CITY OF SAN ANTONIO TEXAS

Bike Network Plan

Recommended Network Development & Structure Report

November 2024

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Section 1. Introduction and Existing Conditions

What is a Bike Network?

The core of the City of San Antonio (COSA or City) Bike Network Plan (BNP) is the definition of a network of safe and comfortable bike facilities to connect San Antonians to the places they want to go and people they want to see. In the BNP, a "bike facility" is defined as any paved surface on which bike users can legally operate with either a dedicated space or a signed route. When joined together along longer routes, these bike facilities, regardless of their design, become parts of "bikeways." In turn, bikeways create the city's "bike network" as they connect the San Antonio area, accommodate all bike and micromobility users, and offer a safe and comfortable riding experience. The network also aims to make riding a bike a practical transportation option for more people by routing infrastructure that encourages biking for everyday tasks, such as commuting or running errands both within neighborhoods and between destinations.

Function of the Bike Network

A successful network plan serves two essential functions: setting intentions for the deployment of new infrastructure and routing bike usage.

The bike network maps out the deployment of bike infrastructure both on City projects and private development projects. The City's Unified Development Code (UDC) Table 506-3 only requires bicycle facilities to be implemented on arterials (higher volume roadways connecting major points, often parallelling controlled-access highways) and collectors (roadways with moderate traffic volumes, linking arterials and local roads). With no bike network, these would generally be the only roadways featuring bike facilities. While collectors and arterials are intended to connect regions and subregions, they do not connect to all destinations and neighborhoods. They also move a large volume of motor vehicles per hour, making them high-stress for many bike users.

To require the deployment of bike facilities on any local street, UDC Table 506-3 Footnote 17 states that bike facilities "Shall be required if identified on adopted Bike Master Plan." Thus, this network is essential to the creation of neighborhood bike routes that connect all destinations in San Antonio for bike users. It is also important in informing the deployment of the city's Neighborhood Traffic Calming Handbook to slow traffic on local streets. Additionally, UDC Table 506-3 Footnotes 8 and 14 speak to the requirements and allowances for protected or roadway-separated bike facilities – this network can support their deployment as well.

As the City evaluates projects through its 5-year bond cycle, its roadway improvement (IMP) fund, its rolling maintenance obligations, or other funding sources (discussed further in the BNP *Funding Strategy Plan*), this network defines a list of projects for implementation to inform these discussions. It also amends the city's *Master Plan* by updating the 2011 *Bike Master Plan*'s recommended network. This will require bike facilities be included on all future city projects along the existing roadways on the network. It will also mandate their inclusion on new roadways platted and designed as part of the city's *Major Thoroughfare Plan*.

Even before bike facilities are deployed or improved along the network, its existence also informs riders where to go by calling out specific low-stress routes that are already safe for bike users. While the BNP identifies a specific network of streets that must have safe bicycle facilities, streets or corridors that are not identified are not precluded from bicycle facility additions or improvements. In fact, it is recommended that the network adapt to changing circumstances and follow community demands. The principles described in the next section do not stop being informative once the network is developed –they continue to inform decision-making as community comments and desires change, new roads and areas face mounting traffic violence, new destinations are built around San Antonio, or communities experience inequitable treatment. Furthermore, riding a bike is a legal mode of transportation and, to varying extents, bicycles will be ridden on all city-owned roadways. Therefore, all streets should be designed with cyclists in mind regardless of inclusion on recommended network.

What is the Foundation of the Recommended Network?

In 2011, the City adopted its *Bike Master Plan* with the goal of implementing a transportation and recreation system covering most areas of town by 2030. A variety of facilities were proposed to meet different users' needs. The pre-2011 209-mile bike network would be expanded to almost 1800 interconnected miles, providing San Antonio residents and visitors access to destinations throughout the city.

The projects proposed by the plan were divided into two tiers. Tier 1 was to be implemented within the first 5 years, and Tier 2 was for projects to be implemented within the subsequent 5 years. Prioritization was based on need, connectivity, ease of implementation, and community support. The 2011 *Plan* also outlined policies, programs, and staffing needs.

Although significant improvements have been made to the city's bike and pedestrian infrastructure, much remains to be accomplished.

The 2011 *Plan* was developed with all the best practices at the time. In the intervening years, the industry has updated those practices based on new data. While the 2011 *Bike Master Plan* provides a foundation for developing cycling infrastructure in San Antonio, an update is needed to accommodate the safety needs of more types of riders.

This existing network is the foundation on which the updated network of bike facilities was developed. It was recorded in the *Existing Conditions, Needs Assessment, and Inventory Report.* Recorded attributes include dedicated and shared bike facilities, traffic calmed streets, crossings and lighted intersections, and facilities impacted by flooding.

This network, both owned by the city and other entities, is currently 604 miles long and broken into five facility types:

1. Shared Lanes, Bike Routes, or Bike Boulevards: 73 miles
2. Traditional Bike Lanes: 257 miles
3. Buffered Bike Lanes: 28 miles
4. Protected Bike Lanes: 10 miles
5. Shared Use Paths: 236 miles

For the remainder of this report, these facilities will not be discussed by their facility type, but rather grouped as “bikeways”.

What Principles Guide the Recommended Network?

San Antonio's 2011 *Bike Master Plan* established a foundation for on- and off-street bicycle facilities throughout the city, but much has changed since that plan was adopted. In describing its recommended bike network, the 2011 *Plan* stated the overarching goal of "Develop[ing] a comprehensive network of on- and off-street bicycle facilities." While this goal supported an important vision, it did not provide opportunities for evaluation of varying levels of success in the network or a roadmap for its achievement.

The 2011 *Bike Master Plan* stated five objectives for the bike network: "Address key barriers in the bicycle network; Address and resolve the issues with parking in bicycle lanes; Develop a connected and regional network of on and off-street bicycle facilities; Improve bicycle facility maintenance practices; [and] Connect the on-street network with off-street trails and paths to create a comprehensive network of bicycle facilities." While these objectives describe essential features of a connected network, many are not related to the development of a network. Improving maintenance practices is not a matter of the routing of facilities, but rather the city's budgetary practices around maintenance for bike facilities. Similarly, resolution of motor vehicle parking/bike facility interaction is a matter of policy and facility design. Both issues are addressed in the BNP's *Funding Strategy* and *Bike Guidelines* documents, respectively. All goals and measures of success for the BNP are specifically designed, data-informed, and feature realistic timelines. BNP goals are discussed at length in the *Performance Targets* memo.

The BNP articulates the principles described below for the routing of bike facilities. These principles are not goals – there is no metric by which the below concepts are determined to be "accomplished." Instead, they serve as the foundation for reasoning behind the routing of new facilities.

Equity: Transportation and land use decisions often place unfair burdens on disadvantaged communities. Many of these communities include high concentrations of people who may not have the financial capacity to own a vehicle and rely on walking, biking, and transit to meet their daily travel needs. The prioritization of new bike infrastructure should support reparative outcomes for areas of San Antonio that have historically been marginalized by transportation infrastructure and government policy.

Community Desire: Network prioritization should be influenced by community preferences as outlined in BNP surveys and previous community engagement from other studies and plans. While additional engagement will be required as each project moves towards implementation, the broadly focused community comments must inform the prioritization of new facilities.

Safety and Redundancy: Areas with a high rate or high likelihood of crashes should be prioritized for improvements to limit the risk of severe injury or death while riding a bike. Protection for bike users should be included when the motor vehicle usage of a roadway (volume, speed) and the design of the roadway create conditions where the likelihood of a fatal or severe injury collision is higher. Many environmental and personal preference conditions may determine where bike users are able to ride; these can include the perception of safety on major roadways (even in a protected facility) or the historic flooding of roadways and trails. Redundant facilities should be routed to ensure bikes can continue to be operated regardless of condition and to ensure that people of all ages and abilities can move around San Antonio by bike.

Demand and Connectivity: Bike users should be able to get to every destination in the city with minimal deviation from a direct path. Disconnections at intersections or barriers such as highways, rivers, or rail lines should not prevent facility users from reaching their destinations by bike. Bike users have a lower tolerance for diversion than car users, especially in extreme heat experienced by Texans every summer. If direct facilities are not routed, bike users will often make their own path on the direct route, regardless of safety. Projects should be implemented in response to known bike travel demand or predicted latent demand for bike travel.

