CITY OF SAN ANTONIO TEXAS

Bike Network Plan

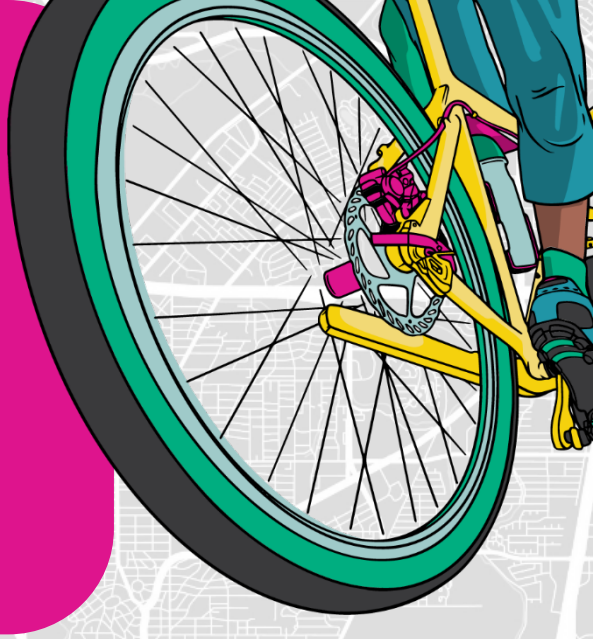
Health Impact Assessment

Final Report

December 2024

HOW CAN THE BIKE NETWORK PLAN IMPROVE COMMUNITY HEALTH IN SAN ANTONIO?

Beyond safety and connectivity, San Antonio's transportation system plays a large role in the physical, mental, and social health of our residents. The City of San Antonio Bike Network Plan (BNP) offers the opportunity for more connections to education and employment opportunities, more access to healthy foods, more places to comfortably exercise and play, and more ways for San Antonians to connect to each other.

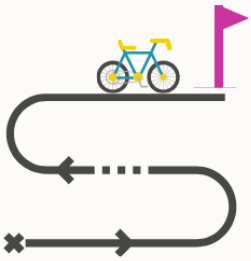


The following is a snapshot of key metrics illustrating how the BNP can improve health in San Antonio.

Expands and Improves the Bicycle Network

1,740 miles
of new and upgraded bike facilities in San Antonio.

Creates New Shared Use Path Network



212% increase
in shared use path mileage, from 211 miles to 660 miles!

Develops a More Equitable Bike Network

275% increase
of comfortable bike facilities and routes in disadvantaged areas.

Makes it More Comfortable for More San Antonians to Bike

75% increase
of San Antonians with access to bike facilities that physically separate riders from vehicle traffic.

Makes it Easier to Bike to School

~2 out of 3
San Antonians can access at least one school via a 15-minute bicycle ride.

Connects More People to Healthy Food Options

Over Half
of San Antonians can access at least one grocery store via a 15-minute bicycle ride.

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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 and 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). Ultimately, the HIA broadens the BNP's scope by linking transportation and health planning by giving decision- 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, considers the mental and physical health of San Antonians, but also considers social health factors such as social equity and access via safe and comfortable bike facilities to daily needs like jobs, education, healthcare, healthy food, and social and recreation destinations. Ultimately, the HIA presents a holistic view of well-being and quality of life in San Antonio and offers a lens through which to view the BNP as a tool to improve the lives of San Antonians through context sensitive mobility solutions.

A 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

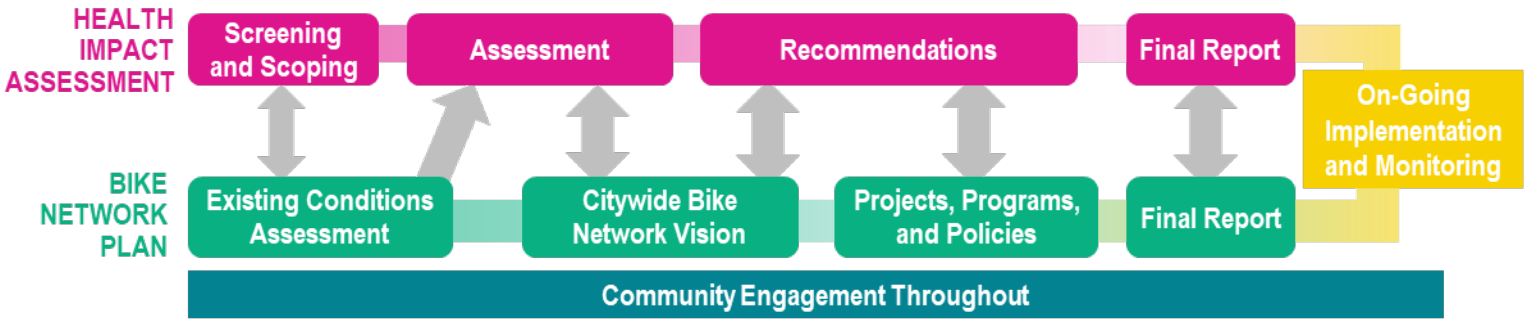
The HIA follows a formal evaluation process that is of six key stages: 1) Screening, 2) Scoping, 3) Assessment, 4) Recommendations, 5) Reporting, and 6) Monitoring and Evaluation. This report covers steps 1, 2, and portions of Step 3 to create a baseline for evaluating how proposed projects and programs 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. Ultimately, 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 and/or necessary and if it would add value to the project.
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 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 Metropolitan Planning Organization (AAMPO)
- Alamo Area Council of Governments (AACOG)
- disABILITYsa
- San Antonio Diversity, Equity, Inclusion, and Accessibility Department (DEIA)
- Esperanza Peace & Justice Center
- FitCItySA
- Food Policy Council of San Antonio
- Joint Base San Antonio Veterans Advisory Commission
- Salud America!
- San Antonio Area Foundation
- San Antonio Independent School District (ISD) School Health Advisory Council
- San Antonio Metropolitan Metro Health District (Metro Health)
- San Antonio Parks & Recreation
- South Texas Asthma Coalition
- Texas Department of Transportation (TxDOT)
- 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

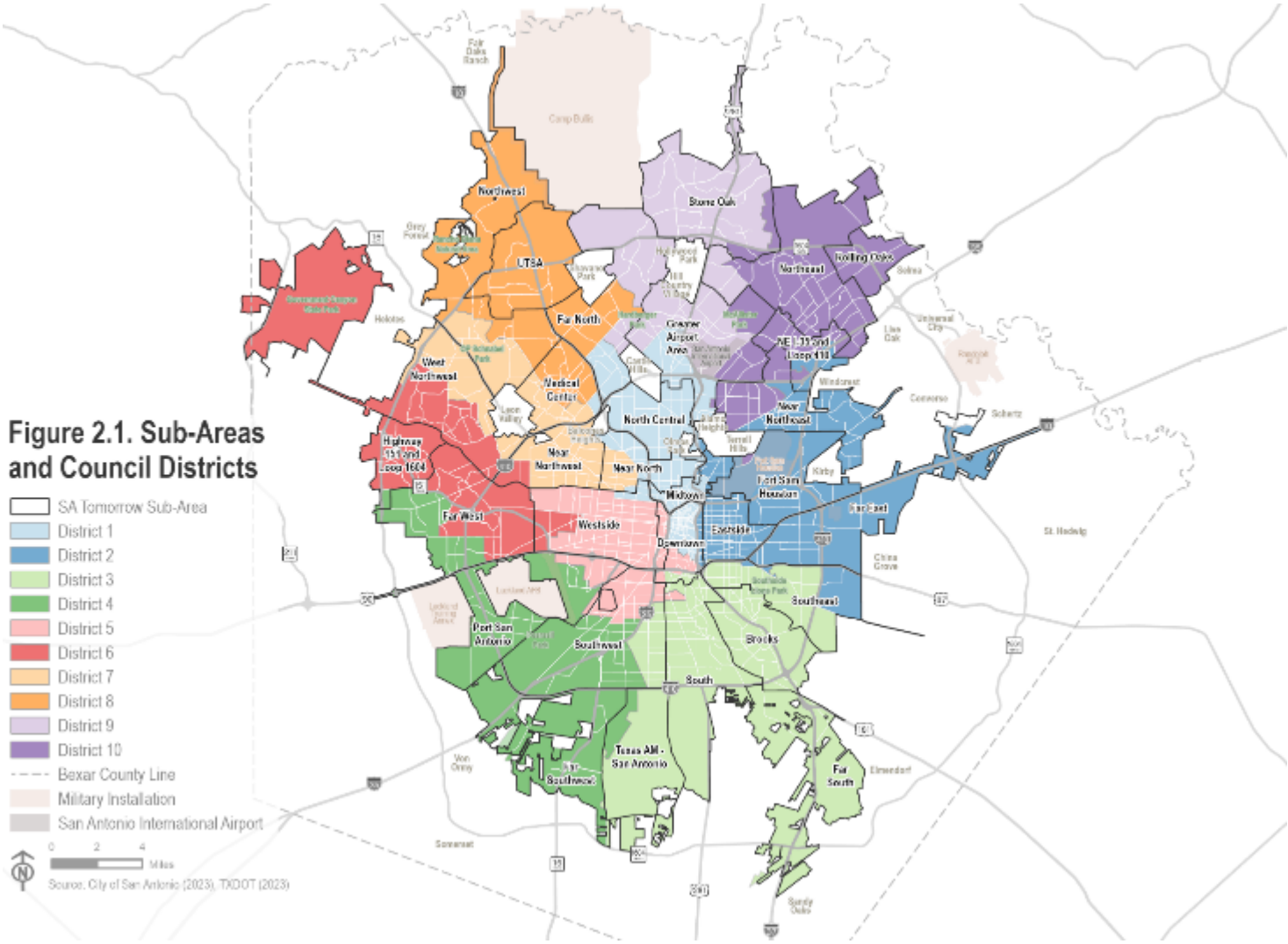
Originally settled in the early 1700s and incorporated in 1837, San Antonio has evolved into a thriving, full-service community with historic charm, beautiful neighborhoods, and robust recreational amenities. With over 4,300 miles of roadways in San Antonio today, the City has an extensive network of interstates, highways, local roadways, trails, and bike facilities to help San Antonians 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 110 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 distinct transportation, land use, socioeconomic, and health 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.



SOCIOECONOMIC CHARACTERISTICS

To better understand the multimodal needs of San Antonio, demographic and socioeconomic background research was conducted. The findings in this section are based on data 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.

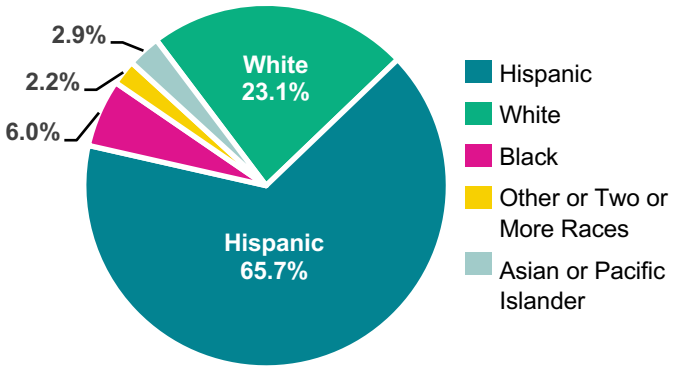
San Antonio is Racially and Ethnically Diverse

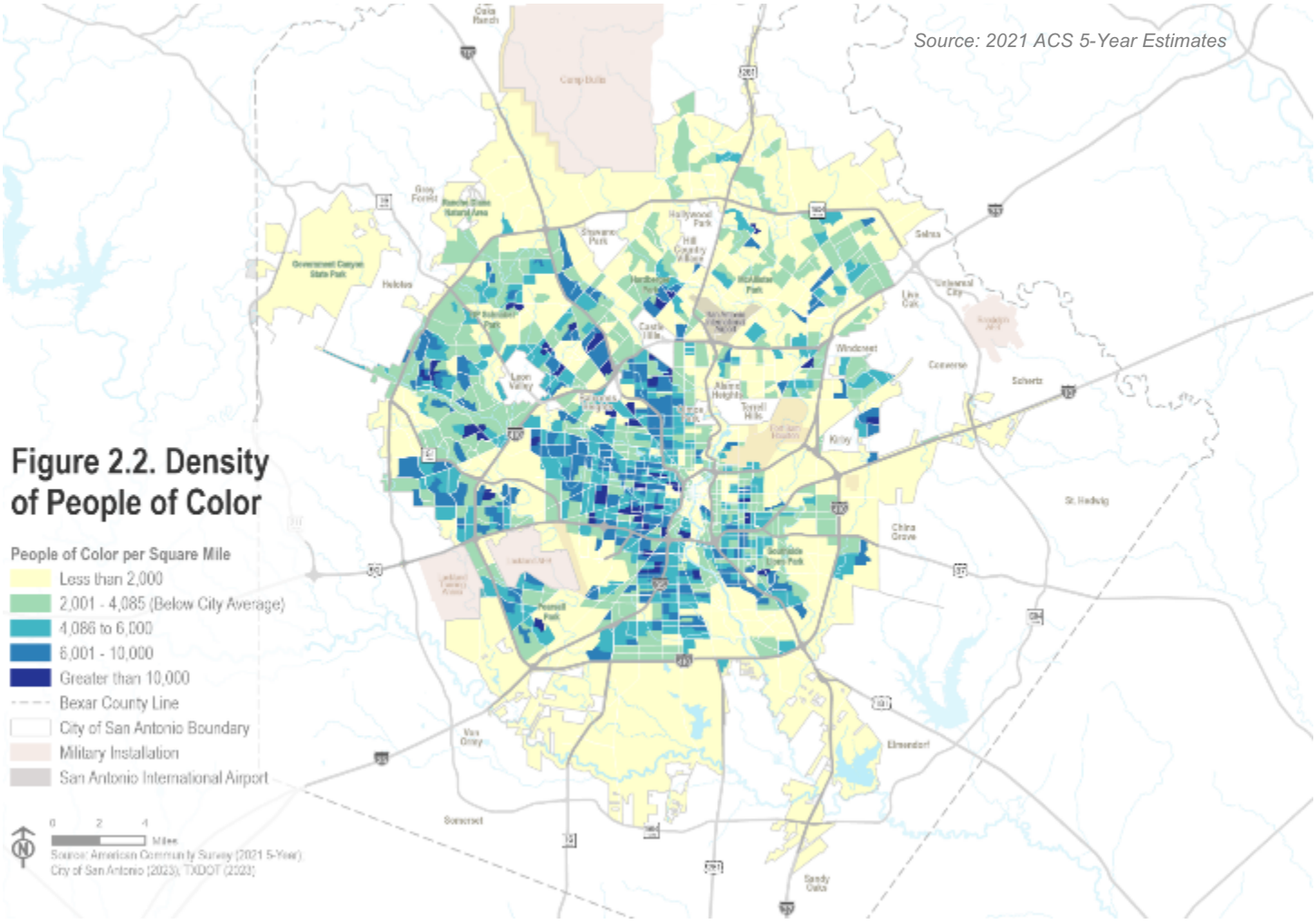
Understanding San Antonio's diversity is critical as, across the nation, People of Color have historically and systemically been disenfranchised, resulting in disproportionately poor health outcomes and limited access to resources.

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

The City is unique in that 3 in 4 San Antonians identify as People of Color and of those, 82.9% are non-White Hispanic/Latino. Figure 2.2 illustrates the density of People of Color in San Antonio.

Population by Race





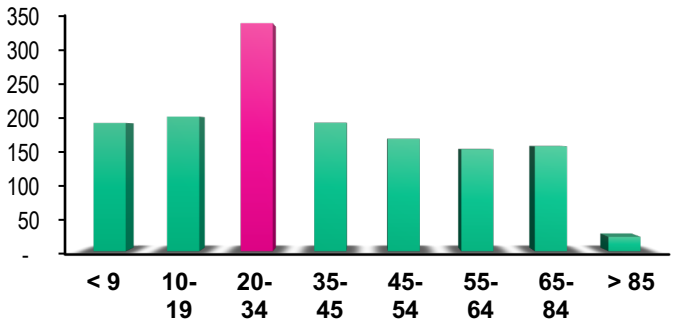
San Antonians are Young, but Aging

Age is an important factor to consider as different age groups have different mobility needs and abilities to access those needs. Figure 2.3 illustrates the concentration of children and elderly in San Antonio. 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 Antonians 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 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 Antonians age 65 and older, many seniors choose to stop driving and instead rely on alternative modes of transportation. Walking and biking, however, may create new mobility challenges for seniors due to decreased response time, vision issues, and risk of falls. 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

Source: 2021 ACS 5-Year Estimates

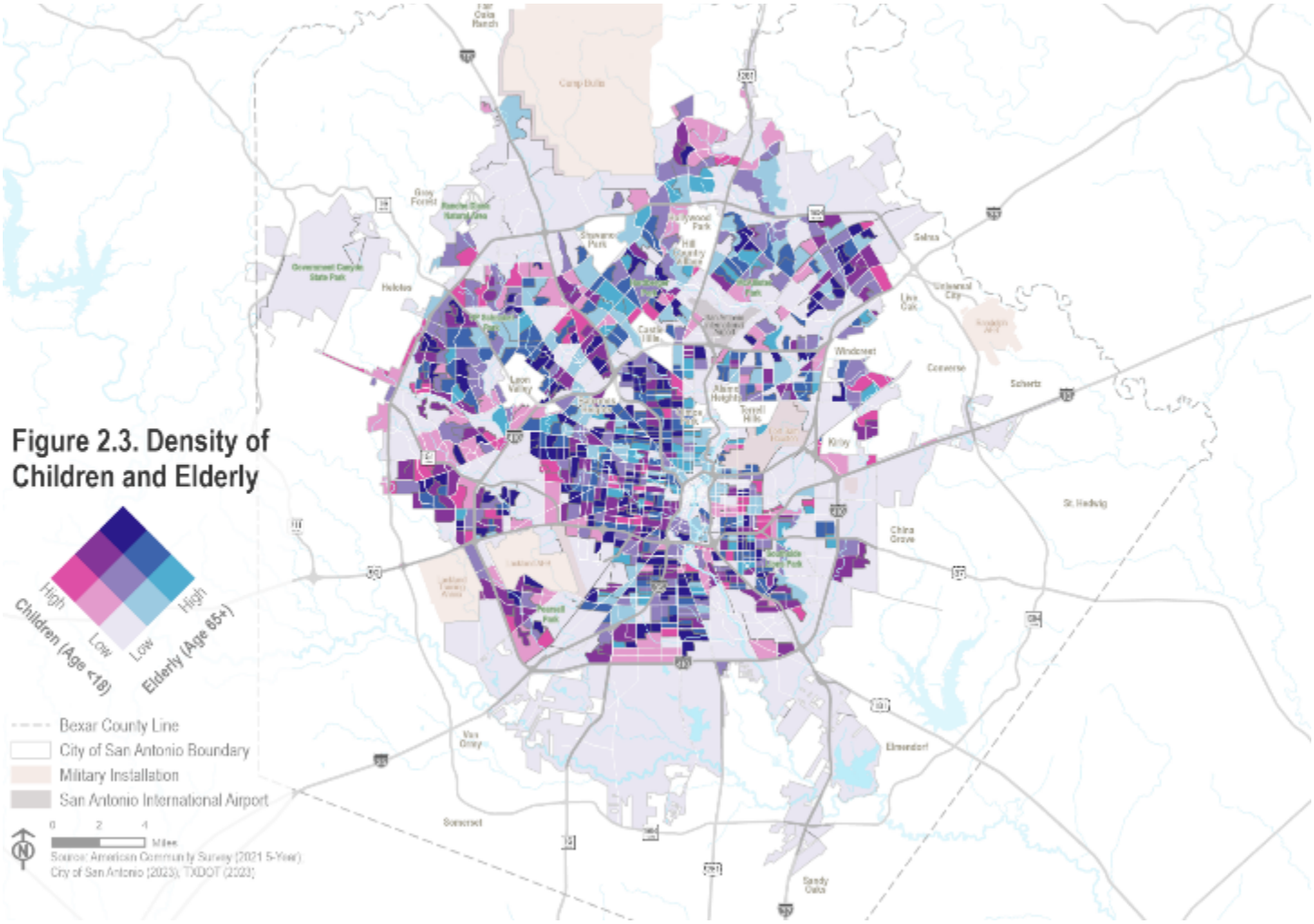


Figure 2.3. Density of Children and Elderly

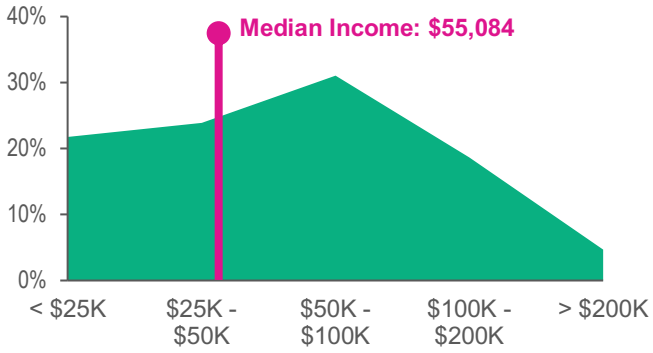
Many Have Limited Mobility Options

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 to jobs, healthcare, and education. This can limit access to opportunity and daily needs, reinforcing cycles of inequity.

Population Experiencing Poverty

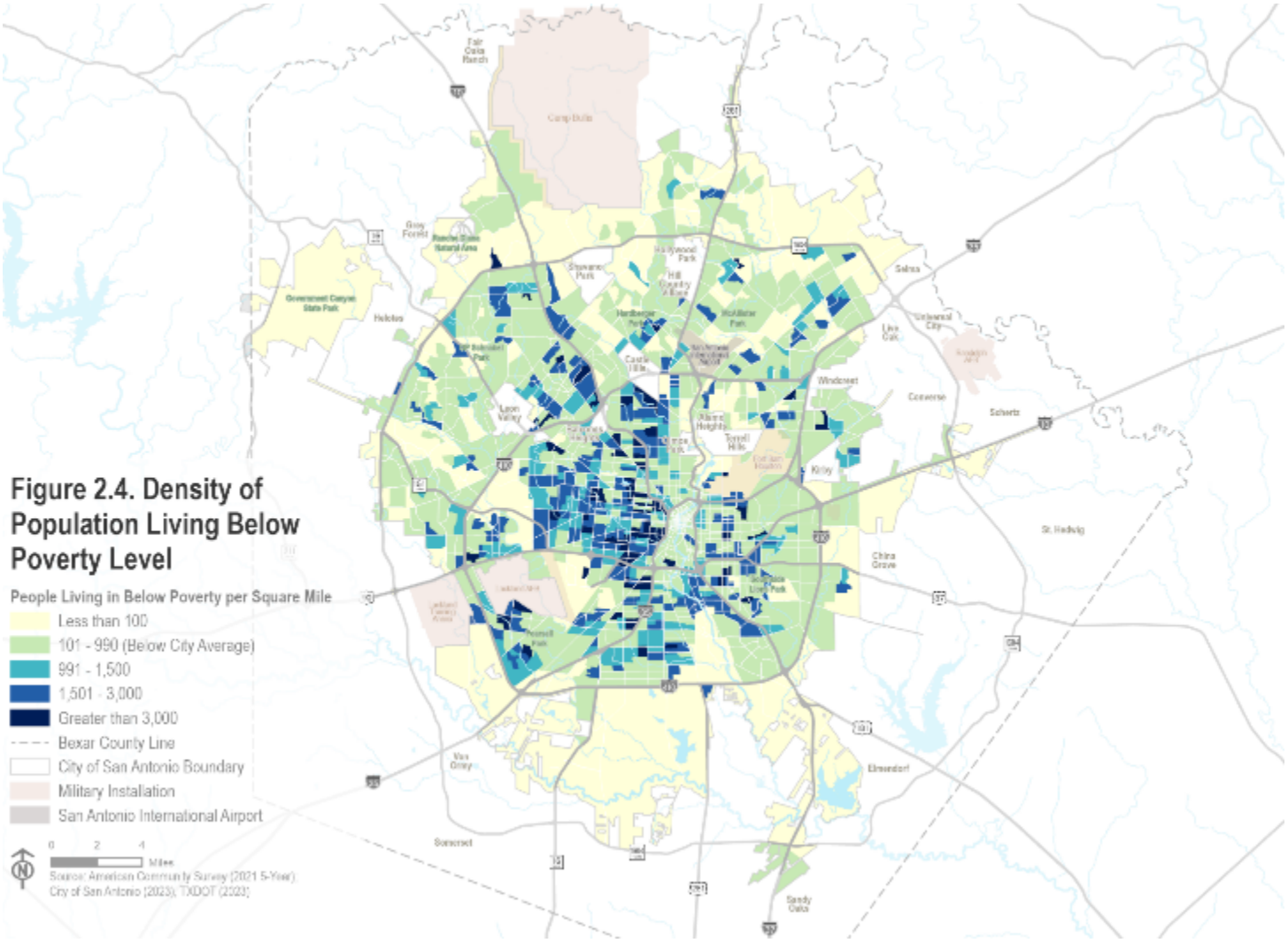
Wealth can play a major role in how individuals travel. Not only can wealth help purchase a vehicle, but affluent individuals also have the resources to adopt healthier lifestyles including access to healthier food, exercise options, and stress-lowering recreation. Low-income households can indicate 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 (2021 ACS 5-Year Estimates).

Median Household Income



17% of San Antonians live below the poverty line

Source: 2021 ACS 5-Year Estimates



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

For people who do have a vehicle, the costs of vehicle ownership can hinder their ability to afford healthcare premiums and other health-related costs, such as healthy food. Additionally, people who are unable to afford a vehicle are more likely to face challenges in accessing healthcare, jobs, education, and daily needs.

