Bike Network Plan

HEALTH IMPACT ASSESSMENT

WORKING PAPER 1

January 2024

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CHAPTER 1. HEALTH IMPACT ASSESSMENT OVERVIEW

The City of San Antonio Bike Network Plan (BNP) is a visionary effort to rethink how San Antonians get around by creating a blueprint for building and maintaining a comfortable, complete, and accessible bicycle network for all people, regardless of their age or ability. Through the BNP, the City has the unique opportunity to integrate and advance healthy community planning through the development of a Health Impact Assessment (HIA). The HIA broadens the BNP's scope by linking transportation and health planning by giving decisionmakers - and policymakers more information about how multimodal investment can benefit or impact the health of San Antonians.

Together the HIA and BNP aim to address the physical, social, and emotional health of San Antonians through improved:

- **Equitable access to goods, services, jobs, recreation, and education**
- **Safety and comfort for all roadway users**
- **Economic development and community livability**

WHAT IS A HEALTH IMPACT ASSESSMENT?

Beyond safety and connectivity, San Antonio's transportation system plays a large role in the physical, mental, and social health of its residents. With chronic diseases, like obesity and cardiovascular disease on the rise, the built environment has become an important aspect of health-promotion strategies. Health, in the BNP's context, is viewed as not merely the absence of disease or infirmity, but as "a state of physical, mental, and social well-being".

An HIA is a formal evaluation process that incorporates location-specific scientific data, health expertise, and public input to assess a proposed project or policy's impact on the health of a population and the distribution of those effects within the population. The primary goal of a HIA is to identify the potential health impacts of a project or policy and encourage informed decisions related to the project that will positively influence a population's health. Specifically, the HIA considers mental and physical health, environmental, and economic matters that may not have been part of conventional transportation planning discussions.

The Purpose of an HIA is to...

- Use **data** and **personal experience** to identify potential health effects of proposed projects.
- Recommend improvements to **policies** and **regulations**.
- Evaluate **health** and **environmental** impacts of proposed projects.
- Monitor and evaluate community **impacts**.

THE HIA PROCESS

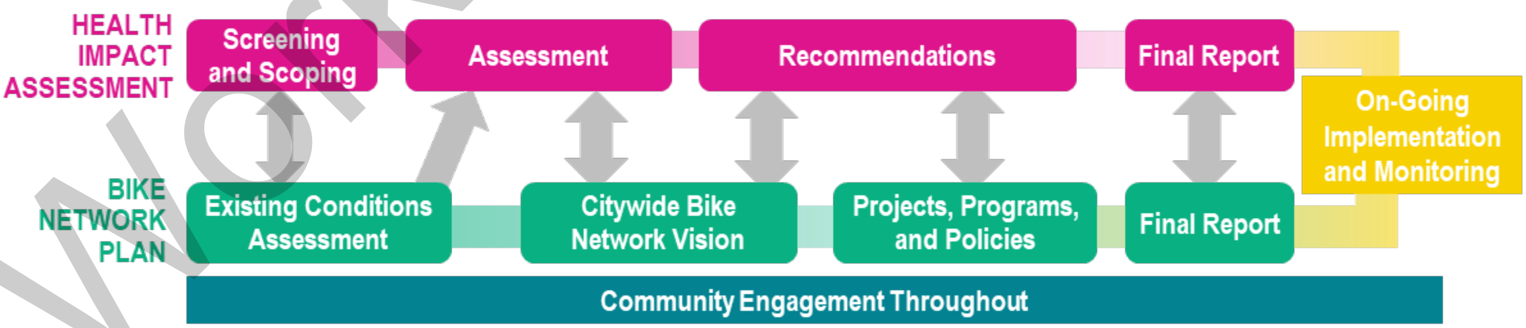
The HIA follows a formal evaluation process that is of six key stages: 1) Screening, 2) Scoping, 3) Assessment, 4) Recommendations, 5) Reporting, and 6) Monitoring and Evaluation. This report covers steps 1, 2, and portions of Step 3 to create a baseline for evaluating how proposed projects and programs may potentially impact or influence public health concerns. The next phase of the project will complete the last part of steps 3, 4, and 5, as well as laying the groundwork for step 6. The HIA will serve as a tool to help decision-makers recognize the health consequences of the decisions they make so they can refine community investments and policies towards a healthier living environment.

Figure 1.1: 6-Step HIA Process

1	**Screening**	Determine whether a HIA is feasible & would add value.
2	**Scoping**	Identify the study area, health indicators, research questions, and data.
3	**Assessment**	Create an existing conditions profile for the study area. Assess impacts of proposed recommendations and specify direction and magnitude of impacts.
4	**Recommendations**	Create recommendations in line with health promotion strategies.
5	**Reporting**	Develop a report to communicate the decision-making process and results and present the HIA to the community.
6	**Monitoring & Evaluation**	Track the impacts of the HIA on the decision-making process, the implementation of the projects and policies, and on health indicators.

Integrating the HIA into the BNP

The HIA is being developed concurrently with the BNP so that the HIA findings can actively impact the BNP decision making process. As illustrated below, the two plans are connected throughout the planning process and help inform recommendations and findings.



PARTNERSHIPS AND COMMUNITY OUTREACH

Incorporating community input throughout the HIA process and soliciting feedback on HIA outcomes are core components of the HIA practice. In conjunction with the BNP, the HIA integrates robust stakeholder and community engagement throughout the plan's development through interactive workshops, online surveys, and on-the-ground surveys. BNP HIA process involved the formation of the HIA Working Group (an advisory body of transportation and public health experts and stakeholders) and community outreach using online surveys.

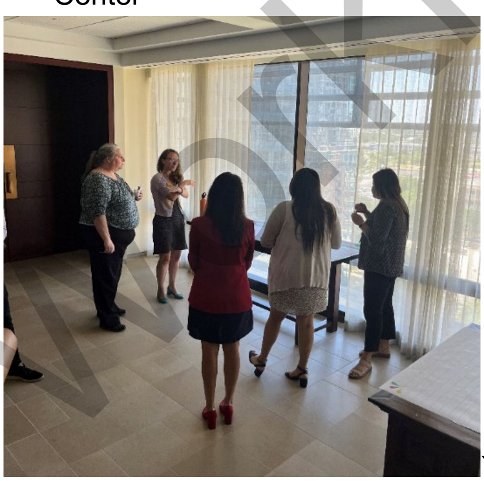
HIA Working Group

The HIA is guided by a Working Group that includes transportation planners, health practitioners, and stakeholders. The role of the HIA Working Group is to:

- Provide feedback and input on the HIA and incorporating health in the decision-making process,
- Support technical analysis by providing critical datasets and insight on citywide and location specific public health concerns,
- Identify opportunities for collaboration with health initiatives, and
- Assist in the development of key elements of the HIA, such as the pathway diagram, primary indicators, and HIA recommendations.

The BNP Study Team will meet with the HIA Working Group four times throughout the study to share study findings and obtain input on key elements of the HIA, such as primary indicators, research questions, and HIA recommendations regarding policies and programs. The HIA working group includes members from:

- Alamo Area Alamo Area Metropolitan Planning Organization
- Alamo Area Council of Governments
- disABILITYsa
- San Antonio Diversity, Equity, Inclusion, and Accessibility Department
- Esperanza Peace & Justice Center
- FitCItySA
- Food Policy Council of San Antonio
- Joint Base San Antonio Veterans Advisory Commission
- Salud America!
- San Antonio Foundation
- San Antonio Independent School District School Health Advisory Council
- Metro Health
- San Antonio Parks & Recreation
- South Texas Asthma Coalition
- Texas Department of Transportation
- The Health Collaborative
- UT San Antonio Health
- VIA Metropolitan Transit
- World Heritage Office




Photos: HIA Working Group Members Selecting HIA Indicators

CHAPTER 2.
SAN ANTONIO TODAY

STUDY AREA OVERVIEW

Originally settled in the early 1700s and incorporated in 1837, San Antonio has evolved into a thriving, full-service community with historic charm, beautiful neighborhoods, and robust recreational amenities. With over 4,300 miles of roadways in San Antonio today, the City has an extensive network of interstates, highways, local roadways, trails, and bike facilities to help San Antonian's move. However, even with this robust transportation network, less than 10% of San Antonio's roads have a bike facility. To provide new opportunities for people to walk and bike, the construction of the Howard Peak Greenway Trail System began in 2007. Today, the Howard W. Peak Greenway Trail System includes over 97 miles of multi-use paths that connect residents and visitors to parks, jobs, schools, and activity centers.

A City of Vibrant Districts and Sub-Areas

San Antonio is comprised of 10 City Council Districts, each district has its own unique distinct transportation, land use, and socioeconomic characteristics that influence how people move around the City and ultimately the bicycle facility needs of the City (see Figure 2.1).

SAN ANTONIO AT A GLANCE

- 7th largest city in the United States and 2nd most populous in Texas.
- Known for the Alamo, the number one tourist attraction in Texas and one of the city's five Spanish colonial missions.
- Host to more than 39 million visitors a year.
- Home to the River Walk and Howard W. Peak Greenway Trail System –a 97-mile network of multi-use paths along San Antonio's waterways.
- Includes more than 240 parks, totaling over 16,000 acres of park and conservation land.

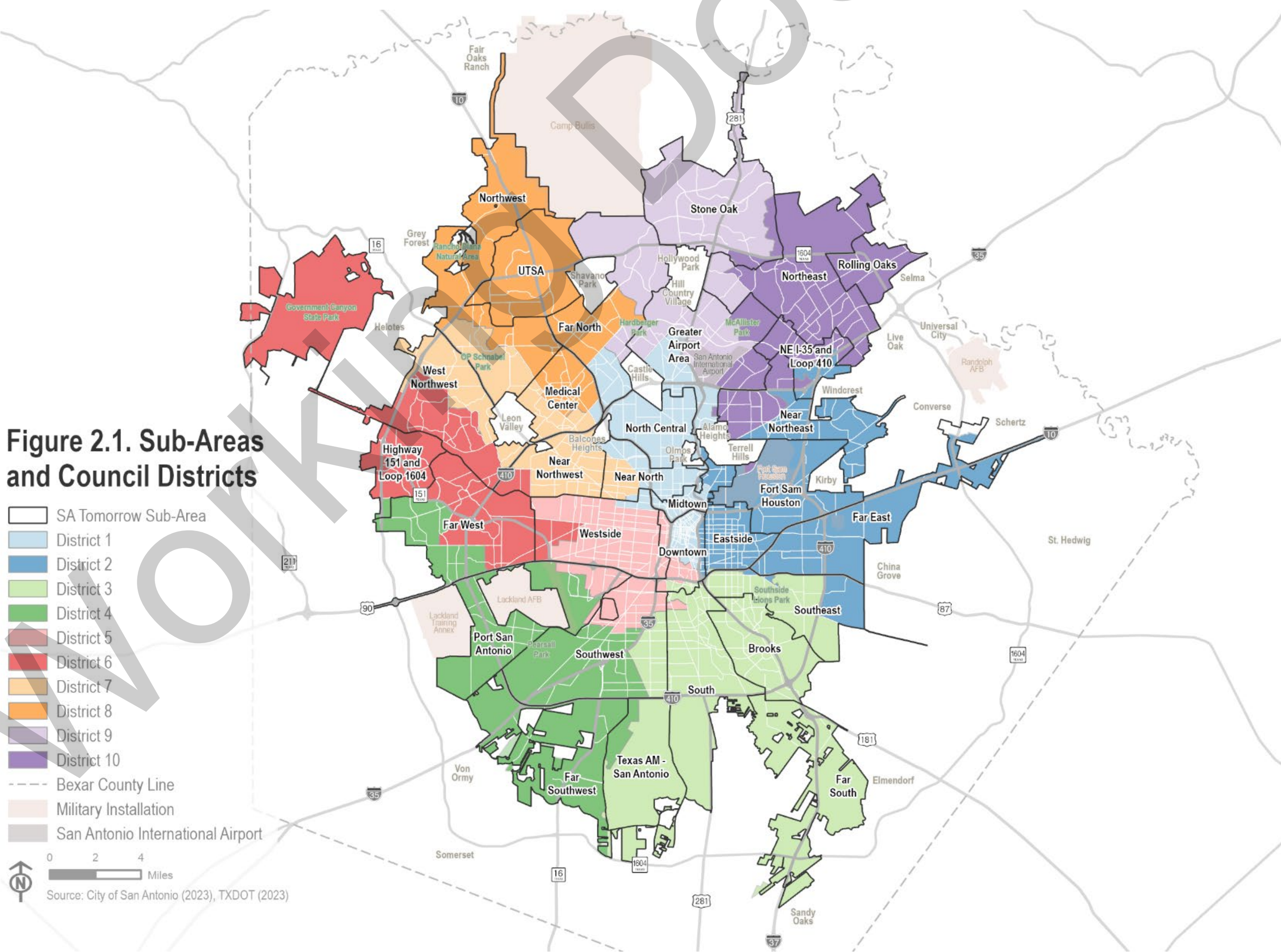


Figure 2.1. Sub-Areas and Council Districts

SOCIOECONOMIC CHARACTERISTICS

San Antonio is diverse in its residents, users, and land uses. To better understand the multimodal needs of San Antonio, demographic and socioeconomic background research was conducted. The findings in this section is based on available from the 2010 U.S. Census, 2020 U.S. Census, the 2021 American Community Survey, the City of San Antonio, and the Centers for Disease Control and Prevention PLACES dataset.

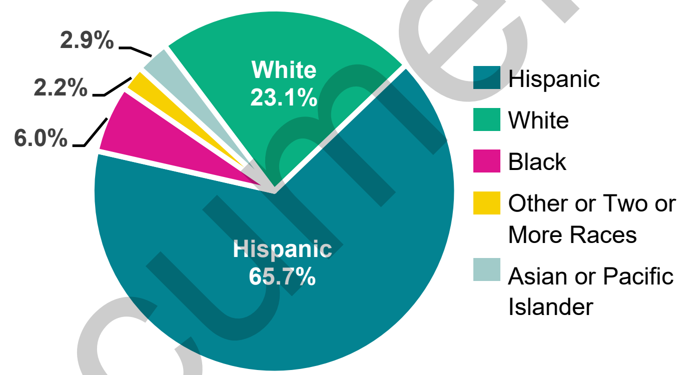
San Antonio is Racially and Ethnically Diverse

Understanding San Antonio's diversity is critical as, across the nation, People of Color have historically and systemically been disenfranchised, resulting in disproportional poor health outcomes and limited access to resources.

77% of San Antonians are from racial or ethnic minority groups

The City is unique in that 3 in 4 San Antonian's identify as People of Color and of those, 82.9% are non-White Hispanic/Latino.

Population by Race



Source: 2021 ACS 5-Year Estimates

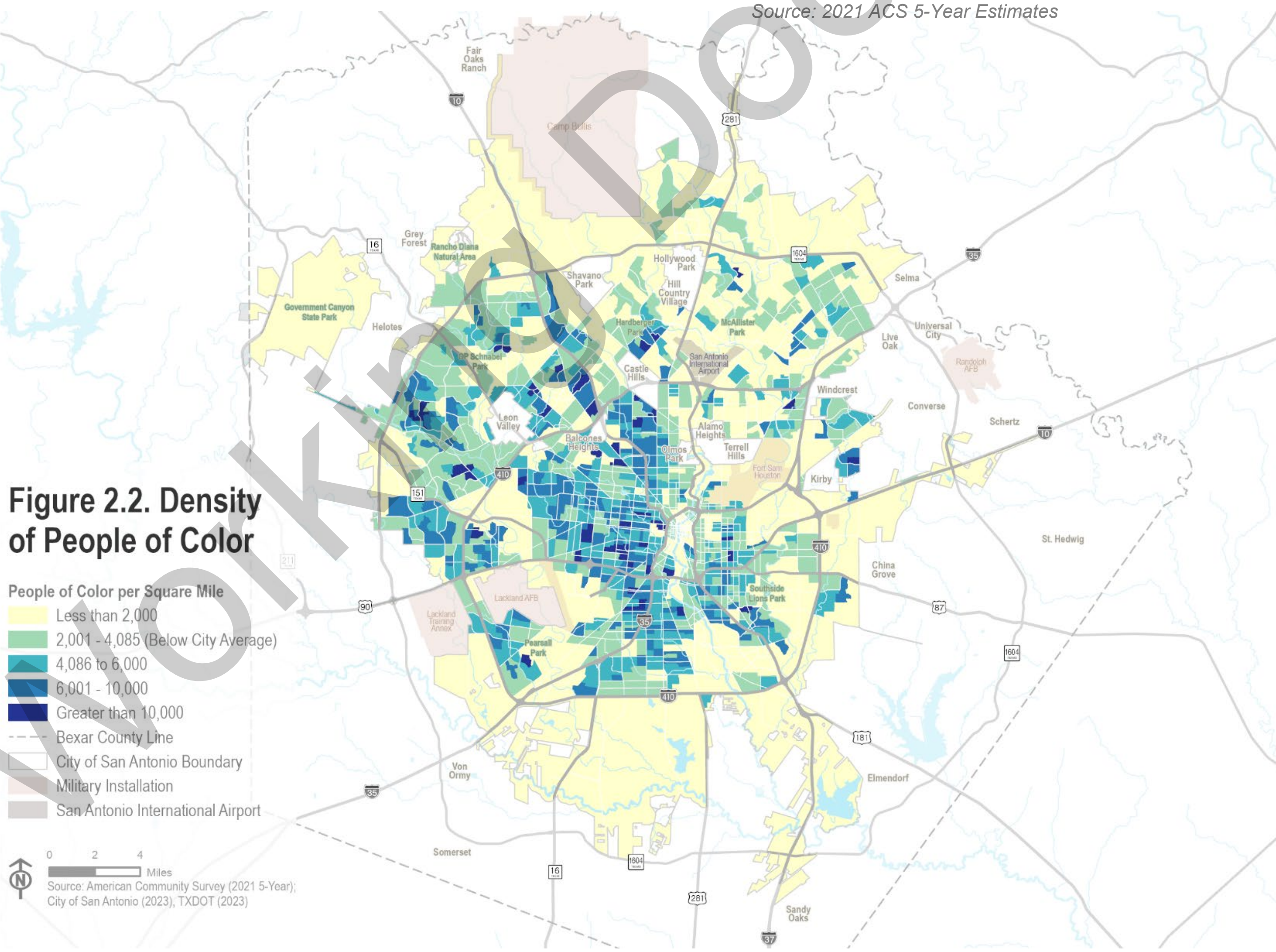


Figure 2.2. Density of People of Color

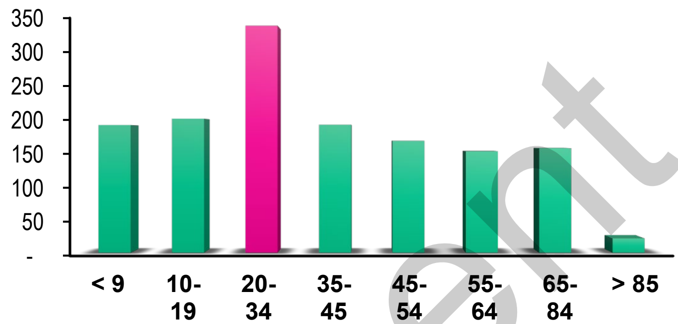
San Antonians are Young, but Aging

Age is an important factor to consider as different age groups have unique mobility needs and abilities to access those needs. With a median age of 33.9 years old, San Antonians are younger than the median age in Texas (35) and the United States (38.4). In fact, 25% of San Antonian's are under the age 18. These school-age children are an important demographic for cycling but face unique safety challenges and they are less visible from the driver's seat than adults, and often have less ability to detect risks or negotiate street conflicts.

Despite San Antonio's young age, however, San Antonio is aging. In 2010, the median age was 32.5, 4% younger than it is today. With 13% of San Antonian's age 65 and older, many seniors choose or need to stop driving and instead rely on alternative modes of transportation. Through a safe, comfortable, and connected bike network, seniors can maintain their independence and stay physically active.

