

# 3 SITE ANALYSIS

The City of San Antonio's diverse environmental, cultural and economic conditions require close study to inform design standards that will responsive to the conditions across the City. Connections between major population centers, existing green spaces, and transportation infrastructure must be identified to maximize the effectiveness of the trail system. Meanwhile, environmental conditions such as flood potential, canopy cover, and soil types provide vital information used to determine the appropriate design for individual trail segments.

The following section includes maps and visualizations of this important site condition information for the entire trail system, including built segments out of the scope of this document, to provide a complete picture of the conditions on the ground. The analysis was typically conducted for the area within a 1 mile buffer of the trail. The analysis was conducted for all trails that are currently built, designed, or planned. Some areas, such as in Leon Creek South, are still only proposals, with no confirmed alignment - therefore they were omitted from this analysis.



# 3.1 REGIONAL PLANNING CONTEXT

## SA TOMORROW COMPREHENSIVE PLAN



SA Tomorrow Comprehensive Plan is the recently adopted (2016) comprehensive plan for the city of San Antonio, encompassing the City and surrounding area, with a planning outlook to the year 2040.

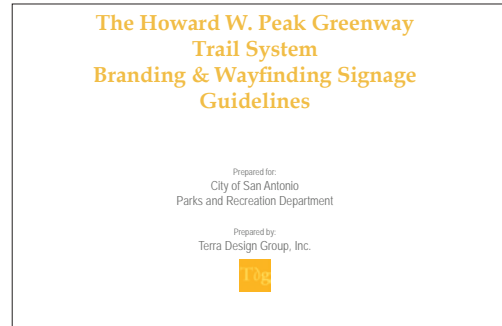
The plan identifies the major corridors and growth centers which will be the focus of improvements and development in the coming years, most of which directly intersect or relate to the HWP Greenway System.

## ALAMO AREA REGIONAL PLAN



The Alamo Area Regional Plan identifies transportation goals and specific improvements for the entire San Antonio metro area. The bicycle and pedestrian studies identify improvement priority hot-spots throughout the metro area, followed by detailed design recommendations. The study identifies many crucial opportunities to integrate the regional multi-modal transportation network with the HWP Greenway System.

## THE HOWARD W. PEAK GREENWAY TRAIL SYSTEM BRANDING & WAYFINDING SIGNAGE GUIDELINES



The document serves as a technical resource to guide parks and transportation agencies as they plan, design, and implement brand and wayfinding signage along the greenway trail system within the San Antonio metro area. It provides guidance for greenway trail brand applications, wayfinding element design, sign messaging, sign placement and the modification of the existing sign styles to create a unified signage system.

## SAN ANTONIO BIKE PLAN 2011



The San Antonio Bike Plan 2011 established the long-term vision for cycling in the City, including a 1,768 mile cycling network, comprehensive support facilities, advocacy programs and bike facility design guidelines.

The plan includes quantifiable goals, like integrating the larger cycling network with the off-street trail network where important benchmark targets are identified.

## VIA 2040 LONG RANGE TRANSIT PLAN



VIA Vision 2040, San Antonio’s public transit long range plan, dovetails strongly with SA Tomorrow Comprehensive Plan’s corridor and nodal growth plans while identifying specific improvements to the transit system to improve the experience and effectiveness of the transit system. The plan identifies major transit corridors and centers with their corresponding Trail Capacity and implementation priority. The transit centers include prioritization for connections to the City’s bicycle network.

The plan also outlines the characteristics of “Transit Oriented Development” (TODs), which promotes urban density near transit centers to reduce car trips and improve urban quality of life. The plan recommends that the TODs be well connected to multi-modal transportation options, including the off-street trail network.

## SAN ANTONIO PARKS SYSTEM PLAN



The SA Parks System Plan will guide future planning decisions on the expansion, capital improvements, and programming of the more than 240 City-owned parks and recreational facilities, 15,000 plus acres of green space and over 181 miles of trails. The plan is updated every 10 years with the last plan being adopted in 2006.

The plan will leverage the work and coordinate closely with the goals and policies outlined in the SA Tomorrow Comprehensive Plan. Such policies include: addressing gaps in pedestrian and bicycle access to parks, open space and recreation sites as well as investing in furthering the momentum of the City’s current river and trail investments for multi-use paths and multi-modal connectivity.



# 3.2 REGIONAL PARKS SYSTEM

## MAJOR PARKS ON HWP GREENWAY SYSTEM

The trail system intersects a number of major regional, city and neighborhood parks. These parks vary widely in ecology, use and size. Leveraging these parks as activity nodes, particularly for recreational purposes, will be crucial in the continued success of the system.

### DESIGN RELEVANCE

Parks throughout the City of San Antonio are major hubs for the HWP Greenway system and should be given special consideration as key locations for Tier 1 Trailheads, especially at the most well-used parks. Additionally, amenity gaps in particular parks throughout the City could be grounds for prioritizing greenway investments to help mitigate those needs.

McAllister Park



Southside Lions Park



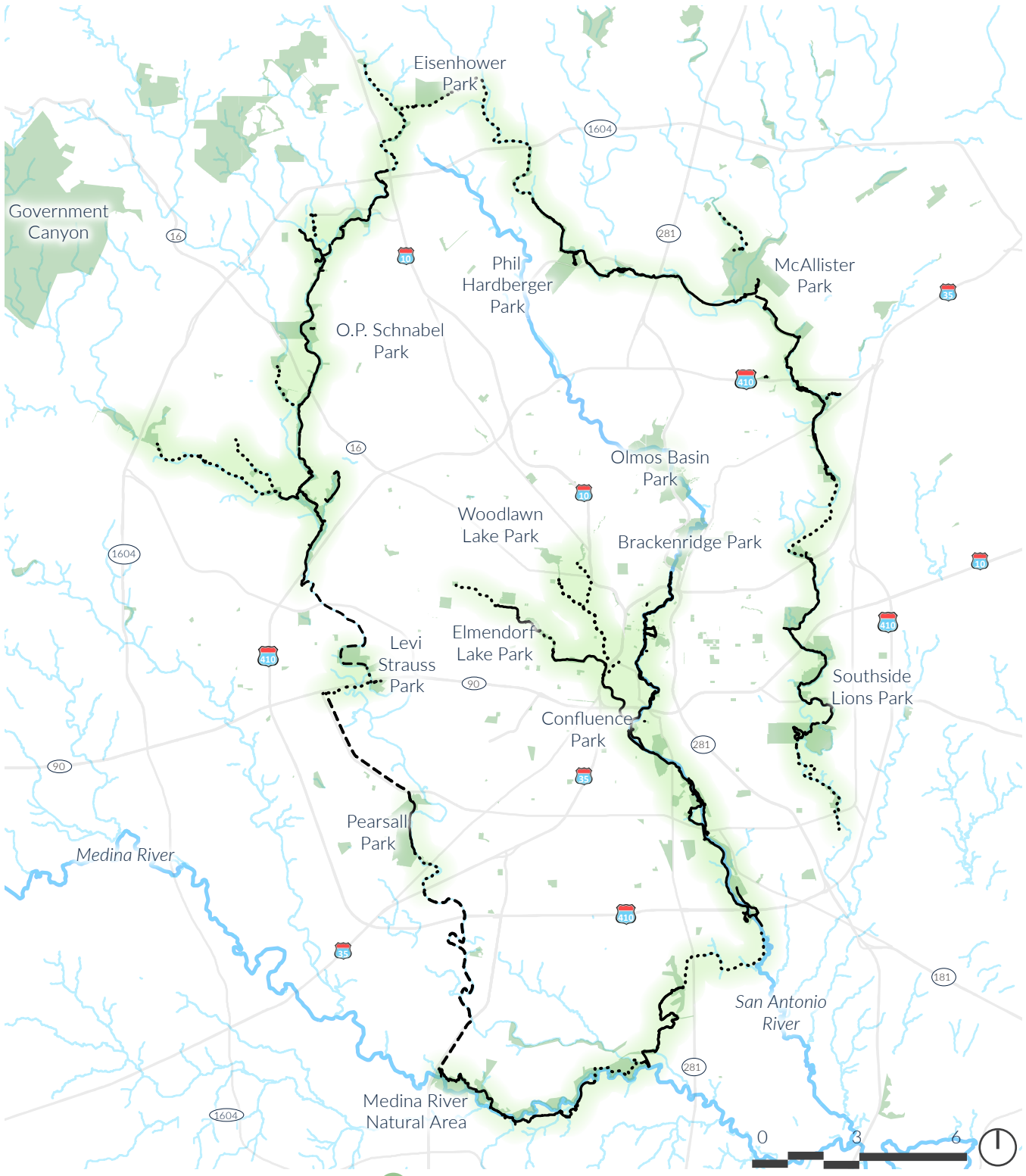
Woodlawn Park, City of San Antonio



O.P. Schnabel Park



# PARKS AND OPEN SPACE



- Existing Trails
- ..... Trails Under Construction/Design and Approved Trails
- - - Potential Future Alignment
- Parks

Source: City of San Antonio

# 3.3 DEMOGRAPHICS

## DEMOGRAPHIC THEMES

### POPULATION GROWTH

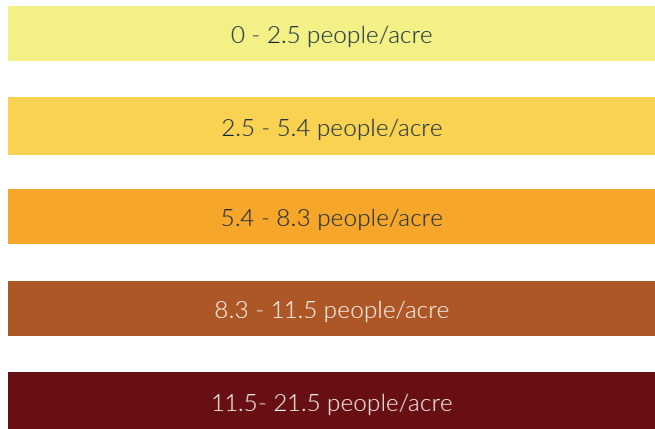
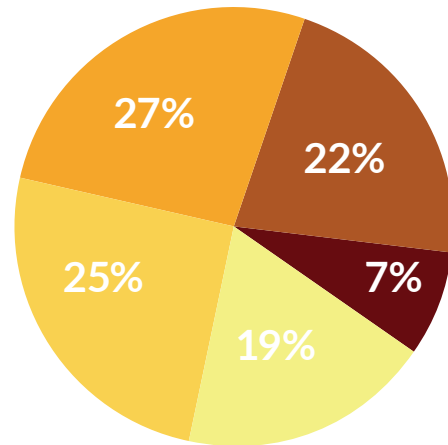
San Antonio, like much of the Central Texas Region, is experiencing some of the fastest urban growth in the country. This growth is concentrated in multiple areas around the City, including around downtown, the far North (Stone Oak) area, and the far west sides. Because the trail system is largely confined to creek and river corridors, the system does not necessarily track with population centers or transportation corridors. This leaves some of the most densely populated areas of the City underserved by the trail system. As the City population grows, the trail system's role as transportation infrastructure as well as a recreational amenity will also increase.

