LUBBOCK PEDESTRIAN AND BICYCLE MASTER PLAN

WALK & BIKE

LUBBOCK

FINAL DRAFT

Pedestrian and Bicycle Master Plan

DECEMBER 2018

Prepared for:

LUBBOCK METROPOLITAN PLANNING ORGANIZATION

City of Lubbock TEXAS

Prepared by:

Kimley»Horn

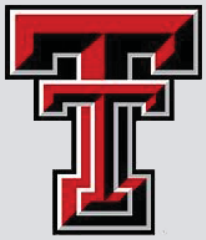
TOOLE DESIGN

CONTENTS

ACKNOWLEDGMENTS

Thank you to all the citizens, stakeholders, MPO and City Staff that contributed to the creation of the Walk and Bike Lubbock Plan. Thank you specifically to the members of the Study Oversight Committee, listed below:

Study Oversight Committee



Prepared for the Lubbock Metropolitan Planning Organization

Project Team:

This project will further the safety of bicycle and pedestrians through improved infrastructure, enhanced policies, and new programs. During this plan development, one bicyclist, John David Nelson, was killed during his ride. This plan is dedicated to him and all bicyclists and pedestrians who have lost their lives.

Prepared by Kimley-Horn

4411 98th Street, Suite 300, Lubbock, TX 79424
817.335.6511 | www.kimley-horn.com

Chapter 1: Introduction

The Walk and Bike Lubbock Plan sets the stage for bringing the bicycle and pedestrian systems together into a unified network in the Lubbock Metropolitan Area. This plan builds on the work accomplished by the 1994 Comprehensive Bicycle Master Plan. Since the development of that plan, the Lubbock Metropolitan Area has seen the addition of more than 14 miles of bike lanes and now has more than 72 miles of signed bike routes, 12 miles of paved trails, and 15 miles of partially paved trails. Pedestrian improvements have been added recently as well, including shared sidepaths, curb ramps, and enhanced crossings.

Bicycle and Pedestrian design has also grown and evolved since the development of the 1994 Comprehensive Bicycle Master Plan. There is now a stronger push toward separated bicycle facilities and an enhanced pedestrian experience. Since 1994, national standards have been updated to reflect these advancements in building safer facilities. The purpose of the Walk and Bike Lubbock Plan is to establish, for the first time, a plan for pedestrian facilities in Lubbock and to re-examine the existing bicycle network through the lens of current best practices in both planning and design.

Vision and Goals

The project team reached out to the public and stakeholders of the Walk and Bike Lubbock Plan to receive feedback on what the vision for the plan should be. Based on the feedback received, the vision of the Walk and Bike Lubbock Plan is:

> Walk and Bike Lubbock will create a **unified and integrated** regional bicycle and pedestrian system that **connects** people of **all ages and abilities** to desired destinations and encourages them to walk or bike for **transportation or recreational** purposes in a **safe** manner.

The Walk and Bike Lubbock Plan is:

- Coherent
- Comfortable
- Complete
- Compliant
- Connected
- Constructible and Maintainable
- Continuous
- Culture

This vision will be accomplished with a focus on these eight C's:

Coherent

The plan should be easy to understand on the map and on the ground. Proper signage and pavement markings can make bicycle and pedestrian routes simpler to navigate in a safe and efficient manner.

Comfortable

Walking and biking in Lubbock should be a comfortable, low-stress experience. This can be accomplished when proper facilities are in place which provide a high level of safety and protection.

Complete

The bicycle and pedestrian system should be a complete system with sidewalks on both sides of the streets for pedestrians and adequate two-way bicycle facilities on bicycle routes.

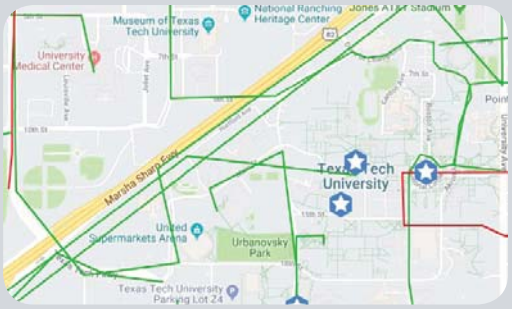
Compliant

In order to connect people of all ages and abilities, bicycle and pedestrian facilities should be compliant with current and proposed standards for accessibility and design. These standards include:

- Americans with Disabilities Act (ADA)
- Public Rights-of-Way Accessibility Guidelines (PROWAG)
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities

Connected

Bicycle and pedestrian routes should be planned carefully to connect people's origins to the destinations they visit most frequently.



Constructible and Maintainable

The plan should take existing constraints into consideration, allowing for the implementation of facilities that are realistic and feasible to construct and maintain.

Continuous

The bicycle and pedestrian system should be continuous, by eliminating sidewalk gaps and continuing bike lanes through intersections.

Culture

A focus on culture is key to a successful bicycle and pedestrian system. Creating a culture that is friendly to all modes of travel includes education, enforcement, awareness, and visibility. It is common that individuals may simply not know the laws and regulations regarding governing bicycle use on public roadways. Individuals may be unaware that walking or biking to their destination is a viable option, or they may feel discouraged from doing so because of a negative perception. The aim of this plan is to provide potential pedestrians and bicyclists additional options for walking and biking and to make it easier to understand how to get where they need to go. Added routes, facilities, signage, and markings can naturally make the bicycle and pedestrian system more visible to all, increasing awareness and subtly improving perception. When combined with education and enforcement of existing laws, carefully planned bicycle and pedestrian improvements can have a significant impact on culture.

Benefits of Active Transportation

The following table highlights several benefits that can be gained by promoting walking and bicycling in Lubbock.

Category	Definition	Potential Benefits
Economy	Strong economies are supported by job growth, increased sales revenue, and land development	Improving walk- and bike-ability can be a boon to homeowners and business owners
Environment	Environmental stewardship holds the community accountable to protect natural resources	More people walking and riding bikes can result in lower levels of motor vehicle emissions, cleaner air, and stronger preservation of streams and open spaces
Health	Health includes the mental state and physical condition of individuals and collective communities.	Walking and biking are low impact forms of exercise that can reduce stress and diseases such as high blood pressure, diabetes, and obesity
Livability	Livability comprises quality of life, sense of place, and community vibrancy for residents and visitors	Infrastructure features that increase comfort for bicyclists can enhance the character of communities by reducing motor vehicle speeds and improving safety
Mobility	Mobility is the equitable availability of transportation options for everyone	Walking or bicycling can be an attractive travel mode for short trips that would otherwise be made by driving
Safety	Safe travel conditions result from effective design, enforcement, and education.	The presence of bike and pedestrian infrastructure and people walking and riding bicycles naturally calms traffic, and fully separated facilities can provide safe and comfortable travel ways

Chapter 2: Existing Conditions

The development of the Walk and Bike Lubbock Plan began with building an understanding of the Lubbock Metropolitan Area's current demographic, societal, administrative, geographic, physical, and operational contexts. Who lives in Lubbock, current and future transportation preferences, and the factors that influence their travel choices are all important considerations for the Walk and Bike Lubbock Plan.

The Lubbock Metropolitan Area is located in West Texas, approximately 325 miles west of the Dallas-Fort Worth Metropolitan Area, 125 miles south of Amarillo, and 120 miles north of Midland. Lubbock County is estimated to be home to just over 300,000 people, of which approximately 250,000 reside in the City of Lubbock. Lubbock is also home to Texas Tech University, which enrolls approximately 36,000 students per year, helps sustain nearly 15,000 jobs in Lubbock County, and contributes an economic impact of $1.26 billion a year to the County.

