2. COMMUNITY GROWTH

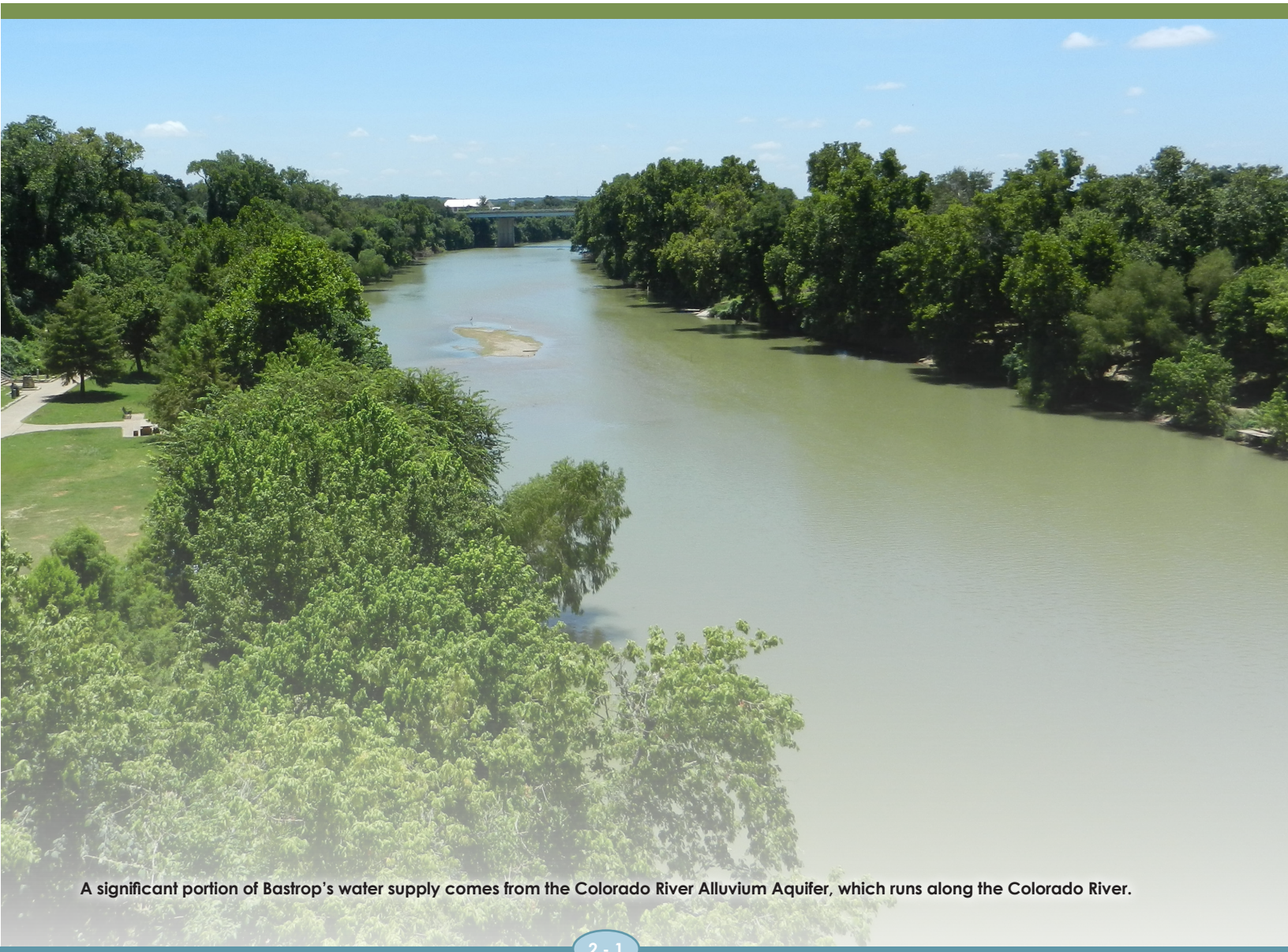
BASTROP COMPREHENSIVE PLAN UPDATE (2016 - 2036)

CHAPTER TWO

COMMUNITY GROWTH

Chapter 2 of the Bastrop Comprehensive Plan examines the City of Bastrop's prospective growth patterns. Tools and policies are identified within the chapter through which the City may guide future growth in a fiscally responsible manner. An evaluation of the City's water, waste water, storm drainage, and electric utility system capacities - and necessary enhancements - is based on the growth assumptions presented in the chapter.

The goals, objectives, and strategies presented throughout this chapter provide the preliminary framework for identifying and prioritizing the City's potential capital improvement projects. **A summary list of all Community Growth goals and objectives can be found at the end of this chapter (page 2-35).**



A significant portion of Bastrop's water supply comes from the Colorado River Alluvium Aquifer, which runs along the Colorado River.

GROWTH CONTEXT.

HISTORICAL GROWTH PATTERN

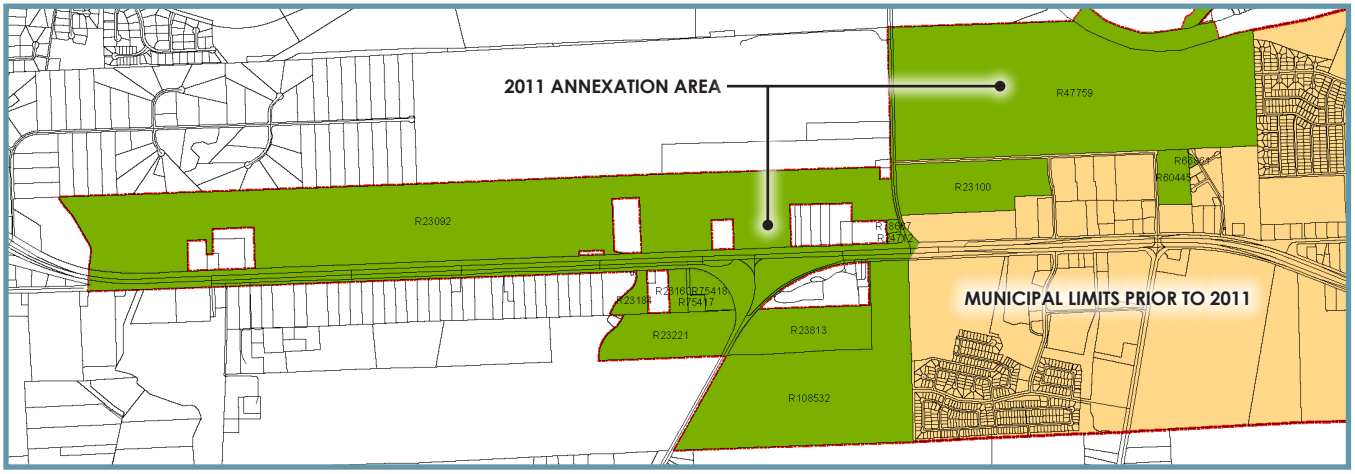
Figure 1.1, Historic Population (see page 1-8) quantifies Bastrop's historically slow but steady rate of population growth. Although Bastrop's historic growth pattern is characteristic of many rural Texas communities, societal advances in transportation and utility infrastructure have (figuratively) decreased distances between communities.

The City is located within the five (5) county Austin-Round Rock-San Marcos Metropolitan Statistical Area (MSA), and is not much further from the MSA's principal city than bedroom communities such as Cedar Park, Leander, Hutto, Buda, and more - all of which have been absorbed into a single suburban environment. Barring dramatic reversals in the statewide economy, similar changes in land use and population growth are inevitable in Bastrop County over the next 20 years. City policies must reflect a conscious determination of the amount, type, and manner of growth and development the City is willing to absorb to ensure long-term community health.

ANNEXATION PATTERNS

Bastrop's recent annexation activities have been measured and deliberate. Since 2000, the City has participated in a single annexation that incorporated a total of 1,266 acres. While the additional acreage increased the City's land area by 22 percent, the Bastrop's rate of annexation is far less assertive than many other fast-growing Texas municipalities.

Although no standard fiscal impact analysis tool is currently utilized by Bastrop, the limited frequency of recent City annexation, combined with the location of the City's 2011 addition along a major arterial highway (see image below), has resulted in incorporating properties with maximum revenue-producing potential (as opposed to simply increasing residential growth potential). The comprehensive planning process has revealed little local interest in modifying Bastrop's historic approach toward annexation. As a result, subsequent projections utilized herein assume future population growth largely within current City boundaries.



Bastrop's 2011 annexation extended the municipal limits over 2 and 3/4 miles to the west along Highway 71. The exempt status or agricultural/ open space zoning applied to annexed properties is likely a temporary condition pending accessibility to municipal infrastructure.

POPULATION GROWTH MODELS

Population projections are an important component of the long-range planning process. Projections help determine and quantify the demands and capacities that are expected of public facilities and services based on the potential pace and scale of a community's physical growth. There are many standard methodologies which may be used to project a community's population growth or decline. Every standard methodology may be supplemented by unique local variables or indicators.

In preparing the Bastrop Comprehensive Plan, nine (9) population projection models were evaluated to determine the City's growth potential over the next 20 year period (and beyond). ***Figure 2.1, Bastrop Population Growth Models***, illustrates four (4) of the evaluated models to project the City's anticipated population growth between 2015 and 2040. The models suggest that Bastrop's current population will grow by between 38 and 208 percent by the year 2040.

The second to last column within ***Figure 2.1*** (labeled "City Water Demand Projection Scenario 2") reflects the most probable population growth scenario that is anticipated in Bastrop during the 20 year horizon of this Plan. More information regarding Bastrop's anticipated population growth model – and the methods that may used to monitor and/or refine it - can be found on page 2-11.

FIGURE 2.1. BASTROP POPULATION GROWTH MODELS

YEAR	HISTORIC POPULA-TION	1.0 COUNTY STEP DOWN	CITY WATER DEMAND PROJECTION SCENARIO 1[1]	CITY WATER DEMAND PROJECTION SCENARIO 2[1]	T.W.D.B. REGION K 2011 PLAN*
1970	3,172				
1980	3,789				
1990	4,044				
2000	6,308				
2010	7,218	7,218	7,218	7,218	7,218
2015		8,429	8,054	8,232	10,683
2020		9,643	9,689	10,540	12,475
2025		11,121	11,656	12,743	14,198
2030		12,857	14,022	15,336	15,920
2035		14,829	16,869	18,450	18,462
2040		17,072	20,293	22,195	21,003

Source: U.S. Census Bureau, Texas Water Development Board, Bastrop Independent School District, & City of Bastrop
*Note: [1]City of Bastrop Water Demand Projections (2014). City Water Demand Projection Scenario 2 reflects the City's most probable population growth projection. (see also **Figure 2.7, Bastrop Population Growth Projection**, page 2-11.)*

GROWTH MANAGEMENT METHODS.

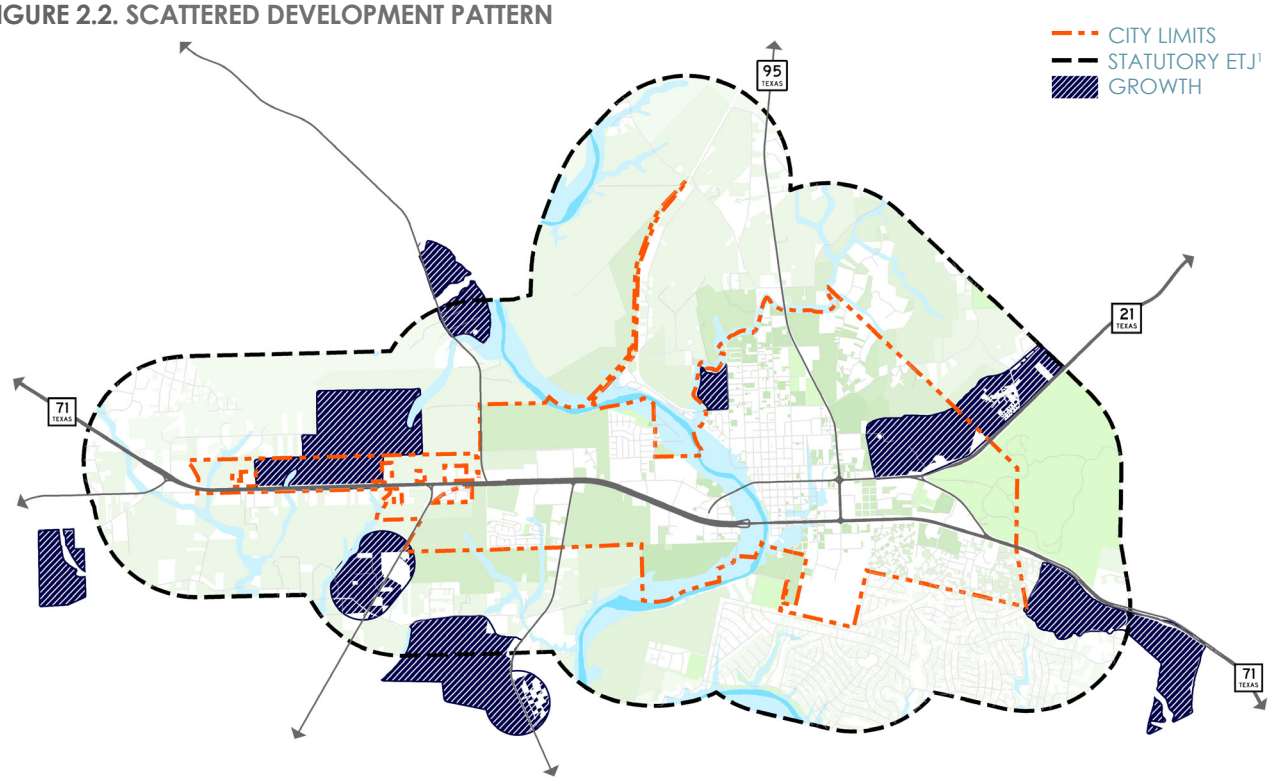
PATTERNS OF GROWTH

Several conditions and factors will influence how and where physical growth and development occurs within Bastrop, and surrounding areas. Over time, obvious patterns of development emerge - along transportation corridors, at crossroads, adjacent to water bodies, etc. Sometimes growth is logical and contiguous - following an already established development pattern. Other times, growth is haphazard and scattered, the result of economic influences, like the availability of inexpensive land, or access to a utility trunk line.

