ordinances of the City or laws of the State of Texas that relate to flooding, drainage, drainage management, or drainage improvements.
b) The establishment of the drainage utility does not imply or warrant that a benefitted property will be free from flooding, pollution, or stream erosion. The City makes no representation that all drainage problems will be remedied. This ordinance does not create additional duties on the part of the City or create new liability or remedies for any flooding, stream erosion, deterioration of water quality, or other damages. Nothing in this ordinance shall be deemed to waive the City's immunity under law or reduce the need or necessity for flood insurance.

The HOA President has indicated to City staff that he is interested in a cost-sharing proposal to design and install erosion protection for the channel. Since most of the stormwater entering the channel is from outside of the neighborhood, City staff finds that the channel does function as a public stormwater conveyance system which benefits properties outside of the Northpointe Subdivision. Based on that finding, staff finds that a cost-sharing agreement would be both reasonable and prudent. However, staff's primary concern regarding any solution to the erosion problem is the high cost of a permanent solution. The current stormwater utility revenues are not sufficient to provide even a 50% funding match for the project. It also remains unknown to the City what the financial position of the HOA is pertaining to project funding. However, it is likely that a 50% match would not be feasible for the HOA to provide either.

There are several options which could be pursued to address the cost concern. The project could be divided up into multiple construction phases during the design process. This would allow for permanent solutions to be constructed in the areas with the highest risk of causing residential property damage. Another option would be to install temporary solutions which would provide a near-term solution which could last 5+ years, but which would eventually need to be replaced with more permanent improvements. The cost of near-term solutions has not yet been fully explored.

Staff is planning to provide the City Council with a presentation during the workshop portion of an upcoming City Council meeting once the costs of a short-term solution can be determined. We will be seeking feedback and direction from the City Council on project scope, appropriate funding levels, and the potential partnership with the HOA.

Attachments:
Exhibit 1 – City Ordinance 971-2022
Exhibit 2 – Aerial imagery and site photos

c: Greg Peters, Assistant City Manager
Taylor Lough, Assistant City Manager
Wes Lawson, City Engineer
Clark McCoy, City Attorney
Carrie Land, City Secretary
Management Team

Exhibit 1

CITY OF ANNA, TEXAS

ORDINANCE NO. 971-2022

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ANNA, TEXAS, AMENDING THE ANNA CITY CODE OF ORDINANCES TO ADD A NEW ARTICLE 12.09 TO CHAPTER 12 (UTILITIES), SAID NEW ARTICLE ESTABLISHING THE CITY OF ANNA'S DRAINAGE UTILITY SYSTEM AND ITS SERVICE AREA; DEDICATING CITY ASSETS TO THE DRAINAGE UTILITY SYSTEM, AND ADOPTING RELATED REGULATIONS; PROVIDING FOR EXEMPTIONS; PROVIDING FOR SEVERABILITY; PROVIDING FOR REPEALER AND AN EFFECTIVE DATE.

WHEREAS, the City of Anna City Council (the "City Council") finds that to protect the public health and safety from loss of life and property caused by surface water overflows, surface water stagnation, and pollution arising from nonpoint source runoff within the city; and

WHEREAS, the City Council finds that funding for improvement of the existing drainage system and construction of future drainage projects is best funded by users of the drainage system on a prorated basis; and

WHEREAS, the City Council desires to establish a municipal drainage utility system and this ordinance is adopted for that purpose pursuant to the Texas Local Government Code, Subchapter C, Sections 552.041, et seq., as amended; and

WHEREAS, the City Council finds that pursuant to the Local Government Code, Section 552.045:

(a) it will establish a schedule of drainage charges against all real property in the service area subject to charges as permitted by Subchapter C, Chapter 552, Texas Local Government Code, subject to any exemptions as required or permitted by Subchapter C as set forth herein;

(b) it will provide drainage for all real property in the service area on payment of drainage charges, except real property exempted in accordance with Subchapter C;

(c) it will offer drainage service on nondiscriminatory, reasonable, and equitable terms; and

(d) notice as required by Subchapter C has been provided and a public hearing has been held; and

WHEREAS, the City Council finds that certain persons and entities shall be exempt from the rules, regulations, and charges imposed by the new 12.09 (Drainage), of The Anna City Code of Ordinances;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ANNA, TEXAS:

SECTION 1. The recitals set forth above are incorporated herein as if set forth in full and The Anna City Code of Ordinances Chapter 12 (Utilities) is amended to add Article 12.09 (Drainage), to read as follows:

ARTICLE 12.09. DRAINAGE

Sec. 12.09.001 Definitions.

Benefitted property. An improved lot or tract to which drainage service is made available under this article.

City. The City of Anna, Texas.

City council. The city's governing body.

Cost of service. As applied to the drainage utility system service to any benefitted property:

(a) the prorated cost of the acquisition, whether by eminent domain or otherwise, of land, rights-of-way, options to purchase land, easements, and interests in land relating to structures, equipment, and facilities used in draining the benefitted property;

(b) the prorated cost of the acquisition, construction, repair, and maintenance of structures, equipment, and facilities used in draining the benefitted property;

(c) the prorated cost of architectural, engineering, legal, and related services, plans and specifications, studies, surveys, estimates of cost and of revenue, and all other expenses necessary or incident to planning, providing, or determining the feasibility and practicability of structures, equipment, and facilities used in draining the benefitted property;

(d) the prorated cost of all machinery, equipment, furniture, and facilities necessary or incident to the provision and operation of draining the benefitted property;

(e) the prorated cost of funding and financing charges and interest arising from construction projects and the start-up cost of a drainage facility used in draining the benefitted property;

(f) the prorated cost of debt service and reserve requirements of structures, equipment, and facilities provided by revenue bonds or other drainage revenue-pledge securities or obligations issued by the city; and

(g) the administrative costs of a drainage utility system.

Drainage. Bridges, catch basins, channels, conduits, creeks, culverts, detention ponds, ditches, draws, flumes, pipes, pumps, sloughs, treatment works, and appurtenances to those items, whether natural or artificial, or using force or gravity, that are used to draw off surface water from land, carry the water away, collect, store, or treat the water, or divert the water into natural or artificial watercourses.

Drainage utility. The drainage utility established under this article in accordance with Subchapter C.

Drainage utility system. The drainage system owned or controlled in whole or in part by the city and dedicated to the service of benefitted property, including provisions for additions to the system.

Equivalent Residential Unit (ERU). An area of impervious coverage on an improved lot or tract that is generally equal to the average impervious area on a single family property in the City limits, calculated as 3,600 square feet.

User. The person or entity who owns or occupies a benefitted property.

Impervious Cover. Impervious area for the purpose of the SDUS charge, defined below, means any surface or subsurface of benefitted property including, but not be limited to, roads, parking areas, buildings, roofs, pools, patios, sheds, driveways, private sidewalks, compacted subgrades, compacted gravel used for vehicular traffic and/or parking, and other impermeable construction that does not readily absorb water and has the effect of increasing water runoff flow rate or runoff volume that drains to the drainage utility system.

Improved lot or tract. A lot or tract that has a structure or other improvement on it that causes an impervious coverage of the soil under the structure or improvement.

Surface water drainage utility system (SDUS) charge means the total monthly drainage charge for a benefitted property as calculated under this article and the schedule of charges adopted by the city council, as may be modified from time to time.

Wholly sufficient and privately owned drainage system. Land owned and operated by a person other than a municipal drainage utility system the drainage of which does not discharge into a creek, river, slough, culvert, or other channel that is part of the drainage utility system.

Sec. 12.09.002 Establishment of drainage utility.

The provisions of Subchapter C, Chapter 552, Texas Local Government Code ("Subchapter C"), are hereby adopted to create a drainage utility for the city. Accordingly, drainage of the city is hereby declared to be a public utility. The city incorporates into the drainage utility system all existing property, facilities, materials, and supplies constituting the city's drainage utility system on the effective date of this article. All future acquisitions by the city of real or personal property used in the city's drainage utility system shall be maintained as a part of the drainage utility.

Sec. 12.09.003 Service area.

The service area for the drainage utility shall include all real property within the city limits of the City of Anna as now existing and which may be annexed hereafter from time to time.

Sec. 12.09.004 Calculation of drainage charges.

(a) The city council finds that:

(1) impervious cover increases water runoff and associated pollutants: and

(2) rates charged shall be based on a benefitted property's impact on the drainage utility system; and

(3) it is fair and equitable to calculate the impact and assess the drainage charge to each benefitted property based on impervious cover, subject to the limitation set forth below for single family residential properties.