Feasibility: The projects recommended by the BNP should be specific and implementable in alignment with existing city project delivery procedures. For this reason, any bike project must state the implementation agency, project extents, draft cost estimates, specific recommendations for designs, and project constraints.

What Data Informs the Recommended Network?

San Antonio has made considerable strides in building a transportation network that provides choices for how to travel. However, additional investments are needed to create an interconnected, safe, and comfortable biking network that meets the needs of all San Antonians, no matter their confidence level. Like most American cities, San Antonio is seeking ways to retrofit its built environment for walking and bicycling so that the city can adequately serve the transportation needs of residents and visitors.

Understanding the needs and preferences of anticipated end-users was crucial to determining the type of infrastructure and best implementation options for the recommended network. A complete, connected bike network that is comfortable and safe for users of all ability levels is an essential characteristic of a viable transportation option that is useful to San Antonians.

Before developing the recommended network, the BNP assessed the condition of the existing bicycle network, evaluating not only its physical characteristics but also its connectivity, traffic volumes, comfort level for the users, and safety. Another important aspect of the BNP was the input of stakeholders and community members. A review of past documents was conducted, and the information, findings, and community feedback were taken into consideration when trying to understand San Antonio's bicycle challenges and needs.

Public and Stakeholder Input

The BNP is a community-driven effort to develop a transportation network that meets the needs of every person in San Antonio. In order to serve the thousands of residents, visitors, and commuters who travel to and through the city every day, the team involved the public early and throughout the process. One of the most important engagement tools was the survey crafted for each phase. Provided online and on paper at tabling events, respondents of the survey helped the team to determine what new infrastructure is needed and where. The three surveys provided generated over 3,600 response total. Pop-up and tabling events were also an integral part of engagement, giving people an opportunity to view BNP information and to give input without going to a public meeting. At each event, the BNP provided large format maps for respondents to draw desired bike routes or dangerous existing conditions. QR codes to participate in surveys. While 3 surveys were distributed, all had a map component. The third survey gave respondents the opportunity to comment on every road on the network, producing data to route desired facilities. Mapping activities to review and refine a draft network was the primary component of BNP open houses in the summer of 2024. More information on the BNP's public engagement activities can be found in the Engagement Report.

While developing the recommended bike network with the public, the BNP also hosted three advisory bodies to oversee the development of the bike network. Each advisory body engaged in four meetings during which they had to opportunity both through discussion and activities to help the BNP define the most desired routes for bike facilities. The Internal Advisory Committee (IAC) was comprised of representatives from different City departments such as Public Works, Parks, and Planning, who advised as to ongoing activities that may affect the deployment of future bike facilities on the network. The Technical Advisory Committee (TAC) was comprised of representatives from partner governmental bodies who own, maintain, or operate in the public Right-of-way (ROW) – these partners gave essential input as to their ongoing efforts and most desired location for future bike facilities in their areas or on their roadways. The Mobility Working Group (MWG) allowed community leaders to discuss their visions for the San Antonio bike network. Finally, the BNP hosted a series of one-on-one meetings with both City departments and five key stakeholder groups to further refine the network and incorporate their feedback. But stakeholders and the public have not just been involved in this plan, they have been involved in many plans over the past decade. Previous plans, such as the 2011 *Bike Plan,* the *SA Tomorrow Mobility and Subarea Plans*, and partner agency plans were geocoded and added to the BNP GIS database alongside public and stakeholder input to support the routing of bikeways.

Bicycle Accessibility to Destinations

Major employment areas and activity centers represent key destinations that generate transportation trips for people looking to work, play, live, and learn. Understanding where key activity centers are located is imperative to developing a complete and connected bicycle network that conveniently connects people to the places they want and need to go. In the *Existing Conditions, Needs Assessment, and Inventory Report*, eight types of key destinations were identified and analyzed, including schools, grocery stores, and health centers.

Creating and maintaining a bike network that offers users viable options for reaching their destinations can potentially increase the number of users. A key indicator of the network accessibility is how far one can travel within 15 minutes using only low-stress streets.

During the development of the BNP, a bicycle accessibility assessment was conducted to review this data based on the current condition of the network. For the evaluation, these steps were followed:

1. Key activity centers and destinations that San Antonio residents and/or visitors may want or need to bike to were identified
2. Using level of traffic (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 miles per hour (mph), or up to 2 miles, can travel within 15 minutes. (Note: people riding electric bikes and athletic riders may be capable of higher average speeds and can likely access more destinations than the typical rider; however, using the typical rider allows the bikesheds to reflect a more significant portion of the biking population)
5. A 0.25-mile grid of the city was developed to illustrate, at a citywide level, areas with high or low levels of access via a 15-minute bike ride.
6. Using Census Block data, population estimates were calculated to determine the number of residents within each bikeshed.

Based on the results of this assessment, San Antonio’s current bicycle accessibility is low throughout the city. Key takeaways include:

- While the majority of San Antonians can reach at least one destination by bike, nearly 1 in 4 San Antonians cannot reach any destination at all.
- Islands of low-stress connectivity are located throughout the city; however, access between low-stress islands is limited.
- While San Antonio’s greenway trail system provides a comfortable, off-street biking experience, gaps in the network and limited connections to low-stress streets limit access.
- Schools, parks, and trailheads are dispersed throughout the city, offering residents in different parts of town access to the facilities. However, the availability of amenities, upkeep, and perception of safety may not make these parks or trailheads desirable for some users.
- Residents living within a 15-minute bike ride of a park might not have adequate infrastructure to access it safely.
- While most of the city may be car-dependent, pockets of connectivity do exist. The city has unrealized potential for future bicycle networks through the greenway system, utility corridors, and existing streets.

Safety

Since San Antonio adopted their first *Vision Zero Action Plan* in 2015, the city has been working toward eliminating traffic fatalities and serious injuries on its roadways. Understanding where, when, and how crashes happen can assist in developing a priority implementation list. Developing an implementation plan focused on safety and accessibility has the potential to encourage residents to choose an alternative transportation mode.

Numbers of pedestrian and bicyclist fatalities are on the rise nationally. These fatalities comprise a disproportionately large number of the nation's annual traffic fatalities considering the number of cyclists and pedestrians using the roadways. Understanding these trends helps to identify the critical factors impacting transportation safety that need to be addressed.

Between 2019 and 2021, pedestrian and cyclist fatalities on Texas roadways increased by 24%. Between 2018 and 2022, 5,486 pedestrian and bicyclist crashes occurred in San Antonio. Of these crashes, 331 resulted in one or more fatalities and 580 resulted in one or more serious injuries, averaging 160 fatal or serious pedestrian crashes and 22 fatal or serious cyclist crashes every year on San Antonio's roads. In recent years crash numbers have been trending upward, with more than 175 fatalities in 2022. From 2020 to 2022, fatal and serious injury bicycle crashes increased by 127%. Fatal bike crashes in 2023 reached a 10-year high (8 fatal crashes on all roads, 4 fatal crashes excluding highway facilities).

Crash data was analyzed with a focus on the factors that contributed to each crash so that the BNP can address those issues. Crash data was obtained from the Texas Department of Transportation (TxDOT) Crash Records Information System (CRIS). CRIS has a variety of categories to classify crash causes. Examples of contributing actions include *Failing to Yield the Right of Way*, *Motorist Inattentive or Distracted*, *Chemical Impairment,* or *Disregarding a Traffic Control Device*. *Driver Inattention* was primarily cited as the leading cause of crashes involving pedestrians and bicycles, with *Failing to Yield* as the second leading cause. More than 40% of the fatal and serious injury pedestrian and bicyclist crashes involved the pedestrian or bicyclist failing to yield to the right of way to the vehicle.

The locations and attributes of these crashes played an important role in determining which roads require the highest quality, most protected bike facilities.

Other Demographic and Use Data

Other data sources aggregated to census block groups and census tracts played smaller, but still import roles in the creation of the network. These included, but aren't limited to:

- Population Density
- Equity Atlas
- Transportation Cost Burden
- Health Outcomes
- Replica short trip density

Section 2. Network Development Methodology

What Process Created the Recommended Network?