Five (5) varying scenarios are presented on pages 1-4 through 1-6 which illustrate patterns of growth that can occur in Bastrop. The degree to which any one of these five (5) hypothetical growth patterns may come to fruition is influenced by a mix of private market forces; and public policies, investments, and regulation.

Of the five (5) scenarios presented on the next few pages, this Plan encourages growth policies that: **A)** Facilitate infill and redevelopment activity; **B)** Encourage contiguous development; and, **C)** Manage targeted corridor development. Bastrop's growth policies are found on page 2-14.

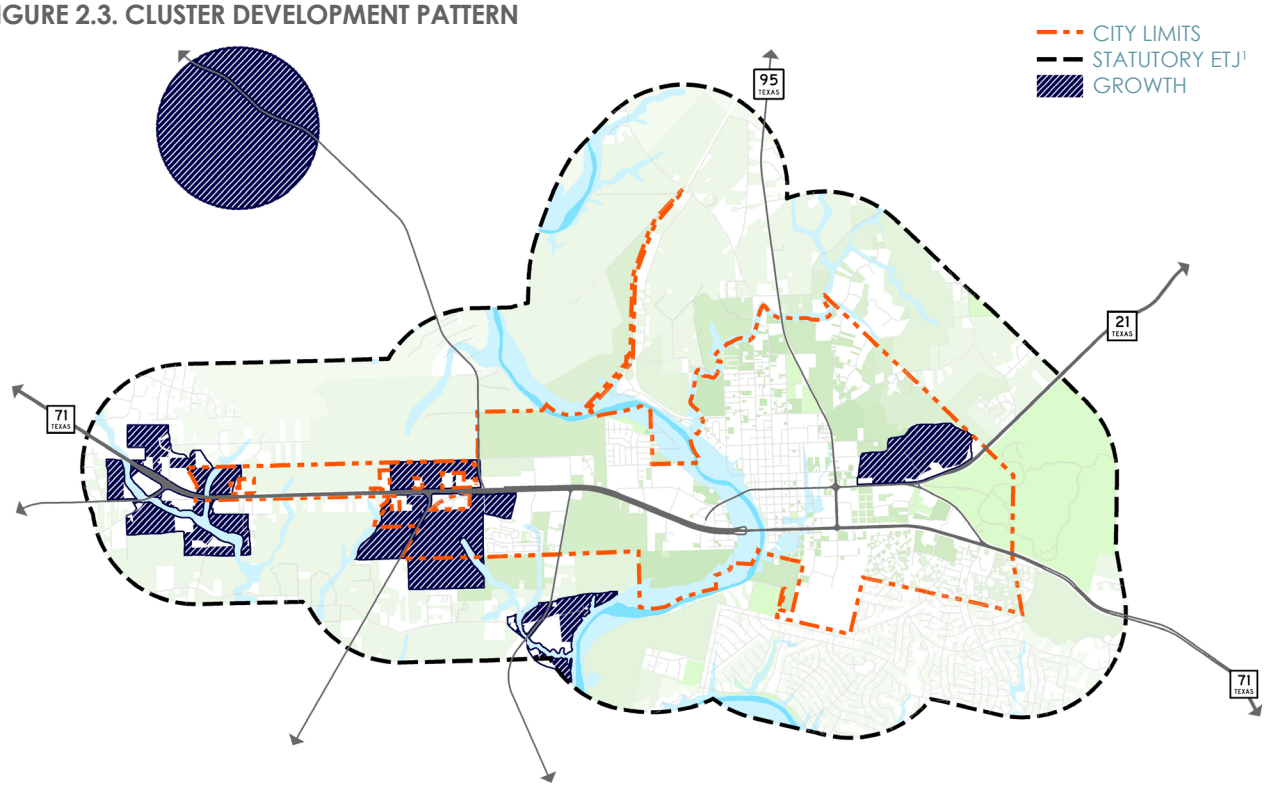
FIGURE 2.2. SCATTERED DEVELOPMENT PATTERN



Development is not constrained by land use or development regulations. "Leapfrog" development occurs over empty land to build in remote locations – often through privately financed infrastructure.

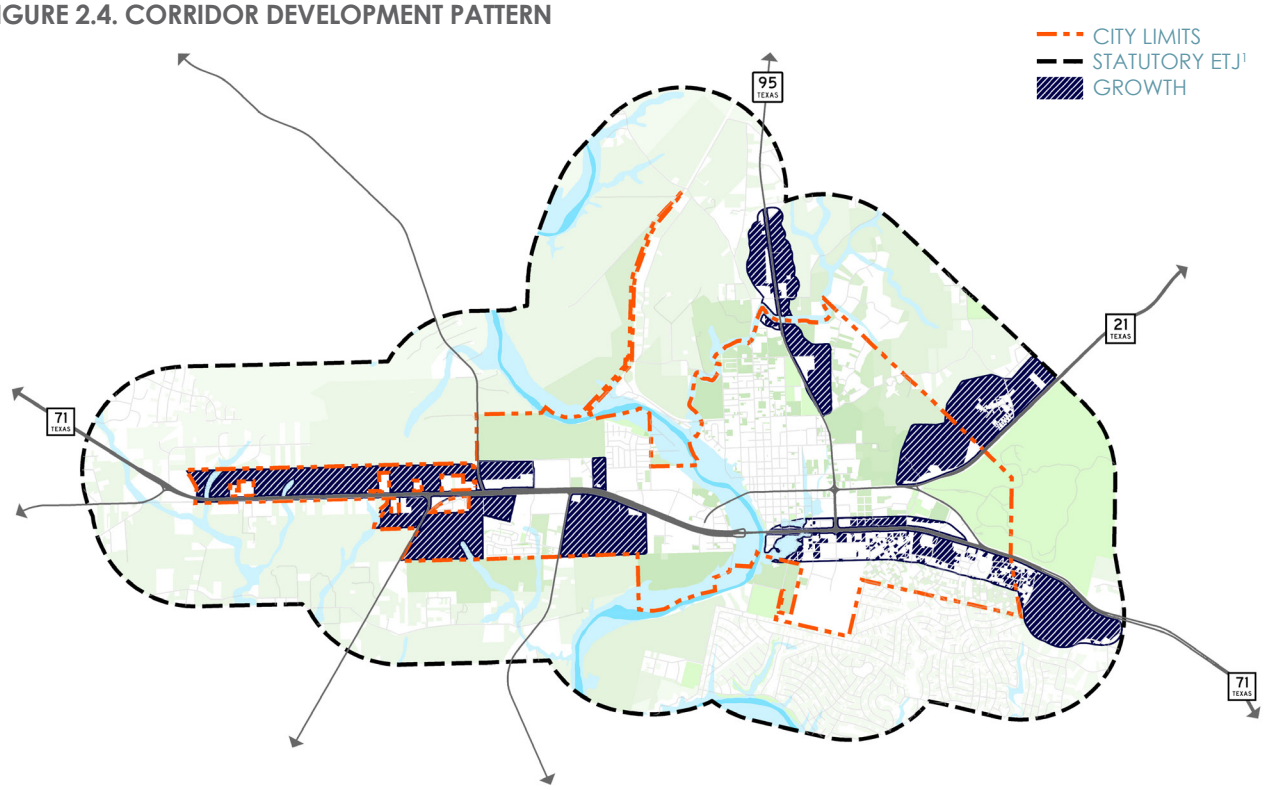
[1] LIMITS OF STATUTORY ETJ LOCATED 1 MILE FROM CITY LIMITS

FIGURE 2.3. CLUSTER DEVELOPMENT PATTERN



Nodal development at strategic locations, where on-site construction occurs in concentrated areas. Compact on-site building and site design preserves natural features; but, development nodes may still be occur in a scattered manner.

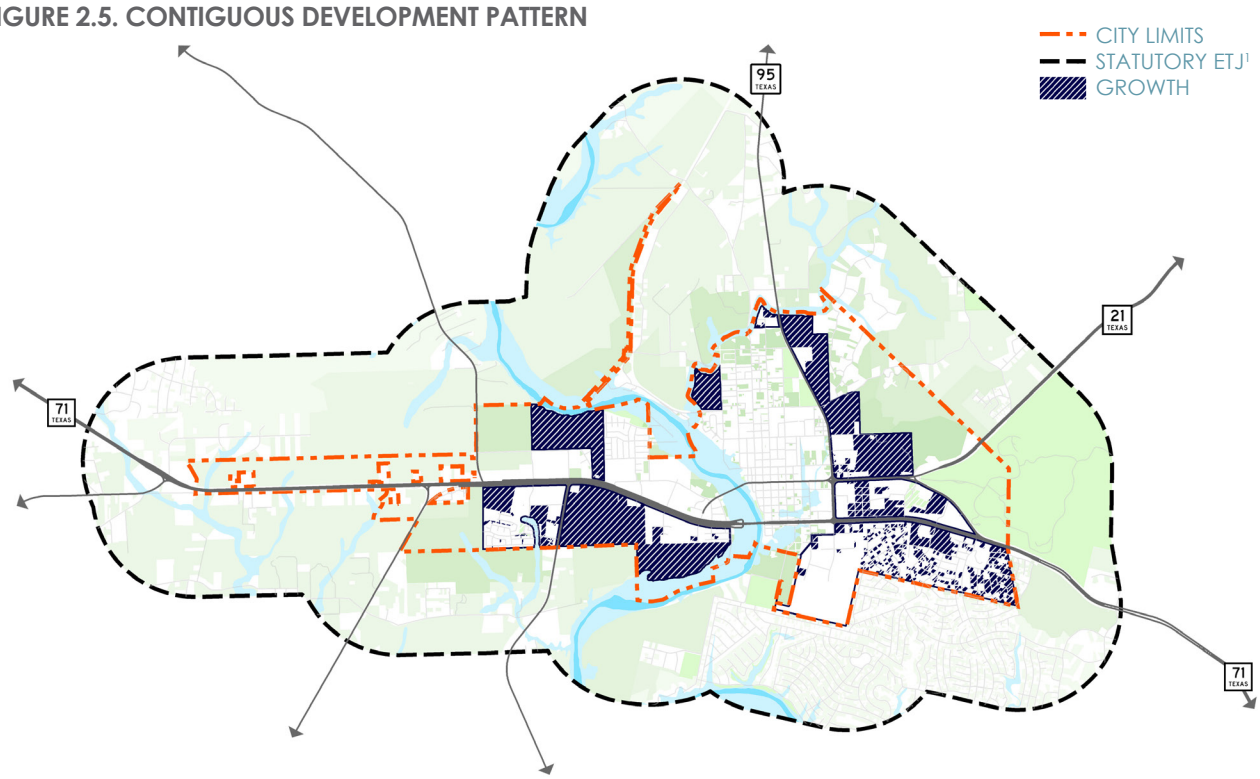
FIGURE 2.4. CORRIDOR DEVELOPMENT PATTERN



Development occurs along major transportation corridors in a linear manner. Access to transportation and utility infrastructure saves development costs; but, development quality and intensity can overburden thoroughfares.