Population by Age in thousands

Median Age: 33.9



25%

Of San Antonians are under 18

13%

Of San Antonians are 65 or older

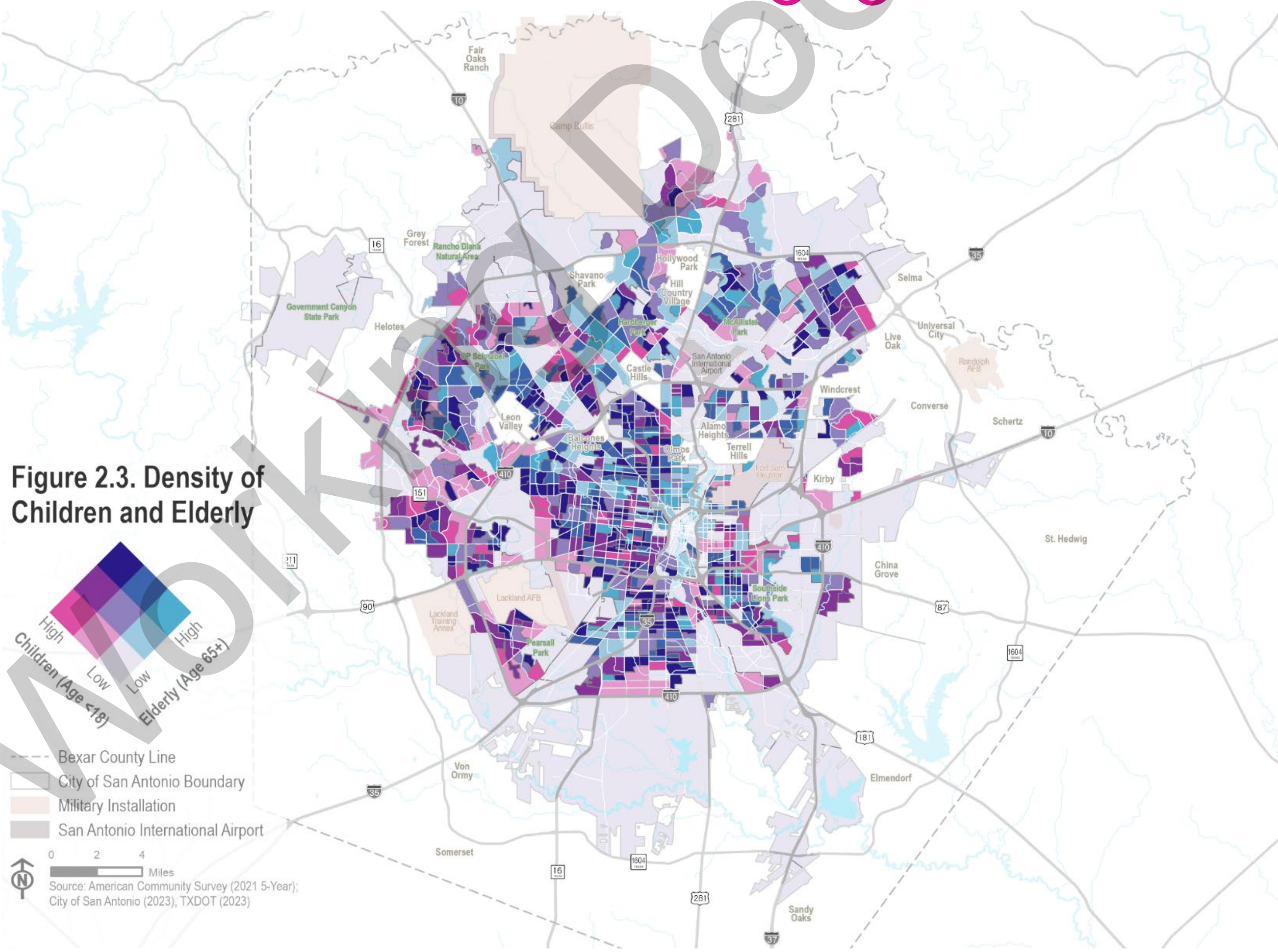


Figure 2.3. Density of Children and Elderly

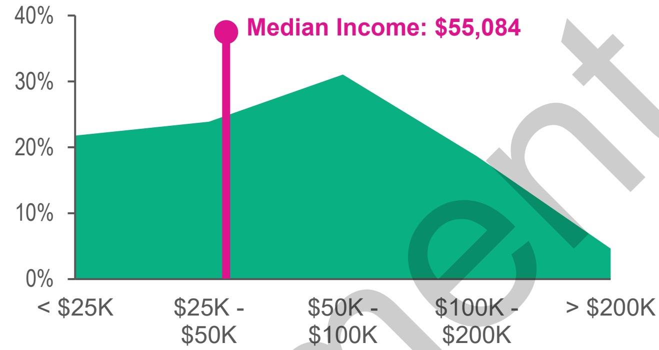
Many Have Limited Mobility Options

People that live below the poverty line, have mobility limitations, or do not have access to a vehicle often are more reliant on non-motorized transportation to travel.

Population Experiencing Poverty

Wealth can play a major role in how individuals travel and ultimately their access to health services, goods, and daily needs. Not only can wealth help purchase a vehicle, but affluent individuals also have the resources to adopt healthier lifestyles including access to healthier food, exercise options, and stress-lowering recreation. Low-income households can indicate non-motorized transportation dependent populations that would improve from additional multimodal access. Figure 2.4 illustrates concentrations of households residing below the poverty level. In San Antonio, of those experiencing poverty, 36.1% of them are children and 9.3% are those 65 years and older.

Median Household Income



17% of San Antonians live below the poverty line

Source: 2021 ACS 5-Year Estimates

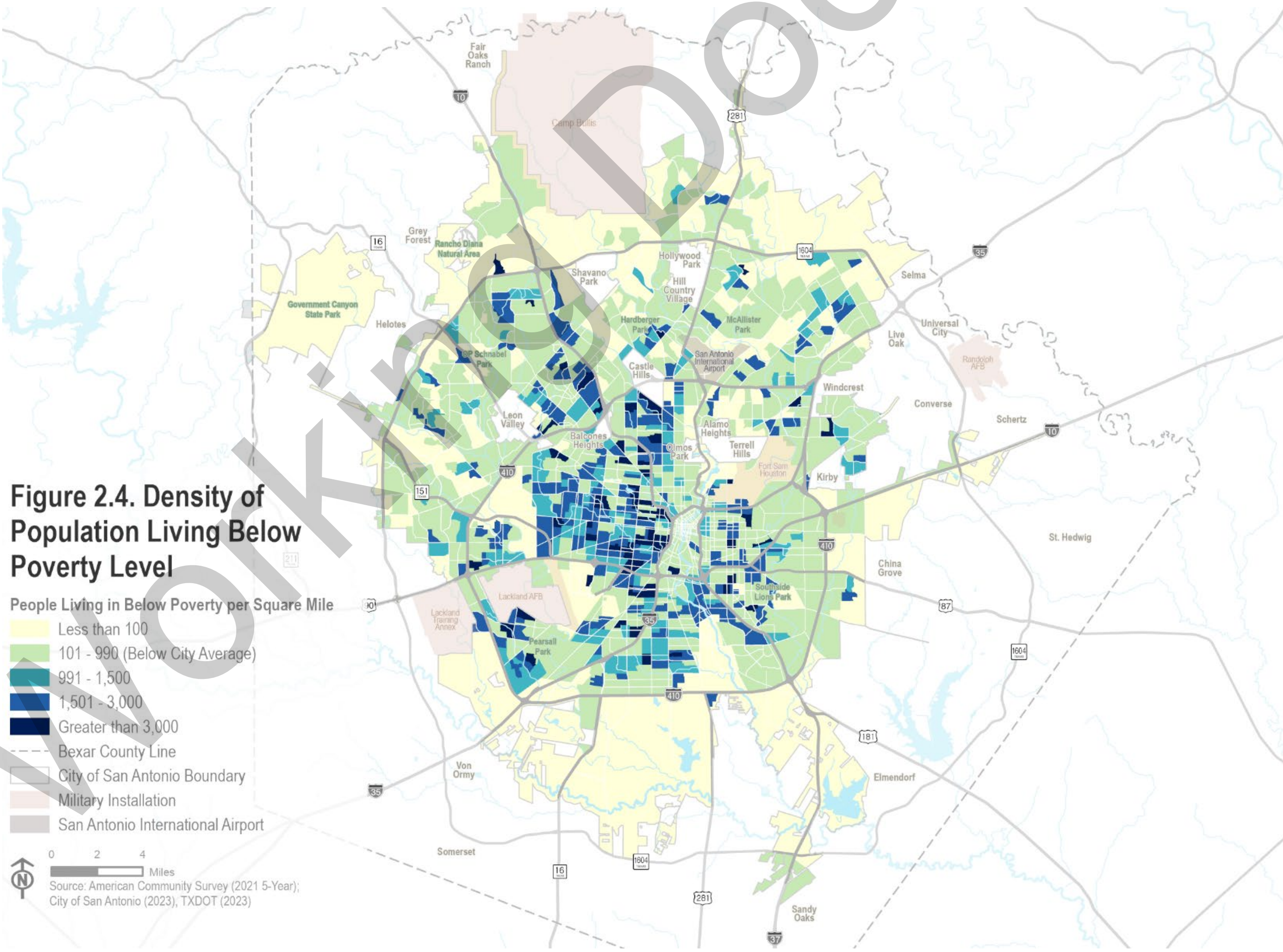


Figure 2.4. Density of Population Living Below Poverty Level

Access to a Vehicle

The financial burden of owning a car is a major barrier for many households to fully participate in the same social and economic opportunities as those who can finance a personal vehicle. Currently the average household in San Antonio spends 22% of their income on transportation costs—nearly the same as housing (24%).

7.9% Of households in San Antonio do not have access to a vehicle.
Source: 2021 ACS 5-Year Estimates

Not all households can afford to own a vehicle. Those that can, still may not be able to maintain or operate it regularly. These households are much more dependent on other means to get around such as walking, biking, taking transit, or carpooling with others.

$13,342
Average annual transportation costs per household

46%
Of the average San Antonian's income goes to housing and transportation costs

Source: 2021 ACS 5-Year Estimates

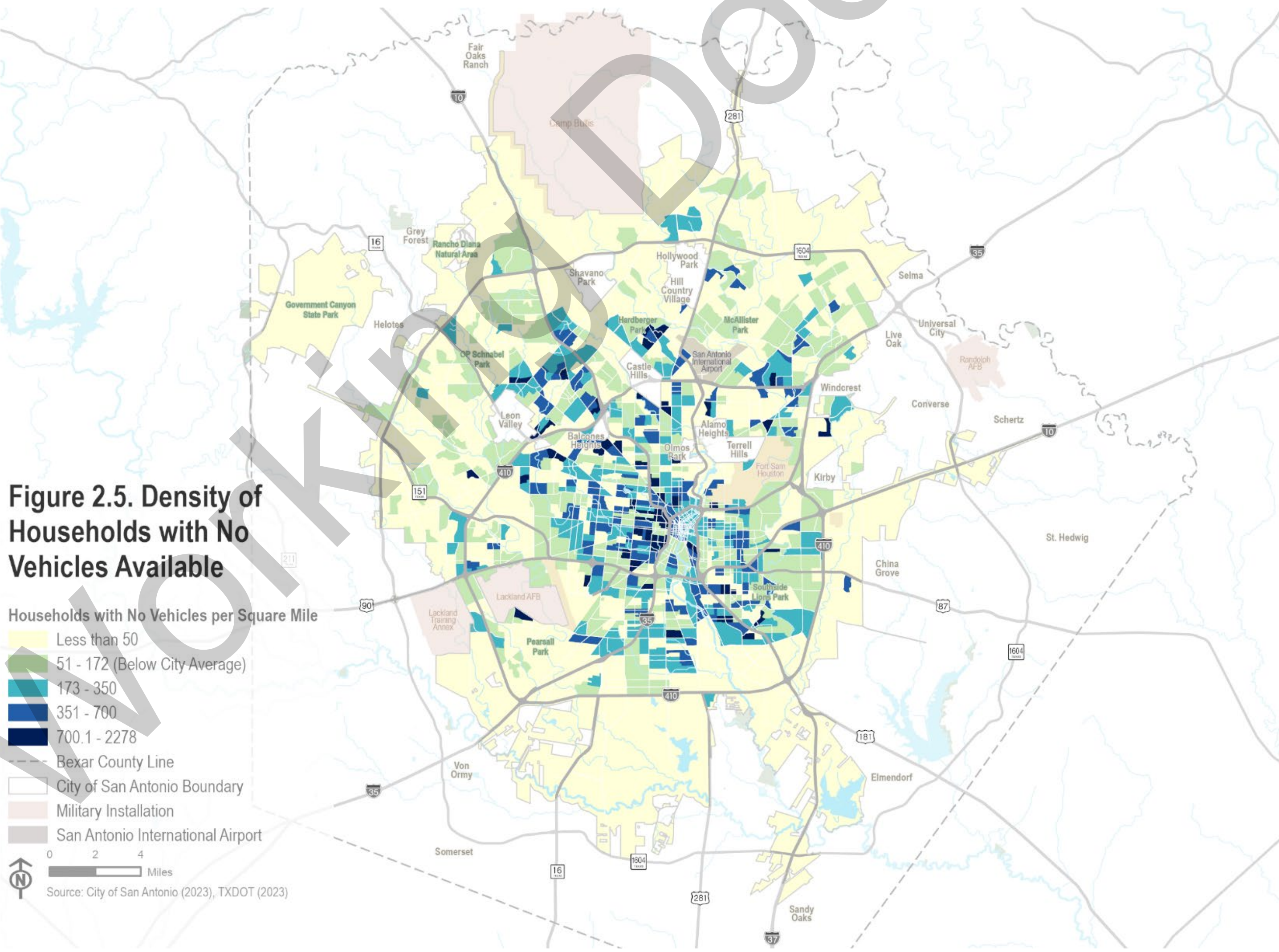


Figure 2.5. Density of Households with No Vehicles Available

Mobility Impairments

A well-designed bicycle network is about more than getting people to exercise or to move through the city, it is also about providing equitable mobility for all. On average, approximately 11% of San Antonio's population under the age 65 have a disability, and 42% of people 65 or older live with a disability. Furthermore, life events like crashes or illness can leave able-bodied people unable to drive.

Bike networks can be designed to support people who live with disabilities. Considering elements like assistive devices, facility width requirements, and tactile surfaces or separation in the planning efforts can ensure the built network and supporting programs is inclusive and welcoming for all San Antonians.

San Antonian's Living with a Disability

11% Of population age 18-64

42% Of population over the age 65

Source: 2021 ACS 5-Year Estimates

"Been temporary disabled due to injury/illness. Experienced how car-dependent San Antonio is, and the resulting difficulty & isolation from not having car access or the ability to drive."

-San Antonio Resident, collected during online engagement

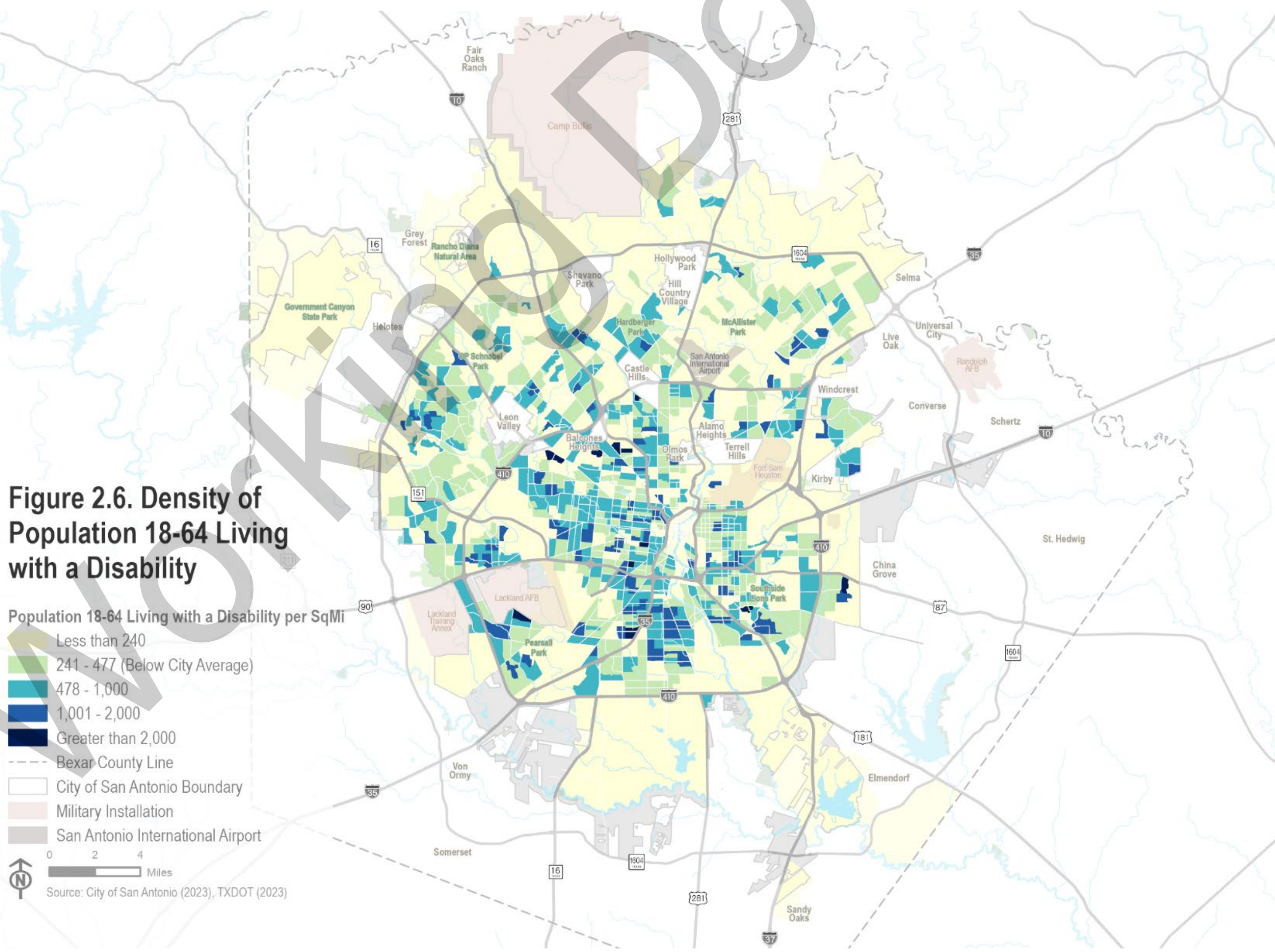


Figure 2.6. Density of Population 18-64 Living with a Disability

TRAVEL PATTERNS AND CHARACTERISTICS

Understanding where people want to go and how they choose to get there–regardless if it's by walking, biking, driving, or taking transit—will help reveal the types of places San Antonian's need to go and how they currently get there.

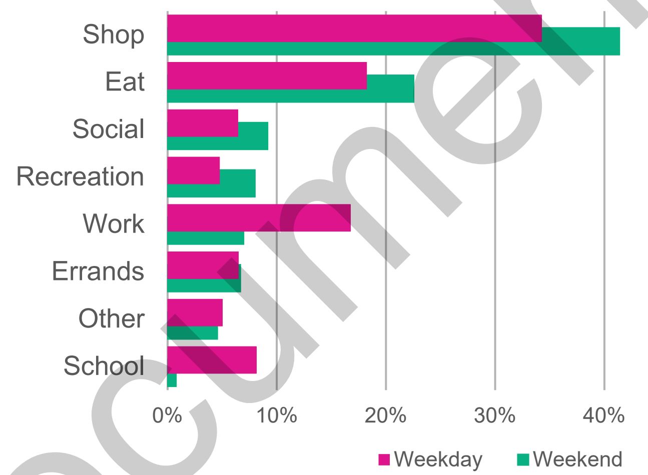
Mobility is More Than a Commute...

New data is revealing a better understanding of the why people travel in San Antonio. Cell phone, credit card, and other data sources now inform that while commuting trips are a significant part of weekday trips (17%), they are a much smaller part of the daily trips San Antonians take compared to other needs.

3of4

Trips San Antonians take are for quality of life: Shopping, eating, socializing, and running errands.

Typical Trip Purpose (Replica 2022)



Trip Distance

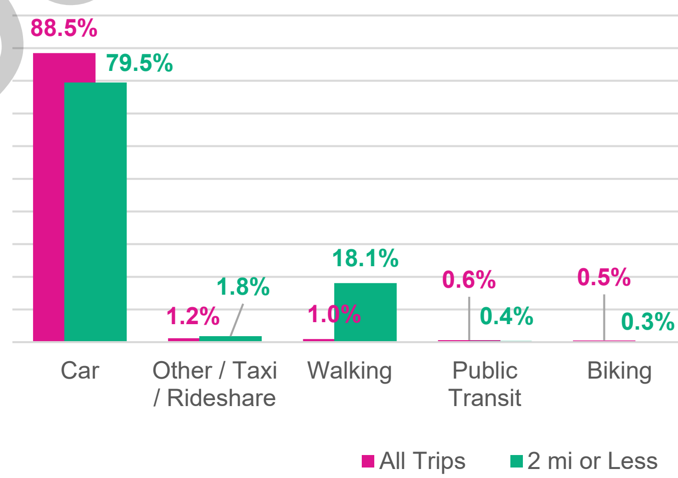
While the average commuting trip in San Antonio is 11 miles, 27% of all trips are two miles or less. Two miles is an important threshold as destinations within this distance are most likely to be converted to biking or other micro-mobility trips when a safe and convenient network is available. This is true for San Antonio where 9% fewer trips are taken by car when trips are 2 miles or less.

1in5

Children and guardians walk to school in San Antonio.

Currently, getting to school is the shortest type of trip San Antonians take (averaging just under 4 miles) and represents the trip people most take by walking (22%) and biking (2%). Thus, populations that can afford to live in neighborhoods where many destinations are within close distance will have more transportation options than others.

Trips by Mode (Replica 2022)



Transportation Burdens are Unequal

Often, transportation and land use decisions place unfair burdens on disadvantaged communities. Conducting an analysis of traditionally underserved populations helps identify locations with high concentrations of people or groups who may not be physically or financially capable of owning or driving a vehicle and rely on walking, riding bicycles, and transit to meet their daily travel needs.