$13,342

Average annual transportation costs per household in San Antonio

46%

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

Source: 2021 ACS 5-Year Estimates

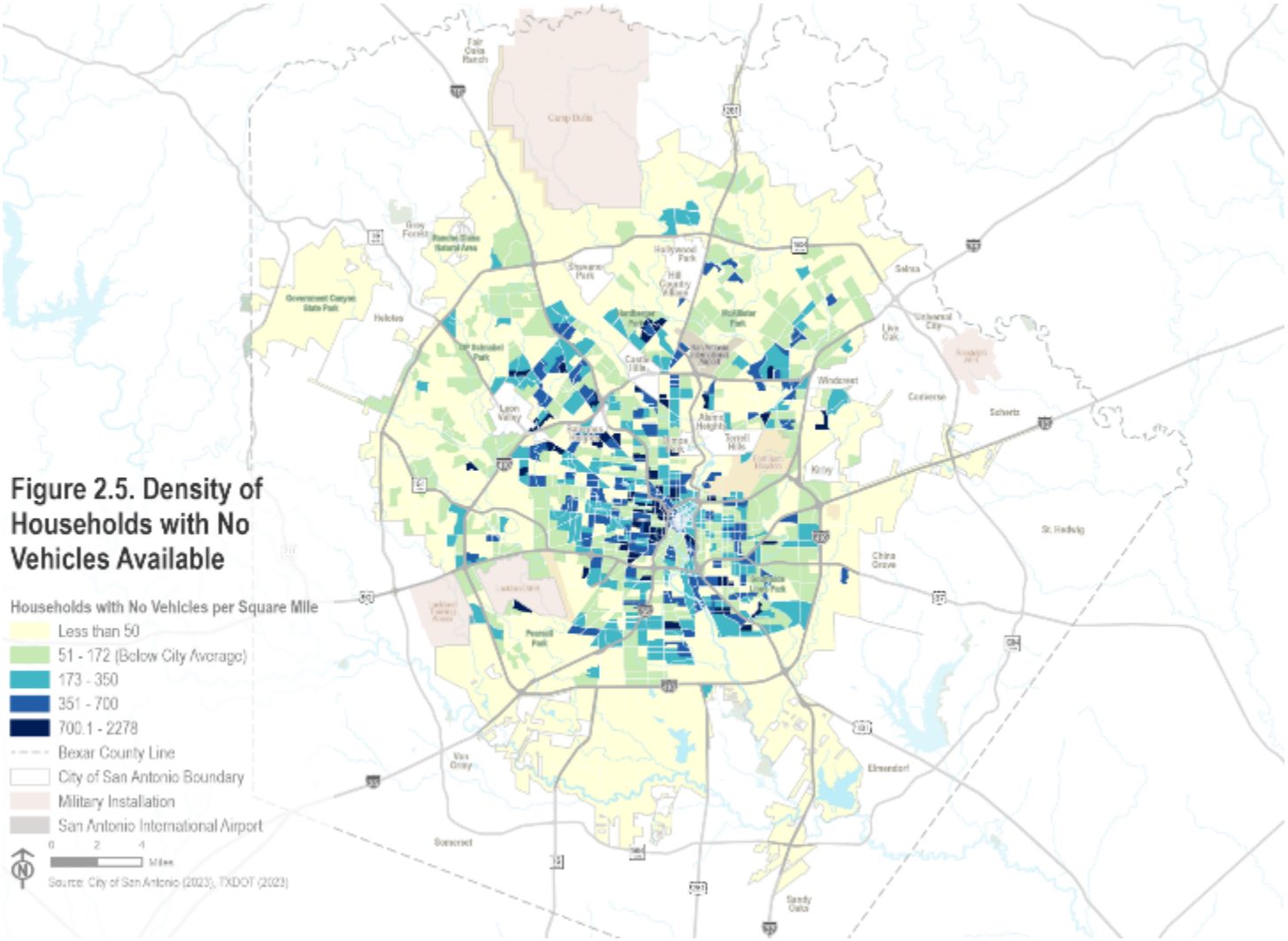


Figure 2.5. Density of Households with No Vehicles Available

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 a crash 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

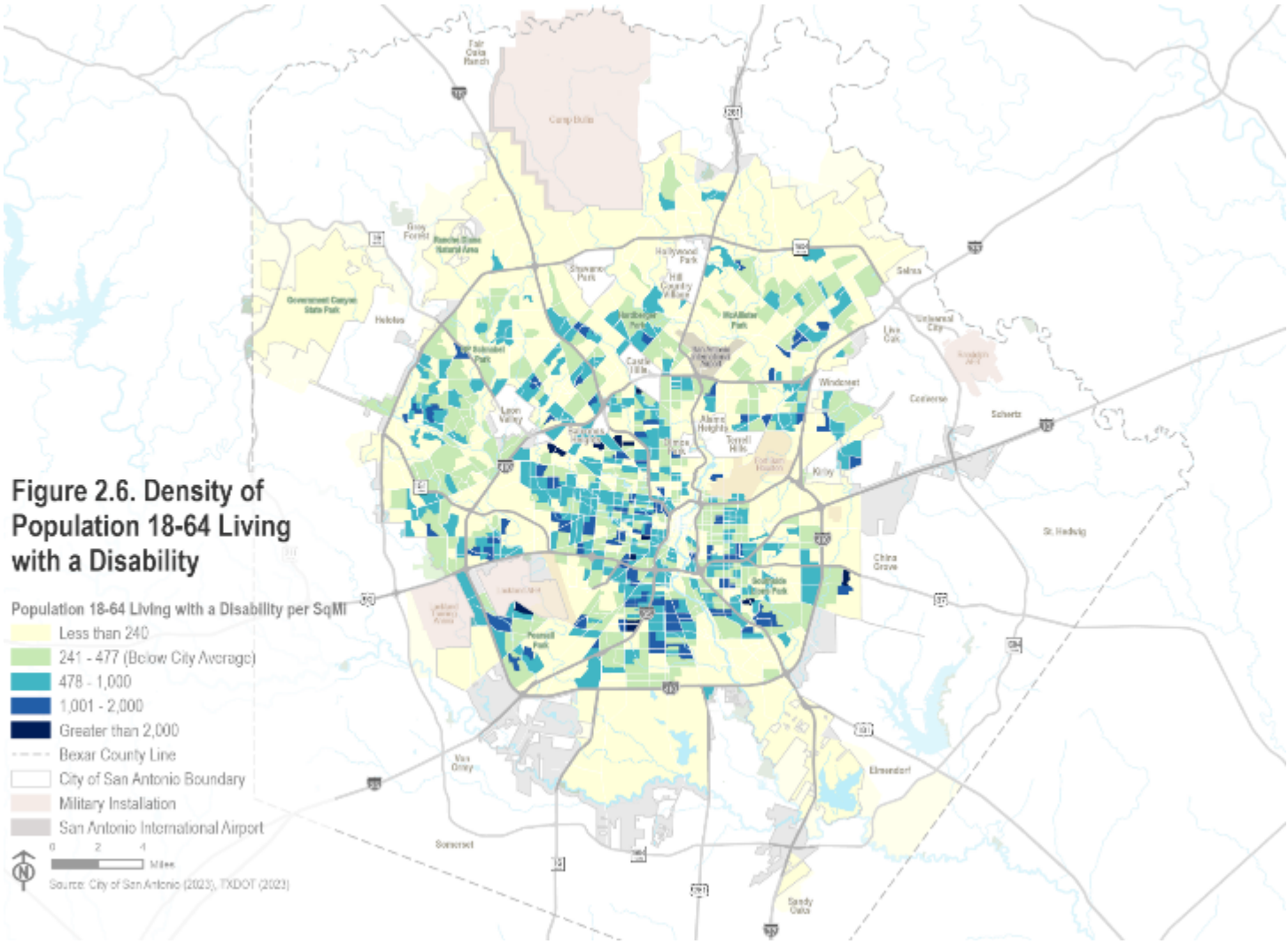


Figure 2.6. Density of Population 18-64 Living with a Disability

TRAVEL PATTERNS AND CHARACTERISTICS

The HIA is a tool to evaluate more than physical health; it also includes an evaluation of disparities in access and travel patterns between populations. Understanding where people want to go and how they choose to get there will help reveal the types of places San Antonians need to go and how they currently get there. The travel patterns and characteristics identified in this phase of the HIA set a baseline to evaluate the impacts of recommendations from the BNP. This will ultimately lead to the development of a data informed final BNP which provides mobility solutions to improve physical, mental, and economic health and quality of life.

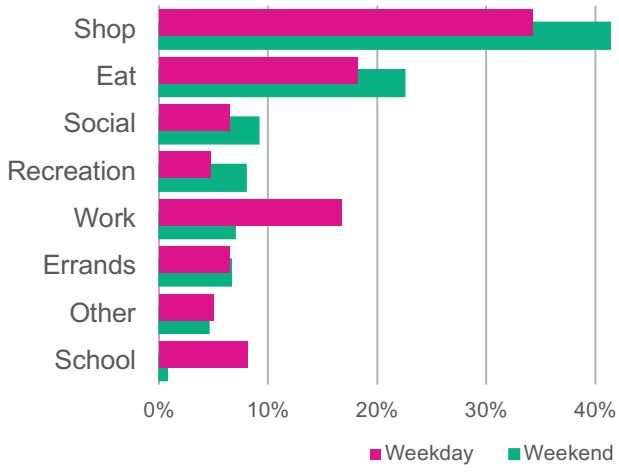
San Antonians Drive A Lot...

New data is revealing a better understanding of the why people travel in San Antonio. Travel patterns collected from cell phones, credit cards, and other data sources show 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.

3 of 4

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

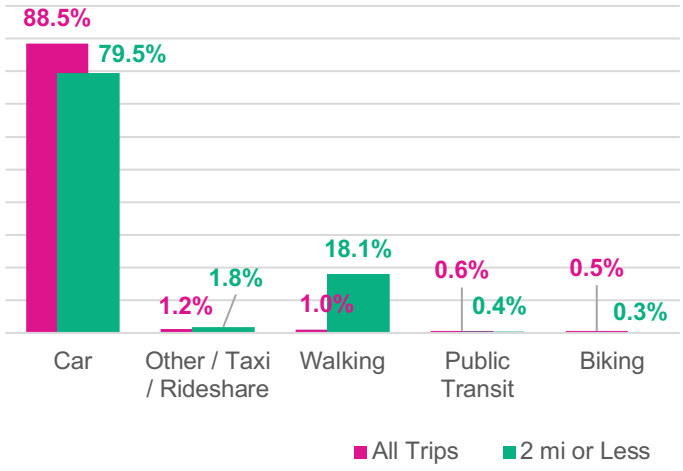
Typical Trip Purpose (Replica 2022)



Trip Distance

While the average commuting trip in San Antonio is 11 miles, 27% of all trips are 2 miles or less. 2 miles is an important threshold as destinations within this distance are most likely to be converted to biking or other micromobility 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. Thus, populations that can afford to live in neighborhoods where many destinations are within close distance may have more convenient transportation options than others.

Trips by Mode (Replica 2022)



1 in 5

Children and guardians walk to school in San Antonio.

Currently, getting to school is the shortest type of trip San Antonians (averaging just under 4 miles) and represents the trip people most take by walking (22%) and biking (2%).

What Does This Mean to Community Health in San Antonio?

Driving more, and longer distances, is related to lower rates of physical activity, leading to health challenges. Additionally, driving longer distances has economic impacts to drivers when considering the cost of gas, wear and tear on vehicles, and the time spent driving that could be spent doing other things.

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 highlight the demographic differences and socioeconomic disparities within the City. As shown in Figure 2.7:

- **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 greater investment in bike infrastructure compared 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; few protected bikeways exist in the City in total.

65% more bike infrastructure investment has occurred in Low Equity Concern Areas,

Unequal Safety Impacts

While the number of San Antonians living in areas with low equity concerns is approximately equal to those living in areas high equity concerns, people living in areas with high equity concerns have significantly higher rates of being involved in bicycle and pedestrian crashes.

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

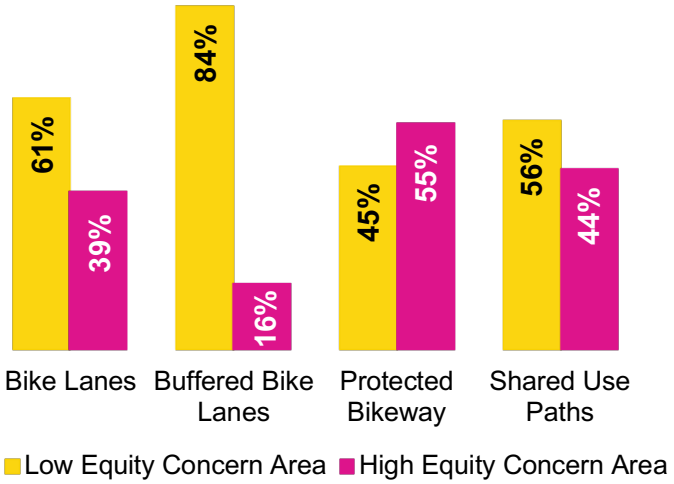
2x **More People of Color live below the poverty level** in San Antonio compared to all residents

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

	In Areas of Low Equity Concern	In 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%

What Does This Mean to Community Health in San Antonio?

A safe, connected, and equitable bicycle network fosters fairness and facilitates access and opportunities for all community members. An effective network mitigates disproportionate health impacts, and addresses socioeconomic, safety, and access concerns for traditionally underserved populations.

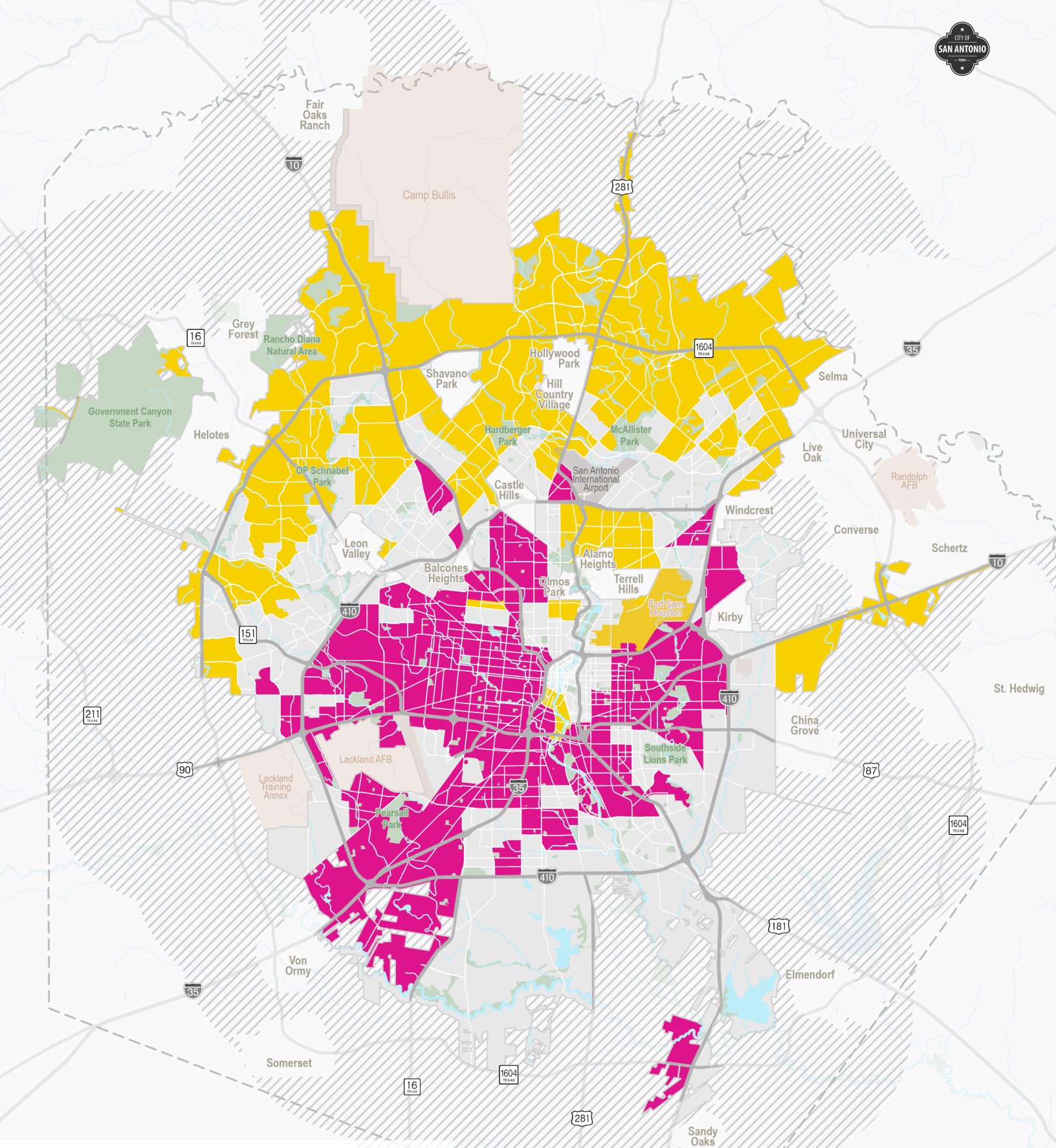


Figure 2.7. Equity Atlas

- Area of High Equity Concern
- Area of Low Equity Concern
- Bexar County Line
- City of San Antonio
- Park or Recreation Area
- Military Installation
- San Antonio International Airport
- Extraterritorial Jurisdiction

0 2 4 Miles

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. Furthermore, someone who identifies as an athletic, skilled bike rider may not have the same perception of a route's safety as someone else 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 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.

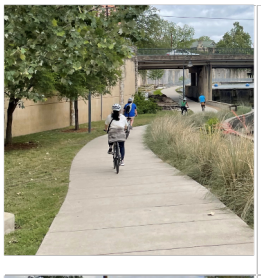
On Small Wheels. People who use scooters, skateboards, and other small devices.

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

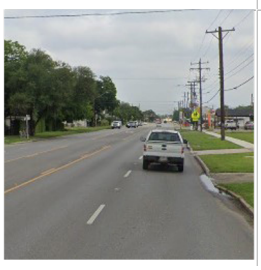
Local streets with low traffic speeds and volumes can be comfortable for people to bike on. Bike Boulevards are enhanced local streets with wayfinding additional features to manage vehicle speeds and volumes.

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

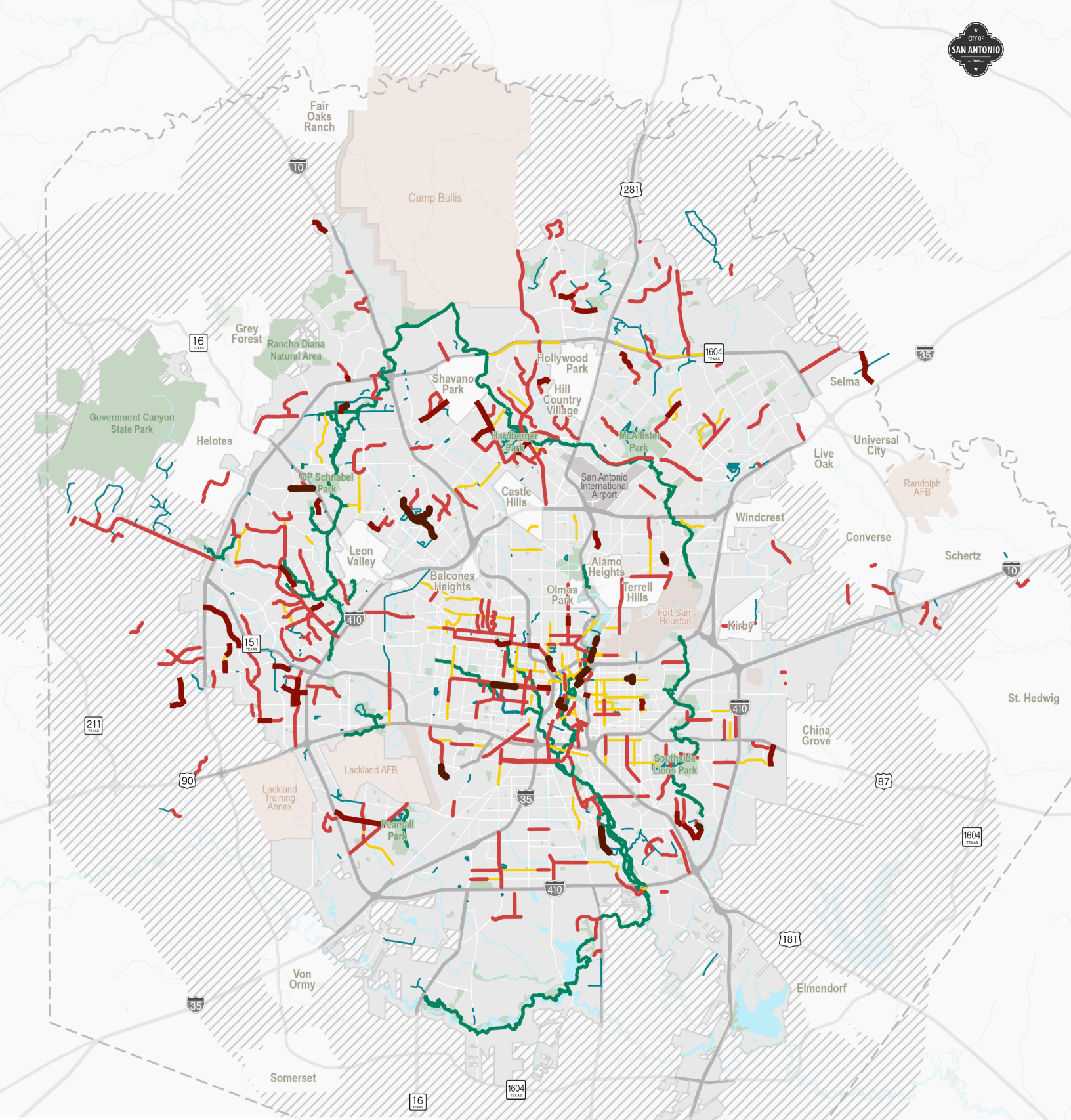


Figure 3.1. Existing Bike Facilities

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:

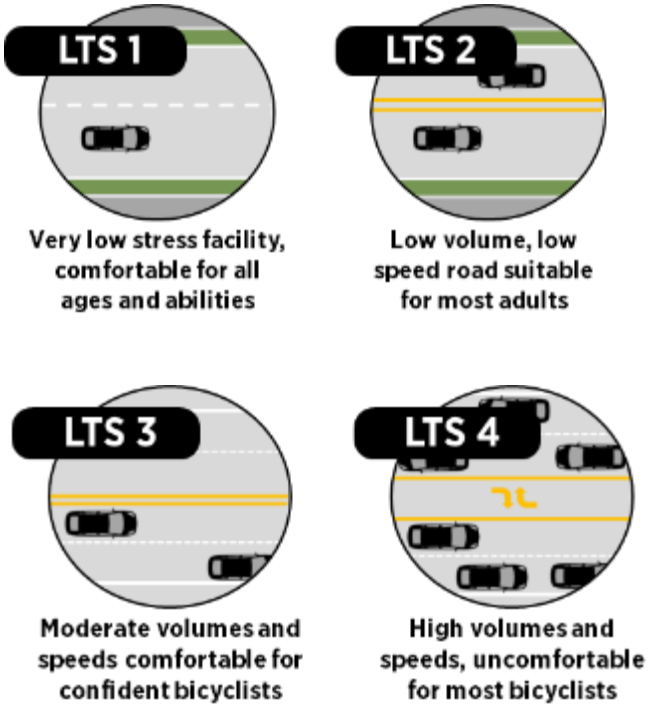
- Low-stress streets (LTS 1 and LTS 2)
- High-stress streets (LTS 3 and LTS 4)

LTS 1 is considered comfortable for people of all ages and abilities 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. For more information on how LTS was calculated, see the Existing Conditions Technical Memorandum.

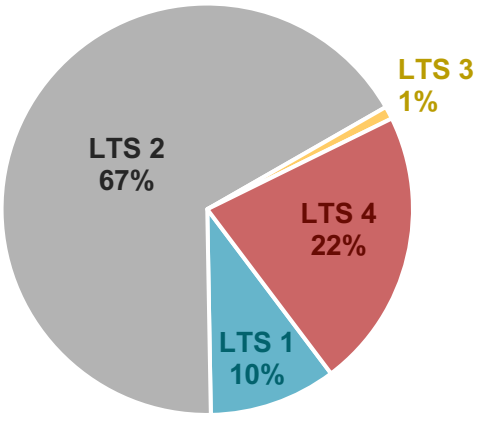
1 in 5

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

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.



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



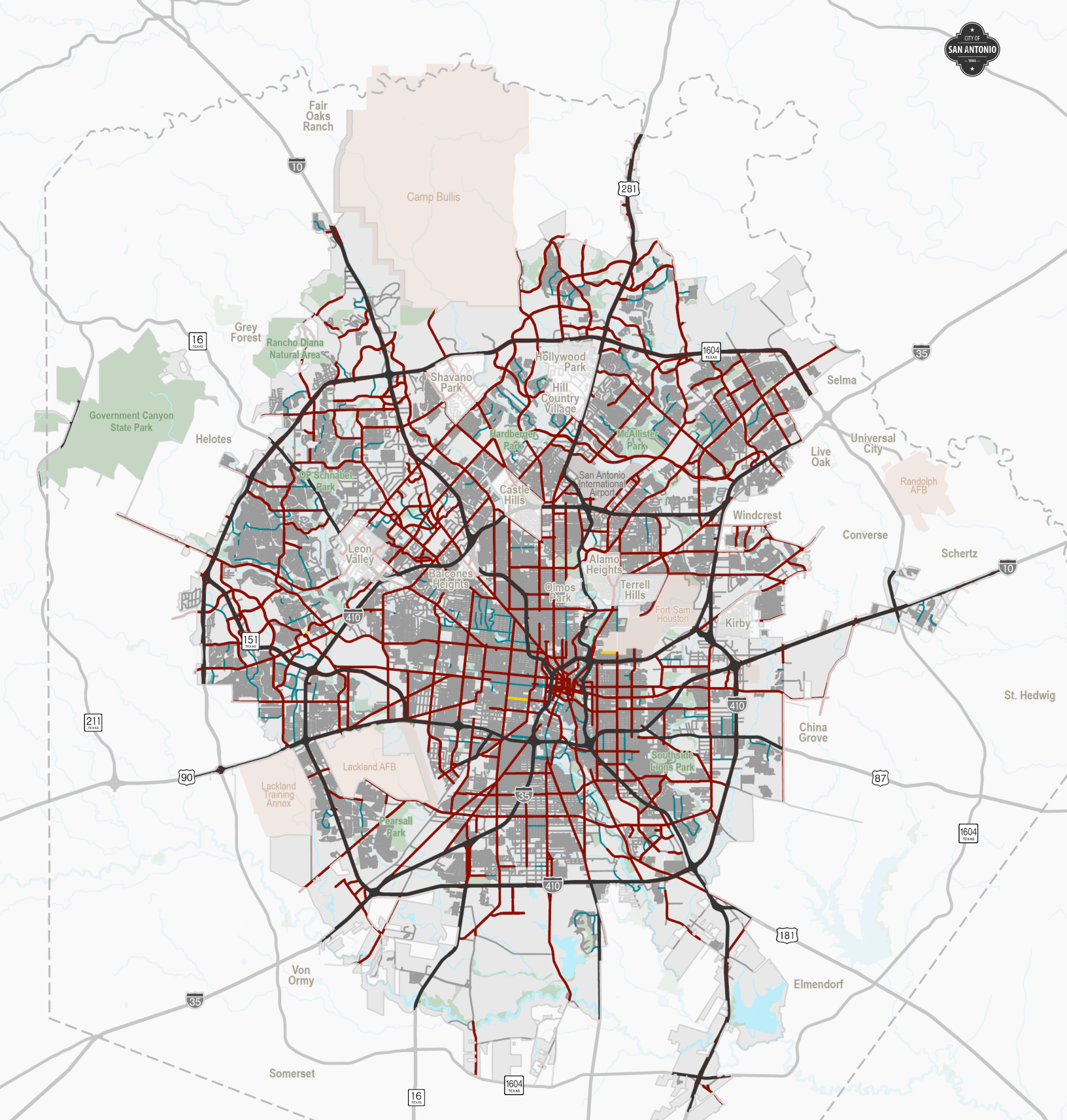


Figure 3.2. Level of Traffic Stress

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

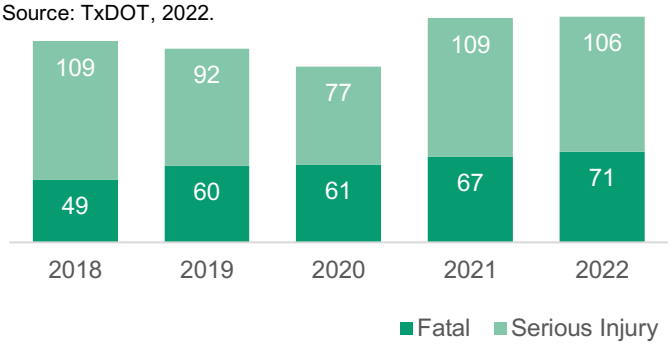
HOW SAFE ARE OUR STREETS?

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.

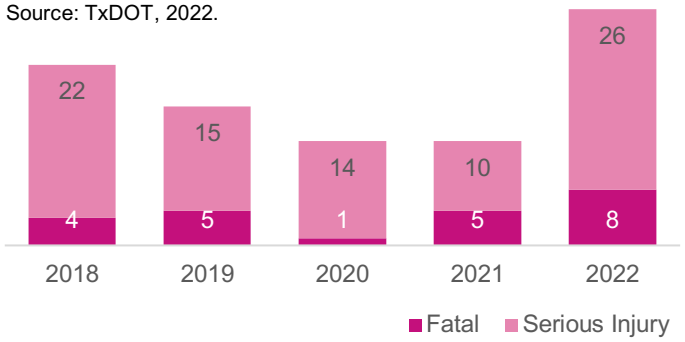
From 2018 to 2022, 5,486 pedestrian- and bicycle-involved crashes in San Antonio, of which 331 were fatal and 580 were serious injury crashes. This means that on average, 160 people walking and 22 people bicycling have lost their lives or are seriously injured in a crash. In recent years, the number of these crashes have 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 in San Antonio
Source: TxDOT, 2022.



Fatal and Serious Injury Bicycle Crashes in San Antonio
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 with streetlights 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, and treatments to slow down vehicular speeds. Additionally, there is inequity in where crashes are occurring – areas with high equity concern experience 113% more pedestrian and bike involved crashes than areas with low equity concern.

Table 3.1: Crash History in San Antonio's 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%

**Areas of Equity Concern are based on the City of San Antonio's Equity Atlas. Additional information can be found in Chapter 2.*

CHAPTER 4. SAN ANTONIO BNP HIA GOALS AND OBJECTIVE

GOALS AND MEASUREMENTS

The primary goal of the Health Impact Assessment (HIA) is to evaluate how the Bike Network Plan may impact the health of people who live, work, and travel in San Antonio. Ultimately, 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 decision makers to make informed decisions regarding investments and policies. The HIA utilized the process in Figure 4.1 to identify potential topics which could be researched and evaluated as part of HIA Step 2 (Scoping) and Step 3 (Assessment).

Figure 4.1: HIA Research Topic Identification Process

Step	Purpose
1	**Identify and Screen** The study team and Health Impact Assessment Working Group (HIAWG) identified and screened a long list of potential indicators which could address a variety of topics.
2	**Confirm the Short List** Based on Step 1, a short list of preferred indicators were 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 developed potential research questions to understand if and how much the confirmed 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, a long list of potential health indicators was developed. 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 were 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 professionals and their viewpoints on the effects that active transportation investments have 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 highlighted in Table 4.2.

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 conditions that exacerbate symptoms 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 the United States in 2019, 19.86% of adults (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 4.3.

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 subsequent comorbidities, 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 is 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 4.4 shows some 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, employment and transportation are closely linked.