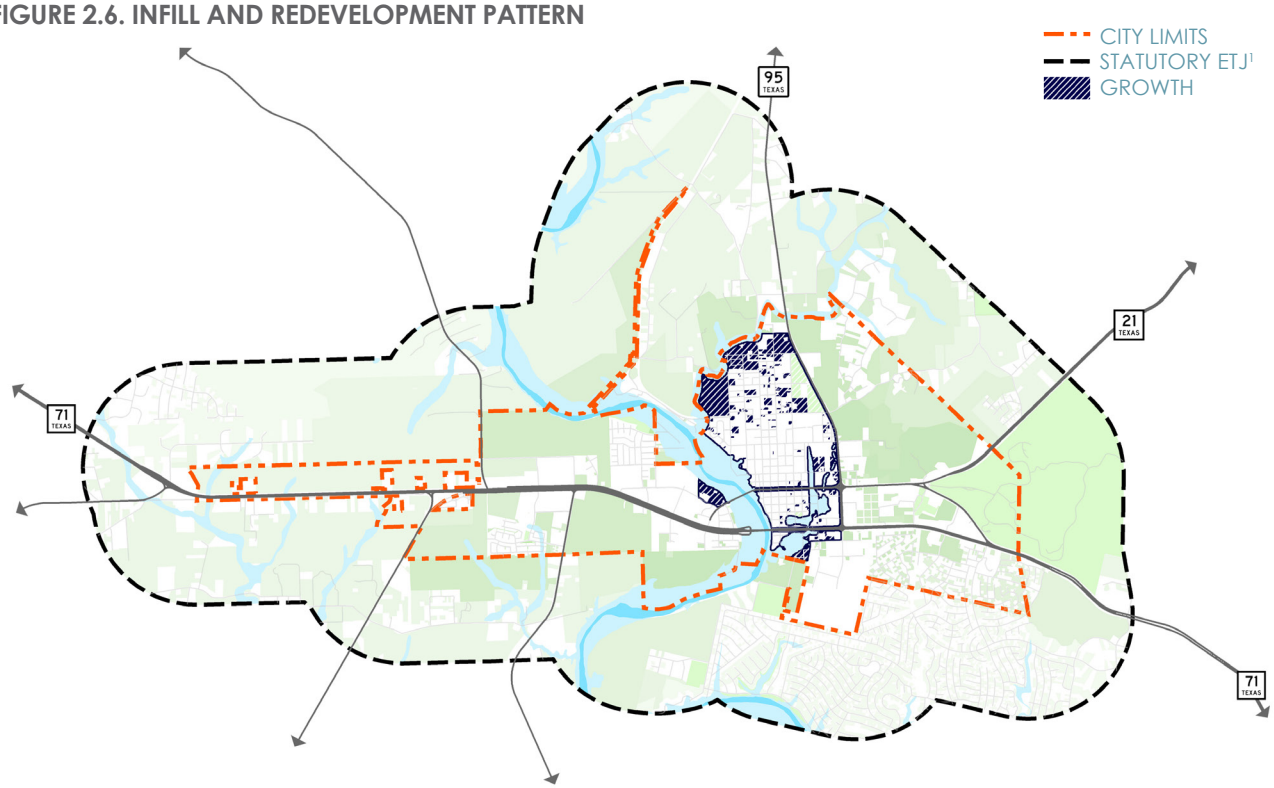
[1] LIMITS OF STATUTORY ETJ LOCATED 1 MILE FROM CITY LIMITS

FIGURE 2.5. CONTIGUOUS DEVELOPMENT PATTERN



Growth occurs in very close proximity to existing development. When carefully planned, can reduce the footprint of development, while strategically increasing development intensity.

FIGURE 2.6. INFILL AND REDEVELOPMENT PATTERN



Development within existing districts and neighborhoods in close proximity to existing utilities and public services. Promotes a compact community form and utility network, and may promote neighborhood conservation and blight removal.

[1] LIMITS OF STATUTORY ETJ LOCATED 1 MILE FROM CITY LIMITS

CONSEQUENCES OF POOR GROWTH MANAGEMENT

The term "sprawl" refers to the reduction of rural land due to the inefficient increase of the land area of a community over a particular period of time. Sprawl is a spatial development pattern or condition that occurs when large tracts of land are devoted to a single use (single-use zoning); where individual buildings take-up increasingly large portions of land (low-density zoning); and the only way to navigate from one area to another is by automobile (auto-dependency).

Urban sprawl and car-dependent development patterns can have several negative consequences, including:

- *Erosion of a defined community edge, thereby blurring its boundaries and contributing to a loss of community character, identity, and sense of place;*
- *"Job sprawl" - defined as dispersed patterns of employment far from home, shopping, and recreation;*
- *Degradation of environmental resources, such as floodplains, wetlands, and mature tree canopy;*
- *Overwhelmed utilities and transportation infrastructure (e.g., roads, water and waste water systems);*
- *A lack of coordinated planning between individual developments, which can lead to unexpected shifts in traffic patterns, and associated increase in traffic congestion; and*
- *Inefficient provision of public services, such as police and fire protection, and the dedication and maintenance of parks and open space.*

These consequences, if left unchecked, can significantly erode the quality of life and economic well-being within a community.

These negative development consequences are more frequently associated with the scattered development pattern described on page 2-4; but, may also accompany cluster and corridor development patterns to varying degrees.

MUNICIPAL UTILITY DISTRICTS.

State provisions allowing the creation of municipal utility districts (Texas Water Code, Chapter 54, Municipal Utility Districts) limit the ability of Texas cities and counties to truly influence the location, timing, and scale of development in and around their communities. Authorized by Article XVI, Section 59, of the Texas Constitution, under the often divergent objectives of the "conservation and development" of the State's natural resources, municipal utility districts (MUDs) are most frequently used to allow for the establishment of privately-financed utilities to support private development.

Although cities such as Bastrop have the ability to influence the character of development in MUDs through development agreements and subdivision regulations, the approval process in the Texas Water Code makes it difficult for local governments to withhold consent – even if the location and scale of the development is contrary to preferred community growth patterns.

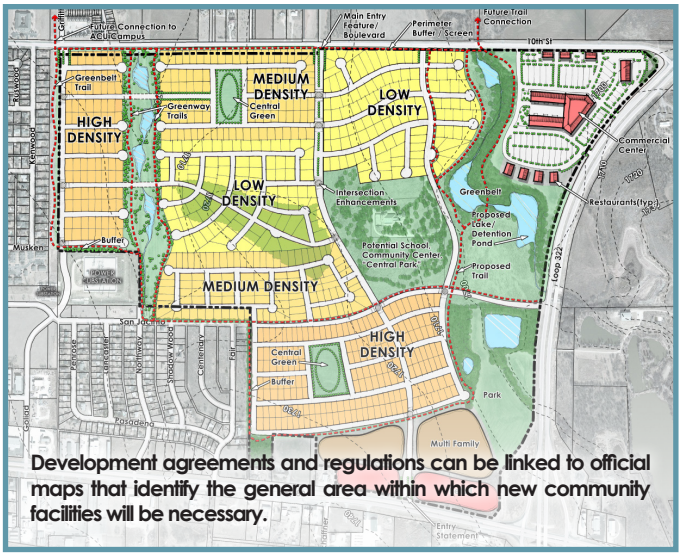
CONVENTIONAL GROWTH MANAGEMENT METHODS.

Metropolitan growth is gradually decreasing the physical distance between Bastrop and proximate urban areas. Evidence of this trend is apparent from recent increases in residential and commercial growth in Bastrop, and evolving commuting patterns to, from, and through the City. It is therefore prudent for the City to re-examine ways in which it can exert influence over the direction, timing, pattern, mix and quality of new development within the City limits.

Rather than relying solely on minimum lot sizes, land development ordinances should provide options for meeting residential density requirements.

It is currently within the City's capacity to exercise the following tools to influence growth:

- ***Long-range Planning.*** *The process of identifying, analyzing and documenting locations in the City that are targeted for the gradual expansion of its urbanized area, in contrast with areas that are less conducive for intensive development because of environmental or other identifiable constraints (e.g., terrain, wetlands,, historic sites, etc.), existing patterns of use and ownership, or service provision constraints.*



Development agreements and regulations can be linked to official maps that identify the general area within which new community facilities will be necessary.

- ***Subdivision and Development Regulations.*** *Can be used to carry out growth strategies, particularly in terms of the quality of new development or redevelopment. Clear infrastructure standards in the regulations, and associated City specifications and criteria, shall establish minimum improvements required of private development. Robust open space requirements may enhance the City's ability to mitigate the impacts of privately financed development that may occur in contrast to any preferred City growth patterns.*

- ***Development Agreements.*** *Where appropriate, development agreements may require that development in the City's extra-territorial jurisdiction (ETJ) must comply with certain aspects of the regulations that apply to similar development within the City limits, prior to their annexation into the City (§212.172). Development agreements can be negotiated with private interests that request extension of the City's utility infrastructure to fringe and/or ETJ locations, especially to clarify the timing of future planned improvements and any conditions in exchange for the City's infrastructure and service commitments. They can also be used to establish levels of participation in public-private cost-sharing arrangements for infrastructure improvements, as well as reimbursement provisions for infrastructure oversizing or other special circumstances.*

- ***Annexation.*** *This process brings key growth areas and areas intended for limited development into the City limits well before any significant development activity begins, and so appropriate land use and development standards may be established early on. Annexation is a mechanism to expand the City's tax base, especially to incorporate the pool of tax and fee payers who benefit from municipal infrastructure and services. Consequently, the City assumes responsibility for providing services to newly annexed areas, in the form of expanded utilities infrastructure and police and fire protection, among other services.*

- ***Impact Fees.*** *Are assessed on new residential and nonresidential development to provide dedicated funding for particular capital improvements that are specifically needed to serve the new development (as authorized by Texas state law for water, waste water, drainage, and roads).*

- ***Joint Powers Agreements (JPA).*** *Are a means for the City and other units of government to coordinate on the provision of electric power infrastructure as regulated in Chapter 163 of the Texas Utilities Code.*
- ***Adequate Facilities Ordinances.*** *Require that approvals for projects are contingent upon evidence that public facilities have adequate capacity for the proposed development. When facilities are found to be inadequate, development is postponed or developers may contribute funds to improve facilities.*
- ***City-county Coordination.*** *Facilitates synchronization of development policies and procedures in Bastrop County and helps to improve regulatory enforcement in the City's ETJ.*
- ***Zoning.*** *Is the land use regulatory concept under which a municipality establishes rules for the use and development of land. A zoning structure consists of two separate components. The first is the text of the ordinance, which establishes specific development regulations that will be applicable to structures and property within the community. The second component is the zoning map, which allocates the various zoning districts geographically within the community. In adopting zoning a city establishes a series of districts, and within each district, sets forth the uses to which structures or land may be placed. Section 211.004 of the Texas Local Government Code specifically requires that zoning regulations must be adopted in conformance with a comprehensive plan.*
- ***Urban Growth Boundary / Urban Service Limit.*** *May be established around a community within which the local government plans to provide public services and facilities; and, beyond which urban development is discouraged or prohibited. Boundaries are usually set to accommodate growth over 10 to 20 years and are intended to provide more efficient services and to protect rural land and natural resources.*
- ***Designated Development Area.*** *Is similar to an urban growth boundary in that certain areas within a community are designated according to their existing or intended built environment: such as urbanized, urbanizing, future urban and/or rural. Within each of these areas, different policies for future development apply. These contextual development areas are used to encourage or direct development into urbanized or urbanizing areas, as opposed to areas intended to remain rural.*

- ***Multi-year Capital Improvements Programming.*** *Establishes the City's intentions for extending its primary arterial streets, trunk water mains, and waste water collection lines to targeted growth areas.*
- ***Official Map.*** *Although not a formal growth management mechanism in Texas, communities in other states utilize "official maps" to identify the intended locations of future public facilities such as streets, parks, fire stations, and schools. Bastrop can incorporate official map exhibits into intergovernmental agreements with other agencies to program the intended location of future public facilities as a way to entice private development to targeted areas. Development regulations can be modified to include the reservation of necessary land for public use through the plat approval or development agreement process.*
- ***Chapter 380 Economic Development Agreements.*** *Chapter 380 Agreements enable cities to provide incentives encouraging developers to build in their jurisdictions. Development incentives typically take the form of property tax abatements, loans or grants, commitments for infrastructure, or payments of portions of the sales tax generated by the project.*
- ***Public Improvement District.*** *A Public Improvement District (PID) is a financing tool created by the Public Improvement District Assessment Act as found in Chapter 372 of the Texas Local Government Code. A PID enables any city to levy and collect special assessments on property that is within the city or within the city's ETJ. PIDs are typically used to help fund enhancements like special lighting and streetscapes, and to help fund special events that benefit businesses in the district.*
- ***Tax Increment Reinvestment Zones.*** *Chapter 311 of the Texas Tax Code allows municipalities or counties to form a Tax Increment Reinvestment Zone (TIRZ), which is a form of tax increment financing. Tax Increment Financing (TIF) is a way to encourage reinvestment in blighted or under-utilized areas that probably will not redevelop on their own. Put simply, it is a way to self-finance new development projects by capturing their back-end tax proceeds to amortize front-end project costs.*

Tools that are traditionally viewed as economic development incentives (such as Chapter 380 Agreements, PIDs, and TIRZ) can be utilized by municipalities to steer growth toward preferred locations such as downtown and redevelopment areas.