(b) The city council hereby imposes a drainage charge to be paid by users of benefitted property to cover the cost of service of the drainage utility system. Said drainage charge shall be set forth in a schedule of charges to be adopted by the city council and calculated as follows:

(1) Single family residential properties shall be measured as one ERU per month regardless of actual amount of impervious cover on such properties;

(2) except with respect to the limitation for single family residential properties set forth in subsection (1), above, all non-exempt benefitted properties shall be measured for ERU in one/tenth increments with no maximum and for such non-exempt properties there shall be a minimum of one ERU regardless of actual amount of impervious cover on such properties; and

(3) Each benefitted property shall be assessed a monthly SDUS fee to be established by the city council in a schedule of charges. The schedule of charges shall be included in Appendix A Schedule of Fees.

(c) The city council may adjust the values, rates, and fees at any time based upon the recommendation of the city manager that the cost of service for the drainage utility warrants an adjustment in rates.

(d) The rates to be imposed shall be collected through the city's bill for public utilities in accordance and be set forth therein as a separate charge.

Sec. 12.09.006 Segregation of income.

The income of the drainage utility system shall be segregated and completely identifiable in city accounts. If drainage charges are solely for the cost of service, the city may transfer the charges in whole or in part to the city's general fund, except for any part collected outside municipal boundaries and except for any part pledged to retire any outstanding indebtedness or obligation incurred, or as a reserve for future construction, repair, or maintenance of the drainage utility system. If the city council has levied, in the drainage charge, an amount in contribution to the funding of future system improvements, including replacement, new construction, or extension, that amount is not transferable to the general fund.

Sec. 12.09.007 Exemptions; fee credits.

(a) The following shall be exempt from the provisions of this article:

(1) property with proper construction and maintenance of a wholly sufficient and privately owned drainage system;

(2) property held and maintained in its natural state until such time that the property is developed and all of the public infrastructure constructed has been accepted by the city for maintenance;

(3) a subdivided lot until a structure has been built on the lot and a certificate of occupancy has been issued by the city;

(4) property owned by the United States, the State of Texas, or Collin County;

(5) property owned by Anna Independent School District and private K-12 education providers;

(6) property owned by public or private institutions of higher education; and

(7) property owned by a religious organization that is exempt from taxation pursuant to Section 11.20, Tax Code.

(b) A property owner may petition the city to reduce the drainage utility fee for an individual property to account for on-site stormwater management controls that reduce the property's impact to the drainage utility system. The petition shall be evaluated and the fee adjustment decision determined by the city engineer or the engineer's designated representative. The evaluation and determination performed by the city engineer shall be based on nondiscriminatory, reasonable and equitable terms in accordance with the applicable law and this section.

Sec. 12.09.008 No effect on land owner obligations under city ordinances; no waiver of immunity; other laws and obligations.

(a) The establishment of the drainage utility by the city does not relieve users, private land owners, developers, other individuals or entities from responsibility for providing drainage improvements in connection with land development pursuant to the other ordinances of the city or laws of the State of Texas that relate to flooding, drainage, drainage management, or drainage improvements.

(b) The establishment of the drainage utility does not imply or warrant that a benefitted property will be free from flooding, pollution, or stream erosion. The city makes no representation that all drainage problems will be remedied. This ordinance does not create additional duties on the part of the city or create new liability or remedies for any flooding, stream erosion, deterioration of water quality, or other damages. Nothing in this ordinance shall be deemed to waive the city's immunity under law or reduce the need or necessity for flood insurance.

(c) This article is intended to be read in harmony with all other provisions of this Code. To the extent this article conflicts with any other provision in this code, the provisions shall be harmonized when possible, however, this article shall control and supersede any other conflicting provision regarding the drainage utility system.

(d) A wholly sufficient and privately owned drainage system must have volume to capture runoff for storms of magnitude up to and included in the one-percent annual chance (100-year) storm event, 24-hour duration. Captured runoff must be removed from the retention system of a wholly sufficient and privately owned drainage system within 72 hours of the rainfall event without discharging into the drainage utility system. Owner of the wholly sufficient and privately owned drainage system must provide evidence to the city to show the facility meets the above requirements. Failure to comply with this provision shall result in a wholly sufficient and privately owned drainage system being deemed to be a benefitted property and subject to the SDUS charge and other provisions of this article.

Sec. 12.09.009 Delinquencies.

Any charge due hereunder which is not paid when due may be recovered in an action at law by the city. In addition to any other remedies or penalties provided in Subchapter C or other law, failure of a user within the service area to pay the charges promptly when due shall subject such user to discontinuance of any utility services provided by the city. City employees of the utility drainage system shall have access, at all reasonable times, to any benefitted properties served by the drainage utility for inspection or repair or for the enforcement of the provisions of this article; provided, however that this section does not authorize entry, access or searches where a search warrant is required.

Section 12.09.010 Appeals.

(a) Billing and payment disputes for administrative issues shall be subject to appeals procedures used by the city for other utility billing disputes.

(b) Appeals for the following reasons shall be directed to the public works director or his designee for evaluation and determination:

(1) exempt property has been assessed a charge under this article;

(2) a charge under this article for an individual property is based on an incorrect determination of the property's contribution to the drainage utility system, as established in accordance with the schedule of charges referenced in Sec. 12.09.004(b)(3);

(3) a charge under this article for an individual property is assessed on more than one utility account;

(4) a charge under this article is assessed to individual property outside the service area; or

(5) a benefitted property has boundaries or dimensions that deviate from the city's determination of the boundaries or dimensions for such benefitted property.

(c) The public works director or his designee shall render a written decision on such appeals within thirty (30) days after receiving a written notice of appeal from the user.

(d) Any user who disagrees with the decision of the public works director or his designee may appeal to the city manager. The city manager shall render a written decision on such appeals within thirty (30) days after receiving a written notice of appeal from the user. The city manager's decision is final. If the city manager does not render a decision within thirty (30) days of an appeal, it shall be deemed to have sustained the decision of the public works director.

SECTION 2. Savings, Severability and Repealing Clauses.

All ordinances of the City in conflict with the provisions of this ordinance are repealed to the extent of that conflict. If any provision of this ordinance shall be held to be invalid or unconstitutional, the remainder of such ordinance shall continue in full force and effect the same as if such invalid or unconstitutional provision had never been a part hereof. The City declares that it would have passed this ordinance, and each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that anyone or more sections, subsections, sentences, clauses, and phrases be declared unconstitutional or invalid.

SECTION 3. Publication of the Caption Hereof and Effective Date.

This ordinance shall be in full force and effective from and after its passage and upon the posting and/or publication, if required by law, of its caption and the City Secretary is hereby directed to implement such posting and/or publication.

PASSED by the City Council of the City of Anna, Texas, this 12th day of April, 2022.

ATTESTED:

Carrie L. Land

Carrie L. Land, City Secretary

APPROVED:

Nate Pike, Mayor

MUNICIPAL DRAINAGE UTILITY 2021 RATE ANALYSIS

Prepared For

THE CITY OF
Anna

Prepared By

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
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October 2021

CITY OF ANNA, TEXAS

MUNICIPAL DRAINAGE UTILITY
(STORMWATER SYSTEM)
2021 RATE ANALYSIS

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CITY OF ANNA
MUNICIPAL DRAINAGE UTILITY
2021 RATE ANALYSIS

A. INTRODUCTION

A "Drainage Charge" is a fee that is imposed by a municipality and used to finance a municipal drainage utility system. The drainage charge is to be imposed to all benefitted properties in the service area of the stormwater drainage system, excluding properties such as parks, other public-use facilities or undeveloped land. The drainage charge shall be levied on nondiscriminatory, equitable and reasonable terms, regardless the value of a property. The drainage charge rates are based on the estimated stormwater runoff rate (flow contribution) from each benefitted property and on the budgetary requirements for provision, operation and maintenance of the system.

This analysis calculates the drainage charge rates that are required to be obtained to meet the financial requirements of the system, including the cost of operation and maintenance (O&M) and the cost of the capital improvement plan (CIP) projects. That total cost is distributed among the benefitted properties, proportionally, based on the land uses and estimated runoff rates from the properties. The rates calculated are recommended monthly fees.

The calculation of the rates does not consider capacities of existing facilities or the geographical location of each benefitted property in relationship to the proposed capital improvement projects. Prior investments to the stormwater system are not included in the rate calculation.