### DEMOGRAPHIC TRENDS

Generally, the north side of San Antonio has held far more wealth than the south, west and east sides. This inequality can be traced to a history of Jim Crow racial segregation, economic redlining, unequal school funding and infrastructure investment concentrated on the north side. While the HWP Greenway Trails are hardly a solution to these system issues, it is vital that these conditions are taken into consideration to ensure equitable investment in the system moving forward.

In addition to the history of segregation, the City is also experiencing gentrification in central neighborhoods, particularly on the City's east side. It is important to take into account the role of infrastructure investment in the gentrification process, and to couple improvements and expansions to the greenway system with programs aimed at preventing displacement of longtime communities even as the neighborhoods evolve around them.

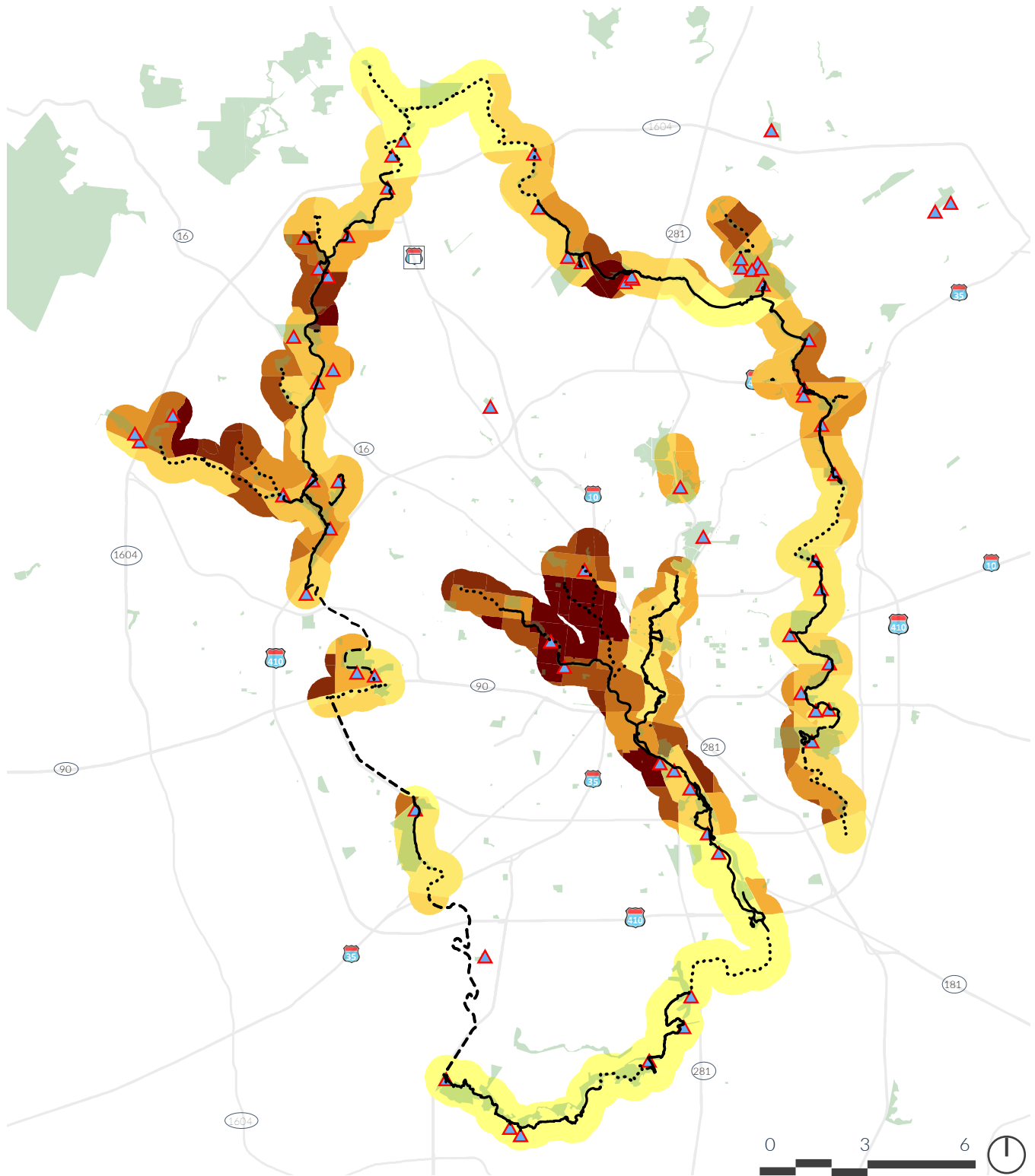
### TRACTS INTERSECTING WITH TRAILS



### DESIGN RELEVANCE

Population density often correlates with the frequency of use for trail systems nationally. Density should be a key consideration when determining locations for both Tier 1 and Tier 2 Trailheads throughout the system.

# POPULATION DENSITY NEAR TRAILS



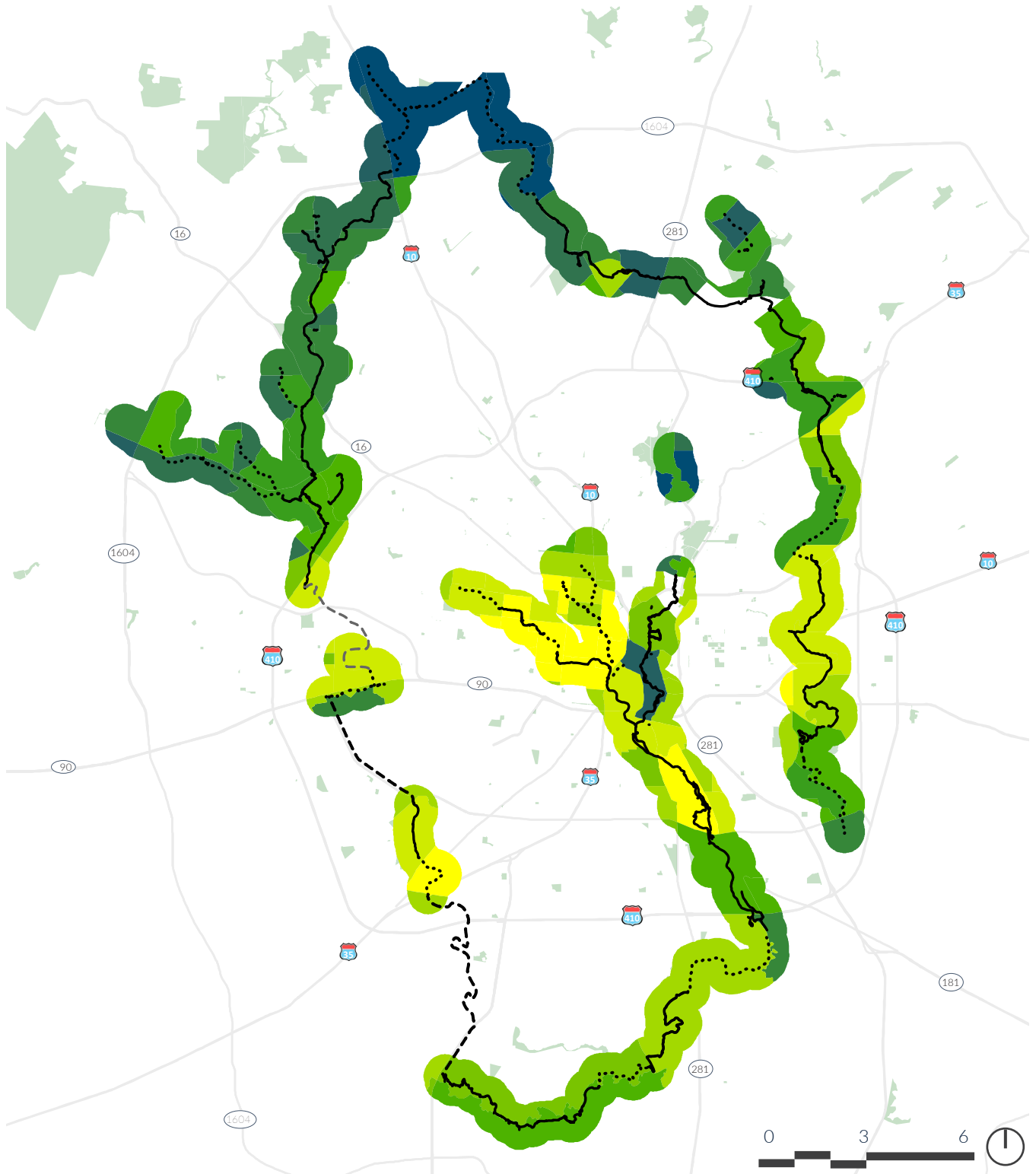
- Existing Trails
- ..... Trails Under Construction/Design and Approved Trails
- - - Potential Future Alignment
- ▲ Trailhead
- 1 Mile Buffer
- Population Density
  - 9 people/acre
  - 21.45 people/acre