Education and employment attainment is more challenging for individuals:[27, 28]

- 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.[29]

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]

Current access to jobs without a vehicle is poor 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 4.5. 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 on 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 micromobility / bikeshare memberships for disadvantaged individuals can help increase affordable transportation options.[32, 33]

Crossing guards, bike racks, 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 continues to increase in recent years.[38] Along with this increase is an increase in pedestrian and bicyclist fatalities, which comprise approximately 19% (nearly 8,000 road users) of all traffic fatalities, 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, people walking and biking comprise approximately 13% total of the state's traffic-induced fatalities and suspected serious injuries (11% and 2%, respectively), 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 biking 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, 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 following measures were created 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 CO_2 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%

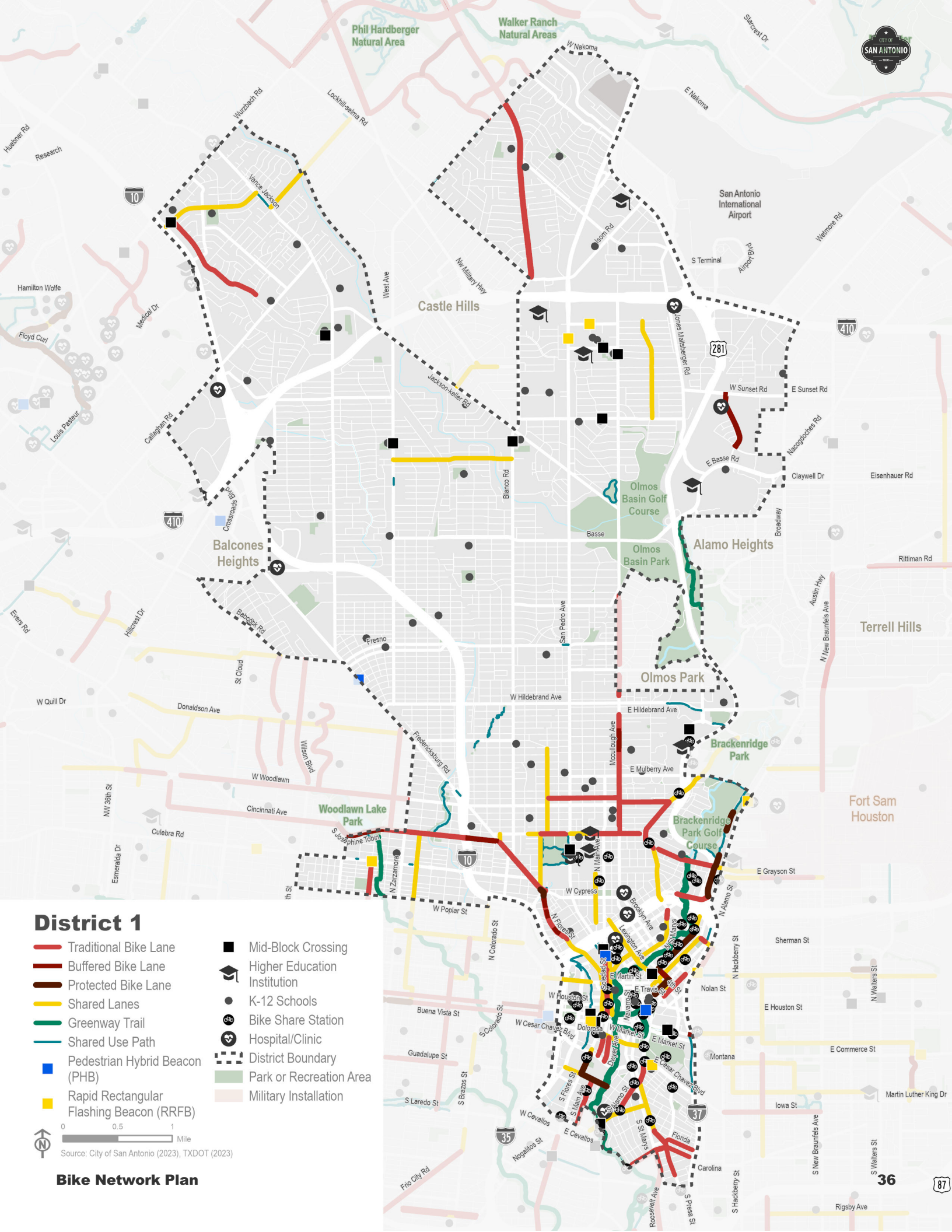
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO_2 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 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%

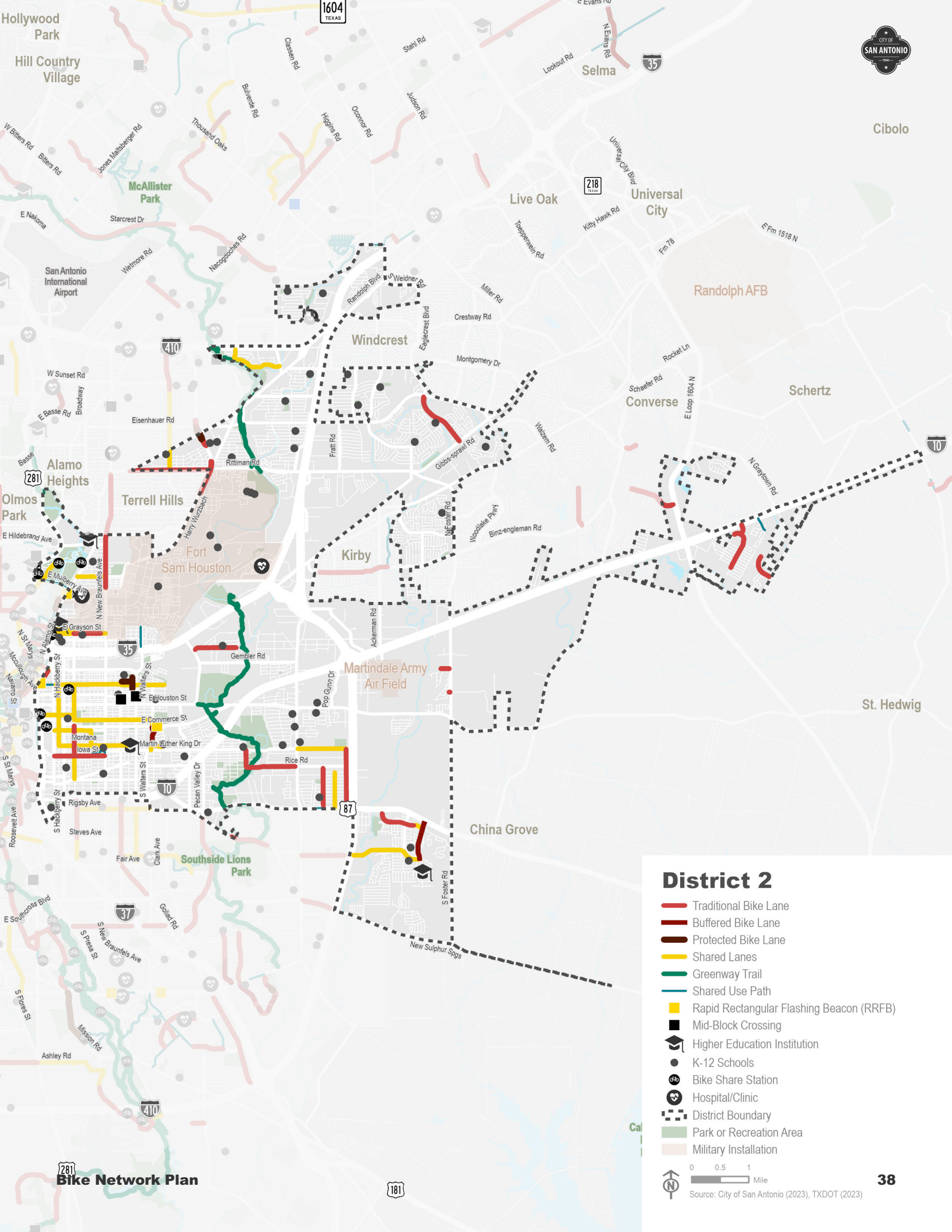
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 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%

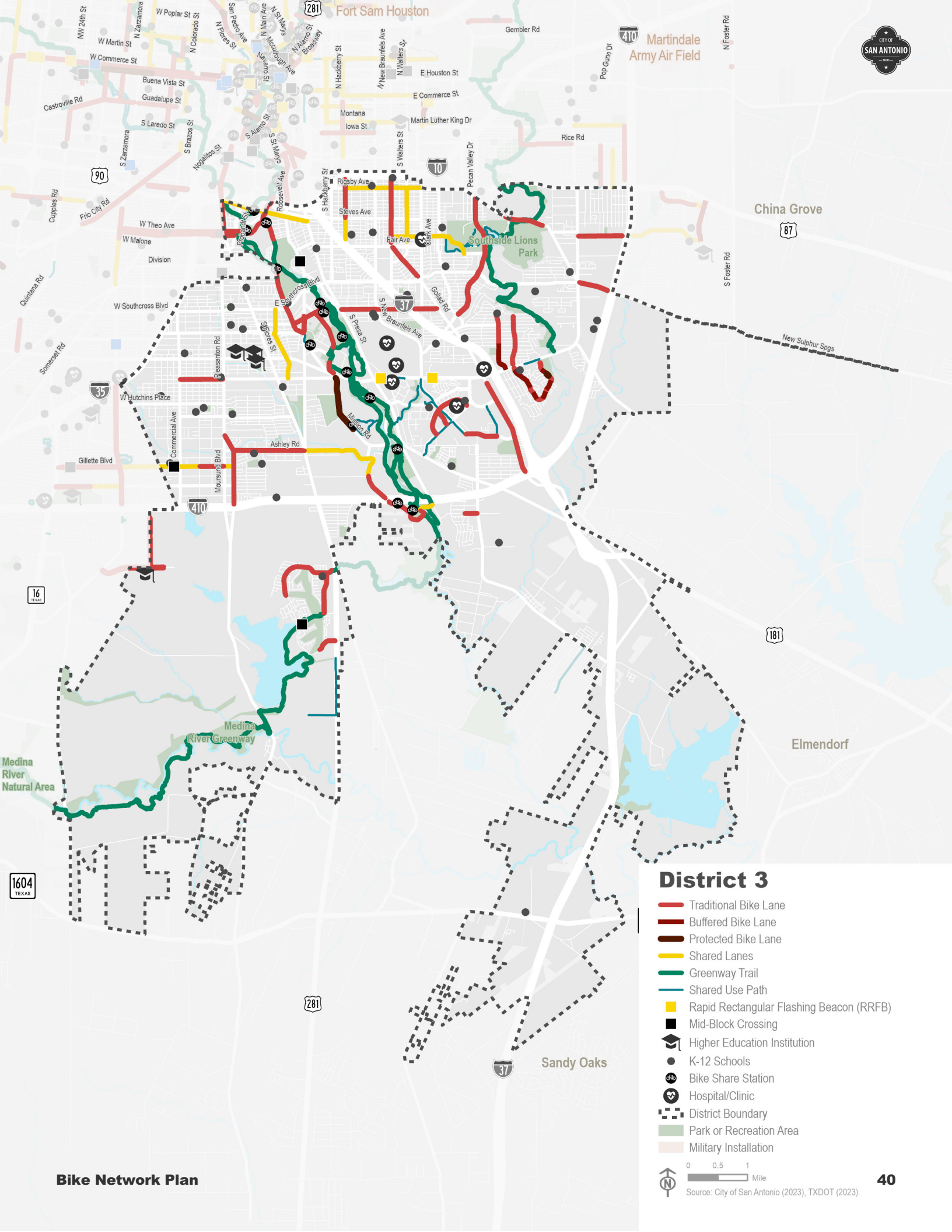
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO_2 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 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%

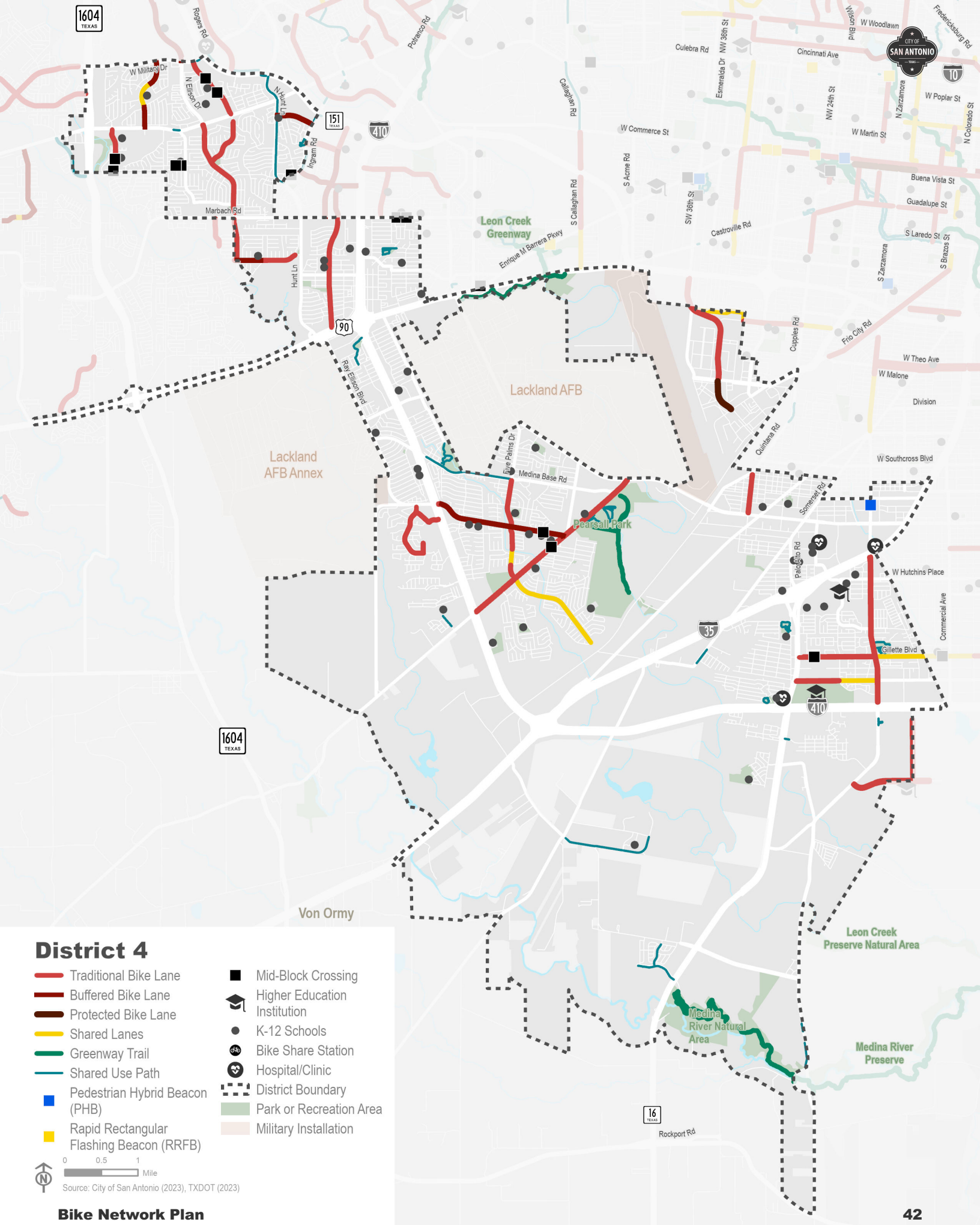
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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.



District 4

- 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 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%

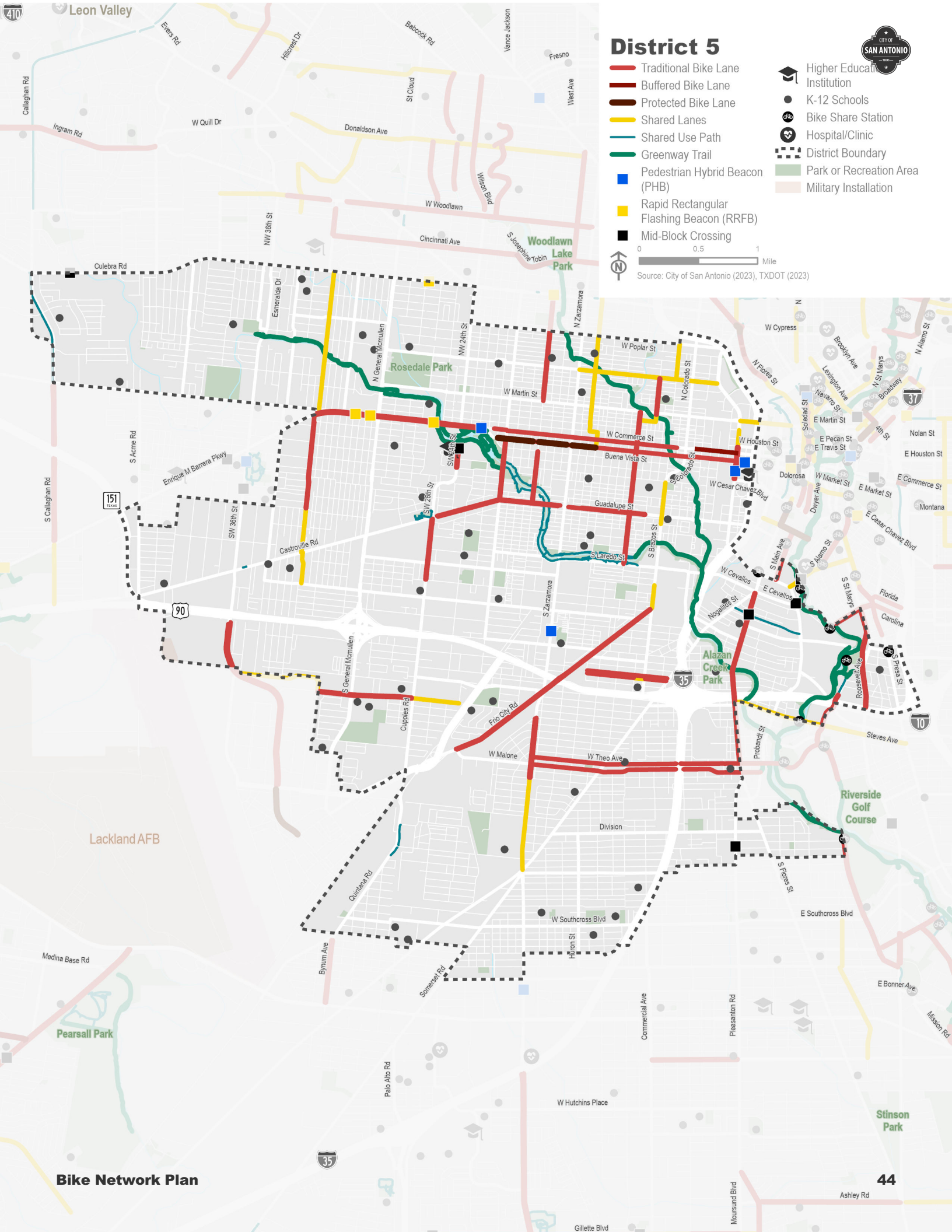
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO2 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)
Leon Valley
Culebra Rd
W Woodlawn
Cincinnati Ave
Woodlawn Lake Park
Rosedale Park
W Martin St
W Commerce St
Buena Vista St
Guadalupe St
W Cesar Chavez Blvd
W Houston St
W Poplar St
W Cypress
Castroville Rd
Enrique M Barrera Pkwy
W Malone
W Theo Ave
Division
Frio City Rd
Cupples Rd
Alazan Creek Park
Riverside Golf Course
Lackland AFB
Pearsall Park
Medina Base Rd
W Hutchins Place
Stinson Park
E Southcross Blvd
W Southcross Blvd
Steves Ave
Florida
Carolina
E Commerce St
E Market St
E Cesar Chavez Blvd
Montana
Nolan St
E Houston St
E Martin St
E Pecan St
E Travis St
Ashley Rd
Gillette Blvd
Bike Network Plan
44

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%

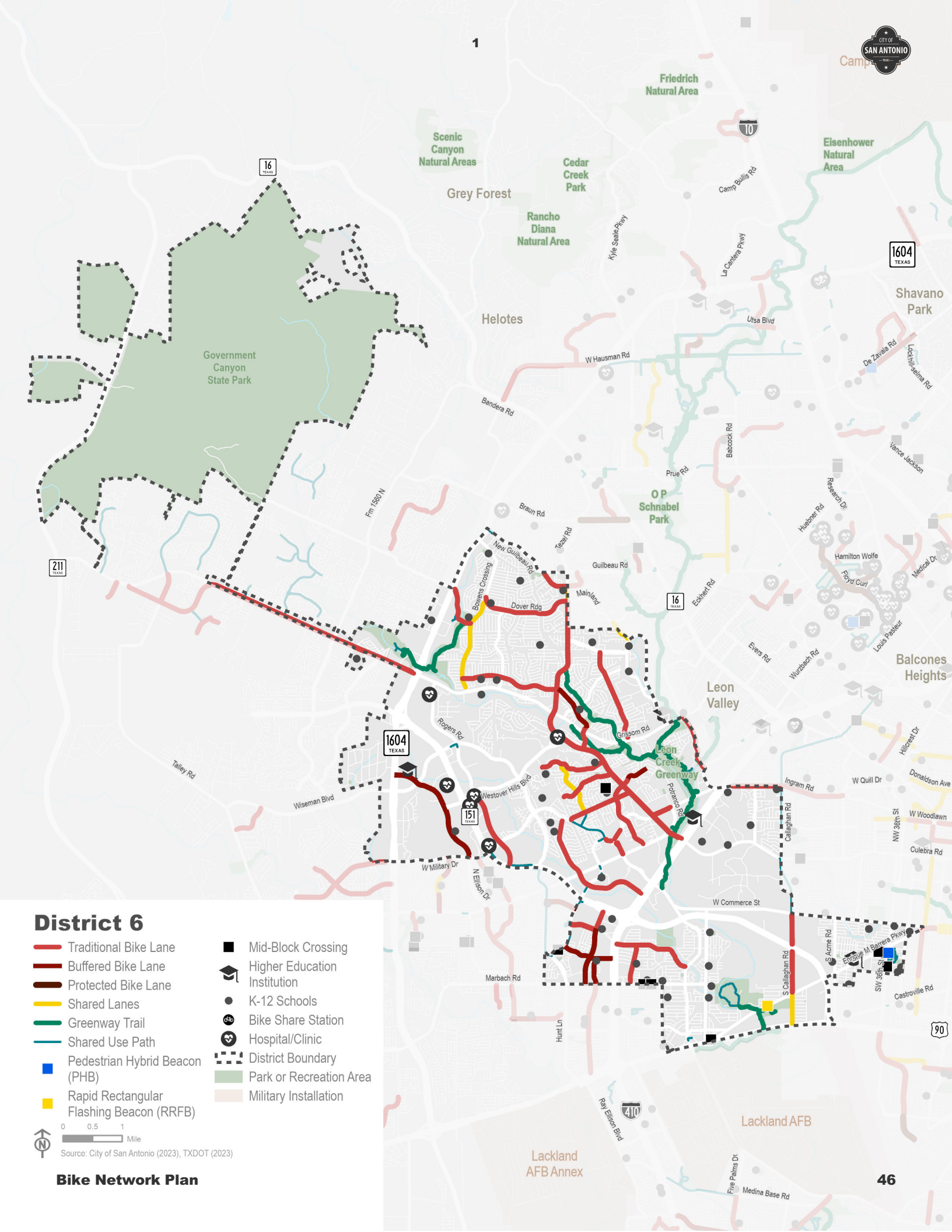
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO_2 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)

Bike Network Plan

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%

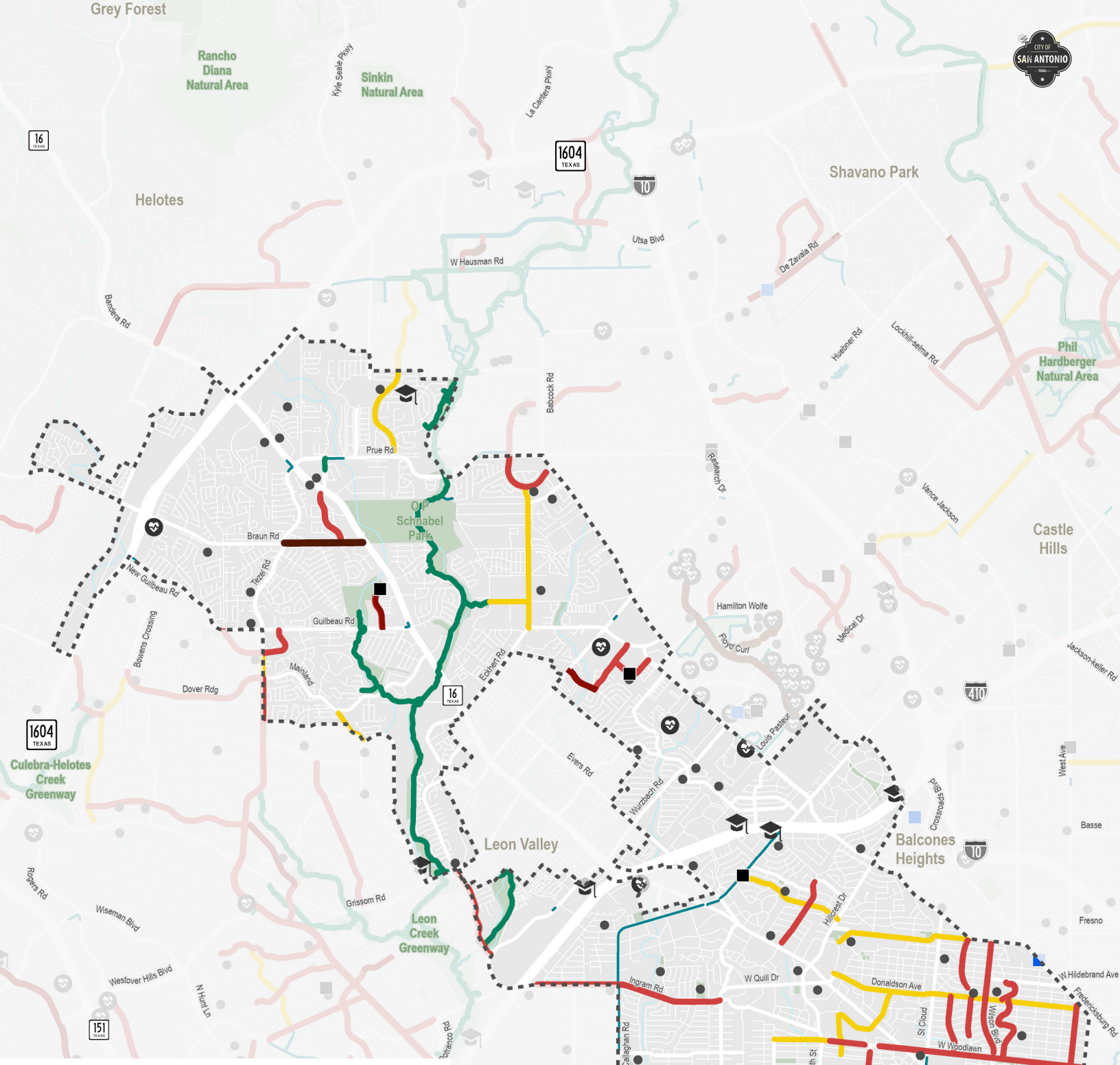
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO_2 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)

Bike Network Plan

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%

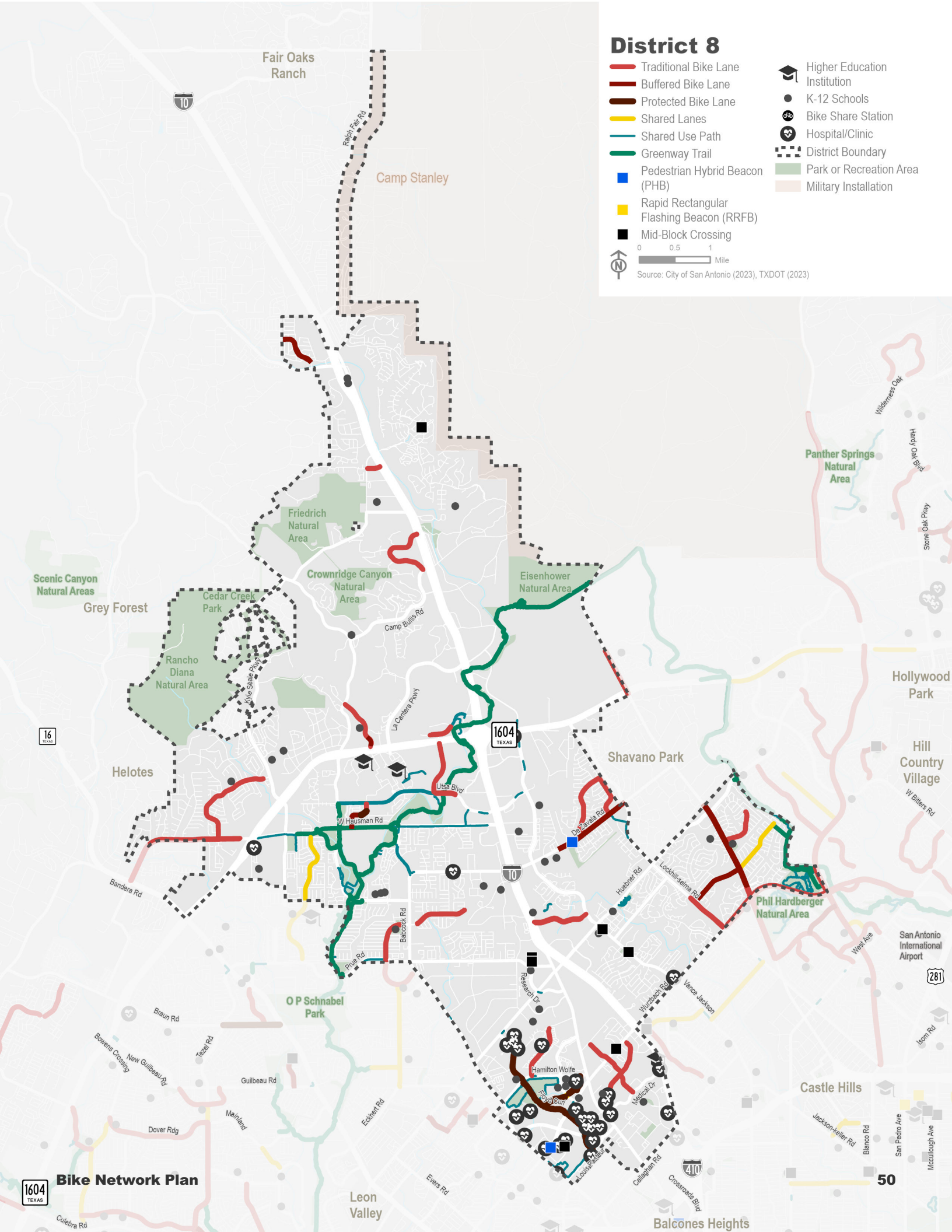
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 CO_2 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
Bandera Rd
Babcock Rd
Prue Rd
W Hausman Rd
Utsa Blvd
Shavano Park
De Zavala Rd
Huebner Rd
Lockhill-selma Rd
Phil Hardberger Natural Area
Hollywood Park
Hill Country Village
W Bitters Rd
Panther Springs Natural Area
Wilderness Oak
Hardy Oak Blvd
Stone Oak Pkwy
San Antonio International Airport
West Ave
O P Schnabel Park
Braun Rd
Bowens Crossing
New Guilbeau Rd
Tezel Rd
Guilbeau Rd
Dover Rdg
Mainland
Eckhert Rd
Research Dr
Wurzbach Rd
Vance Jackson
Ism Rd
Hamilton Wolfe
Floyd Curl
Medical Dr
Louis Pasteur
Callaghan Rd
Crossroads Blvd
Castle Hills
Jackson-keller Rd
Blanco Rd
San Pedro Ave
Mcculloch Ave
Evers Rd
Leon Valley
Culebra Rd
Balcones Heights
1604
TEXAS
10
16
281
410

