IRVING
TEXAS

Irving Bike Plan

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Acronyms

AAA - All Ages and Abilities

AASHTO - American Association of State Highway Transportation Officials

ACS – American Community Survey

AADT - Annual Average Daily Traffic

BFB - Bicycle Friendly Business

BFC - Bicycle Friendly Community

BLOC – Bicycle Level of Comfort

CIP - Capital Improvement Plan

CRIS – Crash Records Information System

DART - Dallas Area Rapid Transit

DFW - Dallas - Fort Worth

DFWIA – Dallas-Fort Worth International Airport

FHWA - Federal Highway Administration

IH – Interstate Highway

LAB - League of American Bicyclists

LOC- Level of Comfort

LTS - Level of Traffic Stress

MTP – Metropolitan Transportation Plan

NACTO - National Association of City Transportation Officials

NCTCOG - North Central Texas Council of Governments

NTTA – North Texas Tollway Authority

PGBT - President George Bush Turnpike

RTC - Regional Transportation Council

ROW - Right-of-way

SH – State Highway

SRTS – Safe Routes to School

TxDOT - Texas Department of Transportation

TRE – Trinity Railway Express

Document Imagery

Unless otherwise noted, imagery throughout the document was provided by NCTCOG or the City of Irving.

Acknowledgements

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Chapter 1: Introduction

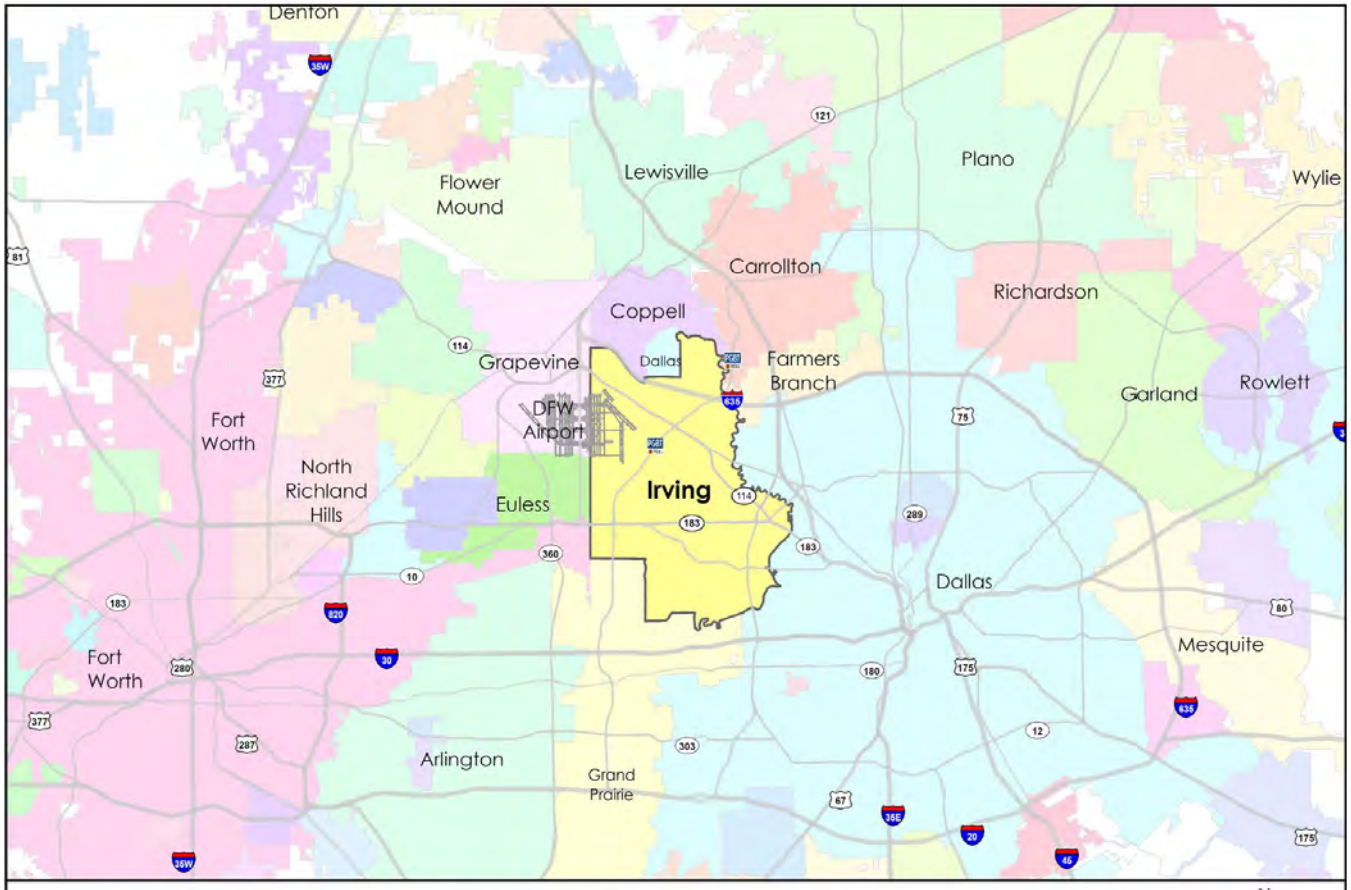
Bicycling is widely accepted by cities across the country as a mode of transportation and is institutionalized in local transportation planning practices. The benefits of bicycle transportation at the local level include enhancing a community's quality of life, improving the public's physical and mental health, expanding mobility options, reducing the number of bicycle-related crashes with motor vehicles, reducing traffic congestion, and supporting economic development. A well-connected bicycle network and an active bicycling population are considered indicators of a livable community. The first step toward becoming "bike-friendly" is the development of a guiding plan.

The ***Irving Bike Plan*** provides the community vision, goals, and framework to implement a bicycle transportation network across Irving. This Plan identifies the infrastructure network necessary for citywide travel by bicycle, with an emphasis on the ability to make short distance bicycle trips including connections to transit stops and stations, employment, education facilities, recreation, and other major destinations throughout the community. This Plan also includes recommended phasing of bikeway corridors for implementation, action steps for enhancing and institutionalizing bicycling in the community, and performance measures to gauge long-term progress and accountability.

Background and Purpose

Irving is geographically located at the center of the Dallas-Fort Worth metropolitan area (see **Figure 1-1**) and serves as an important hub for various modes of transportation. Prior to the completion of the ***Irving Bike Plan***, each of the eight neighboring cities (Carrollton, Coppell, Dallas, Euless, Farmers Branch, Fort Worth, Grand Prairie, and Grapevine) had adopted local master plans for the development of on-street bikeways and shared-use path (trails) systems (see Ch. 2, **Figure 2-1**). As of 2023, the North Central Texas Council of Governments (NCTCOG) reported nearly 40 communities across the region have adopted master plans identifying on-street bicycle facilities. Mobility 2045 Update, the ***Metropolitan Transportation Plan*** adopted by the NCTCOG Regional Transportation Council, identifies a total of 2,656 miles of on-street bikeways and a total of 5,864 miles of off-street shared-use paths across the Dallas-Fort Worth region that are existing/funded or planned for future development by 2045.

Figure 1-1



Irving in the Context of the Dallas-Fort Worth Region

In 2017, the Irving City Council adopted the ***Imagine Irving Comprehensive Plan***, which serves as an interdisciplinary guiding document outlining the goals and strategies for future activities and development across Irving. The Transportation chapter recommends a multimodal approach to the City's transportation system, supporting transit, walking, and bicycling.

The charge to develop a citywide bicycle plan originates from ***Imagine Irving***. The Comprehensive Plan acknowledges further bicycle network planning is necessary to achieve the multimodal and air quality goals set forth by that Plan:

Transportation Chapter: Goal 2: Improve multimodal transportation connections.

Strategy 2.3: Develop a citywide active transportation network of on-street and off-street bicycle facilities.

2.3.1: Develop and implement a citywide Bicycle Master Plan.

2.3.2: Promote bicycle facilities that connect neighborhoods to existing and planned parks, schools, trails, recreation areas, transit stations, and major activity centers.

2.3.3: Encourage safe and comfortable bicycle facility design that attracts a variety of riders and minimizes conflicts with motor vehicles.

Conservation, Sustainability and Green Initiatives Chapter: Goal 7: Expand alternative transportation options to address air quality issues to help mitigate regional nonattainment.

Strategy 7.1: Develop a bicycle plan with the goal of providing safe, comfortable and convenient accommodations for bicycling in the city.

Strategy 7.2: Consider becoming League of American Bicyclists Bicycle Friendly Community.

Imagine Irving's Transportation Vision Statement:

"Irving residents will have ***a variety of transportation choices*** for getting around town. All residents will have ***access to major corridors***, neighborhood corridors, ***bike and pedestrian friendly streets***, and transit routes. People living and working in the city will be able to drive, ***bike***, catch a bus, or hop on a train ***to nearly anywhere in the region***...Commuters will spend less time delayed by traffic, and getting around will be ***safer and more convenient by any mode of transportation***."

The ***Irving Bike Plan*** serves as an important tool to implement the recommendations of ***Imagine Irving***. Through the guidance and recommendations of the ***Irving Bike Plan***, a seamless bikeway network with connections to adjoining cities will be established and will facilitate bicycle transportation across the city and region. This Plan serves as the City of Irving's first step in becoming a top-tier bicycling community in Texas.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The citywide bicycle network should allow people of all ages and abilities to make daily trips using a bike for nonmotorized travel.

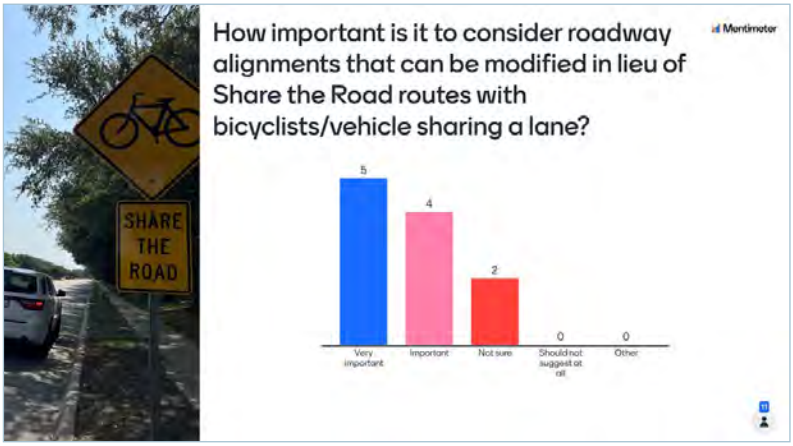
Planning Process Overview

The planning process began in the spring of 2022 and involved soliciting community input. At the outset of the Plan, a stakeholder committee was established. This committee consisted of over 20 members representing residents, the local business community, and people interested in bicycling. Stakeholders shared input and guidance throughout the planning process.

The initial public meetings solicited feedback about existing conditions for bicycling, including barriers and opportunities for bicycle travel. Through a series of interactive display boards at meetings, attendees provided feedback about their vision for bicycling in Irving, the types of places and destinations they want to travel to by bicycle, and top priorities for the ***Irving Bike Plan***. Through this process, the committee and the public emphasized the importance for the ***Irving Bike Plan*** to address safety, encourage bicycle ridership, implement a network that is safe and comfortable for bicyclists of all ages and abilities, and increase driver awareness.

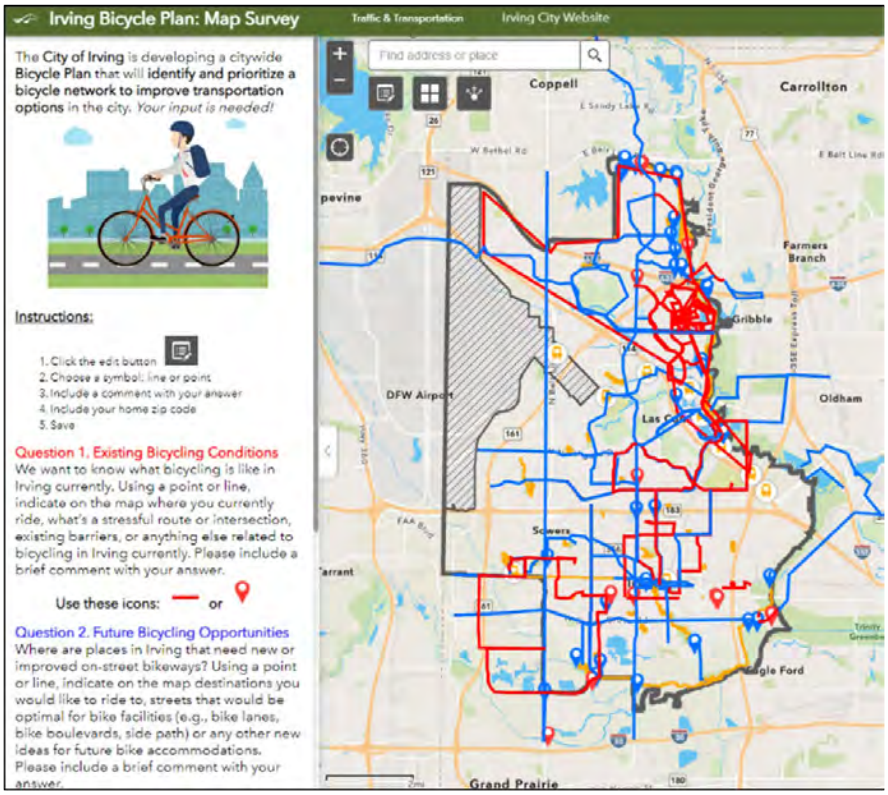
Irving Bike Plan Stakeholder Committee and public meetings were held at Irving City Hall.

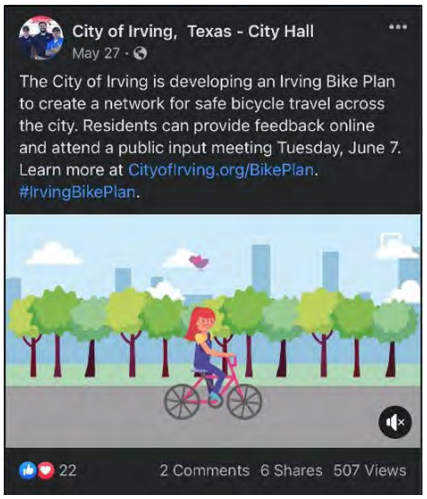
The Stakeholder Committee emphasized safety, connectivity, and designated bicycle facilities as key aspects for the Plan's vision.



The Stakeholder Committee indicated it is "Important" or "Very Important" for roadways to have dedicated bicycle facilities in lieu of bicyclists sharing the road with motor vehicles.

Opportunities to provide feedback on the ***Irving Bike Plan*** involved social media posts, announcements on the City of Irving web page, and presentations to city boards/committees. Additional tools were used to solicit public engagement during the planning process, including an online interactive map and opinion survey. Feedback and comments received from stakeholder committee members and the public informed the development of the ***Irving Bike Plan***'s vision, goals, and priorities.





Above: An online interactive map collected feedback on existing conditions, such as stressful routes or barriers, and future opportunities, such as roadways that would benefit from bicycle facilities. Right: The City of Irving posted on popular social media platforms encouraging the public to attend ***Irving Bike Plan*** *meetings and provide feedback.*

Responses provided from the stakeholder committee members during the Plan development process about key issues for the future bicycle network in Irving. The Stakeholder Committee also identified priorities for the Plan.

What issues would the public like the Plan to address?

"Campion trail and bike lanes for safe riding in Irving."	"Safety."	"Safety on (busy) roads."
"Establish where people would ride if it was safe and plan those routes."	"Ability to travel throughout Irving without fear, with convenience of lane sizes, and well marked [bike lanes]."	"Have streets that give access to north-south and east-west that have signage or marked lanes saying bicycles have right to road."
"1. Safety 2. Trail conditions 3. Trail route connects"	"Dedicated bike lanes."	"Safety, bike-friendly roads, bike lanes."

What is most important for the Plan to prioritize?

1st Connecting the most people to major destinations

2nd Building a network that is safe and comfortable for bicyclists of all ages and abilities

3rd Retrofitting roadways to include dedicated bikeways separated from traffic

4th Neighborhood greenways / bike boulevards

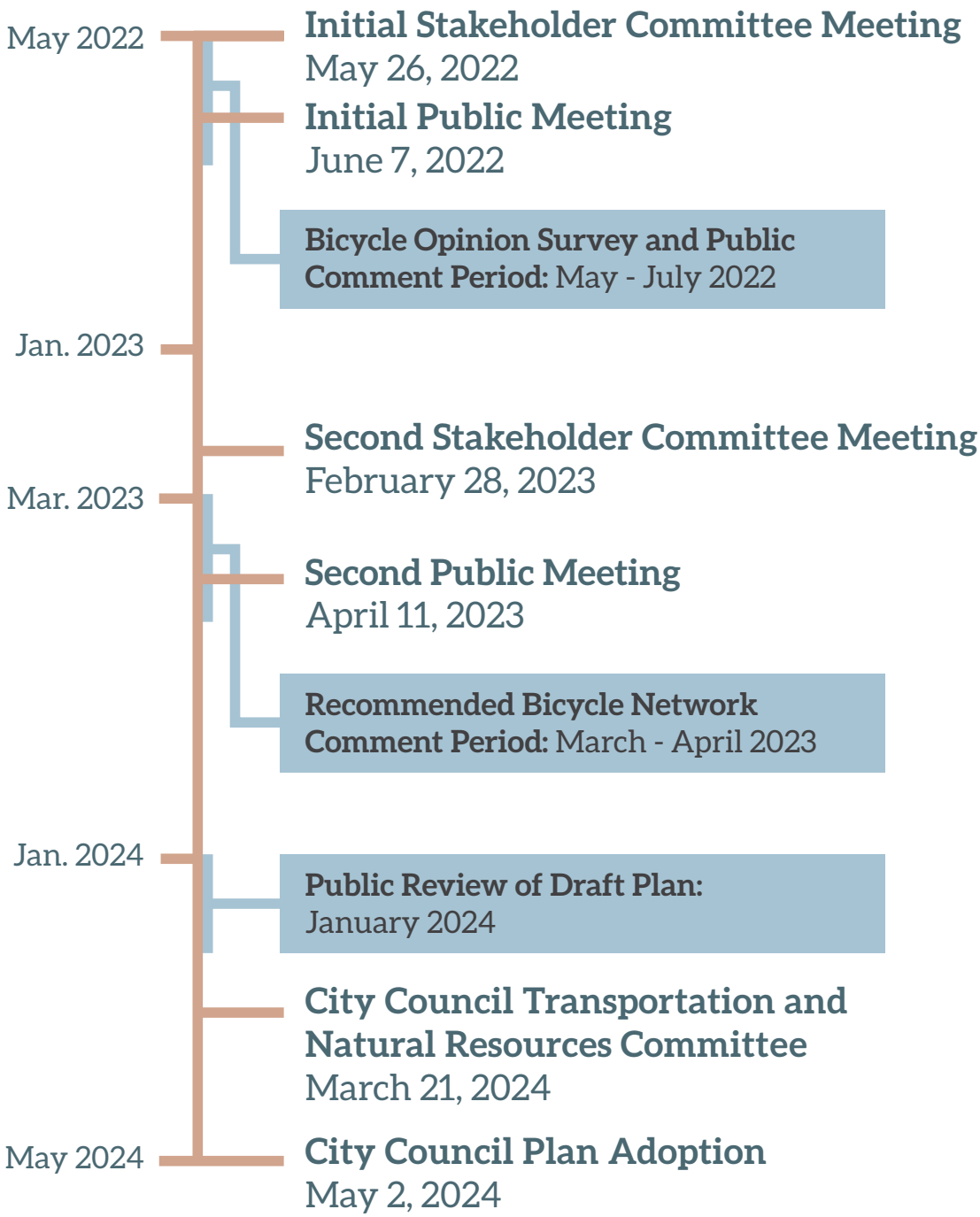
After the initial phase of public input, data was collected to create an inventory of existing conditions which included roadway characteristics (e.g., existing traffic volumes and forecasts, number of vehicular travel lanes, available right-of-way), areas of high demand for bicycling transportation, and barriers to bicycle travel. This information was used to evaluate the feasibility of implementing on-street bicycle facilities on various roadways and the types of bikeway facilities for the greatest level of comfort and safety for people of all ages and abilities given the existing roadway conditions. After completion of the data collection and analysis phases, a draft bikeway network was developed for review and refinement.