Regulation set forth by Title 13, Subtitle A, Chapter 552 of the Local Government Code provides the framework and requirements for the Drainage Charge and Rates calculation.

B. SERVICE AREA

The 7,777-acre City of Anna City Limits was the Service Area for this analysis.

C. CALCULATION METHOD

The approach taken to classify land uses was related to the estimation of runoff rates for a per-acre assessment. The Rational Method, used for estimation of stormwater runoff rates, assigns coefficient values to various land use types which correspond to the portion of rainfall expected to runoff from a unit of land area, based on impervious cover.

Variable coefficient 'C' of the Rational Method Equation ($Q = CiA$) is the factor related to an area's impervious coverage (likewise, related to the area's ability to retain rainfall). Coefficient 'C' is multiplied by the watershed area 'A' and by the rainfall intensity 'i' to calculate a runoff flow rate 'Q'. For this calculation, C*A was used to define the runoff characteristics for the property types in the service area. C*A can be applied to storms of various intensities, and therefore, the rainfall intensity factor, 'i', was not used.

The eligible and benefitted properties in the service area were distinguished into impervious-coverage categories. Runoff coefficients, 'C'-values, were assigned to each category, per the City of Anna Storm Drainage Design Manual. An analysis of the City's parcel areas was conducted to determine each category's flow contribution percentage to the total runoff. Those percentages of the total runoff were applied to the required average monthly budget to allocate the required fees and to determine the rates.

D. RATE CATEGORIES (LAND USES)

Drainage charge rates were calculated for land use Categories 1 through 3:

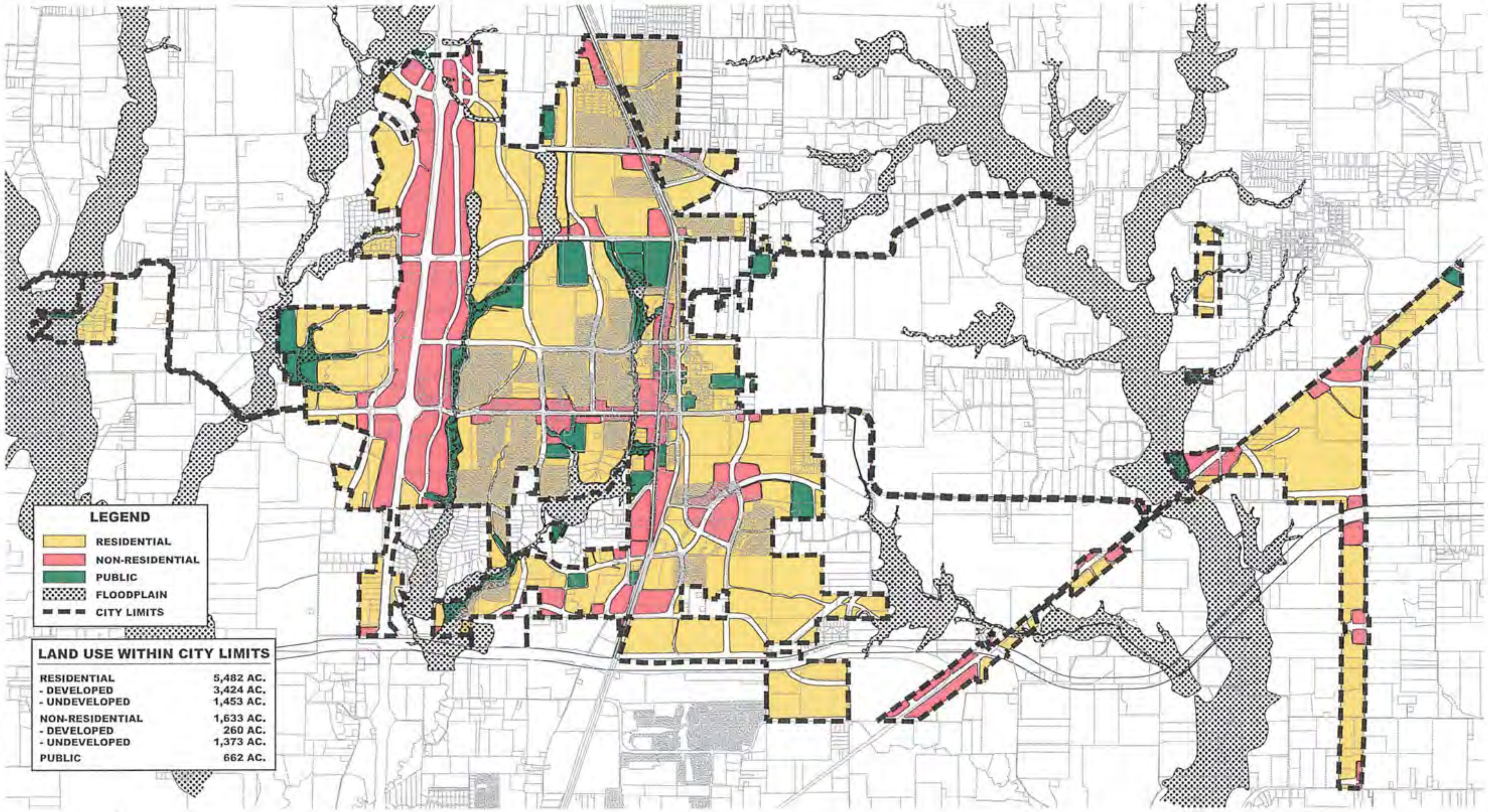
1. Residential
2. Non-Residential
3. Exempt Lands
    a. Collin County
    b. School District
    c. Public/ Semi-Public & Parks
    d. Undeveloped (Natural State) or Unoccupied
    e. Religious or Cemetery (optional exemption)

It was assumed that the tracts of land within each category have similar runoff characteristics. Non-residential tracts of land typically have more impervious coverage than residential tracts due to larger concrete parking lots and buildings, while residential tracts tend to have larger portions of grassed area which detain and percolate stormwater.

The Land Use Categories are defined by measurable qualities, where applicable, for the assignment of fee classification for each benefitted property.

  - **Residential Properties**– Properties used for residential dwelling.
  - **Non-Residential Properties** – Tracts of land which are not used for residential dwelling and are developed such that the natural state of the property is altered may be classified as a non-residential property, unless the property was determined to be exempt per local government code (Section 552.053)

- **Public Properties (Exempt Land)** – Per the Local Government Code, tracts of land owned by Collin County or by a school district are exempt from drainage charges, and residential dwellings associated with a municipal housing authority are also exempt. Undeveloped properties held and maintained in the natural state are exempt, and subdivided lots or tracts that have not been issued a certificate of occupancy are exempt. Additionally, properties which utilize a wholly sufficient and privately owned drainage system are exempt. The City may also grant exemption from the drainage charge if a property is owned by a religious organization or used as a cemetery. A map showing the geographical distribution of the Rate Categories (Land Uses) is provided as **Figure 1**.



LAND USE WITHIN CITY LIMITS

RESIDENTIAL	5,482 AC.
- DEVELOPED	3,424 AC.
- UNDEVELOPED	1,453 AC.
NON-RESIDENTIAL	1,633 AC.
- DEVELOPED	260 AC.
- UNDEVELOPED	1,373 AC.
PUBLIC	662 AC.

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THE CITY OF
Anna

STORMWATER UTILITY RATE ANALYSIS
LAND USE RATE CATEGORIES

FIGURE 1

October 2020

REVISED: 7/20/21 - HWISE H:\Projects\Anna\2018123 Stormwater Master Plan\Sheets\Drainage Utility Analysis Figures\Figure 1 - Landuse Map City Limits Only.dwg

E. LAND USES & CHARGE DISTRIBUTION

The Texas Administrative code allows for the drainage charge rates to be established on the basis of impervious cover as it relates to land use. The mechanism for distribution of the required monthly budget (being the same as the required revenue) to the properties is by a ratio of the runoff rate calculated for the parcel in question to the total runoff rate calculated for the entire service area.

A uniform drainage charge rate is recommended for all properties classified as Single Family Residential and High Density Residential, due to relative uniformity in size and in impervious coverage, and therefore the calculation for runoff uses the average property size for those categories. Non-Residential properties, however, vary more widely by land area, and the rates calculated for those properties are based on the land area of the individual properties themselves.

Table 1 summarizes the current and 10-year projected developed parcel counts and areas for both Residential and Non-Residential lots within the service area. The table includes the 10-Year Level Average for the developed parcels and acres for each category. The table also calculates fee allocation percentages using runoff coefficients, 'C'-values, with the parcel counts and areas.