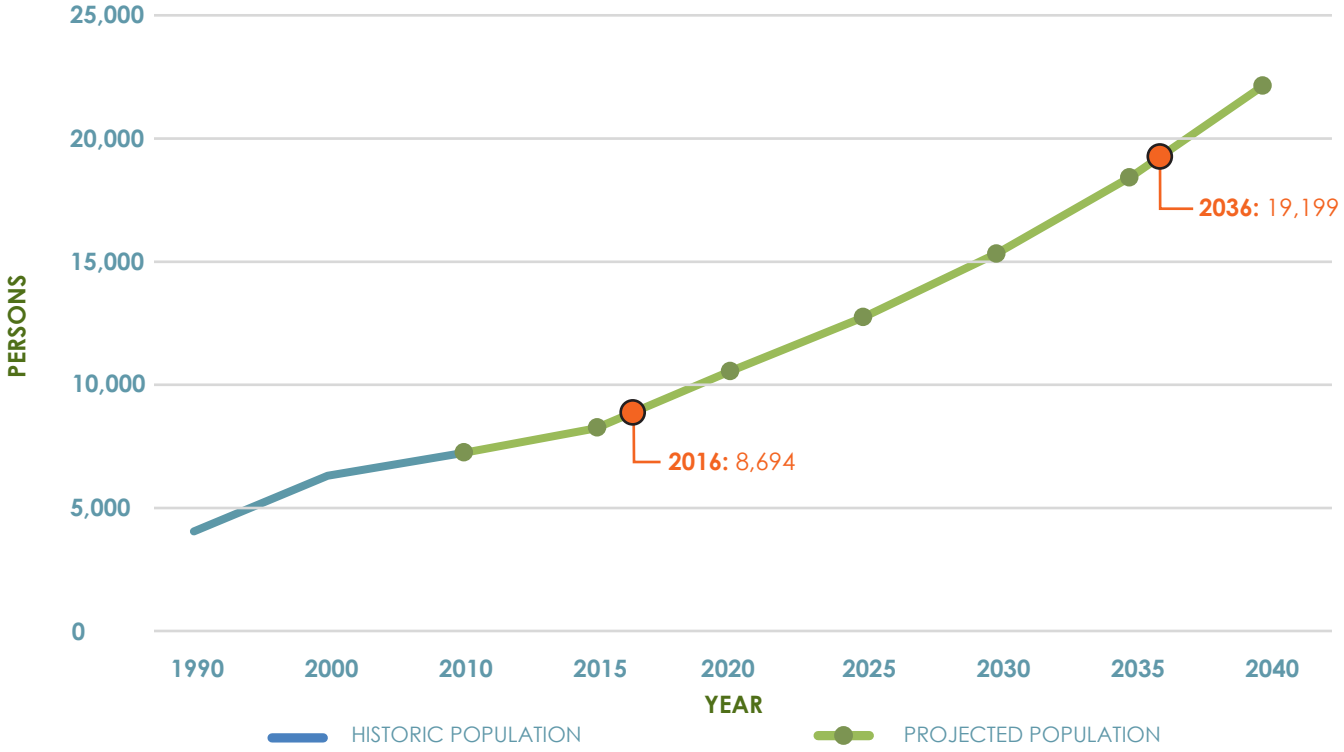
BASTROP GROWTH PROGRAM.

BASTROP POPULATION GROWTH PROJECTION

Nine (9) population projection models have been evaluated to determine the City of Bastrop's growth potential over the next 20 plus years. The results of some of these models are presented in ***Figure 2.1, Bastrop Population Growth Models*** (page 2-3), and illustrate City population growth potential of between 137 percent and 208 percent by 2040 (based on a fixed 2010 population figure of 7,218 persons).

Figure 2.7, Bastrop Population Growth Projection, illustrates the final population growth projection upon which subsequent City growth and development assumptions are based. The population projection presented in ***Figure 2.7*** is derived from a technical memorandum prepared in 2014 for the City for purposes of meeting future water demand (and is also included in ***Figure 2.1***). During the 20 year horizon of this Plan, Bastrop's population is expected to grow from 8,694 to 19,199 persons.

FIGURE 2.7. BASTROP POPULATION GROWTH PROJECTION



Source: City of Bastrop Water Demand Projections (2014)

ADDITIONAL POPULATION PROJECTION INPUTS

Bastrop's population growth projection is based on static City boundaries. The City must continually monitor and refine the population projections through a formal review process (see Goal 2.1, Objective 2.1.1, item 1). Although such adjustments can be made at any time that new data becomes available, modifications to population projections should at least occur in conjunction with the periodic Comprehensive Plan monitoring activities that are recommended in Chapter 9, Implementation.

Additional data inputs which may enhance the accuracy of long-term population projections include:

- *Annexation Policy*
- *Residential Building Permits*
- *Preliminary and Final Subdivision Plats*
- *School Enrollments*
- *Sewer System Expansion*
- *Zoning of Vacant Land*
- *Municipal Utility Districts*

GROWTH CONSTRAINTS

Bastrop's growth patterns will be influenced by the presence of sensitive environmental lands within and around the community, and by the capacities of its various public utility systems.

NATURAL RESOURCES

Many features of a community's lands and waters can influence the manner in which property is developed; or, is otherwise left in a natural state. The following natural features will have the greatest influence on where Bastrop grows, and how property is developed:

- ***Floodplains.*** *The Colorado River, Copperas Creek, Gills Branch Creek, and Piney Creek are all located within 100-year floodplains of variable width.* ***Figure 2.9, Bastrop Flood Hazard Profile*** *(page 2-28) identifies developed properties in the City that are currently located in the 100 year floodplain. A much larger portion of the City is located within the 500-year floodplain. More information is located in the Subsection entitled "Hazard Mitigation" on page 2-28.*
- ***Lost Pines Habitat Conservation Area.*** *That portion of Bastrop lying east of S.H. 95 is located in the Lost Pines Habitat Conservation Area. This habitat area delineates the largest known concentration of the Houston Toad, a federally-designated endangered species. Certain development activities in this area are subject to an incidental take permit, issued by the U.S. Fish and Wildlife Service, prior to land disturbance or construction.*
- ***Topography.*** *Other than the bluffs located along the Colorado River stream bed, much of Bastrop west of S.H. 95 is level or moderately sloping in nature. Much of the property west of the river is located in the 500-year floodplain, although recent annexation further to the west along S.H. 71 has led to the incorporation of higher table land above 500 year flood levels. Bastrop's greatest topographic challenges lie on the City's eastern fringe where steep elevation changes inhibit the development of pad sites of large size without substantial cutting and filling of property.*

Past comprehensive planning efforts have also referenced the types and conditions of soils present in Bastrop. While soil types can pose development challenges (through varying properties affecting percolation, water run-off, expansion, and settling), no soil type identified in Bastrop by the Natural Resource Conservation Service (NRCS) inhibits the ability to develop in the City. Likewise, concentrations of freshwater wetlands in

FISCAL IMPACT ANALYSIS TOOLS.

Many communities are developing standardized fiscal impact analysis tools to weigh the cost versus benefit of annexing property. Figure 2.8, Example Fiscal Impact Analysis Tool (right) highlights one (1) simple method by which potential expenditures versus revenues may be measured when considering annexation, or other development proposal (particularly when a full service annexation would obligate the extension of city services within a constrained time frame). Many variations of the model may be developed for use by the City.

Bastrop are not present in sufficient area to substantially inhibit development activity in the City. Only in limited instances would a property owner in Bastrop be subject to a Section 404 permit issued by the U.S. Army Corp of Engineers for purposes of wetland dredging or fill.

COMMUNITY FACILITIES

The City of Bastrop's growth can be also be limited if it fails to anticipate increases in water withdrawal and storage requirements, and waste water treatment capacity necessary to meet the needs of a growing population. In addition, the boundaries of utility service areas can constrain the growth of Bastrop's municipal limits. Water, waste water, and electric utility service area boundaries are largely fixed (unless agreements can be reached with adjacent providers), and City expansion beyond one (1) or more of these service areas – as opposed to within such areas – decreases opportunities to maximize the use of existing City owned and maintained infrastructure.

The growth constraints listed in this section were considered during the preparation of the **Map 2-A, *Bastrop Growth Program Map*** *(page 2-16)* These factors have likewise been considered in the preparation of the City's *Future Land Use Program* included in **Chapter 5, *Land Use and Urban Design***.

FIGURE 2.8. EXAMPLE FISCAL IMPACT ANALYSIS TOOL

SERVICE	INPUT
EXPENDITURES	
Public Safety	
Estimated # Calls Per Service	Total Number
Cost Per Hour	Dollars
Average Time Per Call (State or Local Average)	Hours (1.0)
1st Year Cost of Service	Number x Dollars x Hours
Public Works	
Streets	
Miles Per Street	Total Number Within and Directly Accessed to 1st Stop Sign or Traffic Signal.
Cost For Routine Maintenance	Average Cost To City Per Lane Mile
1st Year Cost of Service	Miles x Cost Per Lane Mile
Water	
Add formula if all costs are not offset by impact fees, and monthly service fees.	
Waste water	
Add formula if all costs are not offset by impact fees, and monthly service fees.	
Electricity	
Add formula if all costs are not offset by impact fees, and monthly service fees.	
Solid Waste	
Add formula if all costs not offset by monthly service fees.	
Estimated O&M Costs:	
REVENUES	
Property Tax Revenues	
(Year) Assessed Valuation	Less Exemptions
Assessed Value of Non-Agriculture	Percentage of Overall Assessed Valuation (Less Exemptions)
Tax Benefit of Non-Agriculture	Estimated Tax Revenue (As percent of Assessed Valuation)
O&M Budget: Estimated Fiscal Impact in 1st Year	Percentage of Tax Benefit (Split with Debt Service)
Debt Service: Estimated Fiscal Impact in 1st Year	Percentage of Tax Benefit (Split with O&M Budget)
Net Fiscal Impact on O&M Budget (1st Year)	**Estimated O&M Revenues - Estimated O&M Costs**

Source: Halff Associates

BASTROP GROWTH PROGRAM: PRINCIPLES AND POLICIES

Past annexation activity, and feedback received during the comprehensive planning process, does not reveal Bastrop to be a community fixated on "achieving" an arbitrary level of population growth. While prospective future population growth throughout Bastrop County is largely viewed as inevitable, there is little evidence of a community desire that the City receive its so-called "fair share" of these anticipated residents. Instead, there is a greater interest in ensuring that City infrastructure investments attract quality growth that increases City revenues and is fiscally sustainable.

Under the premise of fiscally sustainable public investment – or "measured growth," the principles and policies of the Growth Program are intended to facilitate land development (and associated population growth) that is in close proximity to existing City infrastructure and services. The future decisions of Bastrop's elected and appointed officials, and City staff, regarding Bastrop's growth patterns will adhere to the following statements of principle and policy:

BASTROP GUIDING GROWTH PRINCIPLE: The City of Bastrop will implement policies, programs, investments, and strategies that are fiscally sustainable by: A) Facilitating infill and redevelopment activity; B) Encouraging contiguous development; and, C) Managing targeted corridor development.

GROWTH POLICIES:

- *Capital improvement projects will be evaluated based on the degree to which they support reinvestment in existing districts and neighborhoods.*
- *Annexation proposals will be considered based on the anticipated costs of providing immediate and long-term infrastructure and public services.*
- *Development within the municipal limits, and in close proximity to existing infrastructure, will be prioritized.*
- *Extensions of the City's infrastructure networks will be the minimum necessary to support preferred growth patterns.*
- *Infrastructure enhancements will exhibit a benefit to Bastrop's existing utility customers.*
- *City investments will support development patterns that promote the least possible disturbance of land and smallest possible development footprints.*
- *Bastrop will exercise a conservative annexation strategy that emphasizes the incorporation of contiguous parcels.*
- *The City will utilize its statutory authority to mitigate the anticipated impacts of scattered private development that does not conform to the City's preferred growth patterns.*
- *The use of economic development tools such as 380 Agreements, PID, and TIRZ, will be focused on properties within the City's overlapping service areas, and other areas of preferred growth.*

BASTROP GROWTH PROGRAM MAP

DESCRIPTION

The policies of the *Bastrop Growth Program* (*page 2-14*) provide parameters under which the City might initiate future annexation activity or infrastructure investment. The Program is a **statement of intent**, indicating Bastrop's preference to facilitate development within, and in close proximity to, existing municipal boundaries. This policy may be referred to as *measured growth*. **Map 2-A, *Bastrop Growth Program*** depicts close adherence to the Bastrop Growth Program principles and policies is depicted on **Map 2-A, *Bastrop Growth Program***. The darker a parcel on **Map 2.A**, the more likely that its development reflects Bastrop's preferred future growth pattern.

VARIABLES. Map 2-A represents the following variables:

Boundary. Only parcels partially or completely located within ½ mile of Bastrop's statutory ETJ or sewer CCN area (whichever was greater) were considered.