Areas of High Equity Concern

The City of San Antonio Equity Atlas is a tool to help to help highlight the demographic differences and socioeconomic disparities within the City. As shown in Figure 2.8:

- **Areas of High Equity Concern** includes areas with the top third highest concentrations of People of Color, combined with the greatest densities of below median income households
- **Areas of Low Equity Concerns** includes the third lowest concentrations of People of Color combined with the lowest densities of below median income households

Unequal Investments

Historically, Low Equity Concern Areas have seen a higher investment of bike infrastructure in comparison to areas of High Equity Concern. Areas of Low Equity Concern have more bike lanes, more buffered bike lanes, and more shared use paths compared with High Equity Concern Area. While High Equity Concern areas have 19% more protected bikeways; fewer than four miles of protected bikeways exist in the City in total.

65% More bike infrastructure has been invested in Low Equity Concern Areas, historically.

Unequal Safety Impacts

Despite areas with having the same percentage of San Antonio residents in areas with low equity concerns, people living in areas with high equity concerns have significantly higher rates of bicycle and pedestrian crashes.

113% More bike and pedestrian crashes in areas with high equity concerns.

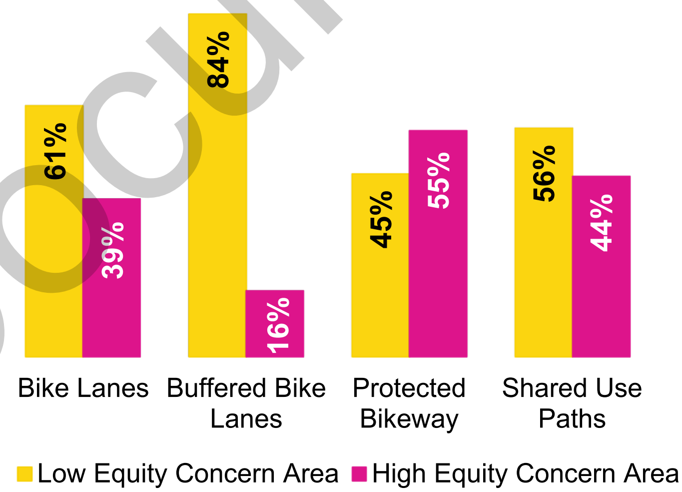
2x **More People of Color live below the poverty level** in San Antonio compared to all residents

14% **Of People of Color live in a high-poverty neighborhood compared** to 8.1% of all residents

28% **Of Latino/Hispanic residents have less than a high school diploma** compared to 6% of white residents

Source: 2020 IPUMS USA | National Equity Atlas

Historic Bike Infrastructure Investments



Crash, Serious Injury, and Fatality Rates

	Areas of Low Equity Concern	Areas of High Equity Concern
% of Total Bike and Pedestrian Crashes	13%	47%
% of Bike and Pedestrian Serious Injuries	14%	47%
% of Bike and Pedestrian Fatalities	14%	44%

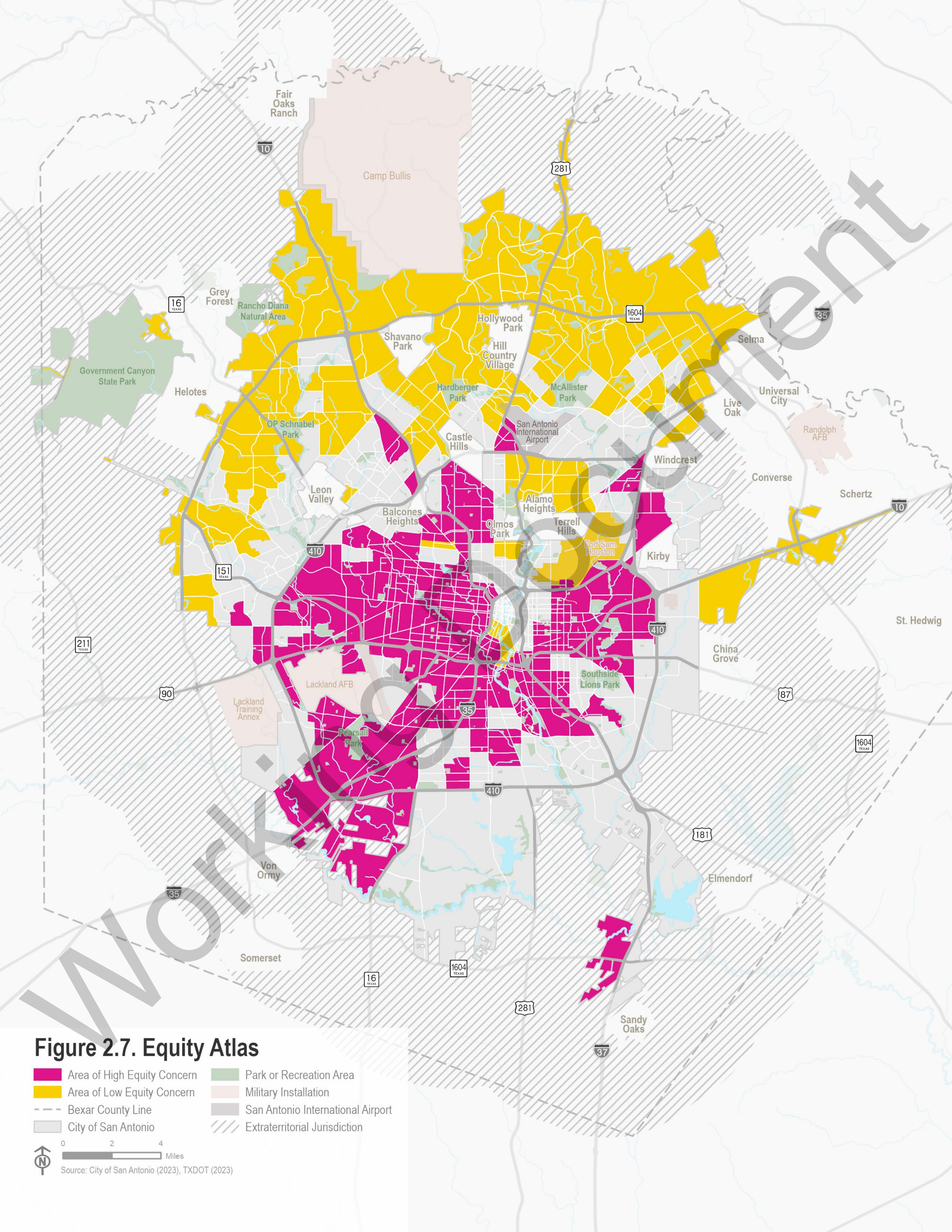


Figure 2.7. Equity Atlas

Source: City of San Antonio (2023), TXDOT (2023)

CHAPTER 3. BIKING IN SAN ANTONIO TODAY

TYPES OF PEOPLE BIKING

We know people experience environments in different ways based on their knowledge/experience level, trip purpose, age, gender, background, and other factors. These same factors also impact how people perceive the safety and comfort of bike facilities and roadways they use while riding. For instance, those who travel with children by bike may choose very different routes and take different risks than athletic riders traveling alone. Further, someone who identifies themselves as an athletic, skilled bike rider may not have the same perception of a routes' safety as someone else who identifies the same due to experience, age, gender, or other factors. Understanding who is riding, why they are riding, and the user experience helps identify the different needs of people using the network.

Types of Users

Generally, people who walk and bike in San Antonio can be categorized into the following, recognizing people may fit into multiple categories:

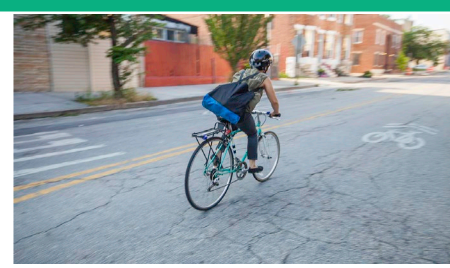
Utilitarian. People who walk or bike for everyday errands like shopping, medical appointments, to visit friends/family, etc.

Commuters. People who walk or bike to work or school, including those who bike for work such or walk or bike to access transit.

Kids & Families. Parents and children (under 16) who walk or bike, often to parks, schools, or neighborhood destinations.

Riders with Disabilities. People who use assistive devices.

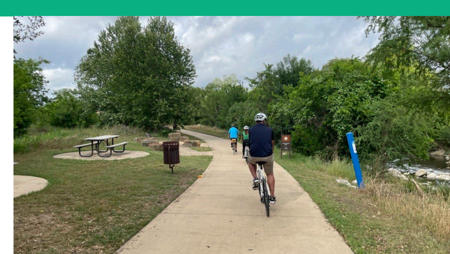
Sports & Fitness. People who bike for sport, generally at higher speeds and longer distances.



Road Enthusiasts. People who prefer to bike in the street in mixed traffic.

Tourists. Visitors who choose to bike or walk and who may or may not regularly do so at home.

On Small Wheels. People who use scooters, skateboards, and other small devices.



Recreational. People who walk or ride for fun, generally on the trail network.

BIKING INFRASTRUCTURE TODAY

Roadway design and the presence of bike facilities play a key role in the sense of safety people experience while biking. Generally, the greater the degree of separation from traveling cars the safer and more comfortable riders feel, regardless of their cycling expertise. Achieving separation between bikes and traffic can be accomplished by creating a physical barrier between modes or placing a bike path off-road. Reducing traffic volumes on roadways frequented by cyclists minimizes riders' exposure and provides a form of separation. Additionally, the speed at which cars travel and the number of lanes on the roadway also significantly impact a cyclist's sense of security.

More Separation, Greater Comfort for Most

Shared Use/Side Path

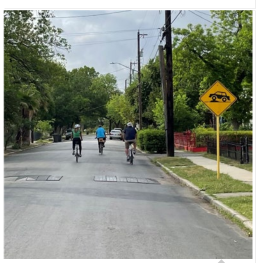
Off-street facilities dedicated exclusively for non-motorized travel. Shared use paths run independent of roadway facilities and side paths run along roads.

Typical Users All types of people biking. Shared use paths include non-bike riders such as pedestrians and other users who use mobility assistance devices.

Protected Bike Lane

A protected bike lane is physically separated from motor traffic and distinct from the sidewalk. May be single or bi-directional. Protected bike lanes are comfortable for all users.

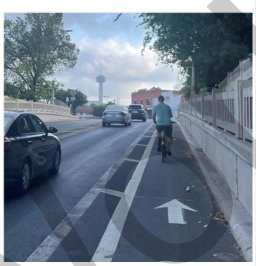
Typical Users Most people biking. Sports & Fitness riders may feel constricted if lanes are not wide enough to pass slower riders. Kids & Families may feel uncomfortable if protection is not provided through crossings and intersections.



Bike Boulevards and Some Local Streets

Local streets with low traffic speeds and volumes can be comfortable for people to bike on. Bike Boulevards are enhanced local streets with wayfinding and additional features to manage vehicle speeds and volumes.

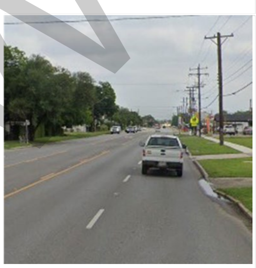
Typical Users Most people biking if observed traffic speeds and volumes are low enough for those biking. People on small wheels will only feel comfortable if asphalt is well maintained.



Buffered & Painted Bike Lanes

Striped lane with pavement markings and signs that designated an exclusive lane for bicycle use. The level of comfortable bike lanes can provide depends on roadway speeds, volumes, and number of lanes. A bike lane with a painted buffer can provide further separation between vehicle and / or parking lanes.

Typical Users Sports & Fitness, Road Enthusiasts, Commuters, and some Utility Cyclists



Shared Lanes for Bikes

Signed routes where the travel lane is shared by drivers and people biking. These may be on local streets or wider roads and generally include wayfinding and shared lane markings.

Typical Users Road enthusiasts and some Sports & Fitness Riders. Other users may feel comfortable riding if observed traffic volumes and speeds are low and there are few lanes.

Less Separation, Less Comfortable for Most

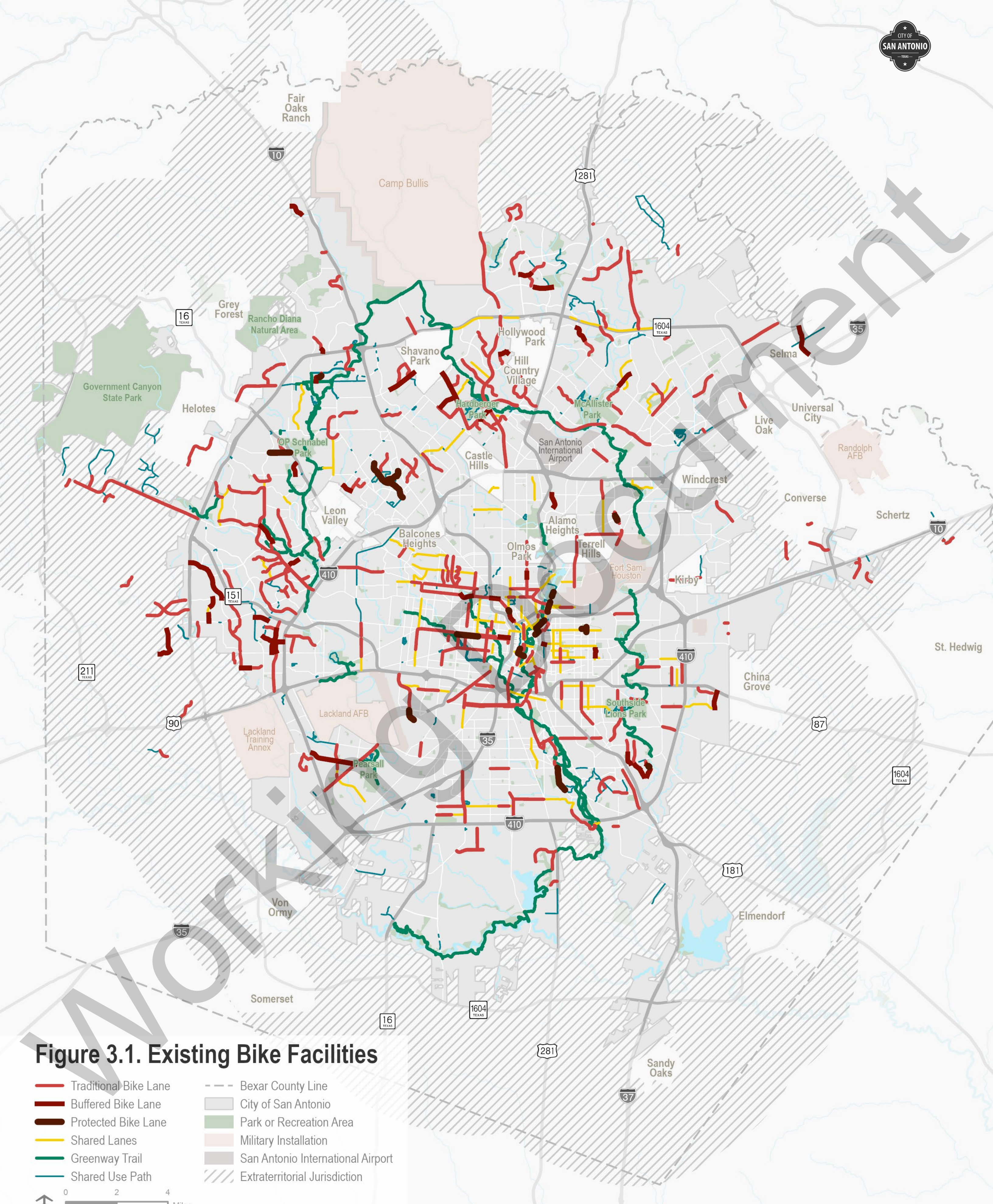


Figure 3.1. Existing Bike Facilities

Source: City of San Antonio (2023), TXDOT (2023)

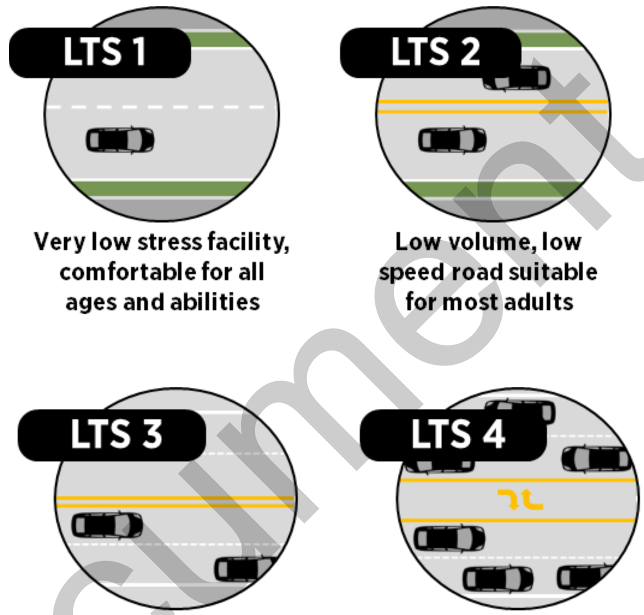
As of November 2023

HOW COMFORTABLE ARE OUR STREETS?

Bicycle Level of Traffic Stress (LTS) is a method of quantifying the perceived sense of comfort associated with biking along a given roadway. Whether a rider feels comfortable on a street depends on factors such as the speed and volume of traffic, presence and type of bicycle infrastructure, and the design of the road and intersections. As illustrated on the right, LTS ranges include:

- Low-stress streets (LTS 1 and LTS 2)
- High-stress streets (LTS 3 and LTS 4)

LTS 1 is considered an all ages and ability facility and is comfortable for most riders including families and children; whereas LTS 4 is high-stress and may only be used by the most confident bike rider. Depending on a person's skill level, roads with high LTS scores may deter potential bicyclists from riding, leading them to choose a different mode of transportation or forcing them to make lengthy detours to avoid high-stress streets. Figure 3.2 illustrates the LTS scores for streets in San Antonio.

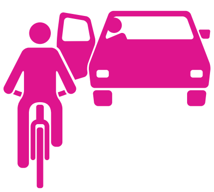


Very low stress facility, comfortable for all ages and abilities

Low volume, low speed road suitable for most adults

Moderate volumes and speeds comfortable for confident bicyclists

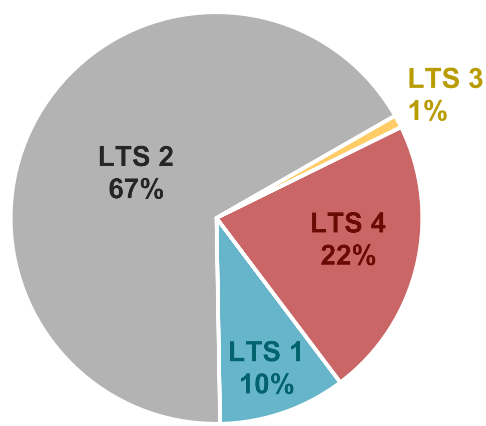
High volumes and speeds, uncomfortable for most bicyclists



1 in 5

Streets in San Antonio are uncomfortable for most to bike on.

Level of Traffic Stress Distribution on San Antonio Owned or Maintained Streets*



While local and neighborhood roadways, with lower speeds and fewer lanes, make up the majority of the network, 23% of San Antonio's owned or maintained streets are considered high stress (LTS 3 or LTS 4). As shown in Figure 3.2, islands of low-stress facilities are located throughout San Antonio; however, higher LTS roads create physical and perceived barriers to bicycle ridership, as it makes it difficult for users to cross major roads causing connectivity issues along low-stress routes.