Irving is currently served by "Share the Road" signage and a limited number of dedicated bicycle lanes. The planning process focused on identifying corridors for future bikeways that will provide the greatest level of comfort and safety for people of all ages and abilities.

A second phase of planning meetings with the stakeholder committee and the public occurred in the spring and fall of 2023. During these meetings, feedback was provided on the draft bikeway network and the ***Irving Bike Plan***'s draft goals and priorities. In addition, feedback from the online interactive map identified common themes for the ***Irving Bike Plan***, including connections to existing shared-use paths (trails), desire for bicycle signage along streets and improved street sweeping, and safety concerns related to speeding motorists.

Public meeting attendees were very engaged and provided valuable feedback about Plan priorities and future bikeway corridor alignments.

Irving Bike Plan
Timeline



Opinion Survey Highlights

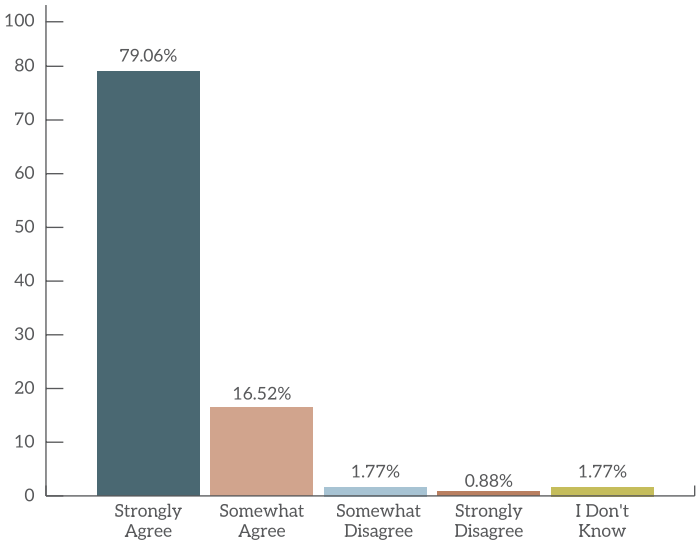
Early in the planning process, the City of Irving conducted an online survey to gauge public opinions on bicycling safety and infrastructure in Irving. The survey launched on May 4, 2022, and closed on August 5, 2022. Four hundred fifty-seven people responded to the survey, with 327 fully completing all questions on the entire survey. ***Appendix A*** provides a complete summary of the results for each survey question.

The survey questions were constructed to help determine:

- Perception of factors that might help or hinder bicycle use in Irving
- Perceived barriers to bicycling in Irving
- Priorities for implementing bicycle facilities in Irving

Opinion Survey Results

I would like to travel by bike more than I do now.



Over 95% of survey respondents indicated a desire to bicycle more often.

Bicycling for transportation is enjoyable, healthy, and practical.

FREQUENCY OF BICYCLING

- Nearly 90 percent of respondents had bicycled at least once in the past 12 months, and nearly 76 percent bicycled at least a few times or more every month.
- More than 65 percent of respondents bicycled at least a few times a week.

PERCEIVED BARRIERS TO BICYCLING

- 43 percent of respondents expressed they feel unsafe while bicycling in their community.
- Over 35 percent of respondents expressed feeling unsafe was a reason they did not bike as much as they would like to.

BICYCLING FOR TRANSPORTATION OR RECREATION

- Over 52 percent of respondents bike to get to a destination such as work, school, or shopping every month.
- Nearly 94 percent of respondents bicycled for fun or exercise at least once or twice a week in the past month.
- 95 percent of respondents reported they strongly agree or somewhat agree that they would like to travel by bike more than they do now.

Many short distance trips can be made by bicycling in lieu of a motor vehicle.

Bicyclists sharing the road among motor vehicle traffic is stressful for most adults and children.

BICYCLE ACCESS

- 23 percent of respondents perceive a quarter mile is a reasonable maximum distance for a person to reach a bicycle facility.
- 60 percent of respondents do not bike as much as they would like because bike lanes, trails, and paths do not exist near them.
- Almost 78 percent of respondents do not bike as much as they would like because bike lanes, trails, and paths are disconnected.

A citywide connected bicycle network will enable more people to comfortably travel by bike.

PRIORITIES FOR THE IRVING BIKE PLAN

The top priorities identified by respondents for the ***Irving Bike Plan*** are (respondents were permitted to select up to three topics from the list):

- Bike lanes separated from motor vehicle traffic (64 percent)
- Connections to existing trails (59 percent)
- On-street bike lanes (36 percent)

Separating bicyclists from motor vehicle traffic can be accomplished in various ways, such as raised curbs or on-street parking.

Plan Vision and Goals

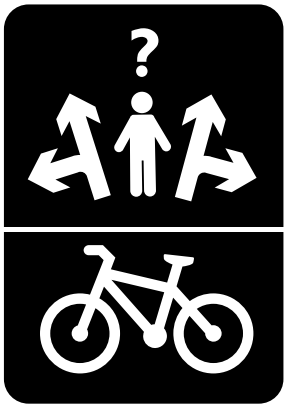
Based on feedback received through the planning process, the following vision and goals were developed through strategic coordination between the City of Irving, residents, business representatives, stakeholder committee input, and bicyclists of all abilities including those who work in Irving but reside outside the city. The vision and goals articulate the priorities for the community and establish how the ***Irving Bike Plan*** will transform mobility for the City.

THE IRVING BIKE PLAN VISION:

To be a bicycle friendly community that provides a safe, comfortable, comprehensive, and accessible network of on-street and off-street bicycle facilities. The citywide bicycle network will connect residents and visitors to important destinations.

The Irving Bike Plan aims to create a future in which more families comfortably and safely bicycle together.

GOALS

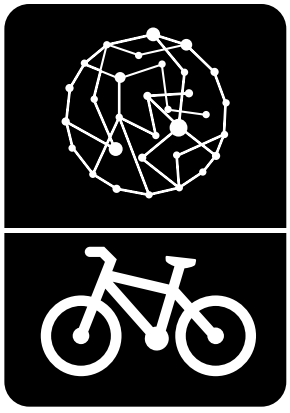


TRANSPORTATION CHOICE

Provide a transportation network that supports bicycle travel as a means of transportation in lieu of motor vehicle travel.

SAFETY

Provide a bicycle network of facilities in which users feel safe, including separated bike lanes and neighborhood streets with traffic calming measures.



CONNECTIVITY

Provide a bicycle network that is comfortable and has direct connections to/from surrounding communities with access to major destinations throughout the city including large employment and commercial centers, entertainment districts, transit, schools, community centers, recreational facilities, grocery stores, and medical centers.

INCLUSIVITY

Provide a bicycle network that serves people of all ages and abilities.

EQUALITY

Provide communitywide access to bicycle facilities for all Irving residents by being located within a quarter mile of where they live, work, or travel.

CHAPTER 2: EXISTING CONDITIONS

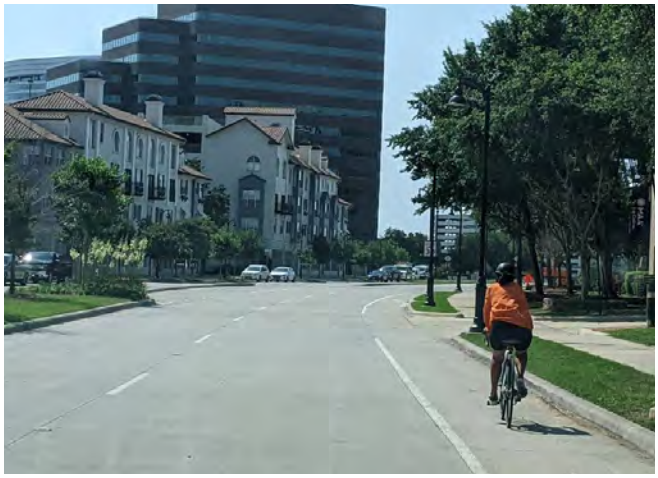
Irving has many qualities and unique attributes to be a prominent bicycle friendly community in the Dallas–Fort Worth metropolitan area. The city has a wealth of neighborhoods, destinations and businesses, mixed-use districts, educational institutions, and parks available to residents, workers, and visitors. This chapter provides an overview of baseline information relevant to bicycling including an inventory of bicycle facilities, crash data, significant barriers restricting travel, and areas of the community most conducive to bicycling. The city's existing comprehensive multimodal transportation system, featuring six light rail stations and two commuter rail stations, numerous bus routes, and trails provides a means for travel by modes other than an automobile. The integration of bikeways, both on-street and off-street, can play an important role in leveraging the existing multimodal network to increase connectivity and travel options to destinations throughout the community. Considerations outlined in this chapter influenced the development of the recommended bicycle network.

Bikeways play an important role in accessing the existing transit network and increase connectivity to destinations throughout the community.

Existing Bicycle Transportation System

In recent years, the City of Irving has installed on-street bikeways on select roadways. As of 2023, Irving's existing bicycle network consisted of approximately three miles of on-street bike facilities and 23 miles of off-street shared-use paths (trails). In addition, bike lanes on E. Irving Boulevard and a multimile gap in the Campion Trail are funded for construction. The locations of the existing on-street bikeways are in areas conducive to bicycling for short-distance trips, such as Las Colinas Urban Center and the University of Dallas. "Share the Road" signage is also installed along select roadways; however, a complete inventory of the sign locations does not currently exist.

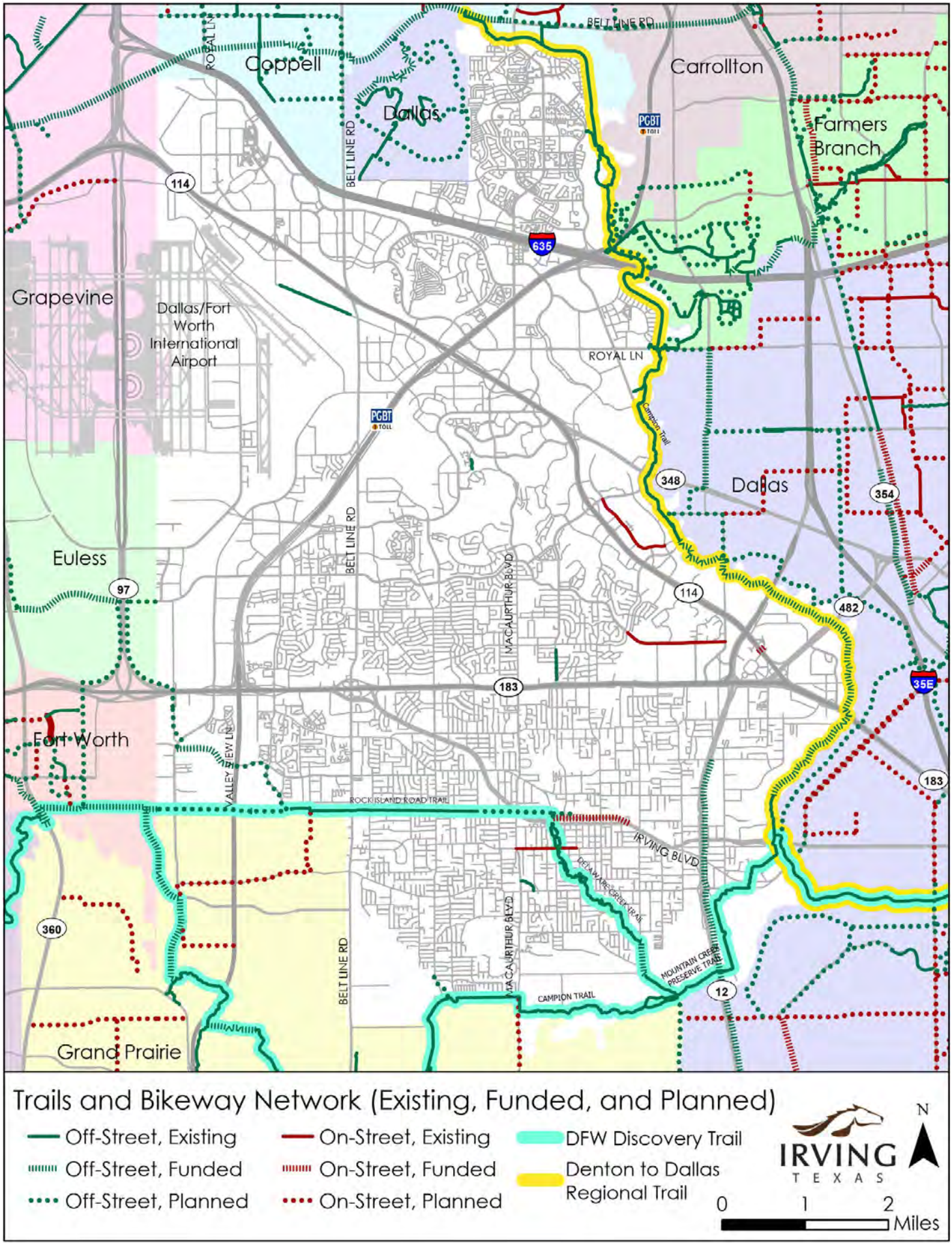
Figure 2-1 displays the existing on-street bicycle facilities and trails, most of which are currently disconnected and provide limited access between neighborhoods and major destinations. Results from the City's 2022 Opinion Survey found residents do not currently bike as much as they would like because existing bike facilities are disconnected or do not exist near them. As reported by the US Census Bureau, 0.2 percent of residents commute to work by bicycle in Irving.[1] This statistic serves as a baseline for performance measures over time as the ***Irving Bike Plan*** recommended bicycle network is implemented.



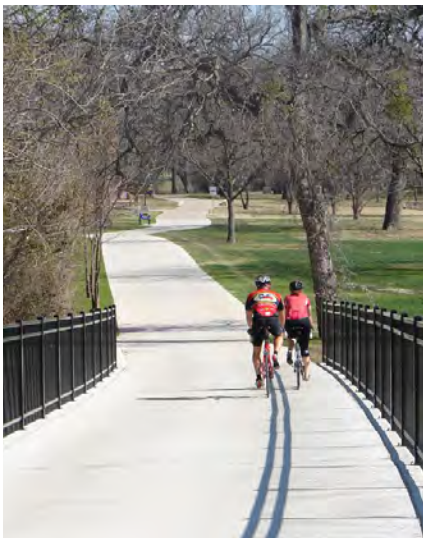

The existing bicycle network in Irving consists of Share the Road signage and a limited number of dedicated bike lanes, such as on Las Colinas Boulevard.

1 ***American Community Survey 5-Year Estimates*** (2017-2021) (Table S0801: Commuting Characteristics by Sex)

Figure 2-1


Coppell
Dallas
Carrollton
Farmers Branch
Grapevine
Dallas/Fort Worth International Airport
Euless
Fort Worth
Grand Prairie
Dallas
BELT LINE RD
ROYAL LN
ROYAL LN
MACARTHUR BLVD
VALLEY VIEW LN
ROCK ISLAND ROAD TRAIL
IRVING BLVD
DELAWARE CREEK TRAIL
MOUNTAIN CREEK PRESERVE TRAIL
CAMPION TRAIL
PGBT TOLL
114
635
97
183
348
354
482
35E
12
360
Trails and Bikeway Network (Existing, Funded, and Planned)
Off-Street, Existing
Off-Street, Funded
Off-Street, Planned
On-Street, Existing
On-Street, Funded
On-Street, Planned
DFW Discovery Trail
Denton to Dallas Regional Trail
IRVING TEXAS
N
0
1
2
Miles

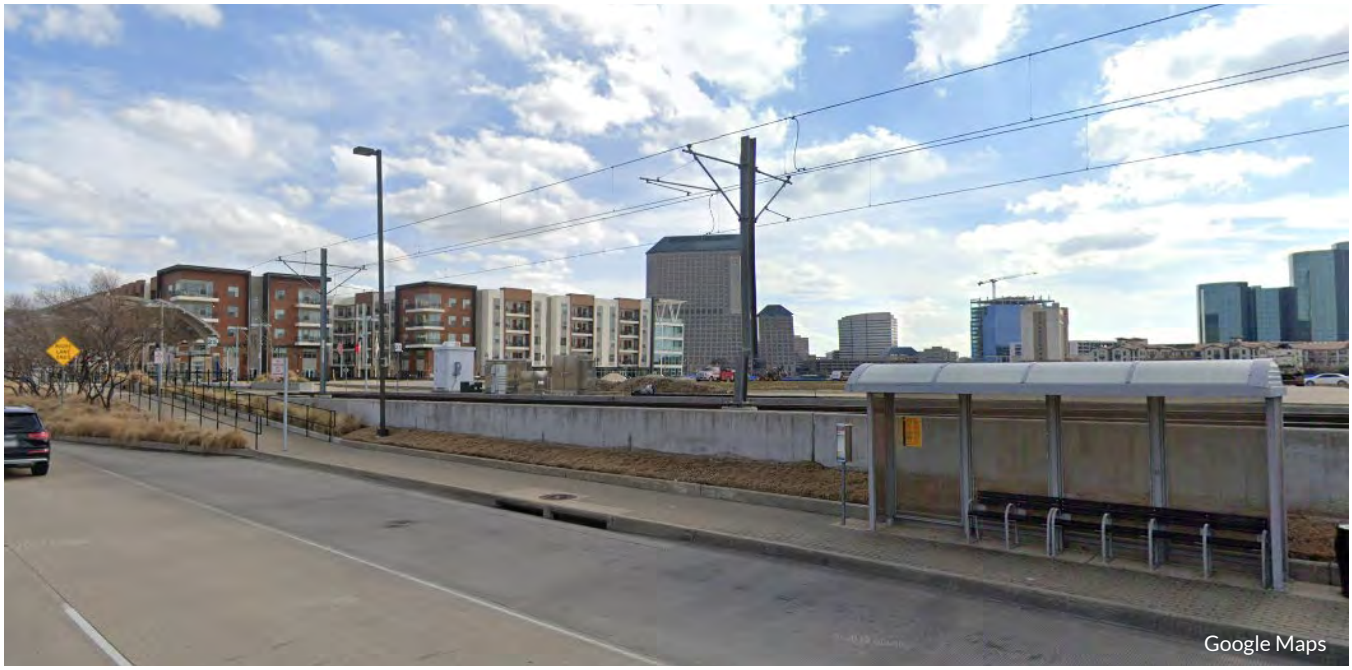
The crown jewel of Irving's trail network is the Campion Trail, an off-street shared-use path primarily following Grapevine Creek, Elm Fork Trinity River, and West Fork Trinity River on the eastern and southern perimeters of the city. However, opportunities to safely and comfortably access the Campion Trail by bicycle do not exist in much of the city. The planned and existing sections of the Campion Trail, Delaware Creek Trail, and Rock Island Road Trail are part of the Regional Veloweb as identified in ***Mobility 2045 Update***, a vast network of trails connecting cities and counties, as well as major employers and regionally significant destinations. Furthermore, the Rock Island Road Trail, Delaware Creek Trail, and a southern portion of the Campion Trail serve as segments of the DFW Discovery Trail corridor connecting Irving with the cities of Fort Worth, Arlington, Grand Prairie, and Dallas. The northern and central portions of the Campion Trail also serve as segments of the Denton to Dallas Regional Trail Corridor. Once fully completed, these regional trails are anticipated to attract large volumes of people walking and bicycling and will enable people to comfortably travel longer distances for transportation and generate tourism from across the country.



The existing shared-use paths, such as the Campion Trail, provide connections to major destinations and surrounding communities.

Irving is a member city of the Dallas Area Rapid Transit (DART) agency, and is served by the Orange light rail line, the Trinity Railway Express (TRE) commuter rail line, and six bus routes. The TRE line through central Irving includes rail stops at West Irving Station and Downtown Irving/Heritage Crossing Station. In the northern and eastern areas of the city, the Orange Line includes existing stops at University of Dallas Station, Las Colinas Urban Center Station, Irving Convention Center Station, Hidden Ridge Station, North Lake College Station, and Belt Line Station. Enhancing connectivity to these rail transit stations will allow residents and employees to reach more destinations, employment, and businesses than bicycling alone. At this time, most of these existing stations and bus routes feature a variety of land uses and destinations within near proximity and could be reached by a short-distance trip by walking, bicycle, or micromobility device.


DART


Google Maps

Combining bicycling and transit increases the level of accessibility for all riders.