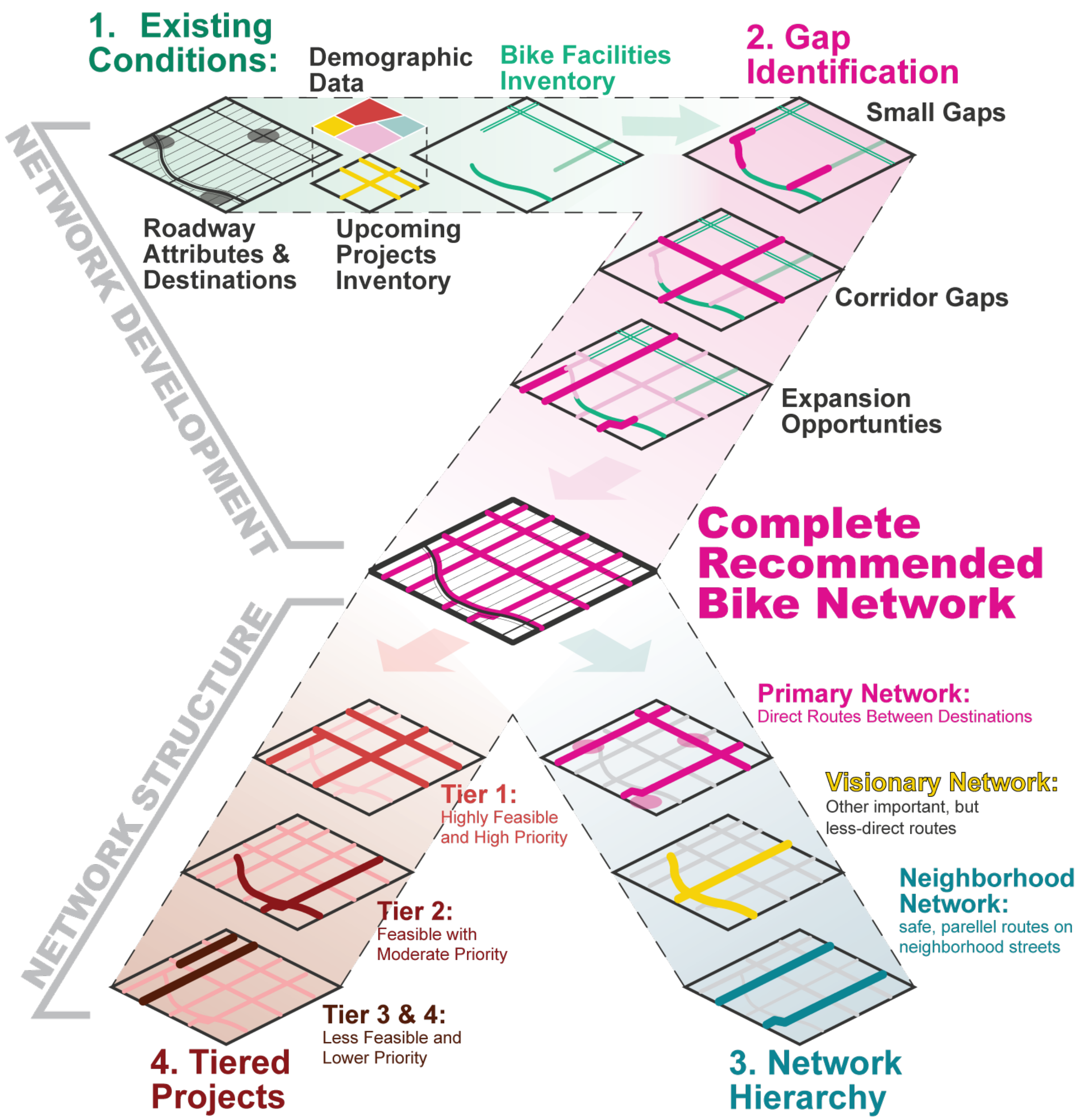
The updated network was created using a four-part, data-driven process that structures the development of the network and balances all data inputs (**Figure 1**). The process aims to create a safe alternative transportation mode connecting destinations that are used by both San Antonians and visitors. The first part of the process is a full understanding of the existing network, its accessibility to destinations around San Antonio, and the unseen demographic impacts of the network's gaps and connections. This was analyzed in the Bike Equity Index and Bike Accessibility Assessment in the *Existing Conditions, Needs Assessment, And Inventory Report* and discussed in **Section 1**.

Second, the BNP gaps in the existing network were analyzed and grouped into three types – small gaps, corridor gaps, and expansion opportunities. This prioritizes the addition of any new connections to key destinations across the city. Filling in all network gaps would create a complete recommended network, but it would lack structure and would not be fully implementable.

Steps 3 and 4 of the methodology transform the network into useful subsets by determining a hierarchy in the network. This is accomplished by describing the directness of a route in connecting key destinations, and then breaking up the network into feasible project segments for implementation.

Unlike the 2011 *Plan*, this method does not prescribe a certain facility for each roadway. Rather, using the *Bike Guidelines*, road designers and the community can choose from a suite of bike facility options for each roadway based on the motor vehicle speed and volume, and the surrounding land use.

FIGURE 1: NETWORK DEVELOPMENT PROCESS



Gap Identification (Step 2)

How were Gaps Identified and Recorded?

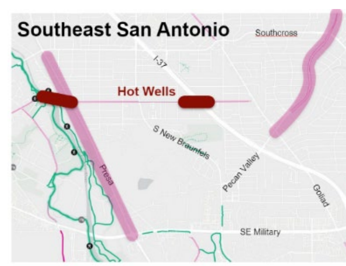
Respondents to the BNP Phase 3 survey identified “filling-in missing links in the existing network” as the improvements the city should most highly prioritize. Following that community guidance, the BNP implemented a methodology rooted in closing gaps in the existing bike network. This method also considers routes identified in previous plans and projects, existing conditions data analysis, and route preferences identified via community engagement to build the complete recommended bike network. The network development process is iterative and can be defined as follows:

- Identify physical gaps (linear breaks) in the existing bike network.
- Identify physical gaps (linear breaks) between the existing bike network and results of Step 1 to key destinations evaluated in the existing conditions analysis.
- Identify additional long-distance connections needed to expand the network (results of Steps 1 and 2).
- Identify intersections or crossing gaps to round out the network.

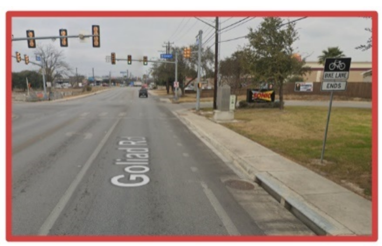
The gap methodology was used to identify physical linear breaks in the existing network using the City’s existing *Streets* GIS Layer, their impact based on the community usage of the area, their importance to completing the network, and their impact on user safety. For simplicity, all existing bike facilities, regardless of their need for upgrade or improvement, were added to the network. It was possible to identify three different patterns of gaps in the system (**Figure 2**).

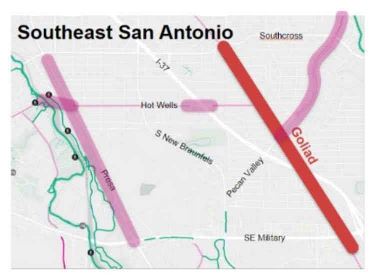
FIGURE 2: LINEAR GAP TYPES

Small Gap: the need to add a few blocks or less of infrastructure to connect the existing facilities (e.g Hot Wells Boulevard).

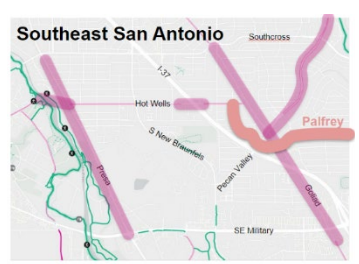


Corridor Gap: longer distance gaps to connect existing facilities usually on the same roadway, such as Goliad Road.





Expansion Opportunities: new routes, low-stress alternatives, and new connections between existing facilities.



How were Crossings Evaluated?