Source: ACS 2012-2016 5-year



# MEDIAN FAMILY INCOME NEAR TRAILS

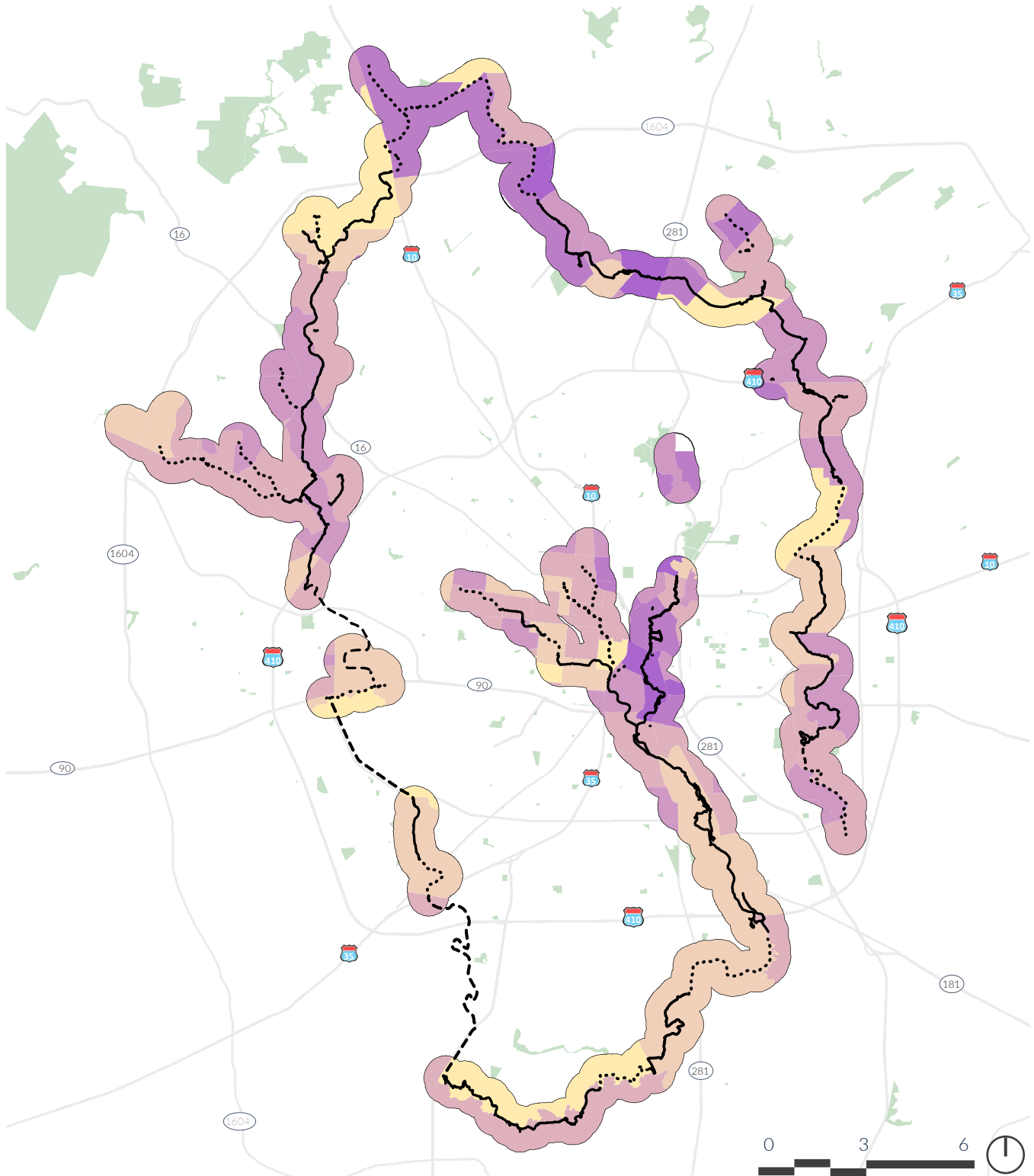


— Existing Trails	..... Potential Future Alignment	Medium Family Income
- - - Trails Under Construction/Design	○ 1 Mile Buffer	Yellow: \$11,076
..... Approved Trails		Dark Blue: \$236,750

Source: ACS 2012-2016 5-year



# MEDIAN AGE NEAR TRAILS



- Existing Trails
- ..... Trails Under Construction/Design and Approved Trails
- - - Potential Future Alignment

 1 Mile Buffer
 
**Median Age**  
 21  
 50



Source: ACS 2012-2016 5-year

## RACIAL DISTRIBUTION NEAR TRAILS

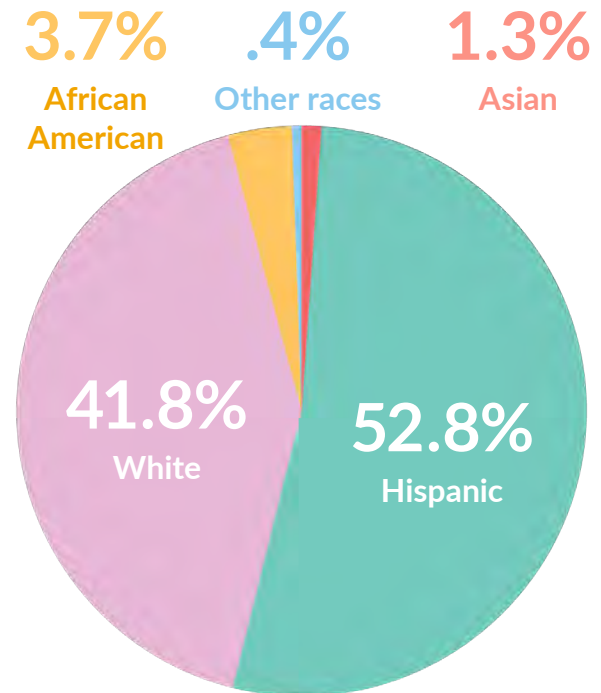
### ECONOMIC SEGREGATION AND RACE

San Antonio is one of the most economically segregated cities in the country. It comes as no surprise then, that this translates to a certain level of racial segregation as well.

After Anglo settlers began outnumbering Hispanic residents of the City in the mid 19th century, the Hispanic population began concentrating on the west and south sides of the City, while the Anglos were concentrated in the central and North sides. These communities were divided by San Pedro Creek, which is today being restored but for much of the 20th century was channelized or covered by highway I10.

This dividing line was institutionalized through Jim Crow racial zoning, which restricted Hispanics to the west, and blacks to the east. Today, these dividing lines are still well delineated. While racial zoning and redlining have been technically outlawed, economic conditions for these communities have led to de-facto racial segregation.

## RACIAL DISTRIBUTION NEAR TRAILS

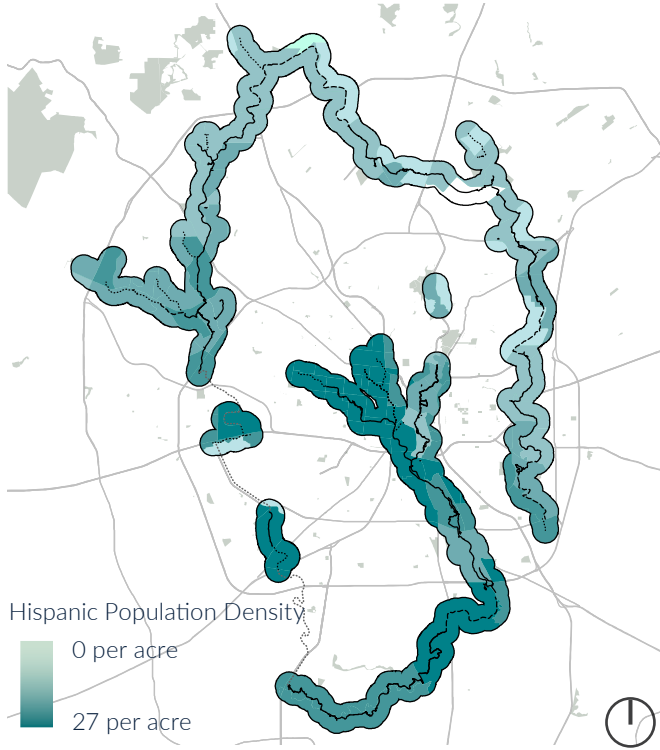


Source: ACS 2012-2016 5-year

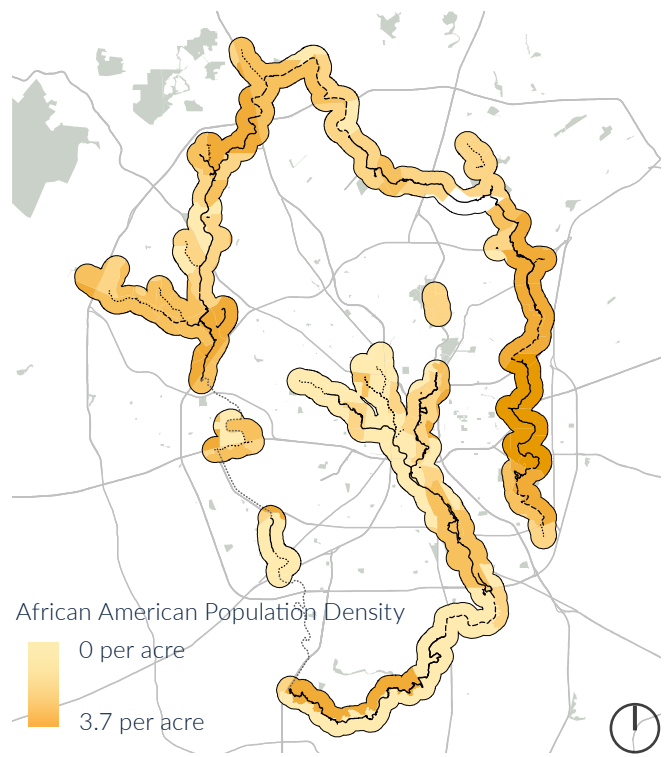
### DESIGN RELEVANCE

The HWP Greenway addresses equitable access to active transportation and recreation while connecting communities and promoting community pride in a positive way. In future trail planning and improvement efforts, it is important to keep in mind the racial distribution throughout the City to address individual community needs through the lens of equity.