Demographics

One of the reasons for implementing the eight C's of the Walk and Bike Lubbock Plan was to create a bicycle and pedestrian network which serves people of all ages and abilities, and connects people from all parts of town to their destinations, including low income areas where residents are less likely to own a motor vehicle. The following maps highlight the existing demographics in the Lubbock Metropolitan Area. These maps include:

- **Exhibit 1. Percent in Poverty**
- **Exhibit 2. Percent in Minority**
- **Exhibit 3. Percent over 64**
- **Exhibit 4. Percent without a Motor Vehicle**

As shown in these maps, Eastern Lubbock is an area where demographic data indicates that the population would benefit significantly from investments in pedestrian and bicycle infrastructure.

Bike lane on Broadway

Bicyclists using shoulder

Exhibit 1: Percent in Poverty

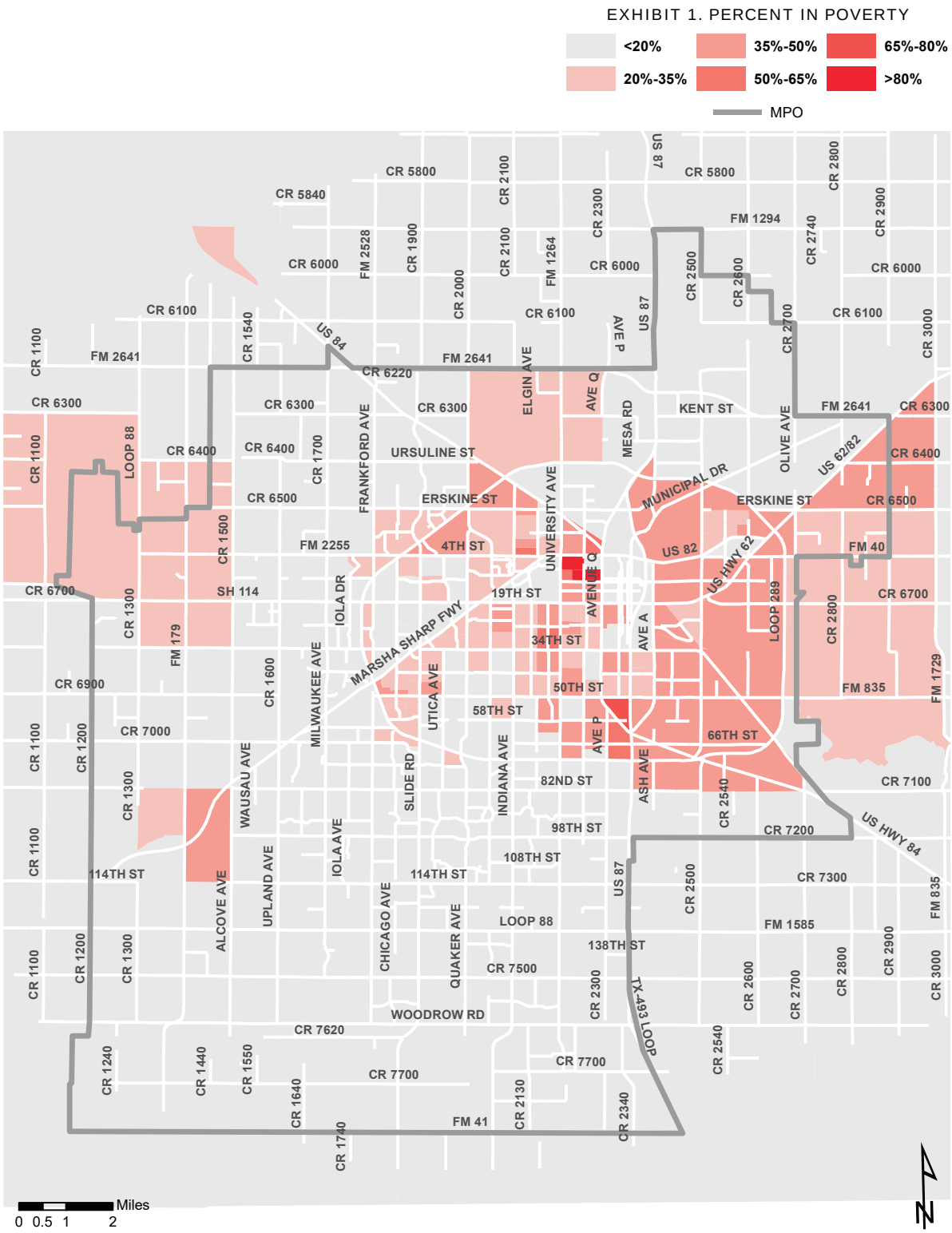


Exhibit 2: Percent in Minority

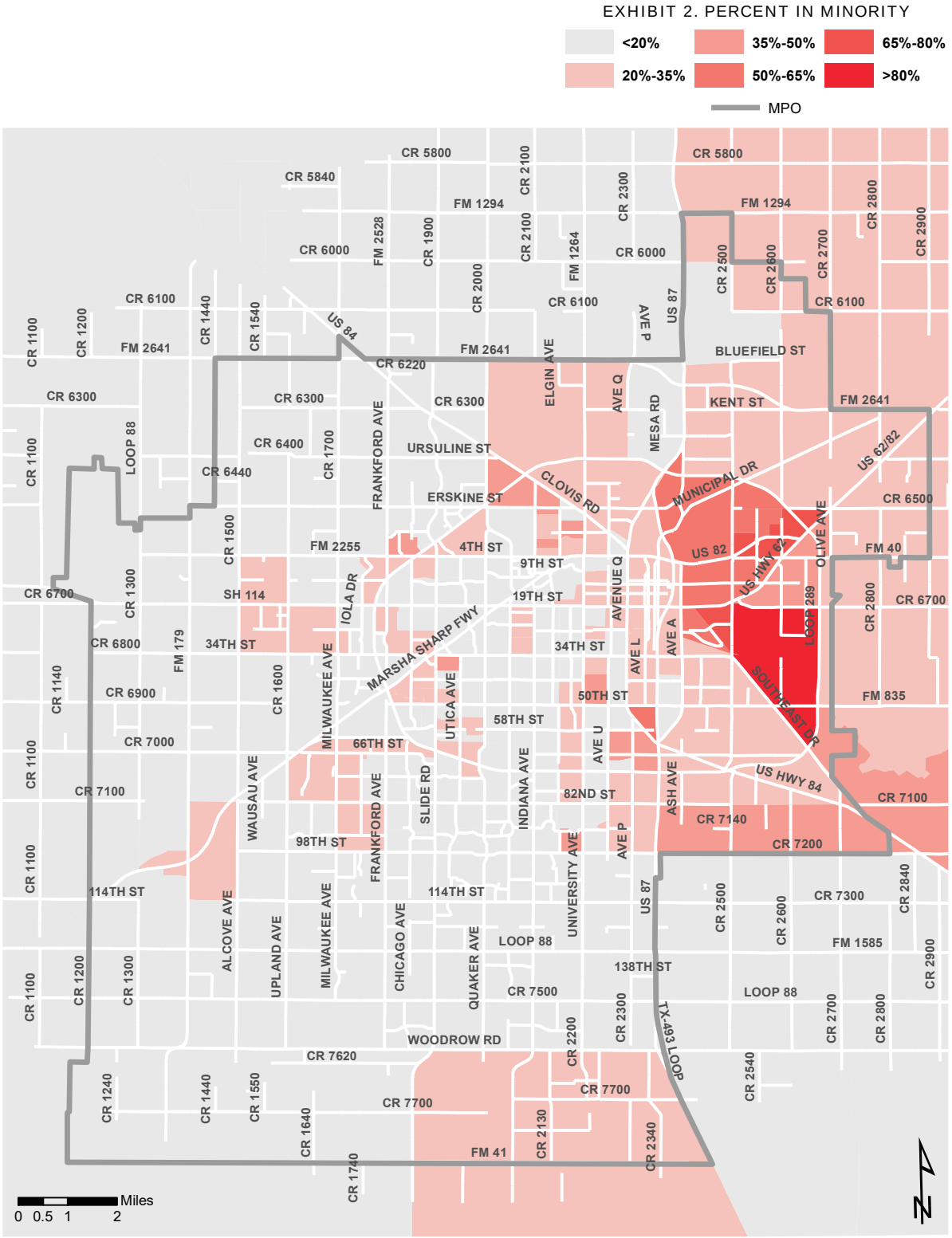


Exhibit 3: Percent Over 64

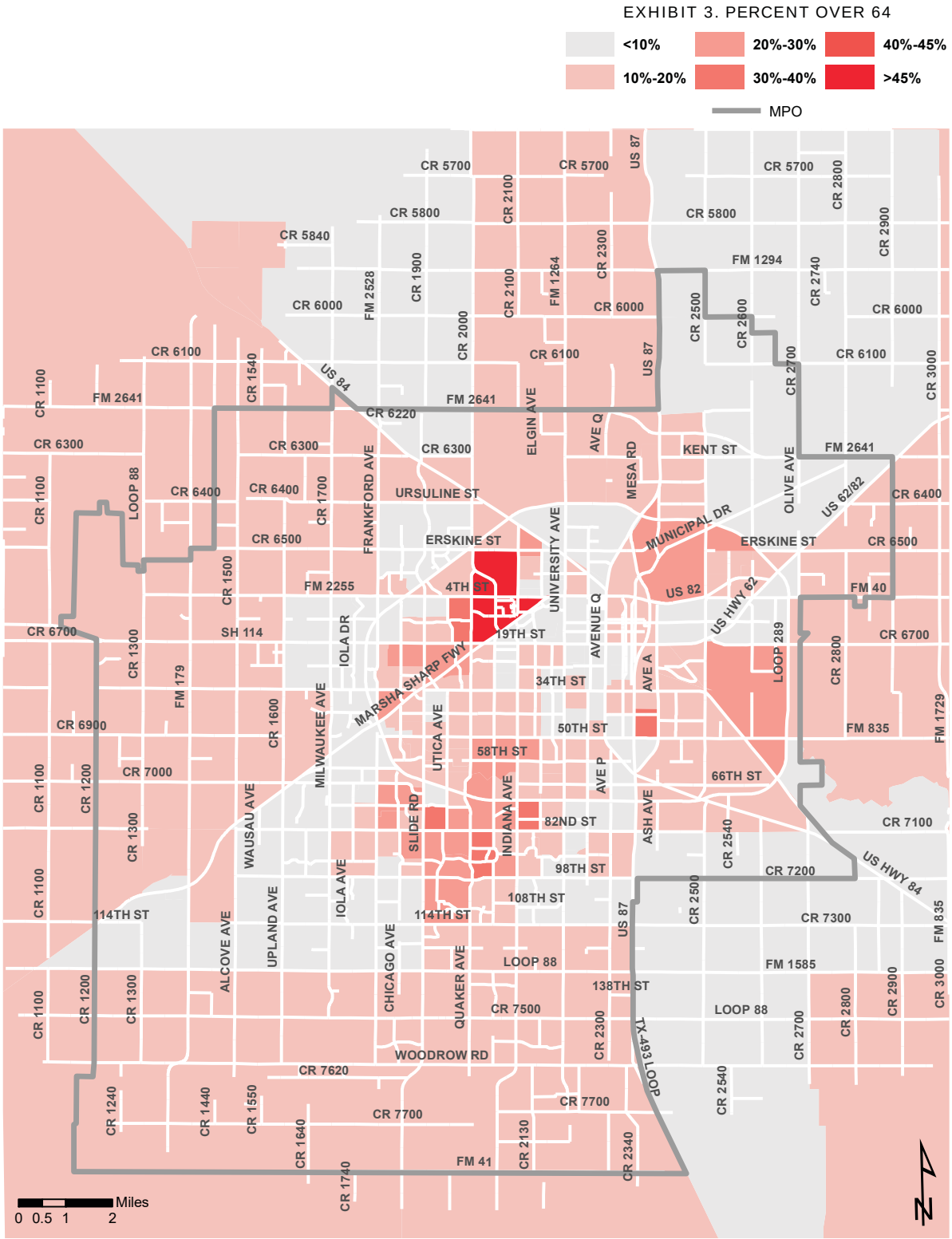
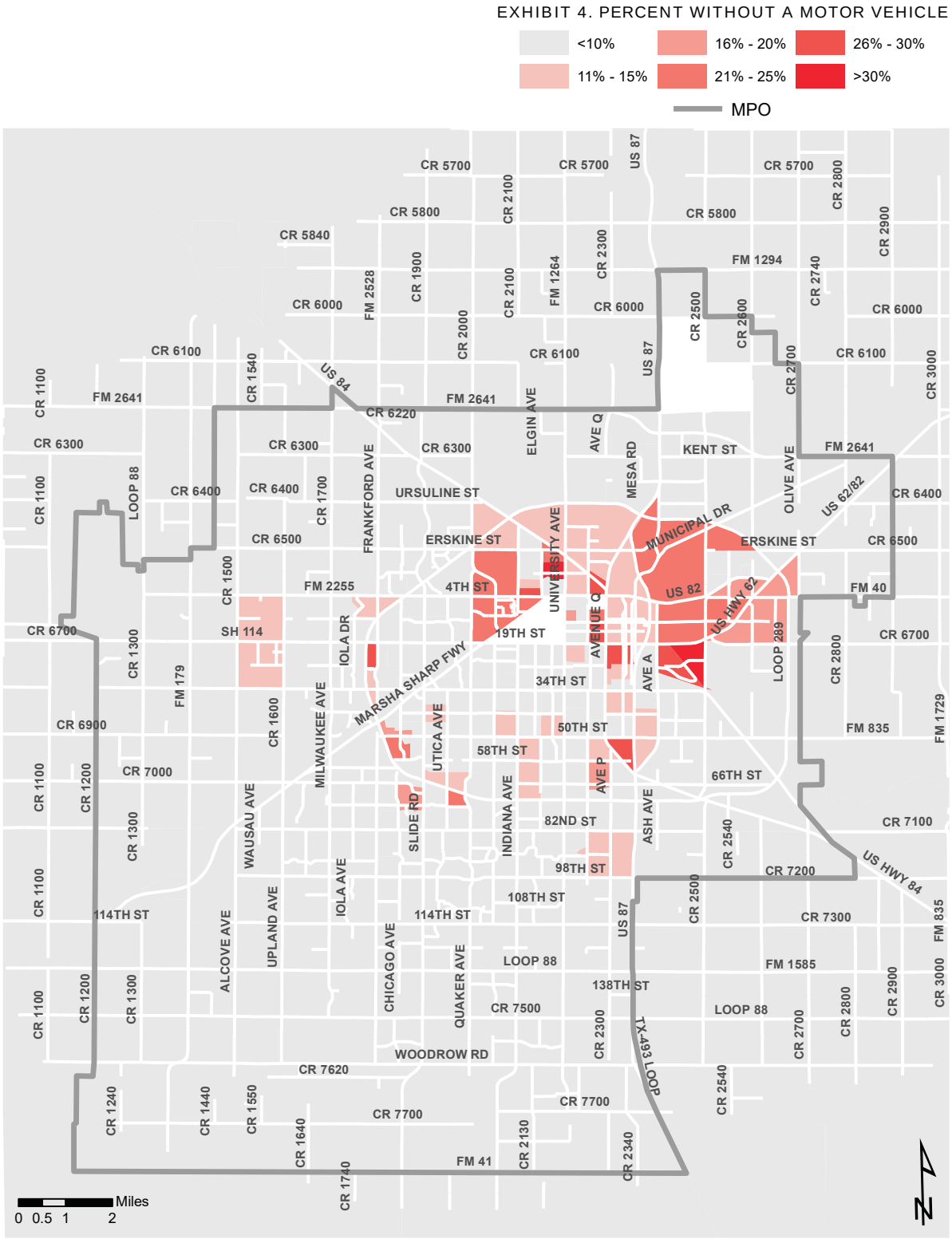