Crash History

Over the five-year period from 2018-2022, an average of 15 reported crashes occurred per year involving motor vehicles and bicyclists (see **Table 2-1**). Individual crash locations are identified in **Figure 2-2**. The density of crashes is greatest in the southern portion of the city. Local roadways with multiple crashes involving bicyclists include Nursery Road, Las Colinas Blvd., and N. Belt Line Road. Eleven crashes (or 15 percent) occurred on Texas Department of Transportation (TxDOT) on-system roadways, including State Highway (SH) 114, SH 183, SH 161, and SH 356. One person bicycling was killed by a motorist on West Walnut Hill Lane in 2018.

Fear of collisions from motor vehicles on busy roadways contributes to many people's uneasiness to bicycle for transportation.

Table 2-1: Bicycle Crashes in Irving

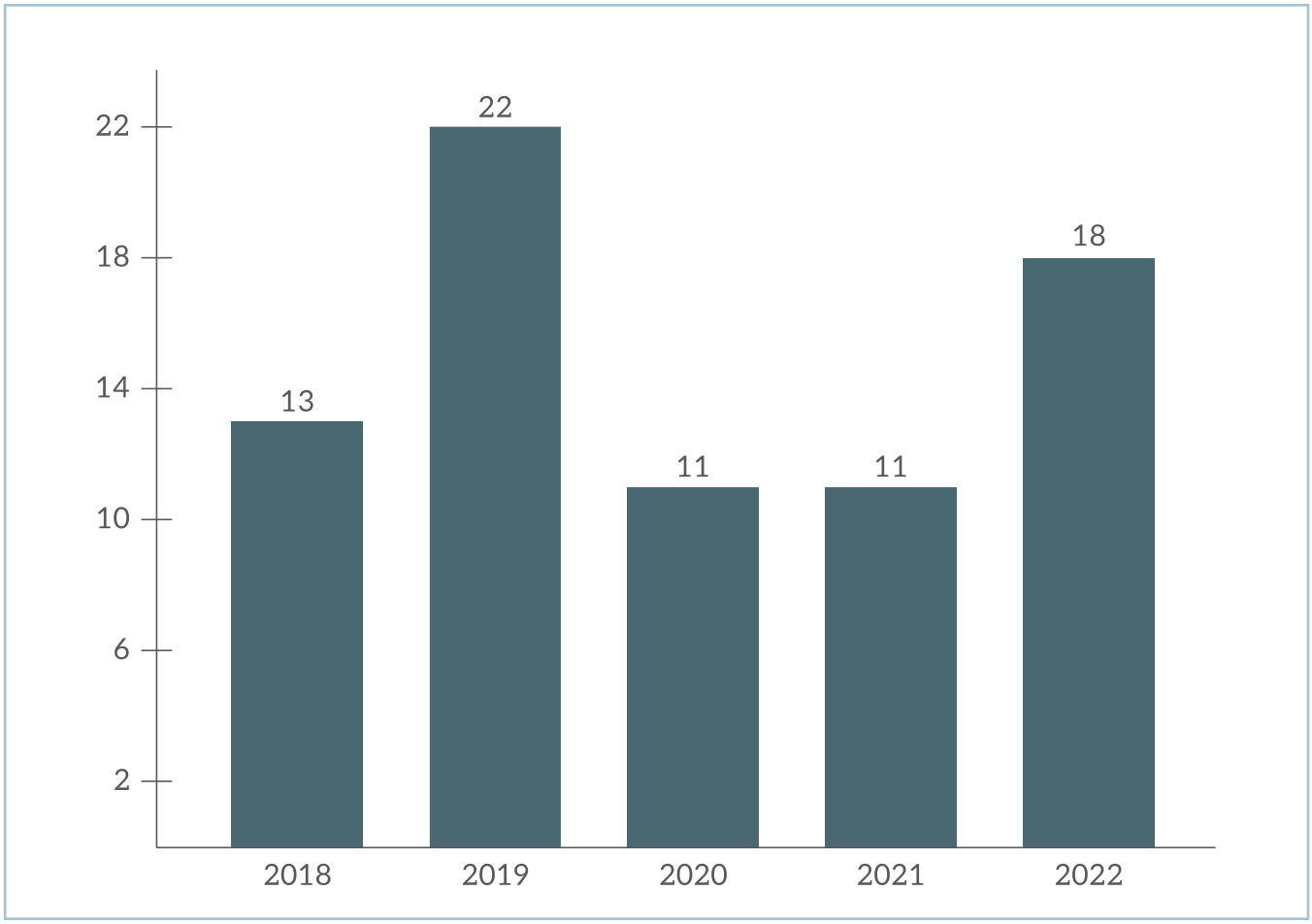
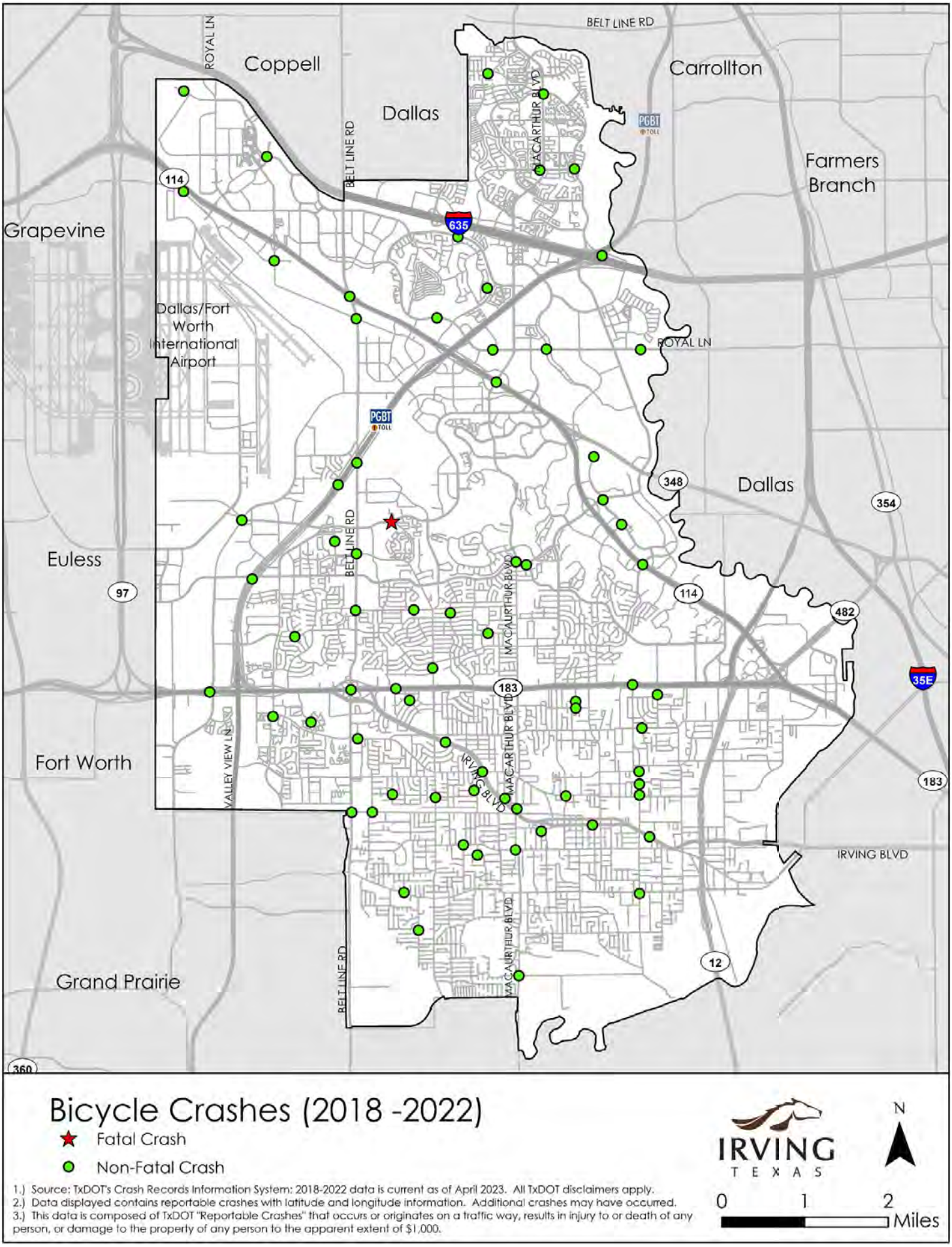


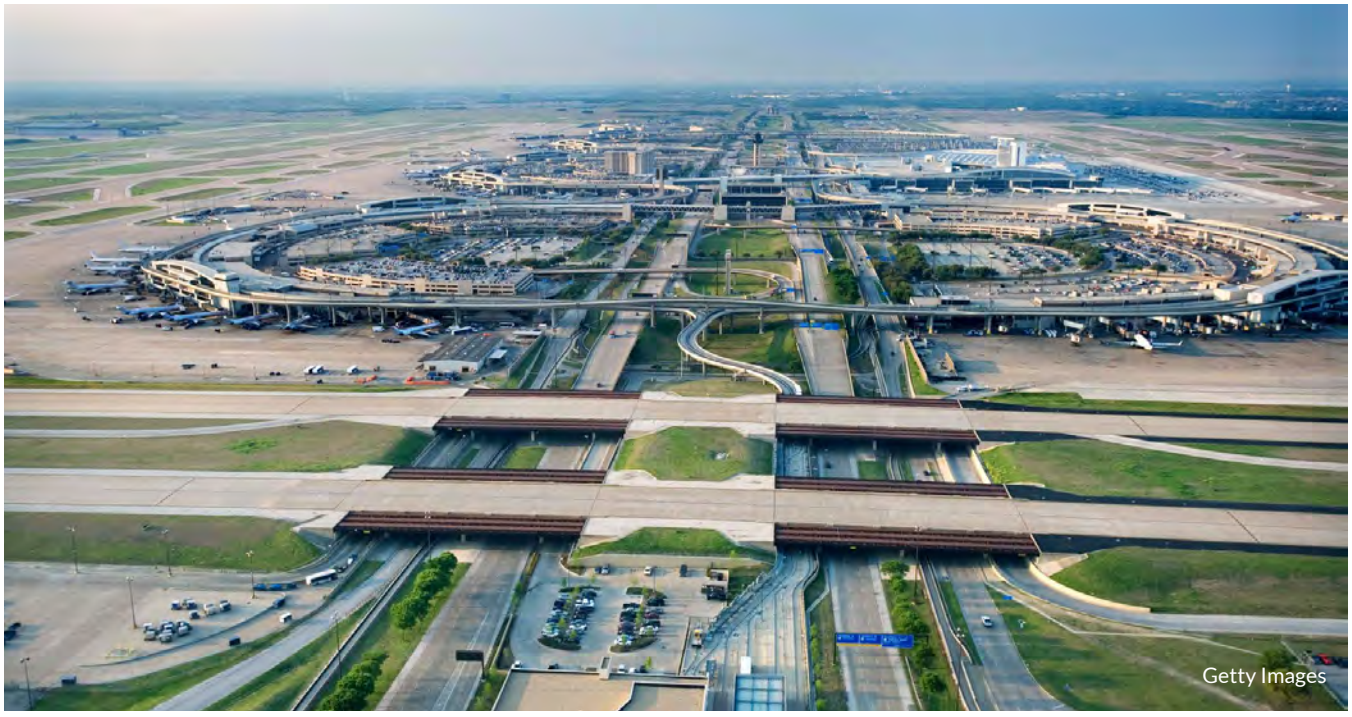
Figure 2-2


Coppell
Dallas
Carrollton
Farmers Branch
Grapevine
Dallas/Fort Worth International Airport
Euless
Fort Worth
Grand Prairie
Dallas
BELT LINE RD
ROYAL LN
MACARTHUR BLVD
VALLEY VIEW LN
IRVING BLVD
PGBT TOLL
114
635
97
348
354
482
35E
183
12
360
Bicycle Crashes (2018 -2022)
Fatal Crash
Non-Fatal Crash
IRVING TEXAS
N
0 1 2 Miles
1.) Source: TxDOT's Crash Records Information System: 2018-2022 data is current as of April 2023. All TxDOT disclaimers apply.
2.) Data displayed contains reportable crashes with latitude and longitude information. Additional crashes may have occurred.
3.) This data is composed of TxDOT "Reportable Crashes" that occurs or originates on a traffic way, results in injury to or death of any person, or damage to the property of any person to the apparent extent of $1,000.

Existing Barriers

Existing barriers to bicycle travel were assessed while reviewing opportunities for future bikeway alignments across Irving. The city is crisscrossed by several TxDOT and North Texas Tollway Authority (NTTA) limited-access roadways which create significant obstacles for bike connectivity and safety. These roadways include Interstate Highway 635 (LBJ Fwy), President George Bush Turnpike (PGBT), and State Highways 114 (John Carpenter Fwy), 161, 183 (Airport Fwy), 356 (Irving Blvd.), 482 (Northwest Hwy), Loop 12 (Midtown Express), and Spur 482 (Storey Ln.). Additionally, the city is also bisected by both passenger and freight rail lines. Dallas-Fort Worth International Airport (DFWIA) is an additional barrier on the western side of the city in that the airport property limits possible bikeway connections to Grapevine and Euless further to the west. While highways and rail facilitate travel by motor vehicle and transit, they also serve as significant barriers to safe bicycle travel from one area of the city to another.

Above: Limited, and often stressful, crossings of highways often prevent bicyclists from reaching their desired destinations. Below: DFWIA is a significant barrier limiting connections to adjacent communities.



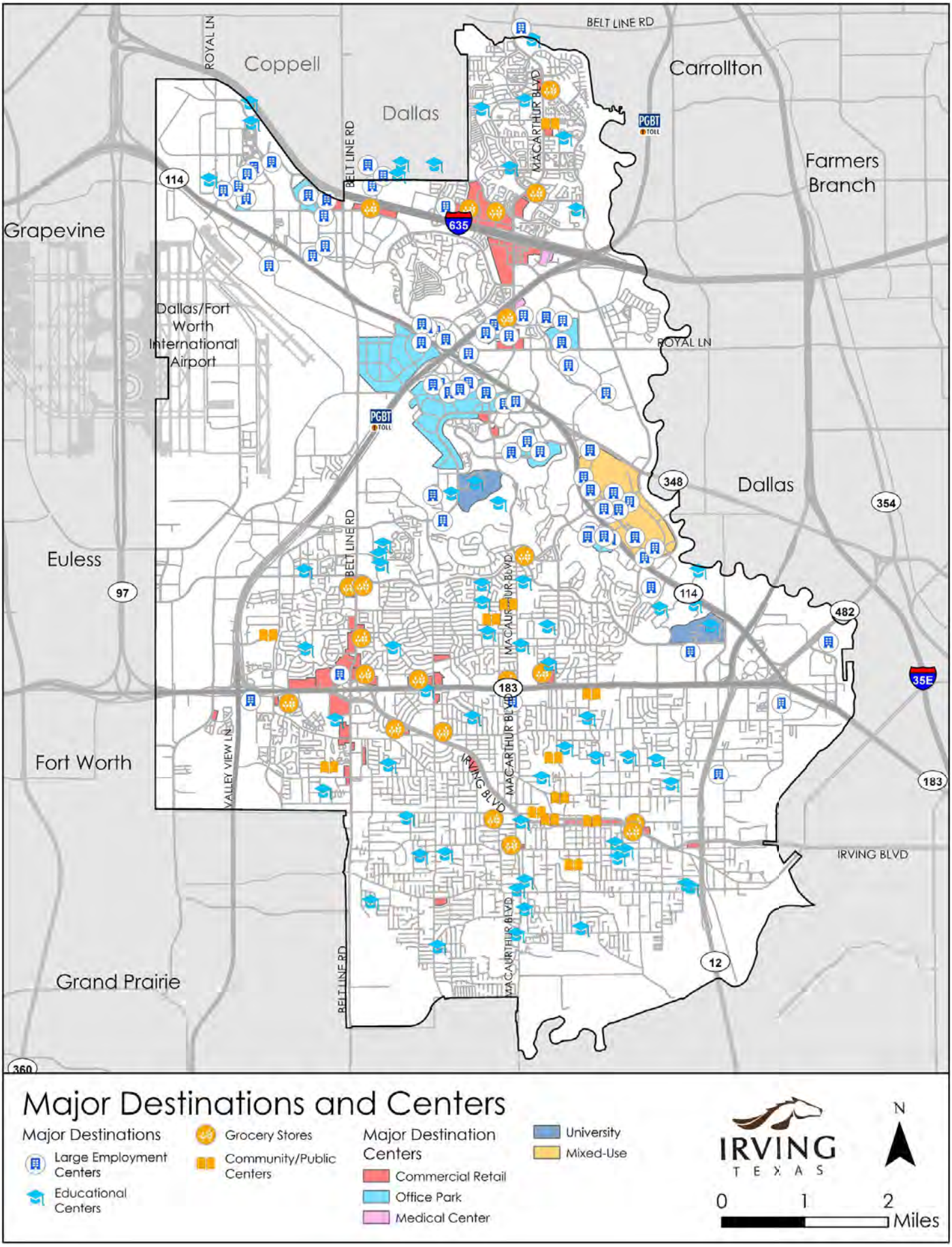
Existing Areas of Demand

Irving is a major employment center within the Dallas–Fort Worth metropolitan area with multiple Fortune 500 and Fortune 1000 companies locating their global office centers and headquarters in the city. The Las Colinas mixed-use development is a major destination center known regionally for its entertainment venues, retail shops, restaurants, office centers, and diverse recreational activities. The Irving Mall located along SH 183 is a major retail shopping center in the area. In addition to the major employment centers, Irving has two college campuses (Dallas North Lake College and University of Dallas), both of which have access to DART light rail stations. **Figure 2-3** identifies the numerous destinations within Irving.

Adjacent to the northern city limits of Irving is the developing Cypress Waters master planned community. This development area is planned to accommodate new retail shops, schools, and thousands of residents and office jobs. While adjacent to the Irving city limits, there are opportunities for multiple bicycle connection points with nearby Irving neighborhoods and surrounding land uses.

Las Colinas in Irving is a hub of major destinations, featuring offices, retail, entertainment, and residential land uses that are important to access by bicycle facilities.