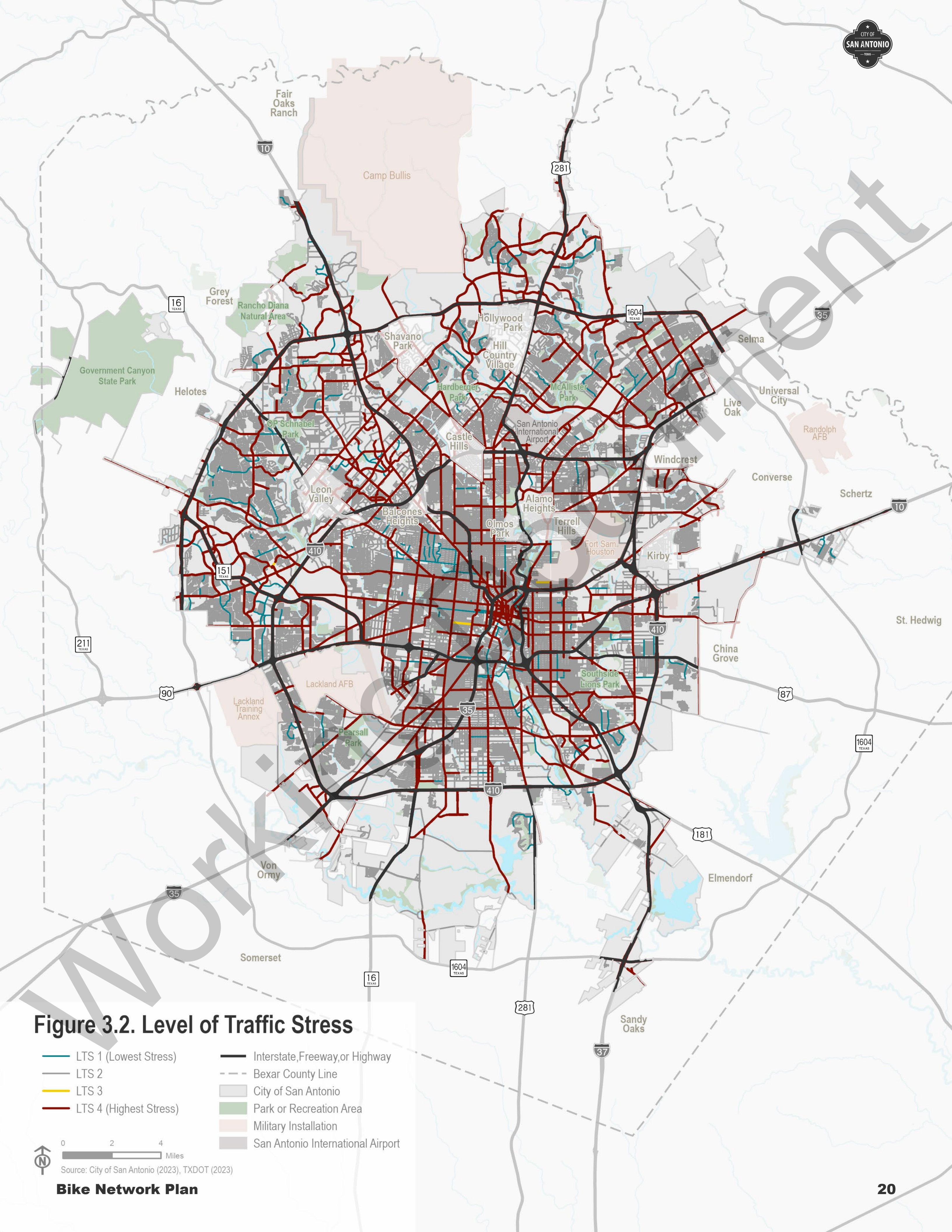


Figure 3.2. Level of Traffic Stress

Source: City of San Antonio (2023), TXDOT (2023)

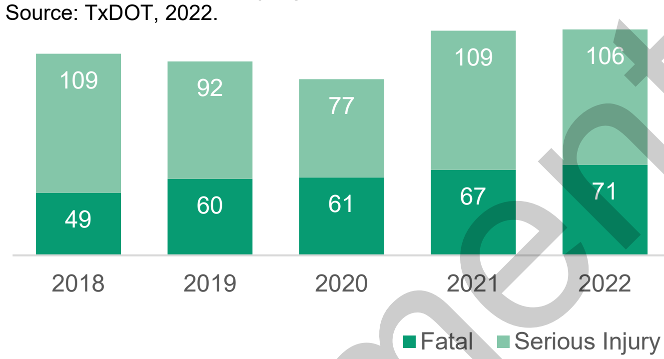
HOW SAFE ARE OUR STREETS?

San Antonio has been striving to eliminate traffic fatalities and serious injuries through its Vision Zero Action Plan since 2015. Working towards Vision Zero is a key component to achieving a bicycle network that is connected, accessible, and safe. Even so, fatal and serious injury crashes involving people biking are increasing.

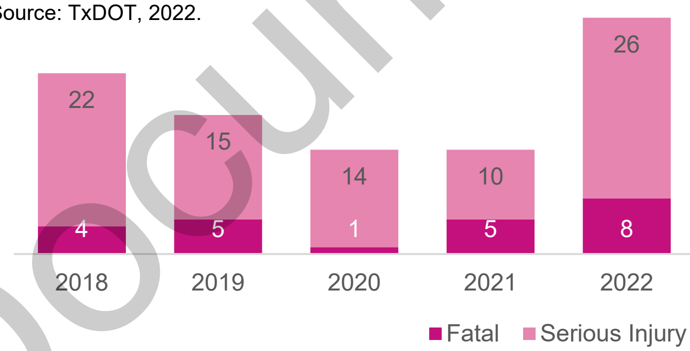
From 2018 to 2022, there were 5,486 pedestrian- and bicycle-involved crashes in San Antonio, of which 331 were fatal and 580 were serious injury crashes. This means that on average, 160 people walking and 22 people bicycling have lost their lives or are seriously injured in a crash. In recent years, the number of these crashes has been trending upward, with fatal and serious injury bicycle crashes increasing by 127% from 2020 to 2022.

In general, some key conclusions can be drawn from the data regarding when and where the most severe crashes involving people walking and biking are occurring.

Fatal and Serious Injury Pedestrian Crashes
Source: TxDOT, 2022.



Fatal and Serious Injury Bicycle Crashes
Source: TxDOT, 2022.



More than 60% of the fatal and serious injury crashes involved a straight-traveling vehicle.

One-fourth of pedestrian crashes and one-half of bicycle fatal and serious injury crashes occurred at an intersection.

44% of the fatal and serious injury crashes involved pedestrians / bicyclists not yielding to vehicle right of way.

26% of the fatal and serious injury crashes involved driver inattention.

Darkness (night time) with streetlights present was the most common lighting condition.

Most fatal and serious injury crashes occurred on city streets and on roadways with posted speeds ranging from 30 to 45 MPH.

These findings suggest the current transportation system is not working for people. There is a need for safe walking and bike infrastructure, safe designs at crossings, more and better lighting focused on nonmotorized users, and slower speeds. Additionally, there are inequities in where crashes are occurring, and there are 113% more crashes involving people walking and biking in areas with equity concerns.

Table 3.1: Crash History in Areas of Equity Concern

	Areas of High Equity Concern	Areas of Low Equity Concern
% of Total Bike and Pedestrian Crashes	47%	13%
% of Bike and Pedestrian Serious Injuries	47%	14%
% of Bike and Pedestrian Fatalities	44%	15%

BICYCLE EQUITY INDEX

Originally developed by the League of American Bicyclists, a Bicycle Equity Index (BEI) estimates how equitable an existing bicycle network is relative to disadvantage populations that traditionally rely on non-motorized transportation as their primary means of travel. In simple terms, the BEI overlays Census data with existing bicycle infrastructure to identify areas with high socioeconomic need and limited access to high-quality bicycle infrastructure. The BEI aids in understanding where bicycle infrastructure exists and may help alleviate wider social issues such as access to jobs, healthy food, education, and healthcare, an equity assessment was conducted.

Methodology

Building off the Leage of American Bicyclists' BEI, the planning team developed a San Antonio-specific BEI methodology using an index of the following indicators:

- **Density of Persons Reliant on Non-Motorized Transportation**
    - Population Aged 65 and Older
    - Population Under 18 Years Old
    - Households with No Vehicles Present
    - Population Living with a Disability
- **Density of Environmental Justice Factors**
    - Population that are Black, Hispanic/Latinx, or other Person of Color
    - Population Living Below the Poverty Level
- **Additional Indicators**
    - Low Stress Bicycle Accessibility

To compare the above indicators across the City, the following process was used:

- The density of persons reliant on non-motorized transportation and environmental justice factors was calculated for each Census Block Group.
- Standard deviation and Z-score was calculated for each metric. Z-scores are based on standard deviations and help to highlight census block groups that are significantly above or below the mean. This helps to identify areas with higher concentrations of disadvantaged populations.
- For each metric, a score of 1 (lowest equity concern) to 5 (highest equity concern) was calculated for each census block based on its Z-score value.
- Areas identified as having low accessibility via the existing low-stress (LTS 1 & 2) facilities were given a score of 5 points.
- A composite scoring for each metric was calculated.

Results of this model are displayed in Figure 3.3. Areas with the highest percentage of population groups that traditionally rely more on walking, bicycling, or transit as their primary form of transportation are depicted as having the higher bicycle equity needs. As the BNP is implemented, additional social equity impacts, such as burden of construction on disadvantaged population groups, should be considered beyond those included in the prioritization process.

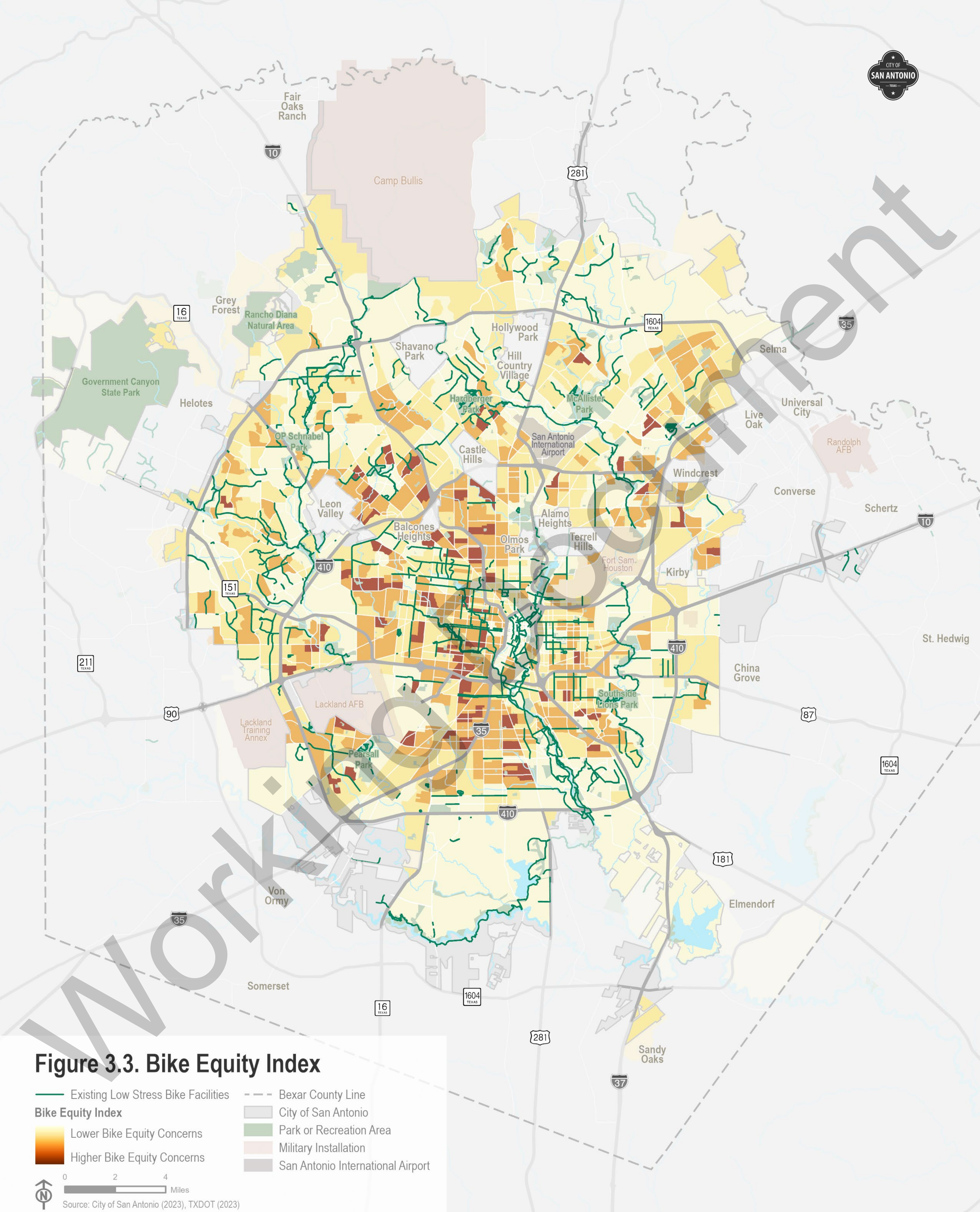


Figure 3.3. Bike Equity Index

Source: City of San Antonio (2023), TXDOT (2023)

CHAPTER 4.
SAN ANTONIO BNP HIA GOALS AND OBJECTIVES

GOALS AND MEASUREMENTS

The Health Impact Assessment's primary goal is to evaluate how the Bike Network Plan may impact the health of people who live, work, and travel in San Antonio. The findings from the HIA can be utilized to show San Antonians how the plan can benefit them and be used as a tool by elected officials and decisions makers to make informed decisions regarding investments and policies. The HIA utilized the following process to identify potential topics which could be researched and evaluated to understand the impacts of the BNP:

Step	Purpose
1	**Identify and Screen** The study team and HIAWG identified and screened an extensive list of potential indicators which could address a variety of topics.
2	**Confirm** Based on Step 1, a short list of preferred indicators was identified that reflect the most pressing issues faced by San Antonians which the BNP could influence.
3	**Develop and Research** The study team and HIAWG identified developed potential research questions to understand if and how much the confirm indicators can be impacted by the BNP.
4	**Create Measures** For each research question, metrics were identified that could be used to evaluate the impact of proposed BNP projects and policies.

Step 1. Identify and Screen

To begin, the planning team developed an extensive list of potential health indicators. The indicators addressed five key categories:

Education Access & Quality

- Access to High-Speed Internet
- Access to Institutes of Higher Education (Trade Schools, Universities, Colleges)
- Access to Libraries and Museums
- Access to Pre-Schools
- Access to Public Schools (K-12)
- Access to social activities for youth (after-school care, clubs, sports, organizations)
- High School Graduation Rate
- Higher Education Enrollment (Trade Schools, Universities, Colleges)

Neighborhood & Built Environment

- Sense of Community
- Quality of Life
- Access to Community Spaces
- Access to Parks, Trails and Green Space
- Physical Activity
- Inclusion (e.g., Diversity Index)
- Social Interaction (access to friends/family, activities, and events)

Health Care Access & Equity

- Access to Doctor's Offices/Urgent Care
- Access to Healthy Food
- Chronic Disease (Diabetes, Obesity, Heart Disease)
- Health Insurance Coverage
- Mental Health/Depression
- Mortality/Morbidity

Neighborhood & Built Environment

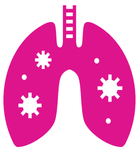
- Access to Transit
- Air Quality
- Bicyclist and Pedestrian Crash Rates
- Cross-Neighborhood Connections
- Flood Risk
- Safe, Comfortable, Connected Bicycle Facilities
- Safe, Comfortable, Connected Sidewalks
- Street Network Density
- Vacant/Underutilized Properties
- Water Pollution

Economic Stability

- Access to Jobs
- Disposable Income
- Economic Return on Investment
- Number of Jobs
- Poverty Levels
- Property Values
- Rental Costs/Housing Cost Burden
- Socioeconomic Status
- Transportation and Housing Affordability
- Unemployment

Step 2. Confirm the Short List

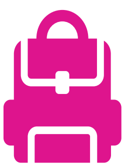
Based on the findings of the existing conditions analysis and the expertise of the HIAWG, a short list of indicators was selected:



Chronic Disease (obesity, diabetes, hypertension, asthma)

Mental Health and Depression

Access to Recreational, Open Space, Trails, and Physical Activity Areas



Access to jobs, Major Employment Centers, Schools, and Educational Opportunities

Crash Frequency and Severity

Step 3. Develop and Research

In order to best understand the effects of the proposed improvements on the identified health indicators, a literature review was conducted to understand current research of industry-leading thought leaders and their viewpoints on the effects active transportation investments on health. This literature review answered the following questions, which are discussed in more detail in the following pages.

1. How will the enhanced active mobility options affect chronic disease (obesity, diabetes, hypertension, asthma) levels in the study area?
2. How will the enhanced bicycle and pedestrian network affect mental health and depression levels in the area?
3. How will the project affect access to recreational, open space, trails, and physical activity areas in the study area?
4. How will the bicycle and pedestrian improvements improve access to jobs, major employment centers, schools, and educational opportunities?
5. How will the bicycle and pedestrian improvements affect levels of injury from collisions between motor vehicles and people who walk and bike?

All reference sources can be found in the Appendix. **Figures illustrating health characteristics within San Antonio are also provided in the Appendix.**

Question 1: How will the enhanced active mobility options affect chronic disease (obesity, diabetes, hypertension, asthma) levels in the study area?

State of the Problem

Chronic diseases are the leading cause of death in Texas and are a leading contributor to annual health care costs.[1] The HIAWG identified asthma, diabetes, obesity, and high blood pressure as chronic diseases to be evaluated as part of the HIA as they are especially prevalent in San Antonio, as shown in Table 4.1.

Table 4.2: Chronic Disease Prevalence in San Antonio, Texas, and the US Today

Measure	US	Bexar County	San Antonio
Adults Diagnosed with Asthma	9.7%	9.4%	**9.8%**
Adults Diagnosed with Diabetes	11.3%	12.7%	**13.1%**
Adults Reporting as Obese	33.0%	38.7%	**39.4%**
Adults Diagnosed with High Blood Pressure	32.7%	31.5%	31.2%

Source: *PLACES Project, Centers for Disease Control (2021)*

How Can the Bike Network Plan Help?

While chronic diseases can have unique triggers, there are some universal factors known to increase risk: tobacco use and secondhand smoke exposure, poor nutrition, excessive alcohol use, and physical inactivity.[1] The BNP has the potential to implement projects that reduce vehicle dependency and support physical activity.[1] In turn, the BNP can aid in preventing healthy individuals from acquiring a chronic disease and help those who suffer with a chronic disease to manage their symptoms. Research shows:

Regular Exercise can prevent excessive weight gain and obesity.[2, 3, 4]

Bicycling has an inverse relationship to hypertension.[6]

Active commuting has the potential to decrease Type 2 diabetes risk by 30%.[2, 3, 5]

Less vehicle miles traveled can reduce air pollution.[7]

Asthma is a unique chronic disease when it comes to bicycling. While it can be triggered by physical activity, it can also be triggered by air pollution. Road traffic is one of the main contributors to air pollution, particularly in urban areas.[8] Therefore, a reduction in vehicle miles travelled has the potential to yield cleaner air, reducing exacerbating conditions for those with asthma. With more than 1 in four trips in the US being less than two miles, a significant number of vehicle trips could become bicycling and walking trips with the implementation of effective active transportation infrastructure.[9]

Motorized vehicles are one of the largest contributors to greenhouse gas emissions in the US,

In San Antonio, private vehicles account for 90% of transportation emissions.[10]

San Antonio ranked **27th** **In the Nation for asthma prevalence,** emergency room visits for asthma, and deaths due to asthma.[11]

Question 2: How will the enhanced bicycle and pedestrian network affect mental health and depression levels in the area?

State of the Problem

In 2019, 19.86% of adults in the United States (nearly 50 million) experienced a mental illness, and it is estimated over half of them did not receive treatment.[12] These numbers are equally distressing for US youth, 15.08% of which experienced a major depressive episode in the same year, with over 60% not receiving treatment.[12] San Antonians report experiencing mental health challenges at greater numbers than the US as a whole, as shown in Table 2.

Table 4.3: State of Mental Health in San Antonio, Texas, and the US Today

Measure	US	Bexar County	San Antonio
Adults Diagnosed with Depression	19.5%	23.5%	**24.7%**
Adults Reporting Poor Mental Health for 14 or More Days in 2021	14.7%	16.7%	**18%**

Source: *PLACES Project, Centers for Disease Control (2021)*

How Can the Bike Network Plan Help?

Mental health is one aspect of overall health and can interact greatly with physical health. For example, depression and anxiety have been linked to increased risk for several other comorbidities, such as obesity, diabetes, heart disease, and stroke.[13, 14] Conversely, depression and anxiety can also be the second-arriving comorbidity, brought on by chronic diseases such as cardiovascular disease or diabetes.[13]

The BNP has the potential to impact mental health and depression the following ways:

Moderate to vigorous exercise reduces the risk of depression due to endorphin release.[3, 4, 15]

People who Walk and Bike to Work tend to be happier than those who ride transit or drive.[15, 16, 17]

Bicycling can increase mental health and boost life satisfaction, especially for women and older adults.[18, 19]

All these aspects can be summarized succinctly in a statement printed by the Institute of Transportation Engineers: "People who live in walkable and bikeable communities tend to be healthier, and commuters who walk and bike to work tend to [be] happier than those who use public transit or drive to work. Daily walking and bicycling have been shown to improve mood, reduce depression, and reduce dementia. Transportation planning can help ensure that the opportunity for convenient and safe active travel are available to all."[20]

Question 3: How will the project affect access to recreational, open space, trails, and physical activity areas in the study area?

State of the Problem

Recreational, open space, trail, and physical activity areas are safe spaces, separated from busy streets and commercial zones, where residents can move, play, exercise, and relax. People who have access to these types of spaces tend to be more physically active and have reduced risk of illness and injury.[21] Parks can also help reduce air and water pollution and mitigate urban heat islands. The closer people live to a park and the safer they feel in the park, the more likely they are to walk or bike to those places and use the park for physical activity.[21, 22]

It is critical to consider access to these spaces via walking and bicycling, as not everyone has access to a vehicle. Table 3 shows key findings related to access to recreation. Notably, San Antonio ranks in the bottom 25% of the 100 most populous cities for park access and residents report less physical activity than an average US resident.[23]

Additionally, according to the 2021 Howard Peak greenway Trail Use Survey, 68% of people access the trails in San Antonio by car.[24] Throughout the BNP engagement process, San Antonians have consistently noted they would like to walk or bike to access the trails but do not feel comfortable doing so due to street conditions.

Table 4.4: Select United States and Texas Recreational Statistics

Measure	US	Bexar County	San Antonio
Residents of Urban Areas who can Access a Park within a 10-minute walk	55%	N/A	**51%**
Adults Who Reported No Leisure-Time Physical Activity	23.7	25.2	**27.3**
Households Without Access to a Vehicle	8.3%	6.4%	7.5%
Households With Access to One Vehicle	32.6%	34.9%	39.6%

Source: *PLACES Project, Centers for Disease Control (2021), American Community Survey 2022 5-year Estimates*

How Can the Bike Network Plan Help?