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%

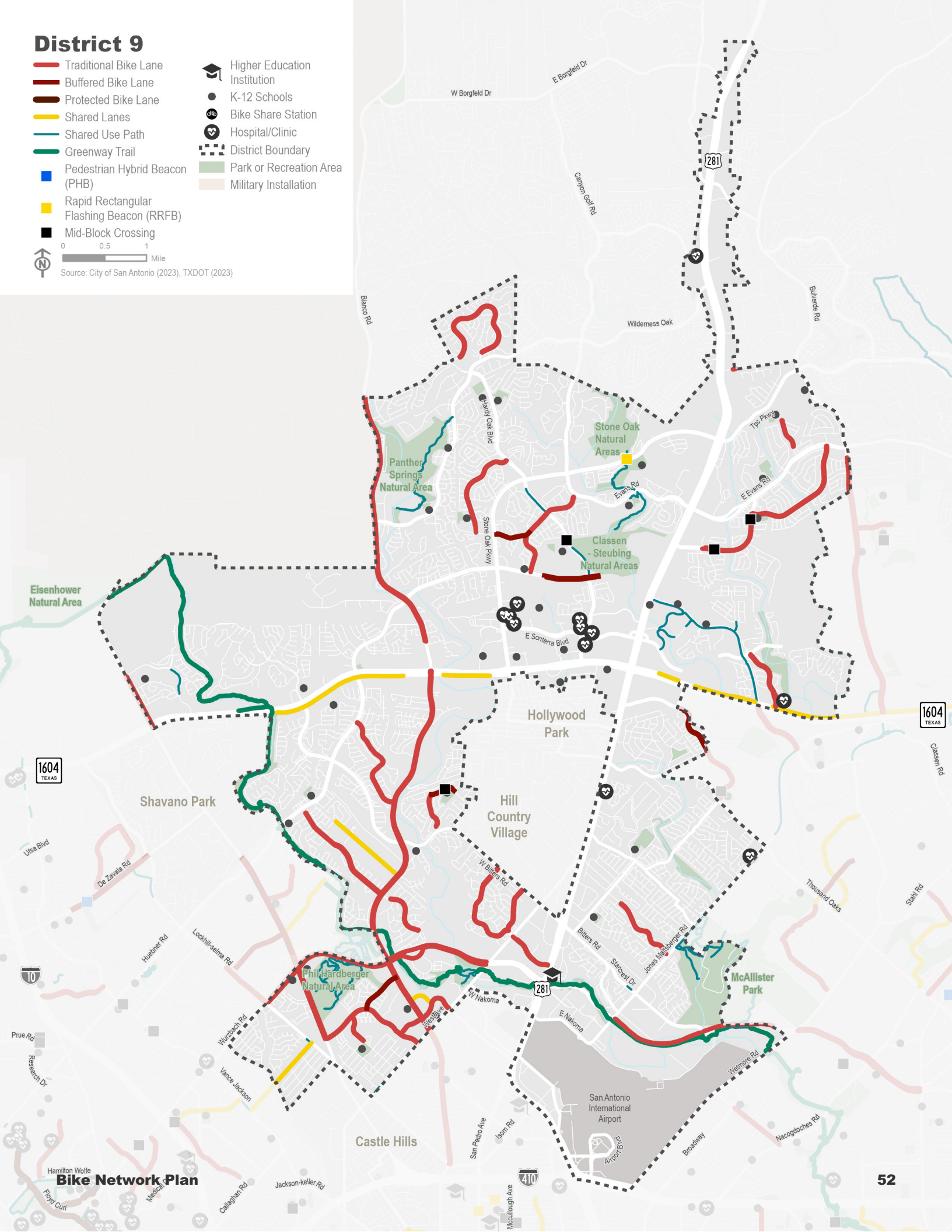
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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
281
Blanco Rd
Wilderness Oak
Bulverde Rd
Hardy Oak Blvd
Stone Oak Natural Areas
Panther Springs Natural Area
Tpc Pkwy
Evans Rd
E Evans Rd
Stone Oak Pkwy
Classen - Steubing Natural Areas
Eisenhower Natural Area
E Sonterra Blvd
Hollywood Park
1604 TEXAS
Classen Rd
Shavano Park
Hill Country Village
Ulsa Blvd
De Zavala Rd
W Bitters Rd
Thousand Oaks
Stahl Rd
Huebner Rd
Lockhill-selma Rd
10
Bitters Rd
Jones Maltsberger Rd
Starcrest Dr
McAllister Park
Phil Hardberger Natural Area
W Nakoma
E Nakoma
Westlake
Wurzbach Rd
Prue Rd
Research Dr
Vance Jackson
Wetmore Rd
San Antonio International Airport
Airport Blvd
Broadway
Nacogdoches Rd
Castle Hills
San Pedro Ave
Isom Rd
Hamilton Wolfe
Floyd Curl
Medical
Callaghan Rd
Jackson-keller Rd
410
Mccullough Ave

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%

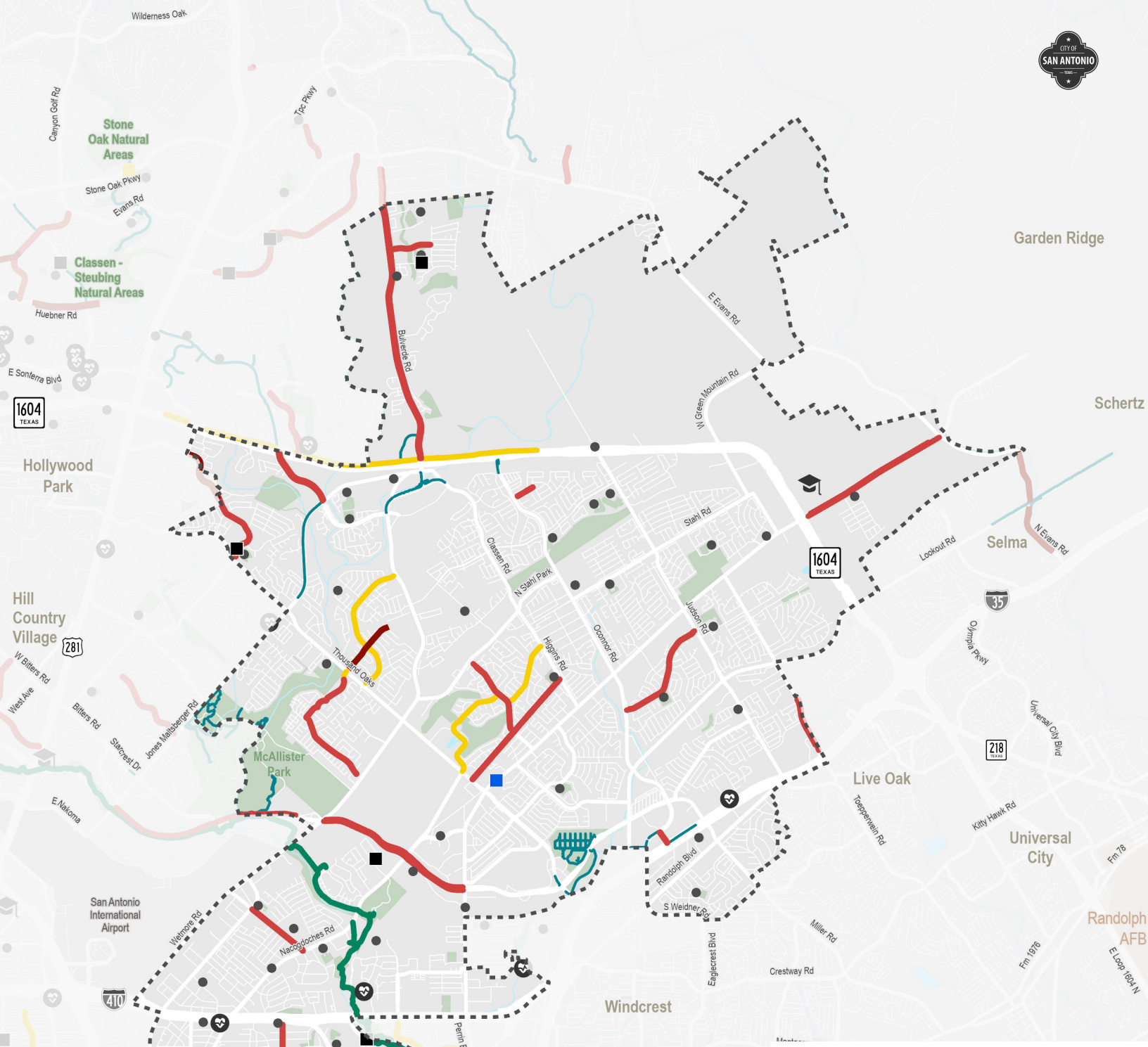
Source: SA2020 San Antonio City Council Profiles, US. Census Bureau, ACS 2021 5-year Estimates

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 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 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

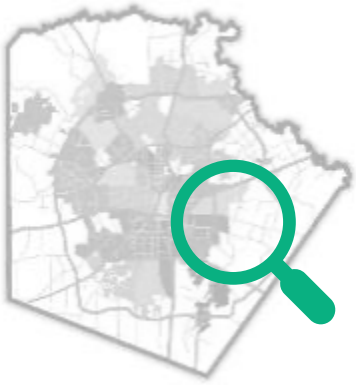
0 0.5 1 Mile

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

CHAPTER 6. SAN ANTONIO'S FUTURE BIKE NETWORK

CREATING A VISION FOR BIKING IN SAN ANTONIO

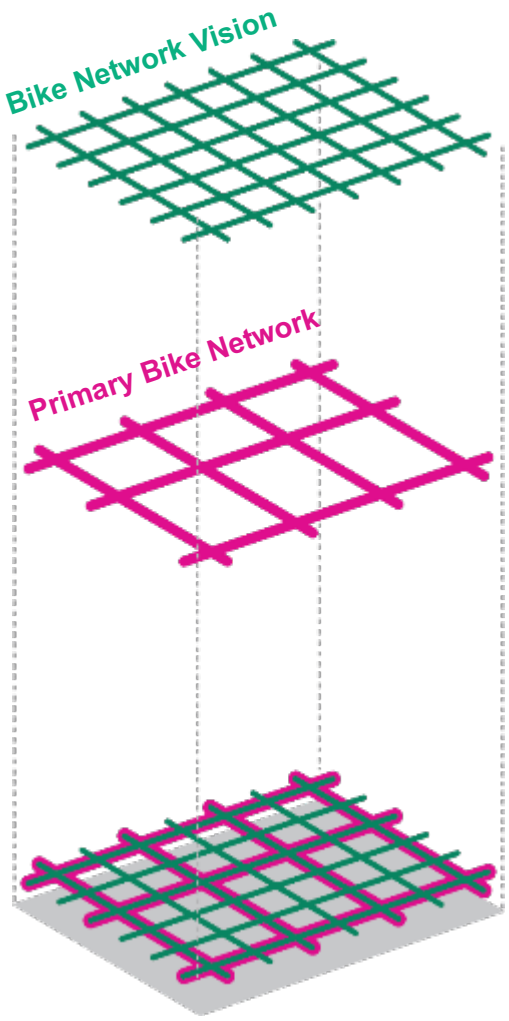
To make riding a bike a viable option for travel in San Antonio, a complete, connected bicycle network that is comfortable and safe for people of all ages and abilities is needed. Developing a bike network of this caliber creates reliable and attractive routes that expands access to jobs, education, and health, and improves the comfort and safety of not only bike riders, but all roadway users. Working with the City, the San Antonio Bike Network Plan creates a vision for a complete and connected bike network. The vision was developed through a multi-phase process that included:



Understand Biking Needs Today. Existing bike facilities were inventoried and evaluated to determine facility type and quality, demand for biking facilities, socioeconomic needs, and roadway characteristics that support bike infrastructure.

Create Vision for Biking in San Antonio. To create a vision for San Antonio's bike network, a comprehensive listing of routes that may benefit from bicycle facility improvements was developed. These included:

- Corridors that lack bike facilities, creating a gap in the local or regional bike network;
- Spot improvements, such as intersections lacking bike facilities or potential freeway, railroad, or river crossings;
- Locations where a low-stress bike facility can be developed;
- Corridors where strategic improvements can aid in expanding the region bike network, such as additional access to trailhead or new long-distance bike routes; and
- Locations identified by the public, stakeholders, and City staff that would benefit from improvement bike facilities.



Gaps in the network may be due to many factors, including but not limited to, inconsistent corridor development, physical constraints, and right-of-way issues. Filling in these gaps has the potential to link thousands of people to jobs and provide choices for convenient travel by foot or bicycle. For each route identified, an appropriate bike facility improvement was also identified to create an all ages and abilities network.

Identify Primary Bike Network. While the previous step created a long term vision for biking in San Antonio, the Primary Bike Network represents a collection of streets that create vital local and regional connections by biking. The Primary Bike Network a creates a system of on-street and off-street low-stress (high-comfort) facilities for people of all ages and abilities riding bicycles. On primary bike streets, the design and operation should prioritize people riding bicycles.

PHASING BIKE INFRASTRUCTURE INVESTMENTS

Once a complete set of infrastructure improvement needs were identified, a prioritization tool was developed to quantify the magnitude of each project's contribution to the overall vision and goals of the Bike Network Plan. The prioritization tool is a flexible approach, intended to provide clear direction for proactively seeking project funds and completing design and engineering of the most critical projects, while still allowing for opportunistic implementation of the entire network.

Five key prioritization categories were identified and weights were assigned based on their overall contribution to the goals of the BNP. Key prioritization criteria included:

- **Safety:** project addresses a location that has a history of bicycle-related crashes and provides a less stressful facility to users of all ages and abilities;
- **Demand and Connectivity:** project fills a gap in the system and improves bicycle access to key destinations, including critical facilities and transit;
- **Community Demand:** project supports needs identified by the public, local jurisdiction planning partners, stakeholders, and internal City staff;
- **Equity:** project serves an underserved area with population groups that traditionally rely on nonmotorized transportation; and
- **Feasibility:** project has few physical constraints and is a modest investment.

Based on the evaluation results, projects were grouped by needs of four tiers that represent priority for implementation. The actual implementation of these improvements will depend on several factors, including available funding, pace of development/growth, community feedback, and Council approval.

	Timeframe	Total Milage, Description, and *Project Opportunities*
Tier 1	1 – 5 years	**337 Miles** of very high priority projects that should be completed in the near term with minimal feasibility concerns that can be quickly deployed.
Tier 2	3 – 10 years	**733 Miles** of lower priority projects that also have minimal feasibility concerns or Priority Projects with more constraints
Tier 3	5 – 15 years	**420 Miles** of projects with serious feasibility concerns that are not a very high priority, but due to changing circumstances could become feasible or a higher priority.
Tier 4	10 – 25 years	**250 Miles** of long term visionary needs that should be implemented as opportunities arise.

CHAPTER 7. HOW THE BNP CAN IMPACT HEALTH IN SAN ANTONIO

HOW DOES THE BNP MOVE THE NEEDLE?

The BNP offers the opportunity for more connections to education and employment opportunities, more access to healthy foods, more places to comfortably exercise and play, and more ways for San Antonians to connect to each other. The metrics developed as part of the HIA process are all indicators of health impacts which are proven to have the potential to improve with the construction of a bike network like the one proposed in the BNP. These metrics are intended to provide tangible proof to San Antonians of how well the implementation of the BNP is meeting the stated goals. While most of these metrics will come with time, the following can be estimated now to demonstrate the potential impact the implementation of this plan will have:

Infrastructure and Mode Use	Safety and Comfort
Lane miles of shared use paths and separated bike facilities	% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

% of Population with Access to…			
• Grocery stores and healthy food • Median centers and healthcare	• Parks / Trails • Tourist destinations • Bikeshare facilities	• 3 or more destinations • Employment Centers	• Transit stops • K-8 Schools • Colleges and Universities

As with the baseline data, this data was pulled at the City level and for each City Council District to enable understanding of how much things change in each area. The numbers are reported for the following implementation phases:

- **Existing:** the infrastructure or access available in 2023, considered the baseline for the BNP planning effort.
- **Near Term (Tier 1 and 2):** the infrastructure or access which will be available after the Tier 1 and 2 projects from the BNP are completed. These projects often fill gaps and address low hanging fruit, rapidly expanding access for as many people as possible.
- **Long Term (Tier 3 and 4):** these numbers represent the full potential of the BNP, building on the access provided by the near term projects and expanding access in new areas or filling gaps.

Summary of Findings

As illustrated in the following pages, San Antonio will see substantial increases in terms of accessibility with the completion of Tier 1 and 2 recommendations, indicating the near term projects are meeting their goals of creating broad access quickly. With the additional projects recommended in the long term, San Antonio's bike network provides access to everyday needs like grocery stores, employment, transit, and schools to about three out of every four San Antonians.

On the other hand, while the BNP improves access to places like healthcare centers, tourist destinations, bikeshare stations, and Universities, overall access remains relatively low. This is due to the concentration of these locations in specific areas, meaning that people who live in other parts of the City have to travel longer distances to get to them. While the analysis performed as part of this study indicates there is limited access to these locations due to distance, the visionary network offers comfortable long-distance facilities that people could use to get to those destinations. Therefore, the analysis likely under-reports the percentage of San Antonians who could get to these locations, especially if people choose to take their bike on a bus and then bike the last mile, or if people use assistive technology available in E-Bikes to easily travel longer distances.

How Does Health in San Antonio Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

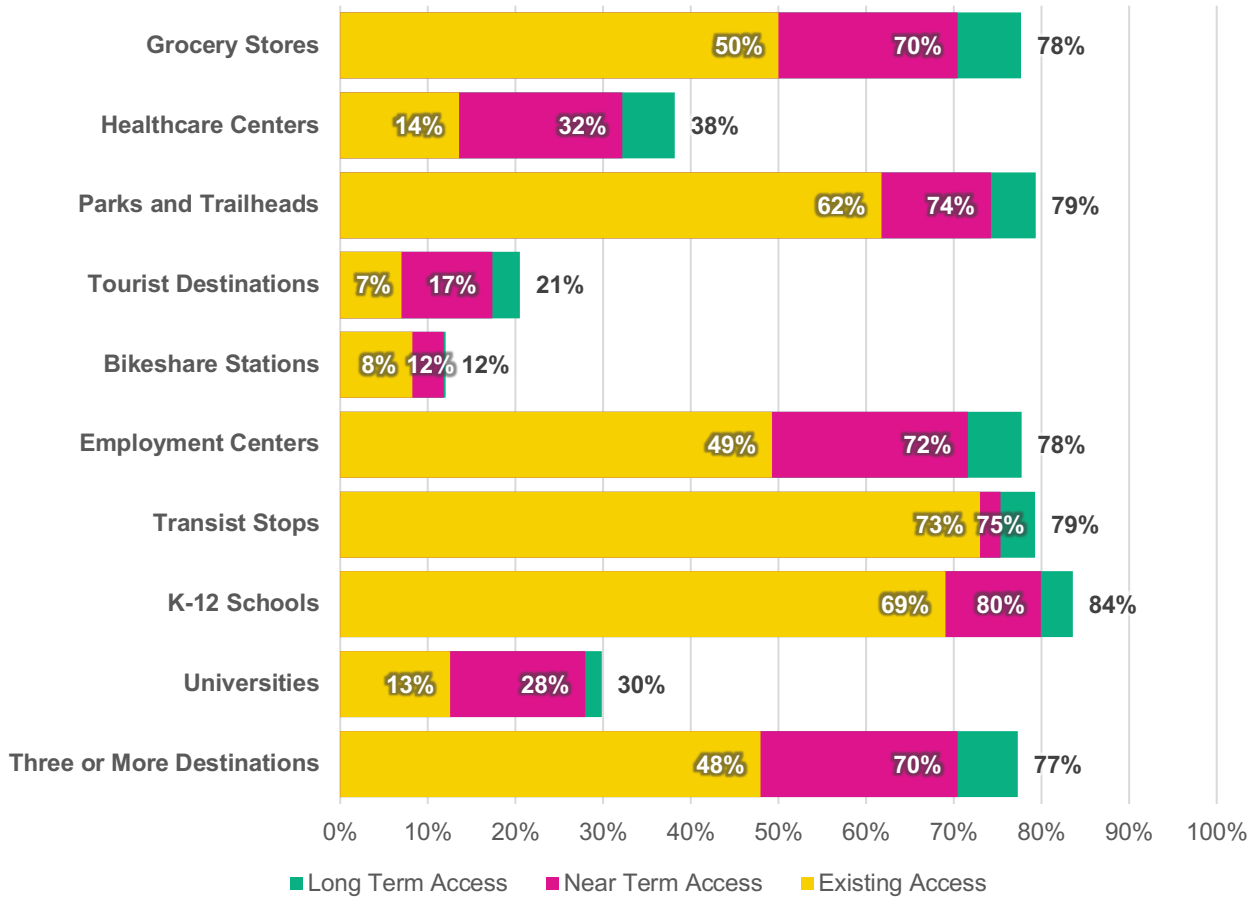
222	872	1,148
Existing	Near Term	Long Term

Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

73%	85%	89%
Existing	Near Term	Long Term

% of Population with Access to…



CITY COUNCIL DISTRICT 1

District 1 contains some of the most historic parts of San Antonio, and the concentration of destinations in areas like Downtown, Tobin Hill, and Southtown make this area one of the best candidates for travel by bike in the City. The BNP builds on this, with large jumps in access to critical destinations like San Antonio College, the UTSA Downtown Campus, the many tourist destinations, and healthcare. These increases in access build on District 1's urban nature to help create somewhere where cars are truly optional.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

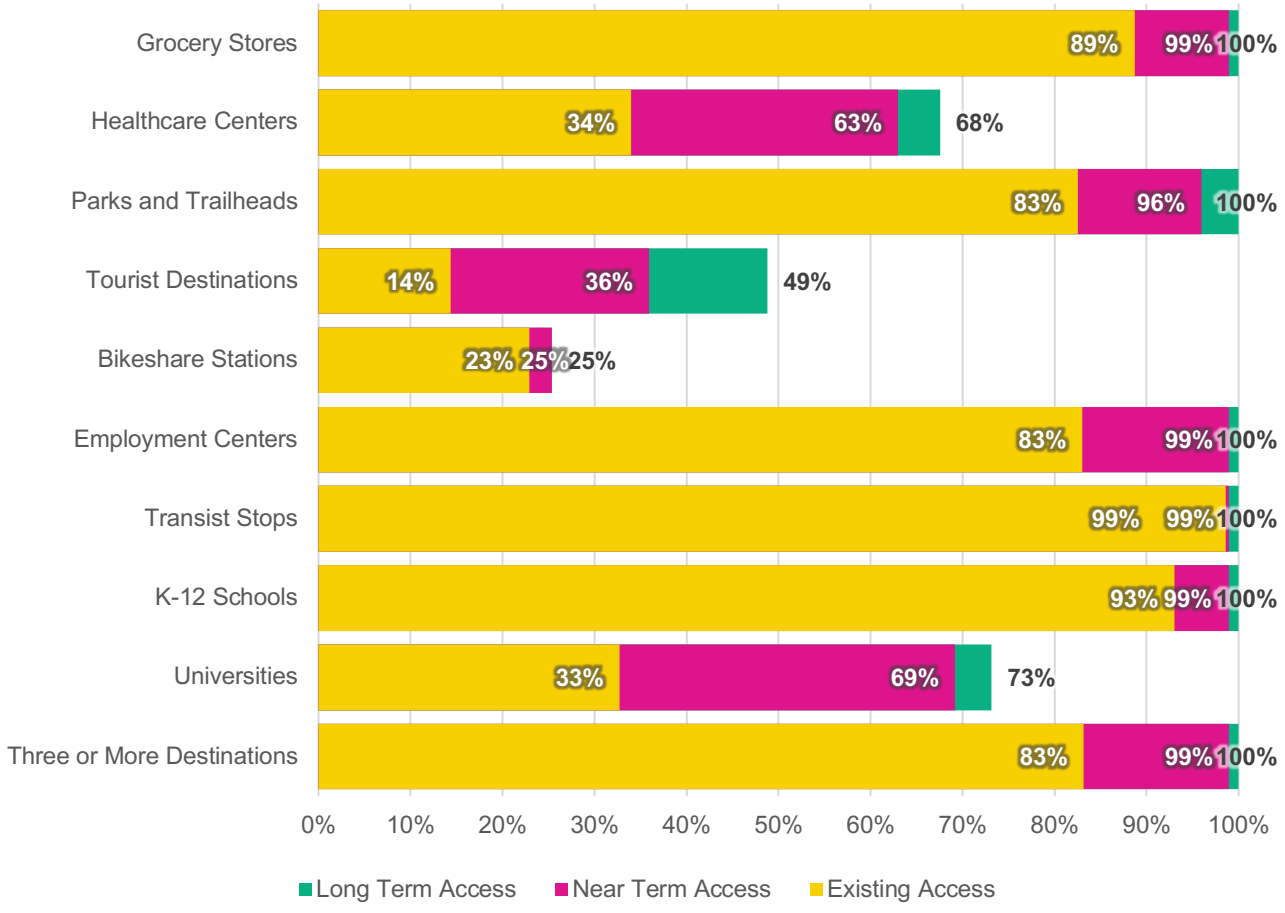
19	103	114
Existing	Near Term	Long Term

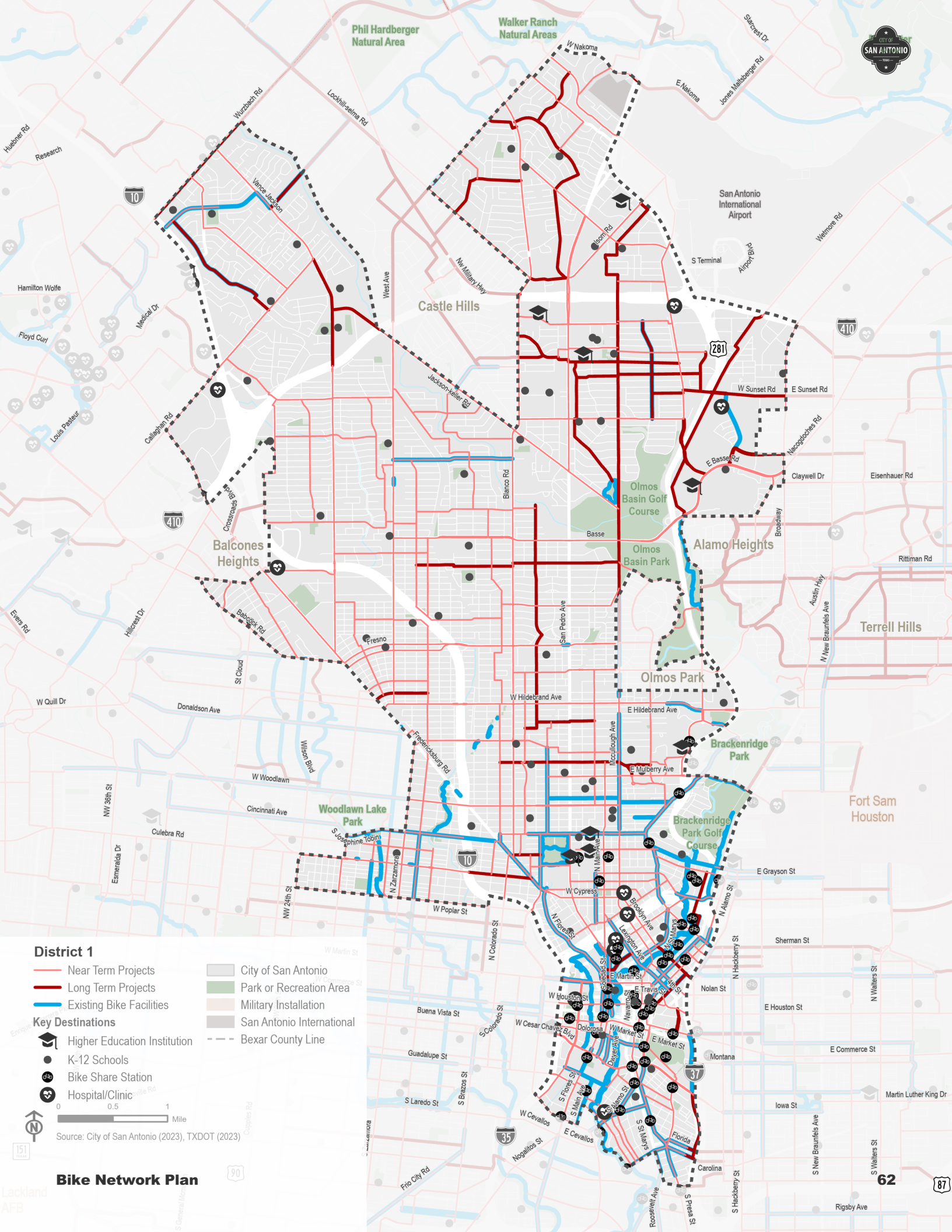
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