Table 1 - Calculation of Runoff Contribution by Property Category

Rate Category	2021		2031		10-Year Level Average		Runoff[d] Coefficient 'C'	Weighted Value 'C*A'	Porportional Share Based on C*A
	Developed Parcels	Developed Acres[a]	Developed Parcels[b]	Developed Acres[b]	Developed Parcels	Developed Acres			
Residential:	6,250	3,424	10,667	5,844	8,459	4,634	0.50	2,317	88.0%
Non-Residential:	N/A	260	N/A	445	N/A	353	0.90	317	12.0%
Public:	N/A	662	N/A	661	N/A	662	0	0	0%
Total:	***6,250***	***3,684***	***10,667***	***6,289***	***8,459***	***4,987***		***2,634***	***100%***

(a) Developed lots ONLY

(b) Source: 2018 City of Anna & Wastewater Impact Fee update landuse assumptions

(c) Direct Annual Average Growth per 2014 Land use assumptions: Source 2014 City of Anna & Wastewater Impact fee, Appendix A

(d) Runoff Coefficient 'C' represents impervious coverage of development on a property.
Source of 'C'-values : City of Plano Storm Drainage Design Manual

In Table 1, The 'Proportional Share Based on C*A' column provides the percentages of the budget that are to be obtained from parcels of each respective category.

F. STORMWATER SYSTEM CAPITAL IMPROVEMENT PLAN

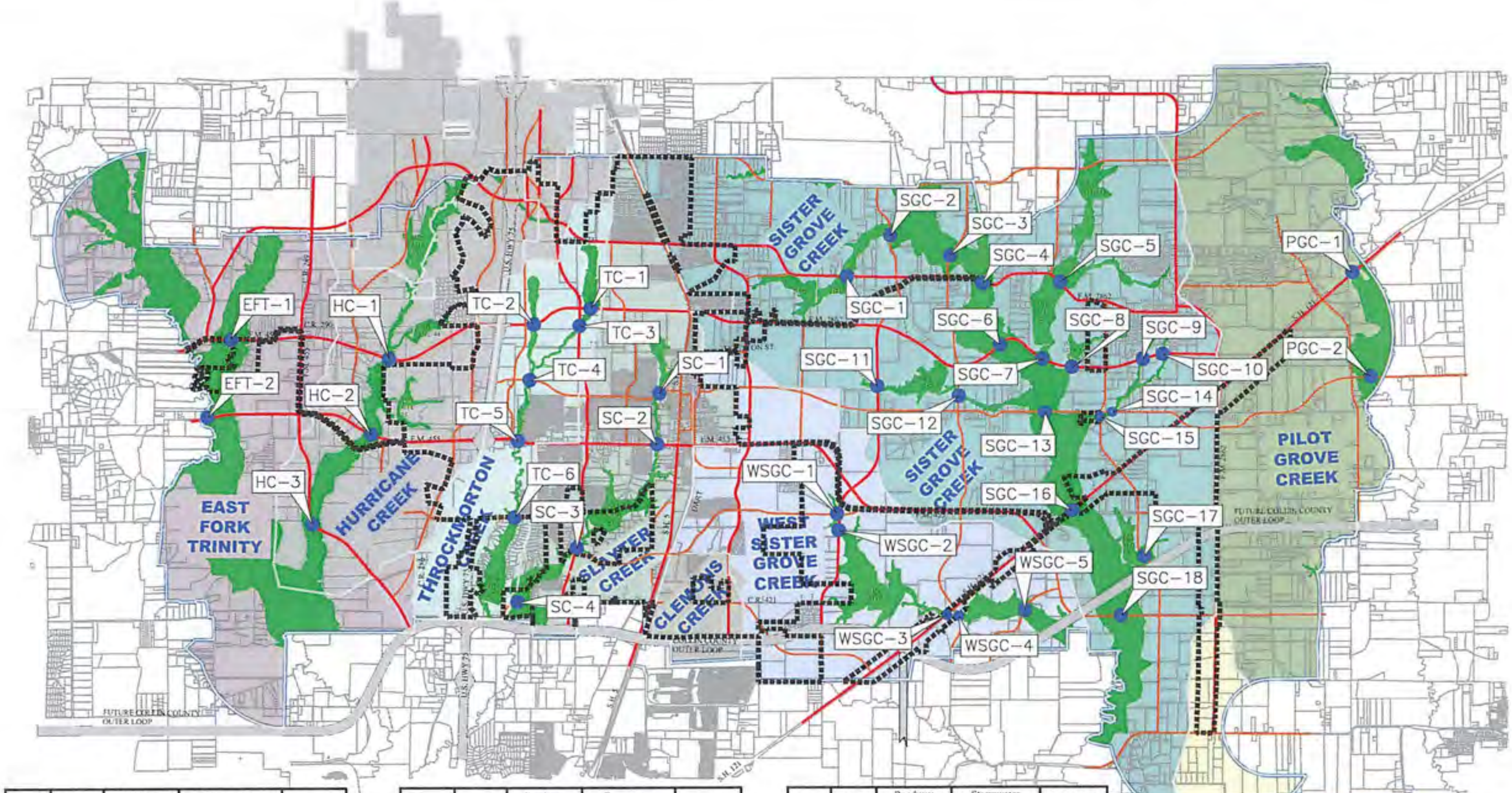
The City has developed a capital improvement plan for the stormwater utility system. The list of proposed projects has been refined through discussion over the past several years. Six (6) projects are expected to be completed over the next 10-years, or so. The projects were distinguished as the following types:

- **Bridge Projects** – Nine (9) projects are proposed to construct a bridge over a creek. One bridge is located on the west side of the City on the future extension of Creekview Drive. This bridge would be constructed at the same time of the future extension of Creekview Drive. The second bridge is located northeast of the City on F.M. 2862 (also known as Houston Street). This second bridge would expand the existing bridge when proposed expansion of F.M. 2862 is being constructed. Other seven bridges located across the City would also be constructed.
- **Culvert Projects** – Four (4) Culverts are proposed for replacement, all of which are in northwestern Anna. One of the proposed culverts cross under C.R. 369, two under C.R. 370, and one crosses under Hackberry Drive. Each of these projects include trench cuts across the roadway for the installations. In addition to Roadway trench repair, the projects may include construction of concrete headwalls and metal beam guard rail fencing for safety. Minor upstream and downstream clearing, grading, and soil stabilization activities are included in the culvert replacement projects, as warranted.

Table 2 summarizes the opinion of project cost for the sixteen (16) projects in the Capital Improvement Plan. The projects are shown by **Figure 2**, the Capital Improvement Plan map. The estimated budget and total required principal for the Capital Improvement Plan improvements is $42,925,000.

Table 2 - Summary of 10-Year Capital Improvement Plan Expenditures

Project I.D.	Stormwater Drainage System Proposed Improvement	Pipe Diameter	Length (ft.)	Estimated Construction Cost	Contingencies & Misc.	Professional Services	Material Testing	Inspection Fee	Total Capital Cost
EFT-1	Storm Water Master Plan, East Fork Trinity, Crossing EFT-1	Bridge	245	3,008,235	601,647	451,235	75,206	75,206	4,212,000
TC-1	Storm Water Master Plan, Throckmorton Creek, Crossing TC-1	4 - 9'x8'	480	858,740	171,748	128,811	21,469	21,469	1,203,000
TC-2	Storm Water Master Plan, Throckmorton Creek, Crossing TC-2	84"	480	580,830	116,166	87,125	14,521	14,521	814,000
TC-3	Storm Water Master Plan, Throckmorton Creek, Crossing TC-3	4 - 9'x8'	480	857,245	171,449	128,587	21,431	21,431	1,201,000
TC-4	Storm Water Master Plan, Throckmorton Creek, Crossing TC-4	Bridge	95	3,007,785	601,557	451,168	75,195	75,195	4,211,000
TC-5	Storm Water Master Plan, Throckmorton Creek, Crossing TC-5	Bridge	85	3,007,755	601,551	451,163	75,194	75,194	4,211,000
TC-6	Storm Water Master Plan, Throckmorton Creek, Crossing TC-6	Bridge	115	3,007,673	601,535	451,151	75,192	75,192	4,211,000
SC-1	Storm Water Master Plan, Slayter Creek, Crossing SC-1	4 - 10'x8'	320	681,940	136,388	102,291	17,049	17,049	955,000
SC-2	Storm Water Master Plan, Slayter Creek, Crossing SC-2	Bridge	75	3,007,725	601,545	451,159	75,193	75,193	4,211,000
SC-3	Storm Water Master Plan, Slayter Creek, Crossing SC-3	Bridge	250	3,008,250	601,650	451,238	75,206	75,206	4,212,000
SC-4	Storm Water Master Plan, Slayter Creek, Crossing SC-4	Bridge	55	3,007,665	601,533	451,150	75,192	75,192	4,211,000
WSGC-3	Storm Water Master Plan, West Sister Grove Creek, Crossing WSGC-3	TXDOT	0	0	0	0	0	0	0
WSGC-4	Storm Water Master Plan, West Sister Grove Creek, Crossing WSGC-4	4 - 9'x9'	320	607,200	121,440	91,080	15,180	15,180	851,000
SGC-4	Storm Water Master Plan, Sister Grove Creek, Crossing SGC-4	Bridge	65	3,007,695	601,539	451,154	75,192	75,192	4,211,000
SGC-15	Storm Water Master Plan, Sister Grove Creek, Crossing SGC-15	Bridge	55	3,007,583	601,517	451,137	75,190	75,190	4,211,000
SGC-16	Storm Water Master Plan, Sister Grove Creek, Crossing SGC-16	TXDOT	0	0	0	0	0	0	0
	Total:			$30,656,320	$6,131,264	$4,598,448	$766,408	$766,408	$42,925,000