Desirable Attributes. *The following attributes increase a property's growth potential:*

- ***Water, Waste water, and Electric Service Areas.*** *Separate filters were applied to parcels completely or partially located within Bastrop's water and waste water CCN areas, and electric utility service area.*
- ***Water, Waste water, and Electric Lines.*** *Separate filters were applied to properties located within a 300' buffer from water, waste water, and electric lines.*
- ***Major Thoroughfares.*** *A filter was applied to parcels located within 1000' of a highway or arterial street.*
- ***Property Classification.*** *A filter was applied to properties were identified as vacant, undeveloped, agricultural, timberland, wildlife, or similar category; and/or which have no improvement value. Property classifications established by the Texas Comptroller of Public Accounts, and sub-classification utilized by the Bastrop County Tax Assessor were considered.*
- ***Watershed.*** *A filter was applied to parcels partially or completely located within the Copperas Creek – Colorado River Watershed (HU-12).*

Undesirable Attributes. *The following attributes decrease a property's growth potential:*

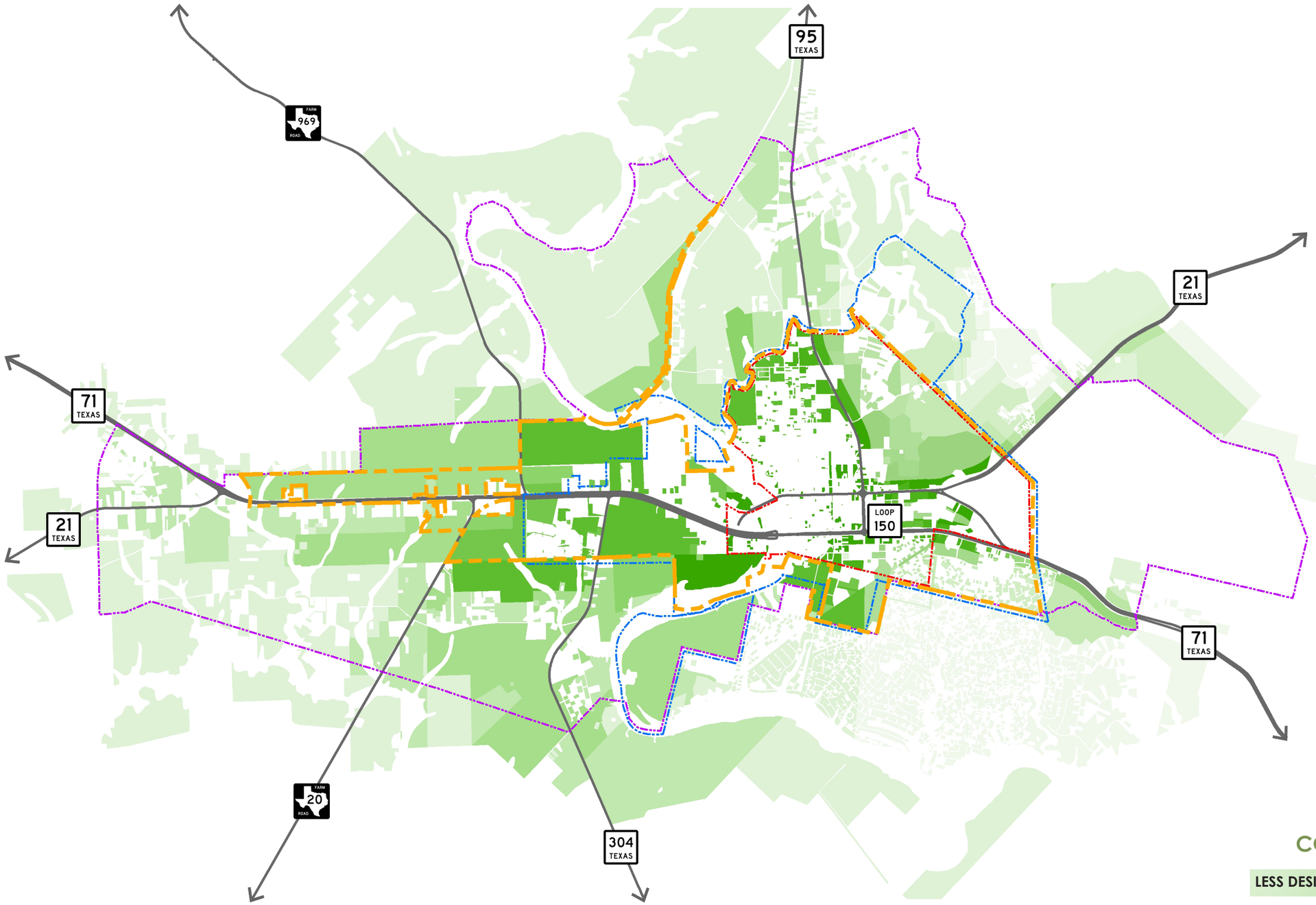
- ***Environmentally Constrained Lands.*** *Specifically, floodplains and Houston Toad habitat.*
- ***Public Properties.*** *City, County, School District, State.*

LIMITATIONS. The Bastrop Growth Program does not do the following:

- *It **does not** establish or imply a fixed urban growth boundary or designated development area outside of which capital investments would be prohibited.*
- *It **does not** prohibit the City from participating in development activities resulting from a privately initiated MUD.*
- *It **does not** limit annexation; although, it may be utilized as a measure when considering the merits of an annexation application.*

BASTROP GROWTH PROGRAM

MAP 2-A:



LEGEND:

- CITY LIMITS
- SEWER SERVICE AREA
- BP&L SERVICE AREA
- WATER SERVICE AREA

COMMUNITY GROWTH IS:

LESS DESIRABLE — MORE DESIRABLE

There are tangible steps that Bastrop can undertake to better ensure that the City's future development actions and decisions align with the Bastrop Growth Program. The following goal, objectives, and initiatives are intended to support the growth principles and policies contained in this Plan.

GOAL 2.1: Maintain and enable a policy of "measured growth" as represented by the Bastrop Growth Program.

OBJECTIVE 2.1.1: Implement a community growth program that maximizes the use of existing City infrastructure.

1. ***Include ranking criteria in a City Capital Improvements Program that provides weight to proposed projects that promote infill and/or contiguous development.***
2. ***Prepare and utilize a fiscal impact analysis tool when determining the value of annexing property, or when reviewing proposed planned developments or other development proposals.***
3. ***Conduct one (1) or more studies of potential annexation areas, and utilize the results to amend and formalize the Bastrop Growth Program Map.***

OBJECTIVE 2.1.2: Exercise greater influence on development patterns and character in the Bastrop ETJ.

1. ***Develop a list of minimum parameters which must be met for the City to approve a proposed MUD or other water district in the ETJ. The following topics are provided as examples only:***
   b. ***Roadway capacity improvements (Based on City-funded traffic impact analysis).***
   c. ***Recreation space (Minimum allocations based on per capita parkland targets).***
   d. ***Public facility land reservations (Based on estimated population, calls for service, emergency response times, Bastrop ISD master plan).***
   e. ***Trail connectivity (In accordance with a greenways master plan).***
2. ***Require MUDs that are completely or partly located outside of the City's preferred growth areas (as provided in this Chapter) or annexation areas to employ cluster development techniques, and preserve natural open space in addition to required recreation areas.***
3. ***Develop minimum benchmarks which must be met in order for the City to approve major amendments to an approved MUD.***
4. ***Employ graduated water and waste water impact fees based on a project's location - proximate to the City's municipal boundaries at the time of the development is proposed - and to water sources and treatment facilities.***

INFRASTRUCTURE CAPACITIES.

Adherence to a preferred growth program requires that a community's various utility networks are developed and maintained in an orderly manner. In particular, opportunities to grow municipal and other public utility system, and expand the associated customer base, should only be entertained if due consideration has also been given to how such actions mitigate existing service deficiencies to current customers.

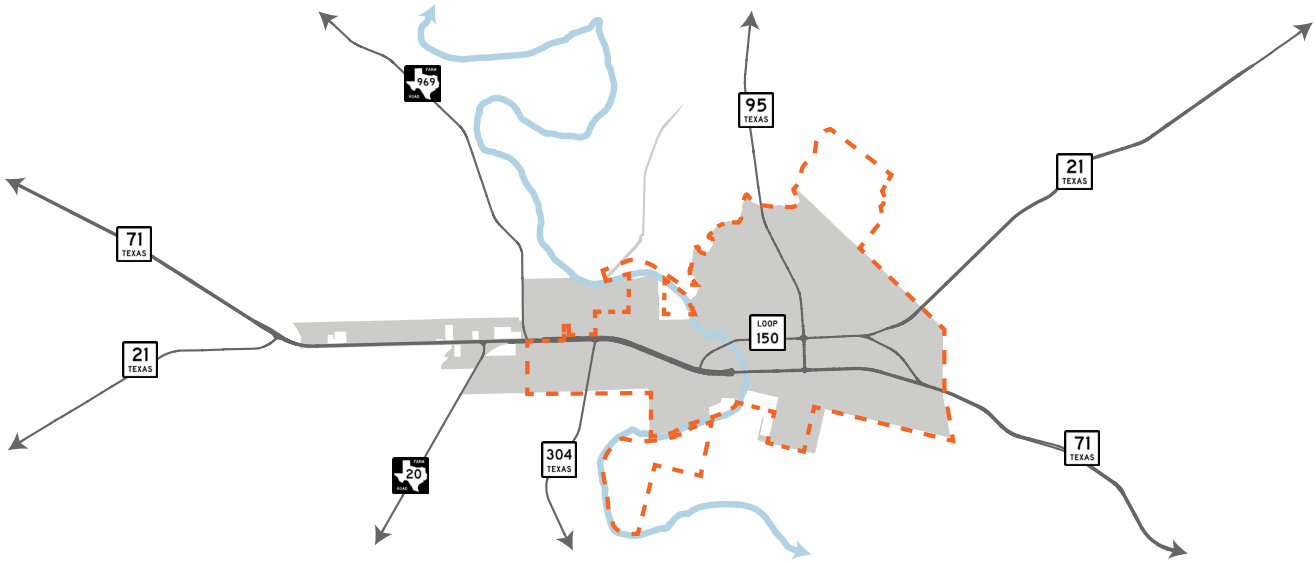
This section of the Plan evaluates Bastrop's water, waste water, storm water, and electrical power networks to consider actions that may be taken to balance system growth potential, with the preservation of existing public utility investments. The associated goals, objectives, and strategies are drafted to support the City framework advocated in the Bastrop Conceptual Growth Program.

Bastrop's three (3) overlapping service areas correspond with a substantial inventory of parcels with infill and redevelopment potential.

BASTROP WATER SYSTEM

The City of Bastrop operates a municipal water system providing potable water to customers within a 7,062 acre service (CCN) area. The utility's approved Certificate of Convenience and Necessity (CCN) area includes land within and outside of Bastrop's current municipal limits. In 2015, the City of Bastrop provided municipal water service for almost 3200 customers. Of these, roughly 80 percent are residential customers. Other non-residential service accounts serve a variety of commercial, industrial, and institutional land uses.

FIGURE 2.9. BASTROP WATER SERVICE AREA



The Bastrop municipal water CCN area does not include the entire municipal limits or statutory ETJ. Some property owners and residents of these areas are serviced by the Aqua Water Supply Corporation, while other remain on private wells.

WATER SYSTEM DEMAND

The average water consumption of Bastrop's municipal water customers is 1.25 MGD (million gallons per day) per day – although peak usage can fluctuate greatly. Current water consumption rates represent a 39 percent increase from 2000 but remain far below total system storage capacity. The rate of water consumption per account in 2015 is over 15 percent less than in 2000. Advances in technology, and the City's adherence to the water conservation goals and strategies it established in its 2010 Water Conservation Plan may account for decreases in water usage per account.

Municipal water accounts in Bastrop - both residential and commercial - have increased by 64 percent since 2000. The rate of increased municipal water accounts exceeds estimated City population growth over that same period using most standard methodologies (*see* ***Figure 2.1****, page 2-3*). Although some of the new accounts are presumably for customers located outside of the municipal limits, the extent and location of the CCN boundaries likely does not fully account for the disparity between the growth in water customers and overall City population. Regardless, it does support the City's recent efforts to seek additional pumping capacity.

The City is currently pursuing permits for additional pumping capacity to serve anticipated future residents and development as determined by a 2014 study on water demand projections. The population growth assumptions of that study have been incorporated into this Plan (*see* ***Figure 2.7****, page 2-11*), and remain the basis for prioritizing recommendations herein.

WATER SUPPLY AND STORAGE

The City of Bastrop relies on ground water for its potable water supply. A total of seven (7) wells (located at the Willow Treatment Plant site, and Bob Bryant Park) provide the City with a total pumping capacity of 2,735 gpm (gallons per minute). The City's current pumping capability amounts to roughly 62 percent of its permitted pumping capacity.

Bastrop's water storage facilities are currently located in close proximity to the City's ground water sites at the Willow Treatment Plant and Bob Bryant Park. Cumulative capacity of the three (3) storage facilities is 2,260,000 gallons.

WATER TREATMENT

The City's reliance on ground water, as opposed to surface water sources, requires minimal water treatment measures. Treatment activities include disinfection and fluoridation which occur close to wellheads on the sites of the City's water storage facilities at the Willow Treatment Plant and Bob Bryant Park.

Bastrop continues to experience intermittent problems with occasional water dis-colorization due to the presence of manganese which is drawn from the City's ground water sources. Although there are no known negative health effects associated with the presence of this metal in the City's water lines, it is an issue that continually contributes to a negative perception of the local water supply and system. The problem is most apparent when rapid changes in water usage within one (1) of the City's three (3) water system zones causes changes in water pressure (and disturbs manganese that is settled at the bottom of water lines). Methods to address the dis-colorization issue include the installation of new filtration systems at wellheads, and the construction of an additional water tower which will not only increase the City's storage capacity, but also equalize flow pressure in the system.