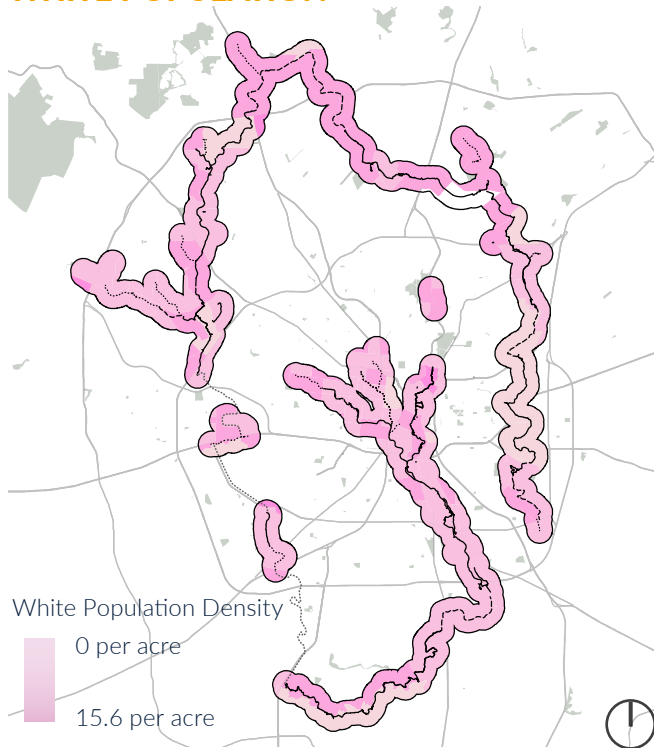
### HISPANIC POPULATION



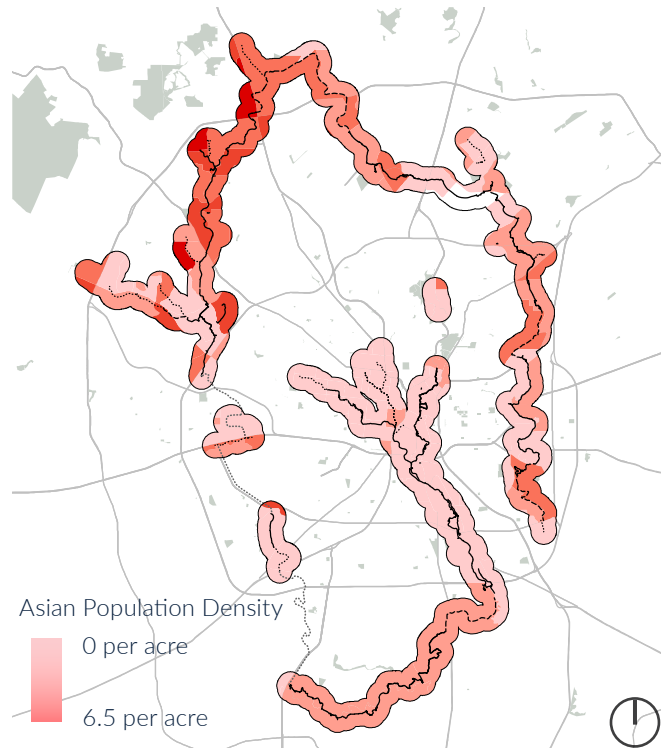
### BLACK POPULATION



### WHITE POPULATION



### ASIAN POPULATION



# 3.4 ENVIRONMENTAL CONTEXT

## BIOREGIONS

### EDWARDS PLATEAU

Extending over much of Central Texas, the Edwards Plateau contains vital watersheds and habitats that support the ecological and economic health of Texas. Historically, the land was characterized by sweeping Oak Savannas, which have been usurped by ash juniper thickets when the savannas were overgrazed by 19th century cattle.

The limestone geology create pristine aquifers, including the Edwards, which is among the most productive in the world. This reliable supply of water in an otherwise dry landscape has supported human settlement along the Balcones Escarpment for more than 10,000 years.

Key species - in terms of environmental importance- are:

**Key Plants:** Silver Bluestem, Turk’s Cap, Cedar Sage

**Key Trees:** Pecan, Cedar Elm, Texas Red Oak

### BLACKLAND PRAIRIE

Watered by numerous rivers and streams flowing from the Edwards Plateau, the Blackland Prairie is a rich grassland mosaic with fertile soils and a gently undulating landscape. The prairie extends southward from the central great plains where it meets its southern terminus around San Antonio.

Much like the Great Plains, the fertile soils of the Blackland Prairie have largely been converted into agricultural land, making it one of the most endangered bioregions in the country. The fragments that remain represent vital habitat and sequester as much, or possibly more carbon than forests of the same size.

**Key Plants:** American Beauty-Berry, Big Bluestem, Purple Coneflower

**Key Trees:** Sycamore, Burr Oak, Eastern Cottonwood

### SOUTH TEXAS BRUSH COUNTRY

From the southern border to central Texas, the South Texas Brush Country is among the most tropical bioregions in the United States. Like other bioregions that pass through San Antonio, the brush country has seen significant degradation from overgrazing. What was once rolling grasslands and subtropical woodlands is now thickets of mesquite and prickly pear cactus.

Despite this degradation, the brush country continues to be vital habit for rare species such as the Ocelot and the northern-most range of tropical species such as the Green Jay.

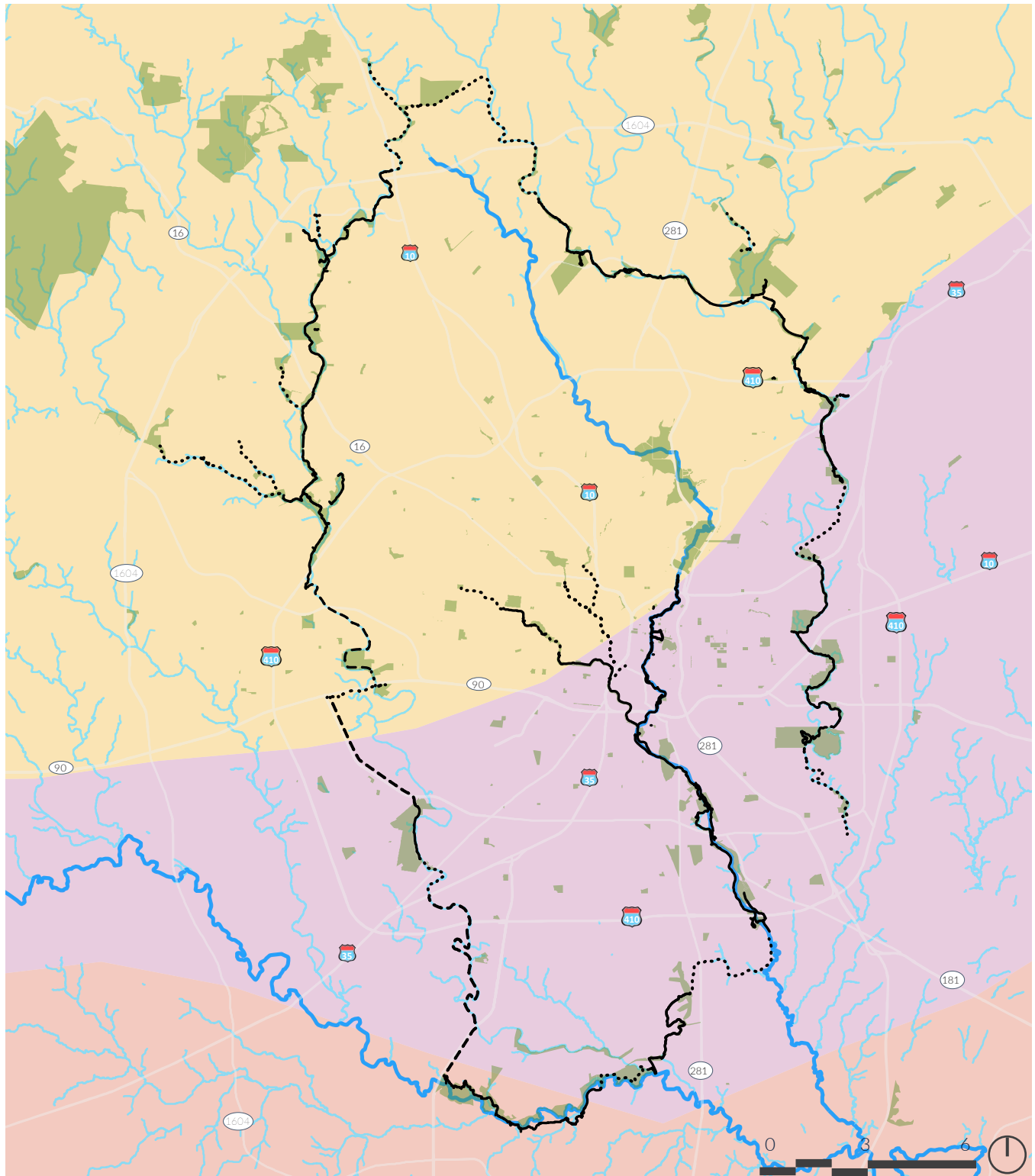
**Key Plants:** Texas Craglily, Heartleaf Hibiscus, Scarlet Sage

**Key Trees:** Hackberry, Brasil, Anaqua

### DESIGN RELEVANCE

The trail spans across three distinct bioregions. Each bioregion has distinct soils and climate, which will affect the tree and plant species selected for planting alongside the trail and in determining the most appropriate LID features.

# BIOREGIONS



— Existing Trails	● Edwards Plateau	● Parks	Source: U.S. Environmental Protection Agency
..... Trails Under Construction/Design and Approved Trails	● Blackland Prairie		
- - - Potential Future Alignment	● South Texas Brush Country		



## TRAIL SEGMENTS IN FLOODPLAINS

### A CITY OF CREEKS

San Antonio's complex network of springs, creeks, and rivers provides linear greenways that are ideal recreation, active transportation, and wildlife corridors. The city's urban fabric is defined by its early development along the San Antonio River, however, frequent flooding lead to the channelization of most of the urban waterways in the 20th century. Today, there is opportunity to restore much of the ecological function of the waterways while improving flood control and installing urban trails.