Comprehensive connected bike networks provide accessibility to all daily needs to all road users. This means that a bike network should provide access to recreational, open space, trails, and physical activity areas in San Antonio. Providing comfortable connections to those facilities can increase usage, and so the BNP has the potential to impact nonmotorized access to recreation in the following ways:

Park, trail, and greenway infrastructure are most effective when paired with **additional interventions**.[25,26]

Additional interventions include access enhancements, such as transportation connections and street crossings.[25, 26]

An 18% increase has been observed in the number of people using park and recreational facilities when interventions were combined.[25, 26]

Question 4: How will the bicycle and pedestrian improvements improve access to jobs, major employment centers, schools, and educational opportunities?

State of the Problem

Education attainment and employment and transportation are closely linked.

Education and employment attainment is more challenging for individuals:[25, 26]

- With compromised health
- From disadvantaged and minority backgrounds
- Living in impoverished areas.

These same individuals are also less likely to have access to a car and other choices of transportation.[27]

This lack of access perpetuates a cyclical effect, leaving individuals in a further deficit from accumulating wealth and improving health.

As noted previously, 7.5% of households in San Antonio do not have access to a vehicle. The cost of owning a vehicle is also prohibitive, with the annual cost of owning a vehicle in San Antonio exceeding $15,000.[30]

Access to jobs without a vehicle is limited in San Antonio. A recent study compared thirty-minute access for four modes of transportation across 117 cities in six world regions.[31] Of the 105 cities with job access related bicycling data, San Antonio ranked 68th. Of the 107 cities with job access related walking data, San Antonio ranked 87th. As such, very few people choose to bike to school or work, as shown in Table 4. While few people walk to work, more than 1 in 5 students walk to school, suggesting existing demand.

Table 4.5: People Who Walk and Bike to Work

Measure	US	Bexar County	San Antonio
People who Walk to Work	5.08%	4.78%	5.21%
People who Bike to Work	0.53%	0.20%	**0.22%**
People who Walk to School	18.79%	18.3%	21.5%
People who Bike to School	2.74%	1.66%	**1.65%**

Source: Replica Southwest, Fall 2022 (Based on Trip Origin)

How Can the Bike Network Plan Help?

The BNP will include a focus on connecting people to destinations. These connections will be context appropriate, with a focus creating routes which people of all ages and abilities feel comfortable using. The BNP will also include program recommendations to increase walking and biking. The BNP can impact access to jobs and education in the following ways:

Discounted transportation micro-mobility / bikeshare memberships for disadvantaged individuals can help increase affordable transportation options.[32, 33]

Crossing guards, bike racks, and promotional materials can increase **students walking and biking** to school by 26% or more.[34]

The presence of comfortable biking infrastructure can increase the number of people who bike to work.[35, 36]

A data driven approach to identifying underserved areas in the community can be used to **implement equitable bike network** access. [33, 37]

Question 5: How will the bicycle and pedestrian improvements affect levels of injury from collisions between motor vehicles and people who walk and bike?

State of the Problem

In 2021 in the US, there were over 42,000 traffic-induced fatalities, a number that has continued to increase in recent years.[38] Along with this rise is an increase in pedestrian and bicyclist fatalities, which comprised approximately 19% (nearly 8,000 road users) of all traffic fatalities in 2021, and over 25% of traffic fatalities in urban environments.[38, 39] In addition to these fatalities, approximately 76,000 pedestrians and 47,000 bicyclists sustain traffic-induced injuries annually.

In Texas, pedestrians (11%) and bicyclists (2%) comprise approximately 13% total of the state's traffic-induced fatalities and suspected serious injuries, and these numbers have been increasing in recent years.[40]

When it comes to risk of being killed or seriously injured in a crash while walking or biking, People of Color, people who live in low-income communities, and people 65 and older are disproportionately impacted. Specifically, Black and Indigenous populations are more than two times as likely to be killed while walking.[41] Between 2018 and 2022 San Antonio, 44% of fatal crashes and 47% of serious injury crashes involving a person walking or biking occurred in an area of high equity concern.[42]

How Can the Bike Network Plan Help?

Fatal and severe crashes involving people walking and bike can be attributed to a plethora of factors: poor compliance with traffic laws, improper use of facilities, speeding, inadequate separation, crossing locations, inadequate conspicuity, and impairment and distraction.[38] However, a significant portion of these causes can be addressed by a comprehensive bike network plan that focuses on 1) separating bicyclists from vehicles in space and/or in time and 2) increasing driver awareness of bicyclists as follows:

Increased bike infrastructure contributes to **increased driver awareness** of vulnerable road users.[38]

Increased separation between drivers and people biking results in reduced crashes. [43, 44]

As the **miles of bike infrastructure increases**, the **number of people biking** increases and the **risk of severe and fatal crashes rates** decreases.[45, 46, 47]

Crashes involving people biking in separated bikeways are **less severe** than those outside of them. [43, 44]

It should be noted that there are many design considerations which should be evaluated when selecting and designing a bike facility. While some studies have shown an overall increase in crashes post installation, they also conclude that protected bike lanes prevent worst case scenario crashes.[43, 44] These studies suggest particular attention needs to be paid to intersection and crossing design for the best results.

Finally, other the BNP can impact other safety-related elements. For example, bike share stations can be used as a safety tool by strategically placing facilities and placing them in ways that define and protect bicyclist and pedestrian spaces.[45]

Step 4. Create Measures

Based on the research, available data, and discussions with the HIAWG, the planning team created the following measures to evaluate the BNP from a health perspective:

- Chronic disease (obesity, diabetes, hypertension, asthma)
- Mental health and depression
- Access to recreational, open space, trails, and physical activity areas
- Access to jobs, major employment centers, schools, and educational opportunities
- Crash frequency and severity

Indicators

Measure	Indicators Addressed				
Infrastructure and Mode Use					
Lane miles of shared use paths and separated bike facilities	●	●			●
Vehicle Miles Traveled (VMT)	●				
% of people who bike to school	●	●		●	
% of people who bike to work	●	●		●	
% of all trips made by bike	●			●	
Safety and Comfort					
% of streets comfortable for people of all ages and abilities (LTS 1 and 2)	●	●			●
Number of fatal and serious injury crashes					●
% of crashes that result in deaths or serious injuries					●
Total number of crashes					●
% of Population with Access to:					
Grocery stores and healthy food	●				
Medical centers and healthcare	●	●			
Parks / trails					
Tourist destinations			●		
Bikeshare facilities			●	●	
3 or more destinations		●			
Employment centers				●	
Transit stops				●	
K-8 schools				●	
Colleges / Universities				●	
Environmental					
Greenhouse gas emissions (Estimated annual metric tons of CO2 emissions per capita)	●				

CHAPTER 5. STATE OF HEALTH INDICATORS TODAY

HEALTH INDICATORS: WHERE ARE WE TODAY?

To provide a baseline for the evaluation of health impacts, statistics were identified for each of the measures identified in the previous section. Data on the health of San Antonians in each City Council District was pulled at several scales to understand if and where disparities exist. Additionally, the data was pulled at the Citywide level, the County, and the State, where available. The Baseline Citywide data can be seen below, and the data for each District can be found on the following pages. The methodology and sources for each indicator can be found in the Appendix.

Metric	Prevalence in San Antonio Today
Infrastructure and Mode Use	
Lane miles of shared use paths and separated bike facilities	221.9
Average daily residential vehicle miles traveled (VMT) per capita	19.8
% of people who bike to school	1.6%
% of people who bike to work	0.2%
% of all trips made by bike	0.5%
Safety and Comfort	
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	74%
Number of fatal and serious injury pedestrian and/or bicycle crashes*	834
% of pedestrian and/or bicycle crashes that result in deaths or serious injuries*	20%
Total number of pedestrian and/or bicycle crashes*	4228
% of Population with Access to:	
Grocery stores and healthy food	50%
Medical centers and healthcare	14%
Parks / trails	62%
Tourist destinations	7%
Bikeshare facilities	8%
3 or more destinations	48%
Employment centers	49%
Transit stops	73%
K-8 schools	69%
Colleges / Universities	13%
Environmental	
Estimated annual metric tons of CO_2 emissions per capita	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .

CITY COUNCIL DISTRICT 1

Covering 28.9 square miles, District 1 is a slender geographic area that covers most of the city's north-central area and the downtown core. Major destinations include downtown San Antonio, the Alamo, the Pearl, Trinity University, San Antonio College, and numerous community centers, parks, libraries, and transit centers.

District 1 at a Glance

Demographic	District 1	San Antonio	Texas	United States
Total Population	141,216	1,434,540	28,862,581	329,725,481
Median Age	35.8	33.9	35.0	38.4
Median Household Income	$29,628	$55,084	$67,321	$69,021
Population Age < 18	20.9%	24.6%	25.8%	22.5%
Population with Disabilities	14.7%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	78.2%	76.9%	59.3%	40.6%
Households with No Vehicles	11.8%	3.2%	2.2%	4.2%

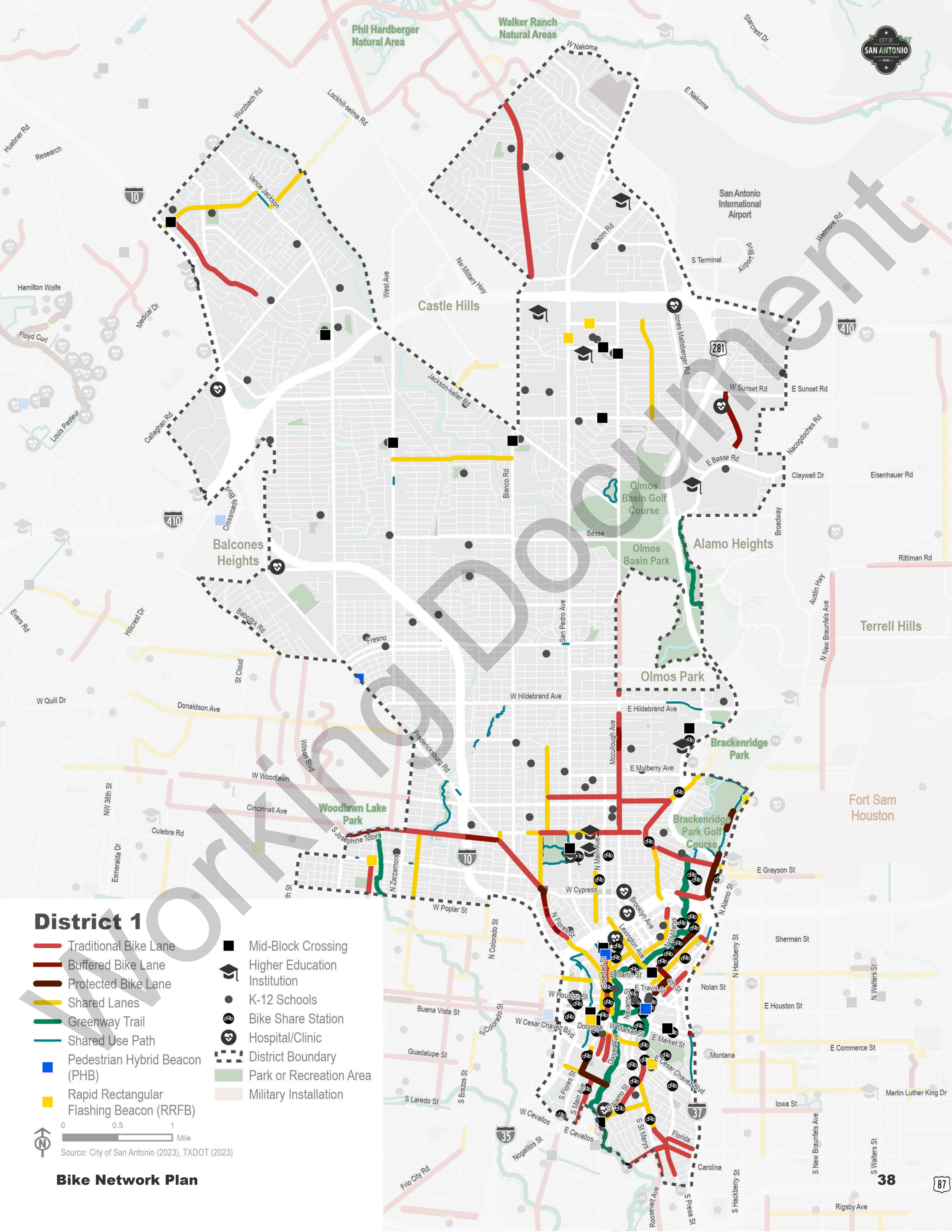
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 1	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	18.6	221.9
Average daily residential vehicle miles traveled (VMT) per capita	17.5	19.8
% of people who bike to school	1.4%	1.6%
% of people who bike to work	0.5%	0.2%
% of all trips made by bike	0.1%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	79%	74%
Number of fatal and serious injury crashes*	136	834
% of crashes that result in deaths or serious injuries*	16%	20%
Total number of crashes*	870	4,228
% of Population with Access to:		
Grocery stores and healthy food	89%	50%
Medical centers and healthcare	34%	14%
Parks / trails	83%	62%
Tourist destinations	14%	7%
Bikeshare facilities	23%	8%
3 or more destinations	83%	48%
Employment centers	83%	49%
Transit stops	99%	73%
K-8 schools	93%	69%
Colleges / Universities	33%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	2.5	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 1
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
Bike Network Plan
CITY OF SAN ANTONIO TEXAS
Phil Hardberger Natural Area
Walker Ranch Natural Areas
W Nakoma
E Nakoma
Starcrest Dr
Wurzbach Rd
Lockhill-selma Rd
Huebner Rd
Research
Vance Jackson
San Antonio International Airport
Wetmore Rd
S Terminal
Airport Blvd
Isom Rd
Nw Military Hwy
West Ave
Castle Hills
Hamilton Wolfe
Medical Dr
Floyd Curl
Louis Pasteur
Callaghan Rd
Jackson-keller Rd
Jones Maltsberger Rd
W Sunset Rd
E Sunset Rd
Nacogdoches Rd
E Basse Rd
Claywell Dr
Eisenhauer Rd
Blanco Rd
Olmos Basin Golf Course
Basse
Crossroads Blvd
Balcones Heights
Alamo Heights
Olmos Basin Park
Broadway
Rittiman Rd
Austin Hwy
N New Braunfels Ave
Terrell Hills
Evers Rd
Hillcrest Dr
Babcock Rd
Fresno
San Pedro Ave
St Cloud
Olmos Park
W Quill Dr
Donaldson Ave
W Hildebrand Ave
E Hildebrand Ave
Wilson Blvd
Fredericksburg Rd
Mccullough Ave
Brackenridge Park
E Mulberry Ave
W Woodlawn
NW 36th St
Cincinnati Ave
Woodlawn Lake Park
Fort Sam Houston
Culebra Rd
S Josephine Tobin
Brackenridge Park Golf Course
Esmeralda Dr
N Zarzamora
N Main Ave
E Grayson St
W Cypress
W Poplar St
N Flores St
Brooklyn Ave
N Alamo St
N Colorado St
Lexington Ave
N St Marys
Sherman St
N Hackberry St
Soledad St
E Martin St
E Travis St
W Houston St
Navarro St
Nolan St
E Houston St
N Walters St
Buena Vista St
S Colorado St
W Cesar Chavez Blvd
Dolorosa
W Market St
E Market St
Guadalupe St
Dwyer Ave
Montana
E Commerce St
E Cesar Chavez Blvd
S Brazos St
S Laredo St
S Flores St
S Main Ave
S Alamo St
Iowa St
Martin Luther King Dr
W Cevallos
E Cevallos
S St Marys
Florida
Nogalitos St
Frio City Rd
Carolina
S New Braunfels Ave
S Walters St
Roosevelt Ave
S Presa St
S Hackberry St
Rigsby Ave
10
410
281
35
37
87

CITY COUNCIL DISTRICT 2

Covering 56 square miles, District 2 covers most of the city's north-east area. Major destinations include St. Phillip's College, University of the Incarnate Word, The Espee, Hays Street Bridge, the AT&T Center and Freeman Coliseum, and numerous community centers, parks, and libraries.

District 2 At a Glance

Demographic	District 2	San Antonio	Texas	United States
Total Population	143,204	1,434,540	28,862,581	329,725,481
Median Age	31.2	33.9	35.0	38.4
Median Household Income	$23,056	$55,084	$67,321	$69,021
Population Age < 18	27.0%	24.6%	25.8%	22.5%
Population with Disabilities	17.0%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	81.8%	76.9%	59.3%	40.6%
Households with No Vehicles	9.9%	3.2%	2.2%	4.2%

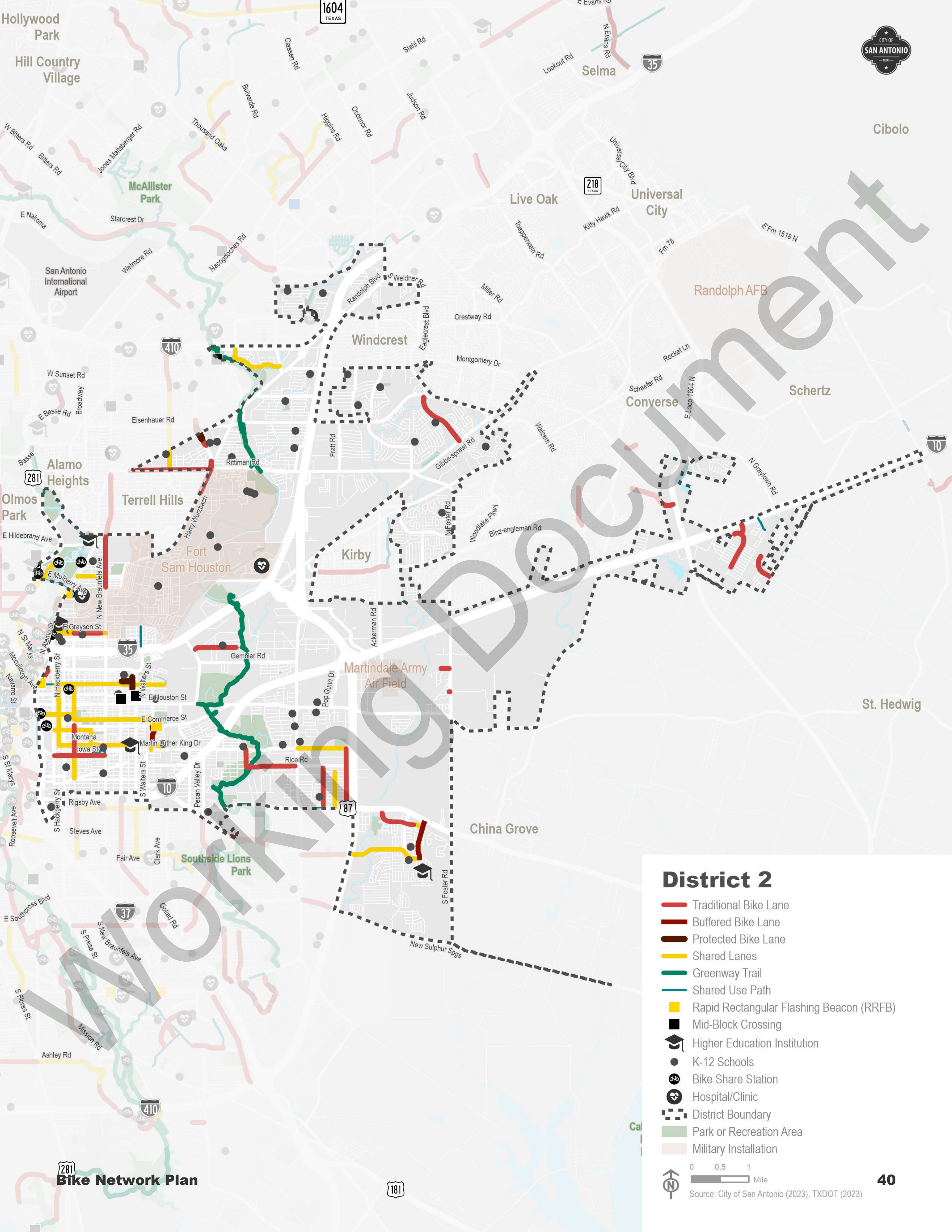
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 2	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	12.9	221.9
Average daily residential vehicle miles traveled (VMT) per capita	19.5	19.8
% of people who bike to school	4.7%	1.6%
% of people who bike to work	0.2%	0.2%
% of all trips made by bike	1.0%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	76%	74%
Number of fatal and serious injury crashes*	129	834
% of crashes that result in deaths or serious injuries*	25%	20%
Total number of crashes*	512	4,228
% of Population with Access to:		
Grocery stores and healthy food	46%	50%
Medical centers and healthcare	11%	14%
Parks / trails	69%	62%
Tourist destinations	18%	7%
Bikeshare facilities	20%	8%
3 or more destinations	45%	48%
Employment centers	58%	49%
Transit stops	88%	73%
K-8 schools	70%	69%
Colleges / Universities	12%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	2.8	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 2
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
CITY OF SAN ANTONIO
Hollywood Park
Hill Country Village
McAllister Park
San Antonio International Airport
Alamo Heights
Olmos Park
Terrell Hills
Fort Sam Houston
Windcrest
Kirby
Live Oak
Universal City
Selma
Cibolo
Converse
Schertz
Randolph AFB
Martindale Army Air Field
St. Hedwig
China Grove
Southside Lions Park
Rittiman Rd
Gembler Rd
Rice Rd
E Houston St
E Commerce St
Martin Luther King Dr
Montana
Iowa St
E Grayson St
E Mulberry Ave
N New Braunfels Ave
Harry Wurzbach
Eisenhauer Rd
Nacogdoches Rd
Wetmore Rd
Starcrest Dr
Thousand Oaks
Bulverde Rd
Higgins Rd
Oconnor Rd
Judson Rd
Stahl Rd
Classen Rd
Lookout Rd
N Evans Rd
Universal City Blvd
Kitty Hawk Rd
Toepperwein Rd
Fm 78
E Fm 1518 N
Miller Rd
Crestway Rd
Weidner Rd
Randolph Blvd
Eaglecrest Blvd
Montgomery Dr
Schaefer Rd
Rocket Ln
E Loop 1604 N
Walzem Rd
Gibbs-sprawl Rd
Woodlake Pkwy
Binz-engleman Rd
N Foster Rd
N Graytown Rd
Fratt Rd
Ackerman Rd
Pop Gunn Dr
Pecan Valley Dr
S Walters St
N Walters St
N Hackberry St
S Hackberry St
Rigsby Ave
Steves Ave
Fair Ave
Clark Ave
Goliad Rd
S New Braunfels Ave
S Presa St
S Flores St
Mission Rd
Ashley Rd
E Southcross Blvd
Roosevelt Ave
S St Marys
N St Marys
N Alamo St
Mccullough Ave
Navarro St
E Hildebrand Ave
Basse
E Basse Rd
Broadway
W Sunset Rd
E Nakoma
W Bitters Rd
Bitters Rd
Jones Maltsberger Rd
New Sulphur Spgs
S Foster Rd

CITY COUNCIL DISTRICT 3

Covering 77.3 square miles, District 3 covers most of the city's southern area. Major destinations include Texas A&M University – San Antonio, UIW School of Osteopathic Medicine, Mission Marquee Plaza, Stinson Municipal Airport, and numerous community centers, parks, libraries, and transit centers.