WATER DISTRIBUTION AND FIRE PROTECTION

Bastrop's water distribution system is divided into three (3) pressure zones. There is sufficient pressure within the City's system to provide for daily water demand. Conversely, system-wide pressure is too great for some of the City's older and smaller water lines – particularly segments within center city. The City relies on pressure reducing valves to decrease pressure and preserve older infrastructure.

The City currently maintains a fire insurance rating of 5. This relatively high rating is reflective of the City's reliance on a volunteer department, and lack of a station staffed for 24 hour periods. Although sufficient water pressure exists throughout Bastrop to meet acceptable fire flow demands, there are areas where smaller water lines must be strategically replaced to enable increased volumes.

FUNDING

The Bastrop municipal water system is financed and operated in a manner similar to a business enterprise. All revenues (primarily user fees) are utilized by Bastrop

to extend, maintain, improve municipal water facilities and services to "preserve the financial integrity of the utility" as defined by the Texas Water Code, Section 13.183. Water customers are charged service fees based on residency, account type, meter size, and graduated levels of usage. One (1) time connection fees are also charged to customers based on residency within or outside of Bastrop. City ordinance verifies Bastrop City Council's intention to increase service rates (by separate ordinance) by not less than 3.5 percent a year through 2019.

Consistent with the City's 2011 water improvement plan, Bastrop has developed service impact fees that are applied to new subdivisions in the municipal limits and applicable portions of the ETJ.

SUMMARY

Three (3) principal factors will continue to influence the timing and manner in which Bastrop invests in its municipal water utility over the next 20 years:

- *Meeting the basic daily needs of its customers in a financially and environmentally responsible manner;*
- *Adhering to the statutes of the Texas Water Code and the regulatory rules of the Texas Commission on Environmental Quality; and,*
- *Facilitating and supporting the growth and development policies and goals adopted by Bastrop City Council, including those established in this Plan.*

To effectively meet these long-term obligations, Bastrop must be prepared to address at least the following overlapping issues:

- ***Water Quality Perception.*** *New filtering systems should be installed to decrease the amount of manganese drawn into the City's water lines.*
- ***Water Pressure.*** *Unequal water pressure disrupts sediment and can stress undersized lines when heavy usage requires pressure valves to open.*
- ***Water Conservation.*** *Many of the measures included in the City's water conservation plan are educational or voluntary in nature. Extended periods of drought have caused periodic fluctuations in peak water usage. A re-evaluation of the City's water conservation plan may reveal opportunities to encourage additional conservation activities.*
- ***Fee Structure.*** *The City's water improvement plan provides the justification for fee increases through 2019, but must be re-evaluated to determine fees and rates in 2020 and beyond.*
- ***Municipal Utility Districts.*** *MUD developments can obligate local governments to adjust short-term capacity needs, and long-term system operations and maintenance.*
- ***Pipe Size.*** *Insufficient pipe size is an acknowledged issue in older portions of Bastrop, and can exacerbate flow and pressure problems.*

BASTROP COUNTY WATER CONTROL AND IMPROVEMENT DISTRICT #2

Some Bastrop residents, property owners, and business owners receive water and waste water service from the Bastrop County Water Control and Improvement District #2 (WCID). Bastrop County WCID #2 serves residents of the Tahitian Village subdivision – a portion of which is located within the municipal limits. While not responsible for water distribution or waste water collection within the WCID service area, the City of Bastrop does maintain an inter-local agreement to treat all WCID waste water in return for a treatment fee and capital costs. Bastrop has also supplied WCID customers with supplemental water during emergencies, and is developing an inter-local agreement to establish parameters for future emergency interconnections. Agreements to assume ownership and maintenance of some WCID streets located in the municipal limits (subject to minimum upgrades) have also been previously executed by the City.

The City must maintain close coordination with the WCID to ensure that the infrastructure investments of both entities provide a consistently high level of public utility to City residents and property owners living in both service areas. City/WCID inter-local agreements regarding waste water treatment and water supply should be for limited time frames and/or otherwise be written to allow flexibility for the City to adjust rates that it charges the WCID. The City should remain receptive to the possibility of accepting additional WCID infrastructure into its water, waste water, and/or street networks where WCID customers could benefit from enhanced services (i.e. street maintenance, improved fire flows, etc.) Such activity should be focused on areas within the municipal limits and/or the City's water and waste water CCN areas, and should be subject to a cost-benefit analysis conducted on a case-by-case basis.

GOAL 2.2: Ensure long-term water system capacity and water quality for existing customers, while accommodating incremental growth and development.

OBJECTIVE 2.2.1: Engage in regional and local planning initiatives to maintain sufficient short and long-term water supplies.

1. *Actively participate in regional water planning efforts with the Lower Colorado River Authority and surrounding water suppliers.*
2. *Create a comprehensive digital inventory of the City's water facilities including: distribution lines, fire hydrants, etc. Purchase equipment necessary to maintain the digital inventory internally. Maintain an ongoing inventory of service records tied to the GIS database.*
3. *Maintain and update a master water system plan which identifies priority water system rehabilitation projects, and sub-areas where system expansion projects are desirable.*
4. *Strategically incorporate water main extension projects into the City's capital improvements program which would promote development patterns that are consistent with the Bastrop Growth Program. Tie extension projects to sub-area land use studies that identify the maximum density/intensity of development that could tie into the water main without unduly taxing permitted withdrawals, or causing imbalances in system pressure zones.*
5. *Update utility ordinances where necessary to permit development within the municipal limits only when it can tie into existing water mains, unless water main extension is paid for by the developer. Base zoning decisions and development approvals on recommended sub-area development thresholds.*
6. *Periodically update water demand projections. Utilize local inputs to refine long-term population projections in conjunction with water demand projections.*

OBJECTIVE 2.2.2: Upgrade the existing water distribution system so that water pressures remain sufficient for necessary fire flows but do not cause strain on existing lines.

1. ***Continue to incorporate water main replacement projects into the City's capital improvements program (CIP) based on CIP ranking criteria, and prioritization established by the master water system plan.***
2. ***Utilize a dynamic model prior to the operation of the elevated water storage tank in west Bastrop to verify areas of high and low water pressure throughout the water system. Run the model following the installation of the water storage tank. Adjust the priority of water main replacement projects based on modeling results.***
3. ***Prioritize system rehabilitation or expansion projects (including transmission lines, loop connections, pressure valves, and pump stations) which help to equalize water pressure throughout the system's three (3) pressure zones.***

OBJECTIVE 2.2.3: Decrease the infiltration of naturally occurring metals into the City of Bastrop's potable water supply, and the taps of water system customers.

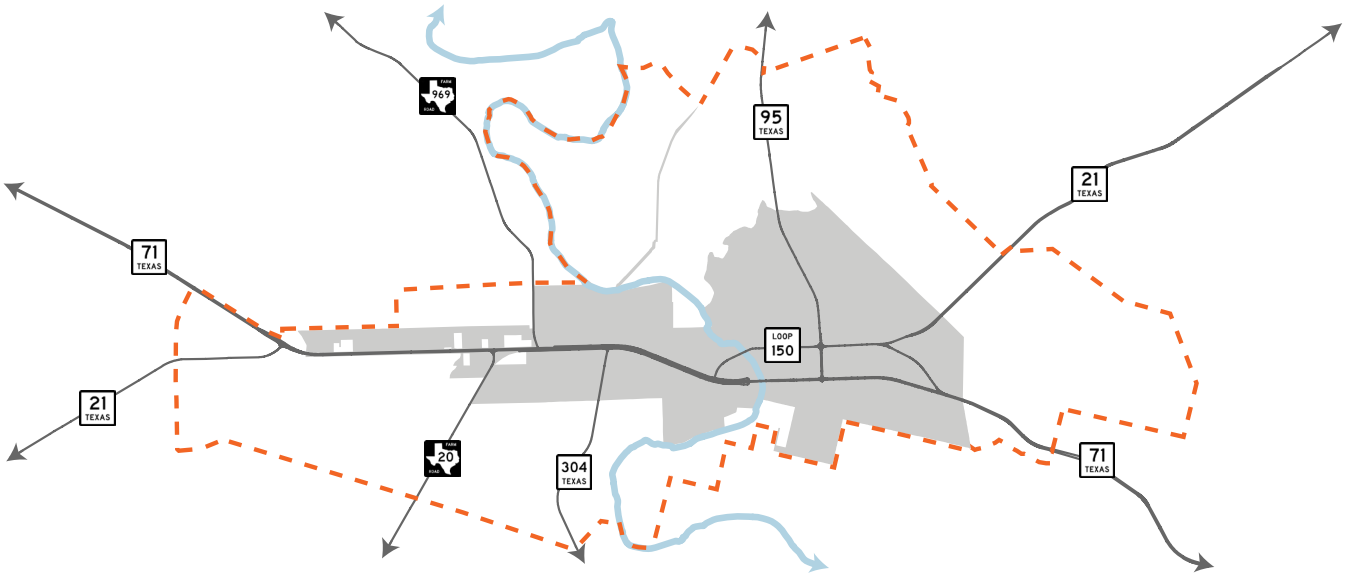
1. ***Install new filtering systems at each water treatment facility that reduce the infiltration of metals into the City's water distribution lines.***
2. ***Schedule periodic flushing of system lines on a recurring basis. Ensure that the public receives advanced notice prior to each scheduled system flush.***
3. ***Seek additional water sources in which lower levels of metals causing water dis-colorization are found and program the replacement of ground water sources with higher levels of manganese.***

GOAL 2.3: Mitigate expected increases in water demand through enhanced conservation practices.

OBJECTIVE 2.3.1: Extend the time frame upon which future water withdrawal permits will be necessary by increasing water conservation activities.

- ***Re-evaluate the City's water consumption charges to determine whether rate adjustments are necessary to reduce per capita water usage at a target conservation rate referenced in the City's 2014 Water Demand Projections model.***
- ***Allocate a fixed percentage of annual revenues for the purchase of household low-flow fixtures for distribution to the general public.***
- ***Modify City landscaping requirements to require the use of drought tolerant native plant species and other xeriscaping techniques for select development sizes and types.***
- ***Construct a waste water reuse system in the City to decrease water consumption rates tied to landscaping and/or industrial uses. (see Objective 2.4.1)***

FIGURE 2.10. BASTROP WASTE WATER SERVICE AREA



BASTROP WASTE WATER (SEWER) SYSTEM

The City of Bastrop operates a municipal waste water system providing sewage collection and treatment service to customers within a 23,522 acre service (CCN) area. The municipal system includes gravity sewers, lift stations, and a central treatment facility.

The utility's approved Certificate of Convenience and Necessity (CCN) area covers an area three (3) times the size of Bastrop, and includes the City's entire municipal limits. In 2015, the City of Bastrop's waste water system served 2,755 customers. Of these, roughly 82 percent are residential customers. Other "commercial" service accounts serve a variety of commercial, industrial, and institutional land uses. Some property owners and residents within the City's waste water CCN remain on private septic systems.

WASTE WATER COLLECTION

Bastrop owns and maintains over 300,000 linear feet (57 miles) of waste water collection lines. The waste water collection system extends across varied terrain and multiple watersheds, requiring the City to operate 16 lift stations of varying capacity (an increase of five (5) stations since 2000).

Inflow and infiltration (I&I) into the waste water collection system is a system-wide challenge that has increased during the last 15 year period. Aging collection lines can allow for increases in overall flows during high rain periods, which can then dilute sewage and decrease treatment effectiveness. I&I problems are most apparent at the waste water treatment facility in the flows encountered during rain events. Elimination of I&I problems requires line repairs - a formidable task due to the lengths of the collection system and topographic challenges.

The City recognizes the extent to which improvements are needed to its waste water collection system. Some needs are already apparent, while others are suspected. Almost 50 percent of the waste water projects included in the City's 2013 – 2018 capital improvements program were dedicated to major system rehabilitation or other testing and repair activities.

WASTE WATER TREATMENT

The City of Bastrop operates a single waste water treatment facility located on the west side of the Colorado River. The City's treatment facility includes two (2) plants that are cumulatively permitted to treat 1.4 MGD. It is currently operating at 60 percent of capacity (0.84 MGD). With a 65 percent increase in total customers since 2000, average daily flows to the facility have increased by 40 percent during the same period. The waste water treatment facility lacks a back-up generator which may inhibit waste water treatment capabilities during a natural disaster or significant storm event.

Bastrop's waste water system will add more future customers than its water and power utilities. Providing for adequate treatment capacity for anticipated growth should remain a high priority.

For both regulatory and practical purposes, Bastrop has initiated plans to increase waste water treatment capacity. Permitting is in place for a new waste water treatment plant to be located on the east side of the Colorado River (along FM 304, and south of the current municipal limits). The City is awaiting the results of an associated study to verify the cost-effectiveness of constructing a new plant on the site. Contingent on the results of the study, the City's most recent capital improvements program divides plant construction into three (3) phases. The servicing of increased treatment capacity will also require the construction of new trunk lines, and may require the redirection of some flows to the new plant.