The cross-cutting right-of-ways and often wooded conditions make the riparian zones of waterways appealing locations for trails, however frequent flooding also presents significant challenges for the trail's maintenance, accessibility, and safety. Additionally, major flood events are predicted to increase in the next century due to climate change, therefore all trails built in or even near 100 year floodplains will require design strategies such as Green Stormwater Infrastructure to mitigate the effects of frequent flooding.

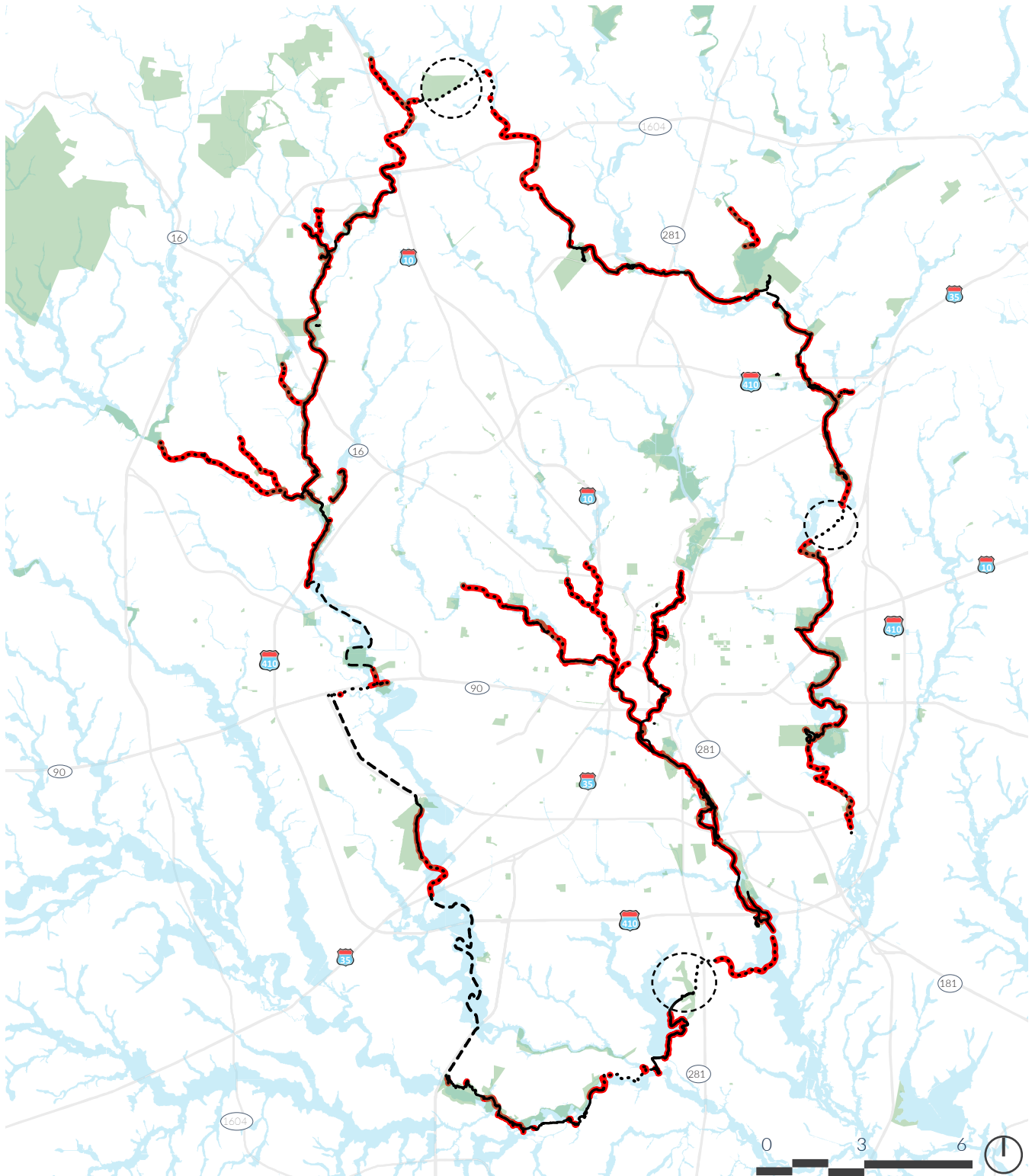
### TRAILS IN FLOODPLAINS

Analysis of the entire trails network, (including major side trails, parallel trails, and trails currently only planned or under construction) shows that 240.8 miles of the 251.5 miles of network are inside of the 100 year floodplain. This challenge will only increase as flooding becomes more frequent.

### DESIGN RELEVANCE

Over 95% of the trail system is in the floodplain and must be constructed with frequent flooding in mind. Site elements, such as shade structures and benches, must be constructed to withstand occasional inundation.

# TRAIL SEGMENTS IN FLOODPLAINS



— Existing Trails	— Trail in Floodplain	○ Significant Areas Outside Floodplain
⋯ Trails Under Construction/Design and Approved Trails	● 100-year Floodplain	
- - - Potential Future Alignment		

Source: FEMA

## MOST COMMON SOILS NEAR TRAILS

### SOIL TYPES

According to the “NRCS Web Soil Survey,” Trail Suitability Ratings from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), are based on the soil properties that affect trafficability and erodability. These properties are stoniness, depth to a water table, ponding, flooding, slope and texture of the surface layer. Analysis shows that the following soil types are the most common within a mile buffer of the trail system.

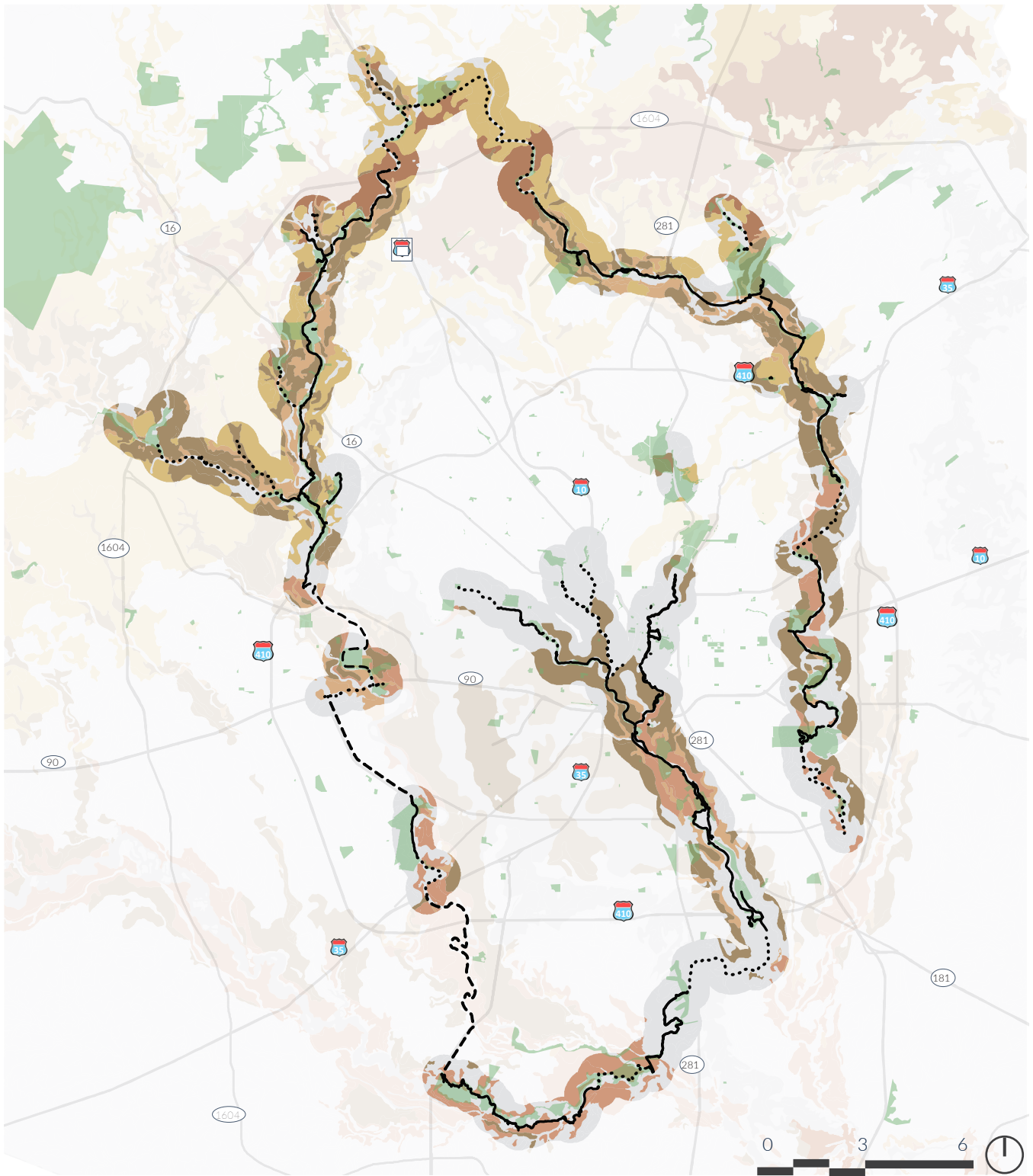
### DESIGN RELEVANCE

Soil properties affect the erodability, trafficability, and texture of a trail and informs the way trails are constructed. Retaining wall selection, trail alignment, and structural footings, among others, should consider soil properties as a key part of determining the best design opportunity.