During the review process, intersections that required improvements to make the system safer were also identified (**Figure 3**). These are not the only intersection improvements included in the BNP, but they are the only ones that require special attention, such as new signalization or key construction concerns. Issues include:

- **Low-stress crossing is needed:** an unsignalized intersection where a low-stress existing or proposed facility meets or crosses through a high-stress roadway. These intersections can be unsignalized four-way intersections, T-intersections, or offset intersections

HOUSTON STREET AND PALMETTO (2 LN + TWLTL CROSSING 2 LN)

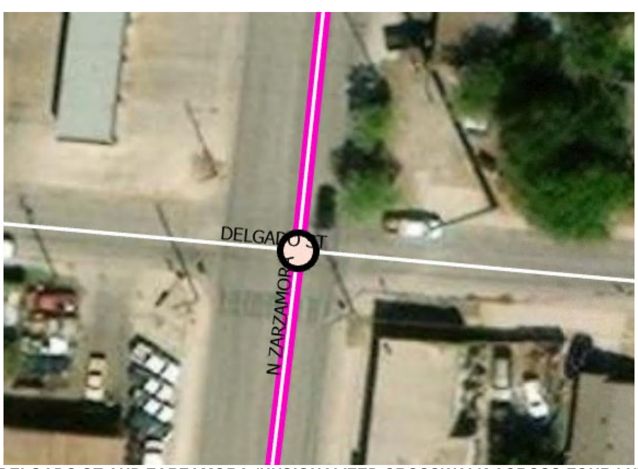
T - PARK AVE AND MAIN AVE (4 LN + TWLTL CROSSING 2 LN)

OFFSET- PINEWOOD LN AND MCCULLOUGH AVE (4 LN AND 2LN)

- **Mid-block crossing is needed:** when a trail or other shared-use path intersects the roadway.

I-35 N ACCESS ROAD AND TRAIL

- **Upgrade existing crossing:** crossing is available, but it is unsignalized on a high-stress road or challenging for cyclists to navigate.



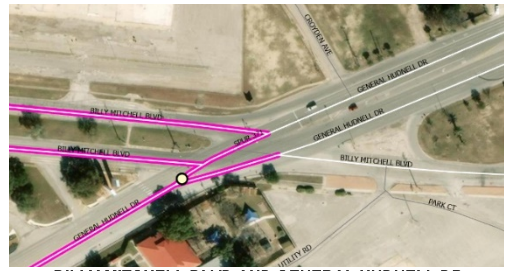
DELGADO ST AND ZARZAMORA (UNSIGNALIZED CROSSWALK ACROSS FOUR LN)

PLEASANTON ROAD AND TRAIL (MIDBLOCK CROSSING, TWO LN)

- **Vertical gap between facilities:** trails and other facilities provide crossing through different levels but either do not provide a connection, or the connection is limited to one side of the roadway.

MITCHELL STREET AND TRAIL

- **Construction constraints:** due to challenging geometric shapes, irregular number of street intersections, or split lanes, it is difficult to implement a standard recommendation at this type of crossing.



BILLY MITCHELL BLVD AND GENERAL HUDNELL DR

- **Spot Gap:** opportunities to build a small trail or other off-street facility to connect two existing facilities.

HOLMGREEN RD AND DIANE RD

- **Other:** all the other scenarios of intersections that were not classified under the listed types, such as major freeway intersections either over or under a facility

DIVISION AND THE I35 ON/OFF RAMPS

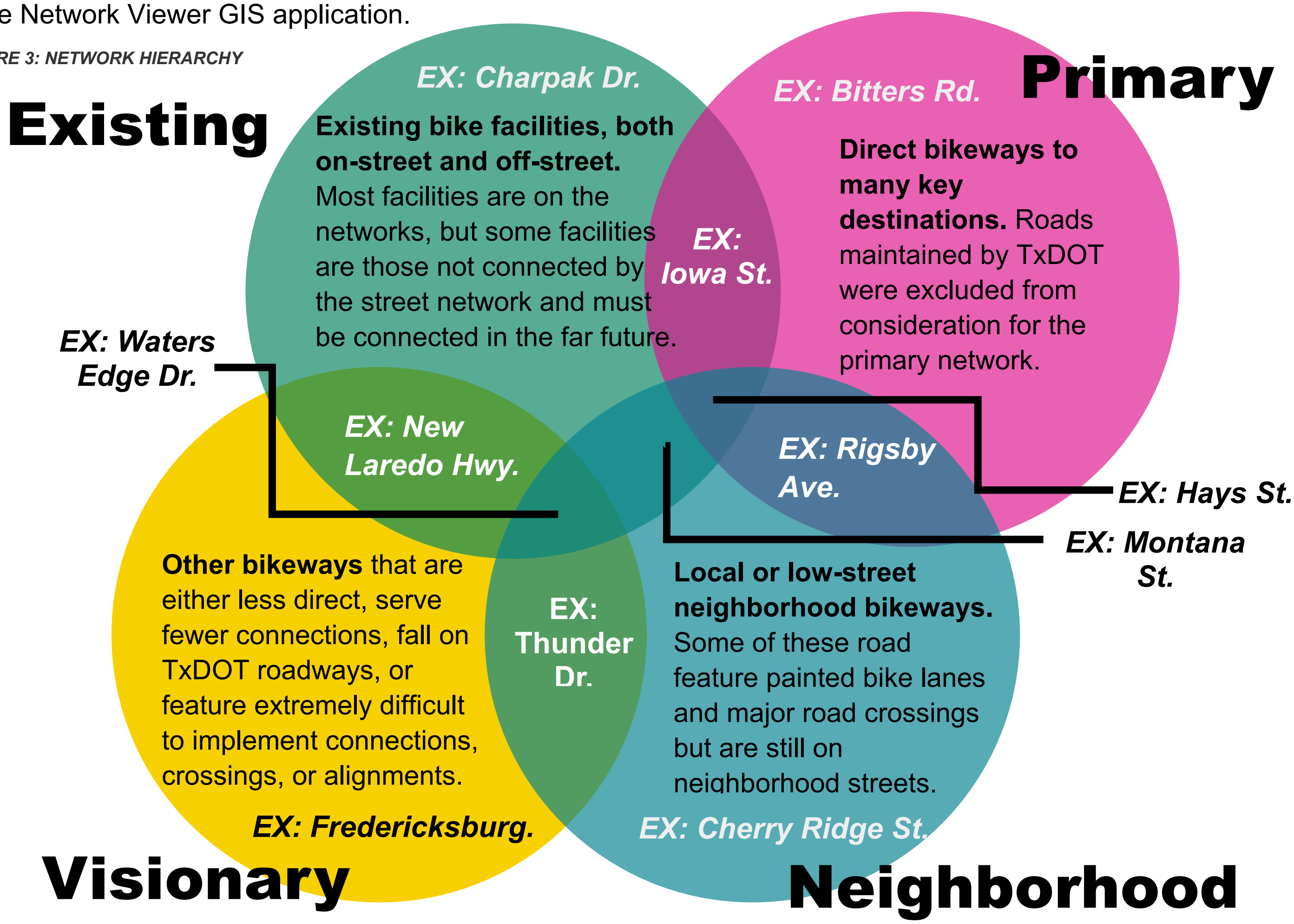
Network Hierarchy (Step 3)

How is the Recommended Network Organized?

A hierarchical network helps direct bike traffic appropriately. Major bike routes can function like major roads for bike users, accommodating higher volumes of traffic with wider lanes and better separation from vehicles. Smaller, local routes may prioritize neighborhood access and slower-paced riding. By establishing a clear hierarchy, San Antonio can ensure safe connectivity between many key destinations.

The 2011 *Bike Master Plan* organized its network into a three-step hierarchy of routes: regional, citywide, and local. A different organizational method is used for the current update, defining the network not by the distance served, but by the directness of the bikeway's connection to key destinations. The most direct 623 miles of bikeways serving the most key destinations are listed as the ***Primary*** Network. There was no threshold for determining the quantity of connections necessary, as the quantity of connections increases or decreases by the density of the built environment. The 690 miles of less direct routes that may connect to a greater number of destinations in the future are the ***Visionary*** Network. Finally, the 580 miles of the ***Neighborhood*** network includes lower-speed neighborhood streets acting as alternatives to higher speed and traffic streets on the network. All three of these networks are not exclusive of each other and are layered on top of and including the ***Existing*** network. For example, a Neighborhood route connecting directly to many destinations is included in both the *Neighborhood* and *Primary* networks. This network hierarchy does not prescribe the facility; streets should always be designed to safely accommodate bicyclists based on speed, traffic volumes, and built environment, no matter their position in the hierarchy. **Figure 3** illustrates the overlapping nature of the three hierarchies of networks and the existing network. To view these networks, please review the Recommended Bike Network Viewer GIS application.

FIGURE 3: NETWORK HIERARCHY



Develop Project Tiers (Step 4)

How were Distinct Projects Identified and Prioritized?

The final phase in structuring the network is a three-step process to convert the recommended bike network into scored, individual projects. The goal of this effort is to create a prioritized list of implementable projects (including intersection improvements) that are scheduled out by potential implementation year for city consideration.