Bastrop sells treated effluent to commercial customers as part of the City's water conservation program. Water re-use activities are confined to the current treatment plant site, although there is interest in expanding the program to pipe treated effluent off-site to sell for irrigation use. Development of the necessary so-called "purple pipe" system would require pro-active City investment and associated amendments to development codes.

FUNDING

The Bastrop municipal waste water system is financed and operated in a manner similar to a business enterprise. All revenues (primarily user fees) are utilized by Bastrop to extend, maintain, improve municipal waste water facilities and services to "preserve the financial integrity of the utility" as defined by the Texas Water Code, Section 13.183. Waste water customers are charged service

fees based on graduated levels of water consumption. One (1) time connection fees are also charged to all customers based on connection size. City ordinance verifies Bastrop City Council's intention to increase service rates (by separate ordinance) by not less than 3.5 percent a year through 2019.

Consistent with the City's 2011 waste water improvement plan, Bastrop has developed service impact fees that are applied to new subdivisions in the municipal limits and applicable portions of the ETJ.

SUMMARY

Bastrop continues to invest in the improvement of its municipal waste water utility. Future decisions regarding service enhancement should at least address the following issues:

- ***Service Area Topography.*** *The CCN boundaries of the municipal waste water system extend across multiple watersheds. Expansion of the system's footprint will require additional lift stations and/or treatment facilities to overcome topographic challenges.*
- ***Treatment Capacity.*** *The City is rapidly reaching maximum permitted waste water treatment capacity. The appropriate solution for increasing treatment capacity, expanding the existing site versus adding a new facility must consider the latent development potential of property on the west side of the Colorado River.*
- ***Inflow and Infiltration.*** *I&I is a constant problem for most municipal waste water utilities. Future selection of major rehabilitation projects should target locations where complimentary improvements to storm drainage, water, and/or street rehabilitation are also programmed.*
- ***Waste water Re-use.*** *Increasing opportunities for the use of treated effluent for irrigation and industrial non-potable purposes can enhance Bastrop's current water conservation program. Although City codes can easily be amended to require the installation of piping for the use of reclaimed water, costs of the City installing a distribution system are unknown.*
- ***Capital Improvements.*** *The inclusion of funding for ongoing maintenance of the waste water collection system (as opposed to major rehabilitation projects) in existing capital improvements programs suggests that adjustments can be made to the City's operating budget to accommodate a greater level of preventative repair and maintenance work.*

Bastrop should investigate the feasibility of developing a water re-use distribution system.

GOAL 2.4: Expand waste water collection and treatment capacity in a cost-effective manner.

OBJECTIVE 2.4.1: Invest in waste water system expansion in areas that promote infill and contiguous development.

1. ***Incorporate the findings of the waste water treatment plant study into the City's capital improvements program to ensure that future treatment capacity demands can be met.***
2. ***Prioritize capital waste water projects that can be leveraged with storm water drainage, street, or other similar infrastructure improvements – particularly those that service developed areas where vacant infill tracts can be developed.***
3. ***Adopt an adequate facilities ordinance to require that waste water system expansion to areas not generally contiguous to developed property – or located between developed areas and the anticipated waste water treatment plant – be privately financed, or be disallowed until planned City improvements are made available to the site.***
4. ***Utilize statutory tools (380 Agreements, PID, TIRZ) to promote system maintenance or expansion in preferred growth locations.***

OBJECTIVE 2.4.2: Expand the City's waste water re-use program.

1. ***Invest in increased operational storage capacity at waste water treatment facilities for point of sale purchases of treated effluent.***
2. ***Prepare a study to determine the viability of constructing a reclaimed water distribution system throughout all, or portions of the Bastrop municipal limits. Prepare the study in a manner consistent with the recommendations of WateReuse (available quantities, potential users, potential demand, distribution system layout, system retrofit, code amendments.)***

LOW-IMPACT DEVELOPMENT

One method of reducing storm water runoff is to require that new land development incorporate low-impact development (LID) / green infrastructure approaches to mimic or restore pre-development hydrology to the maximum extent practicable. LID is an approach to land development that uses various land planning, design practices, and technologies to simultaneously conserve and protect natural water resource systems and reduce infrastructure costs. LID still allows land to be developed, but in a cost-effective manner that helps mitigate potential environmental impacts. For example, site plans should be developed that keep water from running off the land too quickly and instead allow the water to soak back into the earth and replenish the groundwater table or aquifer. Reducing the quantity and velocity of water run-off minimizes soil erosion and loss of land. Site plans should employ strategies and techniques that protect the quality of water that flows into lakes, streams, and wetlands or recharges groundwater supplies. LID storm water management best practices should be implemented within public rights-of-way, particularly along roadsides and in parking lots, where soils and other conditions will allow. LID processes for systematically managing storm water include 'chains' or natural treatment methods of filtration, infiltration, and storage and ultimately reuse.

Bio-retention ponds utilize native vegetation to filter pollutants and absorb storm water runoff.

Recent City development projects have already incorporated LID site design and technologies, but City Code does not require LID approaches to new development.

3. *Modify City codes to require dual piping as part of new construction within at least those portions of the City for which a water reuse system has been deemed feasible. Alternatively, link the applicability of the dual piping requirement to construction in areas that are anticipated to be serviced in the near future as identified in the City's capital improvements program.*
4. *Require connection to the water reuse system for new construction in areas where the system is in place, or retroactively upon system expansion. Limit retroactive connection requirements to certain development types. Offer incentives for retroactive connection to the system of single-family residential property or other types of land uses where costs would otherwise exceed financial benefits.*

GOAL 2.5: Enhance waste water system efficiency.

OBJECTIVE 2.5.1: Maintain a comprehensive inventory of waste water system facilities.

1. *Create a comprehensive digital inventory (GIS) of the City's waste water facilities including pipe size, lift stations, and manholes. Purchase equipment necessary to maintain the digital inventory internally. Maintain an ongoing inventory of service records tied to the GIS database.*
2. *Utilize digital service record inventories as a variable in determining future waste water system maintenance project priorities. (Also in conjunction with a subsequent I&I study as recommended in Objective 2.5.2)*

OBJECTIVE 2.5.2: Incrementally reduce the frequency and volume of inflow and infiltration (I&I) problems in waste water collection and outfall lines.

1. *Commission a comprehensive I&I study of the waste water collection system. Initiate the study following completion of the system-wide digital inventory referenced in Objective 2.4.2. Prioritize major projects within the study in a manner that mimics the City's capital improvements program, and provide associated cost estimates.*
2. *Utilize I&I study results to prepare a yearly maintenance program. Determine an appropriate amount of funds to be allocated in the annual operating budget for routine smoke testing and in-house repairs.*
3. *Determine a minimum threshold whereby the cost/size of a replacement/rehabilitation project requires that the project be considered for inclusion in an annual capital improvements program.*

TxDOT and other public entities may serve as reliable partners in providing for regional detention options.

BASTROP STORM WATER SYSTEM

STORM WATER COLLECTION SYSTEM

The city of Bastrop owns and maintains a series of detention ponds and other drainage structures that collect and convey storm water outfall from City property and private development. The City's network of drainage structures is tied to those of TxDOT and natural drainage channels. Although the majority of City street rights-of-way are currently drained by open ditches, an increasing percentage of the City's street inventory (via new development and street rehabilitation projects) utilizes curb, gutter, and underground storm drainage. Bastrop's drainage structures – including detention ponds, curb and gutter, and inlets – are maintained by Public Works Department staff.

FIGURE 2.11. BASTROP FLOOD HAZARD PROFILE

LOCATED IN FLOOD ZONE	100 YEAR	500 YEAR
Acres	633	1,789
Exposed Structures	133	1003
Persons Affected	363	2,723
Value of Exposed Structures ($)	86,592,700	807,198,744
Critical Facilities	1	7
Bridges & Infra.	10	11
Lost Value ($) (Est.)	15,892,066	20,660,810
Percent (%) of Total Value	18.4	2.6

Source: Bastrop County Hazard Mitigation Plan Update (2016)

The City reports localized flooding and ponding during heavy rain events (particularly in the older parts of the City) that is attributed to inadequately sized drainage structures, and older construction that was built to insufficient finished floor elevations. These localized events are not reported as frequently in newer developments that are subject to the City's current building and site development requirements, floodplain ordinance, and subdivision regulations.

HAZARD MITIGATION

The City of Bastrop is participating in an update to the Bastrop County Hazard Mitigation Plan (part of the TCRFC Hazard Mitigation Plan). The update is a required of all jurisdictions wishing to retain eligibility for FEMA Hazard Funding. The preliminary risk assessment portion of the Hazard Mitigation Plan classifies the City as having a "medium risk" for extreme heat, flood, and wildfire events.

Storm water system investments can help reduce Bastrop's susceptibility to significant life and property loss as a result of a severe flood event. ***Figure 2.11, Bastrop Flood Hazard Profile***, illustrates the degree to which City property is threatened by potential flood events.

A very small percentage of Bastrop's land area lies within the 100 year floodplain.

Property owners in these high risk areas are required to have federal flood insurance policies. In contrast, a significant portion of the City lies within the 500 year floodplain – particularly in center-city, and west of the Colorado River. Property owners in these "moderate to low risk" areas are not required to obtain federal flood insurance.

Continued development in Bastrop can gradually increase impervious surface area, and elevate the volume and velocity of storm water flows. Even with storm water infrastructure built to contemporary specifications, the frequency of localized flooding events even outside of high risk (100 year) floodplains can increase as new development occurs within and upstream of the City. These risks are acknowledged in the most recent TCRFC Hazard Mitigation Plan (2011-2016). Comprehensive drainage system improvements to both Gills Branch and Piney Creek, totaling 16 million dollars, have been recommended due to "slow drainage and rain runoff that has increased the scope of the floodplain."

Bastrop County is currently conducting a flood protection planning study partially funded by the Texas Water Development Board. This study evaluates drainage in targeted watersheds in much more detail than a hazard mitigation plan, but the project scope currently excludes watersheds located in the City. A similar study in Bastrop would identify the specific improvements necessary in the Gills Branch and Piney Creek drainage basins.

WATER QUALITY

The Texas Commission of Environmental Quality (TCEQ) issues and administers "municipal separate storm water "(MS4) permits as part of its responsibility to minimize pollution in the State's surface waters through the regulation of storm water discharges. MS4 permits, and corresponding storm water management programs, are required of many local governments within the urbanized areas of Texas. The permitting process and administration ensures that Texas adheres to its responsibilities under the Clean Water Act.

Bastrop does not meet the minimum threshold required for the City to obtain an MS4 permit from TCEQ, but may after future decennial censuses. Regardless, the very existence of this type of permitting is an acknowledgment that effective storm water drainage systems greatly reduce the impact of non point source pollution discharges to surface waters. Application of these requirements by urbanized upstream communities – including the adoption of storm water management programs, utilities, and fees - has significantly improved the water quality in the Lower Colorado River and other watersheds.

FUNDING

Absent the types of dedicated user, connection, and impact fees that fund the City of Bastrop's municipal water and waste water utilities, storm water system improvements have been funded through the use of general funds and bond revenues. Improvements to inadequately sized storm water drainage structures occur less frequently than those to water and waste water systems. Although periodically heavy, the infrequency of major storm events decreases the urgency to make substantial investments in the system – even though impervious surfaces are increasing as new development occurs in the City's drainage basins.

SUMMARY

Major flooding events, and their visual reminders of potential life and property loss, serve as the primary factors motivating communities to invest in improved local storm water infrastructure. In addition, investment in storm water management is also a way to improve water quality in the Lower Colorado River watershed by mitigating non point source runoff as the City develops.

Future decisions regarding City storm water management should consider at least addressing the following issues:

- ***Community Rating System (CRS).*** *The National Flood Insurance Program (NFIP) lists 18 actions that communities may take to reduce federal flood insurance rates. Bastrop County participates in the CRS program by conducting NFIP-eligible activities in the categories of: public information, mapping and regulations, flood damage reduction, and flood preparedness.*
- ***Storm Water Utility.*** *Establishment of a storm water utility may be a method by which Bastrop can collect funds for the long-term maintenance of its drainage facilities. Chapter 552 (Municipal Utilities), of the Texas Local Government Code establishes the parameters under which Texas municipalities may establish, fund, and operate a municipal storm water (drainage) utility.*
- ***Regional Detention.*** *Storm water utility fees may be utilized to build regional detention facilities. Strategically located regional detention facilities may serve in lieu of required on-site storm water requirements where property constraints otherwise make on-site detention infeasible. Properly designed facilities may also serve as recreational amenities – particularly where they provide linkages to other public parks or greenway corridors.*
- ***Low-Impact Development.*** *Site development standards may be modified to require developments of certain types and/or sizes to utilize a range of low impact development (LID) techniques such as bio-retention areas, cisterns, pervious paving, and rain gardens.*
- ***Stream Buffers.*** *City development codes may be modified to require the preservation and/or installation of stream side vegetation along river and creek corridors.*
- ***Tree Preservation/Planting.*** *Even absent a comprehensive set of LID requirements in the City's development codes, robust tree preservation and planting requirements can maintain or expand tree canopies which mitigate some increases in community-wide impervious surface areas.*

GOAL 2.6: Reduce flood hazards in Bastrop through the programmed improvement of the City storm water system.