78%	90%	92%
Existing	Near Term	Long Term

% of Population with Access to…





District 1

- Near Term Projects
- Long Term Projects
- Existing Bike Facilities

Key Destinations

- Higher Education Institution
- K-12 Schools
- Bike Share Station
- Hospital/Clinic

- City of San Antonio
- Park or Recreation Area
- Military Installation
- San Antonio International
- Bexar County Line

0 0.5 1 Mile

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

Bike Network Plan

CITY COUNCIL DISTRICT 2

District 2 is home to a variety of destinations and generally has a grid street network that is supportive of walking and biking, but is bisected by several freeways that create barriers. The BNP offers the potential to build on that historic grid and overcome those barriers, significantly increasing access to everyday needs like grocery stores, employment, schools, and universities. Destinations like healthcare, tourist attractions, and bikeshare stations see lower increases in access because they are generally located further away from District 2.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

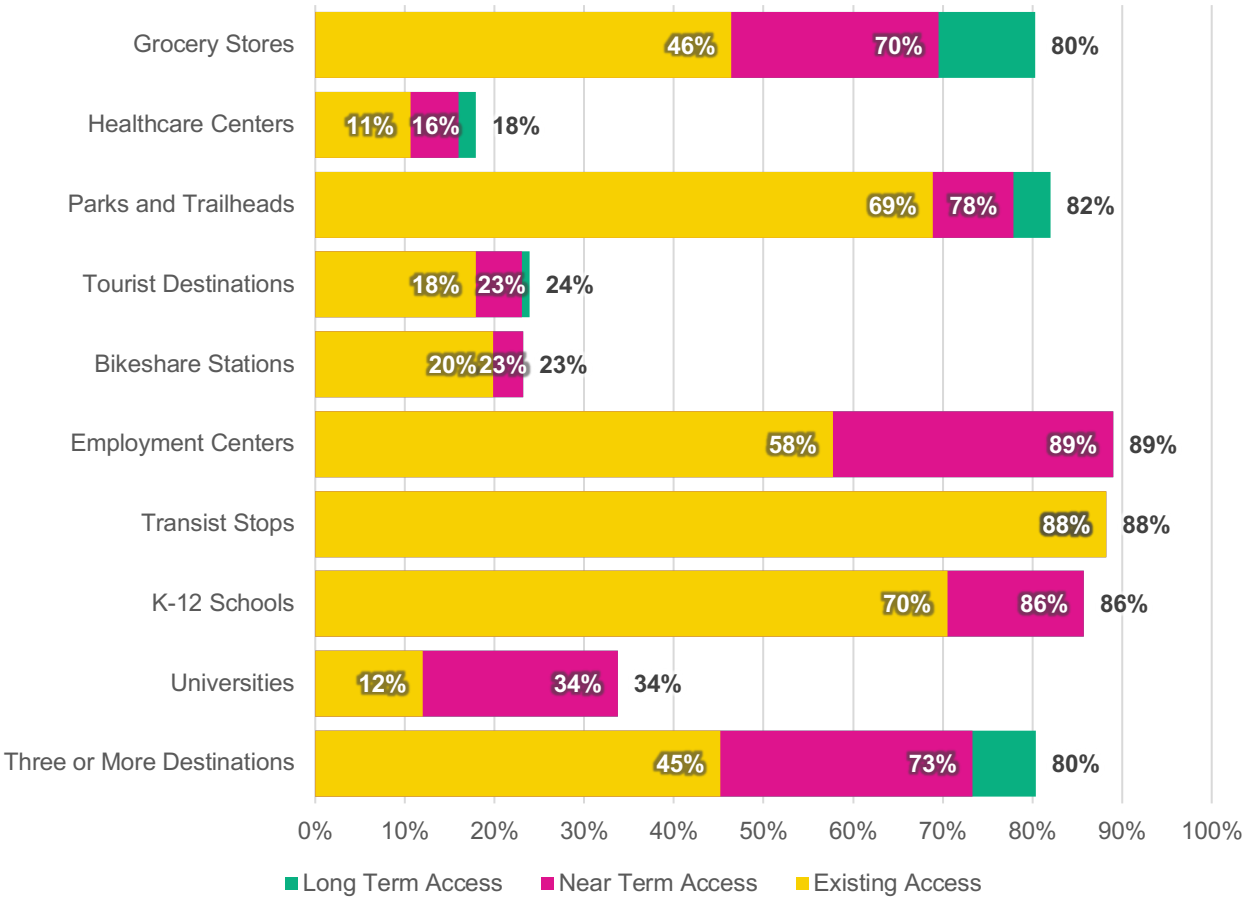
13	96	118
Existing	Near Term	Long Term

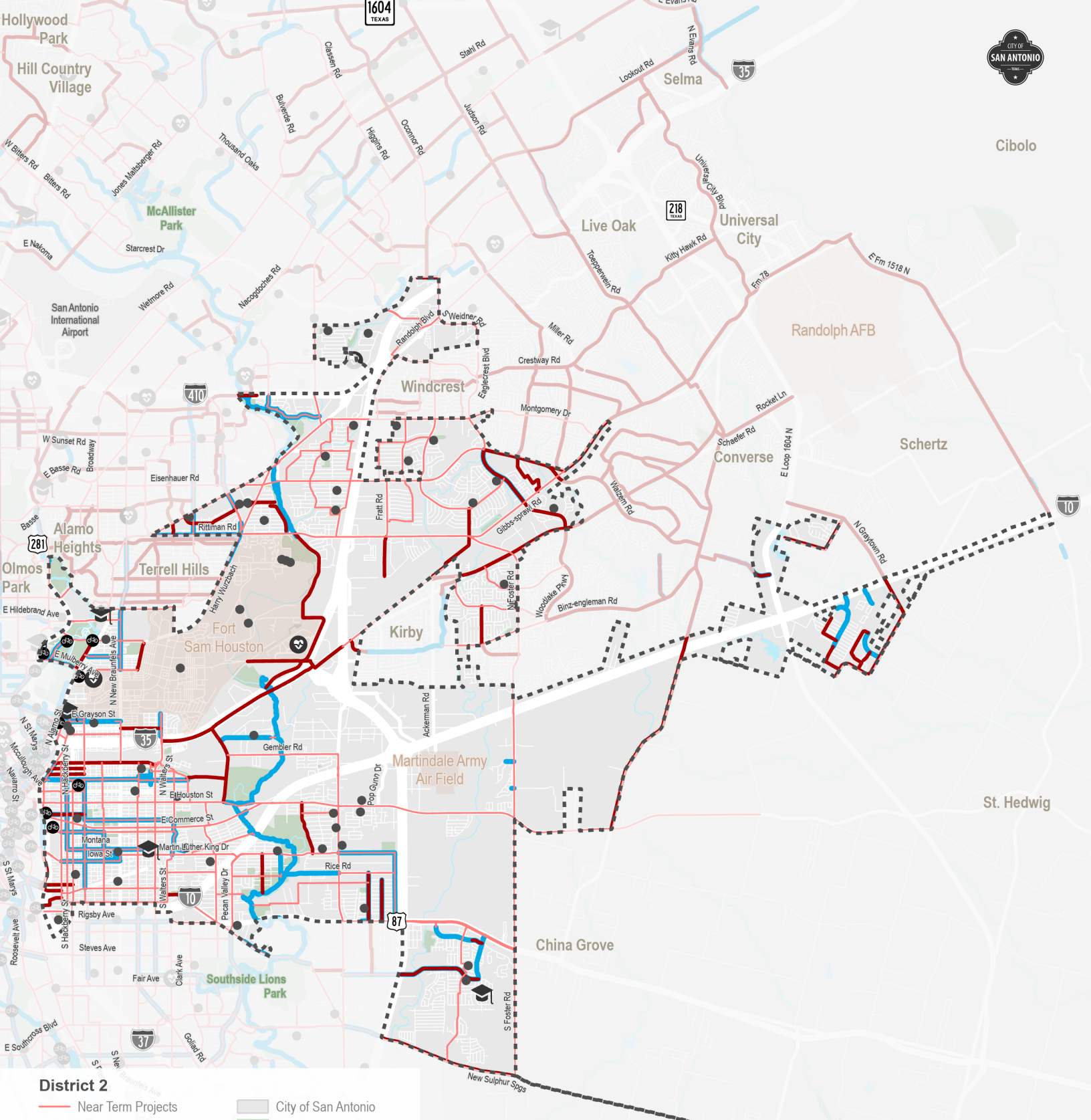
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

74%	85%	87%
Existing	Near Term	Long Term

% of Population with Access to…




Hollywood Park
Hill Country Village
San Antonio International Airport
McAllister Park
Alamo Heights
Olmos Park
Terrell Hills
Fort Sam Houston
Windcrest
Live Oak
Universal City
Randolph AFB
Selma
Cibolo
Schertz
Converse
Kirby
Martindale Army Air Field
China Grove
St. Hedwig
Southside Lions Park
Calaveras Lake Park
1604
TEXAS
410
281
35
10
87
37
218
181
Stahl Rd
Classen Rd
Blvd Rd
Jones Maltsberger Rd
Thousand Oaks
Higgins Rd
O'connor Rd
Judson Rd
Lookout Rd
N Evans Rd
Universal City Blvd
Kitty Hawk Rd
Toepperwein Rd
E Fm 1518 N
Fm 78
Rocket Ln
E Loop 1604 N
N Graytown Rd
Walzem Rd
Gibbs-sprawl Rd
Fratt Rd
Eagle Crest Blvd
Crestway Rd
Miller Rd
Randolph Blvd
S Weidner Rd
Montgomery Dr
Schaefer Rd
Binz-engleman Rd
Woodlake Pkwy
N Foster Rd
Ackerman Rd
Pop Gunn Dr
Gembler Rd
Rittiman Rd
Eisenhauer Rd
W Sunset Rd
E Basse Rd
Broadway
Harry Wurzbach
N New Braunfels Ave
E Hildebrand Ave
E Mulberry Ave
E Grayson St
N Alamo St
N St Marys
Mccullough Ave
Navarro St
S St Marys
Roosevelt Ave
S Hackberry St
Nacogdoches Rd
Wetmore Rd
E Nakoma
Starcrest Dr
W Bitters Rd
Bitters Rd
E Houston St
E Commerce St
Montana
Iowa St
Martin Luther King Dr
N Walters St
S Walters St
Rice Rd
Pecan Valley Dr
Rigsby Ave
Steves Ave
Fair Ave
Clark Ave
E Southcross Blvd
Goliad Rd
S Foster Rd
New Sulphur Spgs
District 2
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
0 0.5 1
Mile
N
Source: City of San Antonio (2023), TXDOT (2023)

CITY COUNCIL DISTRICT 3

People who live in District 3 enjoy great access to transit, schools, and parks and trailheads today and the BNP is poised to increase that access. District 3 also has the most miles of shared use paths and separated bike facilities in San Antonio. With the BNP, District 3 will see significant increases in access to employment centers, healthcare, universities, tourist destinations, and bikeshare stations.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

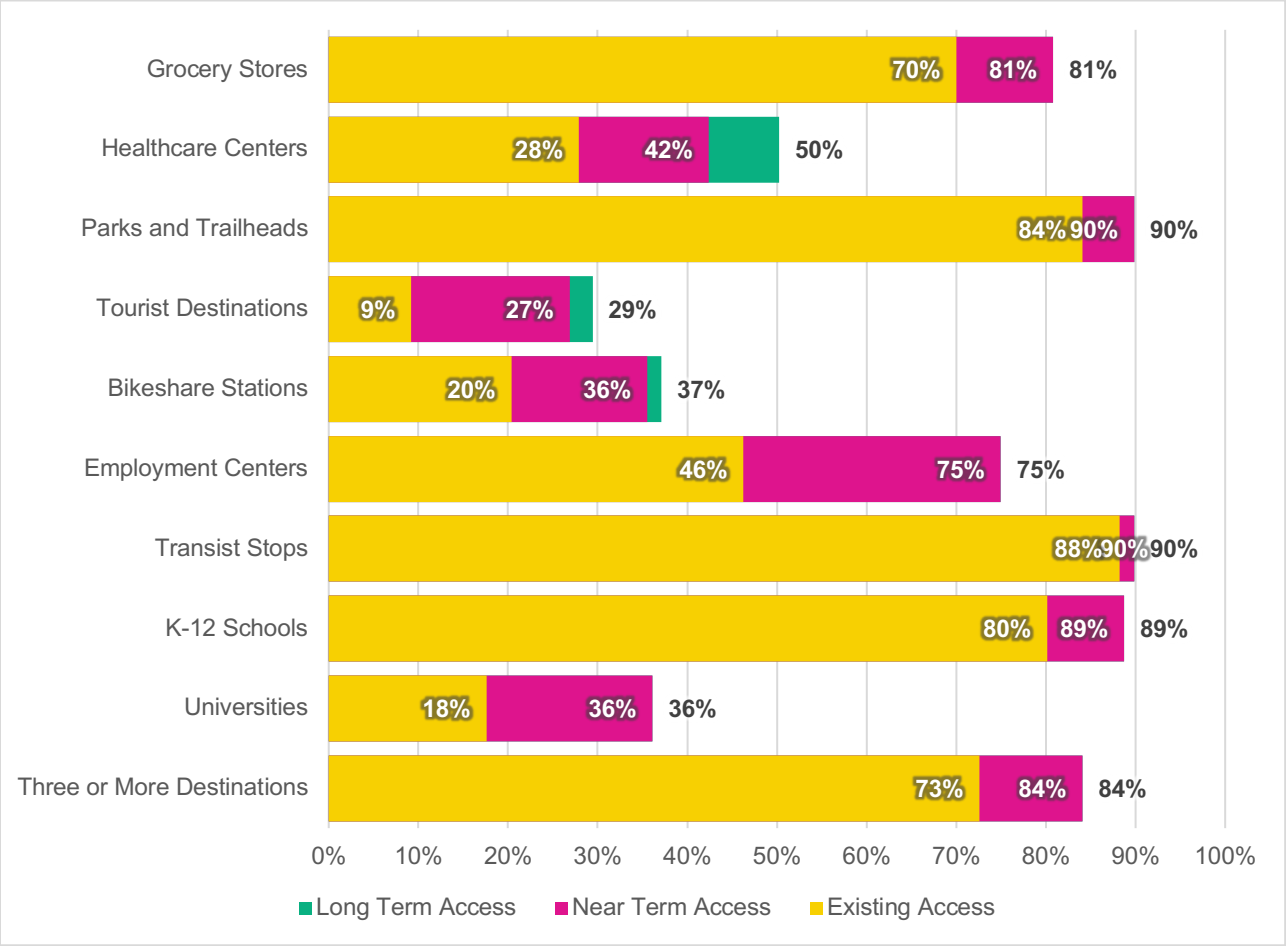
49	135	161
Existing	Near Term	Long Term

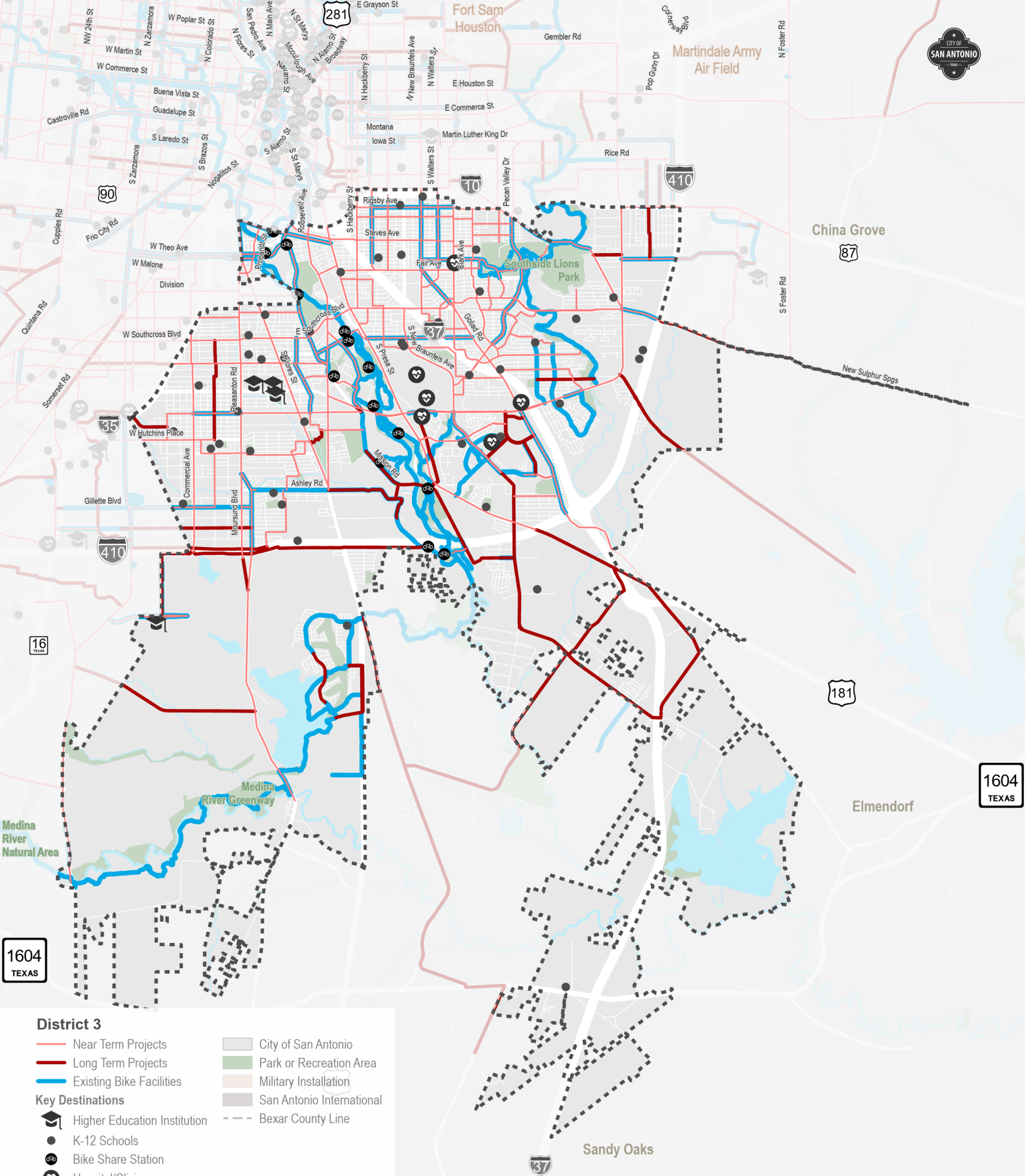
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

74%	86%	89%
Existing	Near Term	Long Term

% of Population with Access to…




District 3
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
0 0.5 1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
Fort Sam Houston
Martindale Army Air Field
China Grove
Southside Lions Park
Medina River Greenway
Medina River Natural Area
Elmendorf
Sandy Oaks
Gembler Rd
E Houston St
E Commerce St
Martin Luther King Dr
Rice Rd
Rigsby Ave
Steves Ave
Fair Ave
W Southcross Blvd
Ashley Rd
Gillette Blvd
W Hutchins Place
W Theo Ave
W Malone
Division
Frio City Rd
Castroville Rd
Guadalupe St
Buena Vista St
W Commerce St
W Martin St
W Poplar St
E Grayson St
New Sulphur Spgs
Gollad Rd
Mission Rd
Pleasanton Rd
Commercial Ave
Moursund Blvd
S Flores St
S Presa St
S New Braunfels Ave
S Foster Rd
N Foster Rd
Pecan Valley Dr
S Walters St
N Walters St
N Hackberry St
S Hackberry St
Roosevelt Ave
S Alamo St
N Alamo St
S St Marys
N St Marys
S Laredo St
S Brazos St
Nogalitos St
S Zarzamora
N Zarzamora
N Main Ave
San Pedro Ave
N Flores St
N Colorado St
NW 24th St
Quintana Rd
Somerset Rd
Cupples Rd
Probandt St
Clark Ave
Pop Glunn Dr
Cornerway Blvd
281
410
10
90
87
37
35
16
181
1604
TEXAS

CITY COUNCIL DISTRICT 4

District 4 is changing rapidly with the redevelopment of Port San Antonio. Therefore, it is likely access will improve more than can be predicted today. Ultimately, the BNP has the potential for create large increases in access to employment centers, healthcare, and grocery stores. Additionally, residents will also see increases in access to schools and parks and trailheads, among other destinations.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

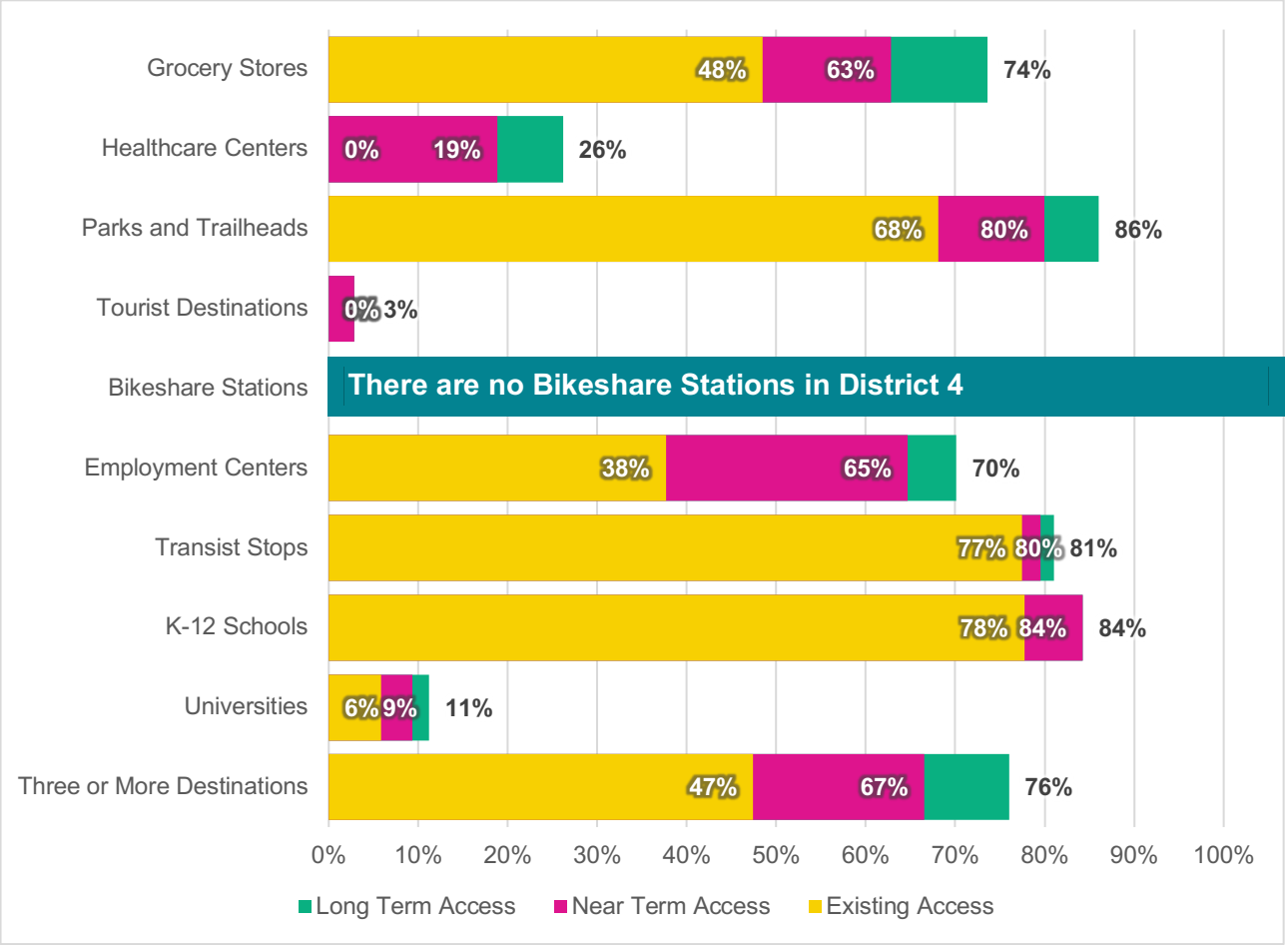
Existing	Near Term	Long Term
15	75	114

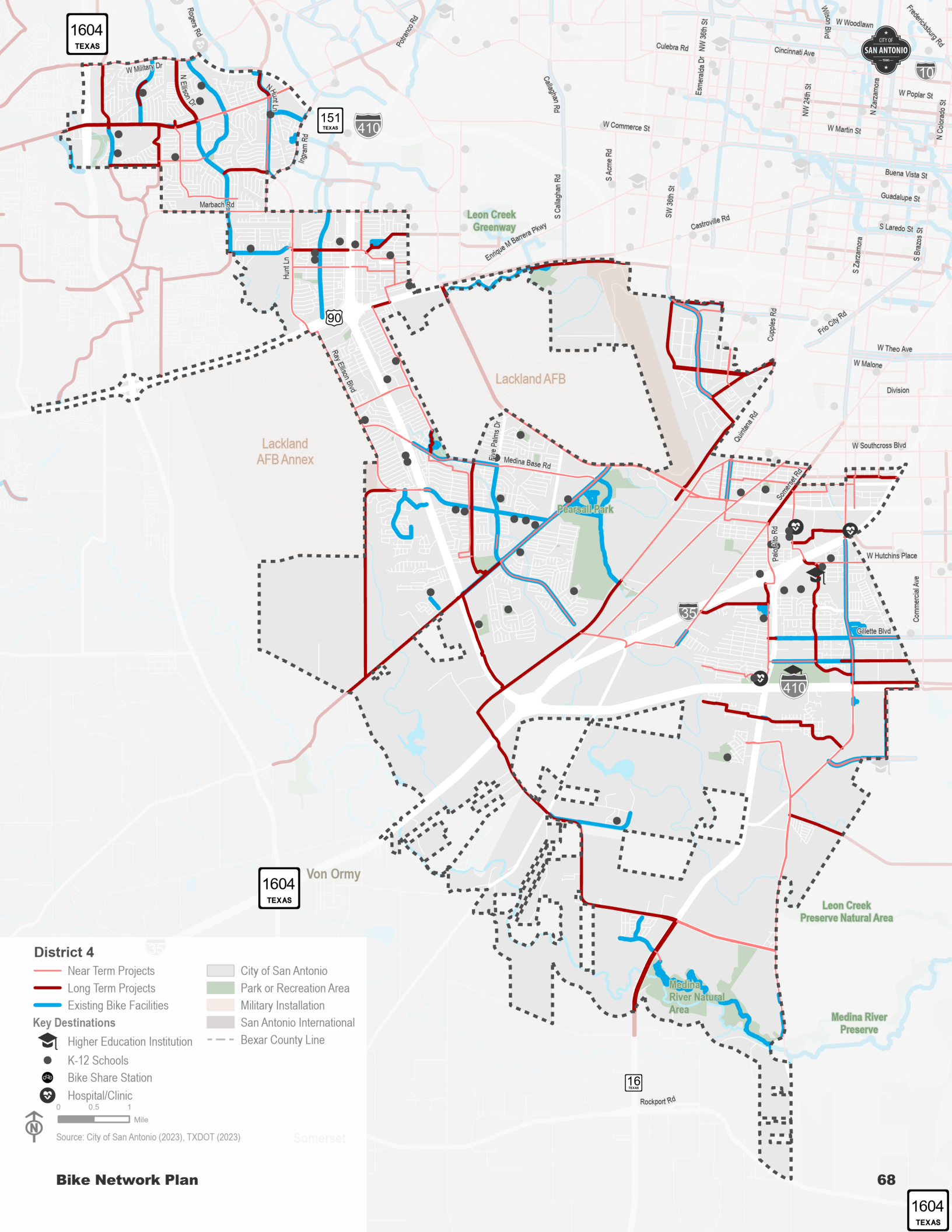
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

Existing	Near Term	Long Term
66%	79%	83%

% of Population with Access to…




1604
TEXAS
W Military Dr
N Ellison Dr
N Hunt Ln
Rogers Rd
Potranco Rd
151
TEXAS
410
Ingram Rd
Marbach Rd
Hunt Ln
90
Leon Creek
Greenway
Enrique M Barrera Pkwy
Callaghan Rd
S Acme Rd
SW 36th St
Culebra Rd
NW 36th St
Esmeralda Dr
Cincinnati Ave
Wilson Blvd
W Woodlawn
Fredericksburg Rd
CITY OF
SAN ANTONIO
10
NW 24th St
N Zarzamora
W Poplar St
N Colorado St
W Commerce St
W Martin St
Buena Vista St
Guadalupe St
Castroville Rd
S Laredo St
S Brazos St
S Zarzamora
Cupples Rd
Frio City Rd
W Theo Ave
W Malone
Division
Rai Ellison Blvd
Lackland AFB
Lackland
AFB Annex
Five Palms Dr
Medina Base Rd
Quintana Rd
W Southcross Blvd
Somerset Rd
Pearsall Park
Palo Alto Rd
W Hutchins Place
Commercial Ave
35
Gillette Blvd
410
1604
TEXAS
Von Ormy
Leon Creek
Preserve Natural Area
Medina
River Natural
Area
Medina River
Preserve
16
TEXAS
Rockport Rd
Somerset
District 4
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
0
0.5
1
Mile
N
Source: City of San Antonio (2023), TXDOT (2023)