The process for creating the project list is informed by the five principles discussed earlier in the report and began with the gap identification methodology. In the gap identification methodology, roadway segments from the COSA GIS inventory were enhanced with data compiled by the BNP *Existing Conditions Inventory*, added to the draft network, and categorized into three gap types:

- **Small Gap** – Gaps in existing bicycle or trail facilities that are only a few blocks.
- **Corridor Gap** – Longer gaps connecting existing facilities, often the length of an entire roadway.
- **Expansion Opportunities** – New bike corridors that provide low-stress connections or vital links.

Other gaps highlighted were:

- **Bike Facility Upgrade** – Segments with existing facilities exceeding the acceptable level of traffic stress (LTS).
- **Programmed Projects** – Known roadway/greenway improvements that will include bike facilities.

Additional datapoints were added to ensure specificity in connection type:

- **Alternate Route** – Is this route a low-stress alternative to a high-stress route?
- **Construction Concern** – Are there concerns about the ability to add a bike facility to this roadway given right-of-way or other constraints?
- **External Trigger** – Is there a trigger allowing this facility to be implemented, such as a new development or a change in the ownership of a facility?

To transform the bike network lines into distinct projects, the prioritization process places network street segments into longer project lines, informed by type of connection and additional delineators. It then creates a 100-point, data-informed priority score for each project. Finally, it determines a simplified feasibility checklist for each project, allowing the project list to be scheduled out by likely funding sources and implementing agencies.

The priority score and feasibility checklist combined will produce the goal project list that can be organized into any area boundary such as council district or *SA Tomorrow* planning area.

How were Project Extents Defined?

To create distinct projects, the BNP defines start and end points of projects using the three-step GIS process below:

1. Group needs based on location
    a. Join proposed intersection improvements to the proposed roads they fall along unless the intersection has unique design constraints coded in the network methodology as *Spot Gap*, *Vertical Gap*, or *Construction Constraint*.
    b. Intersection improvements that do not connect to a proposed roadway improvement will stand alone or be grouped with other nearby, similar intersection-only improvements.

2. Split linear locations at logical breaking points
    a. Determine geographic extent for potential upgrades and split linear projects at logical breaking points such as major highways without crossings, the end of a roadway, city boundaries, connections to existing major bike infrastructure, or planned future major bike projects. These breaking points could also be delineated by phases, allowing for longer projects to be split into more manageable pieces (3 miles or less).
3. Separate Project by Delivery Agency
    a. There are six agencies likely involved in the project delivery process for these planned projects. The following agencies are suggested based on the roadway attributes and the Project Type:
        1. City of San Antonio Public Works Department – Major Projects
        2. City of San Antonio Public Works Department – Rolling Maintenance
        3. City of San Antonio Public Works/Transportation Department Collaboration
        4. City of San Antonio Parks Department Projects
        5. TxDOT
        6. Suburban City or County Public Works and Improvements Departments

How were Projects Prioritized?

The BNP used various data sources as prioritization metrics to attribute a 100-point maximum total “priority score” to each project. These data sources are grouped into four categories based on the first four of five prioritization methodology principles. These scores alone will not dictate the priority of a project but will inform the final tier groups of all projects before incorporating the final principle – feasibility. The 100-point score is an aggregate of data inputs representing how important and impactful a project could be in building out the city’s bike network, adding new connections and key destinations, and improving safety for all road users. **Figure 4** lists all metrics by category; it includes a brief description of each and their maximum and minimum scores. The mean priority score of all projects was **30.1** and the standard deviation of the scores was **17.7**

FIGURE 4: PRIORITY SCORING TABLE

Category	Weight	Metric	Data Source	How it is Measured	Scoring
Equity	20	Provides transportation for high **Bike Equity Index Score** areas	Bike Equity Index	Density of population with low access to low-stress bike facilities	**Scale Range of 0 - 10** 10 = Top 25% 4 = Top 50% 2 = Top 75% 0 = Bottom 25%
		Provides transportation for an area of **high overall equity concern**	San Antonio Equity Atlas	Density of underserved populations	**Scale Range of 0 - 6** 6 = Equity Scores of 7+ 4 = Equity Scores of 5 or 6 2 = Equity Scores of 3 or 4 0 = Equity Score of 2
		Provides bike facilities in areas with high rates of **chronic health issues** such as heart disease, diabetes, and stroke	Health Equity Score	Average of Health Inequity composite score	**Scale Range of 0 - 4** 4 = Top Half 0 = Bottom Half

Community Comments	**20**	Received **public or agency support** during public or stakeholder outreach	Online Map/Public Meeting and Stakeholder comments	Total number of public and agency comments received on facility	**Scale range of 0 – 10** 10 = 10 or more comments 7 = 5 or more comments 4 = 2 or more comments 2 = Any comment(s) 0 = no public input received
		Reflects a **planned connection or recommendation** from another plan	SATomorrow, SATomorrow Corridors, 2011 Bike Plan Tier 1 or 2, Centro DTS, ULI Mobility Hubs, TxDOT BTTS, TxDOT District Bike Plan, ActivateSA, Great Springs Project	Total number of plans reflected	**Scale range of 0 – 10** 10 = reflected in 4+ plans 7= reflected in 3 plans 4 = reflected in 2 plans 1 = reflected in 1 plan 0= reflected in 0 plans
Safety	**30**	May **reduce number of crashes** on High-Injury corridors	COSA	On the Bike High Injury Network	**Scale Range of 0 - 8** 8 = On HIN 0 = Not on HIN
		May **proactively reduce crash risk** on High-Risk corridors	COSA	Scoring 1 standard deviation above mean Risk Score (11.3)	**Scale Range of 0 - 6** 6 = On HRN 0 = Not on HRN
		May address corridors or intersections with high numbers of **cyclist or pedestrian crashes**	CRIS	Total number of pedestrian or cyclist crashes within 100 feet	**Scale Range of 0 - 10** 10 = top quartile of Bike/Ped related crashes 8 = Top half 4 = Bottom half 0 = No Bike/Ped related crashes
Demand & Connectivity	**30**	Improves direct access to **parks and trailheads**	Parks and Trailheads	Includes a direct connection to a park or trailhead	**Scale Range of 0 - 5** 5 = connects 0 = does not connect
		Fills system gaps to create a contiguous active transportation network or closes a gap in the low-stress network	Existing Bicycle Network	Spatial overlay if it closes gaps in existing network or closes a gap in the bikeshed analysis	**Scale Range of 0 - 5** 5 = addresses connection gap in the existing and planned network 0 = does not provide connection in the existing network
		Improves direct **access to everyday needs** (health centers, grocery stores, schools, and universities)	Destinations	Total number of everyday needs within 1/8 mile	**Scale Range of 0 - 15** 15 = connects to 5 or more destinations 10 = connects to 3-4 destinations 5 = connects to 1 -2 destinations 0 = does not connect to any destinations
		Improves **first/last mile connections** between transit stops and surrounding destinations	Bus Stops	Bus stop located with 1/8 miles	**Scale Range of 0 - 5** 5 = Connects to Transit Center, Park & Ride, or ART 4 = Connects to PRIMO 3 = Connects to Frequent Bus (<= 15 minute headway) 2 = Connects to Local Bus 0 = No transit route/stop

How were Project Tiers Developed?

Finally, project feasibility was determined and projects were grouped into tiers. Binary checks will be performed to determine if projects are impacted by any high, medium, or low-level constraints. The severity of the constraint was determined by the likely duration of delay or the unlikelihood of project success within the consideration of project delivery processes in San Antonio (**Figure 5**). This was done as a qualitative analysis of the visual attributes of a roadway.