Figure 2-3


Coppell
Dallas
Carrollton
Farmers Branch
Grapevine
Dallas/Fort Worth International Airport
Euless
Fort Worth
Grand Prairie
Dallas
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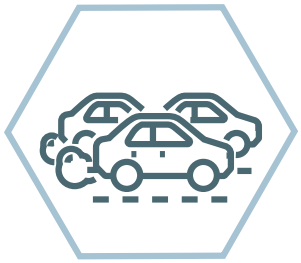
ROYAL LN
MACARTHUR BLVD
IRVING BLVD
VALLEY VIEW LN
PGBT TOLL
114
635
97
348
354
482
183
35E
12
360
Major Destinations and Centers
Major Destinations
Large Employment Centers
Educational Centers
Grocery Stores
Community/Public Centers
Major Destination Centers
Commercial Retail
Office Park
Medical Center
University
Mixed-Use
IRVING TEXAS
N
0 1 2 Miles

Demand Analysis for Walking and Bicycling Travel

A latent demand analysis was performed to identify existing developed areas of Irving most conducive to bicycling for transportation based on existing demographics and travel patterns. This analysis considered criteria including:

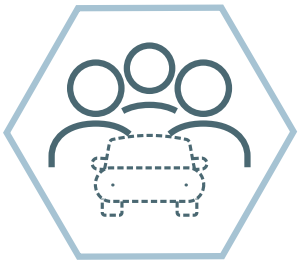
Density of Low-Income Populations

Density of Short-Distance Trips



Areas with High Vehicle Congestion

Density of Population and Employment

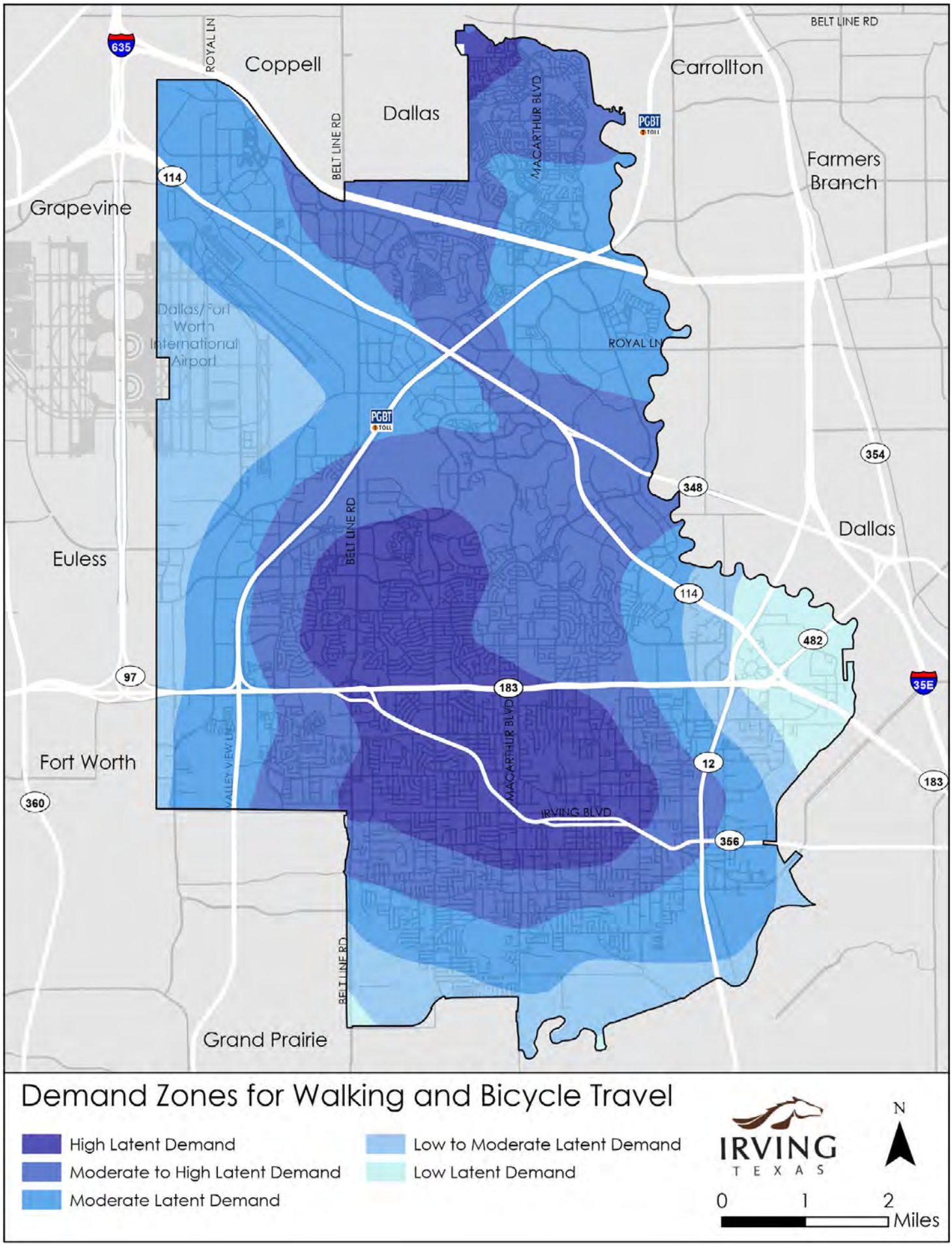


Density of Zero-Car Households

Appendix B contains additional information used in this analysis. The results of this demand analysis identified locations where current traffic conditions would benefit from a reduction in motor vehicle trips and where bicycle facilities would serve the greatest number of people, including those with the greatest need or desire for nonmotorized transportation. As illustrated in **Figure 2-4**, the areas of the city with the highest demand for bicycle travel, and thus the greatest demand for active transportation infrastructure, are located within High Latent Demand, Moderate to High Latent Demand, and Moderate Latent Demand. Generally, most of the central portion of the city, extending from the northern city limits to the southern area north of Hunter Ferrell Road, has a moderate to high demand for bicycle trips. This coincides with areas of Irving that have a high density of home-based average daily short-distance transportation trips (defined as two-and-a-half miles or less) as reflected in **Figure B-1 Density of Average Daily Short-Distance Trips** in ***Appendix B***. Such areas have high potential to convert trips from motor vehicles to nonmotorized forms of transportation (e.g., bicycling and walking).

The western side of the city and portions of the far southern and far eastern sides of the city have less demand for bicycle trips due to existing land use patterns and/or the undeveloped conditions in those areas. However, despite lower demand in these fringe areas of the city it is important to strategically provide bicycle facilities to connect with regional trails (e.g., Campion Trail and Mountain Creek Preserve Trail) and to provide access to/from adjoining cities.

Figure 2-4


Demand Zones for Walking and Bicycle Travel
High Latent Demand
Moderate to High Latent Demand
Moderate Latent Demand
Low to Moderate Latent Demand
Low Latent Demand
IRVING
TEXAS
N
0
1
2
Miles
Coppell
Dallas
Carrollton
Farmers Branch
Grapevine
Euless
Fort Worth
Grand Prairie
Dallas/Fort Worth International Airport
BELT LINE RD
MACARTHUR BLVD
ROYAL LN
IRVING BLVD
VALLEY VIEW LN
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Chapter 3: Recommended Bicycle Network

Development of the planned citywide bicycle network was guided by the ***Irving Bike Plan***'s vision, goals, public input, and review of existing conditions. This chapter provides an overview of the recommended network of bicycle facilities, design characteristics, criteria used in selecting appropriate context sensitive bicycle facilities on roadways, and the anticipated impact the network will have on bicyclists in Irving.

The planning process to develop the recommended bicycle network involved multiple steps, which encompassed a wide range of considerations including input from community stakeholders and the public. The process involved reviewing existing roadway characteristics across Irving to identify opportunities where the retrofit of certain roadways could integrate on-street bicycle facilities to maximize the safety and level of comfort for bicyclists, while also resulting in minimal impact on existing motor vehicle traffic. The alignments and spacing of bikeway corridors throughout the recommended network were selected with the purpose of balancing convenient access to a bicycle facility and connecting people to major destinations .

After the structure and alignments of the network were identified, the type of potential bicycle facilities was evaluated and recommended for each corridor based on roadway characteristics and the context of surrounding land uses. The level of comfort afforded by each type of bicycle facility was a key consideration for determining the most appropriate bikeway type on each roadway alignment. When built out, the recommended bicycle network will facilitate comfortable utilitarian trips by people of all ages and abilities to popular destinations across Irving and to adjacent communities.

All Ages and Abilities (High Comfort) Bicycle Network

Roadway conditions such as traffic speeds, volumes, and number of travel lanes influence bicyclists' perception of safety and comfort, especially for less experienced bicyclists of any age. As such, all types of current and potential bicyclists were considered during the planning process to develop the recommended bicycle network that will ultimately accommodate bicyclists of All Ages and Abilities (AAA), ranging from children to seniors.

According to the National Association of City Transportation Officials (NACTO), an AAA bicycle facility network is safe, comfortable, and equitable. It also provides accommodations for the most vulnerable bicyclists, with a focus on bicycling as a viable form of transportation.

Developing an inclusive bicycle network includes taking into consideration the needs of the city's general population and their level of comfort for bicycle travel. In 2017, the North Central Texas Council of Governments (NCTCOG) conducted a statistically valid **Regional Bicycle Opinion Survey** of residents across 12 counties in the North Texas region to capture the views of the public at large about bicycle transportation. The survey identified three types of bicyclists in the region primarily based on their relationship to bicycling infrastructure and their level of confidence.

A father enjoying a trip by bicycle with his children.

The Federal Highway Administration (FHWA) indicates "Interested but Concerned" bicyclists have the lowest tolerance for traffic stress and tend to avoid bicycling unless they have access to networks of separated bikeways or very low-volume streets with safe roadway crossings. According to surveys, "Interested but Concerned" bicyclists are the largest group in Irving, the Dallas-Fort Worth region, and around the country. These bicyclists, and potential bicyclists, are willing to bicycle if there is dedicated infrastructure separated from motor vehicle traffic that feels comfortable and safe. People willing to bicycle with limited or no bicycle-specific infrastructure are a very small percentage of the overall population. Thus, for purposes of the ***Irving Bike Plan***, the focus is to unlock the latent demand of the "Interested but Concerned" population.

Encouraging more people to bicycle as a mode of travel requires addressing widespread concerns over sharing the road with motor vehicle traffic.

Respondents to the NCTCOG Regional Bicycle Opinion Survey reported they feel the greatest level of comfort on facilities with separation from motor vehicle traffic. More than three-fourths of all respondents indicated they would feel very or somewhat comfortable if a bicycle lane was separated from traffic by a raised barrier (rather than pavement markings). Survey respondents also indicated they would feel nearly as comfortable riding on a physically separated on-street bikeway as they would using an off-street shared-use path (trail) separated from the street. Furthermore, 70 percent of survey respondents reported it is essential or very important for their community to have bike lanes separated from vehicles to avoid sharing the same lane.

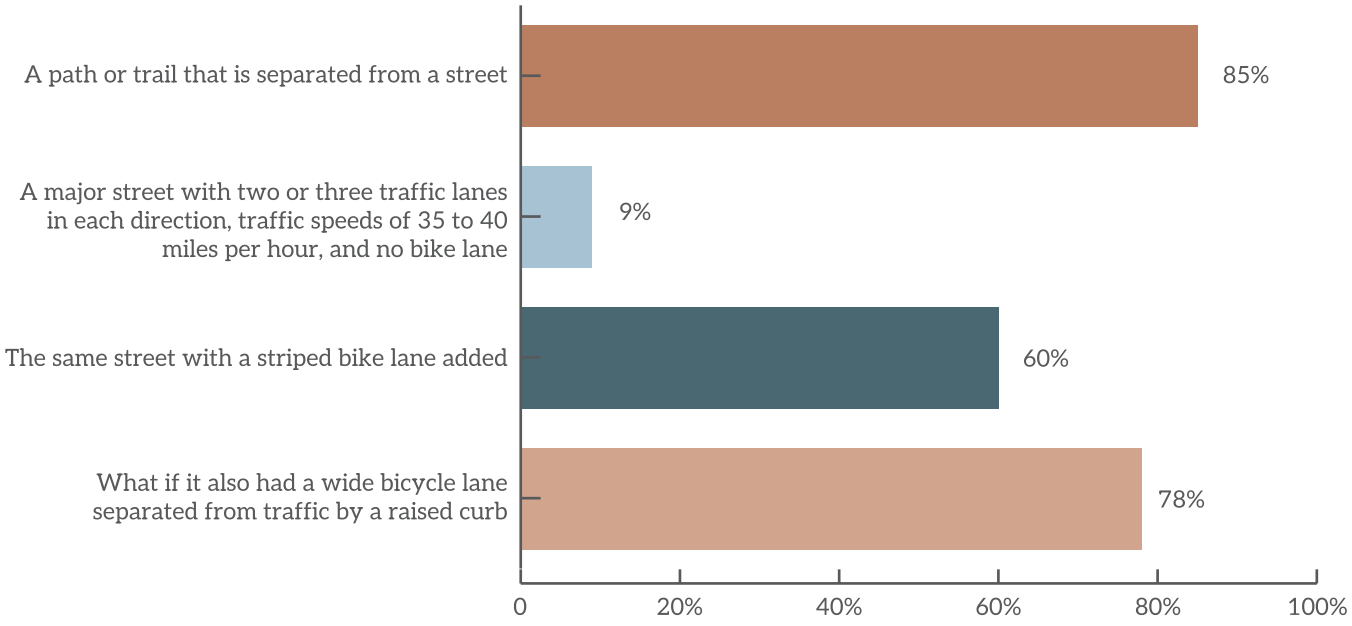
The bicycle opinion survey conducted by the City of Irving in 2022 included questions similar to the regional survey in order to gauge the public's opinions on biking safety and infrastructure in Irving. Based on the City survey results, nearly 80 percent of respondents indicated they would like to bike more than they do now, and a lack of safe, connected bike lanes and trails is the primary reason they do not bike more often.

70%

of survey respondents reported that it is essential or very important for their community to have bike lanes separated from vehicles to avoid sharing the same lane.

How comfortable are you riding a bike on the following?

(Percent of ALL respondents reporting they would feel "Very Comfortable" or "Somewhat Comfortable")



Example question from NCTCOG 2017 Regional Bicycle Opinion Survey.

Bicycle Facility Design Context

Research and best practices related to the design of bicycle facilities have evolved over the years. The planning process for the ***Irving Bike Plan*** integrated the latest authoritative bicycle facility planning and design resources to designate recommended bicycle facility types for various roadway corridors in Irving. These resources reinforce the notion that on-street bicycle facilities should be designed in a context sensitive manner based on characteristics of the roadway and the surrounding community. Notable design guides used in the development of the recommended bicycle network include:

GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES, AMERICAN ASSOCIATION OF STATE HIGHWAY TRANSPORTATION OFFICIALS

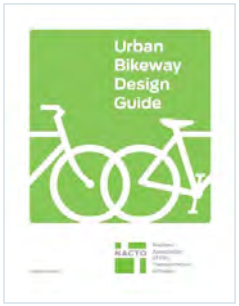
MATERIAL SUCCESS, DESIGNING DURABLE BIKEWAYS, NACTO

BIKEWAY SELECTION GUIDE, FHWA

DON'T GIVE UP AT THE INTERSECTION, NACTO

SEPARATED BIKE LANE PLANNING AND DESIGN GUIDE, FHWA

TRANSIT STREET DESIGN GUIDE, NACTO



URBAN BIKEWAY DESIGN GUIDE, NACTO

ROADWAY DESIGN MANUAL,TXDOT

as well as **PEDESTRIAN AND BICYCLE SAFETY IN BUS RAPID TRANSIT AND HIGH-PRIORITY BUS CORRIDORS: A SYNTHESIS OF TRANSIT PRACTICE, TRANSPORTATION RESEARCH BOARD.**

Potential Roadway Retrofit

The first step in developing the planned network of bikeways involved identifying the area's most desirable for bicyclist travel and providing access to major destinations across Irving. While on-street bike facilities may be desired in many locations, the ability to retrofit an existing urban roadway in select developed areas of the city is often constrained. However, in Irving there are many opportunities to accommodate bicycle facilities by retrofitting roadways where the constructed vehicle capacity of the roadway exceeds the actual existing and forecasted traffic volumes. This could include roadway retrofits through a quick build process generally consisting of low-cost, short-term pavement marking materials to restripe existing roadways to include new bikeways.

Three methods of potential street retrofits, described in **Table 3-1**, were considered to identify opportunities where dedicated bicycle facilities could be integrated within the existing developed roadway cross-sections. These roadway retrofits typically involve restriping existing pavement markings. In some corridors the number of vehicle lanes or on-street parking should be reduced to better balance the accommodation of motor vehicles and bicyclists. A roadway's primary function is for transportation and to accommodate the movement of people, rather than the storage of stationary vehicles. As such, some roadways with existing permitted on-street parking should be considered for retrofit by restricting parking to reallocate that space for dedicated bicycle facilities.

Planning for the recommended bicycle network included a thorough review of roadways throughout Irving to identify existing street conditions, including:

- Vehicle traffic counts (Annual Average Daily Traffic)
- Number of vehicle travel lanes and lane width
- Posted speed limit
- Surrounding land use context
- Presence of "No Parking Allowed" street signage
- Roadway right-of-way and parcel boundaries

Getty Images

Table 3-1: Roadway Retrofit Methods

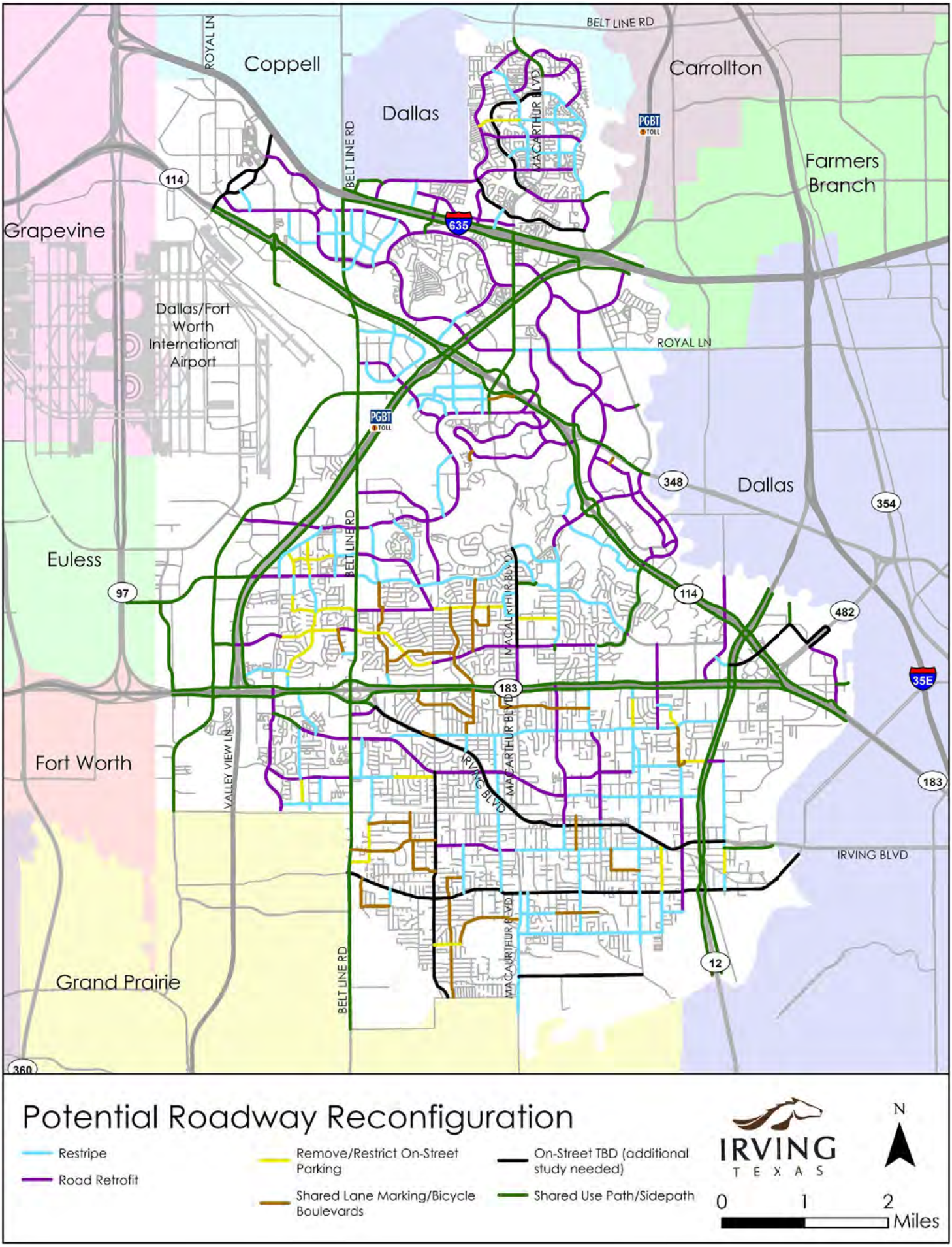
Road Restripe	Road Retrofit	Remove/Restrict On-Street Parking
Restripe the existing roadway to add bike lanes with no reduction in the number of vehicle travel lanes. These roadways may accommodate reduced width of the existing travel lanes and/or shoulders to reallocate space to accommodate a bicycle facility. The number of vehicle travel lanes is unchanged.	Reconfigure roadways to reduce the number of travel lanes and integrate bicycle facilities. Such a retrofit would occur on roadways with more travel lanes than necessary to facilitate the average traffic volumes, with the resulting roadway still accommodating pre-existing vehicle traffic volumes with relatively minimal increase in congestion or delay. The number of vehicle travel lanes is reduced.	Restrict or reallocate on-street parking to repurpose space to integrate bicycle facilities. In areas where available off-street parking is limited, it may be feasible to provide on-street parking on one side of the street while accommodating a dedicated bicycle facility along the opposite side of the street. There is no change to the number of vehicle travel lanes.
		
		

Figure 3-1 identifies the type of potential roadway retrofit on various roadways throughout Irving. These potential roadway retrofits serve as the building blocks for developing the recommended bicycle network throughout Irving. Widening projects on existing developed roadways was not a strategy considered to add dedicated bike facilities, except for locations where future city and/or TxDOT road widening projects were already planned and could accommodate the addition of bicycle facilities. Once the preferred roadway corridors with feasible potential for retrofit were identified, further analysis of the corresponding roadway characteristics was conducted to determine the most appropriate type of high comfort bicycle facility type that could be implemented in the future.

An additional type of roadway retrofit involves upgrading an existing bicycle lane. Such upgrades generally seek to improve turning movements or the perceived safety of bicyclists. For example, green thermoplastic pavement markings can greatly enhance visibility of bicyclists at intersections. Over the course of time, conventional or buffered bike lanes may also be upgraded from pavement markings to include vertical separation.