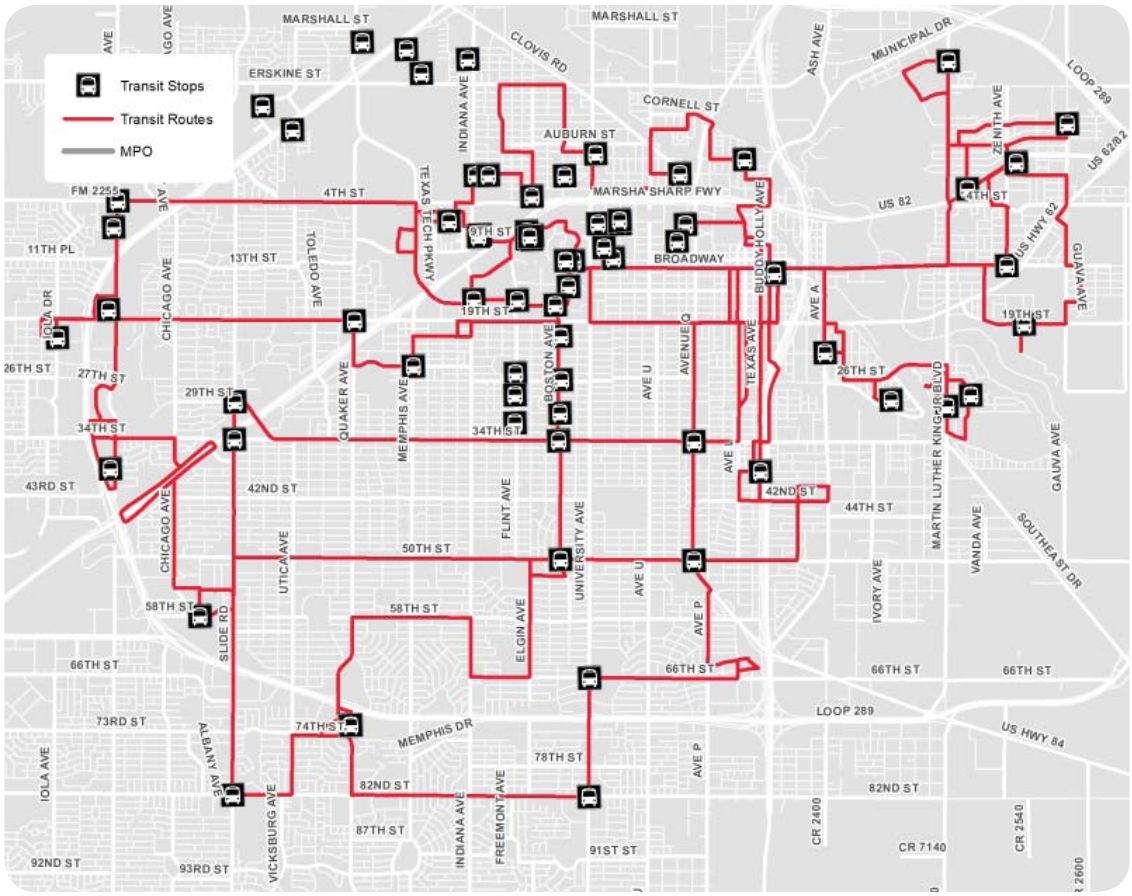
Exhibit 4: Percent Without a Motor Vehicle



Commuting

Four out of ten people nationwide who bicycle do so primarily for transportation (personal errands, visiting friends, and commuting), while the remainder bicycle for recreation and exercise. Commuting to work or school is a major consideration for transportation planners, as commute trips generally occur when the streets are the most congested. While commute data captured by the American Community Survey is fairly limited and does not effectively reflect commuters who utilize different modes throughout the week, throughout the day, or even within the same trip, the information still provides insight into commuters' primary mode of transportation, including public transportation. Citibus is the public transportation system in Lubbock and their routes and stops are an important consideration in pedestrian and bicycling master planning. The following maps highlight the percent of trips made by various modes, as well as which areas have the smallest commutes. These maps include:

- **Exhibit 5. Percent Trips Walking or Biking**
- **Exhibit 6. Percent Trips on Public Transit**
- **Exhibit 7. Percent of Residents with Less than Five-Minute Commute**