FIGURE 5: FEASIBILITY CHECKS TABLE

Category	Constraint	Description	Data Source	Severity
Roadway Design	**Impact to Parking Spaces**	10 or more parking spaces impacted per mile.	BNP	Mid
	Impact to Car Lanes – Reconfiguration	Roadway Reconfiguration where one car travel lane in each direction is replaced with a TWLTL or one car travel lane is removed in one direction for more than ½ mile.	BNP	Low
	Impact to Car Lanes – Removal	Removal of one car lane in each direction for more than ½ mile.	BNP	Mid
	Impact to Left Turn Lanes	Removal of a dedicated left turn lane or two way left turn lane.	BNP	Low
	Impact to Right Turn Lanes	Removal of a dedicated right turn lane or a wide shoulder.	BNP	Low
Management	**TxDOT-Owned**	Primarily on a facility owned by TxDOT.	TxDOT	Mid
	VIA ART	Primarily on a facility with a VIA Advanced Rapid Transit (ART) Route.	VIA	Mid
	VIA Service	Along a facility serving another VIA bus route.	VIA	Low
	Rail Service	Requires modification of active rail line crossing.	Railroads	High
	Suburban City	Interfaces with a suburban city or county facility.	COSA	Low
	MTP	Primarily on a future roadway included in the major thoroughfare plan.	COSA	High
	Long-Term External Projects	Primarily on the access road of a highway planned and funded for widening.	AAMPO	Low
Concerns	**Private Property**	Potentially significant impact to private property (e.g. off-street greenway trail).	BNP	Mid
	ROW	Likely requiring significant impact to expanded ROW along a roadway.	BNP	Mid
	Engineering/ Environmental	Apparent significant waterway or elevation issues, or environmental constraints complicating project delivery.	BNP	Low
	New Lighted or Signalized Intersections	Requires the creation of more than one crossing or at least one new highway bike/ped crossing; only applies to new crossings, not all crossing improvements.	BNP	Mid

Project feasibility (**Figure 5**) is identified as:

- *Very feasible*
    - did not check any "High" or "Mid" severity constraints, and
    - checked fewer than two "Low" severity constraints.
- *Feasible*
    - did not check any "High" severity constraints and
    - checked fewer than two "Mid" severity constraints, and
    - checked fewer than four "Low" severity constraints.
- *Less feasible*
    - checks a "High" severity constraint or
    - more than four "Mid" severity constraints or
    - all six "Low" severity constraints.

These three feasibility categories are combined with the priority score to create four project tiers (**Figure 6**).

FIGURE 6: PROJECT TIERS AND FEASIBILITY

	Priority Score one standard deviation above the mean	Priority Score above mean	Priority Score below mean	Priority Score one standard deviation below the mean
Very Feasible	1	1	2	3
Feasible	1	2	3	4
Less Feasible	2	3	4	4

Figure 7 describes these tiers along with their likely timeframe and mileage.

FIGURE 7: PROJECT TIERS WITH TIMELINE AND MILEAGE

	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.

Section 3. Short-Term Implementation

What Can Be Implemented Immediately?

This report provides recommendations on several project types and elements that could be implemented quickly following passage of the BNP (the *Bike Network Plan Cost Estimation Report* contains a complete list of projects by tier with generalized cost estimates). For many bike facilities recommended in the BNP, implementation requires changes in the roadway that would flag one of the feasibility checks (**Step 4. Tiered Projects**). This might include lane removal, parking removal, limiting turn lanes, or new or augmented signalization for bike crossings at dangerous intersections. However, some recommended BNP projects can be implemented without major impacts. This section further addresses barriers to immediate implementation by highlighting examples of four types of easier-to-implement infrastructure that can quickly improve bike safety.

Barriers to Easy Implementation

Today, several City policies limit expedient reallocation of space to bike users and modify the roadway. These include:

1. No Parking Areas:
   - In San Antonio, removal of parking from one or both sides of any street requires a petition from a resident of that street, which must be signed by owners of adjacent properties and at least one corner lot. However, the City Engineer may place no parking signs on one side of streets narrower than 30 feet, allowing for some flexibility in the deployment of bike infrastructure.
2. One Way Streets:
   - Changing a street from serving two-way traffic to one-way traffic creates additional room for bike infrastructure. To make this change, 90% of adjacent property owners must agree favor it, making implementation extremely difficult.
3. Traffic Calming:
   - To implement traffic calming devices, such as speed cushions, chicanes, and median islands, 51% of the adjacent property owners must favor it, making this infrastructure burdensome to implement.
4. Intersection Signalization:
   - TxDOT requires passing of a technical warrant analysis before signal implementation at any intersection – a costly and delay-prone process.
5. Vehicular Lane Removal and Reallocation:
   - The City does not currently have a standardized process by which vehicular travel lanes are removed and reallocated to other uses, such as bike infrastructure. However, such a process will soon be established under the City's Complete Streets Policy,. Currently, extensive and costly engineering and public input processes must be undertaken to assess feasibility of lane removal.

The implementations in this memo trigger none of these requirements and can be installed with standard design and community engagement.

Easier-to-Implement Infrastructure #1: Bike Boulevards Along Existing Signalized Local Streets

Bike boulevards provide low stress routes for bike connections. While these routes should be paired with traffic calming devices, lower speed limits, and new signalized intersections, they can and have been implemented in San Antonio without such changes. Bike boulevards would not require a warrant analysis, would not reduce parking access, and would not affect any vehicular travel lanes. Moreover, these are extremely cost-effective solutions, only requiring shared lane markings and bike route wayfinding signage. Examples of such projects are included in **Figure 8.**

FIGURE 8: IMPLEMENTATION EXAMPLES OF BIKE ROUTES ALONG EXISTING SIGNALIZED LOCAL STREETS

Council District	Project #(s)	Street Name	Key Connections	Length
1	2106, 99, 108	Cherry Ridge Dr., Pinebrook Dr., Panda Dr.	Dellview Park, Granados Sr. Center	3.2 mi
2	3015, 3024	Rice Rd., Semlinger Rd.	Salado Creek Greenway, Copernicus Park	2.3 mi
3	3032	Palfrey Ave., Corfu	Salado Creek Greenway	1.7 mi
4	3106, 3107, 3108	Ansley Blvd, Lytve Ave.	Palo Alto College, Zarzamora Middle School	2 mi
5	1132	W. Cesar Chavez Blvd.	Apache Creek Greenway, Lanier High School	1.3 mi
6	5110	Bowen’s Crossing, Weybridge	Brauchle Elementary, Helotes Creek Greenway	6.3 mi
7	1040, 1042, 1062	Donaldson Ave, Quill Ave., Benrus St.	Jefferson High School, West Quill Park, St. Paul Community Center	5 mi
8	5157, 5140	Hollyhock, Oakland Rd.	Leon Creek Greenway	4.6 mi
9	2112	Parhave, Copperstone, Park Hill, Ledge Hollow, Turkey Point	Oak Haven Park, Mud Creek Park	3.6 mi
10	278	Titan Dr, Asteroid Dr, Mayfair Dr.	Macarthur Highschool; Salado Creek Greenway	2.6 mi

Easier-to-Implement Infrastructure #2: Bike Lane Upgrade with Adjacent Lane Narrowing

Striped bike lanes make up the plurality of San Antonio’s bike network, but many have been implemented on inappropriate roadways that allow high speeds, too much traffic, too many lanes, or incompatible land uses. Luckily, striped bike lanes are often the easiest to upgrade while maintaining all other roadway features – simply by narrowing the adjacent car travel lanes. Car travel lane widths do not need to exceed 10 feet unless the roadway features consistent truck traffic or VIA Transit operations, yet many lanes in San Antonio are 12 feet or wider. Furthermore, even in cases of bus or truck use, only one lane must maintain an at least 11-foot width. Thus, on roadways with greater than two car travel lanes and striped bike lanes, the left lanes or two way center turn lane of a roadway can be narrowed while not affecting transit and freight movement.

This can yield multiple feet of additional space for bikes on both sides of the roadway. This space could be used to either increase bike lanes to the 5-foot minimum or wider, provide a buffer, or place a protective separator such as parking stops in the new buffer space (if 1.5 feet on each side can be reallocated). On major facilities like Culebra Road and Bulverde Road, where too-narrow striped bike lanes were implemented and are not appropriate, reducing inside travel lanes by just 1 foot each and maintaining one 11-foot right-most travel lane can provide ample space for protective separators. If implemented as a part of a planned resurfacing or restriping operation, this improvement can yield significant safety improvements without any additional expenditure. Examples of such roadways are shown below in **Figure 9**. Project numbers are not included in this table because projects may include many different types of infrastructure. Projects in the BNP were delineated not by uniform implementations, but by key connections made and major roadways intersected.