An existing bike lane is enhanced to warn motorists the need to yield to bicyclists before crossing the lane into the right-turn only lane at the approaching intersection.

Figure 3-1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Dallas
BELT LINE RD
ROYAL LN
MACARTHUR BLVD
IRVING BLVD
VALLEY VIEW LN
PGBT TOLL
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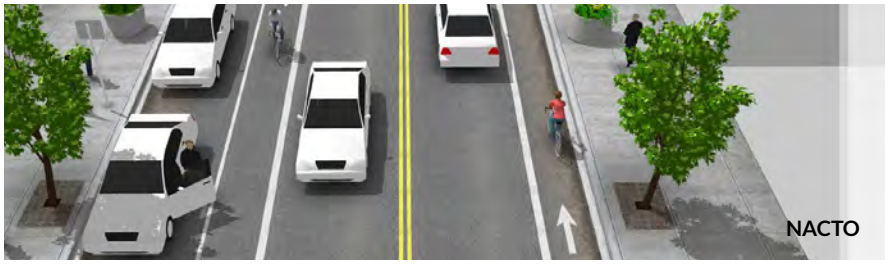
Potential Roadway Reconfiguration
Restripe
Road Retrofit
Remove/Restrict On-Street Parking
Shared Lane Marking/Bicycle Boulevards
On-Street TBD (additional study needed)
Shared Use Path/Sidepath
IRVING
TEXAS
N
0
1
2
Miles

Bicycle Facility Types

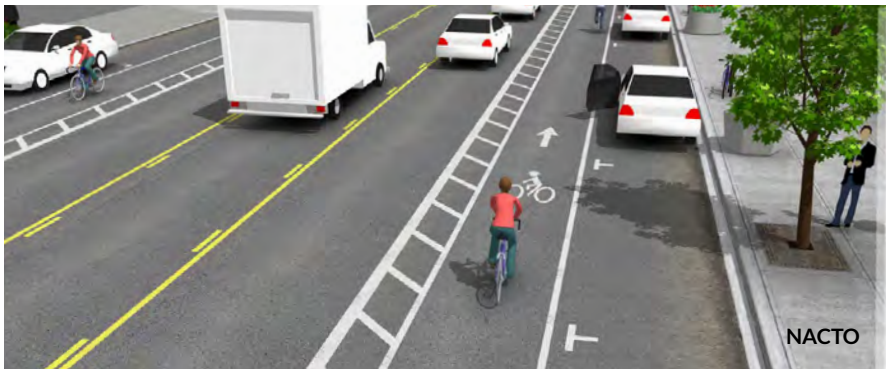
Various bicycle facility types are anticipated to be implemented throughout Irving as part of roadway retrofit projects and other bikeway capital projects. These bicycle facilities should include design features consistent with guidance used nationwide, and may include variations based on local context, land uses, and traffic conditions. The following are general types of bicycle facility types considered for implementation along roadway corridors in Irving.

CONVENTIONAL BIKE LANES



Conventional Bike Lanes are a dedicated travel lane for bicyclists adjacent to the vehicular travel lane(s) designated through the use of pavement markings and "Bike Lane" street signage.

BUFFERED BIKE LANES



Buffered Bike Lanes are conventional dedicated bicycle lanes paired with buffer striping space that provides greater separation from the adjacent motor vehicle travel lanes and/or parking lanes. These lanes are best used on roadways with moderate traffic volumes and travel speeds to provide a more comfortable experience for bicyclists.

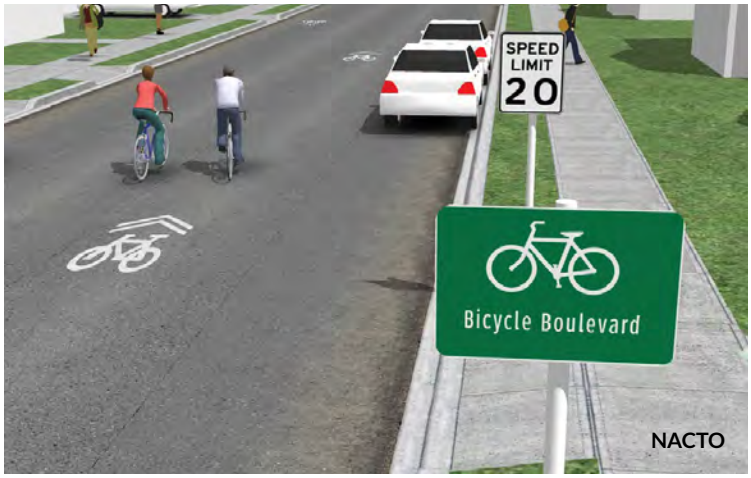
SEPARATED BIKE LANES

Separated Bicycle Lanes are dedicated travel lanes with a vertical physical barrier providing separation from the adjacent motor vehicle travel lanes, such as plastic or concrete curbs, tubular markers (flex posts), vegetative planters, parked cars, and other variations. These lanes are typically located on roadways with higher traffic volumes and higher travel speeds. The physical barrier from the vehicular travel lanes allows for improved bicycle safety and comfort.

TWO-WAY CYCLE TRACKS

Two-Way Cycle Tracks are bidirectional lanes physically separated from vehicular traffic lane(s), allowing bicycle movement in both directions on one side of the roadway. Cycle tracks are most appropriately located in areas with few street or drive-way intersections, without on-street parking, and may be implemented on roadways with higher vehicular volumes and travel speeds as an alternative to buffered or separated bike lanes.

BICYCLE BOULEVARDS



Bicycle boulevards are local streets with low traffic volumes and low travel speeds intended for shared bicycle and vehicular travel. Bicycle boulevards may include various design elements tailored to the neighborhood context such as pavement intersection treatments for safe and convenient crossings, and street signage. These Boulevard facilities provide connections between dedicated bikeways, and also provide opportunities to connect from dedicated bikeways to neighborhood destinations such as schools and community facilities. Low motorized traffic volumes and travel speeds on these roadways are critical for maintaining a perception of safety and comfort for bicyclists while sharing the travel lane(s) with motor vehicles. ***Appendix D*** provides more detail about bicycle boulevards and the related design element options.

SIDEPATHS (SHARED-USE PATHS)

Sidepaths (Shared-Use Paths) are an off-street facility located adjacent to the roadway (within street right-of-way) that is shared by pedestrians and bicyclists. Sidepaths are set back from the street curb and are physically separated from motorized vehicular traffic by a landscape buffer space.

Forms of Vertical Separation for Bicycle Facilities

Bike lanes with vertical separation have increasingly become the preferred design approach in cities across the United States to provide accommodations suitable for bicyclists of all ages and abilities. Multiple forms of vertical separation can be applied to physically separate bike facilities from motor vehicle traffic lanes. Factors to consider when selecting the form of vertical separation include the street width, the width of the buffer between the bike facility and outside vehicle travel lane, the presence of on-street motor vehicle parking, the frequency of driveways and turn lanes, traffic speeds, access for maintenance equipment such as street sweepers, as well as the separation material cost, durability, and aesthetics. Various forms of separation may be used such as delineator posts, bollards, planters, curb or raised medians, concrete barriers, low-profile plastic dividers, parked cars, and a raised sidewalk-level facility.

Separated bicycle facilities are appropriate in urban and suburban community contexts.

A buffered bike lane with low profile plastic diverters as a form of separation from motor vehicle traffic.

An example of a bike lane with delineator posts as a form of separation.

An example of a bike lane with a curb as a form of separation.

An example of a raised sidewalk-level bike lane as a form of separation.

An example of a bike lane with parked cars and planters as a form of separation.

Street Sweepers are an efficient method of clearing debris from separated bike lanes.

An example of a bike lane with bollards as a form of separation.

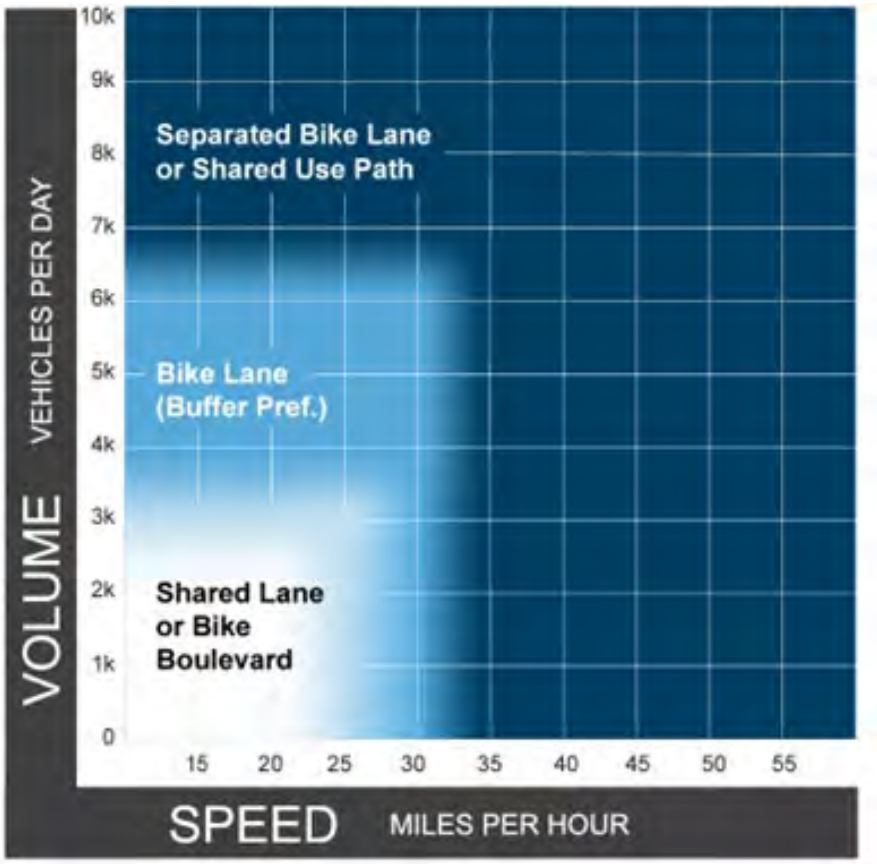
An example of a bike lane with planters as a form of separation.

Selection of Bicycle Facility Types

During the review of roadway corridors across Irving, design guidance was used to designate the appropriate bicycle facility type that would operate functionally and maximize comfort. In addition to available right-of-way, traffic volumes and operating vehicle speeds are the primary considerations when determining suitable bicycle facilities.

Typically, bicyclists sharing the road with motor vehicles should be limited to corridors with low vehicle speeds and volumes; meanwhile, dedicated on-street bikeways with greater separation and physical barriers should be installed on, but not limited to, roadways with higher travel speeds and volumes (See **Figure 3-2**). Various forms of separation, including roadways with moderate traffic speeds and volumes, provide a greater level of comfort for bicyclists. Constraints such as the availability of right-of-way and frequency of intersecting driveways may require bicycle facility types in some locations to be installed with less separation from motor vehicle traffic, thus as a result provide more stress (lower level of comfort) for bicyclists.

Figure 3-2: Preferred Bikeway Type Based on Motor Vehicle Volume and Speed



Bikeway Selection Guide, FHWA

Table 3-2 outlines the criteria used for guiding the recommended bicycle facility types across the citywide network. The posted speed limit was used in the absence of data for operating vehicle speeds on roadways in Irving. Location-specific or other context-sensitive factors were also considered during the selection process. During the design process for bicycle boulevards, City staff will perform an engineering study to evaluate the feasibility of reducing the speed limit below the 30-mph city standard for residential streets.

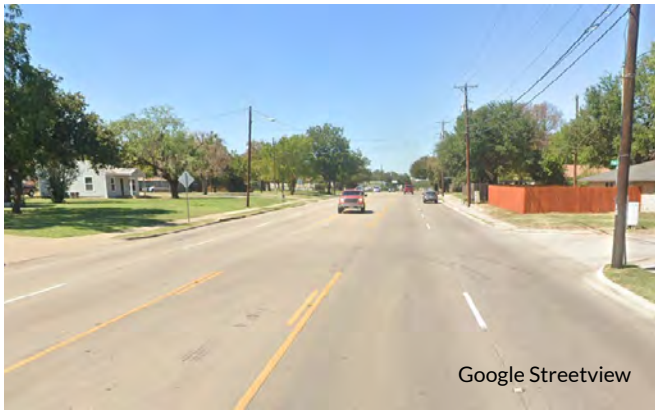
Separating a bike lane from motor vehicle traffic increases the level of comfort for bicyclists.

Table 3-2: Bicycle Facility Selection Criteria

BICYCLE FACILITY TYPE	POSTED SPEED LIMIT (MPH)	CURRENT DAILY TRAFFIC COUNTS (AADT)	NUMBER OF EXISTING VEHICLE TRAVEL LANES
Bicycle Boulevard	25	3,000	2
Bike Lanes	30	3,000 - 7,000	2-4
Buffered Bike Lanes	35	3,000 - 7,000	2-4
Separated Bike Lanes	40	7,000 +	4-6
Two-Way Cycle Track	40	7,000 +	4-6
Sidepath (Shared-Use Path)	No Limit	No Limit	No Limit

Bicycle Facility Types to Be Determined

During the planning process several corridors were determined to require further detailed study and outreach with local stakeholders to identify the most compatible bicycle facility type for implementation. This additional detailed review, to be performed by engineering and planning professionals through a future process for each corridor, will ensure the resulting roadway and bicycle facility may best reflect the needs of the community, adjacent land uses, and traffic circulation.



Select roadways, such as Shady Grove Rd, will undergo detailed evaluation before identifying a recommended bicycle facility.

Recommended Bicycle Network

Consistent with the ***Irving Bike Plan***'s guiding vision and goals, the recommended bicycle network identifies corridors to implement facilities that expand options for how people travel throughout the city, serves all ages and abilities, and connects Irving residents to major destinations. While the ***Irving Bike Plan*** provides a framework for the bicycle network, future studies may be performed to determine or refine the most appropriate type of bicycle facility in various roadway corridors .

The recommended bicycle network consists of a diverse portfolio of bicycle facilities on low-speed/low-volume shared streets, major streets with dedicated bicycle facilities separated from motor vehicles, and off-street paths (see **Figure 3-3**). The recommended bicycle facilities provide flexibility for the city to implement context-sensitive roadway retrofits that meet the needs of all modes of travel, including bus transit operations, while maximizing comfort and safety of bicyclists.

The Recommended Bicycle Network suits the needs for more people to feel comfortable to travel by bicycle for trips.

The planning process for the ***Irving Bike Plan*** satisfies the six principles of an exemplary bicycle network.[2] These principles provide guidance to ensure the entire network will provide multiple route options to reach destinations:

Getty Images

1. ACCESSIBILITY

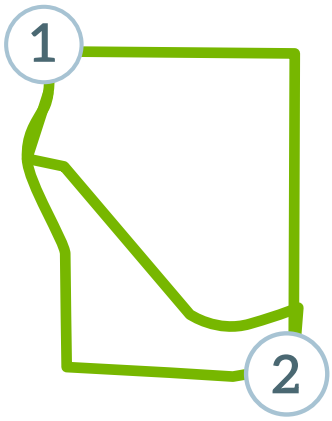
Ability of the network to accommodate travel for all users, regardless of age and ability.

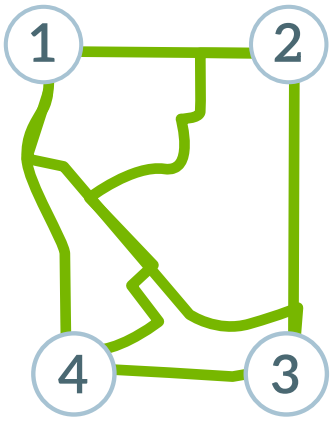
2. SAFETY AND SECURITY

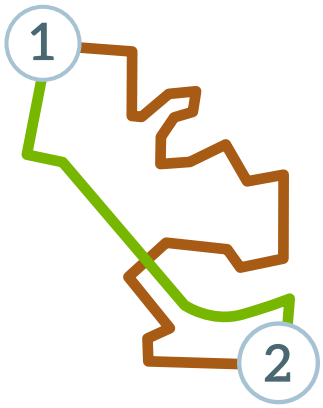
Availability of routes in the network that minimize risk and injury.

3. COMFORT

Appeal of the network to a broad range of users (ages and abilities), such as separated bicycle facilities.







4. ALTERNATIVES

Availability of various route choices within the network.

5. COHESION

Network connectivity in terms of its concentration of destinations and routes.

6. DIRECTNESS

Availability of direct and convenient access to destinations across the network.

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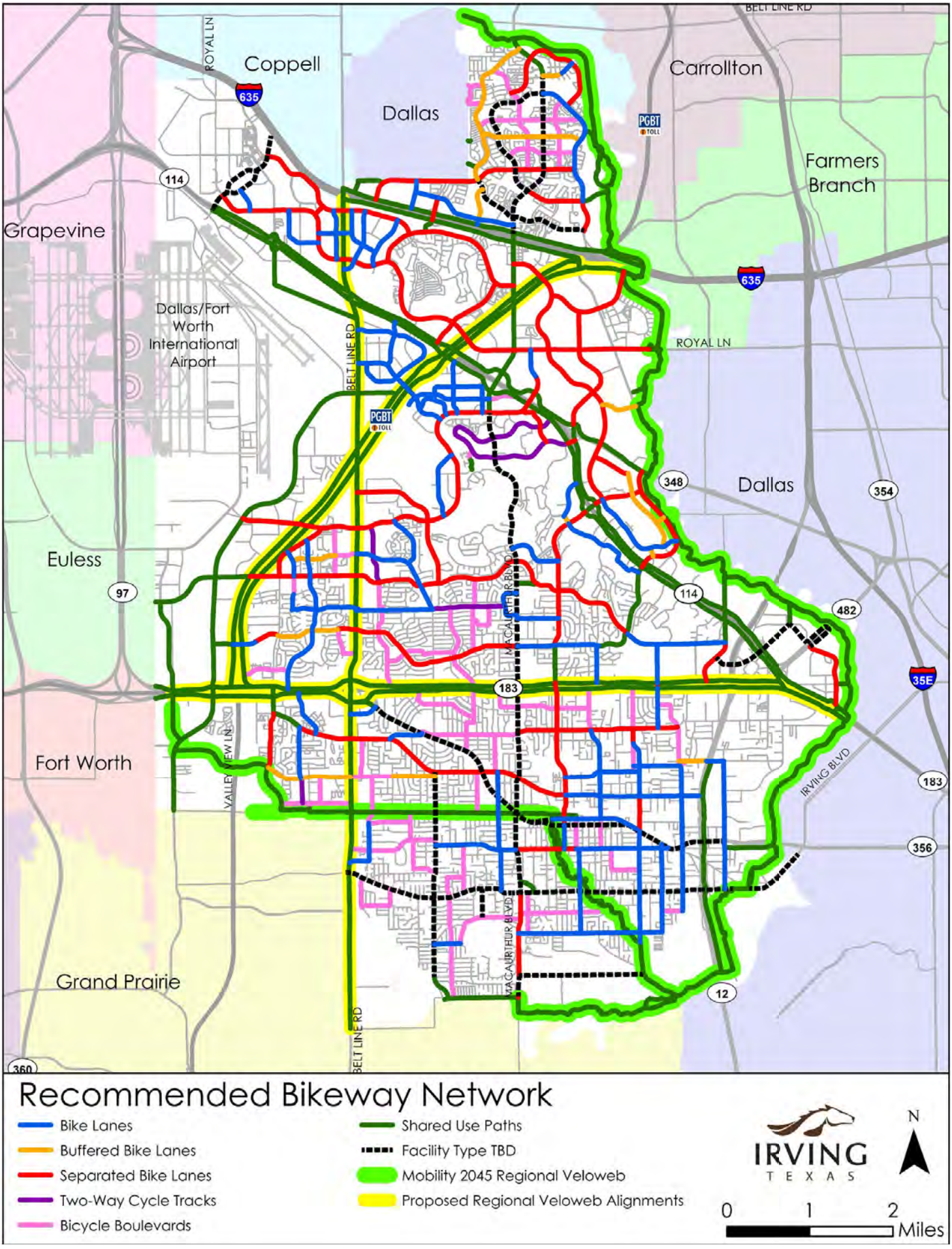
2 Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks, FHWA (2015)

Figure 3-3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Recommended Bikeway Network
Bike Lanes
Buffered Bike Lanes
Separated Bike Lanes
Two-Way Cycle Tracks
Bicycle Boulevards
Shared Use Paths
Facility Type TBD
Mobility 2045 Regional Veloweb
Proposed Regional Veloweb Alignments
IRVING
TEXAS
N
0
1
2
Miles

Access to the Recommended Bicycle Network

The build-out of the recommended bicycle network will result in 319 miles of bikeway facilities (see **Table 3-3**) to supplement the 27 miles of existing facilities in Irving. Approximately 40 percent of the total mileage is associated with street retrofits to accommodate the addition of dedicated on-street bikeways (separated from vehicle travel lanes). Ten percent of the network consists of bicycle boulevards with shared traffic on low volume and low speed roadways. The remaining 44 percent of the network consists of future shared-use paths in most instances to be implemented along highway corridors in collaboration with TxDOT and the North Texas Tollway Authority.