CITY COUNCIL DISTRICT 5

District 5 is built on a gridded street network which is well suited to travel by bike. As such, the district already has great access to places like grocery stores, parks and trailheads, transit, and K-12 schools. With the BNP, the district will see big jumps in access to Universities like UTSA Downtown Campus and Our Lady of the Lake University, tourist destinations, healthcare, bikeshare stations, and employment.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

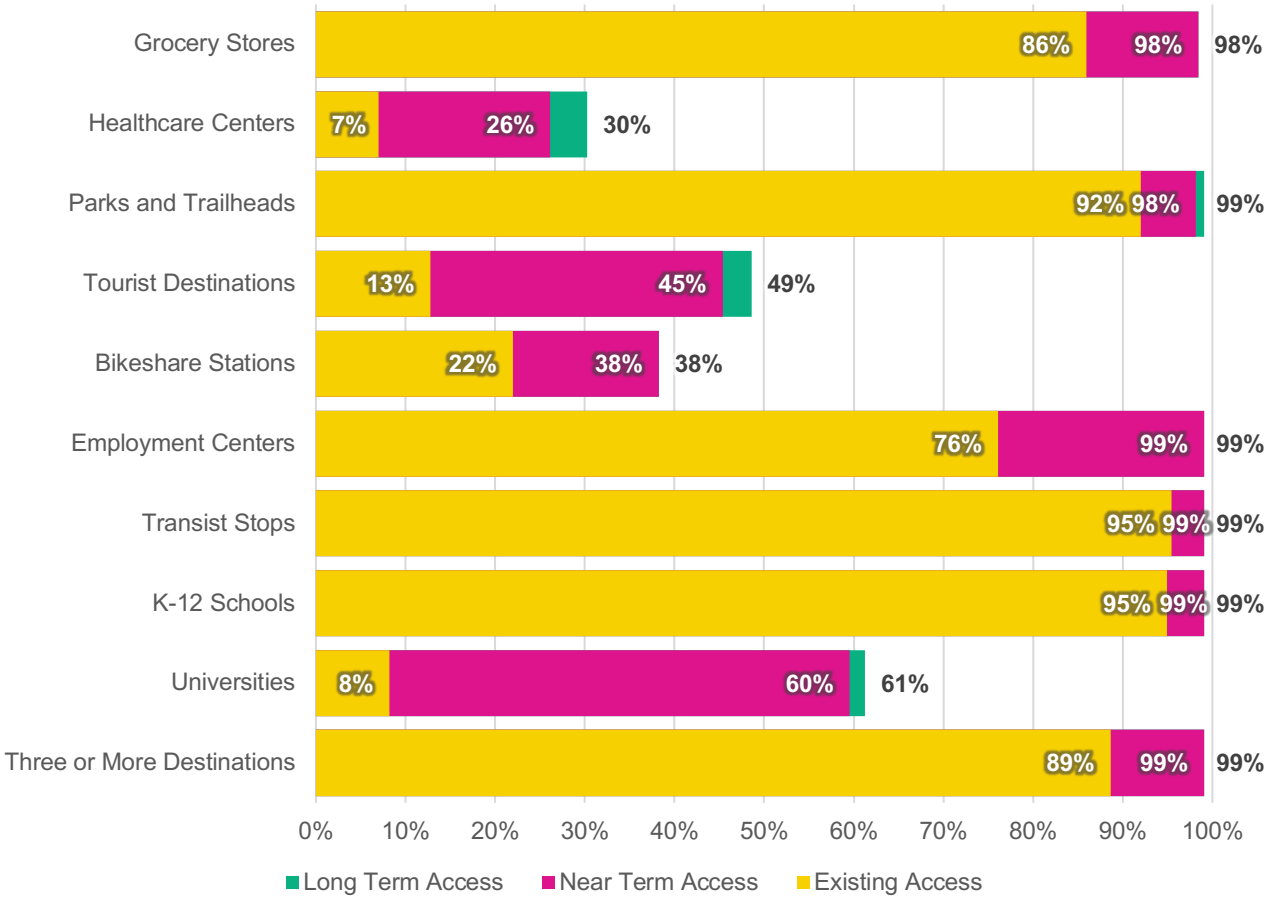
22	91	93
Existing	Near Term	Long Term

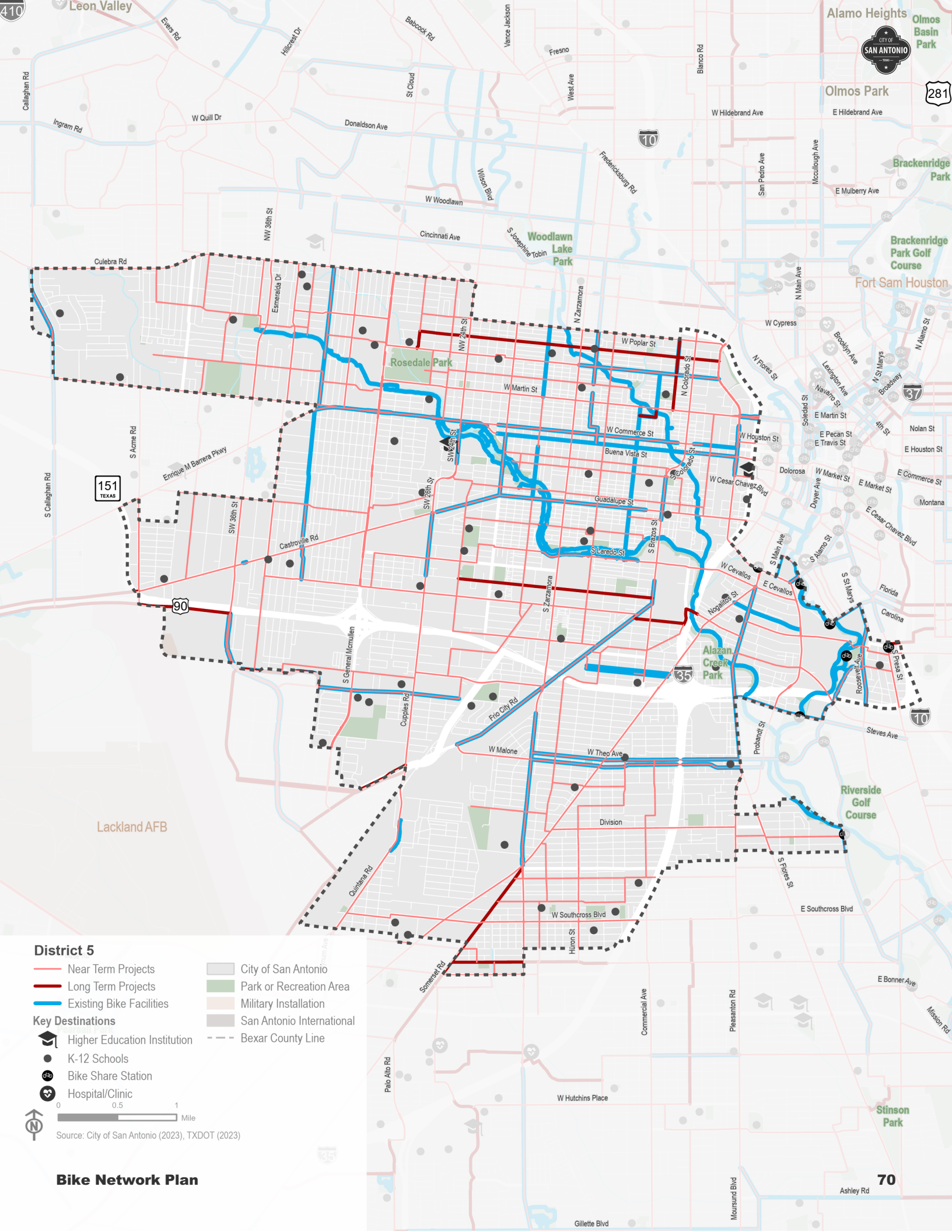
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

83%	97%	97%
Existing	Near Term	Long Term

% of Population with Access to…




District 5
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
0
0.5
1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
Bike Network Plan
Leon Valley
Alamo Heights
Olmos Basin Park
Olmos Park
Brackenridge Park
Brackenridge Park Golf Course
Fort Sam Houston
Woodlawn Lake Park
Rosedale Park
Alazan Creek Park
Riverside Golf Course
Stinson Park
Lackland AFB
Culebra Rd
W Woodlawn
Cincinnati Ave
Donaldson Ave
W Quill Dr
Ingram Rd
Callaghan Rd
Evers Rd
Hillcrest Dr
Babcock Rd
Vance Jackson
Fresno
St Cloud
West Ave
Blanco Rd
W Hildebrand Ave
E Hildebrand Ave
Fredericksburg Rd
Wilson Blvd
San Pedro Ave
Mccullough Ave
E Mulberry Ave
NW 36th St
Esmeralda Dr
S Josephine Tobin
N Zarzamora
NW 24th St
W Poplar St
N Colorado St
W Martin St
W Commerce St
Buena Vista St
Guadalupe St
S Laredo St
S Colorado St
S Brazos St
W Houston St
W Cesar Chavez Blvd
E Cesar Chavez Blvd
N Main Ave
W Cypress
N Flores St
Brooklyn Ave
Lexington Ave
Navarro St
Soledad St
N St Marys
Broadway
N Alamo St
E Martin St
E Pecan St
E Travis St
4th St
Nolan St
E Houston St
Dolorosa
W Market St
E Market St
E Commerce St
Dwyer Ave
Montana
S Alamo St
S Main Ave
W Cevallos
E Cevallos
Nogalitos St
S St Marys
Florida
Carolina
Presa St
Roosevelt Ave
Probandt St
Steves Ave
S Zarzamora
S General Mcmullen
Cupples Rd
Frio City Rd
W Malone
W Theo Ave
Division
Quintana Rd
S Flores St
E Southcross Blvd
W Southcross Blvd
Hiuron St
Somerset Rd
Commercial Ave
Pleasanton Rd
E Bonner Ave
Mission Rd
Palo Alto Rd
W Hutchins Place
Ashley Rd
Moursund Blvd
Gillette Blvd
S Acme Rd
Enrique M Barrera Pkwy
Castroville Rd
SW 36th St
SW 26th St
SW 24th St
S Callaghan Rd
151
TEXAS
90
35
10
37
281
410

CITY COUNCIL DISTRICT 6

District 6 currently has disconnected development patterns that create longer distances between destinations. That said, with the BNP, District 6 residents could see substantial increase in access to many destinations, including grocery stores, healthcare, parks and trailheads, and employment. Additionally, the district could see a greater than 100% increase in access to three or more destinations.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

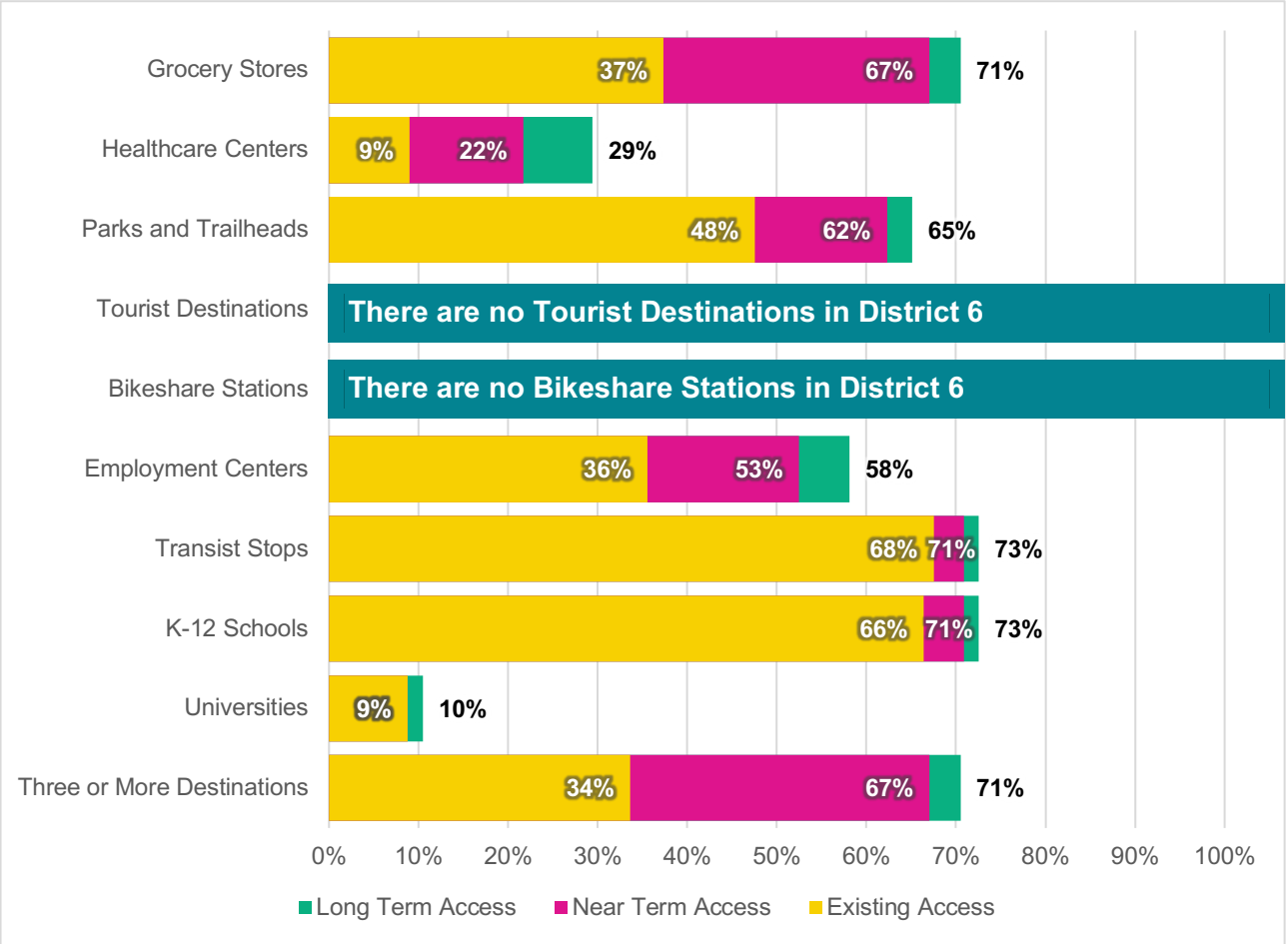
Existing	Near Term	Long Term
20	70	99

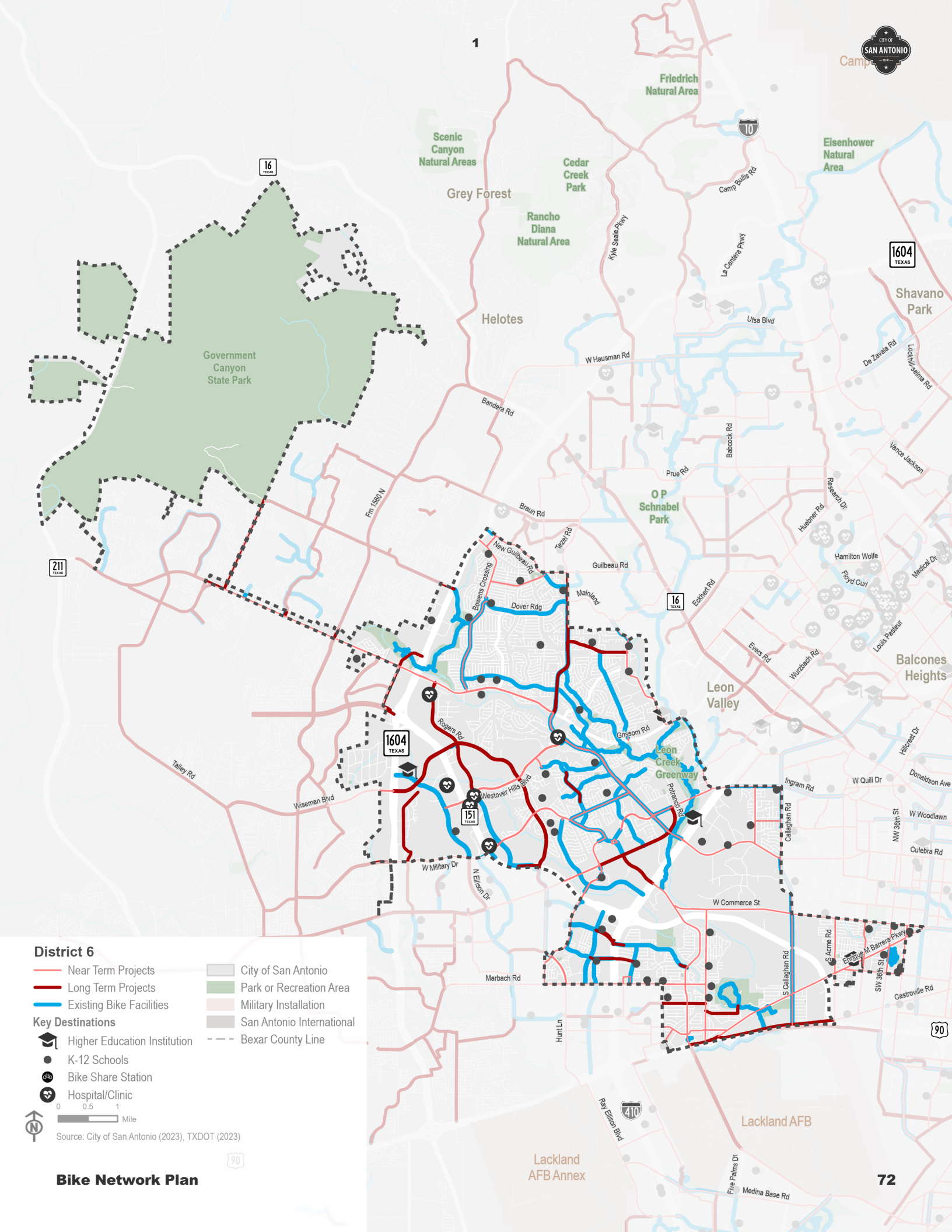
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

Existing	Near Term	Long Term
70%	82%	88%

% of Population with Access to…





District 6

- Near Term Projects
- Long Term Projects
- Existing Bike Facilities

Key Destinations

- Higher Education Institution
- K-12 Schools
- Bike Share Station
- Hospital/Clinic

- City of San Antonio
- Park or Recreation Area
- Military Installation
- San Antonio International
- Bexar County Line

0 0.5 1 Mile

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

Bike Network Plan

CITY COUNCIL DISTRICT 7

Residents of District 7 will see a dramatic increase to many destinations with the implementation of the BNP. Specifically, the District could see large jumps in access to grocery stores, healthcare, parks and trailheads, employment centers, transit stops, and K-12 schools. This has the potential to substantially increase quality of line and access to opportunity for every District 7 resident, especially those without a car.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

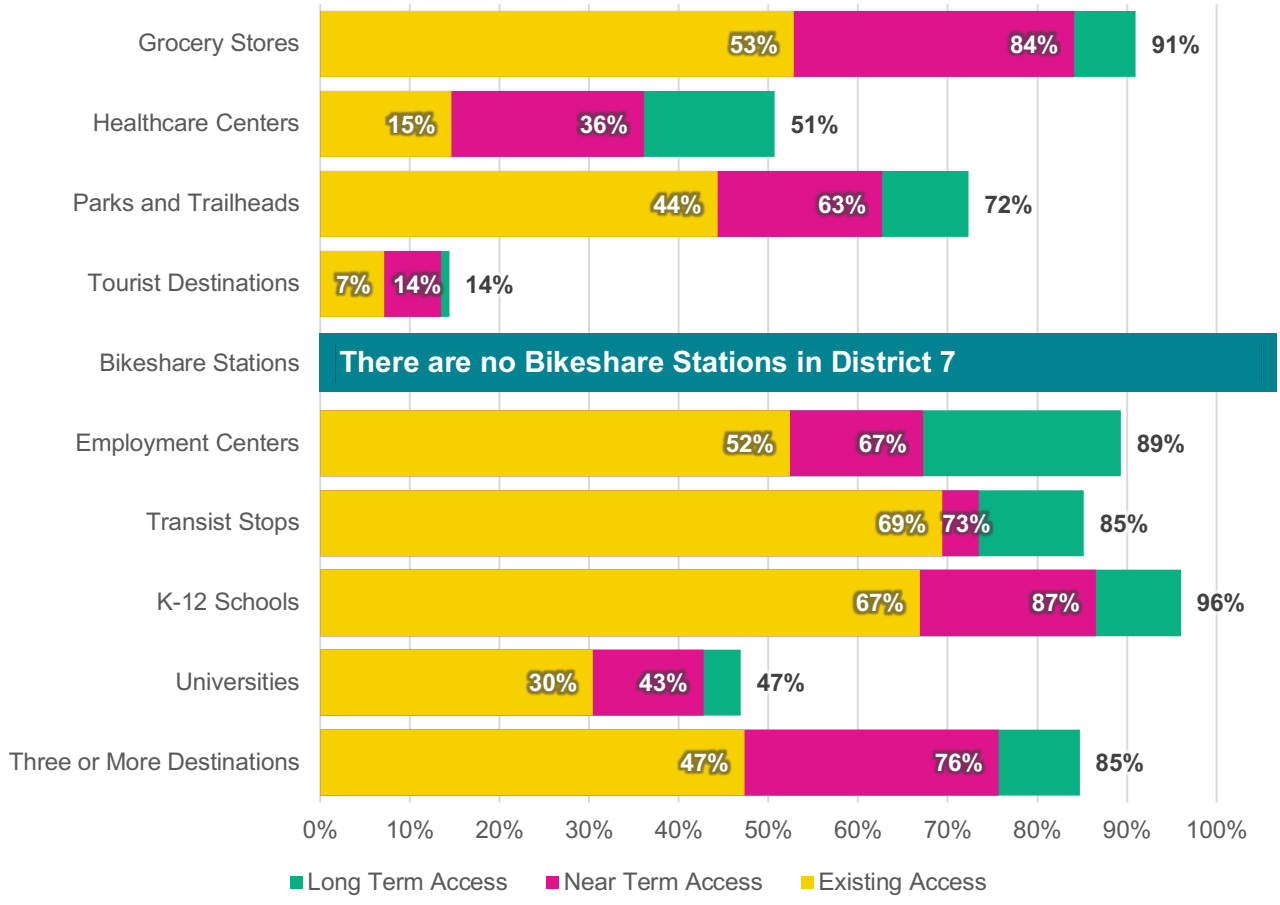
15	67	90
Existing	Near Term	Long Term

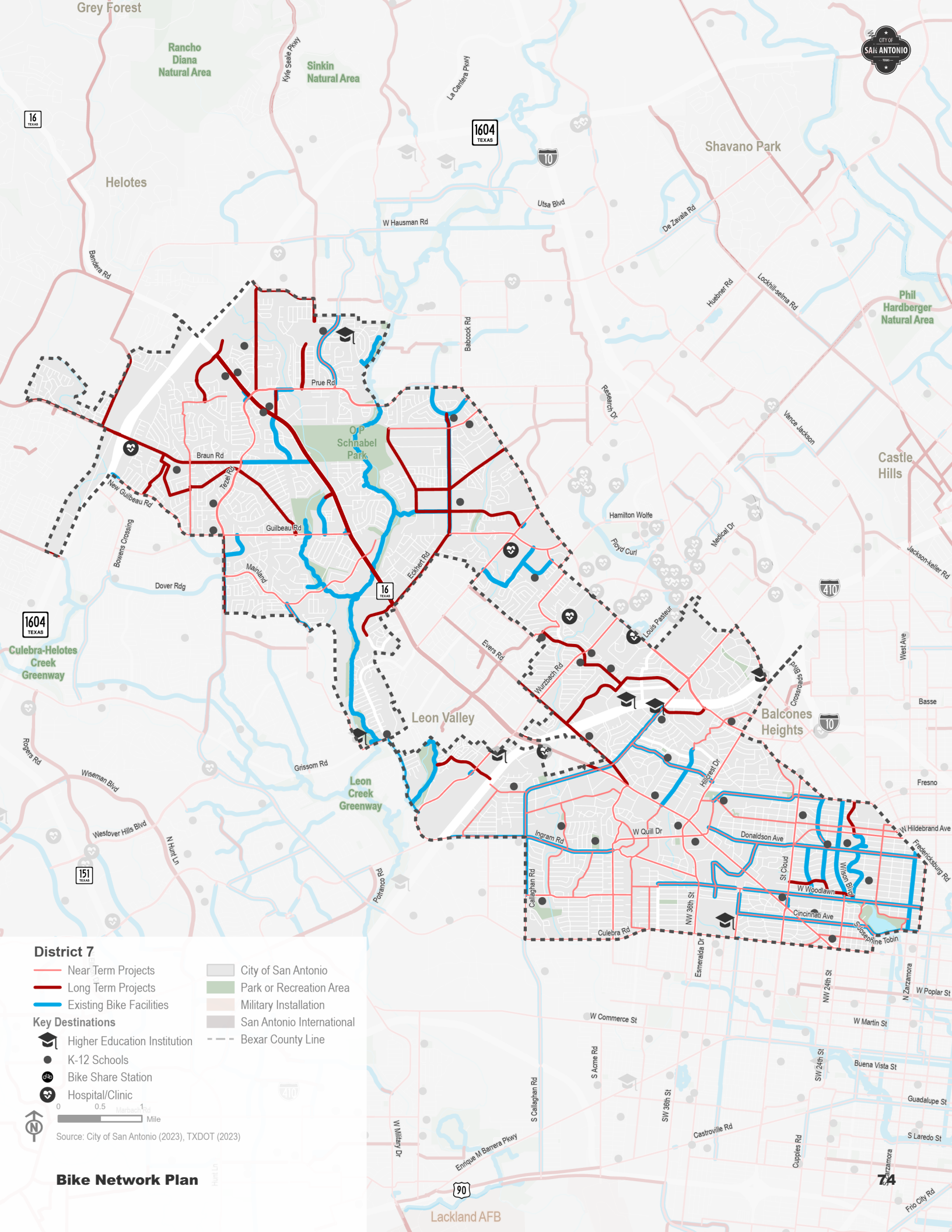
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

83%	91%	95%
Existing	Near Term	Long Term

% of Population with Access to…




Grey Forest
Rancho Diana Natural Area
Sinkin Natural Area
Kyle Seale Pkwy
La Cantera Pkwy
Shavano Park
Helotes
Utsa Blvd
W Hausman Rd
De Zavala Rd
Bandera Rd
Huebner Rd
Lockhill-selma Rd
Phil Hardberger Natural Area
Babcock Rd
Prue Rd
Research Dr
Vance Jackson
Castle Hills
O.P. Schnabel Park
Braun Rd
Texel Rd
New Guilbeau Rd
Guilbeau Rd
Bowens Crossing
Mainland
Dover Rdg
Eckhert Rd
Hamilton Wolfe
Floyd Curl
Medical Dr
Jackson-Keller Rd
Culebra-Helotes Creek Greenway
Evers Rd
Louis Pasteur
Wurzbach Rd
Crossroads Blvd
West Ave
Basse
Leon Valley
Balcones Heights
Rogers Rd
Wiseman Blvd
Grissom Rd
Leon Creek Greenway
Hillcrest Dr
Fresno
Westover Hills Blvd
N Hunt Ln
Ingram Rd
W Quill Dr
Donaldson Ave
W Hildebrand Ave
Fredericksburg Rd
St Cloud
Wilson Blvd
W Woodlawn
Cincinnati Ave
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
S Callaghan Rd
SW 36th St
Guadalupe St
W Military Dr
Castroville Rd
Cupples Rd
S Laredo St
Enrique M Barrera Pkwy
Lackland AFB
Frio City Rd
Porranco Rd
16
1604
10
410
151
90
District 7
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
Bike Network Plan

CITY COUNCIL DISTRICT 8

District 8 has disconnected development patterns that creates longer distances between destinations. Additionally, many of the key destinations are located on busy arterial corridors. Because of this, District 8 residents have lower levels of access today than in some other districts. However, residents are poised to see greater than 100% jumps in access to many destinations with the implementation of the BNP, including to grocery stores, healthcare, parks and trailheads, employment centers, and K-12 schools. Also, more than three times as many residents will have access to three destinations or more.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