Name	Q (cfs)	Roadway Section	Stormwater Infrastructure	Project Cost
EFT-1	2,652.2	6-lane divided	245' Bridge	$4,212,000
EFT-2	4,957.5	6-lane divided	80' Bridge	$4,211,000
HC-1	4,090.3	6-lane divided	75' Bridge	$4,211,000
HC-2	5,412.6	6-lane divided	80' Bridge	$4,211,000
HC-3	6,170.2	6-lane divided	90' Bridge	$4,211,000
TC-1	1,578.6	6-lane divided	4- 9x8 RC Box Culverts ASTM C-1677	$1,203,000
TC-2	804.5	6-lane divided	4-84" Circular Culverts ASTM C-76	$814,000
TC-3	1,766.0	6-lane divided	4- 9x8 RC Box Culverts ASTM C-1677	$1,201,000
TC-4	5,720.7	4-lane divided	95' Bridge	$4,211,000
TC-5	6,743.0	6-lane divided	85' Bridge	$4,211,000
TC-6	7,926.4	4-lane divided	115' Bridge	$4,211,000
SC-1	1,884.9	4-lane divided	4- 10x8 RC Box Culverts ASTM C-1677	$955,000

Name	Q (cfs)	Roadway Section	Stormwater Infrastructure	Project Cost
SC-2	2,528.8	6-lane divided	75' Bridge	$4,211,000
SC-3	2,594.3	6-lane divided	250' Bridge	$4,212,000
SC-4	4,271.3	4-lane divided	55' Bridge	$4,211,000
WSGC-1	2,648.7	4-lane divided	130' Bridge	$4,211,000
WSGC-2	1,757.2	6-lane divided	4- 9x9 RC Box Culvert ASTM C-1677	$1,270,000
WSGC-3	1,642.4	6-lane divided	TXDOT	
WSGC-4	1,807.0	4-lane divided	4- 9X9 RC Box Culvert ASTM C-1677	$851,000
WSGC-5	4,014.2	4-lane divided	70' Bridge	$4,211,000
SGC-1	1,999.4	6-lane divided	5- 9x8 RC Box Culverts ASTM C-1677	$1,497,000
SGC-2	5,350.4	4-lane divided	50' Bridge	$4,211,000
SGC-3	6,566.5	4-lane divided	135' Bridge	$4,212,000
SGC-4	7,049.2	6-lane divided	65' Bridge	$4,211,000

Name	Q (cfs)	Roadway Section	Stormwater Infrastructure	Project Cost
SGC-5	2,970.2	6-lane divided	65' Bridge	$4,211,000
SGC-6	8,058.7	6-lane divided	180' Bridge	$4,212,000
SGC-7	210.6	6-lane divided	3- 48" Circular Culverts ASTM C-76	$209,000
SGC-8	147.6	6-lane divided	3- 42" Circular Culverts ASTM C-76	$173,000
SGC-9	491.9	6-lane divided	4- 5x5 RC Box Culverts ASTM C-1677	$508,000
SGC-10	584.3	6-lane divided	5- 5x5 RC Box Culverts ASTM C-1677	$631,000
SGC-11	1,870.1	6-lane divided	4- 10x8 RC Box Culverts ASTM C-1677	$1,428,000
SGC-12	581.9	4-lane divided	4- 5x5 RC Box Culverts ASTM C-1677	$342,000
SGC-13	8,460.8	4-lane divided	165' Bridge	$4,211,000

Name	Q (cfs)	Roadway Section	Stormwater Infrastructure	Project Cost
SGC-14	2,576.5	4-lane divided	85' Bridge	$4,211,000
SGC-15	2,899.8	4-lane divided	55' Bridge	$4,211,000
SGC-16	15,308.4	6-lane divided	TXDOT	
SGC-17	1,471.3	4-lane divided	4- 9x7 RC Box Culverts ASTM C-1677	$767,000
SGC-18	16,144.9	4-lane divided	105' Bridge	$4,211,000
PGC-1	2,014.0	6-lane divided	250' Bridge	$4,212,000
PGC-2	2,536.3	4-lane divided	70' Bridge	$4,211,000

NO SCALE

These plans and related specifications were prepared for construction of this specific project only. Reuse of these documents is not permitted without written authorization of Birkhoff, Hendricks & Carter, L.L.P. If this drawing is converted to an electronic file, if any discrepancy occurs between the electronic file and the Birkhoff, Hendricks & Carter, L.L.P. original document, the original document will govern in all cases.

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CITY OF ANNA
STORM WATER MASTER PLAN

Figure 2 - Storm Water Utility Capital Improvement Plan

BHC PROJECT NO. 2018123

Oct. 2021

SHEET NO.
1

REVISED: 10/20/21 - JWY H:\Projects\Anna\2018123 Stormwater Master Plan\Basedwgs\Crossings_Exhibit.dwg

PLOT SCALE: 1:2 PLOT STYLE: ------ PLOTTED BY: KEVIN ANDERSON ON 10/20/2021

G. CAPITAL IMPROVEMENT PLAN ANNULIZED DEBT SERVICE

To pay for the Capital Improvement Plan projects, this analysis assumes the city to issue bonds with a maximum value of $5 million dollars per issuance, with an issuance cost of 1.5%, an interest rate of 4%, and a term of 20 years per issuance. **Table 3** below calculates the average Total Annual and Monthly Debt Service during the 10-year term of this evaluation.

Table 3 Annulized Captial Improvement Project Debt Service

Year	Issue 1(1)	Issue 2(1)	Issue 3(1)	Total Annual Debt Service	Monthly Debt Service
Amount	**$5,000,000**	**$5,000,000**	**$5,000,000**		
2022	$373,427	$ -	$ -	$373,427.38	$31,118.95
2023	$373,427	$ -	$ -	$373,427.38	$31,118.95
2024	$373,427	$ -	$ -	$373,427.38	$31,118.95
2025	$373,427	$ -	$ -	$373,427.38	$31,118.95
2026	$373,427	$373,427	$ -	$746,854.77	$62,237.90
2027	$373,427	$373,427	$ -	$746,854.77	$62,237.90
2028	$373,427	$373,427	$ -	$746,854.77	$62,237.90
2029	$373,427	$373,427	$ -	$746,854.77	$62,237.90
2030	$373,427	$373,427	$373,427	$1,120,282.15	$93,356.85
2031	$373,427	$373,427	$373,427	$1,120,282.15	$93,356.85
Average:				**$672,169.29**	**$56,014.11**

(1) Note: Financing Terms

Issuance Cost:	1.5%
Term (Years)	20
Rate:	4%

H. OPERATION & MAINTENANCE ANNUALIZED EXPENDITURES

The Estimated 2021 City of Anna Budget for the operation and maintenance (O&M) of the Stormwater System is $103,105. Because there is not currently a sperate storm water utility account, this amount represents ten percent (10%) of the City's Street Budget. The revenue is used for general maintenance items such as mowing of channels, inspections and debris removal. It is also used for administrative, planning and regulatory-compliance costs for operation of the system.