Table 3-3: Mileage (Centerline Miles) of the Recommended Bicycle Network by Facility Type

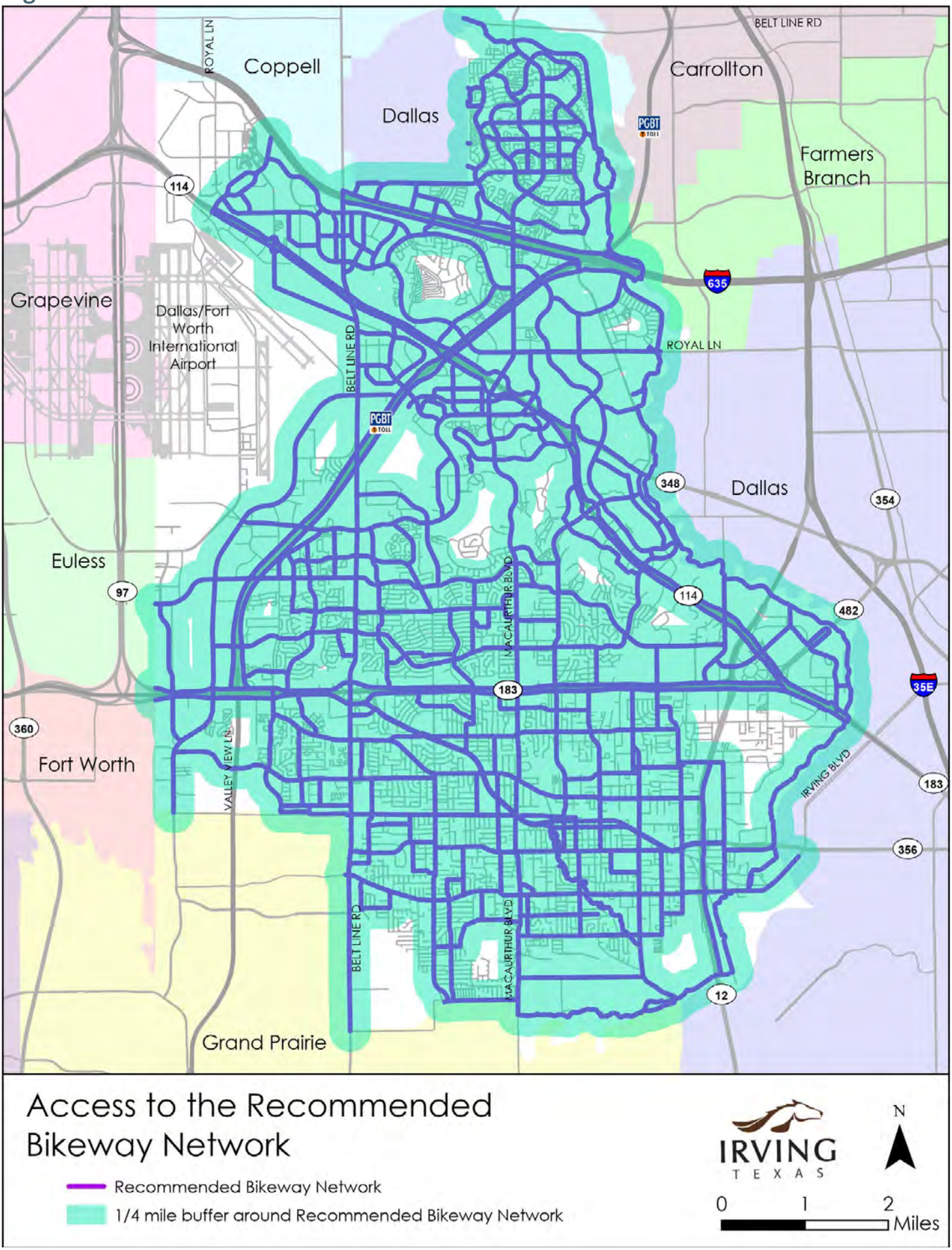
FACILITY TYPE	MILES (EXISTING)	MILES (PLANNED)	MILES (TOTAL)	PERCENT OF TOTAL
Bike Lanes	1	52	53	17%
Buffered Bike Lanes	-	9	9	3%
Separated Bike Lanes	-	56	56	18%
Two-Way Cycle Tracks	-	5	5	2%
Bicycle Boulevards	-	32	32	10%
Shared-Use Paths	26	115	140	44%
Facility Type To Be Determined	-	25	25	8%
TOTAL FACILITIES	**27**	**293**	**319**	**100%**

The density, spacing, and distribution of bicycle facilities in the recommended network provides multimodal options with substantial coverage to where people live, work, or travel. Nearly 40 schools in Irving would have direct connections to planned bicycle facilities including bicycle boulevards as represented on the Recommended Bicycle Network (See ***Appendix E***).

Ninety-three percent of City land area will be within a one-quarter mile reach of a dedicated bicycle facility once the network is fully developed (see **Figure 3-4**).[3] In addition, most of the remaining seven percent of land area is vacant/under-developed or is private development isolated from the City's public roadway network such as a gated community or subdivision.

3 This calculation excludes land dedicated to DFW International Airport. During the development of the Recommended Bicycle Network, connections to the airport were identified through the southern portion of the airport property via Rental Car Drive from the east and International Parkway from the south.

Figure 3-4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PGBT TOLL
PGBT TOLL
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635
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356
12
Access to the Recommended Bikeway Network
Recommended Bikeway Network
1/4 mile buffer around Recommended Bikeway Network
IRVING
TEXAS
N
0
1
2
Miles

Connections to Surrounding Communities

Prior to the completion of the ***Irving Bike Plan***, each of the eight neighboring cities (Carrollton, Coppell, Dallas, Euless, Farmers Branch, Fort Worth, Grand Prairie, and Grapevine), had adopted local master plans for the development of on-street bikeways and shared-use path (trails) systems. Through the development of the ***Irving Bike Plan***, additional Regional Veloweb alignments were identified for a future update to the NCTCOG ***Mobility Plan***, which will be recommended for adoption by the Regional Transportation Council. **Figure E-1** in ***Appendix E*** identifies the Irving recommended bicycle network connections with existing and planned bicycle networks in surrounding cities.

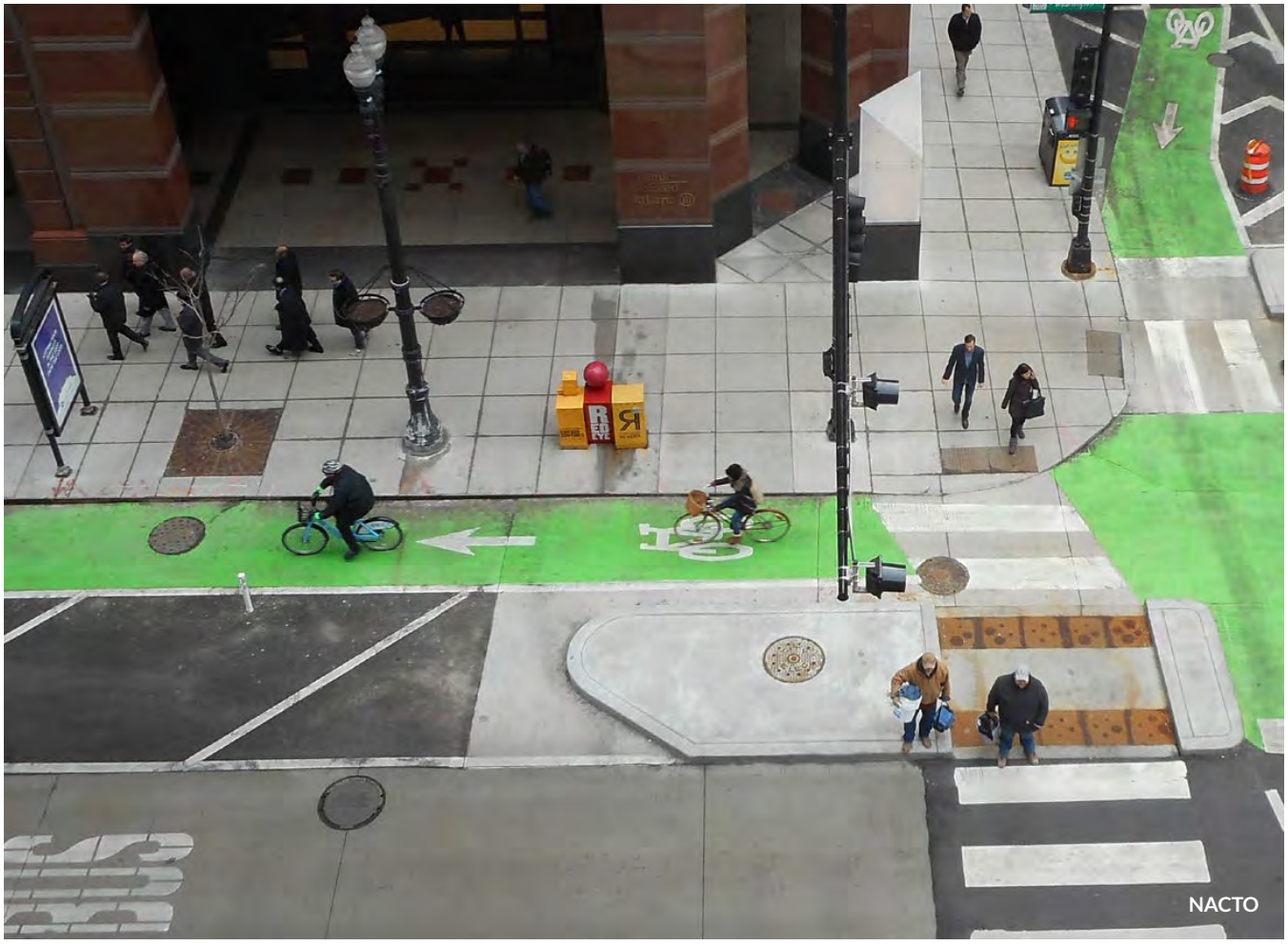
Intersections

The success of the recommended bicycle network will be contingent upon providing safe and high comfort accommodations at street intersections for all bicyclists. A single stressful intersection may be the crucial factor in a person's decision to make a bicycle trip. Thus, ensuring the continuation of a bicycle facility through an intersection, including pavement markings and adjustments to traffic signals and phasing, are important considerations when implementing any type of bicycle facility design. Managing conflicts between vehicle traffic, bicyclists, and pedestrians is a fundamental challenge at intersections since these locations are often the most stressful locations to navigate. According to NACTO, more than 40 percent of urban bicyclist fatalities nationwide occur at intersections. When implementing a bikeway corridor, a traffic engineering evaluation of each roadway intersection should occur on a case-by-case basis.

A median island refuge at an intersection serving as a diverter allows bicyclists to comfortably travel across three or more lanes while also reducing through traffic.

Bicycle treatments and guidance for intersection design is evolving across the United States with multiple strategies having been tested and refined by various cities and states, including NACTO and the Texas Department of Transportation. Intersection designs may utilize multiple strategies to improve safety by reducing the turning speed of motor vehicles, increased visibility of crossing bicyclists, and dedicated bicycle right-of-way and signal phases.

Additional information and best practices can be found in NACTO's guidance **Don't Give Up at the Intersection**. **Figure 3-5** from NACTO identifies the common design characteristics of a protected intersection design, which can be applied to various intersections. Such strategies include, but not limited to, restricting right turn on red, incorporating bicycle-specific traffic signals, increasing sight distance for motorists by setting back the stop bar, and decreasing the turn radii to slow the speed of turning motorists. **Figure 3-6** from NACTO identifies design characteristics unique to bikeway crossings of a minor street intersection. In addition, the ***TxDOT Roadway Design Manual*** Section 6.4.5 (Intersections and Crossings) provides various principles and treatments for bikeways at intersections to minimize or eliminate conflict areas and to maintain bikeway continuity approaching and passing through an intersection.



Separating bicyclists from motor vehicle traffic at intersections ensures comfortable crossings.

Figure 3-5: Design Characteristics of Protected Intersections

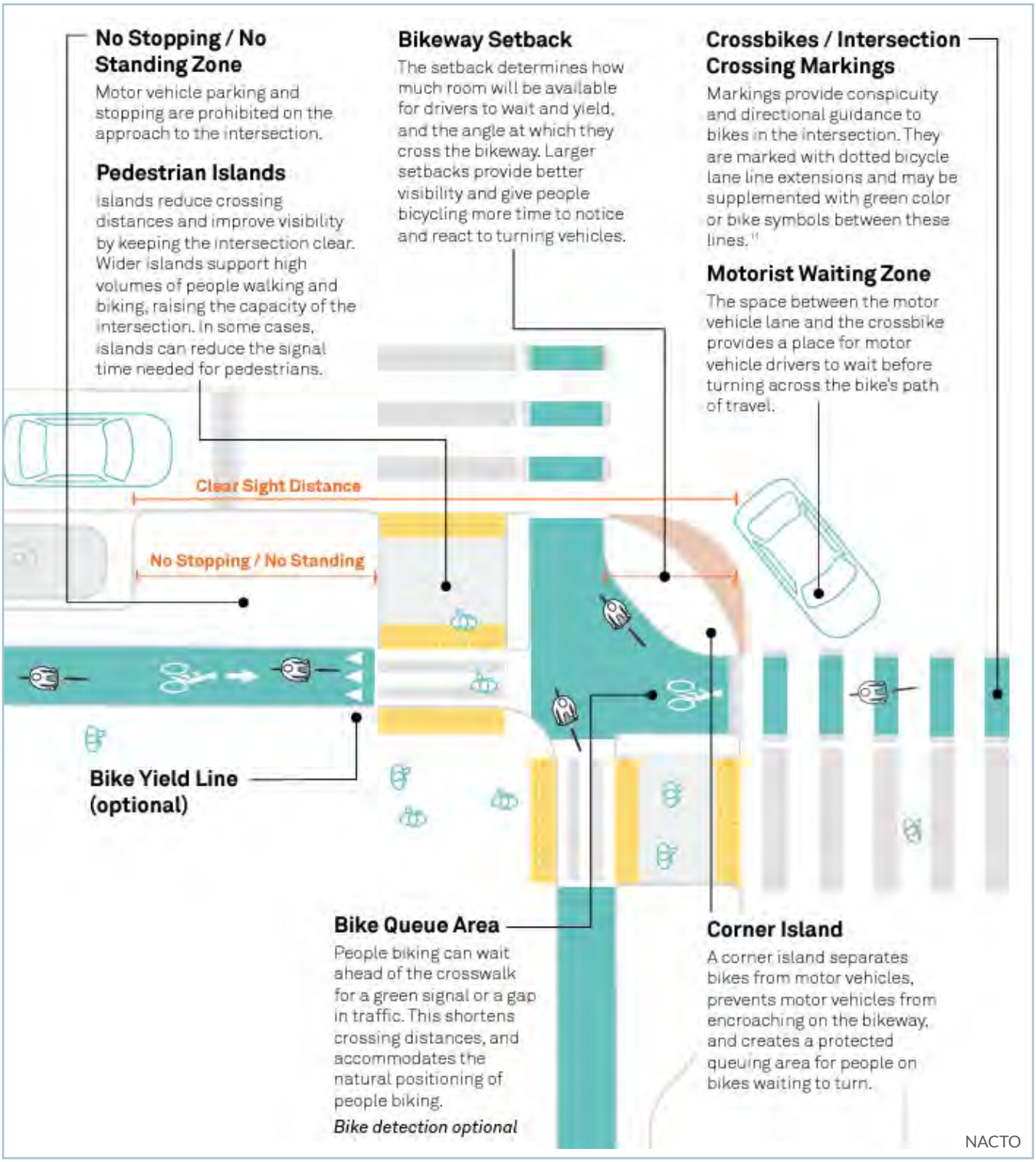
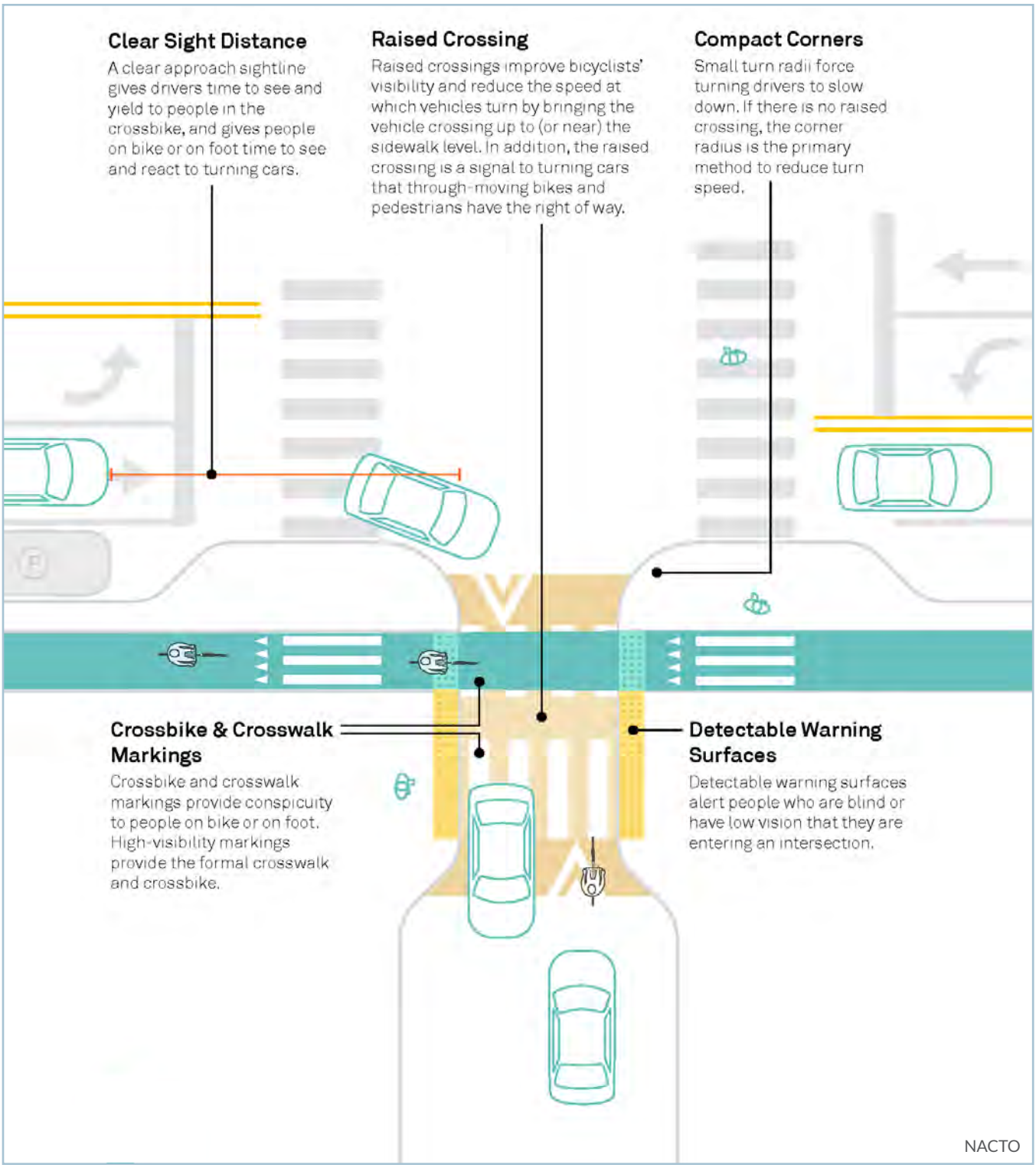