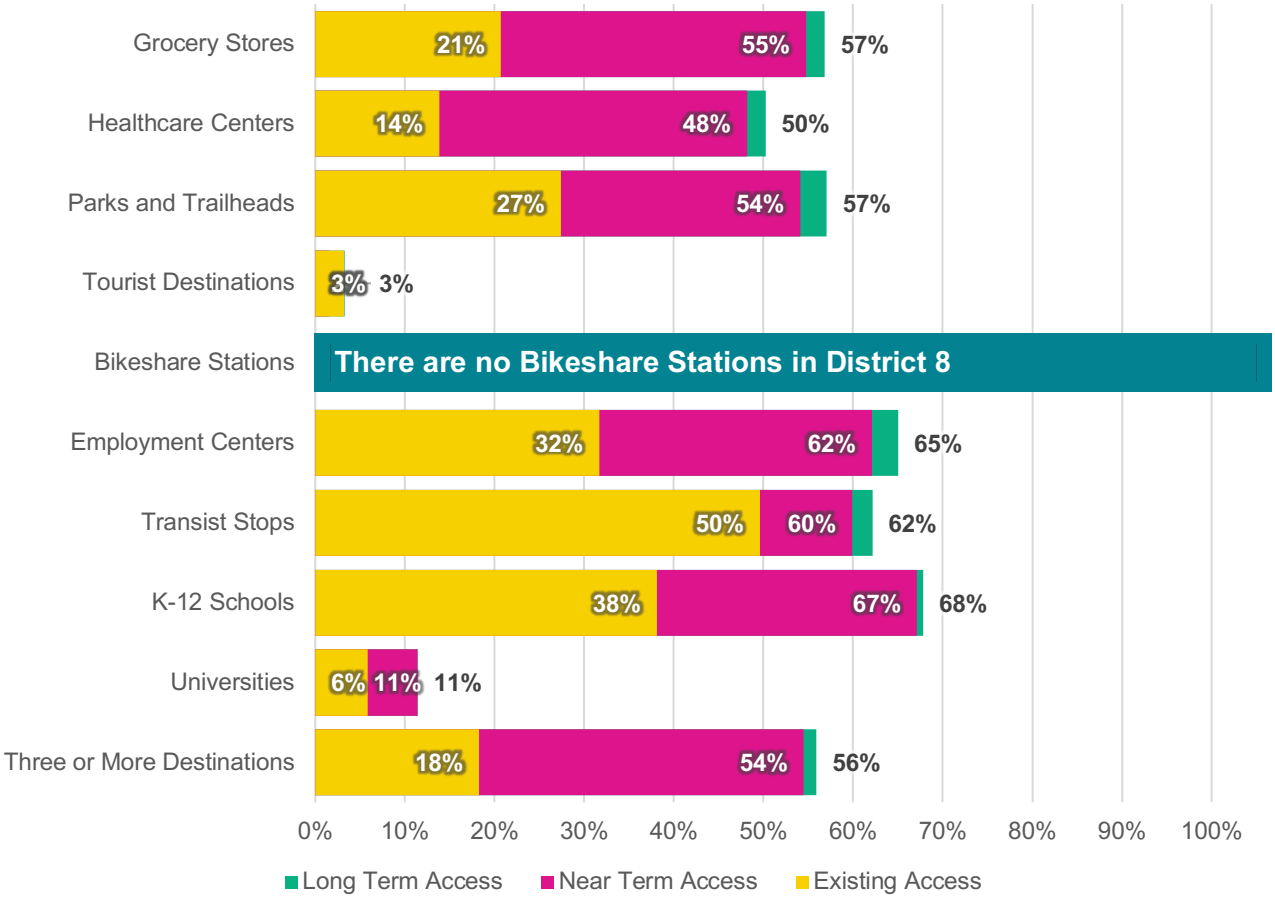
Existing	Near Term	Long Term
36	95	132

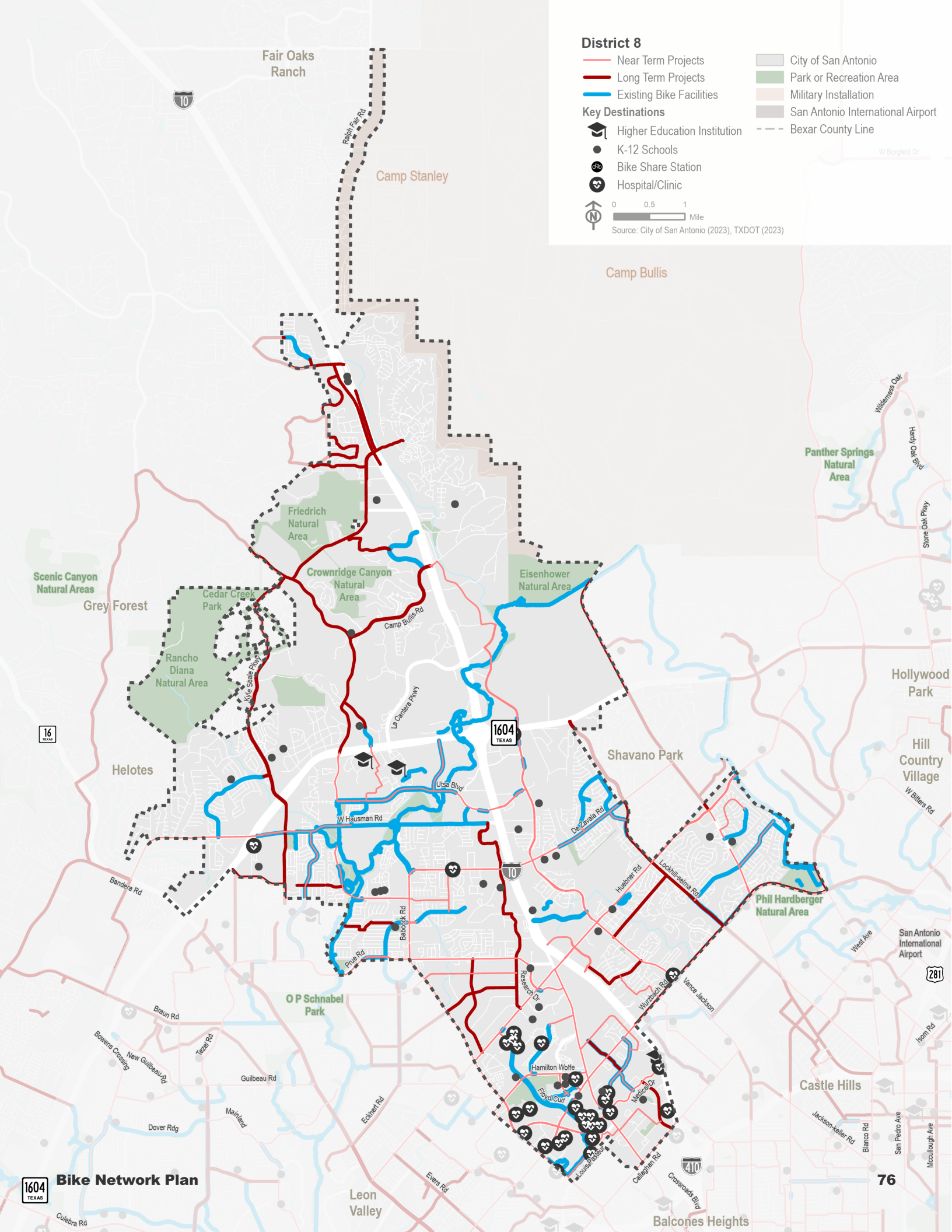
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

Existing	Near Term	Long Term
65%	80%	86%

% of Population with Access to…




District 8
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International Airport
Bexar County Line
0 0.5 1 Mile
Source: City of San Antonio (2023), TXDOT (2023)
Fair Oaks Ranch
Camp Stanley
Camp Bullis
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
Shavano Park
Utsa Blvd
W Hausman Rd
Bandera Rd
Babcock Rd
Prue Rd
Research Dr
Huebner Rd
Lockhill-selma Rd
DeZavala Rd
Wurzbach Rd
Vance Jackson
Phil Hardberger Natural Area
Panther Springs Natural Area
Wilderness Oak
Hardy Oak Blvd
Stone Oak Pkwy
Hollywood Park
Hill Country Village
W Bitters Rd
West Ave
San Antonio International Airport
O P Schnabel Park
Braun Rd
Bowers Crossing
New Guilbeau Rd
Tezel Rd
Guilbeau Rd
Dover Rdg
Mainland
Eckhert Rd
Hamilton Wolfe
Floyd Curl
Medical Dr
Castle Hills
Jackson-Keller Rd
Blanco Rd
San Pedro Ave
Mcculloch Ave
Isom Rd
Callaghan Rd
Crossroads Blvd
Evers Rd
Leon Valley
Balcones Heights
Culebra Rd
1604 TEXAS
16 TEXAS
10
281
410

CITY COUNCIL DISTRICT 9

District 9 covers a wide area and is bisected by several freeways which limit access to destinations. That said, the BNP has the potential to provide large increases in access to grocery stores and healthcare in the near term. In the long term, District 3 residents will also see major jumps in access to parks and trailheads, employment, transit, and K-12 schools..

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

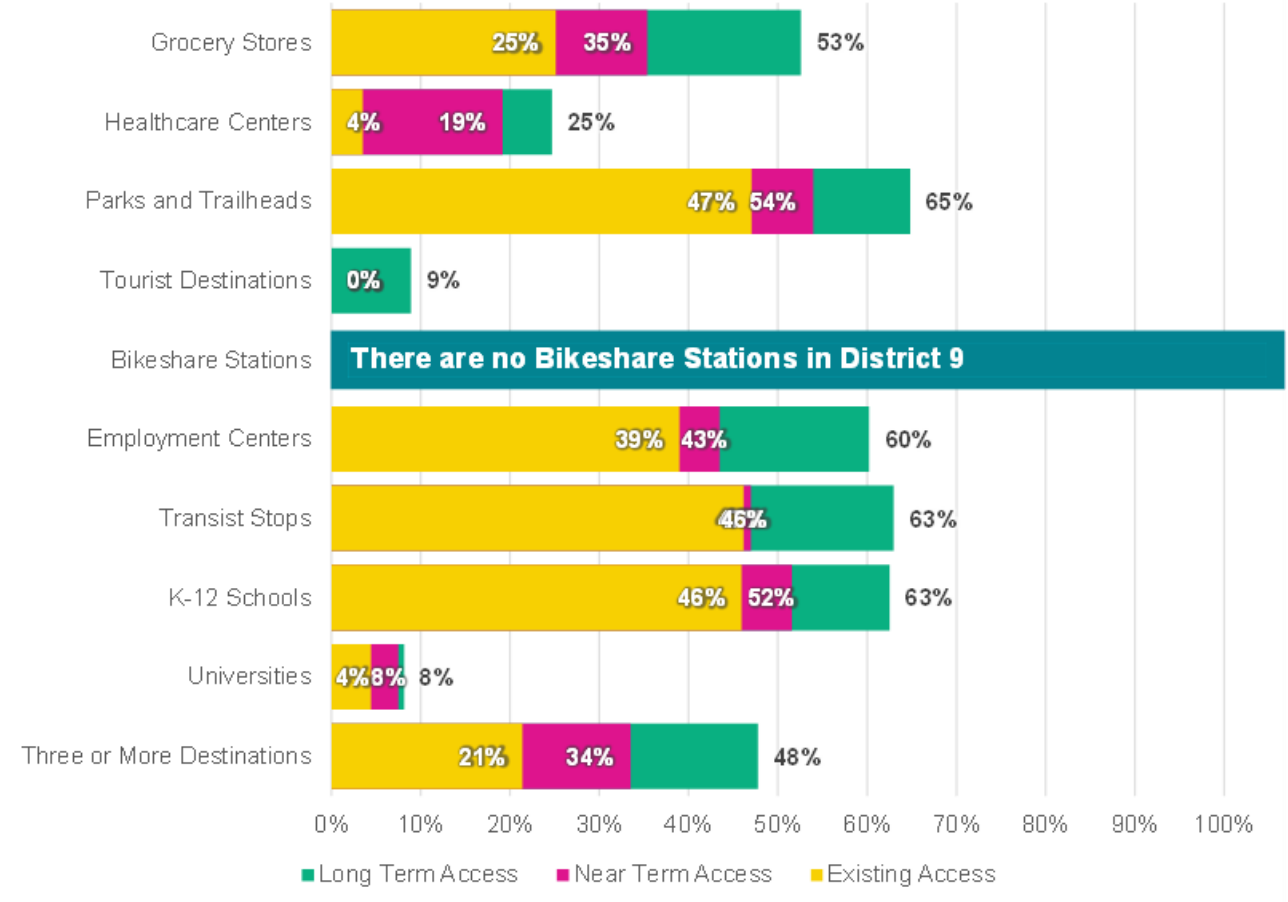
Existing	Near Term	Long Term
24	79	136

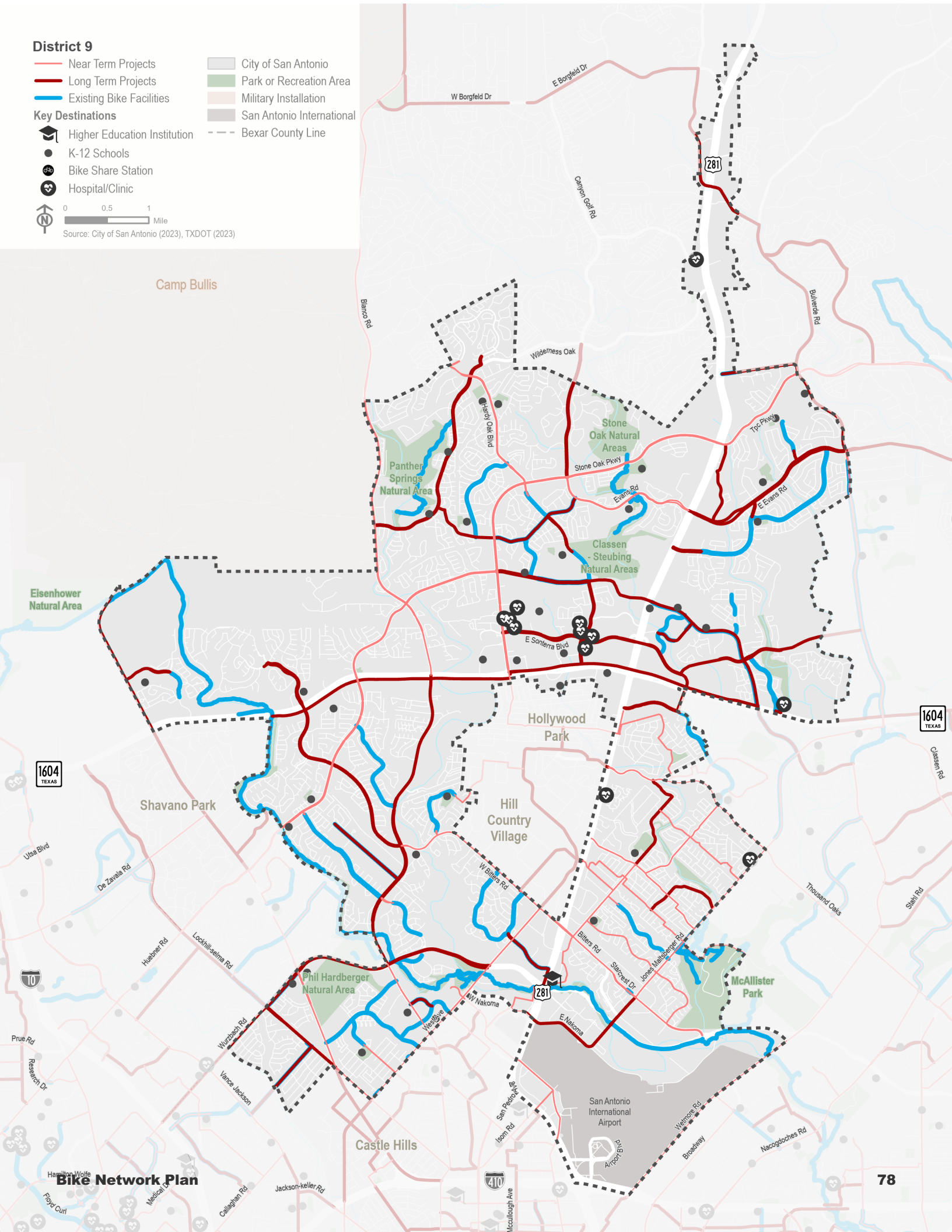
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

Existing	Near Term	Long Term
61%	73%	85%

% of Population with Access to…




District 9
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
0 0.5 1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International
Bexar County Line
Camp Bullis
W Borgfeld Dr
E Borgfeld Dr
Canyon Golf Rd
281
Blanco Rd
Bulverde Rd
Wilderness Oak
Hardy Oak Blvd
Stone Oak Natural Areas
Panther Springs Natural Area
Stone Oak Pkwy
Tpc Pkwy
Evans Rd
E Evans Rd
Classen - Steubing Natural Areas
Eisenhower Natural Area
E Sonterra Blvd
1604 TEXAS
Hollywood Park
Classen Rd
Shavano Park
Hill Country Village
Utsa Blvd
De Zavala Rd
W Bitters Rd
Thousand Oaks
Stahl Rd
Huebner Rd
Lockhill-selma Rd
10
Bitters Rd
Starcrest Dr
Jones Maltsberger Rd
Phil Hardberger Natural Area
NW Nakoma
E Nakoma
McAllister Park
Wurzbach Rd
Vance Jackson
Prue Rd
Research Dr
San Pedro Ave
San Antonio International Airport
Isom Rd
Airport Blvd
Wetmore Rd
Broadway
Nacogdoches Rd
Castle Hills
Hamilton Wolfe
Floyd Curl
Medical Dr
Callaghan Rd
Jackson-keller Rd
410
Mcculloch Ave

CITY COUNCIL DISTRICT 10

District 10 covers a large geographic area with access to many destinations only on major roads. Therefore, access to most destinations is relatively low via the existing network. However, District 10 residents can look forward to major increases in access to grocery stores, healthcare, tourist destinations, and employment destinations. Smaller but still significant increases will also be made in access to parks and trailheads and K-12 schools. Notably, access to three or more destinations doubles in the near term and triples in the long term.

How Does Health Change with the BNP?

Infrastructure and Mode Use

Lane miles of shared use paths and separated bike facilities

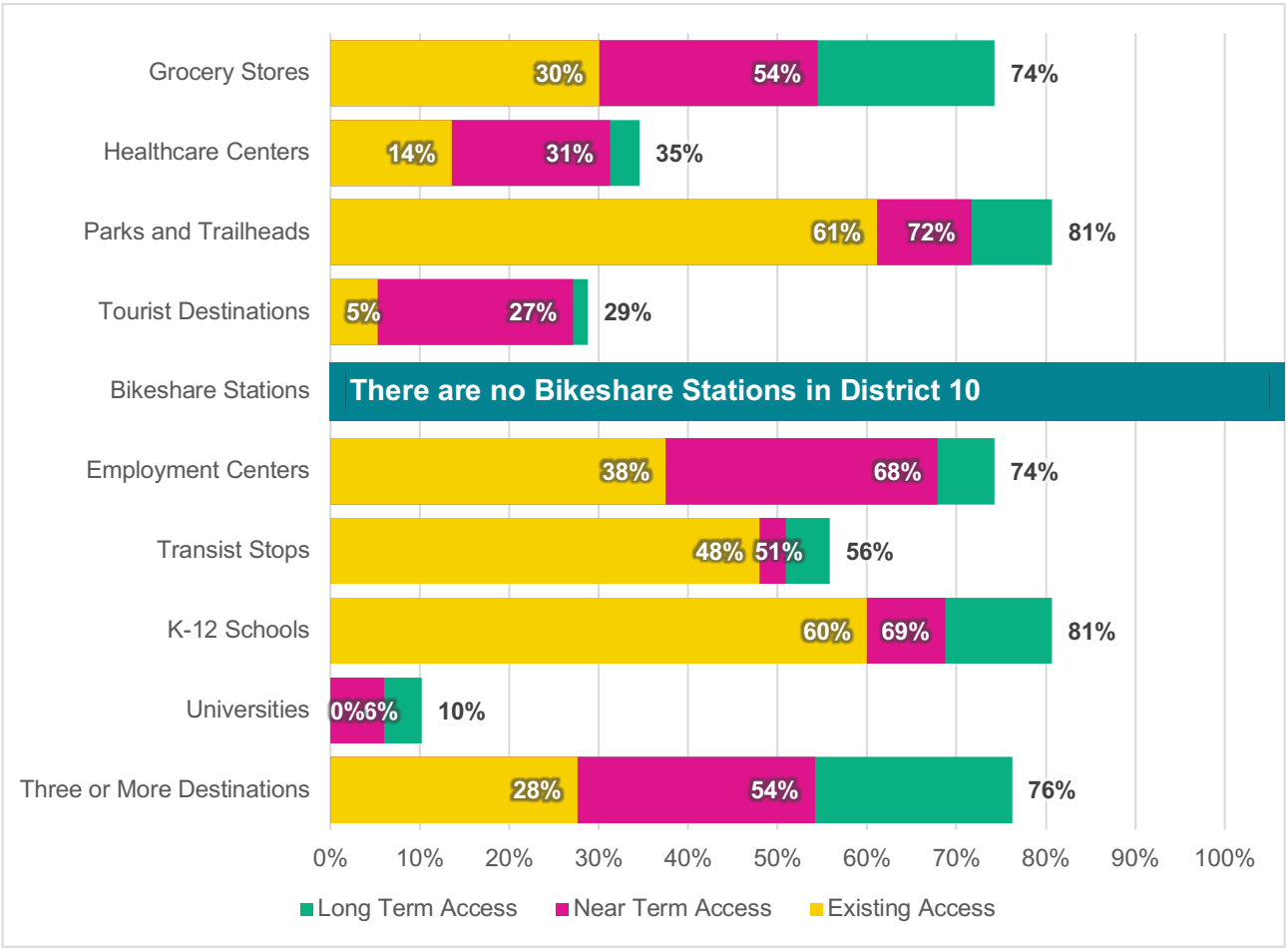
Existing	Near Term	Long Term
10	61	92

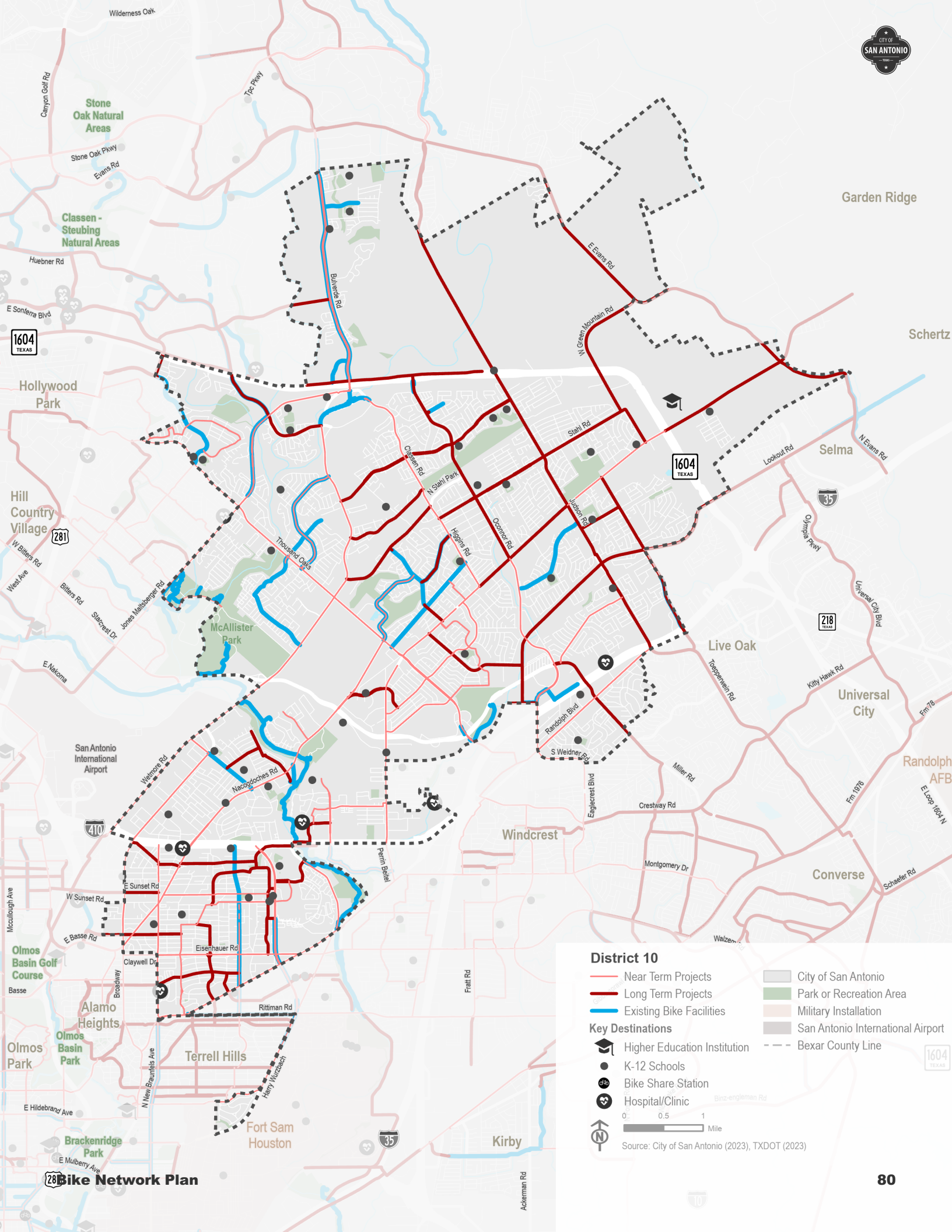
Safety and Comfort

% of streets comfortable for people of all ages and abilities (LTS 1 & 2)

Existing	Near Term	Long Term
77%	86%	91%

% of Population with Access to…




District 10
Near Term Projects
Long Term Projects
Existing Bike Facilities
Key Destinations
Higher Education Institution
K-12 Schools
Bike Share Station
Hospital/Clinic
City of San Antonio
Park or Recreation Area
Military Installation
San Antonio International Airport
Bexar County Line
0 0.5 1
Mile
Source: City of San Antonio (2023), TXDOT (2023)
Garden Ridge
Schertz
Selma
Live Oak
Universal City
Randolph AFB
Windcrest
Converse
Kirby
Hollywood Park
Hill Country Village
McAllister Park
San Antonio International Airport
Olmos Basin Golf Course
Alamo Heights
Olmos Park
Olmos Basin Park
Terrell Hills
Fort Sam Houston
Brackenridge Park
Stone Oak Natural Areas
Classen - Steubing Natural Areas
Wilderness Oak
Canyon Golf Rd
Tpc Pkwy
Stone Oak Pkwy
Evans Rd
Huebner Rd
E Sonterra Blvd
1604 TEXAS
281
410
35
218
Bulverde Rd
E Evans Rd
W Green Mountain Rd
Stahl Rd
N Stahl Park
Classen Rd
Oconnor Rd
Higgins Rd
Judson Rd
Thousand Oaks
Lookout Rd
N Evans Rd
Olympic Pkwy
Universal City Blvd
Kitty Hawk Rd
Toepperwein Rd
Randolph Blvd
S Weidner Rd
Eaglecrest Blvd
Miller Rd
Crestway Rd
Fm 1976
E Loop 1604 N
Fm 78
Montgomery Dr
Schaefer Rd
Perrin Beitel
Nacogdoches Rd
Wetmore Rd
W Sunset Rd
E Basse Rd
Eisenhauer Rd
Claywell Dr
Rittiman Rd
Broadway
Mccullough Ave
N New Braunfels Ave
Harry Wurzbach
Fratt Rd
E Hildebrand Ave
E Mulberry Ave
Ackerman Rd
W Bitters Rd
West Ave
Bitters Rd
Starcrest Dr
Jones Maltsberger Rd
E Nakoma

CHAPTER 8. BICYCLE EQUITY TODAY AND TOMORROW

BICYCLE EQUITY TODAY

An important element of the HIA is analyzing the BNP's impacts to social equity in San Antonio. One way to do this is through a Bicycle Equity Index (BEI). Originally developed by the League of American Bicyclists, a BEI estimates how equitable an existing bicycle network is relative to disadvantaged 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. Ultimately, the BEI aids in understanding where bicycle infrastructure investments may help alleviate wider social issues such as access to jobs, healthy food, education, and healthcare.

Methodology

Building off the League of American Bicyclists' BEI, a San Antonio-specific BEI methodology was developed 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, or other Person of Color
    - Population Living Below the Poverty Level
- **Additional Indicators**
    - Access to Existing Low Stress Bicycle Facilities

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 were calculated for each Census Block Group.
- Standard deviation and Z-score were 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) were calculated for each census block based on its Z-score value.
- Census Blocks identified as having direct access to existing low-stress (LTS 1 & 2) facilities were given a score of 1 point.
- A composite scoring for each metric was calculated.

Results of this model are displayed in Figure 8.1. 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.