**TABLE: SOIL PROPERTIES**

	Lewisville Silty Clay	Eckrant Cobbly Clay	Sunev Clay Loam	Patrick Soils	Crawford and Bexar Stony
<b>Soil Taxonomy</b>	Loamy and clayey alluvium	Clayey-skeletal, smectitic, thermic Lithic Haplustolls	loamy alluvial sediments that are high in calcium carbonate	Clayey over sandy or sandy-skeletal, carbonatic, thermic Typic Calcustolls	Fine, smectitic, thermic Leptic Udic Haplusterts
<b>Drainage</b>	Well drained, moderate permeation	Well drained, moderately slow permeation	Well drained, moderate permeation	Well drained, moderate permeation	Well drained
<b>Typical Landscape</b>	River Valleys	Dissected plateaus	Dissected and undulating plateaus	Dissected plains and River Valleys	Plains

# MOST COMMON SOILS NEAR TRAILS



- Existing Trails
- ..... Trails Under Construction/ Design and Approved Trails
- - - Potential Future Alignment
- Lewisville Silty Clay
- Eckrant Cobbly Clay
- Sunev Clay Loam
- Patrick Soils
- Crawford and Bexar Stony

Source: NRCS Soil Survey

## TREE CANOPY ADJACENT TO GREENWAY TRAILS

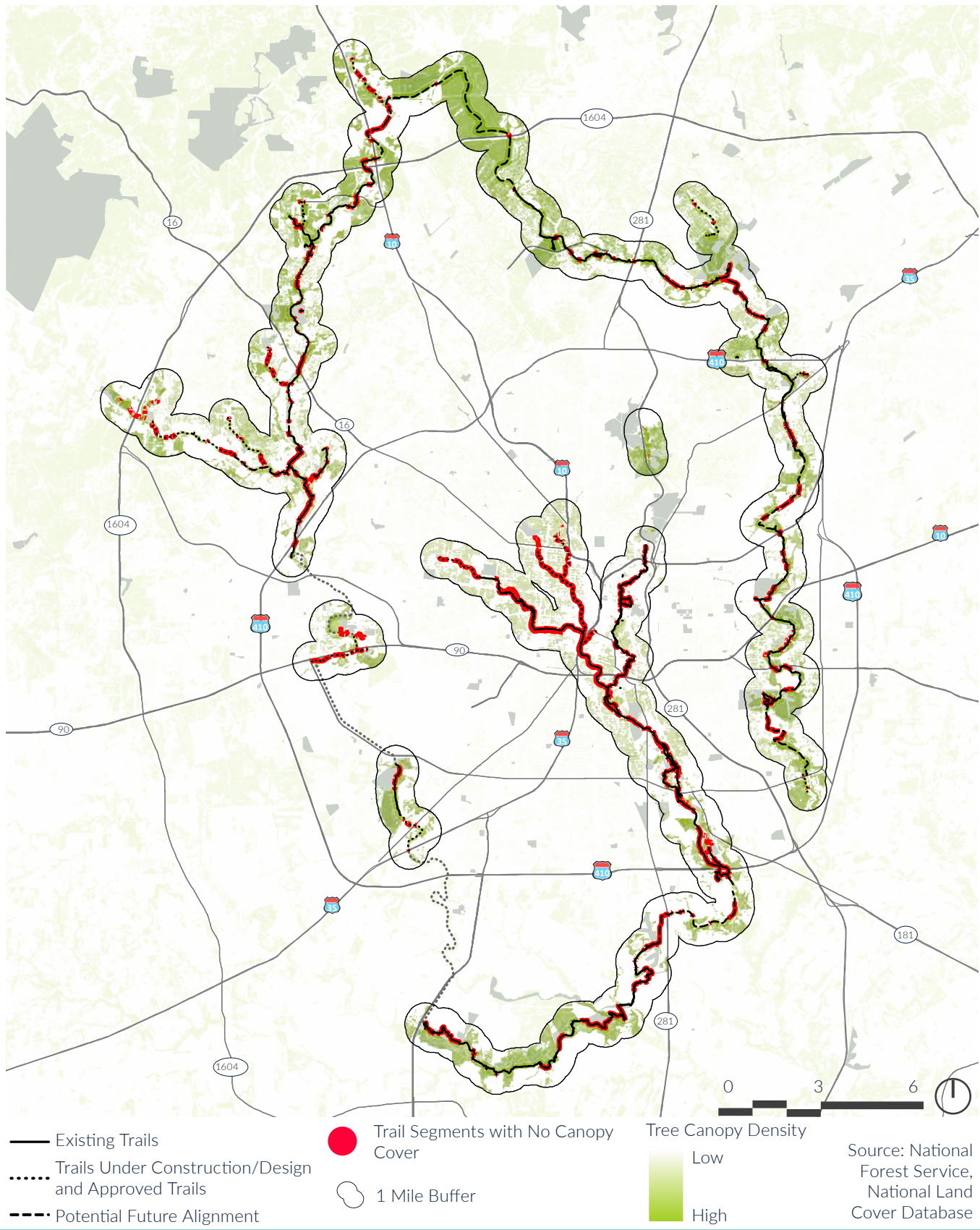
Tree canopy throughout the HWP Greenway System could generally be improved. The map to the right highlights key locations where tree canopy is lacking. The potential success of reforestation along the Greenway hinges on the selection of the appropriate plants for the bioregion, as well as an understanding of how different bioregions vary in their ability to sustain canopy.

### DESIGN RELEVANCE

Tree canopy over a trail helps cool the trail and provides trail users with shade and respite from heat. Assessing the tree canopy adjacent to the trails helps prioritize location of future tree plantings. Additionally, the shade structures recommended in this document can be located in areas identified with low tree canopy.



# TREE CANOPY ADJACENT TO GREENWAY TRAILS



# 3.5 LAND USE AND TRANSPORTATION

## LAND USE THEMES

The central core of the city is characterized by dense mixed-use development where the urban form is responsive to layers of colonial history, frequent flooding and a gilded age economic boom.

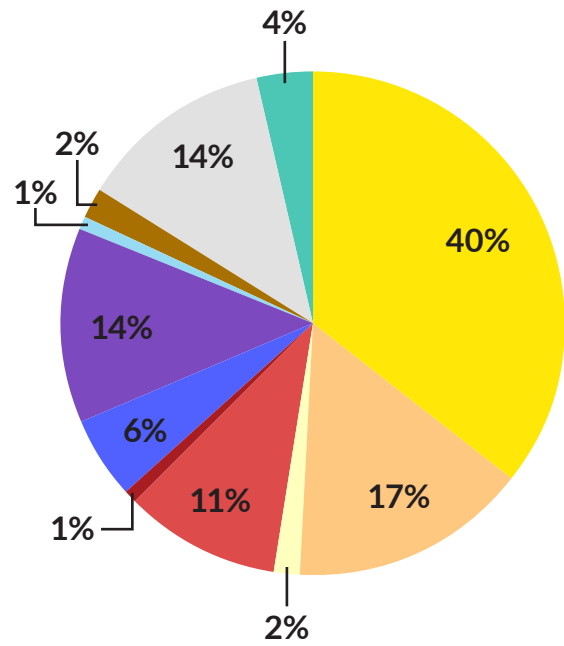
Following WWII, San Antonio followed much of the country in the rapid adoption of the automobile and thus began developing outward from its urban core. Military bases were established or expanded on the City’s outer edges, while major economic centers such as the Medical Center and UTSA were established on the City’s far Northside. In the early 2000’s, major investment in the City’s southside such as the establishment of the Toyota manufacturing plant and Texas A&M San Antonio have begun to direct more development southward.

This pattern of development has made San Antonio a prototypical Sunbelt American City, where a central business district with little housing is surrounded by sprawling housing developments, interspersed with nodes of commercial developments or subsumed suburbs that each have their own individual character.

### DESIGN RELEVANCE

Differing land uses defines San Antonio neighborhoods, creating distinct urban, suburban, and rural environments. These land uses informed the creation of “Character Areas” along the HWP Greenway. The various Character Areas have distinct site furnishings that reflect the personality of the Character Area.

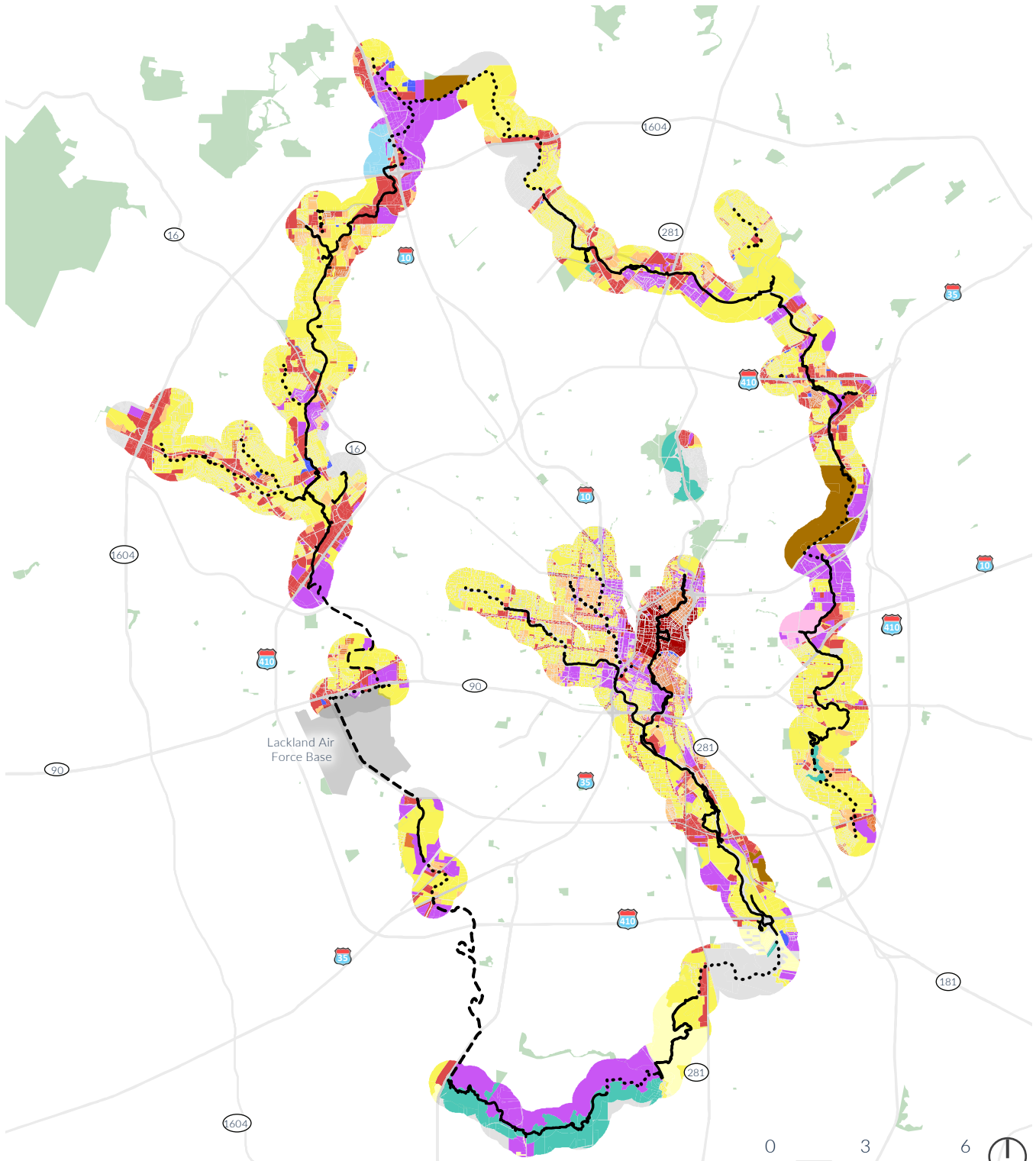
CURRENT LAND USE SHARE NEAR TRAILS\*



- Single Family
- Multifamily
- Mixed-Use
- Commercial
- Downtown
- Office
- No Classification
- Education
- Military
- Outside City Limits/ROW
- Conservation
- Park