FIGURE 9: IMPLEMENTATION EXAMPLES OF BIKE LANE UPGRADES WITH ADJACENT CAR LANE NARROWING

Council District	Street Name	Extents	Length
1	McCullough Ave	Hildebrand to Ashby	1.1 mi
2	Diane Rd	Rice to Rigsby	.7 mi
3	Gevers St	I-10 to Fair	1.1 mi
4	Zarzamora St.	I-410 to Hutchins	1.7 mi
5	Castroville Rd. and Guadalupe Rd.	Cupples to Zarzamora	1.7 mi
6	Culebra Rd.	I-410 to Grissom Rd.	3.2 mi
7	Woodlawn Ave.	Zarzamora to 36th	2.6 mi
8	Datapoint Rd.	Fredericksburg to Wurzbach	1.2 mi
9	Patricia Dr., Braesview	NW Military to West	1.4 mi
10	Bulverde Rd.	Loop 1604 to Evans Rd.	3.2 mi

Easier-to-Implement Infrastructure #3: Buffered Bike Lane Safety Upgrades to Protected Lanes

Buffered bike lanes are even faster to upgrade than striped bike lanes. Many existing buffers are wide enough to feature protective separators, which can be added to the roadway and provide additional safety for bike users with no restriping and no change to the existing car infrastructure. Furthermore, depending on the protective separator type, these upgrades can be extremely affordable. The Bike Facility Guidance for Future Amendments Document contains more information on protective separator selection. Some buffered bike lanes have been implemented too close to the curb to provide space for a separator without too severely constricting the ridable space for bike users, such as on De Zavala in District 8. Examples of such roadways are shown in **Figure 10**. Project numbers are not included in this table because projects may include many different types of infrastructure. Projects in the BNP were delineated not by uniform implementations, but by key connections made and major roadways intersected.

FIGURE 10: IMPLEMENTATION EXAMPLES OF BUFFERED BIKE LANE SAFETY UPGRADES TO PROTECTED LANES

Council District	Street Name	Extents	Length
1	Treeline Pk.	Basse to Sunset	.4 mi
2	Mel Waiters Way	Commerce to MLK	.4 mi
3	Presa St.	Hot Wells to SW Military	1.5 mi
4	Ray Ellison Blvd.	I-410 to Old Pearsall Rd	1.7 mi
5	Commerce St.	Frio Rd to Brazos St	.3 mi
6	N. Ellison Dr.	W Military to Wiseman	1.7 mi
7	Josephine Tobin Dr.	Elmendorf to Cincinnati	.5 mi
8	De Zavala (may require lane narrowing)	Indian Woods to Brandeis St.	.8 mi
9	Henderson Pass	Cedar Ridge to Gold Canyon	.6 mi
10	Rowe Dr.	Cadbury to Thousand Oaks	.6 mi

Easier-to-Implement Infrastructure #4:
Bike Lane to Shared Use Path Ramps at Major Intersections

Intersections are often the most difficult to improve portion of a bike network. However, some are prime for a simple improvement in crossing safety. At intersections, bike lanes can be ramped to the sidewalk level to transition to a side path (such implementations are detailed in the Bike Facility Guidance for Future Amendments Document). This would not require the changing of any signals, car travel lanes, or turning lanes; requiring only widened sidewalks and additional pavement markings parallel to the crosswalk for bike users. This type of implementation can improve crossings of large and dangerous roadways.

Partner cities such as New Braunfels have already implemented this infrastructure at key locations. San Antonio has implemented similar infrastructure at the "Five Points" intersection at Fredericksburg and Flores, but this improvement required geometry modifications, which the examples in **Figure 11** do not. Project numbers are not included in this table because only intersections that feature significant redesign or new signalization were associated with projects.

FIGURE 11: IMPLEMENTATION EXAMPLES OF BIKE LANE RAMPS AT MAJOR INTERSECTIONS

Council District	Intersecting Streets
1	Main at Navarro (partially implemented)
2	Harry Wurzbach at Rittiman
3	Pecan Valley at Southcross
4	S. Ellison at Marbach
5	Commerce at General McMullen
6	Culebra/Tezal at Grissom
7	Woodlawn at Bandera
8	Springtime at Babcock
9	Interpark at West
10	MacArthur View at Nacogdoches

Section 4. Signature Projects

What Could the Network Look Like Once Implemented?

This *Recommended Network Development & Structure Report* acts as the key joining piece between the *Bike Design Guidelines for Future Amendments* and the *Implementation Plan Report* and its sub-reports (*Cost Estimation Report, Funding Strategy Report, Policy Recommendations and Constraints Report*, etc.). The former provides recommended designs for new bike infrastructure in San Antonio, while the latter provides the methods by which those designs and other essential features can be implemented. As a part of its bridging function, this report highlights four Tier 1 projects across the city as **BNP Signature Projects.**

- Signature Project #1: Protected Bike Lane on East Commerce Street (**Figure 12**)
- Signature Project #2: Buffered or Protected Bike Lane on Rhapsody Street (**Figure 13**)
- Signature Project #3: Protected Bike Lane or Bike Boulevard on Gillette Boulevard (**Figure 14**)
- Signature Project #4: Protected or Raised Protected Bike Lane on Ingram Road (**Figure 15**)

The BNP Signature Projects are both implementable and high priority. They also feature key connections to essential locations and facilities such as greenway trails and parks, which the BNP's engagement process identified as the connections most desired by the community. Preliminary conceptual renderings of these projects are included on pages 26 through 29.

The primary goal of the Signature Projects is to showcase how recommended bike infrastructure design, placemaking, and Green Stormwater Infrastructure (GSI) are applied in different land use contexts and geographically diverse roadway types with across the City.

Please note that, while this section does illustrate certain facilities along these roadways, these are not final designs and may change according to engineering judgement and community preference.

East Commerce Street

From: **Cherry** | To: **Houston** | Council District: **2**

Road Type: **Primary Arterial** | Land Use: **Activity Center** | Lanes: **4** | Speed: **35**

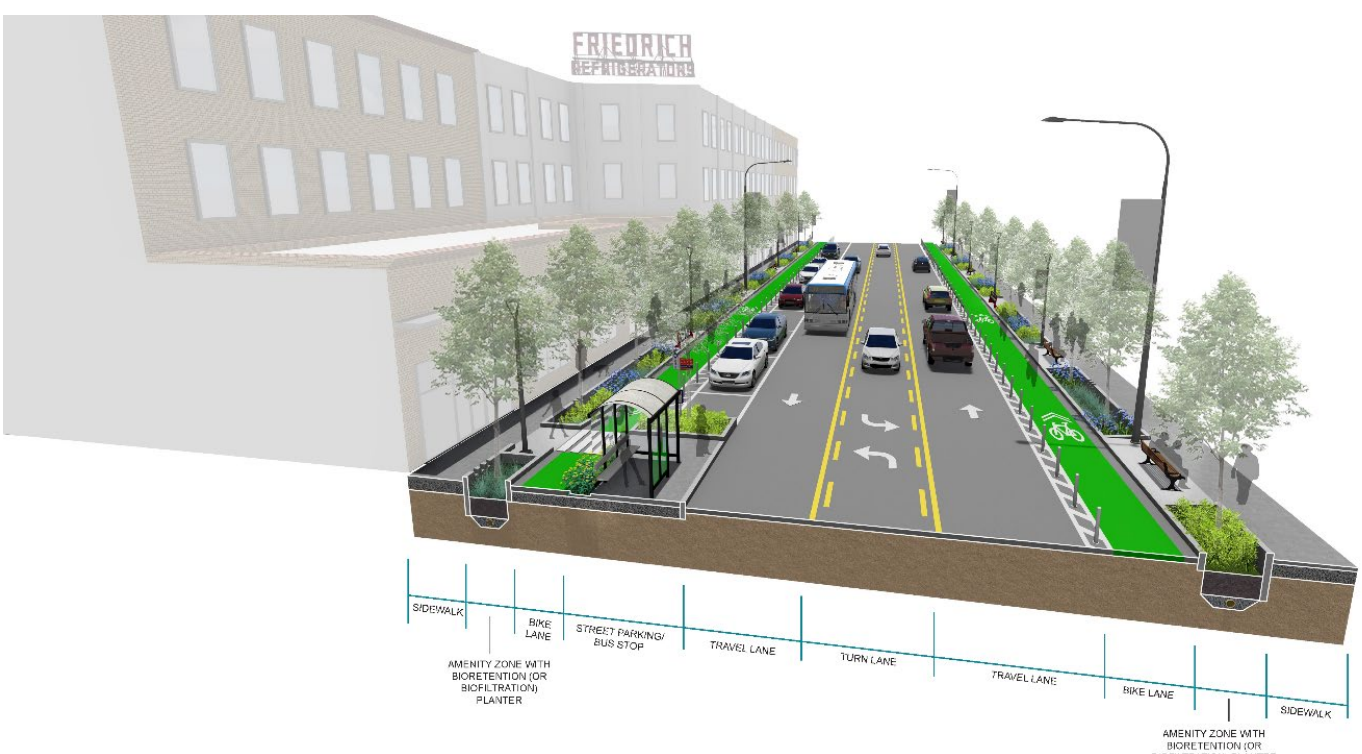
Recommended Bike Facility:

Protected Bike Lane **(see more)**

East Commerce Street runs through the heart of the east side – from Downtown San Antonio to the Arena District. Lincoln Park, the Claude Black Multi Service Center, and the Dawson Community Center are all located along this route, which provides essential bike connectivity between major destinations, local parks, and community centers. This route provides safe bike infrastructure for a diverse user group as multiple land uses exist along it, from commercial centers Downtown to industrial areas on Coca Cola Place. This protected bike facility connects the Alamodome and the Riverwalk to the Salado Creek Greenway, making it part of the Great Springs Project Regional Trail connecting the San Antonio and Austin.