City staff anticipates future expenditures which will increase the required O&M budget, including personnel expansion, equipment purchases and Municipal Separate Storm Sewer System (MS4) permitting. In the future, the required O&M budget will have a 10-Year annualized average of approximately $289,070 per year. It is also anticipated that within the rate study period, the city will be required to service a general permit for storm water discharge into the waters of the U.S. As shown in Table 3 below, beginning in the year 2025 the operation and maintenance budget includes a $75,000 fund for the municipal separate storm sewer system (MS4) annual permit requirements and will grow with a 1.7% CPI rate.

Currently the budget has limited resources for proper and consistent stormwater maintenance. Therefore, a new 'Enhanced Storm Water Maintenance' program has been created with an initial amount of $175,000. This program will allow for the city to regularly maintain stormwater utilities and equipment as the city grows.

Table 4 calculates the average annual budget required to operate and maintain the stormwater system over the next ten years. The average annual O&M budget anticipated for the next 10-years is **$524,514**. ***This is the O&M 10-year level amount utilized for this study.***

The O&M expenses are to be recovered monthly through the drainage charge.

TABLE 4 - Operation & Maintenance Budget

Year	Inflation (CPI) Rate (%)	Annual [(A)] O&M Budget Projection	Enhanced Strom Water Maintennace Program	MS4 Permit Expenses	Capital [(c)] (Equipment) Expenditure	Total Annual Ammount ($) [(d)]
2021	1.7%	$103,105	$170,000	$0		$273,105
2022 [(b)]	1.7%	$284,857	$172,890	$0	$66,000	$457,747
2023	1.7%	$289,700	$175,829	$0		$465,529
2024	1.7%	$294,625	$178,818	$0		$473,443
2025	1.7%	$299,633	$181,858	$75,000		$556,492
2026	1.7%	$304,727	$184,950	$76,275		$565,952
2027	1.7%	$309,908	$188,094	$77,572		$575,573
2028	1.7%	$315,176	$191,291	$78,890		$585,358
2029	1.7%	$320,534	$194,543	$80,232		$595,309
2030	1.7%	$325,983	$197,851	$81,595		$605,429
2031	1.7%	$331,525	$201,214	$82,983		$615,722
Average:	***1.7%***	**$289,070**	**$185,213**	**$50,232**		**$524,514**

(A) Total Annulized Sum of 2021 = $1,031,046 * 10%

(b) Add 2 Maintenance -Tech I [Est. $54,000/yr], 1 Crew Leader [Est. $72,000]

(c) 3/4 Ton Pickup [Est. $38,000], 1-20 Foot Trailer [Est. $18,000], Additonal Misc. Equipment [Est. $10,000]

(d) Total Annual Ammount divided by 12 results in Total Montly Budget

I. STORM WATER UTILITY RATE OPTIONS

A. 10-Year Level Rate Analysis (Base Approach)

In this analysis, the monthly fee for both Residential and Non-Residential lots is calculated on a ten-year (10-year) level rate by using the average budget over a 10-year period for both the Operation and Maintenance and Capital Improvements budget. Three (3) different options are considered

Option 1: Operation and Maintenance monthly budget (Table 5)
Option 2: Capital Improvement Project monthly budget (Table 6)
Option 3: Combining both O&M and CIP monthly budgets. (Table 7)

Tables 5-7 below present the calculate the monthly residential and non-residential fee based on these three different options.

TABLE 5 - Stormwater Utility Rate Calculation (O&M Budget Only)

Rate Category	Porportional Share Based on C*A	Total O&M Monthly Budget ($) (Table 5)	Parcel Count (#)	Total Area (ac.)	Monthly Fee Per Parcel	Monthly Fee Per Acre
Residential	88.0%	$38,437	8,459	4,634	**$4.54**	N/A
Non-Residential	12.0%	$5,263	0	353	N/A	**$14.93**
Public	0.0%	$0	0	0	N/A	**N/A**
Total:	*100%*	*$43,700*	*8,459*	*4,987*		

TABLE 6 - Stormwater Utility Rate Calculation (CIP Only)

Rate Category	Porportional Share Based on C*A	Total Monthly Debt Service ($) (Table 4)	Parcel Count (#)	Total Area (ac.)	Monthly Fee Per Parcel	Monthly Fee Per Acre
Residential	88.0%	$49,268	8,459	4,634	**$5.82**	N/A
Non-Residential	12.0%	$6,746	0	353	N/A	**$19.14**
Public	0.0%	$0	0	0	N/A	**N/A**
Total:	*100%*	*$56,014*	*8,459*	*4,987*		

TABLE 7 - Stormwater Utility Rate Calculation (Combined CIP + O&M)

Rate Category	Porportional Share Based on C*A	Total Monthly Requirement ($) (Table 4+5)	Parcel Count (#)	Total Area (ac.)	Monthly Fee Per Parcel	Monthly Fee Per Acre
Residential	88.0%	$87,705	8,459	4,634	**$10.37**	N/A
Non-Residential	12.0%	$12,009	0	353	N/A	**$34.07**
Public	0.0%	$0	0	0	N/A	**N/A**
Total:	*100%*	*$99,714*	*8,459*	*4,987*		

The Calculated Fees shown in Tables 5-7 are the maximum allowable fees for the properties of each land use classification. The calculated fees assume that the fees shall be fixed for the next five years, however, the Local Government Code allows for the governing body of the stormwater utility to adjust the charges from time to time. It is recommended the maximum fee calculation be reviewed and adjusted, as required, prior to termination of the 5-year period. The update shall reestablish the O&M budgetary requirements with the possible inclusion of newly identified stormwater capital improvement projects and shall consider land use developments in the service area.

Based on the calculated fees, we recommended implementation of the following **Maximum Fee Rates** that include both the Storm Water System Operation and Maintenance expenditures and the Storm Water System Capital Improvements debt service:

Residential:	**$10.37 per month**
Non-Residential:	**$34.07 per Acre**

B. 10-Year Annual Analysis (Supplemental Approach)

During the review phase of this analysis, the City staff requested we perform a "supplemental" annualized evaluation of the storm water rate. In this analysis the monthly fee for both Residential and Non-Residential lots is calculated on a year-by-year annual basis. and utilizes the annual O&M and Capital Projects Debt Service budgets over a projected ten-year period.

This approach requires a more focused estimate of annual growth in residential units and non-residential developments. Table 1A below is an itemized presentation of Table 1 and presents the estimated annual growth in residential units and non-residential developments and calculates the proportional "CA" used for each year of the analysis.

This approach results in an initial lower fee that generally increases over time.

TABLE 1A - Calculation of Runoff Contribution by Property Category (Annual Estimate)

Year	Residential Units					Non Residential acres				Total CA
	Lots	Acres (A)	Run-off "C"	Weighted CA	Proportinal CA	Acres	Run-off "C"	Weighted CA	Proportional CA	
2021	6,250	3,424	0.5	1,712.0	87.98%	260	0.9	234.0	12.02%	1,946.0
2022	6,500	3,561	0.5	1,780.5	87.99%	270	0.9	243.0	12.01%	2,023.5
2023	6,800	3,725	0.5	1,862.5	88.01%	282	0.9	253.8	11.99%	2,116.3
2024	7,200	3,944	0.5	1,972.0	88.06%	297	0.9	267.3	11.94%	2,239.3
2025	7,700	4,218	0.5	2,109.0	88.08%	317	0.9	285.3	11.92%	2,394.3
2026	8,450	4,629	0.5	2,314.5	88.11%	347	0.9	312.3	11.89%	2,626.8
2027	9,217	5,049	0.5	2,524.5	87.93%	385	0.9	346.5	12.07%	2,871.0
2028	9,877	5,411	0.5	2,705.5	88.13%	405	0.9	364.5	11.87%	3,070.0
2029	10,427	5,712	0.5	2,856.0	88.19%	425	0.9	382.5	11.81%	3,238.5
2030	10,667	5,844	0.5	2,922.0	87.95%	445	0.9	400.5	12.05%	3,322.5
2031	10,667	5,844	0.5	2,922.0	87.95%	445	0.9	400.5	12.05%	3,322.5

The same Three (3) different options are considered

Option 1:	Operation and Maintenance monthly budget (Table 5A)
Option 2:	Capital Improvement Project monthly budget (Table 6A)
Option 3:	Combining both O&M and CIP monthly budgets (Table 7A)

Tables 5A-7A below present the calculate the monthly residential and non-residential fee based on these three different options.