\*Data used in the above statistics and “Current Land Use Near Trails” Map to the right is based on the most up-to-date data from the City of San Antonio Planning Department as of August 2018. Some recent and/or new land use may not be reflected in this analysis.

# CURRENT LAND USE NEAR TRAILS\*



- |   |   |   |   |
|---|---|---|---|
| <span style="color: yellow;">●</span> Single Family | <span style="color: red;">●</span> Commercial   | <span style="color: purple;">●</span> No Classification | <span style="color: grey;">●</span> Outside City Limits/ROW |
| <span style="color: orange;">●</span> Multifamily   | <span style="color: darkred;">●</span> Downtown | <span style="color: lightblue;">●</span> Education      | <span style="color: teal;">●</span> Conservation            |
| <span style="color: brown;">●</span> Mixed-Use      | <span style="color: blue;">●</span> Office      | <span style="color: gold;">●</span> Military            | <span style="color: green;">●</span> Park                   |
- 0    3    6
- 1 Mile Buffer

Source: City of San Antonio

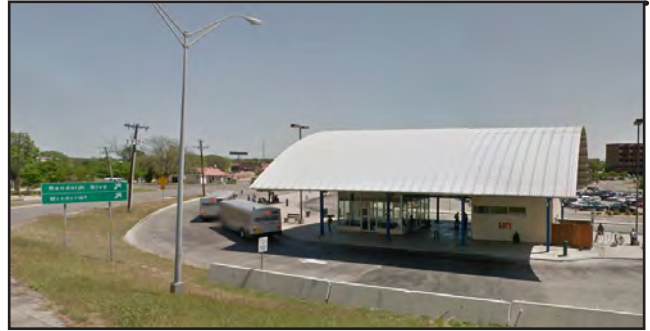


## TRANSPORTATION THEMES

The City's transportation infrastructure both reflects and directs the City's development patterns. Despite once having a world-class streetcar system, the City is today almost entirely dependent on automobile transportation. One's geography in the City is often described in relation to the two loop roads, 410 and 1604, that circumnavigate the City's historic boundaries. Three major highways bring traffic in and out of the central core: I10, I35, and 281, while numerous surface arterials manage local traffic, such as Fredericksburg Road. These highways have largely replaced the City's waterways as the major geographic, economic and cultural delineation lines, however many are based on a waterway's original course.

Faced with unprecedented growth, the City is ramping up efforts to expand its multi-modal transportation system. Since 2011, the City has adopted a comprehensive plan, a bicycle master plan, the VIA Transit master plan, and a regional transportation master plan. These efforts have coordinated to identify multi-modal transportation corridors and areas of future growth, where additional public transit and other infrastructure will be concentrated.

Randolph Park & Ride



Ingram Transit Center



Centro Plaza Transit Center, VIA Metro Transit



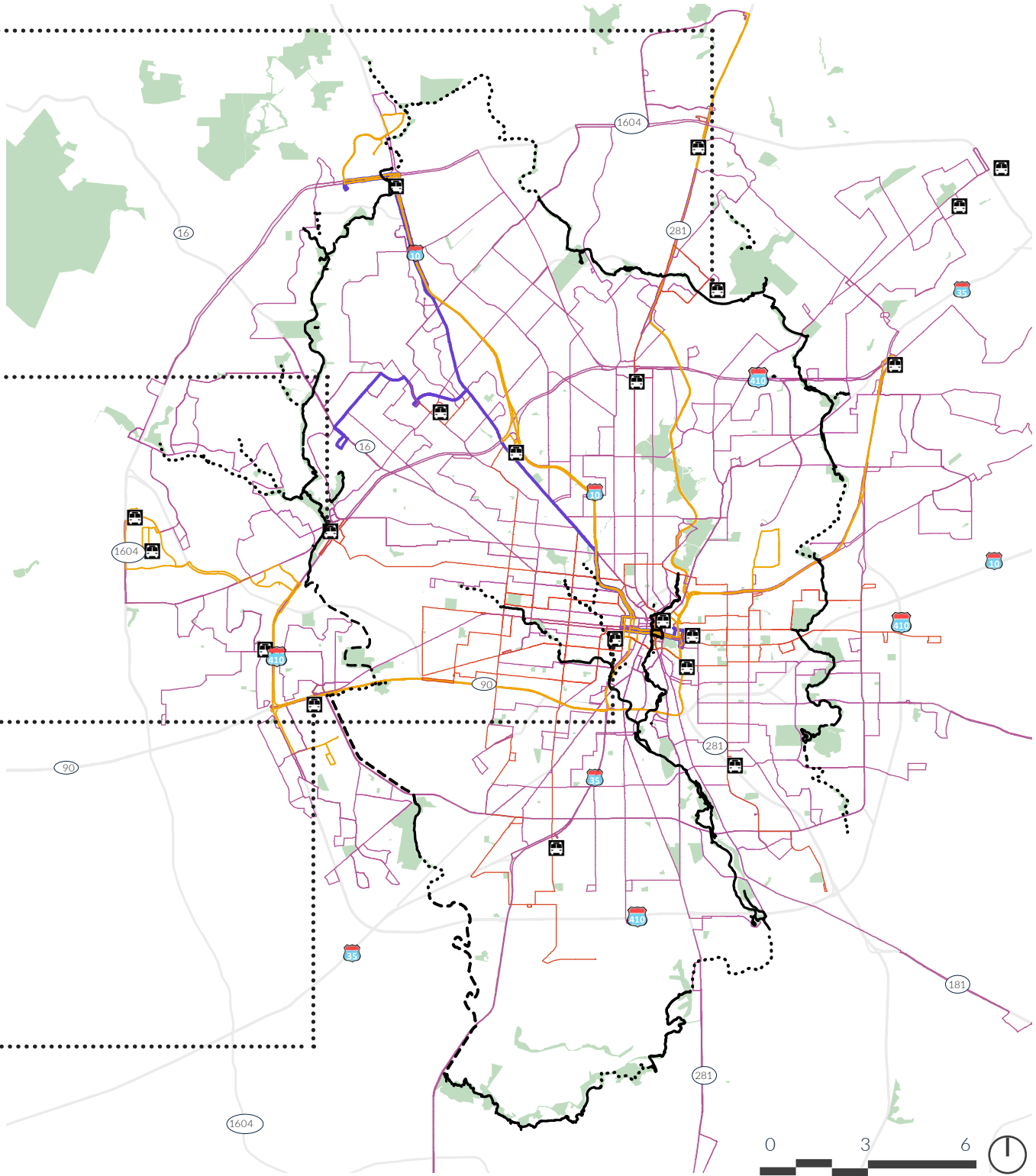
VIA Kel-Lac Transit Center



### DESIGN RELEVANCE

The HWP Greenway system is expected to play an increasingly prominent role in the City's transportation network over the coming decades. Knowledge of existing transit hubs and public transportation routes will help inform key connections the trail can make between city amenities, homes, and places of work.

# TRANSIT NEAR TRAILS



- Existing Trails
- ..... Trails Under Construction/Design and Approved Trails
- - - Potential Future Alignment
- Frequent
- Express
- Metro

 Major Transit Hub



Source: VIA Metropolitan Transit



# 3.6 TRAIL USE FREQUENCY

## USE NUMBERS

The HWP Greenway System sees wide variations in use demand, as evidenced by anecdotal observations by trail managers and strategically installed “eco-counters” which quantify trail use using sensor technology. Using this data, it is clear that the Leon Creek North segment is by far the most heavily trafficked area in the project scope, followed by Salado North and the West Side Creeks, while the Medina and Salado South segments only garner a small fraction of the traffic on Leon Creek.