Citibus routes and stops

Exhibit 5: Percent of Trips Walking or Biking

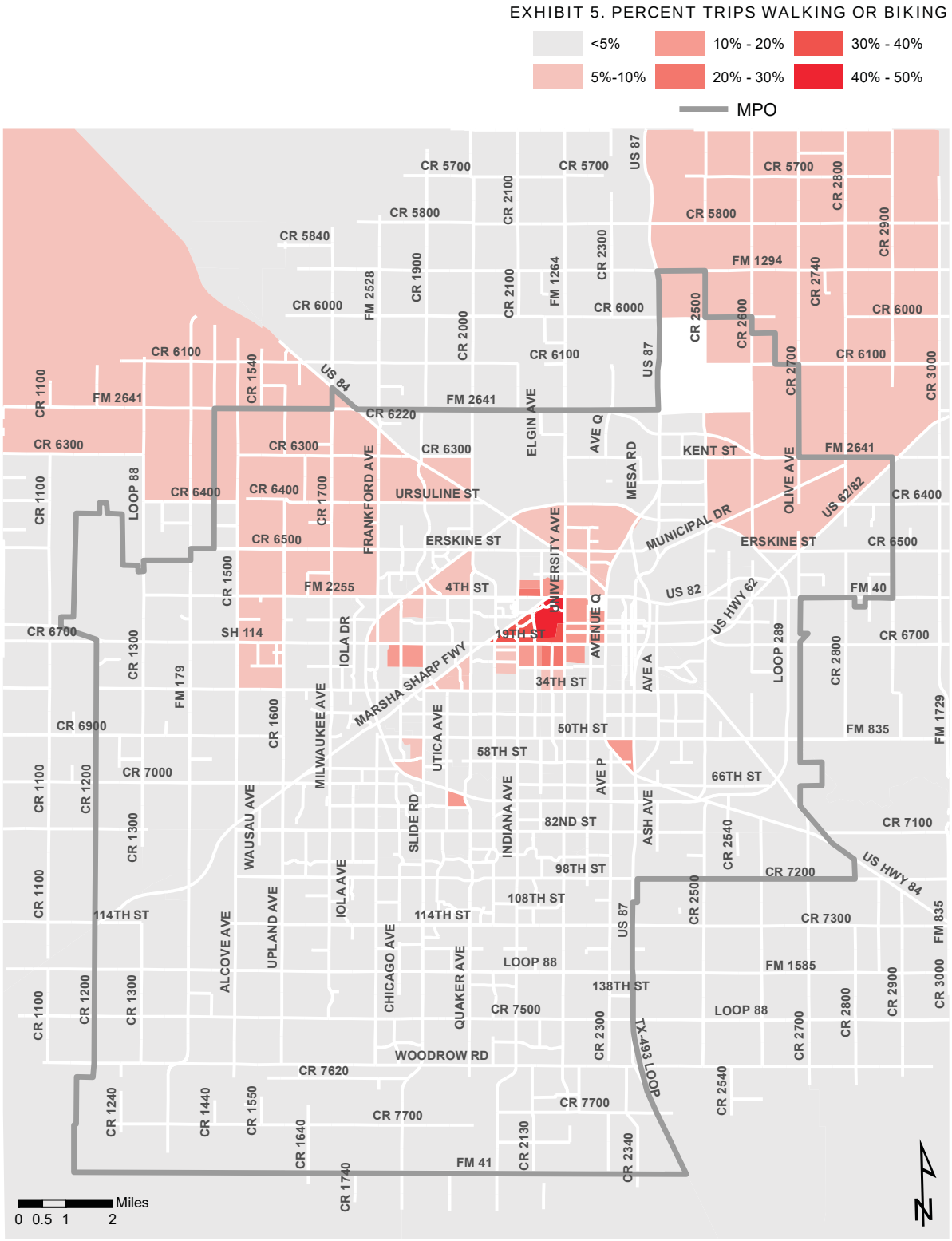


Exhibit 6: Percent of Trips on Public Transit

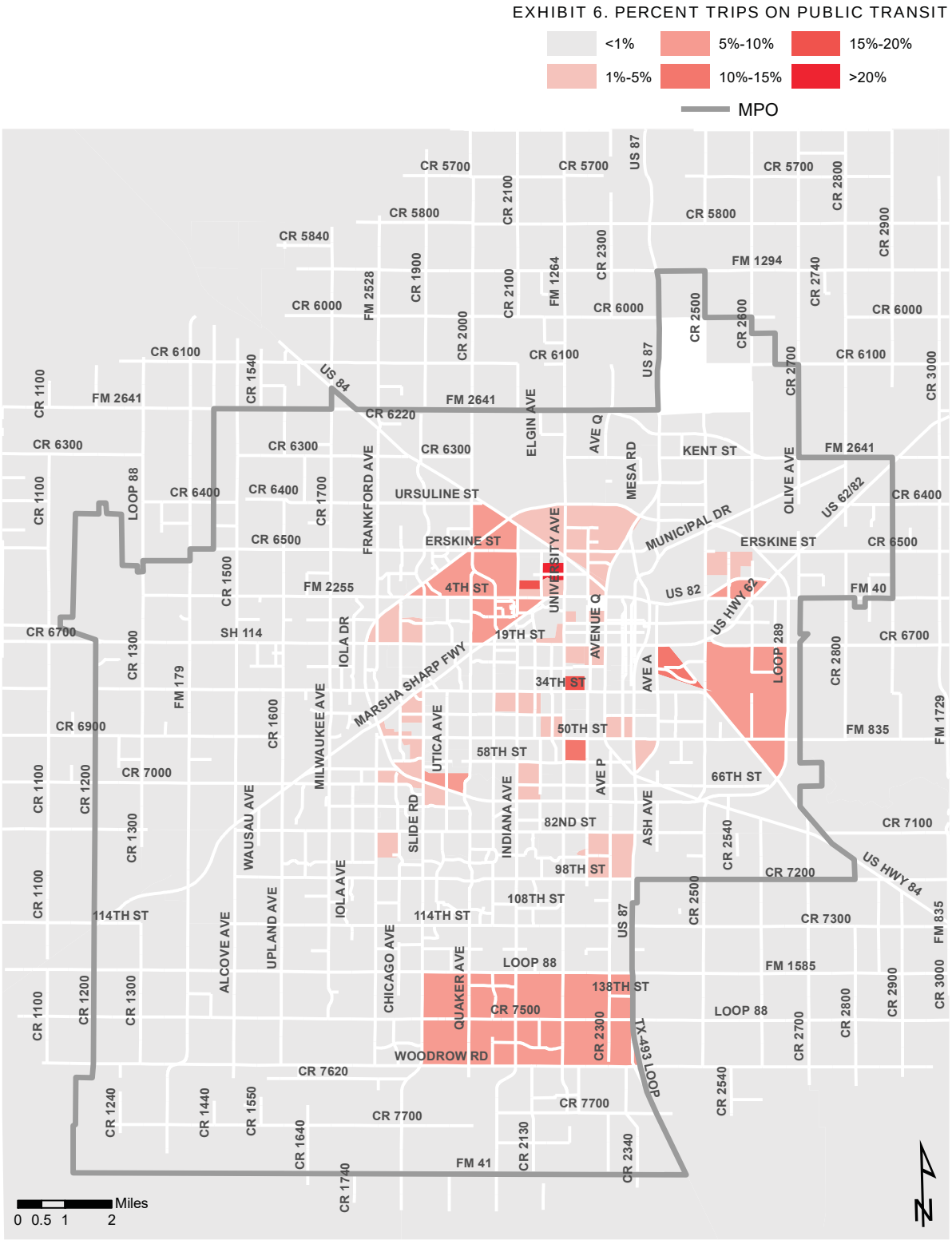
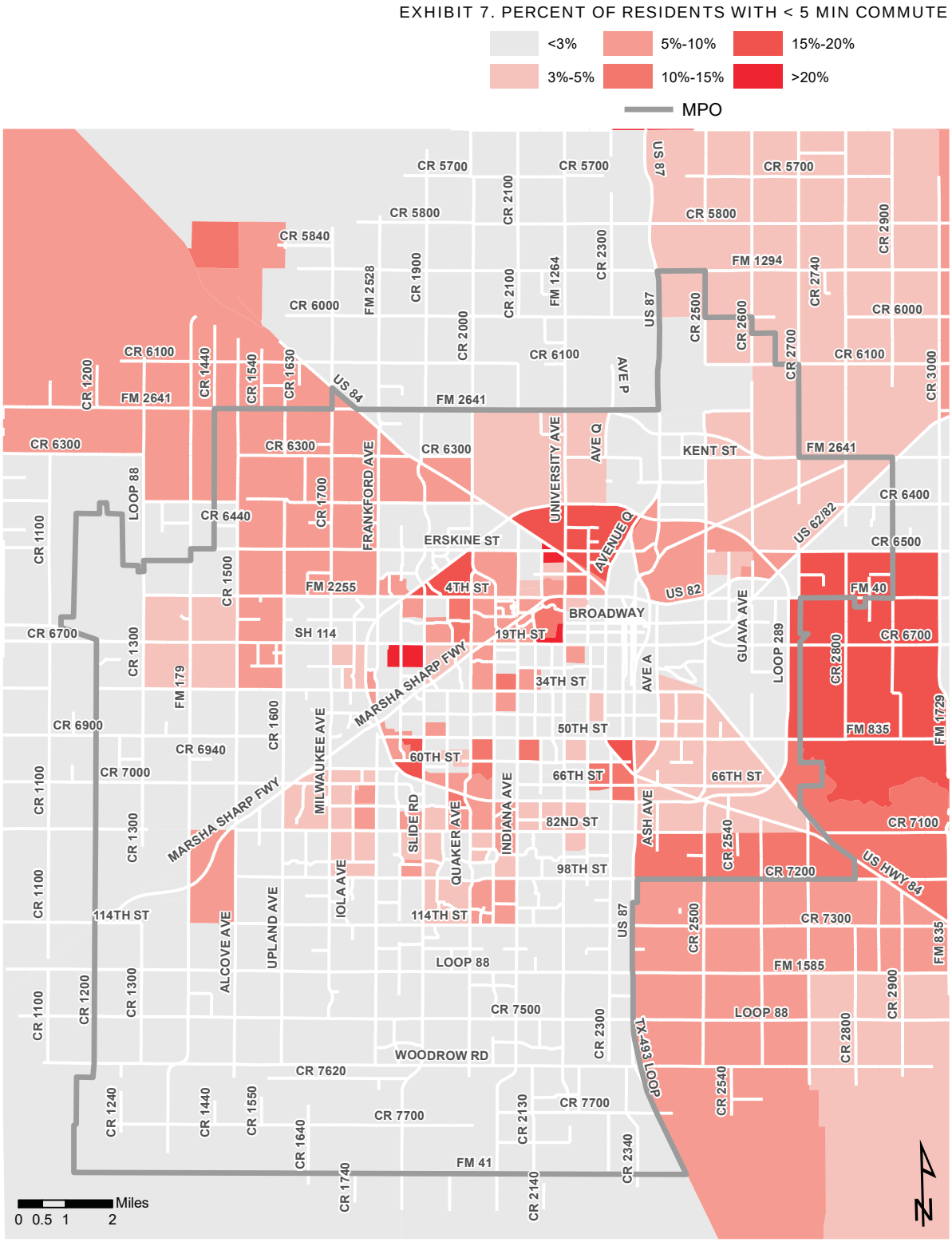