District 3 At a Glance

Demographic	District 3	San Antonio	Texas	United States
Total Population	140,887	1,434,540	28,862,581	329,725,481
Median Age	33.85	33.9	35.0	38.4
Median Household Income	$20,856	$55,084	$67,321	$69,021
Population Age < 18	26.0%	24.6%	25.8%	22.5%
Population with Disabilities	19.5%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	88.1%	76.9%	59.3%	40.6%
Households with No Vehicles	12.1%	3.2%	2.2%	4.2%

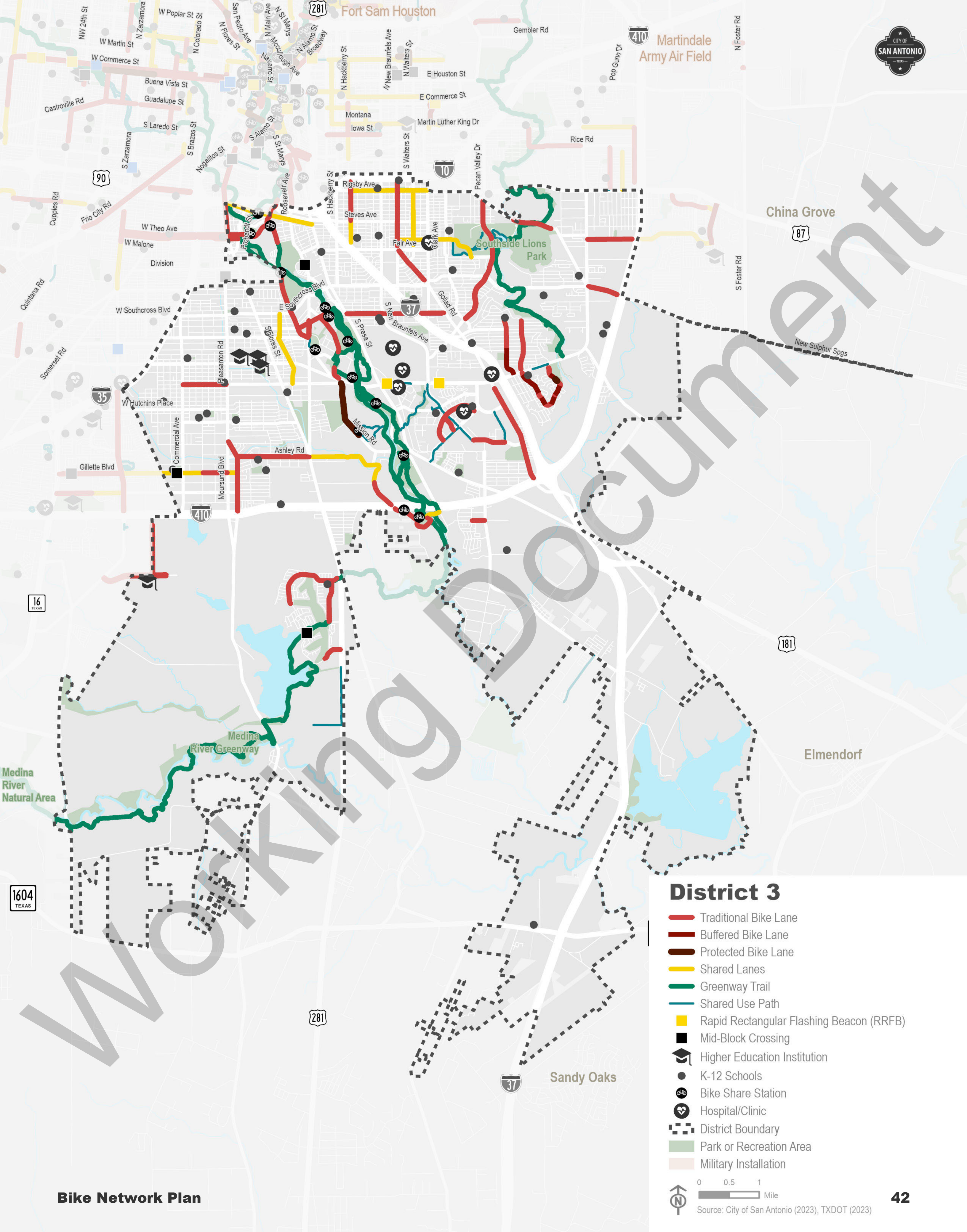
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 3	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	48.6	221.9
Average daily residential vehicle miles traveled (VMT) per capita	19.8	19.8
% of people who bike to school	0.3%	1.6%
% of people who bike to work	0.2%	0.2%
% of all trips made by bike	0.3%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	77%	74%
Number of fatal and serious injury crashes*	86	834
% of crashes that result in deaths or serious injuries*	17%	20%
Total number of crashes*	515	4228
% of Population with Access to:		
Grocery stores and healthy food	70%	50%
Medical centers and healthcare	28%	14%
Parks / trails	84%	62%
Tourist destinations	9%	7%
Bikeshare facilities	20%	8%
3 or more destinations	73%	48%
Employment centers	46%	49%
Transit stops	88%	73%
K-8 schools	80%	69%
Colleges / Universities	18%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	2.9	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 3
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
CITY OF SAN ANTONIO TEXAS
Fort Sam Houston
Martindale Army Air Field
China Grove
Elmendorf
Sandy Oaks
Southside Lions Park
Medina River Greenway
Medina River Natural Area
W Poplar St
W Martin St
W Commerce St
Buena Vista St
Guadalupe St
Castroville Rd
S Laredo St
S Brazos St
Nogalitos St
S Zarzamora
Frio City Rd
Cupples Rd
W Theo Ave
W Malone
Division
Quintana Rd
W Southcross Blvd
Somerset Rd
W Hutchins Place
Commercial Ave
Gillette Blvd
Moursund Blvd
Pleasanton Rd
Ashley Rd
S Flores St
E Southcross Blvd
Mission Rd
S Presa St
S New Braunfels Ave
Goliad Rd
Pecan Valley Dr
Rigsby Ave
Steves Ave
Fair Ave
Clark Ave
S Hackberry St
S Walters St
Roosevelt Ave
S Alamo St
S St Marys
E Houston St
E Commerce St
Montana
Iowa St
Martin Luther King Dr
Rice Rd
Gembler Rd
Pop Gunn Dr
N Foster Rd
S Foster Rd
New Sulphur Spgs
N Hackberry St
N New Braunfels Ave
N Walters St
NW 24th St
N Zarzamora
N Colorado St
N Flores St
San Pedro Ave
N Main Ave
N St Marys
Navarro St
Mccullough Ave
N Alamo St
Broadway
281
410
10
37
90
35
87
181
16
1604

CITY COUNCIL DISTRICT 4

Covering 59.8 square miles, District 4 covers most of the city's south-west area. Major destinations include Palo Alto College, The Baptist University of the Americas, Port San Antonio, Kelly Field, numerous parks, and few community centers and libraries.

District 4 At a Glance

Demographic	District 4	San Antonio	Texas	United States
Total Population	135,763	1,434,540	28,862,581	329,725,481
Median Age	31.50	33.9	35.0	38.4
Median Household Income	$20,747	$55,084	$67,321	$69,021
Population Age < 18	29.6%	24.6%	25.8%	22.5%
Population with Disabilities	18.0%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	88.2%	76.9%	59.3%	40.6%
Households with No Vehicles	4.9%	3.2%	2.2%	4.2%

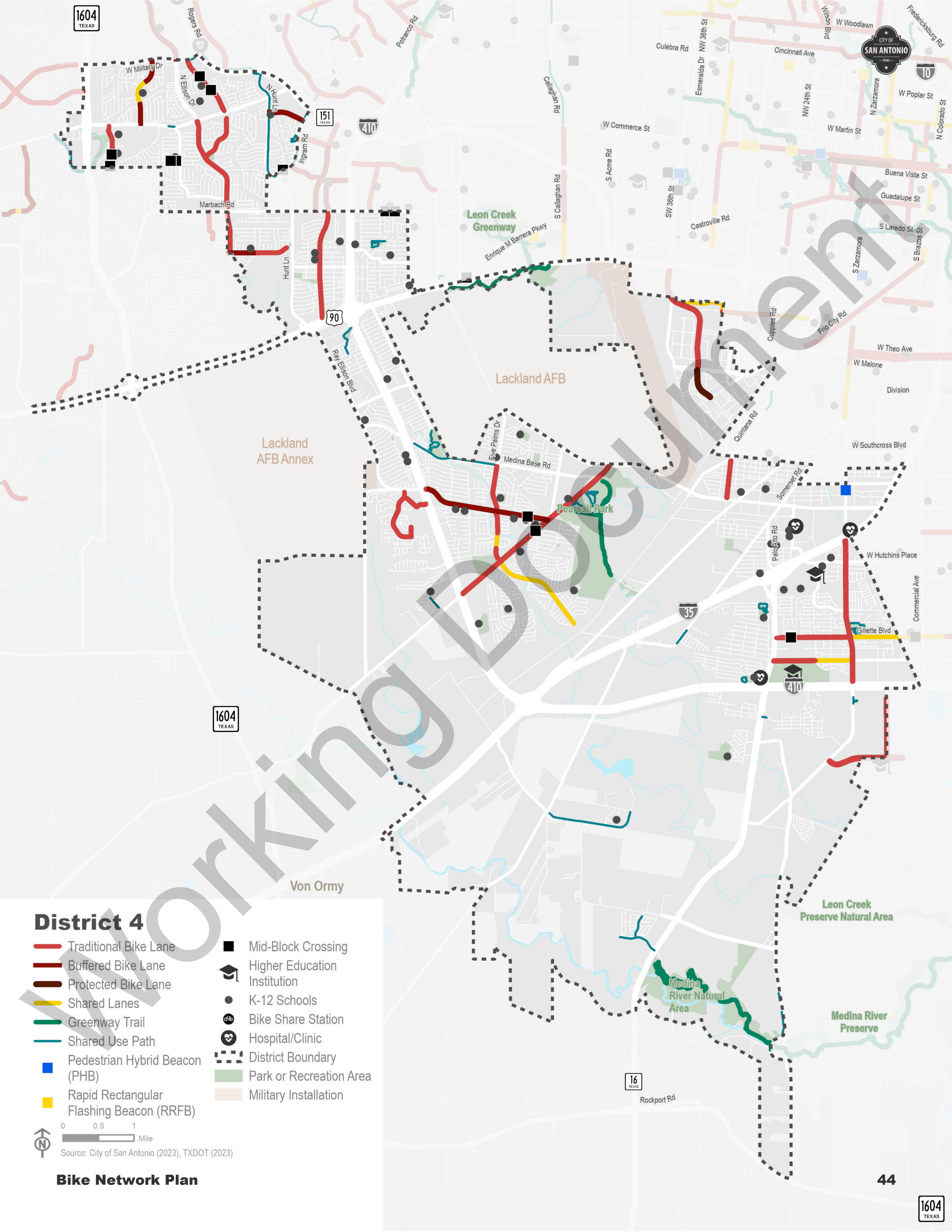
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 4	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	15.3	221.9
Average daily residential vehicle miles traveled (VMT) per capita	21.4	19.8
% of people who bike to school	1.2%	1.6%
% of people who bike to work	0.1%	0.2%
% of all trips made by bike	0.3%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	70%	74%
Number of fatal and serious injury crashes*	80	834
% of crashes that result in deaths or serious injuries*	24%	20%
Total number of crashes*	327	4228
% of Population with Access to:		
Grocery stores and healthy food	48%	50%
Medical centers and healthcare	<.1%	14%
Parks / trails	68%	62%
Tourist destinations	<.1%	7%
Bikeshare facilities	<.1%	8%
3 or more destinations	47%	48%
Employment centers	38%	49%
Transit stops	77%	73%
K-8 schools	78%	69%
Colleges / Universities	6%	13%
Environmental		
Estimated annual metric tons of CO_2 emissions per capita	3.1	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred.



Bike Network Plan

CITY COUNCIL DISTRICT 5

Covering 23.9 square miles, District 5 covers most of the city's west-central area. Major destinations include the University of Texas at San Antonio – Downtown Campus, Our Lady of the Lake University, Blue Star Arts Complex, Guadalupe Cultural Arts Center, and numerous community centers, parks, libraries, and one transit center.

District 5 At a Glance

Demographic	District 5	San Antonio	Texas	United States
Total Population	141,149	1,434,540	28,862,581	329,725,481
Median Age	33.46	33.9	35.0	38.4
Median Household Income	$17,234	$55,084	$67,321	$69,021
Population Age < 18	27.3%	24.6%	25.8%	22.5%
Population with Disabilities	20.2%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	95.2%	76.9%	59.3%	40.6%
Households with No Vehicles	14.7%	3.2%	2.2%	4.2%

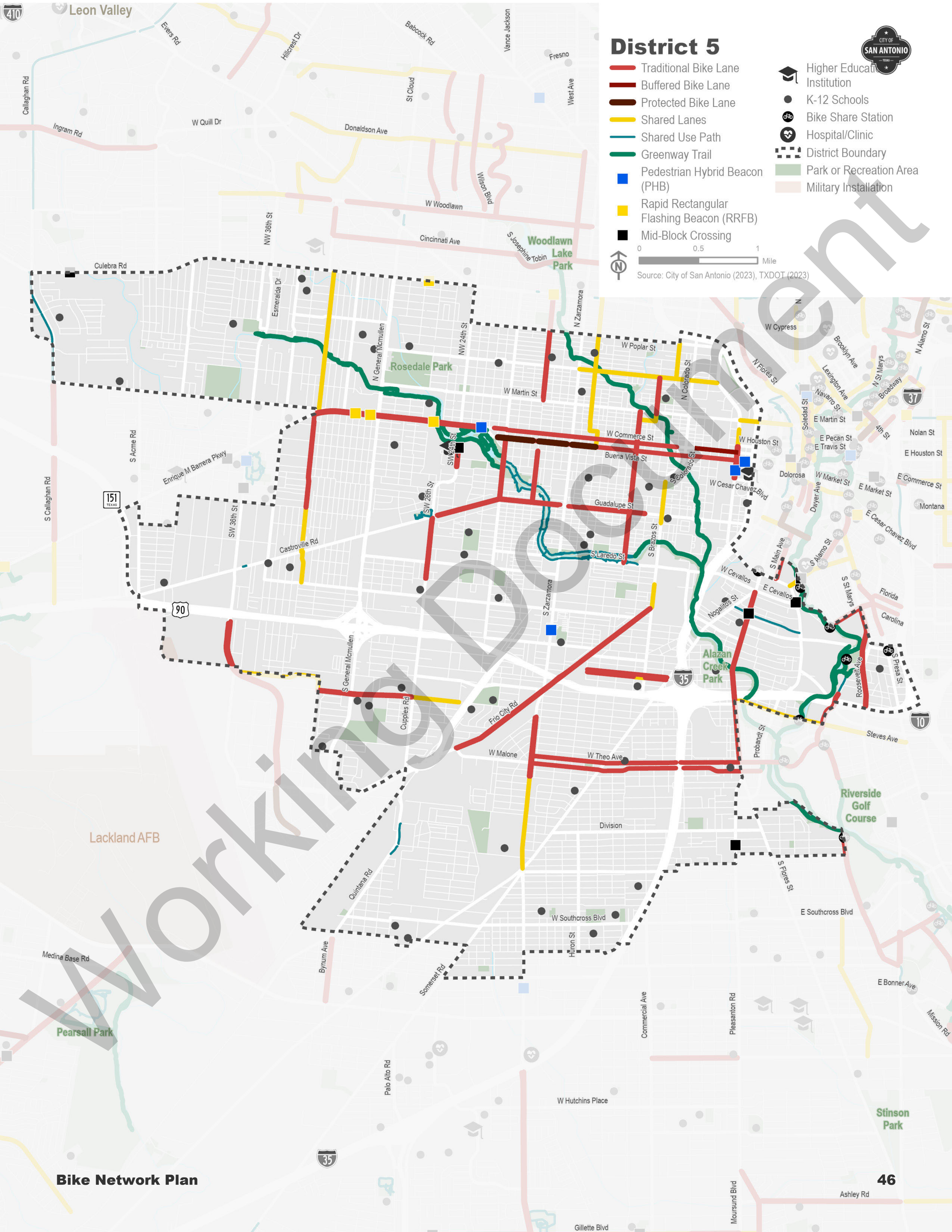
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 5	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	22.1	221.9
Average daily residential vehicle miles traveled (VMT) per capita	15.5	19.8
% of people who bike to school	1.3%	1.6%
% of people who bike to work	0.2%	0.2%
% of all trips made by bike	0.5%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	83%	74%
Number of fatal and serious injury crashes	121	834
% of crashes that result in deaths or serious injuries	19%	20%
Total number of crashes	629	4,228
% of Population with Access to:		
Grocery stores and healthy food	86%	50%
Medical centers and healthcare	7%	14%
Parks / trails	92%	62%
Tourist destinations	13%	7%
Bikeshare facilities	22%	8%
3 or more destinations	89%	48%
Employment centers	76%	49%
Transit stops	95%	73%
K-8 schools	95%	69%
Colleges / Universities	8%	13%
Environmental		
Estimated annual metric tons of CO_2 emissions per capita	2.2	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 5
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Shared Use Path
Greenway Trail
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0
0.5
1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
CITY OF SAN ANTONIO TEXAS
Leon Valley
Rosedale Park
Woodlawn Lake Park
Alazan Creek Park
Riverside Golf Course
Lackland AFB
Pearsall Park
Stinson Park
Culebra Rd
W Commerce St
Buena Vista St
W Martin St
W Poplar St
Guadalupe St
Castroville Rd
Frio City Rd
W Malone
W Theo Ave
Division
W Southcross Blvd
E Southcross Blvd
Steves Ave
S Zarzamora
N Zarzamora
S General Mcmullen
N General Mcmullen
Quintana Rd
Somerset Rd
Enrique M Barrera Pkwy
S Callaghan Rd
S Acme Rd
W Cesar Chavez Blvd
S Laredo St
S Flores St
Probandt St
Cupples Rd
Nogalitos St
W Cevallos
E Cevallos

CITY COUNCIL DISTRICT 6

Covering 55.2 square miles, District 6 covers most of the city's north-west area. Major destinations include Northwest Vista college, Hallmark University, Culebra Park Greenway, BCFS Health and Human Service-San Antonio South Texas Centre, Nelson W. Wolff Municipal Stadium, numerous parks, and few community centers, libraries, and transit centers.