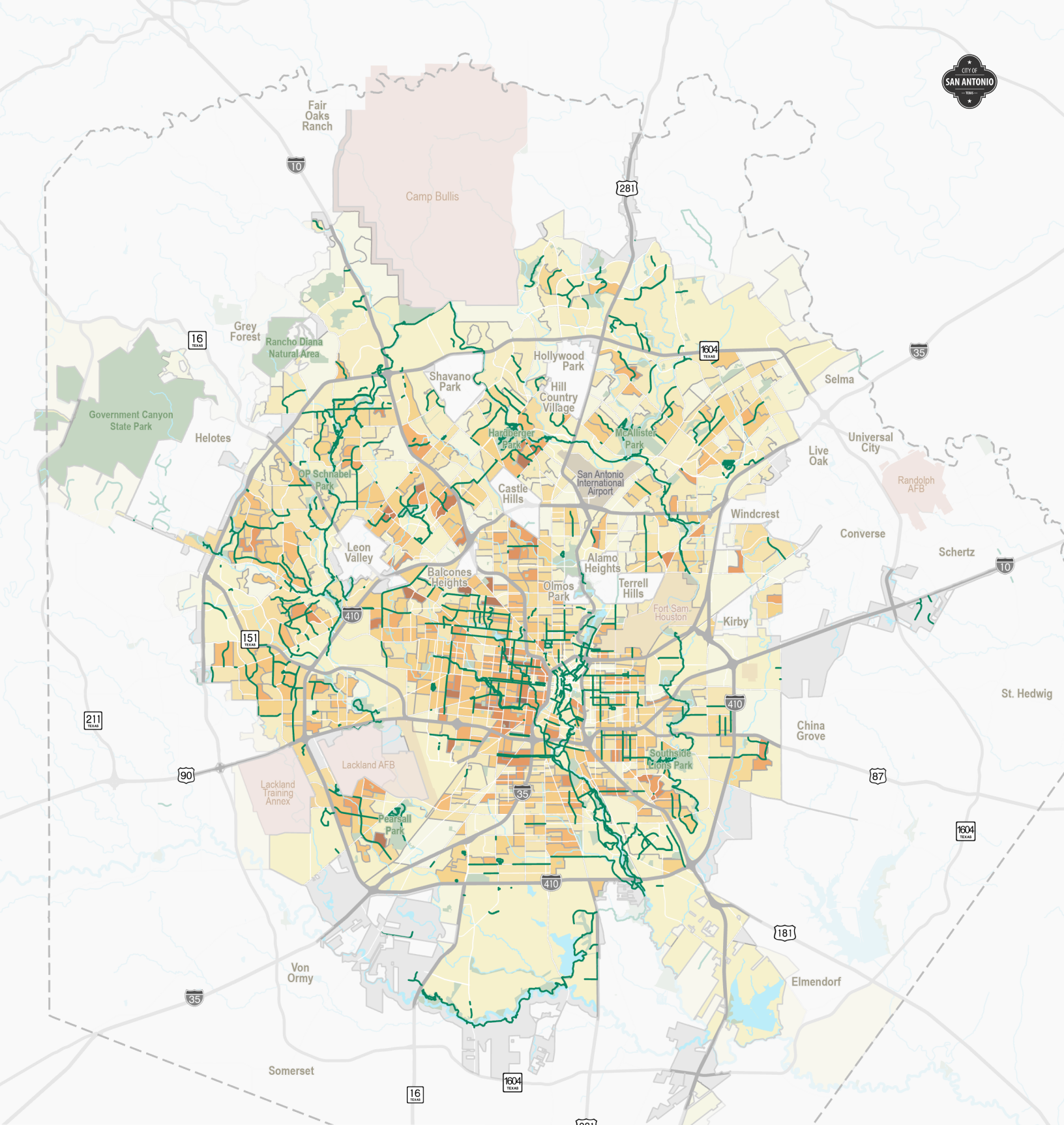


Figure 8.1. Bike Equity Index Today

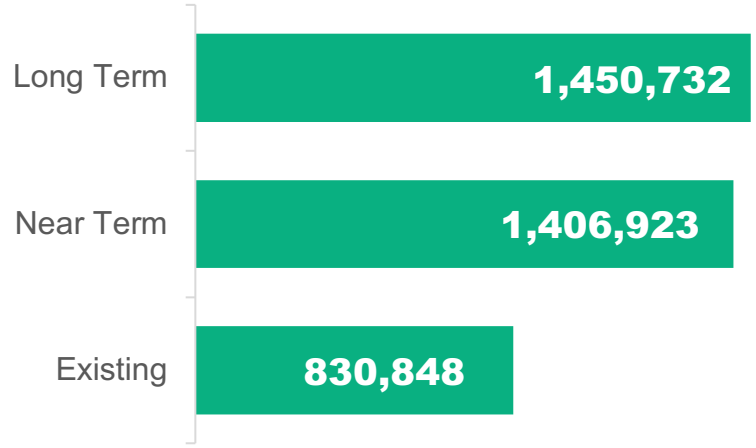
- Existing Low Stress Bike Facilities
- Lower Bike Equity Concerns
- Higher Bike Equity Concerns
- Bexar County Line
- City of San Antonio
- Park or Recreation Area
- Military Installation
- San Antonio International Airport

0 2 4 Miles

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

BICYCLE EQUITY TOMORROW

The implementation of the Near Term (Tier 1 and 2) network would have a significant impact on bicycle equity by the expanding low stress biking infrastructure throughout the City. The following provides a snapshot of how the complete and connected bicycle network can enhance equity and improve San Antonio's transportation system.



- Currently, **only 68.4% who live in an area with High Bike Equity Concern have access to a low stress bike facility nearby**.
- The BNP would expand the low stress bike facilities and add network redundancies that improve access to key destinations and ultimately support biking. Ultimately, implementing the recommended BNP networks will **provide low stress bicycle connectivity to over 99.1% of people living in a High Bike Equity Concern area.**
- The recommended BNP network increases the **total miles of low stress facilities in High Bike Equity Concern areas by 231% in the Near Term and 275% in the Long Term.**
- Without changing other metrics, **executing the BNP projects would decrease the total number of people living in High Bike Equity Concern Areas by 34.9%**.

As illustrated in Figure 8.2, building out the Near and Long Term bicycle networks would have a positive impact on addressing bicycle equity concerns in the City today. As the figure shows, with the Near Term Network, areas with high bicycle equity concerns in the central and southern portions of the City would have a condensed network of low-stress facilities that provide direct, connected access to local and regional destinations. The Long Term Network would expand on this, by providing increased low stress facilities in areas with bicycle equity concerns in the outskirts of the City.

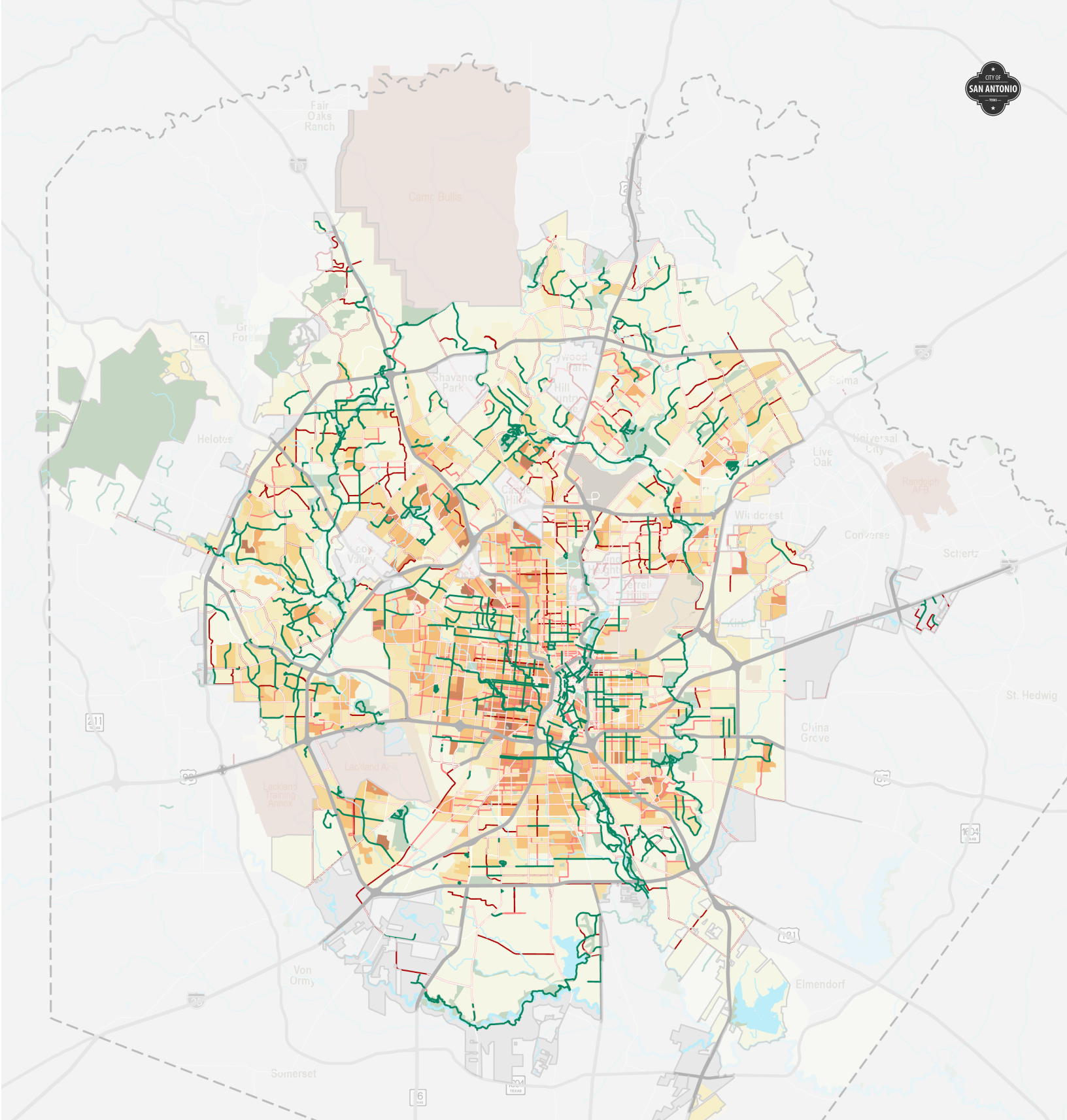


Figure 8.2. Bike Equity Index Tomorrow

CHAPTER 9. POLICIES TO SUPPORT THE BNP

POLICIES TO ADVANCE THE BNP'S IMPACT ON PUBLIC HEALTH

Infrastructure installation is a one of the most effective ways the City can improve health for San Antonians. However, infrastructure alone doesn't address key factors like bike access, safe parking, and trip-end facilities. Complementary policies can address these issues and accelerate infrastructure development, enhance street safety, and support bike facility construction and funding. To address this, the BNP recommends a variety of policies. Additionally, the HIA offers policy recommendations to directly improve health outcomes related to biking. These policies as discussed in this section.

It is not expected that the City of San Antonio adopt every policy recommendation exactly as written. Rather, the City may use these recommendations as a framework for further policy deliberation and creation.

BNP Recommended Policies

The BNP identified policies based on bicycle infrastructure deployment and bicycle infrastructure usage, mainly based on potential amendments to the existing city codes. For more information on these policies, see the BNP Policy Action Report. The policies include:

Policy	Recommendations	Inspiration Cities
Infrastructure Deployment		
Roadway Reallocation	• Require consideration of reallocating roadway space to accommodate walking and biking infrastructure.	• Little Rock, AR • Seattle, WA
Right-of-Way Acquisition	• Require maintenance of existing or provision of new bike infrastructure when property is acquired and through construction.	• Atlanta, GA • Greensboro, SC
Right-of-Way Maintenance	• Remove the existing misdemeanor offense for failure to maintain. • Perform a comprehensive sidewalk assessment to determine maintenance needs and costs. • Create a sidewalk maintenance fund and adopt a policy to allow for public maintenance of ROW.	• Albuquerque, NM • Ithaca, NY • Seattle, WA
Utility Relocation	• Require maintenance of existing or provision of new bike infrastructure when utilities are relocated. • Conduct city-wide assessment of existing utilities to relocate or remove utilities which obstruct bikeways.	• Atlanta, GA • Washington County, OR • State of Maryland
Cyclist Visibility	• Require the use of colored pavement on bike facilities. • Require "daylighting" at intersections.	• Austin, TX • Portland, OR
Bicycle Detection	• Install bicycle detection systems along the bike network.	• State of California
Speed Limits	• Lower design speeds in the UDC based on updated prima facie speed limits (see next policy)	• Seattle, WA • State of Oregon • State of Minnesota
Prima Facie Speed Limits	• Adopt a resolution in support of 20 or 25 MPH speed limits on local streets and lobby the state to lower the minimum prima facie speed from 30 MPH. • Conduct a citywide educational campaign to encourage slower driving speeds.	• Austin, TX • Boston, MA • Seattle, WA
Traffic Study Requirements	• Require traffic studies to analyze and make recommendations to improve safety and comfort for multimodal users.	• Baltimore, MD • State of Georgia

Policy	Recommendations	Inspiration Cities
Infrastructure Use		
Helmet Use	• Undertake an educational campaign encouraging helmet use, • Create a Bicycle and Pedestrian Advisory Committee to conduct outreach and research and advise on issues related to walking and biking.	• Seattle, WA • Dallas, TX • Santa Monica, CA • Washington, DC
Sidewalk Riding	• Allow people to bike on sidewalks except where signage prohibits it. • Identify corridors where sidewalk riding is unsafe. • Complete the bike network.	• Philadelphia, PA • Cambridge, MA • Austin, TX
Stop-as-Yield (Idaho Stop)	• Advocate for the passage of SB 2506 to allow people biking to yield at stop signs. • Provide related education.	• States of Arizona, Arkansas, Delaware, Idaho, Minnesota, North Dakota, Oklahoma, Oregon, Utah, and Washington
Pedicab Permitting and Operations	• Amend the Code of Ordinances to increase pedicab operating licenses, allow for 24-hour operations, and expand the area to lift restrictions on Commerce St, Market, and Cesar Chavez Blvd.	• Dallas, TX • Houston, TX • Austin, TX
Vehicles Obstructing Bike Lanes	• Prohibit vehicles from parking, idling, or driving in bike lanes. Implement associated education and enforcement campaigns.	• Houston, TX • Austin, TX • Montreal, Canada
Safe Passing	• Advocate to increase the safe passing distance in Texas from three feet to five feet on roads with speed limits above 25 MPH and consider adopting a resolution of support or recommendation ordinance.	• New Braunfels, TX • State of South Dakota
Bicycle Security	• Implement an educational campaign to teach people how to lock bikes. • Consolidate bike parking regulations into one section of code or policy document. • Update bike parking regulations based on current best practices. • Consider partnering with a voluntary bike registry such as 529 Garage. • Explore ways to incentivize developers to install bike parking and end-of-trip facilities.	• Austin, TX • San Diego, CA • Minneapolis, MN • Vancouver, Canada

Additional Recommended Policies to Support Health

The policies identified in the BNP go a long way to addressing infrastructure and usage needs. The HIA analysis identified several other key needs which could be addressed through policy to address public health.

- **Access to Destinations:** some parts of San Antonio are more spread out than others. Because of this, people may have difficulty getting to destinations on traditional bikes.
- **Rapid, Flexible Implementation of Facilities:** San Antonians will benefit greatly from the implementation of the bike network. However, bike projects can take a long time to implement due to lengthy design, construction, and procurement phases. Additionally, traditional implementation processes are rigid in design and projects cannot be modified when they are installed, limiting the ability to adjust for changing needs.
- **Safe Practices Education:** The types of bike facilities recommended in the BNP will be new to many San Antonians. Education will be required for both community members and agencies alike so people driving, walking, and biking use the facilities in safe ways and agencies are able to equitable uphold laws related to them.

As the City of San Antonio explores the BNP policies, these additional policies may also be explored:

Policy	Description	Inspiration Cities
Access To Destinations		
E-Bike Incentive Program	Implement a program to provide access to e-bikes which can be used to help people travel longer distances on bike faster and using less exertion. This program could prioritize access to the incentives for people in disadvantaged communities. It could have a secondary benefit of encouraging people to choose to bike more often, as the inspiration cities have seen.	• Austin, TX • Denver, CO • San Diego, CA
Access to Destinations Goal	Adopt a goal setting targets for the percentage of San Antonians who have access to places like schools, grocery stores, and community centers via the low stress bike network to meet goals noted in the HIA. This would operate similar to the City's goal related to access to parks.	• San Antonio, TX • Jersey City, NJ
Rapid, Flexible Implementation of Facilities		
Field Engineering Policy	Implement Field Engineering for specific types of bike facilities and other infrastructure to allow for limited design to be conducted, instead having engineers address final tweaks in the field. This could speed up the implementation process and allow for context-based changes to occur during installation.	• Austin, TX
Quick Build Program	Develop and adopt a Quick Build Design Guide, which identifies a process, standard materials, and design templates for quick build projects to be implemented fast and save on design and construction costs.	• Orlando, FL • San Francisco, CA • Portland, OR
Traffic Calming / Slow Streets / Neighborhood Network Policy	Adopt a policy for blanket approval of the use of specified traffic calming treatments on neighborhood bike routes. Templates could be used for design which would accelerate project delivery.	• San Francisco, CA

Policy	Description	Inspiration Cities
Safe Practices Education		
Agency Education Program	Implement a program to educate Law Enforcement Officers, the fire department, transit operators, and other agencies working in the street right of way on the laws related to the new bike facilities and how to safely operate around them. Such a program could also include an equity component. The program should include guidance on laws and enforcement related to all road users in relation to bikeways, including people driving, walking, and biking. This could help to improve safety and equitable outcomes for people biking.	• State of Florida • San Diego, CA
Community Educational Campaign	Adopt a campaign to educate San Antonians on the new bike infrastructure. This should focus on educating all users, including people who drive, walk, and bike on how to safely operate around and near the bike facilities. It could also include a policy and educational campaign regarding where to place trash cans near bike lanes to prevent blockages.	• State of California • New York City, NY • Portland, OR

CHAPTER 10. NEXT STEPS

REALIZING THE HEALTH IMPACTS OF THE BNP

The Bike Network Plan has the potential to substantially alter the way people get around San Antonio and greatly improve the health of many San Antonians. The final BNP includes significant discussion of how to implement the plan, including potential funding sources and programming to make the network successful.

From a health perspective, the metrics noted in the report offer the City the potential to track how the health of San Antonians is changing relative to the project goals. These metrics offer the City tangible evidence to demonstrate the impacts of the plan which can be used to gain support and increase momentum behind projects. In order to do this, the City should continue to collect and update data on the metrics evaluated in this report, repeated below for future reference. While the installation of one project often provides immediate evidence of progress, the true impacts of the BNP will occur as the network begins to take shape. Therefore, data should be collected on each of the metrics every five years to allow time for impacts to be felt.

Metric	Source
Infrastructure and Mode Use	
Lane miles of shared use paths and separated bike facilities	City
Average daily residential vehicle miles traveled (VMT) per capita	Calculation (See Appendix)
% of people who bike to school	Census, Replica, or City Identified Source
% of people who bike to work	Census, Replica, or City Identified Source
% of all trips made by bike	Census, Replica, or City Identified Source
Safety and Comfort	
% of streets comfortable for people of all ages and abilities (LTS 1 & 2)	Calculation (See Appendix)
Number of fatal and serious injury pedestrian and/or bicycle crashes	TxDOT CRIS
% of pedestrian and/or bicycle crashes that result in deaths or serious injuries	TxDOT CRIS
Total number of pedestrian and/or bicycle crashes	TxDOT CRIS
% of Population with Access to:	
Grocery stores and healthy food	City
Medical centers and healthcare	City
Parks / trails	City
Tourist destinations	City
Bikeshare facilities	City
3 or more destinations	City
Employment centers	City
Transit stops	City
K-8 schools	City
Colleges / Universities	City
Environmental	
Estimated annual metric tons of CO_2 emissions per capita	Calculation (See Appendix)

CITY OF SAN ANTONIO TEXAS

Bike Network Plan

HEALTH IMPACT ASSESSMENT

APPENDIX

APPENDIX OF SOURCES

1 "About Chronic Diseases | CDC." Accessed: Sep. 29, 2023. [Online]. Available: https://www.cdc.gov/chronicdisease/about/index.htm

2 "Walking and cycling: latest evidence to support policy-making and practice." Accessed: Sep. 27, 2023. [Online]. Available: https://www.who.int/europe/publications/i/item/9789289057882

3 Office of Disease Prevention and Health Promotion. "2018 Physical Activity Guidelines Advisory Committee Scientific Report." Accessed: Sep. 27, 2023. [Online]. Available: https://health.gov/sites/default/files/2019-09/PAG_Advisory_Committee_Report.pdf

4 Harvard T.H. Chan School of Public Health, "Bicycling," The Nutrition Source. Accessed: Sep. 28, 2023. [Online]. Available: https://www.hsph.harvard.edu/nutritionsource/bicycling/

5 M. Dinu, G. Pagliai, C. Macchi, and F. Sofi, "Active Commuting and Multiple Health Outcomes: A Systematic Review and Meta-Analysis," *Sports Med.*, vol. 49, no. 3, pp. 437–452, Mar. 2019, doi: 10.1007/s40279-018-1023-0.

6 A. T. Berger, X. (Lisa) Qian, and M. A. Pereira, "Associations Between Bicycling for Transportation and Cardiometabolic Risk Factors Among Minneapolis–Saint Paul Area Commuters: A Cross-Sectional Study in Working-Age Adults," *Am. J. Health Promot.*, vol. 32, no. 3, pp. 631–637, Mar. 2018, doi: 10.1177/0890117117710735.

7 S. K. Galson, "MENTAL HEALTH MATTERS," *Public Health Rep.*, vol. 124, no. 2, pp. 189–191, 2009.

8 F. J. Kelly, I. S. Mudway, and J. C. Fussell, "Air Pollution and Asthma: Critical Targets for Effective Action," *Pulm. Ther.*, vol. 7, no. 1, pp. 9–24, Nov. 2020, doi: 10.1007/s41030-020-00138-1.

9 P. Filigrana, J. I. Levy, J. Gauthier, S. Batterman, and S. D. Adar, "Health benefits from cleaner vehicles and increased active transportation in Seattle, Washington," *J. Expo. Sci. Environ. Epidemiol.*, vol. 32, no. 4, pp. 538–544, 2022, doi: 10.1038/s41370-022-00423-y.

10 "SA Climate Ready." City of San Antonio. October 17, 2019. Available: https://www.sanantonio.gov/Portals/0/Files/Sustainability/SAClimateReady/SACRReportOctober2019.pdf

11 "2023 Asthma Capitals." Asthma and Allergy Foundation of America. 2023. Available: https://aafa.org/wp-content/uploads/2023/09/aafa-2023-asthma-capitals-report.pdf

12 "2022 State of Mental Health in America.pdf." Accessed: Sep. 28, 2023. [Online]. Available: https://mhanational.org/sites/default/files/2022%20State%20of%20Mental%20Health%20in%20America.pdf

13 S. K. Galson, "MENTAL HEALTH MATTERS," *Public Health Rep.*, vol. 124, no. 2, pp. 189–191, 2009.

14 "About Mental Health." Accessed: Sep. 28, 2023. [Online]. Available: https://www.cdc.gov/mentalhealth/learn/index.htm

15 A. Krishnamoorthy, "How bicycling can help support your mental health," Bicycle Colorado. Accessed: Sep. 28, 2023. [Online]. Available: https://www.bicyclecolorado.org/bike-news/how-bicycling-can-help-support-your-mental-health/

16 Bicycle commuters experience joy, but motorists would rather teleport," State Smart Transportation Initiative. Accessed: Sep. 28, 2023. [Online]. Available: https://ssti.us/2020/02/10/bicycle-commuters-experience-joy-but-motorists-would-rather-teleport/

17 S. Sreenivas, "Health Benefits of Bike Commuting," WebMD. Accessed: Sep. 28, 2023. [Online]. Available: https://www.webmd.com/fitness-exercise/bike-commuting-health-benefits

18 L. Ma and R. Ye, "Utilitarian Bicycling and Mental Wellbeing," *J. Am. Plann. Assoc.*, vol. 88, no. 2, pp. 262–276, Apr. 2022, doi: 10.1080/01944363.2021.1950036.

19 "The Built Environment, Bicycling, and Mental Wellbeing," American Planning Association. Accessed: Sep. 27, 2023. [Online]. Available: https://www.planning.org/blog/9232705/the-built-environment-bicycling-and-mental-wellbeing/

20 T. Litman, "Active Transportation Quick Bites: Transportation for Mental Health and Happiness," Dec. 2021.

21 CDC, "What's Your Role? Parks, Recreation, and Green Spaces," Centers for Disease Control and Prevention. Accessed: Oct. 03, 2023. [Online]. Available: https://www.cdc.gov/physicalactivity/activepeoplehealthynation/everyone-can-be-involved/parks-recreation-and-green-spaces.html

22 "The Power of Trails for Promoting Physical Activity in Communities - American Trails." Accessed: Oct. 03, 2023. [Online]. Available: https://www.americantrails.org/resources/the-power-of-trails-for-promoting-physical-activity-in-communities

23 "ParkScore® for San Antonio, TX - TPL," Trust for Public Land. Accessed: Oct. 03, 2023. [Online]. Available: https://www.tpl.org/city/san-antonio-texas

24 "2021 Howard W. Peak Greenway Trail Survey." City of San Antonio. Accessed: Sep. 27, 2023. [Online} Available: https://www.sanantonio.gov/Planning/News-Events/News/ArtMID/27965/ArticleID/20736/Howard-W-Peak-Greenway-Trails-Survey

25 "The Power of Trails for Promoting Physical Activity in Communities - American Trails." Accessed: Oct. 03, 2023. [Online]. Available: https://www.americantrails.org/resources/the-power-of-trails-for-promoting-physical-activity-in-communities

26 "CPSTF Recommends Park, Trail, and Greenway Infrastructure Interventions to Increase Physical Activity | The Community Guide." Accessed: Oct. 03, 2023. [Online]. Available: https://www.thecommunityguide.org/news/cpstf-recommends-park-trail-and-greenway-infrastructure-interventions-increase-physical-activity.html

27 Healthy People 2030, “Poverty.” [Online]. Available: https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty#:~:text=Poverty%20can%20also%20limit%20access,perpetuates%20cyclical%20effects%20of%20poverty.&text=Unmet%20social%20needs%2C%20environmental%20factors,for%20people%20with%20lower%20incomes.

28 R. J. Bonnie *et al.*, “Education and Employment,” in *Investing in the Health and Well-Being of Young Adults*, National Academies Press (US), 2015. Accessed: Oct. 04, 2023. [Online]. Available: https://www.ncbi.nlm.nih.gov/books/NBK284788/

29 Federal Highway Administration Office of Highway Policy Information, “A Resident’s Guide for Creating Safer Communities for Walking and Biking.” Accessed: Oct. 04, 2023. [Online]. Available: https://safety.fhwa.dot.gov/ped_bike/ped_cmnity/ped_walkguide/residents_guide2014_final.pdf

30 “Total Driving Costs | H+T Index,” H+T Affordability Index. Accessed: Nov. 03, 2023. [Online]. Available: http://htaindex.cnt.org/total-driving-costs/

31 H. Wu *et al.*, “Urban access across the globe: an international comparison of different transport modes,” *Npj Urban Sustain.*, vol. 1, May 2021, doi: 10.1038/s42949-021-00020-2.

32 “In Philly, $5 bike share memberships for food stamp users take off,” Better Bike Share. Accessed: Oct. 04, 2023. [Online]. Available: https://betterbikeshare.org/2016/08/29/philly-offering-bike-share-discounts-food-stamp-cards-working-great/

33 “How Can We Reach Underserved Communities?,” PeopleForBikes. Accessed: Oct. 04, 2023. [Online]. Available: https://www.peopleforbikes.org/news/how-can-we-reach-underserved-communities

34 S. E. Jones, “School Factors Associated With the Percentage of Students Who Walk or Bike to School, School Health Policies and Practices Study, 2014,” *Prev. Chronic. Dis.*, vol. 13, 2016, doi: 10.5888/pcd13.150573.

35 K.J. Krizek, “Analyzing the Effect of Bicycle Facilities on Commute Mode Share over Time.” *Journal of Urban Planning and Development*. Vol 135, 2009, doi: 10.1061/(ASCE)0733-9488(2009)135:2(66).

36 J. Dill, T. Carr, “Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them. Commuters Wil Use Them.” *Transportation Research Record*, vol. 1828, iss. 1, 2003, doi:10.3141/1828-14.

37 F. D. L. T. Marin, “Accessibility of cycling for low-income populations,” ArcGIS StoryMaps. Accessed: Oct. 04, 2023. [Online]. Available: https://storymaps.arcgis.com/stories/d9c07d045b274084ab90676f9b214153

38 “Pedestrian & Bicycle Safety | FHWA.” Accessed: Sep. 29, 2023. [Online]. Available: https://highways.dot.gov/safety/pedestrian-bicyclist

39 National Highway Traffic Safety Administration, “Overview of Motor Vehicle Traffic Crashes in 2021,” DOT HS 813 435, Apr. 2023.

40 “Vulnerable Road Users.” Accessed: Oct. 03, 2023. [Online]. Available: https://www.texasshsp.com/home/vulnerable-road-users/

41 Smart Growth America, “Dangerous By Design,” 2022. Accessed: Nov. 03, 2023. [Online]. Available: https://smartgrowthamerica.org/wp-content/uploads/2022/07/Dangerous-By-Design-2022-v3.pdf

42 TXDOT Crash Records Information System, 2018-2022.

43 “Some protected bike lanes leave cyclists vulnerable to injury,” IIHS-HLDI crash testing and highway safety. Accessed: Sep. 27, 2023. [Online]. Available: https://www.iihs.org/news/detail/some-protected-bike-lanes-leave-cyclists-vulnerable-to-injury

44 “Not all protected bike lanes are the same: infrastructure and risk of cyclist collisions and falls leading to emergency department visits in three U.S. cities,” IIHS-HLDI crash testing and highway safety. Accessed: Sep. 27, 2023. [Online]. Available: https://www.iihs.org/topics/bibliography/ref/2193

45 “Equitable Bike Share Means Building Better Places for People to Ride,” National Association of City Transportation Officials. Accessed: Oct. 03, 2023. [Online]. Available: https://nacto.org/equitable-bike-share-means-building-better-places-for-people-to-ride

46 A. C. Lusk, P. G. Furth, P. Morency, L. F. Miranda-Moreno, W. C. Willett, and J. T. Dennerlein, “Risk of injury for bicycling on cycle tracks versus in the street,” *Inj. Prev.*, vol. 17, no. 2, pp. 131–135, Apr. 2011, doi: 10.1136/ip.2010.028696.

47 D. Goerke, E. Zolfaghari, A. P. Marek, F. W. Endorf, and R. M. Nygaard, “Incidence and Profile of Severe Cycling Injuries After Bikeway Infrastructure Changes,” *J. Community Health*, vol. 45, no. 3, pp. 542–549, Jun. 2020, doi: 10.1007/s10900-019-00773-z.

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 CO_2

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

[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:

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