Exhibit 7: Percent of Residents with Less Than Five-Minute Commute



Destinations

Developing a community-wide plan for improving bikeability and walkability requires the consideration of accessibility and connectivity to key destinations, including major employers, schools, parks, greenways, and other retail centers such as downtown and grocery stores. These destinations are shown in the figure below:

Major Employers

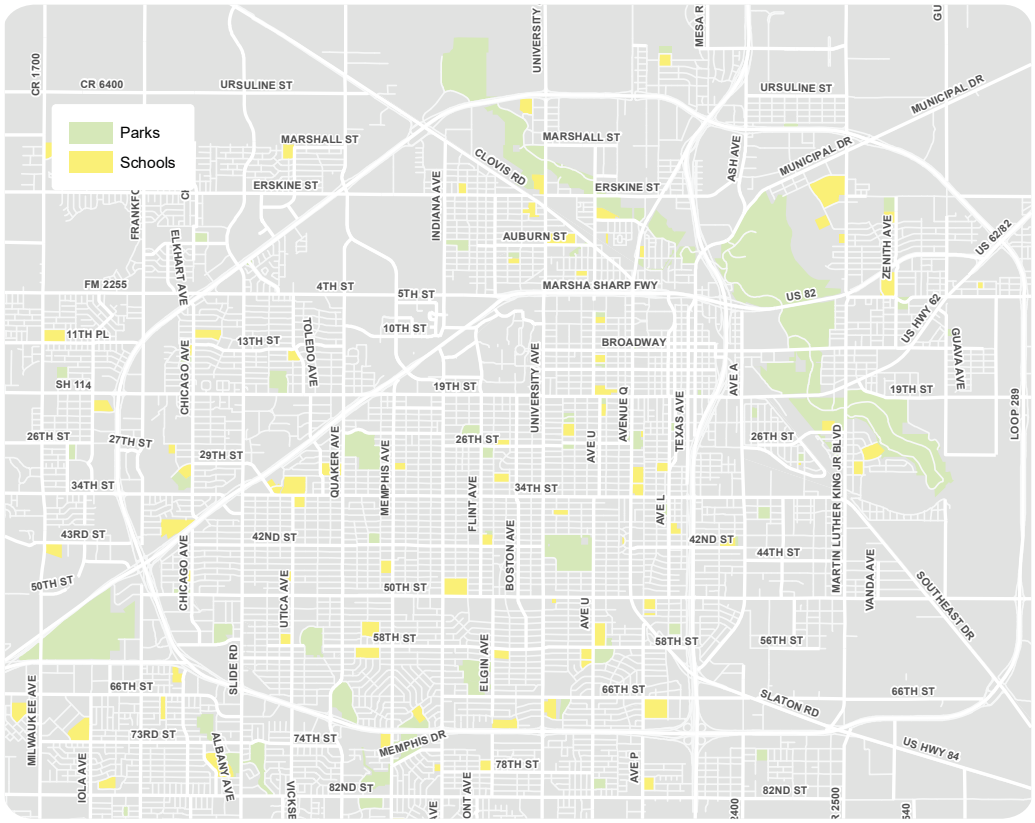
500-999

- Convergys
- Lubbock Cooper ISD
- Interim HealthCare of West Texas
- LBK Street Supported Living Center DADS
- Kingsgate Center - Anderson Bros
- Caprock Home Health Services
- Lubbock Christian University
- VXI
- Grace Medical Clinic
- Suddenlink Communications
- UMC Physician Network Services

1000+

- Texas Tech University
- Covenant Health
- United Supermarkets
- UMC Health System
- Lubbock ISD
- Texas Tech Health Sciences Center
- City of Lubbock
- Walmart
- Lubbock County
- Frenship ISD

Schools and Parks



Street Network

The Lubbock street system was built on a solid
foundation of a grid network with arterials spaced out every half-mile and collectors spaced at half-mile intervals between the arterials. The arterials in Lubbock are generally built with five-seven lanes and include wide outside lanes. Most of them have sidewalk gaps or other pedestrian barriers, no dedicated bicycle facilities, and are generally high volume and high speed. This makes crossing arterials as a pedestrian or bicycling on arterials in Lubbock difficult without a traffic signal or midblock crossing.

The top reasons individuals choose not to walk or bicycle in Lubbock are the discontinuous pedestrian facilities, relative lack of existing bikeways, and because they feel it is unsafe. A major barrier to bicycling along Lubbock's streets is the fear of collisions with motorists, which is heightened along roadways with fast-moving motor vehicle traffic, high volumes of motor vehicle traffic, or large percentages of truck traffic. Other physical barriers to walking and bicycling include Loop 289, poor pavement conditions, difficult crossings and gaps in the collector street network.

The Lubbock Master Thoroughfare Plan (MTP) was updated as part of Plan Lubbock 2040, the City of Lubbock's comprehensive long-term plan. In the updated MTP, pedestrian and bicycle facilities were incorporated into the new roadway functional classifications. All roadways in the MTP will be built with either sidewalks or shared-use paths, and some will be built with bike lanes. The bicycle plan, which is presented in Chapter 5 of this document, was based largely on the bicycle facilities identified in the MTP. In particular, all future principal arterials are planned to include shared-use sidepaths and all new minor arterials are planned to include buffered bicycle lanes, with the alternate option to include a shared-use sidepath.