Figure 3-6: Design Characteristics of Minor Street Crossings

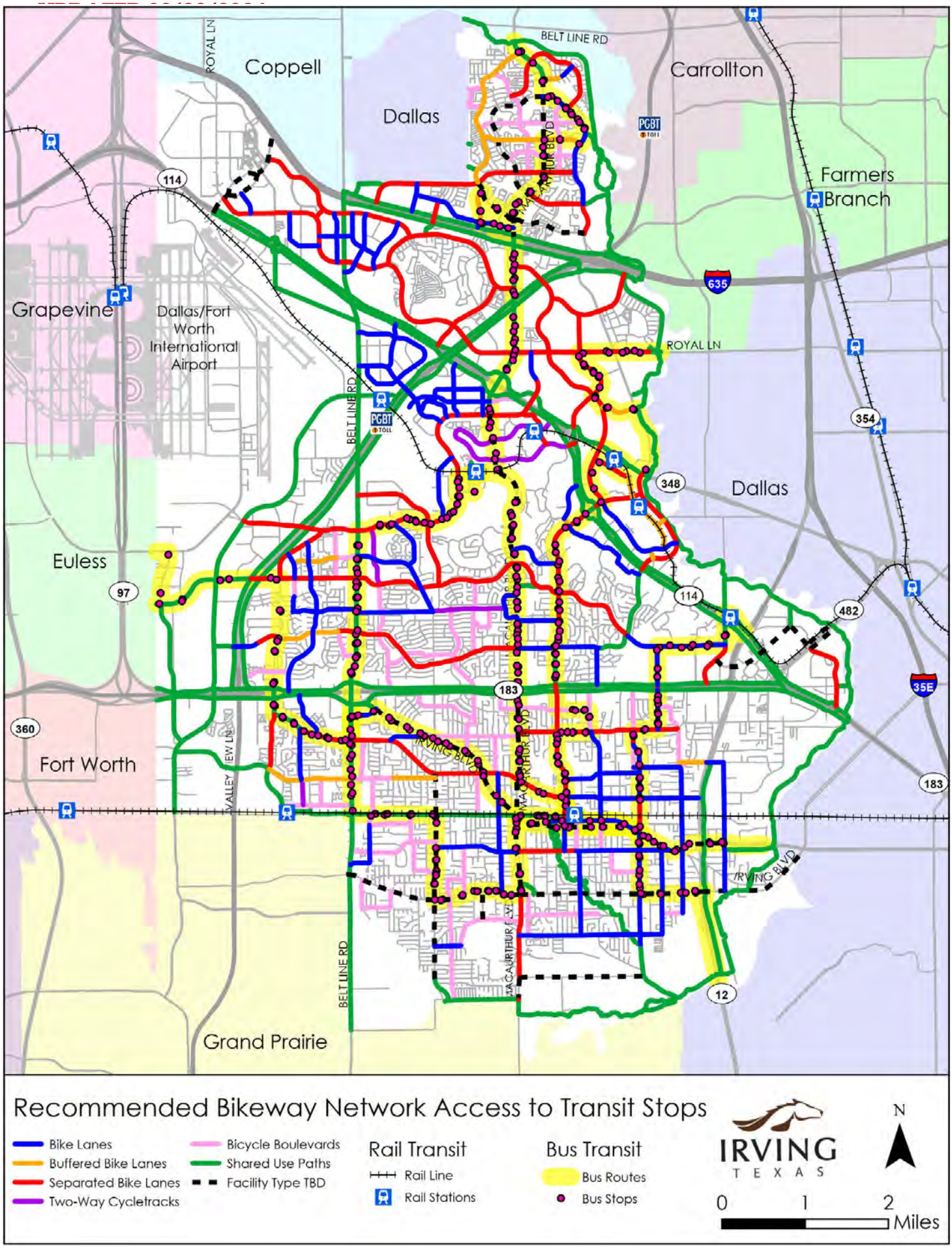


Connections to Transit

Irving is served by DART light rail, TRE commuter rail, and bus routes. Providing bicycle network connections to these transit options is a primary goal of the ***Irving Bike Plan*** and the development of the recommended bicycle network. A lack of bicycle facilities connecting to transit often results in a first-mile / last-mile gap, whereby access to transit is stressful or results in the inability to make a trip by means other than an automobile. **Figure 3-7** identifies the proximity of the recommended bicycle network to bus stops and rail stations. Special consideration must be given to the design of roadway corridors where both bus riders and bicyclists will be served to ensure they safely coexist.

DART bus and rail services accommodate bicycles and empower travelers to safely and comfortably use transit for their trip.

Figure 3-7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IRVING BLVD
MACARTHUR BLVD
VALLEY VIEW LN
PGBT TOLL
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183
35E
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12
Recommended Bikeway Network Access to Transit Stops
Bike Lanes
Buffered Bike Lanes
Separated Bike Lanes
Two-Way Cycletracks
Bicycle Boulevards
Shared Use Paths
Facility Type TBD
Rail Transit
Rail Line
Rail Stations
Bus Transit
Bus Routes
Bus Stops
IRVING
TEXAS
N
0
1
2
Miles

Accommodating bus operations and bus stops with dedicated bicycle facilities (regardless of facility type) along the six DART bus routes requires additional design considerations. Research by the Transportation Research Board and the ***NACTO Transit Street Design Guide*** provides guidance related to improving bicyclist and pedestrian access to transit stops and stations. Design considerations need to address accessibility for transit riders, eliminate conflicts between bicyclists and transit vehicles, maintain a clear pedestrian path through the bike lane to access the bus at the stop, and minimize the impact to traffic flow for motorists. Adequate signage and pavement markings should be provided around bus stops to communicate to bicyclists the need to yield to transit riders boarding and alighting. **Figure 3-8** illustrates an example of integrating access to a bus stop through a dedicated bike facility.

Figure 3-8: Side Boarding Island Stop

Identifying the appropriate bus stop design involves evaluating bicycle volumes and bus ridership.

Examples of bus stops using a rubber platform and a constructed floating island bus stop for alighting passengers.

Bicycle Level of Comfort

Comfort and the perception of safety are emphasized by the goals of this ***Irving Bike Plan*** and are two primary factors in determining if people will choose to travel by bicycle. Roadway conditions with high volumes of motor vehicles traveling at high speeds are stressful and intimidating for a sizable proportion of the public. Implementation of an All Ages and Abilities (AAA) bicycle network transportation system in Irving will serve residents including children, older adults, and less experienced bicyclists who are sensitive to stress from traffic. An AAA network will provide high comfort bicycle facilities and opportunities for the most vulnerable and less experienced to bicycle for everyday trips.

Retrofitting streets with bicycle facilities will increase the appeal of bicycling as a mode of travel. Reducing stress caused by motor vehicle traffic results in a pleasant and enjoyable bicycle trip.

During the planning process, a Bicycle Level of Comfort (BLOC) analysis was performed to identify the level of comfort (or resulting stress) for each corridor of the recommended bicycle network. While the level of comfort experienced by bicyclists is inherently subjective, the BLOC score for each roadway segment was assigned based on traffic volumes, posted speed limit, number of vehicle travel lanes, the presence of on-street parking, and the type of bicycle facility (if any). Typically, streets with lower traffic volumes and speeds feel more comfortable for bicyclists, and bicycle facility types that provide more separation between bicyclists and motor vehicle traffic increase the level of comfort and the perception of safety. The methodology used in classifying Bicycle Level of Comfort was based on research published by the Mineta Transportation Institute and has since been widely adopted and applied in bike plans across the country, including multiple cities in the Dallas–Fort Worth region.

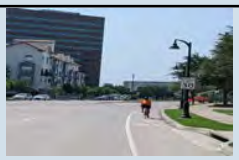
Table 3-4 illustrates the relationship of various roadway conditions and bicycle facility types in determining the level of comfort of the recommended bicycle network. ***Appendix C*** provides further details on the development of BLOC scores for the bikeway network in Irving.

Apollo Road in Richardson is comfortable for many bicyclists due to its low 30 mph speed limit, buffer from motor vehicle traffic, and reduced number of travel lanes.

Low-speed, low-volume residential streets can be found to include separated bicycle facilities.

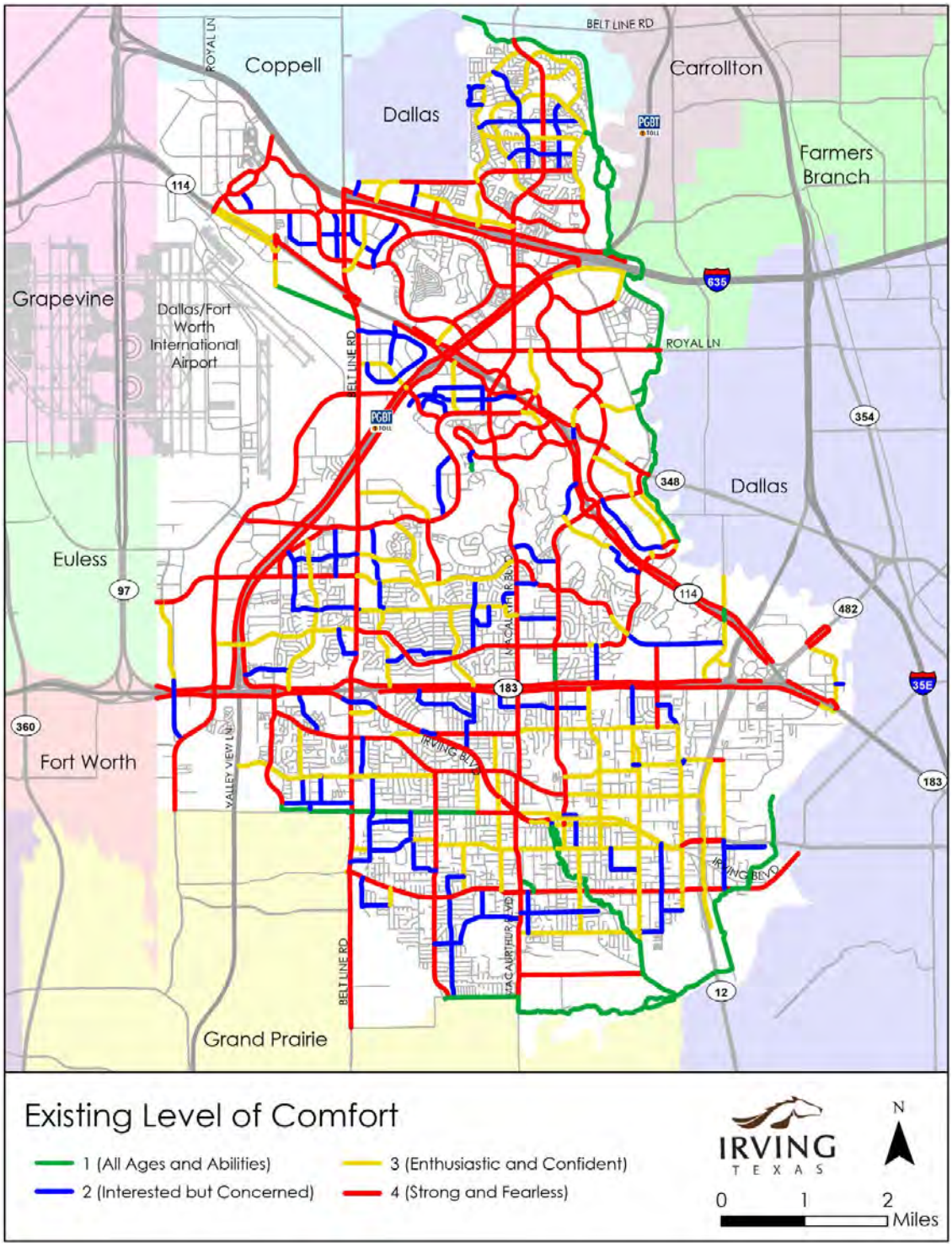
Table 3-4: Bicycle Level of Comfort and the Relationship Between Facility Type and Roadway Conditions

High — Low

Facility Type	1 **All Ages and Abilities** Comfortable for all users between the ages of 8 (children) and 80 (seniors).	2 **Interested but Concerned** Comfortable for the mainstream adult population.	3 **Enthusiastic and Confident** Acceptable for the adult population comfortable in shared traffic, but who may prefer some separation.	4 **Strong and Fearless** Tolerable for the adult population comfortable in shared traffic with no separation.
Bike Lanes	 2 lanes 25 mph or less	 2 to 5 lanes 35 mph or less	 2 to 5 lanes 45 mph or less	 3 to 5 lanes 45 mph or more
Buffered Bike Lanes	 2 lanes 30 mph or less	 2 to 5 lanes 35 mph or less	 3 to 5 lanes 40 mph or more	
Separated Bike Lanes	 2/3 lanes 35 mph or less	 2 to 3 lanes 40 mph or more		
Two-Way Cycle Tracks	 2/3 lanes 35 mph or less	 2 to 3 lanes 40 mph or more		
Sidepaths (Shared-Use Paths)				
Bicycle Boulevards	 2 lanes; Less than or equal to 25 mph Low Traffic Volumes	 2 lanes; Greater than or equal to 35 mph Low Traffic Volumes		

The level of comfort scores range from 1 (high) to 4 (low), where high comfort is most desirable. When evaluating the current roadway network in Irving, an existing conditions BLOC analysis was performed and concluded that a majority of the city's existing roadway network (not including local neighborhood streets) are low comfort for most bicyclists as represented in **Figure 3-9**.

Figure 3-9



FUTURE BICYCLE LEVEL OF COMFORT ANALYSIS

A second BLOC scenario analysis was performed to evaluate the impact of implementing the recommended bicycle network corridors. After review of the results, some of the initial recommended bicycle facility types guided by **Table 3-2 (Bicycle Facility Selection Criteria)** were adjusted to increase separation from motor vehicles and to maintain continuous connected higher comfort bikeway corridors.

Figure 3-10 identifies the future bicycle level of comfort resulting from implementing the recommended bicycle network. Except for roadways designated with bikeways to be determined, the existing stressful roadways for bicycle travel will result in a higher comfort level if the appropriate bicycle facility is implemented. Due to right-of-way constraints on Irving Heights Rd. and the number of travel lanes and posted speed limit on Story Rd., these corridors were the only instances resulting in a Level of Comfort 3 (suitable for enthusiastic and confident bicyclists). **Table 3-5** compares the mileage of existing BLOC analysis to the future BLOC mileage of the built-out recommended bicycle network.

Table 3-5: Comparison of Existing and Future Bicycle Level of Comfort Scores

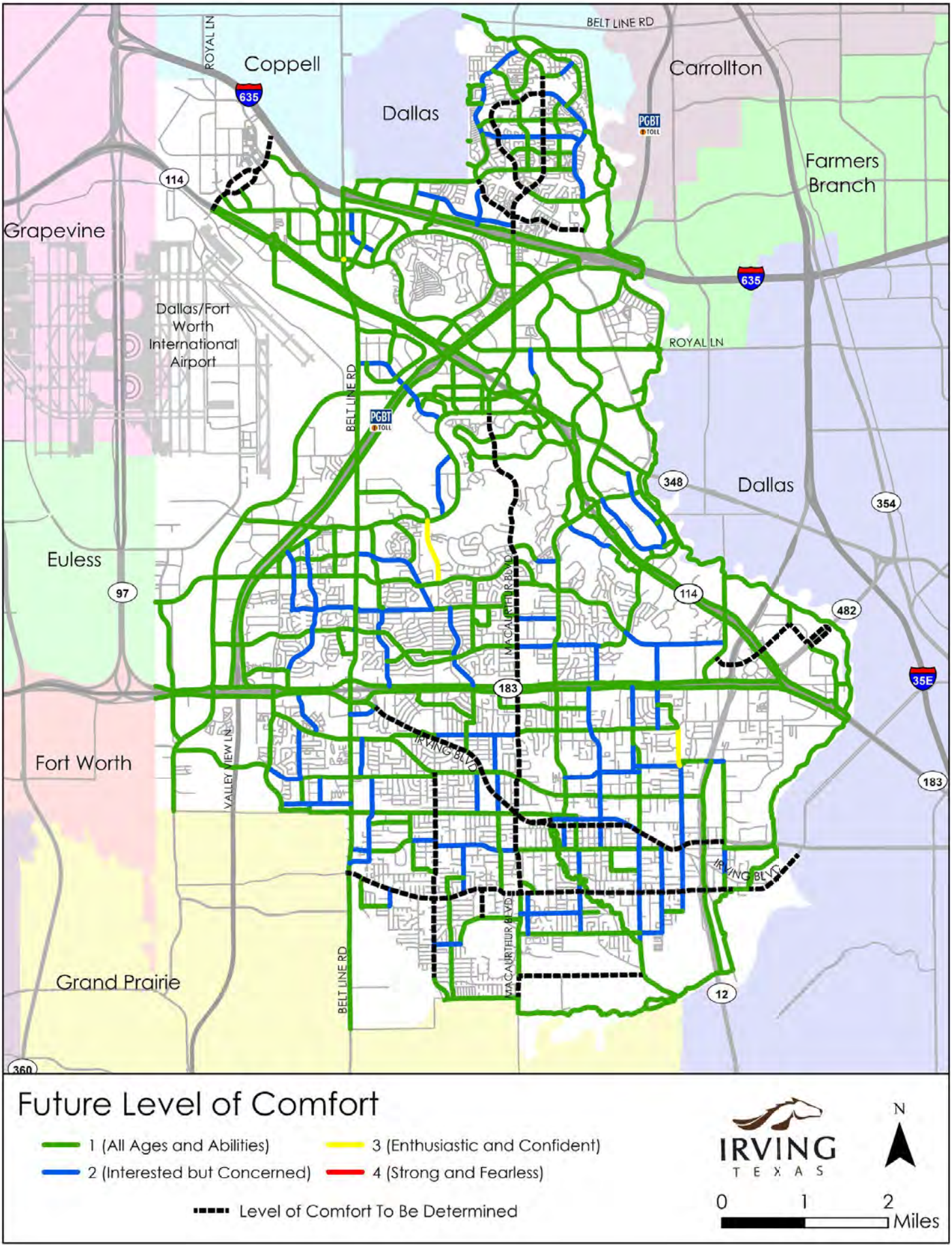
EXISTING LEVEL OF COMFORT	MILES	FUTURE LEVEL OF COMFORT	MILES	PERCENT CHANGE
1 (All Ages and Abilities)	26	1 (All Ages and Abilities)	217	743%
2 (Interested but Concerned)	48	2 (Interested but Concerned)	48	0%
3 (Enthusiastic and Confident)	68	3 (Enthusiastic and Confident)	1	-98%
4 (Strong and Fearless)	124	4 (Strong and Fearless)	0	-100%
TOTAL MILEAGE	**266**	**TOTAL MILEAGE**	**266**	-

Note: Table does not include corridors without an existing or future BLOC score, such as future roadways, future trails, and roadways with a bicycle facility type to be determined.

Existing roadway conditions are stressful for bicyclists riding in traffic with no dedicated bicycle facility.

An improved roadway with a separated bike lane provides higher level of comfort for bicyclists.