OBJECTIVE 2.6.1: Identify, prioritize, and fund a city-wide network of storm water infrastructure improvements.

1. *Create a comprehensive digital inventory of the City's storm water facilities including: inlets, piping, engineered channels, detention ponds, etc. Purchase equipment necessary to maintain the digital inventory internally.*
2. *Prepare a master drainage study for the City that identifies critical storm water infrastructure improvement needs by watershed, phasing, and cost. Include costs related to ongoing maintenance of existing and proposed facilities and structures.*
3. *Ensure that master drainage study recommendations incorporate applicable recommendations from the Bastrop Hazard Mitigation Plan.*
4. *Incorporate priority storm drainage projects into the City's capital improvements program.*
5. *Study the feasibility of establishing a municipal drainage utility as provided by Chapter 552 (Municipal Utilities), of the Texas Local Government Code. Consider storm water utility assessment options to provide funding solely for operations and maintenance versus improvement project costs.*
6. *Investigate the feasibility of establishing one (1) or more regional storm water detention basins to provide private development options for off-site detention.*
7. *Consider assessing impact fees to fund regional storm water detention facilities.*

GOAL 2.7: Protect water quality in the Lower Colorado River Watershed by mitigating storm water discharges associated with growth and development.

OBJECTIVE 2.7.1: Create a storm water management program modeled after the Phase II MS4 permitting requirements for small municipal storm sewer systems.

1. *Develop a model storm water management program for adoption by resolution of Bastrop City Council.*
2. *Implement best management practices (BMP) that address the six (6) minimum control measures required by TCEQ of MS4 communities.*
3. *Contract with a non-profit entity to assist in the implementation of BMPs related to public education and involvement.*
4. *Amend development regulations to provide a direct linkage to BMPs relating to development control policies.*
5. *Incorporate provisions into the storm water management program that address NFIP-eligible activities that will enable City participation in the Community Rating System (CRS).*

OBJECTIVE 2.7.2: Incorporate low impact development (LID) solutions into City development regulations and public construction projects.

1. ***Conduct an "audit" of City land development regulations identifying opportunities for comprehensive low impact development (LID) amendments.***
2. ***In lieu of a LID audit of development regulations, prioritize and incrementally amend land development regulations to incorporate one (1) or more of the following:***
   a. ***Require vegetative buffers of varying widths along creeks, streams, and the Colorado River.***
   b. ***Adopt a tree preservation and planting ordinance. Link requirements to corresponding development regulation amendments requiring land clearance permits.***
   c. ***Include porous paving requirements for parking areas in excess of established thresholds.***
   d. ***Modify street design guidelines to allow "green street" options that incorporate features such as bio-swales, street trees, and rain gardens.***
3. ***Prepare and adopt a policy requiring that selected recommendations from the LID audit of development regulations be incorporated into subsequent City building and site design and construction.***
4. ***Prepare a greenways master plan for the Colorado River, Gills Branch Creek and Piney Creek corridors that ties recreational enhancements to master drainage study recommendations.***

BASTROP POWER AND LIGHT

The City of Bastrop owns and maintains an electrical utility that distributes power to residential and commercial customers within the municipal limits. Bastrop Power and Light's (BP&L) 3,569 acre service area is contained within the municipal boundaries (currently comprising 51 percent of the City's total land area). BP&L facilities include utility poles, lines, transformers, and street lights. As of 2015, the principal distribution network supplied power to 2071 residential and 637 commercial customers. The combined 2708 residential and commercial accounts documented at the end of 2015 represent a 27 percent increase in customers since 2000.

The City of Bastrop's municipal boundaries extend beyond that of BP&L's service area. Bastrop's remaining land area is located within the Bluebonnet Electric Cooperative's service area (which completely surrounds that of BP&L). The majority of the City's growth potential lies west of the Colorado River, primarily within Bluebonnet's service area. All future City annexation activity will gradually increase the percentage of municipal land that will be serviced by Bluebonnet.

In an effort to stay ahead of maintenance needs, and to provide network enhancements, BP&L completed a system-wide study in 2014 which identified 11 essential improvement projects to be completed over a 5 year period. Proposed projects were estimated to cost roughly 990,000 dollars between 2014 and 2019, and included multiple projects to rebuild or reconfigure circuits. BP&L's five (5) year work

program was developed autonomously from those of the City's other utility departments because BP&L is funded exclusively by its own proprietary fund.

FUNDING

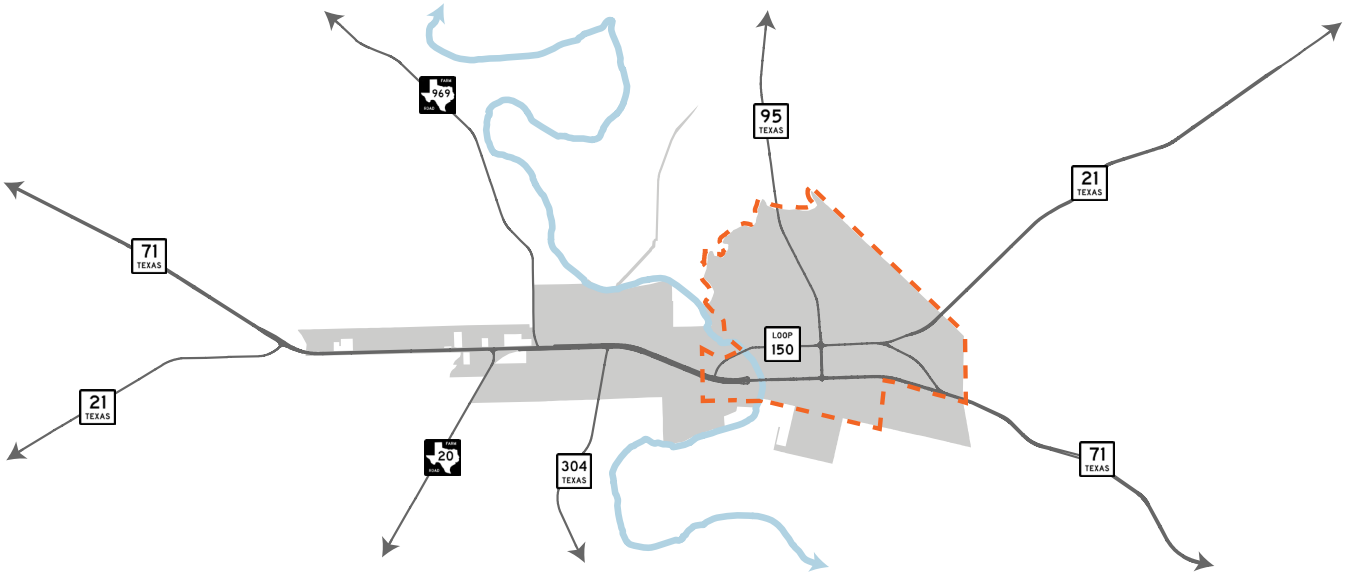
BP&L is financed and operated in a manner similar to a business enterprise. All revenues (primarily user fees) are utilized by Bastrop to offset the cost of providing service to the utility's customers. Customers are charged monthly rates for power usage (adjusted monthly to account for wholesale price variations), and additional fees for security deposits, reconnection or relocation of service, temporary service, and delinquent payments. The City's fee structure has allowed it to maintain an annual electrical fund balance. BP&L has maintained a consistent balance in reserve funds for several fiscal years.

SUMMARY

The reliance of BP&L and Bluebonnet on wholesale power generated from common providers has meant little historical variation between the retail rates offered by either entity to residential and commercial customers in Bastrop. While comprehensive plan public engagement activities revealed distinct opinions regarding the provision of other public services, the activities did not suggest dissatisfaction with the electrical services provided by BP&L or Bluebonnet.

There is no evidence that the continued operation of a municipal is cost prohibitive to the community, or has resulted in lower levels of customer satisfaction. Assuming the City maintains its long-term commitment to provide electrical utility service within the BP&L service area, retail rates must remain competitive, and pro-active distribution network maintenance will be required to keep calls for service low.

FIGURE 2.12. BASTROP POWER AND LIGHT SERVICE AREA



SUMMARY OF GOALS AND OBJECTIVES (COMMUNITY GROWTH).

Chapter 2, *Community Growth*, of the Bastrop Comprehensive Plan includes an overview of the utility services that the City and other public and private partners provide to the citizens of Bastrop. With a view toward improving public service delivery to current residents, property owners and business owners - as well as anticipating demand that will accompany increases in population - the Community Growth chapter includes a series of goals and objectives that have been incorporated into the City's overall comprehensive plan work program (Chapter 9, *Implementation*).

The seven (7) goals and 13 objectives that are recommended throughout this chapter have been compiled into ***Figure 2.13*** below. Detailed initiatives and actions that correspond to the listed goals and objectives may be found on the page numbers referenced within the figure.

FIGURE 2.13. COMMUNITY GROWTH, SUMMARY OF GOALS AND OBJECTIVES

GOAL/OBJECTIVE:	PAGE:
GOAL 2.1: MAINTAIN AND ENABLE A POLICY OF "MEASURED GROWTH" AS REPRESENTED BY THE BASTROP CONCEPTUAL GROWTH PROGRAM.	2-17
OBJECTIVE 2.1.1: Implement a community growth program that maximizes the use of existing City infrastructure.	2-17
OBJECTIVE 2.1.2: Exercise greater influence on development patterns and character in the Bastrop ETJ.	2-17
GOAL 2.2: ENSURE LONG-TERM WATER SYSTEM CAPACITY AND WATER QUALITY FOR EXISTING CUSTOMERS, WHILE ACCOMMODATING INCREMENTAL GROWTH AND DEVELOPMENT.	2-22
OBJECTIVE 2.2.1: Engage in regional and local planning initiatives to maintain sufficient short and long-term water supplies.	2-22
OBJECTIVE 2.2.2: Upgrade the existing water distribution system so that water pressures remain sufficient for necessary fire flows but do not cause strain on existing lines.	2-23
OBJECTIVE 2.2.3: Decrease the infiltration of naturally occurring metals into the City of Bastrop's potable water supply, and the taps of water system customers.	2-23
GOAL 2.3: MITIGATE EXPECTED INCREASES IN WATER DEMAND THROUGH ENHANCED CONSERVATION PRACTICES.	2-23
OBJECTIVE 2.3.1: Extend the time frame upon which future water withdrawal permits will be necessary by increasing water conservation activities.	2-23
GOAL 2.4: EXPAND WASTE WATER COLLECTION AND TREATMENT CAPACITY IN A COST-EFFECTIVE MANNER.	2-27
OBJECTIVE 2.4.1: Invest in waste water system expansion in areas that promote infill and contiguous development.	2-27
OBJECTIVE 2.4.2: Expand the City's waste - water re-use program.	2-27
GOAL 2.5: ENHANCE WASTE WATER SYSTEM EFFICIENCY.	2-28
OBJECTIVE 2.5.1: Maintain a comprehensive inventory of waste water system facilities.	2-28
OBJECTIVE 2.5.2: Incrementally reduce the frequency and volume of inflow and infiltration (I&I) problems in waste water collection and outfall lines.	2-28

FIGURE 2.13. COMMUNITY GROWTH, SUMMARY OF GOALS AND OBJECTIVES

GOAL/OBJECTIVE:	PAGE:
GOAL 2.6: REDUCE FLOOD HAZARDS IN BASTROP THROUGH THE PROGRAMMED IMPROVEMENT OF THE CITY STORM WATER SYSTEM.	2-32
OBJECTIVE 2.6.1: Identify, prioritize, and fund a city-wide network of storm water infrastructure improvements.	2-32
GOAL 2.7: PROTECT WATER QUALITY IN THE LOWER COLORADO RIVER WATERSHED BY MITIGATING STORM WATER DISCHARGES ASSOCIATED WITH GROWTH AND DEVELOPMENT.	2-32
OBJECTIVE 2.7.1: Create a storm water management program modeled after the Phase II MS4 permitting requirements for small municipal storm sewer systems.	2-32
OBJECTIVE 2.7.2: Incorporate low impact development (LID) solutions into City development regulations and public construction projects.	2-33

IMPLEMENTATION OF COMMUNITY GROWTH GOALS AND OBJECTIVES

Implementation of the community growth goals and objectives must occur in coordination with those recommended in other chapters. Goals and objectives - and corresponding actions and initiatives - contained in all seven (7) topic-specific chapters of the Bastrop Comprehensive Plan are important; but, the order of their implementation must consider multiple variables including: **A)** The timing of expected growth and development impacts; **B)** Cost versus revenues; **C)** The availability of grants, loans and other financing methods; **D)** Staffing and other public resources; and, **E)** Dependence on, or completion of, another action or initiative.

In consideration of these inter-related implementation variables, many of the recommendations summarized in ***Figure 2.13*** have been incorporated into Bastrop's overall comprehensive plan work program contained in Chapter 9, *Implementation*. Please reference Chapter 9 for a full overview on the methods and timing by which the city of Bastrop's community growth actions and initiatives will be implemented to the benefit of Bastrop's citizens, business owners and property owners.