District 6 At a Glance

Demographic	District 6	San Antonio	Texas	United States
Total Population	160,305	1,434,540	28,862,581	329,725,481
Median Age	31.70	33.9	35.0	38.4
Median Household Income	$27,666	$55,084	$67,321	$69,021
Population Age < 18	26.6%	24.6%	25.8%	22.5%
Population with Disabilities	12.4%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	81.4%	76.9%	59.3%	40.6%
Households with No Vehicles	3.9%	3.2%	2.2%	4.2%

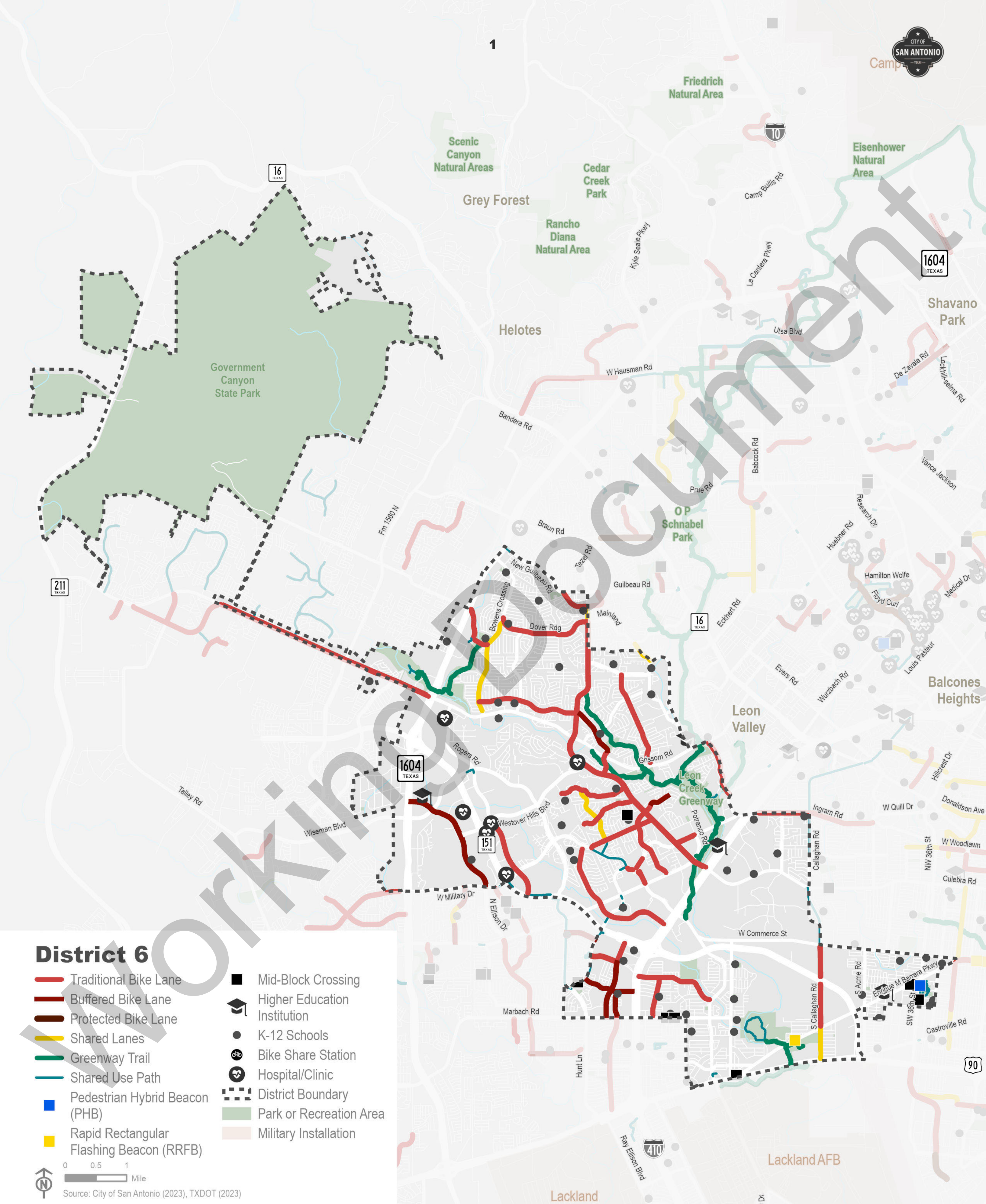
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 6	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	19.9	221.9
Average daily residential vehicle miles traveled (VMT) per capita	20.5	19.8
% of people who bike to school	1.2%	1.6%
% of people who bike to work	0.1%	0.2%
% of all trips made by bike	0.4%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	65%	74%
Number of fatal and serious injury crashes*	59	834
% of crashes that result in deaths or serious injuries*	20%	20%
Total number of crashes*	289	4228
% of Population with Access to:		
Grocery stores and healthy food	37%	50%
Medical centers and healthcare	9%	14%
Parks / trails	48%	62%
Tourist destinations	0%	7%
Bikeshare facilities	0%	8%
3 or more destinations	34%	48%
Employment centers	36%	49%
Transit stops	68%	73%
K-8 schools	66%	69%
Colleges / Universities	9%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	3.0	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 6
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
1
Friedrich Natural Area
Scenic Canyon Natural Areas
Cedar Creek Park
Grey Forest
Rancho Diana Natural Area
Eisenhower Natural Area
Government Canyon State Park
Helotes
Shavano Park
O P Schnabel Park
Leon Valley
Balcones Heights
Leon Creek Greenway
Lackland AFB
Lackland AFB Annex
Camp Bullis Rd
Kyle Seale Pkwy
La Cantera Pkwy
Utsa Blvd
W Hausman Rd
De Zavala Rd
Lockhill-selma Rd
Bandera Rd
Babcock Rd
Vance Jackson
Prue Rd
Research Dr
Fm 1560 N
Braun Rd
Huebner Rd
New Guilbeau Rd
Tezel Rd
Guilbeau Rd
Hamilton Wolfe
Floyd Curl
Medical Dr
Bowens Crossing
Dover Rdg
Mainland
Eckhert Rd
Louis Pasteur
Evers Rd
Wurzbach Rd
Grissom Rd
Rogers Rd
Talley Rd
Wiseman Blvd
Westover Hills Blvd
Potranco Rd
Ingram Rd
W Quill Dr
Hillcrest Dr
Donaldson Ave
W Woodlawn
NW 36th St
Culebra Rd
Callaghan Rd
W Military Dr
N Ellison Dr
W Commerce St
S Acme Rd
Enrique M Barrera Pkwy
SW 36th St
Castroville Rd
S Callaghan Rd
Marbach Rd
Hunt Ln
Ray Ellison Blvd
Five Palms Dr
Medina Base Rd
10
16
1604
211
151
410
90
Working Document

CITY COUNCIL DISTRICT 7

Covering 30.4 square miles, District 7 covers a slender portion of the city's north-west area. Major destinations include St. Mary's University, Woodlawn Lake, numerous parks, and few community centers, libraries, and transit centers.

District 7 At a Glance

Demographic	District 7	San Antonio	Texas	United States
Total Population	152,551	1,434,540	28,862,581	329,725,481
Median Age	35.23	33.9	35.0	38.4
Median Household Income	$29,146	$55,084	$67,321	$69,021
Population Age < 18	22.6%	24.6%	25.8%	22.5%
Population with Disabilities	14.7%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	74.5%	76.9%	59.3%	40.6%
Households with No Vehicles	8.0%	3.2%	2.2%	4.2%

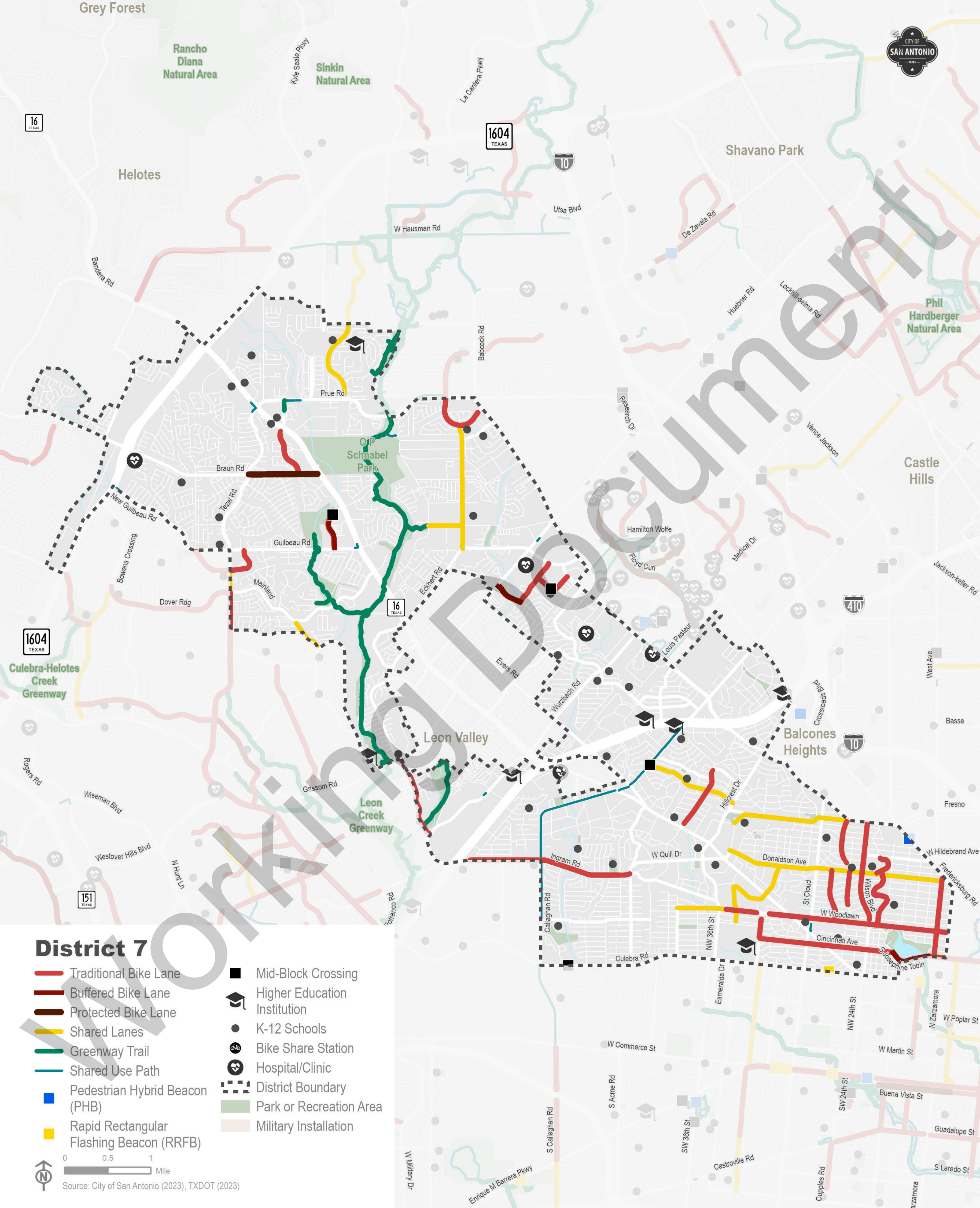
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 7	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	15.0	221.9
Average daily residential vehicle miles traveled (VMT) per capita	18.9	19.8
% of people who bike to school	1.9%	1.6%
% of people who bike to work	0.3%	0.2%
% of all trips made by bike	0.6%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	85%	74%
Number of fatal and serious injury crashes*	85	834
% of crashes that result in deaths or serious injuries*	25%	20%
Total number of crashes*	335	4228
% of Population with Access to:		
Grocery stores and healthy food	53%	50%
Medical centers and healthcare	15%	14%
Parks / trails	44%	62%
Tourist destinations	7%	7%
Bikeshare facilities	0%	8%
3 or more destinations	47%	48%
Employment centers	52%	49%
Transit stops	69%	73%
K-8 schools	67%	69%
Colleges / Universities	30%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	2.7	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 7
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
City of San Antonio Texas
Grey Forest
Rancho Diana Natural Area
Sinkin Natural Area
Helotes
Shavano Park
Phil Hardberger Natural Area
Castle Hills
Balcones Heights
Leon Valley
Leon Creek Greenway
Culebra-Helotes Creek Greenway
O.P. Schnabel Park
Lackland AFB
Kyle Seale Pkwy
La Cantera Pkwy
W Hausman Rd
Utsa Blvd
De Zavala Rd
Bandera Rd
Babcock Rd
Huebner Rd
Lockhill-selma Rd
Research Dr
Vance Jackson
Hamilton Wolfe
Floyd Curl
Medical Dr
Jackson-keller Rd
Prue Rd
Braun Rd
New Guilbeau Rd
Tezel Rd
Guilbeau Rd
Bowens Crossing
Mainland
Dover Rdg
Eckhert Rd
Evers Rd
Louis Pasteur
Wurzbach Rd
Crossroads Blvd
West Ave
Basse
Fresno
Grissom Rd
Rogers Rd
Wiseman Blvd
Westover Hills Blvd
N Hunt Ln
Potranco Rd
Hillcrest Dr
W Quill Dr
Ingram Rd
Donaldson Ave
W Hildebrand Ave
Fredericksburg Rd
St Cloud
Wilson Blvd
W Woodlawn
Cincinnati Ave
S Josephine Tobin
Callaghan Rd
NW 36th St
Culebra Rd
Esmeralda Dr
NW 24th St
N Zarzamora
W Poplar St
W Commerce St
W Martin St
S Acme Rd
SW 24th St
Buena Vista St
Guadalupe St
S Callaghan Rd
SW 36th St
Castroville Rd
Cupples Rd
S Laredo St
W Military Dr
Enrique M Barrera Pkwy
Frio City Rd
Zarzamora
16
1604
10
410
151
90

CITY COUNCIL DISTRICT 8

Covering 52.4 square miles, District 8 covers most of the city's north area. Major destinations include The University of Texas at San Antonio Main Campus, UT Health San Antonio, The Art Institute of San Antonio, Phil Hardberger Park Land Bridge, South Texas Medical Center, numerous parks, and two libraries.

District 8 At a Glance

Demographic	District 8	San Antonio	Texas	United States
Total Population	145,169	1,434,540	28,862,581	329,725,481
Median Age	30.60	33.9	35.0	38.4
Median Household Income	$37,461	$55,084	$67,321	$69,021
Population Age < 18	20.2%	24.6%	25.8%	22.5%
Population with Disabilities	10.7%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	66.5%	76.9%	59.3%	40.6%
Households with No Vehicles	4.6%	3.2%	2.2%	4.2%

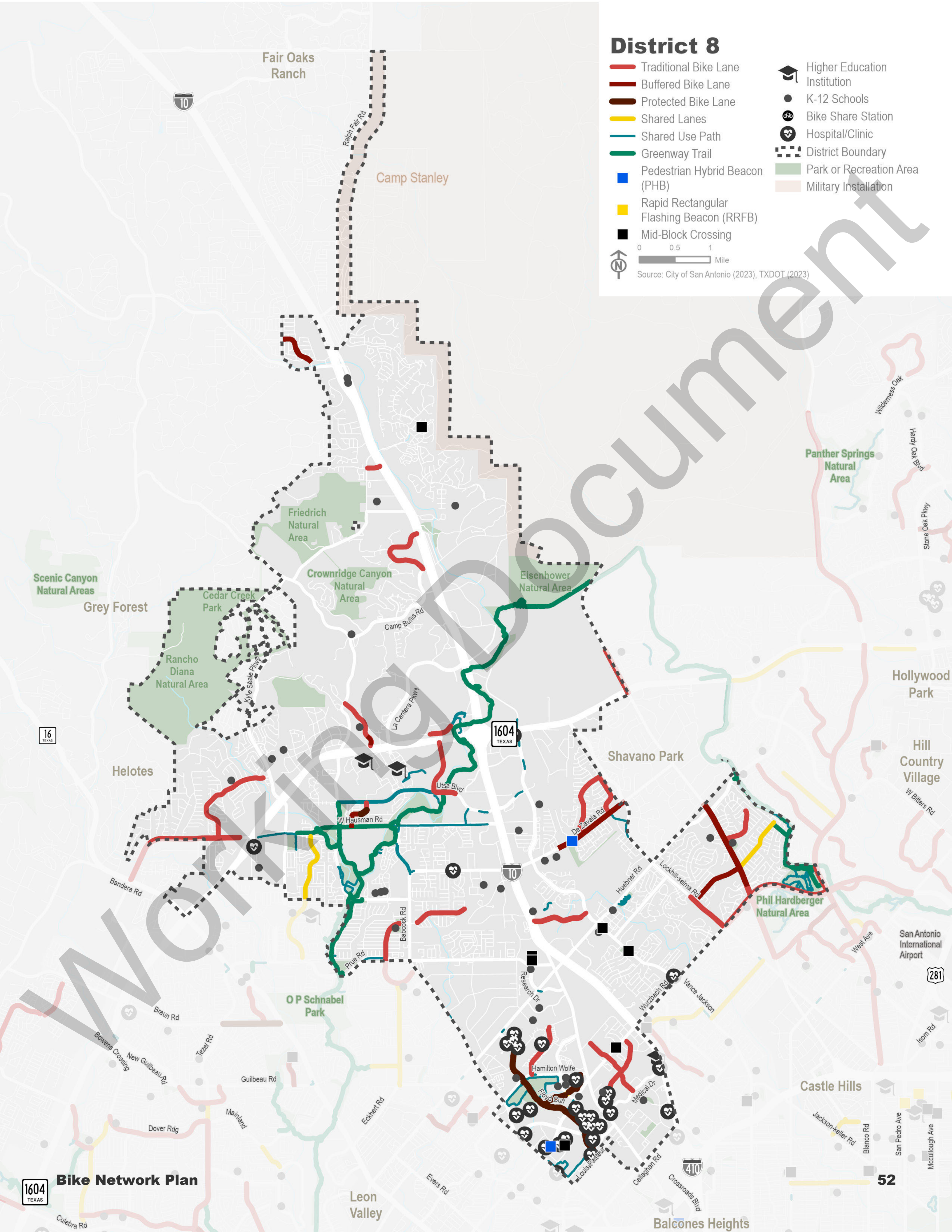
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 8	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	35.6	221.9
Average daily residential vehicle miles traveled (VMT) per capita	20.6	19.8
% of people who bike to school	1.0%	1.6%
% of people who bike to work	0.2%	0.2%
% of all trips made by bike	0.5%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	67%	74%
Number of fatal and serious injury crashes*	57	834
% of crashes that result in deaths or serious injuries*	17%	20%
Total number of crashes*	326	4228
% of Population with Access to:		
Grocery stores and healthy food	21%	50%
Medical centers and healthcare	14%	14%
Parks / trails	27%	62%
Tourist destinations	3%	7%
Bikeshare facilities	<.1%	8%
3 or more destinations	18%	48%
Employment centers	32%	49%
Transit stops	50%	73%
K-8 schools	38%	69%
Colleges / Universities	6%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	3.0	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 8
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Shared Use Path
Greenway Trail
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
Fair Oaks Ranch
Camp Stanley
Ralph Fair Rd
Friedrich Natural Area
Crownridge Canyon Natural Area
Eisenhower Natural Area
Scenic Canyon Natural Areas
Grey Forest
Cedar Creek Park
Rancho Diana Natural Area
Kyle Seale Pkwy
Camp Bullis Rd
La Cantera Pkwy
Helotes
Utsa Blvd
W Hausman Rd
Bandera Rd
Babcock Rd
Prue Rd
Shavano Park
De Zavala Rd
Huebner Rd
Lockhill-selma Rd
Phil Hardberger Natural Area
Panther Springs Natural Area
Wilderness Oak
Hardy Oak Blvd
Stone Oak Pkwy
Hollywood Park
Hill Country Village
W Bitters Rd
San Antonio International Airport
West Ave
Research Dr
Wurzbach Rd
Vance Jackson
Hamilton Wolfe
Floyd Curl
Medical Dr
Louis Pasteur
Callaghan Rd
Crossroads Blvd
O P Schnabel Park
Braun Rd
Tezel Rd
Bowens Crossing
New Guilbeau Rd
Guilbeau Rd
Mainland
Dover Rdg
Eckhert Rd
Evers Rd
Culebra Rd
Leon Valley
Balcones Heights
Castle Hills
Jackson-keller Rd
Blanco Rd
San Pedro Ave
Mccullough Ave
Isom Rd

CITY COUNCIL DISTRICT 9

Covering 47.9 square miles, District 9 covers the most northern portion of the city. Major destinations include San Antonio International Airport, Phil Hardberger Park Land Bridge, numerous parks, and three libraries.