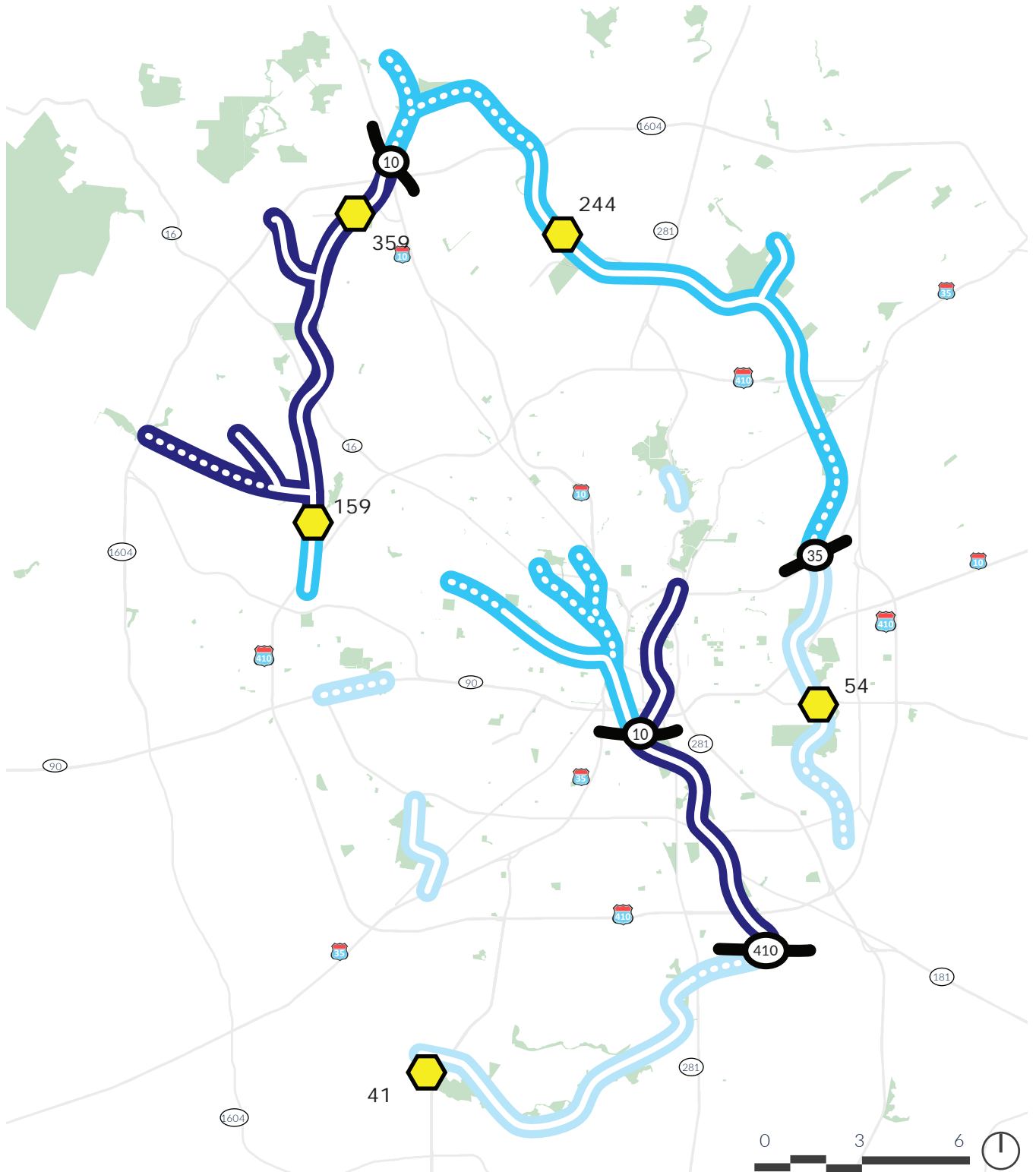
This is a function of a variety of factors. The Leon Creek segment is likely so successful due to its relatively high population density and connectivity between major commercial and recreational hubs. Meanwhile, segments such as Medina are isolated from residential areas, and have not yet been connected to other, more highly trafficked segments.

For segments such as Salado South, the relatively low trail use seems to be at odds with its positioning in a relatively high population area and connection to major hubs such as the AT&T Center. This can likely be explained through other factors such as low connectivity and awareness to adjacent neighborhoods and lack of connection to the Salado North segments. Once this connection is establishment, trail demand could very well increase, and thus planning for such a future will require further analysis for future Trail Capacity.

## DESIGN RELEVANCE

Trail use analysis helps inform the types of construction that occurs along the trail. Trails with a high frequency of use will need to be wider (see section on Trail Capacity on page 43) and may need more site furniture amenities to accommodate more users.

# DAILY USERS MAP



Existing Trails  
Planned Trails

Low Use  
Medium Use  
High Use

Trail Counter with Avg. Daily Trail Use\*  
\*February 2017-March 2018 Monthly Average



# 3.7 TRAIL CAPACITY

## LOCALIZING TRAIL DESIGN

Trail Capacity is a term adapted from the Federal Highway Administration’s “Level of Service” measurement, which is a qualitative measure used to relate the quality of traffic flow and number of users easily accommodated. Trail Capacity is an adaptation of Level of Service intended to provide a measurement of trail service capabilities and operational conditions. To determine trail capacity, population density within a half-mile of trails and frequency of trail usage were combined. The following categories were established using the above methodology:

- **Trail Capacity A:** Segments of the trail with the highest capacity needs based on surrounding populations density and estimate of trail use frequency.

- **Trail Capacity B:** Segments of the trail with intermediate capacity needs based on surrounding populations density and estimate of trail use frequency.
- **Trail Capacity C:** Segments of the trail with the lowest capacity needs based on surrounding populations density and estimate of trail use frequency.

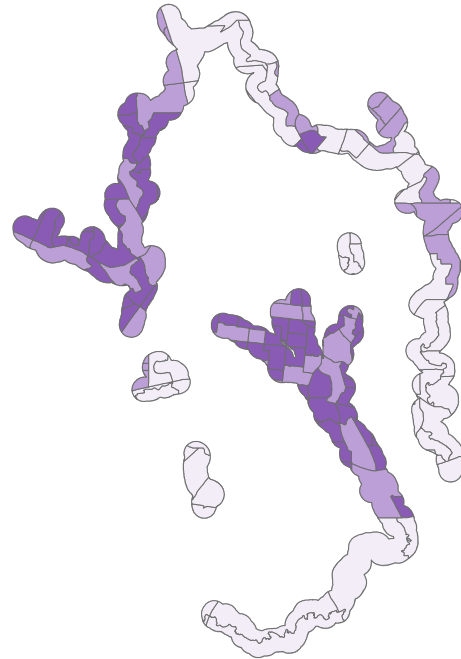
### DESIGN RELEVANCE

Trail Capacity informs the width of the trail - high capacity trails need to accommodate more people and will be wider, while low capacity trails see less use and can be narrower. Trail capacity also informs the trailhead recommendations and the furnishings located at the trailhead.

POPULATION DENSITY

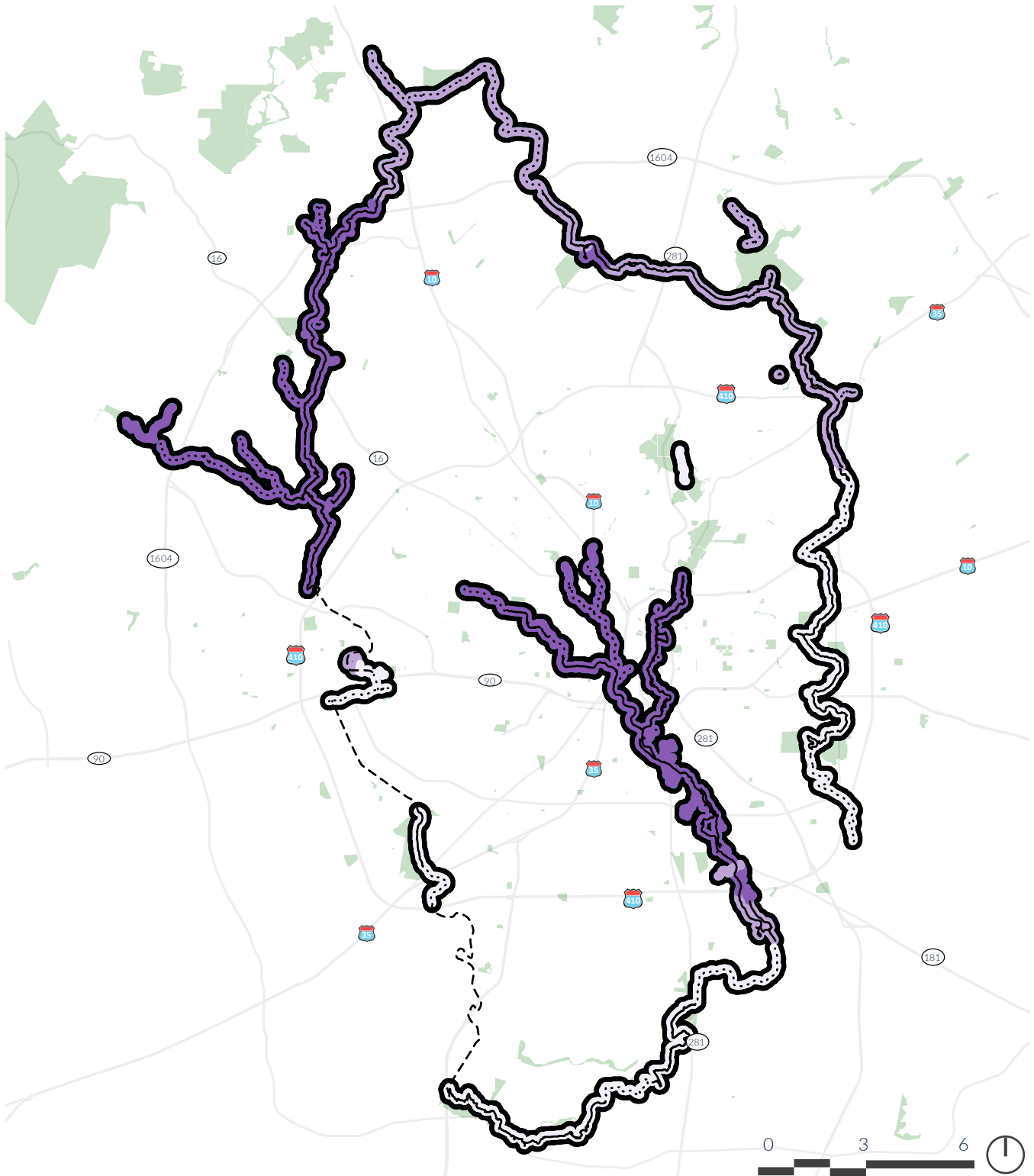


TRAIL CAPACITY



TRAIL USE FREQUENCY

# TRAIL CAPACITY THROUGHOUT TRAIL NETWORK



- Trail Capacity A
- Trail Capacity B
- Trail Capacity C
- Existing Trails
- Trails Under Construction/Design and Approved Trails
- Potential Future Alignment