Figure 3-10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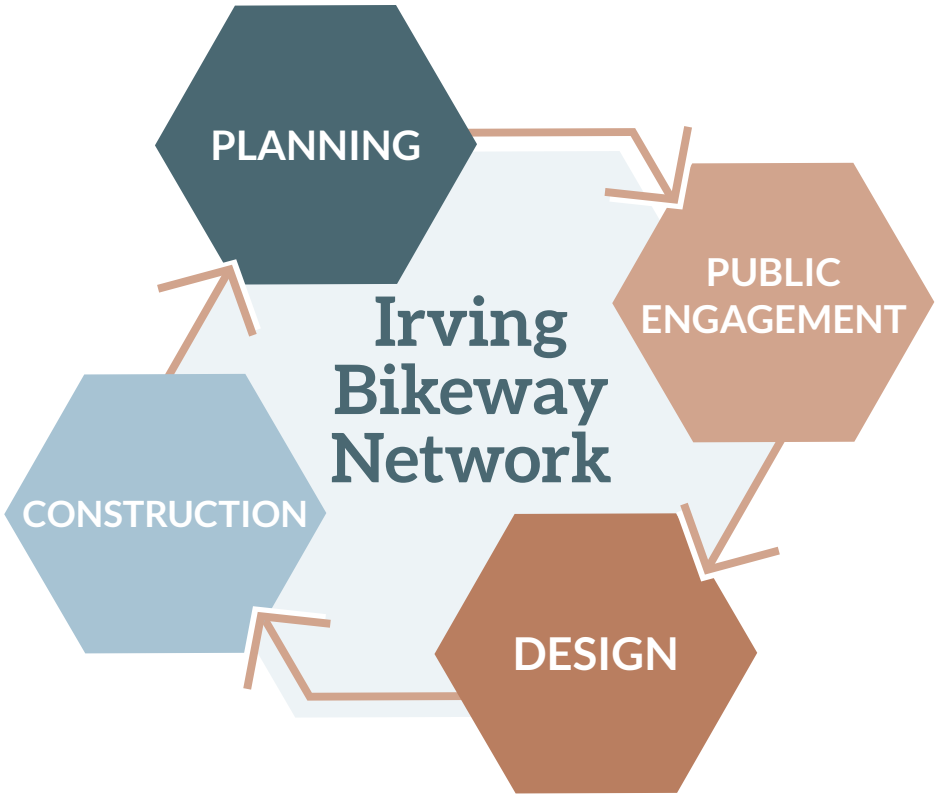
Future Level of Comfort
1 (All Ages and Abilities)
2 (Interested but Concerned)
3 (Enthusiastic and Confident)
4 (Strong and Fearless)
Level of Comfort To Be Determined
IRVING
TEXAS
N
0
1
2
Miles

Chapter 4: Implementation

The success of the ***Irving Bike Plan*** will depend on following through to implement the recommended bicycle network, monitor progress, and conduct ongoing evaluations of benchmarks. This chapter identifies the recommended phasing to implement the infrastructure network necessary for citywide travel by bicycle as a means of transportation in Irving. It also provides recommendations on strategies or action steps and performance measures to guide investments and accountability.



Phased Network Implementation

Constructing a citywide bicycle network suitable for people of all ages and abilities in Irving will take place over time. Bikeway corridors identified in the recommended bicycle network are classified through three phases for implementation from beginning to buildout: Short-Term (1-5 years), Medium-Term (5-10 years), and Long-Term (10+ years). The criteria for designating bikeway corridors in these phases were based on several factors. The primary factors influencing project phasing involve the status of active project development, the complexity of a project, network evaluation criteria, and the agency with jurisdiction over the roadway.

Each of the roadway corridors with recommended bikeway facilities were evaluated and scored based on the criteria and weights outlined in **Table 4-1**, to achieve the goals of the ***Irving Bike Plan***. The 50 corridors that scored the most effective in achieving the criteria were prioritized for implementation in the first ten years after Plan adoption (Short-Term and Medium-Term Phases). The preliminary results of the corridor implementation phasing were subsequently refined based on feedback by City staff related to complexity and feasibility of project timeframes necessitating a greater level of public involvement through the engineering design phase, thus resulting in a realistic implementation plan.

Public input helped inform the phased approach for implementation which prioritizes corridors to make meaningful connections to major destinations.

Many bike lane and buffered bike lane corridors can be implemented in a relatively short timeframe (less than five years) after adoption of the ***Irving Bike Plan*** through a quick build process generally consisting of low-cost, short-term pavement marking materials to restripe existing roadways to include new bikeways. Such projects have limited complexity and few, if any, impacts on the roadway infrastructure that otherwise would require a large-scale capital project. These initial quick build low-to-medium scale projects can be used to accelerate project delivery of the citywide bikeway network and initiate a paradigm shift toward a safer and more connected network of bikeway facilities across Irving. Other projects, such as roadway and intersection retrofits anticipated to require more significant modifications, larger budgets, and a greater level of public involvement through the engineering design phase are identified in the Medium- or Long-Term Phases for implementation.

Overall, bikeway corridors represented in the ***Irving Bike Plan*** do not represent specific project limits, since many corridors may be implemented through multiple project phases depending on the length, scale, complexity, and available budget.

Table 4-1: Bikeway Network Evaluation Criteria

CRITERIA	DESCRIPTION	WEIGHT
Network Connectivity	Corridor directly connects to another corridor implemented in the Short-Term Phase (applicable only to projects in the Medium-Term).	30
Crash History	Number of all types of crashes along the roadway (e.g., bicycle, pedestrian, motor vehicle).	20
Access to Major Destinations	Number of major destinations that can be accessed from the corridor.	20
Equity	Corridor provides access to a disadvantaged community identified as Census Block Groups above the regional average for minority or low-income.	15
Increase in Comfort Level	Improvement in the bicycle level of comfort score as compared to existing conditions.	15
	TOTAL	**100**

SHORT-TERM PHASE (1 – 5 YEARS) 2025-2029

Bikeway corridors identified for implementation in the first five years generally consist of projects currently under design or development and those that can be implemented through a quick build process to accelerate project delivery of the citywide network. Corridors identified for this phase include:

- Existing projects under development or identified in the City of Irving Capital Improvement Program (CIP).
- Roadway cross sections with travel lanes that can be reduced in width through low-cost restriping to accommodate bicycle lanes or buffered bicycle lanes (no reduction in the total number of lanes).
- Select roadways with more vehicle capacity than necessary for the current and anticipated future traffic volumes, and therefore the number of vehicular lanes can be reduced to accommodate bicycle lanes or buffered bicycle lanes.
- High-priority regional trail projects with funding for construction (e.g., Campion Trail).
- Corridors providing access to four DART Orange Line light rail stations included in the Implementation of Bikeway Facilities to DART Rail Stations Study by NCTCOG (anticipated to be complete by Fall of 2024).
- Twenty corridors that scored the most effective in achieving the criteria of the Bikeway Network Evaluation Criteria (**Table 4-1**).

MEDIUM-TERM PHASE (6 – 10 YEARS) 2030-2034

Bikeway corridors recommended for implementation in the Medium-Term will expand upon the bicycle facilities implemented in the Short-Term Phase to close gaps and lead to a more continuous, comfortable, connected bikeway network:

- Corridors that scored in the top 21 – 50 based on the Bikeway Network Evaluation Criteria.
- Texas Department of Transportation (TxDOT) on-system frontage roads identified in the NCTCOG regional 10-Year Plan.
- Corridors identified with “facilities to be determined” that require additional study.
- Select corridors with project complexity identified by City staff, requiring a greater level of public involvement through the engineering design phase.

LONG-TERM PHASE (10+ YEARS) 2034+

Bikeway corridors identified for implementation after the next decade represent those that scored below the top 50 based on the Bikeway Network Evaluation Criteria. These corridors include future TxDOT on-system frontage road projects that are not identified in the NCTCOG regional 10-Year Plan for improvements. Such future TxDOT on-system projects are expected to include sidepaths (minimum 10-foot wide) in accordance with the existing ***TxDOT Roadway Design Manual***.

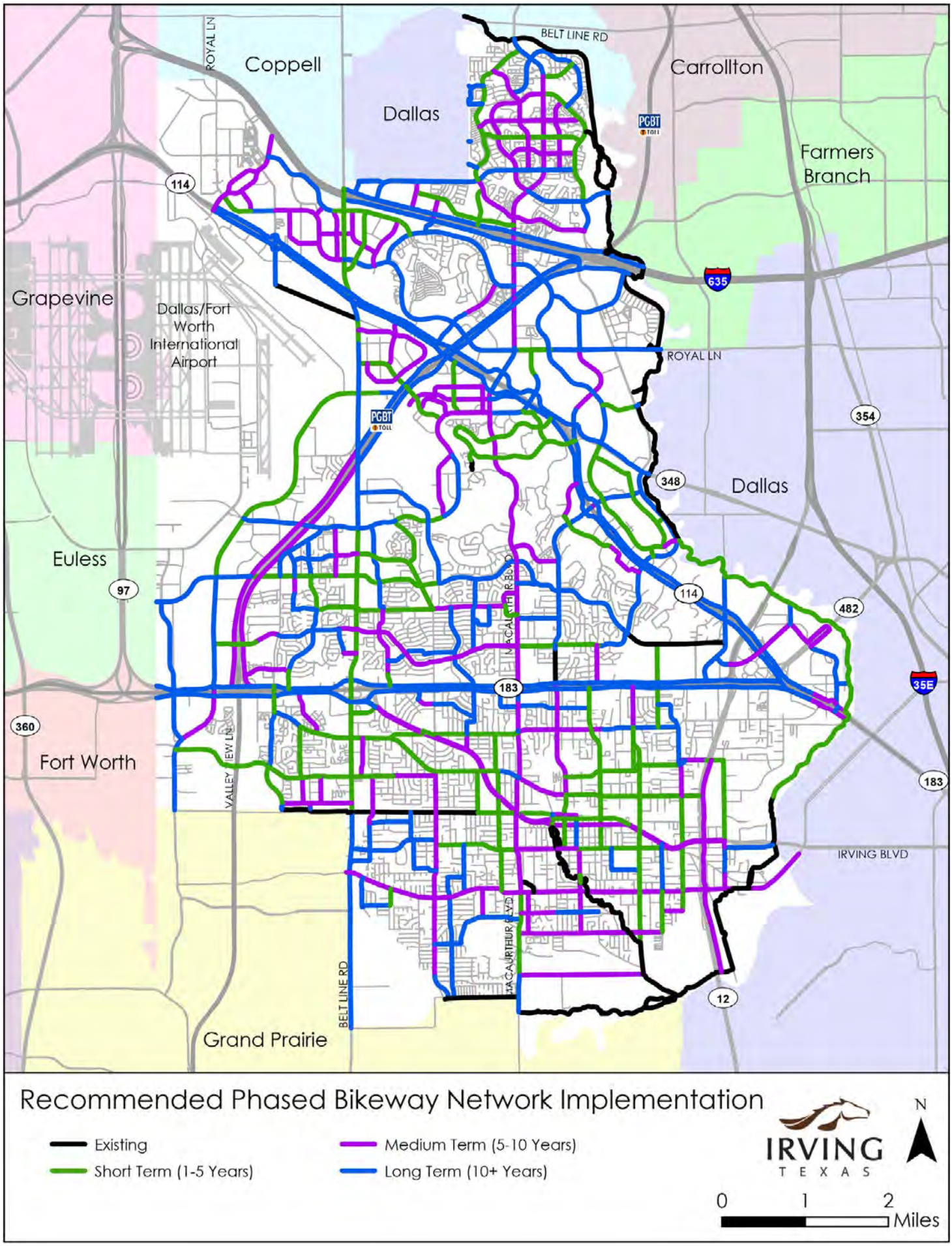
SUMMARY OF ALL PHASES

The total (centerline) miles of bikeways recommended to be implemented in each phase is summarized in **Table 4-2**. The resulting recommended phased implementation of an additional 298 centerline miles of new bikeway facilities throughout Irving to supplement the 27 miles of existing facilities is identified in **Figure 4-1**.

Table 4-2: Bikeway Centerline Mileage by Phase

PHASE	BIKEWAY MILEAGE (CENTERLINE MILES)
Total all Phases	**319**
Existing Facilities	27
Short-Term (1 – 5 years) 2025-2029	88
Medium-Term (6 – 10 years) 2030-2034	78
Long-Term (10+ years) 2034+	127

Figure 4-1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IRVING BLVD
MACARTHUR BLVD
VALLEY VIEW LN
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Recommended Phased Bikeway Network Implementation
Existing
Short Term (1-5 Years)
Medium Term (5-10 Years)
Long Term (10+ Years)
IRVING
TEXAS
N
0
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2
Miles

Action Plan

In addition to constructing the bicycle network facilities, the ***Irving Bike Plan*** includes recommended action steps to further enhance bicycling as a mode of travel. These action steps are intended to institutionalize the planning, engineering, and promotion of bicycling by the City of Irving. Like implementing the bikeway network, the action steps are expected to be implemented incrementally during the life of the ***Irving Bike Plan***. The action steps are organized into Ongoing, Short- (1–5 years), Medium- (6–10 years), or Long-Term (10+ years) based on the level of difficulty or departure from the status quo of how the City currently operates. Generally, actions that can be accomplished quickly with existing resources are listed in the Short-Term, with comprehensive policies that are more complex or require more time for development listed in the Medium-Term.

The phased approach for implementing action steps is outlined in **Table 4-3** with the anticipated responsible party (or parties).

Table 4-3: Action Steps for Plan Implementation

#	ACTION STEPS	RESPONSIBLE PARTY
	ONGOING	
1	Provide an annual status update concerning the implementation of the ***Irving Bike Plan*** and publish results for elected officials and residents.	Transportation Dept.
2	Establish a schedule and perform ongoing sweeping of existing on-street bikeways.	Transportation Dept.
3	Perform regular maintenance of existing on-street bikeways, such as re-striping.	Transportation Dept.
4	Develop and coordinate ongoing community outreach related to bicycle accommodations and bicycle safety.	Transportation Dept. Communications Dept.
5	Coordinate with TxDOT to integrate and construct sidepaths along frontage roads as part of future TxDOT on-system highway projects.	Transportation Dept.

#	ACTION STEPS	RESPONSIBLE PARTY
SHORT-TERM (1-5 YEARS) 2025-2029		
6	Implement engineering design and construction of Short-Term bikeway projects.	Transportation Dept.
7	Incorporate a bicycle committee within the Green Advisory Board and Park Board.	Transportation Dept. Parks and Recreation Dept.
8	Incorporate bikeway projects from the ***Irving Bike Plan*** into regular review of Transportation and Capital projects.	Transportation Dept. CIP Department
9	Establish dedicated annual city budgets for constructing the recommended bicycle network, and for operations and maintenance of existing bicycle facilities.	Transportation Dept. Financial Services Dept.
10	Identify and document the locations of grates, stormwater inlets, manholes and utility covers, and other obstructions that are a risk to bicyclists on roadways with recommended bikeway facilities.	Transportation Dept. CIP Dept.
11	Review appropriate signage on various roadways that are not planned for dedicated bicycle facilities	Transportation Dept.
12	Adjust automatic detection systems to register bicyclists at signalized intersections along the recommended bikeway network.	Transportation Dept.
13	Adopt a bicycle parking ordinance addressing short-term bicycle parking accommodations in new development or major renovation projects.	Transportation Dept. Planning Dept.

#	ACTION STEPS	RESPONSIBLE PARTY
SHORT-TERM (1-5 YEARS) 2025-2029 (CONTINUED)		
14	Develop a wayfinding signage plan and install such signage throughout the city for on-street bicycle facilities and off-street shared-use paths.	Transportation Dept. Parks and Recreation Dept.
15	Install DFW Discovery Trail regional branding and wayfinding signage along the Irving portions of the regional trail (Rock Island Road Trail, Delaware Creek Trail, South Campion Trail, Mountain Creek Preserve Trail, Twin Wells Park Trail, and Trinity View Park Trail).	Parks and Recreation Dept.
16	Adopt an ordinance addressing the permitting process for shared dockless vehicle operators within Irving.	Transportation Dept. City Attorney's Office
17	Adopt an ordinance pertaining to riding and parking motorized micromobility devices such as scooters and electric bicycles, focusing on the first phase to improve access to and from rail stations and trails.	Transportation Dept. City Attorney's Office Planning Department
18	Develop Safe Routes to School (SRTS) plans for schools with direct connections to planned dedicated bikeway facilities (see ***Appendix E*** for a full list of schools along the bikeway network).	Transportation Dept. Planning Dept.
19	Conduct periodic short-term bicycle traffic counts with mobile equipment and/or visual observation along various roadways to document the change in bicycle travel (before and after bikeway project implementation).	Transportation Dept.
20	Update the Master Thoroughfare Plan to account for bicycle accommodations identified in the ***Irving Bike Plan.***	Transportation Dept. Planning Dept.

#	ACTION STEPS	RESPONSIBLE PARTY
MEDIUM-TERM (6 – 10 YEARS) 2030-2034		
21	Implement engineering design and construction of Medium-Term bikeway projects.	Transportation Dept.
22	Install bike-friendly grates and construct necessary modifications on roadways with recommended bikeway facilities to address other bicyclist obstructions/ hazards in the road identified in Action Step #10.	Transportation Dept. CIP Department
23	Install permanent on-street bicycle counters in various locations on existing bikeways to collect data. Annually publish the results of data collection.	Transportation Dept.
24	Adopt an ordinance addressing the installation of end-of-trip facilities in new developments, including long-term bicycle parking, showers, changing rooms, lockers, and related accommodations.	Transportation Dept. Planning Dept.
25	Consider the development of a Complete Streets policy including, but not limited to, vision and intent, applicability, design, and implementation strategy that applies to all types of transportation projects, including all new and existing streets and facilities across Irving.	Transportation Dept.
26	Consider the development of a Vision Zero Policy and an associated comprehensive Safety Action Plan for eliminating roadway fatalities and serious injuries that includes strategies addressing bicyclist safety.	Transportation Dept.
27	Apply to the League of American Bicyclists to designate Irving as a Bicycle Friendly Community.	Transportation Dept.
28	Apply to the League of American Bicyclists to designate the City of Irving Government at City Hall as a Bicycle Friendly Business.	Transportation Dept.
LONG-TERM (10+ YEARS) 2034+		
29	Implement engineering design and construction of Long-Term bikeway projects.	Transportation Dept.

Performance Measures

Data-driven performance-based planning provides a framework for establishing measures of progress to achieve the goals outlined in the Plan. **Table 4-4** identifies performance measures and an associated action-oriented objective for various goal themes of the ***Irving Bike Plan***. Each of the performance measures serves as a general indicator of progress made by the City of Irving using existing publicly available data sources that can be tracked over time to evaluate changes in patterns and trends. The recommended targets represent quantitative goals for the City of Irving to strive to achieve over the next decade.

Table 4-4: Performance Measures for Bicycling

PLAN GOAL THEME(S)	PERFORMANCE MEASURE	OBJECTIVE	BASELINE	TARGET (BY 2034)	DATA SOURCE
 INCLUSIVITY CONNECTIVITY EQUALITY	Increase the mileage of on-street and off-street bicycle facilities	Construct the facilities identified in the Short- and Medium-Term Phases in 10 years.	27 miles	193 miles	NCTCOG Regional Trails and On-Street Bikeways Database
 SAFETY	Decrease the number of bicyclist crashes	Reduce the number of 5-year rolling average crashes by 50% in 10 years.	15 Crashes (2018 – 2022)	8 (or less) crashes (2029-2033)	TxDOT Crash Records Information System 5-Year Rolling Average
 TRANSPORTATION CHOICE	Increase the percent of residents commuting to work by bicycle	Increase the percent of people bicycle commuting to work by 100% in 10 years.	0.2%	0.4%	US Census Bureau American Community Survey 5-Year Estimate

Future Updates to the Plan

The ***Irving Bike Plan*** identifies a robust bicycle network for implementation over the next 10+ years, as well as recommended action steps and policies to enhance bicycling in the community. Over time, amendments or updates to the ***Irving Bike Plan*** may be warranted and should occur. In addition, adjustments to the network alignments and facility types may be necessary as additional planning and design is completed for various bikeway corridors. It is best practice to solicit feedback on any proposed changes to the recommended network from an established stakeholder committee.

There should be continual public input opportunities for implementation, including planning for the design and construction of projects and future updates to the Plan.

Funding

Accommodating on-street bikeway facilities in Irving can be completed through a variety of funding sources, including routine restriping of roadways with limited or no impact upon existing right-of-way. Thus, costs associated with implementing many bikeway corridors may be relatively minimal. For roadway projects involving bikeways with physical separation or other capital costs, additional local funding sources or public-private partnerships may need to be leveraged. In addition, some projects may be eligible for federal formula grant funding or federal discretionary grant programs. **Table 4-5** provides an overview of potential sources of local and federal funding that could be used for implementation.

Table 4-5: Funding Opportunities

LOCAL	CURRENT FEDERAL FORMULA ALLOCATION PROGRAMS (2023)
Neighborhood Associations	Transportation Alternatives Set-Aside
Community Improvement Districts (such as TIFs)	Surface Transportation Block Grant
Crowdsourcing	Congestion Mitigation and Air Quality
Nonprofit Grants	Highway Safety Improvement Program
Impact Fees	Community Development Block Grant
Infrastructure Bonds	Recreation Trails Program
Local Taxes (General Fund)	**CURRENT FEDERAL DISCRETIONARY PROGRAMS (2023)**
Foundation Grants	
Individual Donors	Safe Streets and Roadways for All
League of American Bicyclists Spark Grant	Rebuilding American Infrastructure with Sustainability and Equity
People for Bikes Community Grant Program	
Public-Private Partnerships	Reconnecting Communities Program
Capital Improvement Program Budget Funds	Thriving Communities Program


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