Crash Statistics

The Texas Department of Transportation (TxDOT) collects and analyzes crash data submitted by Texas law enforcement officers. This dataset provides insight in highlighting key corridors and intersections for improvement. Streets that are characterized by a high frequency of motor vehicle crashes, a high severity of motor vehicle crashes, or both are generally unsafe environments for bicycle travel.

Between January of 2012 and December of 2017, a total of 38,587 crashes were reported along roadways in Lubbock County. In this same time, there were 651 reported crashes involving bicyclists and/or pedestrians in Lubbock County. A high concentration of bicycle and pedestrian crashes occurs near Texas Tech. A heat map illustrating the highest frequencies of bicycle- and pedestrian-involved crashes are shown in **Exhibit 8**.

2018 update to City of Lubbock Thoroughfare Plan

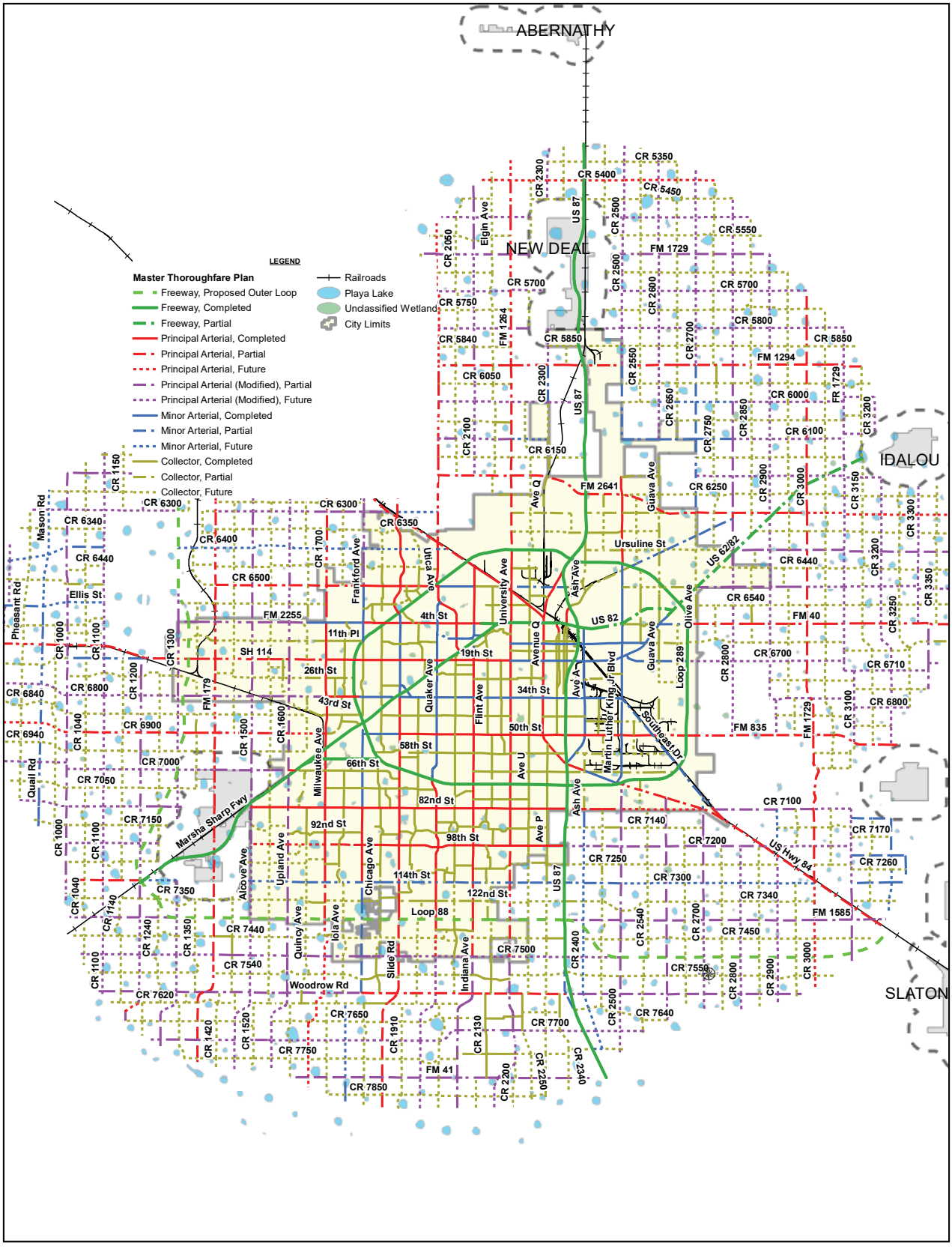
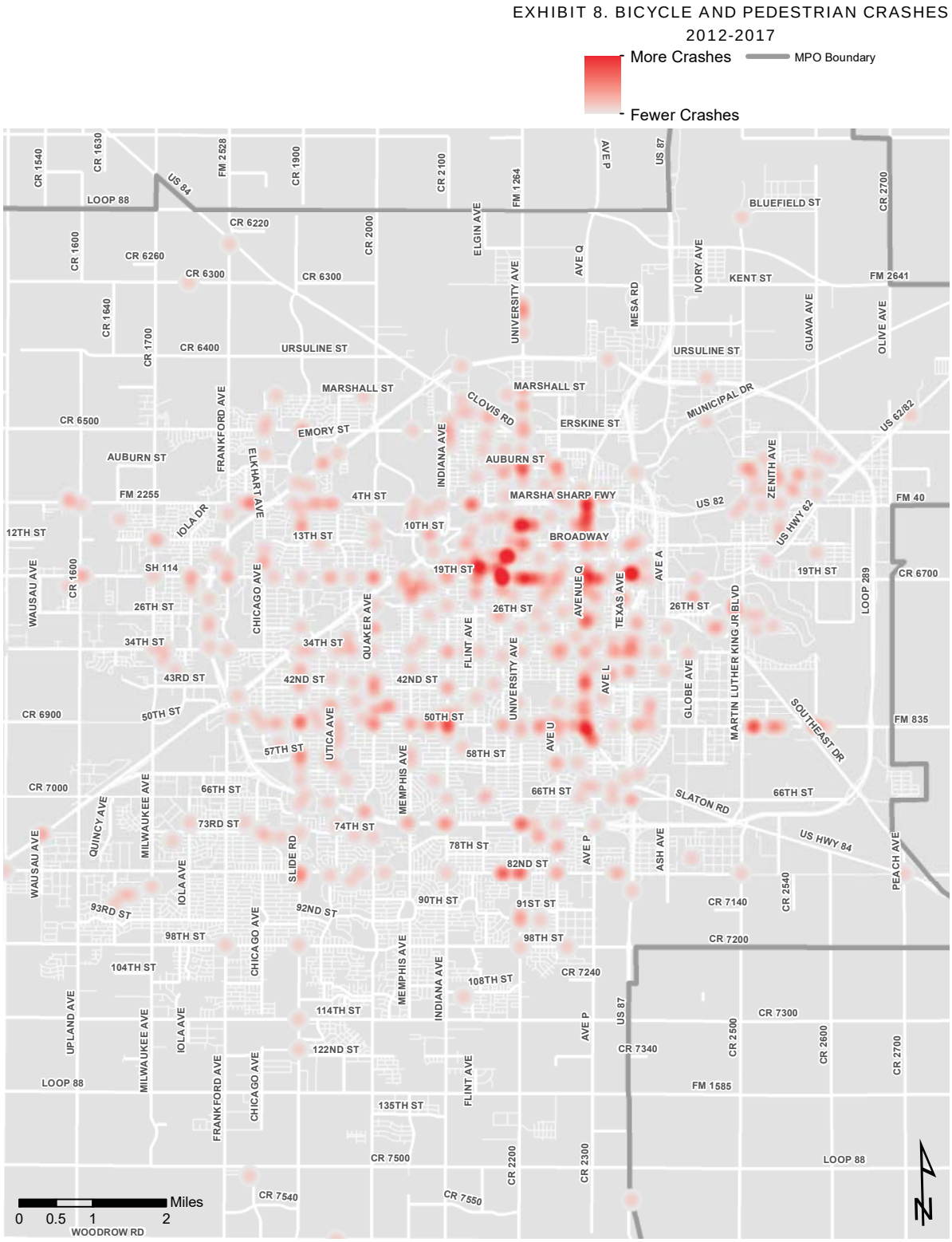