TABLE 5A- Stormwater Utility Rate Calculation (O&M Budget Only)

Year	Total Annual O&M Budget Amount ($)	Monthly Rates	
		Residential Rate (per Unit)	Non-Residential Rate (per Acre)
2021	$273,105	$3.20	$10.52
2022	$457,747	$5.16	$16.97
2023	$465,529	$5.02	$16.49
2024	$473,443	$4.83	$15.86
2025	$556,492	$5.30	$17.44
2026	$565,952	$4.92	$16.16
2027	$575,573	$4.58	$15.04
2028	$585,358	$4.35	$14.30
2029	$595,309	$4.20	$13.79
2030	$605,429	$4.16	$13.66
2031	$615,722	$4.23	$13.89
Average:	**$524,514**	**$4.67**	**$15.36**

TABLE 6A - Stormwater Utility Rate Calculation (CIP Only)

Year	Annual CIP Debt Service	Monthy Rates	
		Residential Rate (per Unit)	Non-Residential Rate (per Acre)
2021	$373,427	$4.38	$14.39
2022	$373,427	$4.21	$13.84
2023	$373,427	$4.03	$13.23
2024	$373,427	$3.81	$12.51
2025	$746,855	$7.12	$23.40
2026	$746,855	$6.49	$21.33
2027	$746,855	$5.94	$19.51
2028	$746,855	$5.55	$18.24
2029	$1,120,282	$7.90	$25.94
2030	$1,120,282	$7.70	$25.28
2031	$672,169	$4.62	$15.17
Average:	**$672,169.29**	**$5.61**	**$18.44**

TABLE 7A - Stormwater Utility Rate Calculation (Combined CIP + O&M)

Year	Total Annual O&M Budget Amount ($)	Annual CIP Debt Service	Total Annual Budget (O&M + CIP)	Monthy Rates	
				Residential Rate (per Unit)	Non-Residential Rate (per Acre)
2021	$273,105	$373,427	$646,532	$7.58	$24.91
2022	$457,747	$373,427	$831,175	$9.38	$30.81
2023	$465,529	$373,427	$838,956	$9.05	$29.73
2024	$473,443	$373,427	$846,870	$8.63	$28.37
2025	$556,492	$746,855	$1,303,346	$12.42	$40.84
2026	$565,952	$746,855	$1,312,807	$11.41	$37.49
2027	$575,573	$746,855	$1,322,428	$10.51	$34.55
2028	$585,358	$746,855	$1,332,213	$9.91	$32.54
2029	$595,309	$1,120,282	$1,715,591	$12.09	$39.73
2030	$605,429	$1,120,282	$1,725,711	$11.86	$38.94
2031	$615,722	$672,169	$1,287,891	$8.85	$29.06
Average:	**$524,514.41**	**$672,169.29**	**$1,196,683.70**	**$10.15**	**$33.36**

J. Non-Residential Stormwater Detention System Fee Credit

Several non-residential properties in the City of Anna currently utilize stormwater detention systems (ie. detention or retention ponds) to reduce runoff rates from the developed properties. An effective, on-site stormwater detention system benefits the City's existing stormwater drainage system by reducing the rate of runoff from the property to the stormwater system, thus reducing the required capacity of the downstream municipal utility system. The City may allow those non-residential properties which utilize an effective stormwater detention system to seek Stormwater Drainage Fee-Reduction Credit.

We recommend requirement of application for the fee-reduction credits that is to be administered, approved and maintained by the City. We recommend the fee-reduction be proportional to the calculated reduction in runoff flow rate provided by the installed detention system, with a maximum allowable reduction established as an equivalent runoff estimated with a 'C'-factor of 0.5. The calculated non-residential fee rate, $34.07 per acre, utilizes a runoff 'C'-factor of 0.9, and therefore the maximum fee-reduction for a well-performing on-site stormwater detention system results in a reduced fee rate of **$18.93 per acre**. The detention system would require review by a licensed engineer in the State of Texas to provide the calculation results necessary for the calculation of the actual flow reduction.

It is further recommended that the City inspect those stormwater detention systems credited for the reduction of runoff flow rate. The facilities must be maintained to ensure performance of the rated flow reduction. The City may require submission of a maintenance schedule with the application, for which City-approval and adherence by the property owner would be required. The City shall retain the powers to revoke the fee-credit upon non-conformance to the maintenance schedule or if the system is removed or found in disrepair. If the detention system fails, the fee-credits shall be revocable and subject to back-charges, based on the City's determination of the failure period and severity.

Exhibit 2

NorthPointe Drainage Channel - Erosion

Aerial Imagery and Site Photos

Aerial Imagery – Pre- and Post-Development

Source: Google Earth Image Date: July, 2008

Source: Google Earth Image Date: November 2014

Channel Alignment

(Pre- vs Post-Development)