District 9 At a Glance

Demographic	District 9	San Antonio	Texas	United States
Total Population	144,565	1,434,540	28,862,581	329,725,481
Median Age	37.55	33.9	35.0	38.4
Median Household Income	$47,275	$55,084	$67,321	$69,021
Population Age < 18	23.3%	24.6%	25.8%	22.5%
Population with Disabilities	10.2%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	54.7%	76.9%	59.3%	40.6%
Households with No Vehicles	4.5%	3.2%	2.2%	4.2%

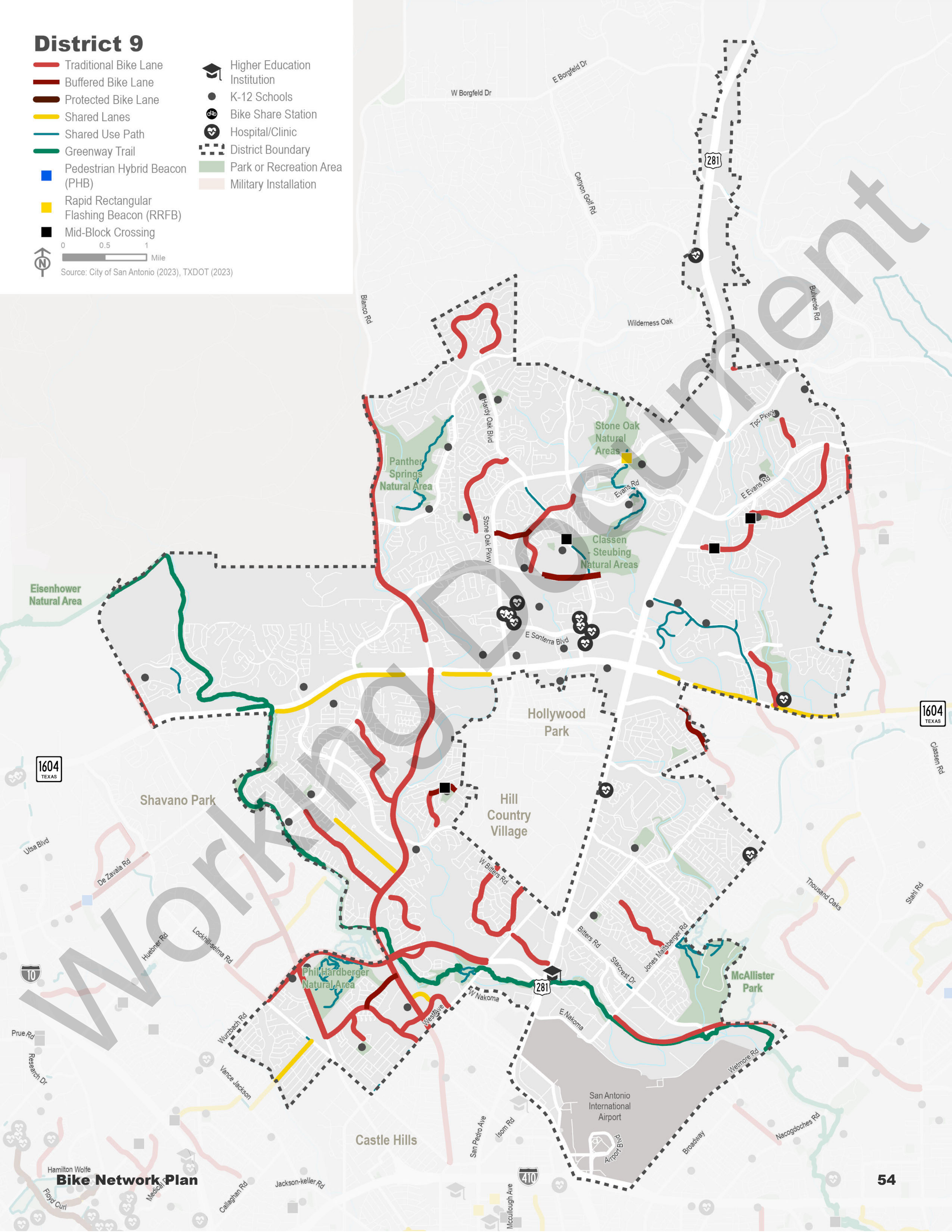
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

Health Indicators in the District Today

Metric	District 9	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	23.7	221.9
Average daily residential vehicle miles traveled (VMT) per capita	22.3	19.8
% of people who bike to school	0.4%	1.6%
% of people who bike to work	0.1%	0.2%
% of all trips made by bike	0.7%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	61%	74%
Number of fatal and serious injury crashes*	19	834
% of crashes that result in deaths or serious injuries*	11%	20%
Total number of crashes*	176	4228
% of Population with Access to:		
Grocery stores and healthy food	25%	50%
Medical centers and healthcare	4%	14%
Parks / trails	47%	62%
Tourist destinations	<.1%	7%
Bikeshare facilities	<.1%	8%
3 or more destinations	21%	48%
Employment centers	39%	49%
Transit stops	53%	73%
K-8 schools	46%	69%
Colleges / Universities	4%	13%
Environmental		
Estimated annual metric tons of CO2 emissions per capita	3.2	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .


District 9
Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Shared Use Path
Greenway Trail
Pedestrian Hybrid Beacon (PHB)
Rapid Rectangular Flashing Beacon (RRFB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
W Borgfeld Dr
E Borgfeld Dr
Canyon Golf Rd
Blanco Rd
Wilderness Oak
Bulverde Rd
Hardy Oak Blvd
Stone Oak Natural Areas
Panther Springs Natural Area
Tpc Pkwy
E Evans Rd
Evans Rd
Stone Oak Pkwy
Classen Steubing Natural Areas
Eisenhower Natural Area
E Sonterra Blvd
Hollywood Park
Shavano Park
Hill Country Village
W Bitters Rd
Bitters Rd
Starcrest Dr
Jones Maltsberger Rd
McAllister Park
Phil Hardberger Natural Area
W Nakoma
E Nakoma
Wetmore Rd
San Antonio International Airport
Airport Blvd
Utsa Blvd
De Zavala Rd
Huebner Rd
Lockhill-selma Rd
Wurzbach Rd
Vance Jackson
Prue Rd
Research Dr
Thousand Oaks
Stahl Rd
Classen Rd
Nacogdoches Rd
Broadway
Isom Rd
San Pedro Ave
Castle Hills
Hamilton Wolfe
Floyd Curl
Medical
Callaghan Rd
Jackson-keller Rd
Mccullough Ave
281
1604
10
410

CITY COUNCIL DISTRICT 10

Covering 50.2 square miles, District 10 covers most of the city's north-east area. Major destinations include Morgan's Wonderland, Toyota Field, Comanche Lookout, numerous parks, and few community centers and libraries.

District 10 At a Glance

Demographic	District 10	San Antonio	Texas	United States
Total Population	147,955	1,434,540	28,862,581	329,725,481
Median Age	36.16	33.9	35.0	38.4
Median Household Income	$34,113	$55,084	$67,321	$69,021
Population Age < 18	23.7%	24.6%	25.8%	22.5%
Population with Disabilities	13.1%	15.0%	11.4%	12.6%
Population Black/Indigenous/Person of Color	58.8%	76.9%	59.3%	40.6%
Households with No Vehicles	4.8%	3.2%	2.2%	4.2%

Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

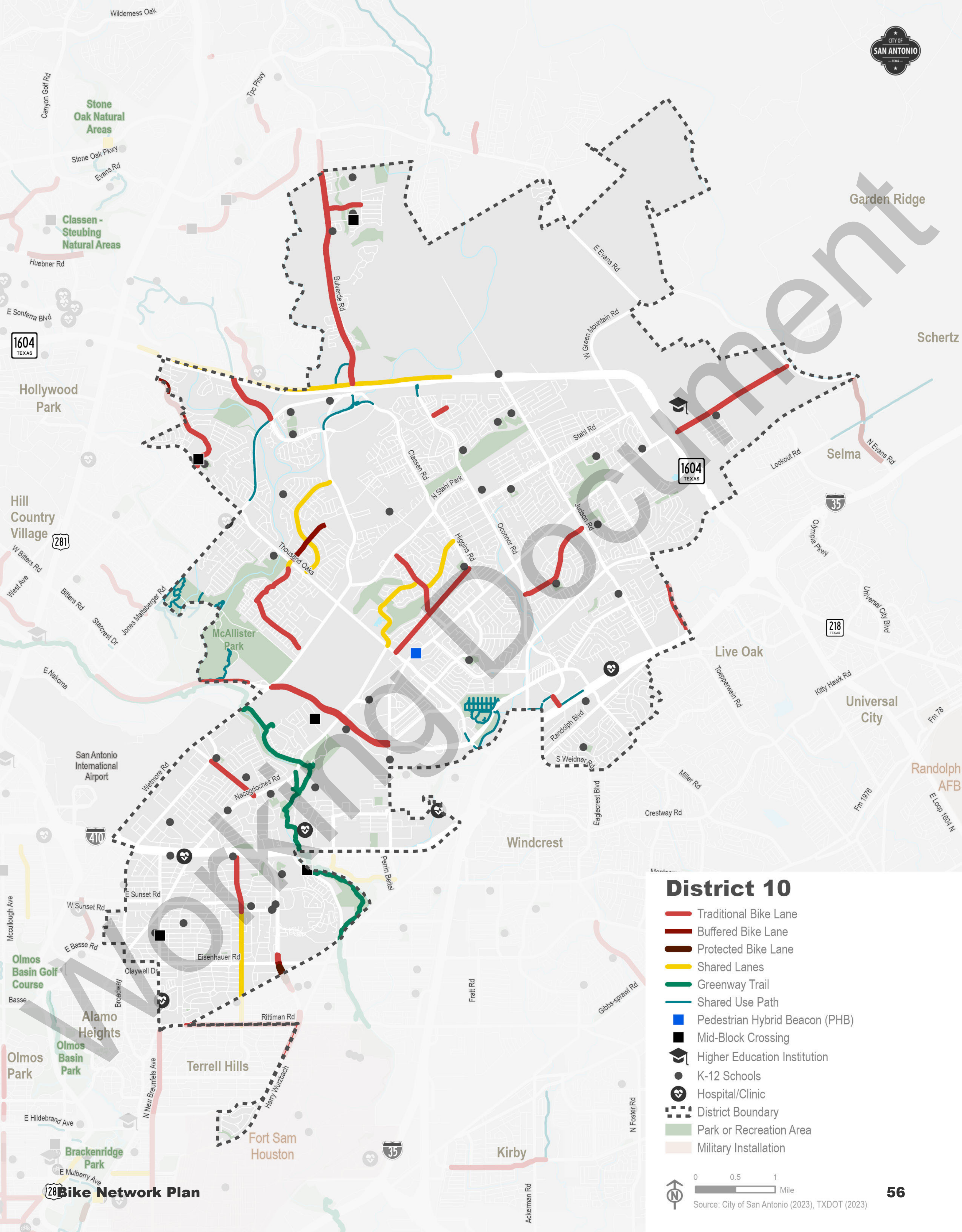
Health Indicators in the District Today

Metric	District 10	San Antonio
Infrastructure and Mode Use		
Lane miles of shared use paths and separated bike facilities	10.3	221.9
Average daily residential vehicle miles traveled (VMT) per capita	22.2	19.8
% of people who bike to school	3.3%	1.6%
% of people who bike to work	0.2%	0.2%
% of all trips made by bike	0.8%	0.5%
Safety and Comfort		
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	75%	74%
Number of fatal and serious injury crashes*	62	834
% of crashes that result in deaths or serious injuries*	25%	20%
Total number of crashes*	249	4228
% of Population with Access to:		
Grocery stores and healthy food	30%	50%
Medical centers and healthcare	14%	14%
Parks / trails	61%	62%
Tourist destinations	5%	7%
Bikeshare facilities	<.1%	8%
3 or more destinations	28%	48%
Employment centers	38%	49%
Transit stops	48%	73%
K-8 schools	60%	69%
Colleges / Universities	<.1%	13%
Environmental		
Estimated annual metric tons of CO_2 emissions per capita	3.2	2.9

Source: U.S. Census Bureau, ACS 2021 5-year Estimates, Replica 2022, TXDOT CRIS 2018-2022

* Pedestrian- and bicyclist-involved crashes occurring within City of San Antonio limits from 2018-2022. Data only includes crashes that have spatial information; however, additional crashes may have occurred .

District 10



Traditional Bike Lane
Buffered Bike Lane
Protected Bike Lane
Shared Lanes
Greenway Trail
Shared Use Path
Pedestrian Hybrid Beacon (PHB)
Mid-Block Crossing
Higher Education Institution
K-12 Schools
Hospital/Clinic
District Boundary
Park or Recreation Area
Military Installation
0
0.5
1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
CITY OF SAN ANTONIO TEXAS
Wilderness Oak
Canyon Golf Rd
Stone Oak Natural Areas
Stone Oak Pkwy
Evans Rd
Tpc Pkwy
Classen - Steubing Natural Areas
Huebner Rd
E Sonterra Blvd
1604
Hollywood Park
Hill Country Village
281
W Bitters Rd
West Ave
Bitters Rd
Starcrest Dr
Jones Maltsberger Rd
McAllister Park
E Nakoma
San Antonio International Airport
Wetmore Rd
410
Mccullough Ave
W Sunset Rd
E Sunset Rd
E Basse Rd
Olmos Basin Golf Course
Claywell Dr
Broadway
Basse
Alamo Heights
Olmos Basin Park
Olmos Park
Terrell Hills
N New Braunfels Ave
E Hildebrand Ave
Brackenridge Park
E Mulberry Ave
Fort Sam Houston
Harry Wurzbach
Rittiman Rd
Eisenhauer Rd
Nacogdoches Rd
Perrin Beitel
35
Kirby
Ackerman Rd
Fratt Rd
Windcrest
Eaglecrest Blvd
Crestway Rd
Gibbs-sprawl Rd
N Foster Rd
S Weidner Rd
Randolph Blvd
Miller Rd
Live Oak
Toepperwein Rd
Universal City
Kitty Hawk Rd
Fm 78
Fm 1976
Randolph AFB
E Loop 1604 N
218
Universal City Blvd
Olympia Pkwy
Selma
N Evans Rd
Lookout Rd
Schertz
Garden Ridge
E Evans Rd
N Green Mountain Rd
Stahl Rd
Judson Rd
Oconnor Rd
Higgins Rd
N Stahl Park
Classen Rd
Thousand Oaks
Bulverde Rd

Bike Network Plan

HEALTH IMPACT ASSESSMENT

APPENDIX

January 2024

APPENDIX OF SOURCES

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MEASURES CALCULATION AND METHODOLOGY

The measures listed below will be used to evaluate the impact of proposed BNP projects and policies. These measures were developed based on the research, available data, and discussions with the HIAWG, the following measures were created to evaluate the BNP from a health perspective.

Measuring Mode Share

To calculate mode share, the geometries for the City of San Antonio and for each individual City Council District were uploaded into Replica. Mode share was estimated for each geometry using Replica's Fall 2022 Thursday model which is generated from cell phone data, credit care information, census, and other sources.

- Bike Commute to School Mode Share
- Bike Commute to Work Mode Share
- Bike All Trip Mode Share

Using Replica's software, to calculate "Bike All Trip Mode Share" commercial freight trips, pass-through trips that do not start and end in San Antonio and return trips to home were filtered out.

Measuring VMT

Like mode share, Replica was used to determine the daily estimated VMT for each district and City wide by uploading their geometries into Replica. Weekday VMT for each geometry is estimated using Replica's Fall 2022 Thursday model and Weekend VMT for each geometry is estimated using Replica's Fall 2022 Saturday model. The Average Daily VMT per Capita was calculated using the following formula:

$$Average\ Daily\ VMT = \frac{(Weekday\ VMT \times 260_{\ Weekdays\ per\ Year}) + (Weekend\ VMT\ *\ 105_{\ Weekend\ Days\ per\ Year})}{365_{\ Days\ per\ Year}}$$

$$Average\ Daily\ VMT\ per\ Capita = \frac{Average\ Daily\ VMT\ for\ each\ Geometry}{Population\ in\ Geometry}$$

Measuring CO₂

Using the estimated VMT per capita, the annual CO_2 emissions per capita can be calculated using the emissions factor provided by the US Environmental Protection Agency as shown below:

$$Total\ Annual\ VMT = Average\ Daily\ VMT\ *\ 365_{\ Days\ Per\ Year}$$

$$Total\ Annual\ Metric\ tons\ of\ CO_2\ per\ Capita = \frac{Total\ Annual\ VMT \times 0.00039_{\ metric\ tons\ of\ CO_2\ equivalnet\ per\ mile^1}}{Population\ in\ Geometry}$$

Measuring the Network

Low Stress Network

The methodology used to identify the comfort of someone biking on a street or bike facility is Level of Traffic Stress (LTS) and is fully addressed in **Bike Network Plan, Chapter 7 – System Assessment**. LTS scores are

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[1] *US Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator for "Miles driven by the average gasoline-powered passenger vehicle"* https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references#vehicles.

determined by a roadway's physical geometry represented by the number of lanes, it's speed, and the bike facilities present. The table below illustrates the LTS scoring based upon these factors:

Posted Speed Limit	Number of Lanes	Bicycle Boulevards	Mixed Traffic / Bike Routes	Striped Bike Lane		Buffered Bike Lane		Protected Bikeway	Shared Use Path
				No Adjoining Parking	Adjoining Parking	No Adjoining Parking	Adjoining Parking		
30 MPH or Lower	2 Lanes	LTS 1	LTS 2	LTS 1	LTS 2	LTS 1	LTS 1	LTS 1	LTS 1
	3 Lanes	LTS 3	LTS 3	LTS 1	LTS 2	LTS 1	LTS 1	LTS 1	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 3	LTS 4	LTS 2	LTS 3	LTS 1	LTS 1
35 MPH	2-3 Lanes	LTS 4	LTS 4	LTS 2	LTS 3	LTS 1	LTS 2	LTS 1	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 2	LTS 3	LTS 1	LTS 1
	6+ Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 3	LTS 1
40 MPH or Greater	2-3 Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 2	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 2	LTS 1
	6+ Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4	LTS 3	LTS 1

LTS 1 LTS 2 LTS 3 LTS 4

LTS scores of 1 and 2 are streets and facilities considered safe and comfortable for most people to bike on regardless of their skill or ability.

The total number of (LTS 1/2) was calculated by overlaying the LTS 1 and 2 streets and bike facilities with each overlaying district geometry and summing the number of miles for each segments whose center is within each district and for the City of San Antonio overall. The same process was performed total street and bike facilities network in order to make the final metric calculation below:

$$\%\ of\ streets\ which\ are\ comfortable\ for\ people\ of\ all\ ages\ and\ abilities\ to\ bike\ on\ (LTS\ 1/2) = \frac{\sum Lengths\ of\ LTS\ 1\ and\ 2\ Streets\ and\ Bike\ Facilities\ in\ Geometry}{\sum Lengths\ of\ all\ Streets\ and\ Bike\ Facilities\ in\ Geometry}$$

Shared Use Paths and Separated Bike Facilities

The metric "Lane Miles of Shared Use Paths and Separated Bike Facilities" was calculated by summing all the lengths of Shared Use Path and Separated Bike Facilities that had their center in each overlaying district geometry to get the total number of lane miles. This was also performed for the City of San Antonio to get the number of citywide lane miles.

Measuring Access

The following access measures determine how many people lived within a 2-mile bike ride along a low stress, comfortable route for most people to a destination.

- % of the population with access to healthy food
- % of the population with access to health care
- % of the population with access to parks / trails
- % of the population with access to tourist destinations
- % of the population with access to employment centers
- % of the population with access to transit stops
- % of the population with access to grade schools
- % of the population with access to Colleges / Universities

For each of the destination types identified (such as schools, healthy food, parks, etc.) the following process was repeated to determine the % of population with biking access to each type of destination. The following snippet was taken from the **Bike Network Plan, Chapter 7 – System Assessment** which can be referenced for further details:

> One indication for a successful bicycle network is how far a person riding a bicycle can travel within 15 minutes using only low-stress (LTS 1 and LTS 2) streets. To quantify how far the average bike rider in San Antonio can travel today, a bicycle accessibility assessment was conducted using these steps:
>
> 1) Key activity centers and destinations that San Antonio residents and/or visitors may want or need to bike too were identified (as illustrated on the right).
> 2) Using LTS 1 and LTS 2 streets, a "Low Stress Network" was established that included low-stress intersections and crossings.
> 3) Barriers to connectivity, such as unsignalized crossings and high-stress streets (LTS 3 or 4) were identified.
> 4) Using the results of Steps 2 and 3, "bikesheds" were created for each of the key activity centers identified in Step 1. Bikesheds represent how far a typical bicycle rider traveling 8 MPH, or up to 2 miles, can reach within 15-minutes. It's important to note that people riding electric bikes and athletic riders may be capable of higher average speeds can likely access more destinations than the typical rider; however, using the typical rider allows the sheds to reflect a greater portion of the biking population.
> 5) A 0.25-mile grid of the city was developed to illustrate at a citywide level, areas that have high or low levels of access via a 15-minute bike ride.
> 6) Using Census Block data, population estimates were calculated to estimate how many residents reside within each bikeshed.

The measure "% of the population with access to 3 or more destinations" was determined by summing the number of destination sheds for healthy food, health care, parks and trails, tourist destinations, grade schools, and colleges and universities that overlap for each 0.25 mile grid. The grid was filtered to only include those that had low stress access to 3 or more destinations. The filtered grid was then overlayed with Census Block data to estimate the number of residents residing within that grid.

Measuring Safety

Safety data was collected from the Texas Department of Transportation Crash Records Information System for 2018 – 2022. In this analysis, only pedestrian- and/or bicycle-involved crashes were included. The "Total Number of Crashes" metric was calculated by counting the number of incidents within each overlaying district or citywide geometry. Likewise, the data was filtered to only include fatal and severe injury crashes and the total number of data points were summed by each district and citywide geometries in order to calculate the "Number of Fatal and Serious Injury Crashes" metric. Finally, the "% of Crashes that Result in Death or Serious Injury" was calculated using the equation below:

$$\%\ of\ Crashes\ that\ Result\ in\ Deaths\ or\ Serious\ Injuries = \frac{Number\ of\ Fatal\ and\ Serious\ Injury\ Crashes}{Total\ Number\ of\ Crashes} \times 100$$