Figure 12 represents a traditional 4-lane-to-3-lane conversion that maintains parking on the north side of the street (frequent driveways along the southern curb limit use of the existing parking lane). A parking-protected bike lane provides parking for the Freidrich Refrigeration Building and additional protection to cyclists. It also provides space near intersections for floating bus islands and green stormwater features, important VIA's Route 25 that runs along East Commerce Street.

FIGURE 12: CONCEPTUAL RENDERING OF SIGNATURE PROJECT #1: EAST COMMERCE STREET PROTECTED BIKE LANE



Signature Project 2

Rhapsody Street

From: **Walker Ranch Senior Center** To: **US-281** Council Districts: **1 & 9**

Road Type: **Major Collector** Land Use: **Industrial** Lanes: **2** Speed: **35**

Recommended Bike Facility:

Buffered Bike Lane or Protected Bike Lane **(see more)**

Rhapsody Street in North San Antonio features direct connections to the Walker Ranch Senior Center from nearby neighborhoods like Harmony Hills and industrial areas surrounding the San Antonio International Airport. This project will be a key connection, transforming the area into a safe and desirable walkable route to users of the Salado Creek Greenway and the senior center, nearby residents, and workers at the many local employment locations. The Walker Ranch Senior Center was recently designed with GSI features throughout its parking lot – this project can extend those features into the streetscape supporting waterflow into Salado creek.

Many features make this a uniquely implementable facility (**Figure 13**). It requires no roadway conversion or lane removal, and frequent driveways and ample parking lots allow no substantial parking to be lost. Thanks to the street's low traffic volumes, both protected and buffered bike lanes may be applicable, allowing designs to adapt to different circumstances.

FIGURE 13: CONCEPTUAL RENDERING OF SIGNATURE PROJECT #2: RHAPSODY STREET BUFFERED BIKE LANE

Signature Project 3

Gillette Boulevard

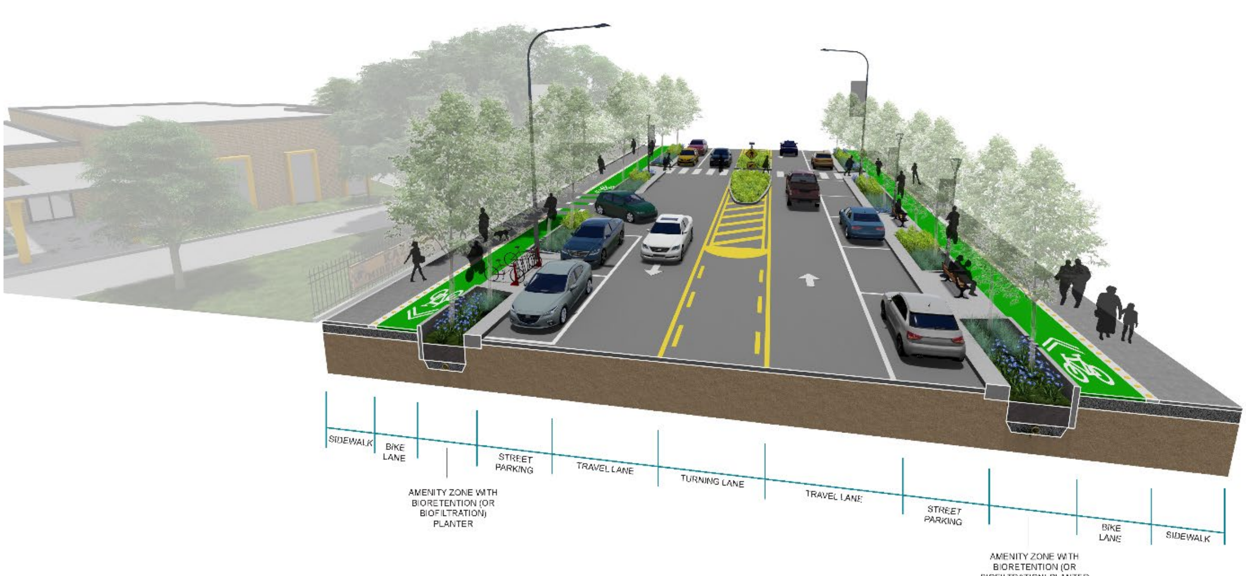
From: **Zarzamora**	To: **Pleasanton**	Council Districts: **3 & 4**	
Road Type: **Primary Arterial (but features less than 5,000 AADT, functioning closer to a Collector)**	Land Use: **Low Density**	Lanes: **2**	Speed: **35**

Recommended Bike Facility:

Protected Bike Lane or Bike Boulevard if speed/classification changes **(see more)**

Gillette Boulevard runs through Southside San Antonio, crossing rail lines and connecting the Ramirez Community Center and Gillette Elementary to universities such as Palo Alto College. It is a unique roadway featuring many different scales and designs. This project corridor features only two driving lanes, but closer to the Poteet Jourdanton Freeway, it expands to five lanes with striped bike lanes. This supports its current designation as a Primary Arterial roadway, but its travel use and overall design are much closer to a Collector. This project provides a unique opportunity to implement safe bike infrastructure that affects a roadway designation. If the Primary Arterial designation is maintained, the protected bike lane design shown in **Figure 14** could be implemented. If designated as a Collector, implementations as minimal as a bike boulevard may be appropriate. Either way, this project demonstrates flexibility in handling railroad crossings – given the lower speed and the high elevation of the railroad crossing, car users could yield to bikes when crossing, allowing this project to be implemented without interacting with rail ROW. This project also highlights flexibility near schools, allowing for new crosswalks for students and maintaining all parking and pick up areas.

FIGURE 14: CONCEPTUAL RENDERING OF SIGNATURE PROJECT #4: GILLETTE BOULEVARD PROTECTED BIKE LANE



Signature Project 4

Ingram Road

From: **Callaghan**	To: **I-410**	Council Districts: **6 & 7**
Road Type: **Secondary Arterial**	Land Use: **Mid Density**	Lanes: **5** Speed: **35**

Recommended Bike Facility:

Protected or Raised Protected Bike Lane (see more)

Ingram Road's elevation changes, high speeds, and high traffic volumes make the existing infrastructure (striped bike lanes) unsafe for students of the nearby Holmes High School and residents of Thunderbird Hills. The Zarzamora Creek Greenway will soon be extended north to Ingram Road, accelerating the need to improve this infrastructure and connectivity across I-410 to the frequently used Leon Creek Greenway and Ingram Transit Center.

More than any other project, Ingram Road's potential for safe bike infrastructure demonstrates the flexibility of design standards when handling unique roadway designs (**Figure 15**). Ingram Road features access roads for single-family homes along it; converting the left curb of these access roads to buffered bike lanes creates a new safe path for bike users without removing any car travel, turn, or parking lanes. It also provides ample space on the main Ingram roadbed for planted medians to protect left turning motorists. The existing planted space between the main roadway and access roads provides an barrier for bikes from car traffic. To the east and west of the access roads' extents, the bikeway can transition to the main roadbed and, by removing the center turn lane, can maintain protected bike facilities through the extent of the entire project.

Figure 15: CONCEPTUAL RENDERING OF SIGNATURE PROJECT #4: INGRAM ROAD PROTECTED BIKE LANE