Original Drainage Channel alignment

Source: Google Imagery Image Date: July, 2023

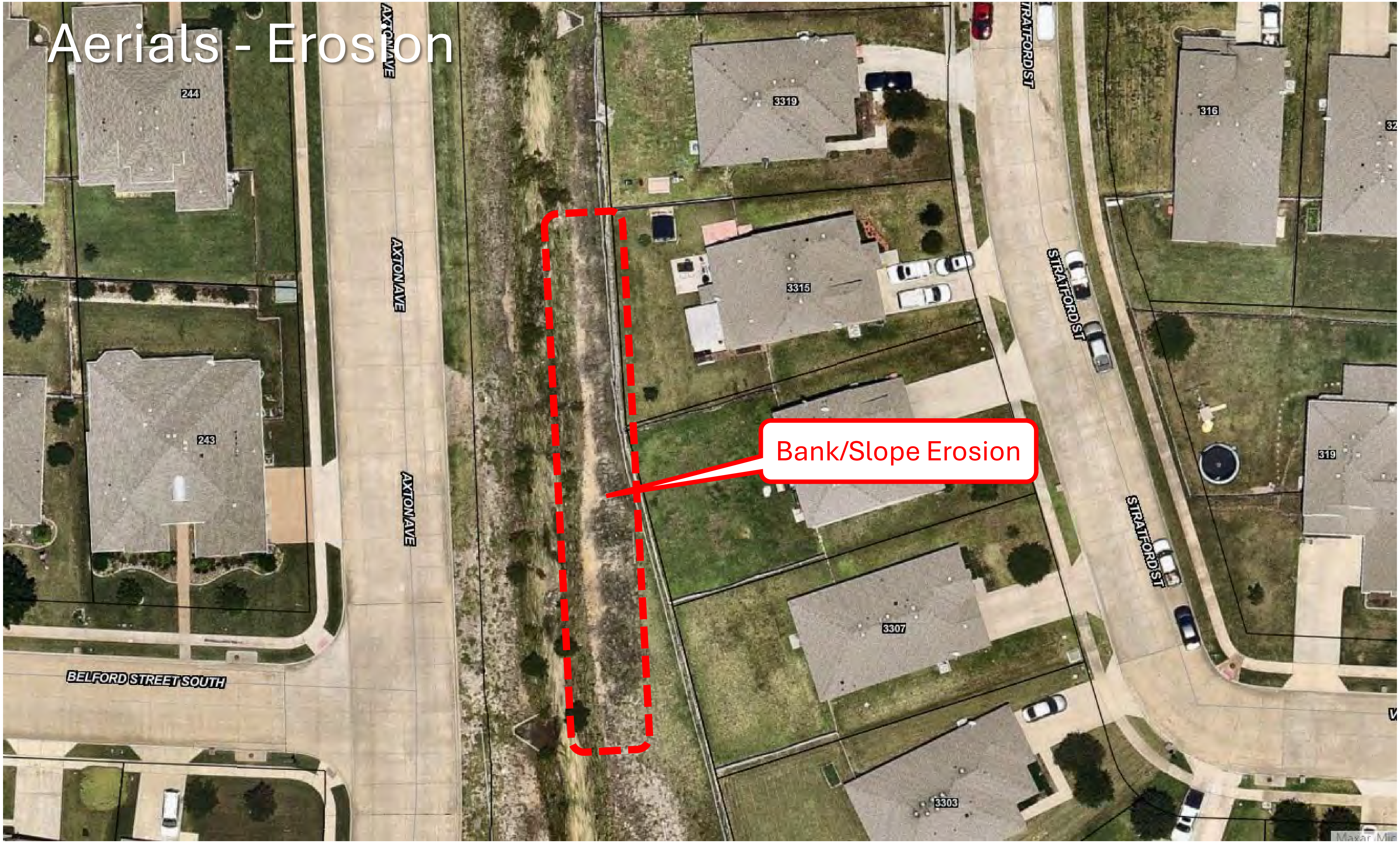
City Aerial Imagery

Source: NearMap

Image Date: May, 2024

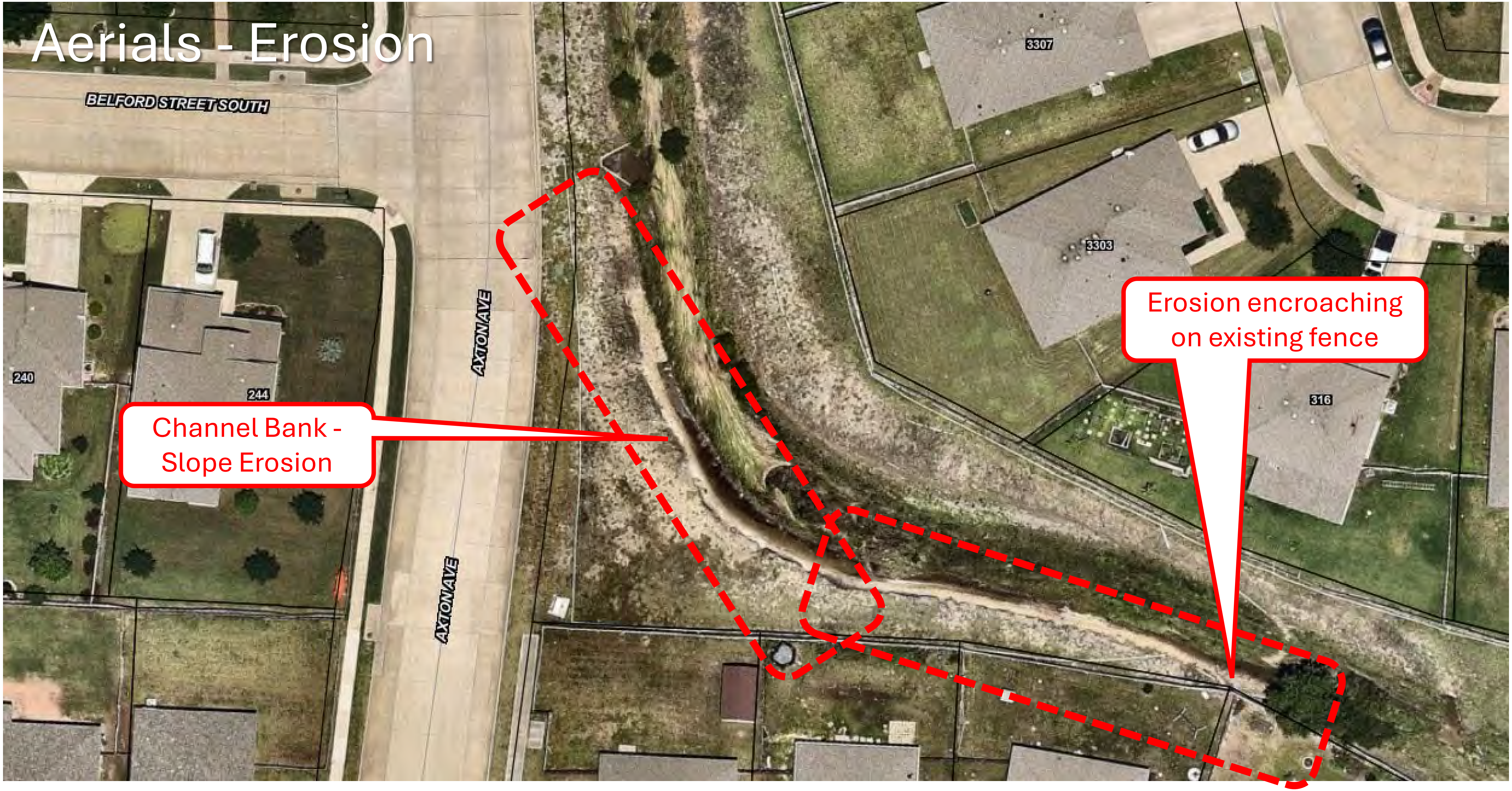
(see following pages for aerials identifying areas of concern)

Aerials - Erosion



Bank/Slope Erosion

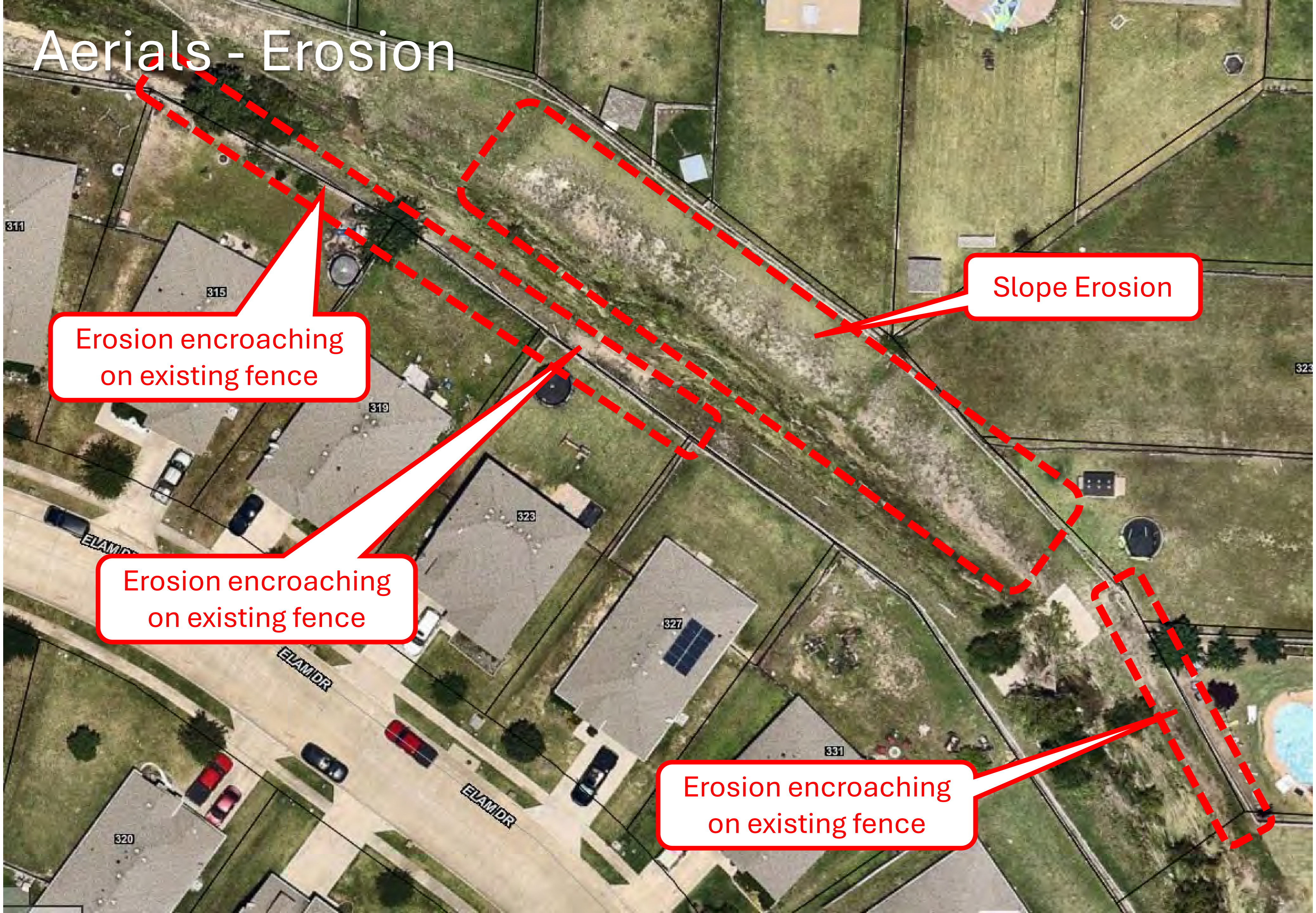
Aerials - Erosion



Channel Bank - Slope Erosion

Erosion encroaching on existing fence

Aerials - Erosion



Erosion encroaching on existing fence

Slope Erosion

Erosion encroaching on existing fence

Erosion encroaching on existing fence

Aerials - Erosion

Erosion encroaching on existing fence

Erosion encroaching on private HOA park

Site Photos

Site Photos

Site Photos

Site Photos

Site Photos

Site Photos

Site Photos