Exhibit 8: Frequencies of Bicycle- and Pedestrian-Involved Crashes



Bicycle Infrastructure and Routes

Dedicated bicycle facilities provide exclusive travel space for bicyclists. Traditional facilities are placed directly adjacent to general travel lanes, though more and more communities are installing bicycle lanes with striped buffers or vertical elements to improve safety and comfort. Shared facilities, such as shared lane markings, require bicyclists and motorists to share the street space. Shared-use paths are off-street facilities shared by bicyclists and pedestrians. As of 2018, there are a limited number of bike routes, dedicated bicycle facilities, and shared-use paths in Lubbock.

Flint Avenue Bike Lanes

Lubbock's bicycle facilities include bike lanes along Chicago Avenue, Memphis Avenue, Flint Avenue, Boston Avenue, Avenue T, Avenue S, and Broadway Street. There are also several bike routes within the loop, most of them designated by a green "bike route" sign on the side of the road, and few have shared lane markings. A recently built sidepath also exists along the north side of 19th Street. There are four bicycle and pedestrian bridges over Marsha Sharp Freeway which connect the north and south portions of the inner loop. There is also a bicycle and pedestrian bridge going over I-27 at 52nd Street, which connects the east and west portions of the inner loop.

The existing bicycle infrastructure is presented in **Exhibit 9.**

Pedestrian Network

While Lubbock's pedestrian network is fairly widespread, the quality of the network is poor, with many crumbling sidewalks, ADA compliance issues, missing curb ramps, and an insufficient number of roadway crossings for pedestrians. Thoroughfares form the backbone of the transportation network, many of which have wide seven lane configurations and large intersections. Sidewalk gaps along thoroughfares and limited opportunities to cross with a formal pedestrian crossing limit travel between neighborhoods situated within the one-mile grids. A finer-grain network, which is more appropriate for pedestrians, can be developed within the existing thoroughfare grid.

Current Pedestrian Network

- Discontinuous sidewalks
- Poor surface conditions
- Curb ramp replacements needed (ADA compliance)
- Steep grades at corners
- Non-accessible bus stops
- More crosswalk visibility

Based on observations and the survey, few residents in Lubbock choose walking as a form of transportation. There is some value placed on walking for exercise, but people do not walk to work, shopping, school, etc., with the exception of students attending the university.

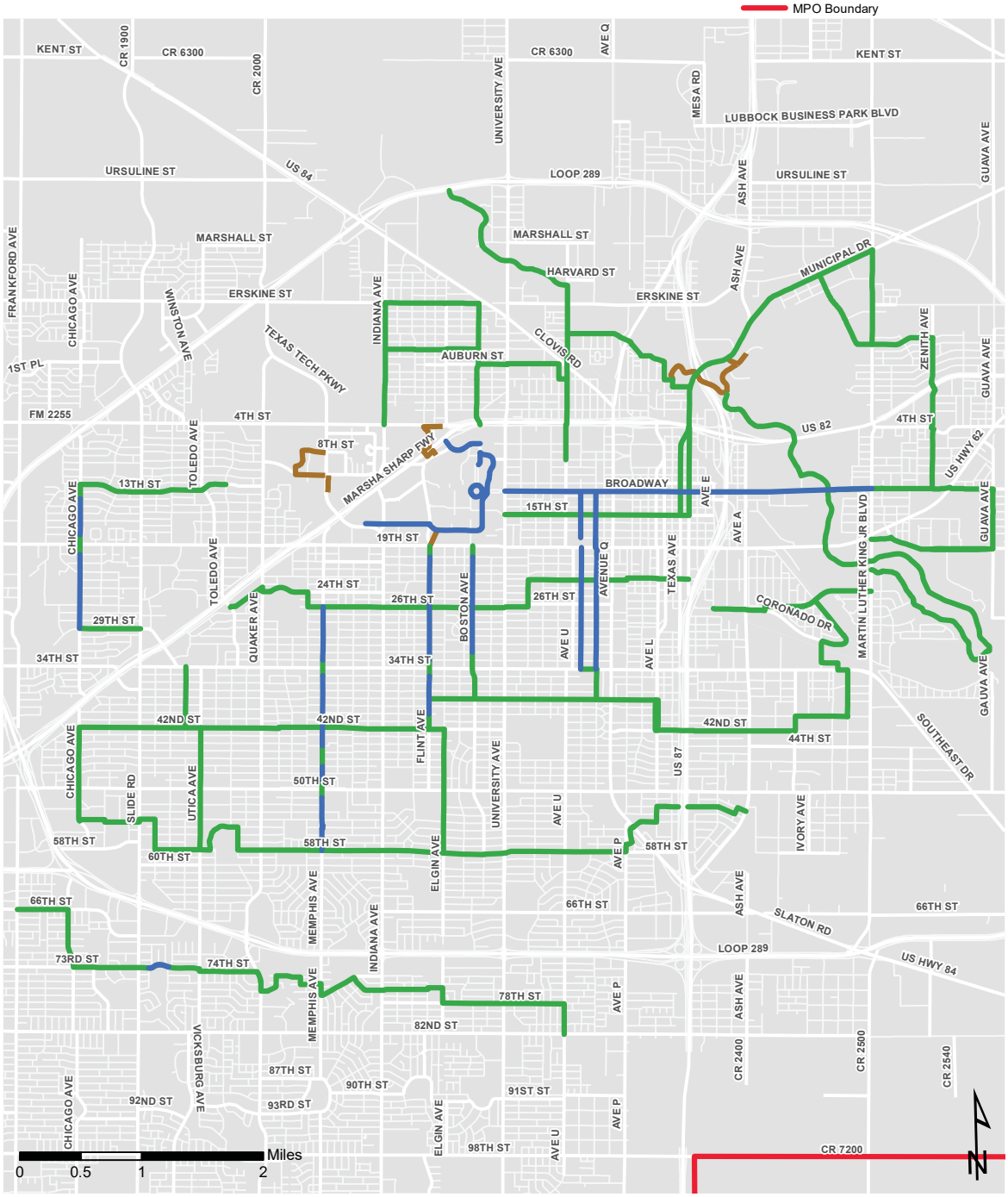
Further, the City does not have an inventory of the network, sidewalks, curb ramps, pedestrian crossings. This makes it difficult to know the condition of these facilities and do effective asset management.

Existing Sidewalk

Bus stop

Exhibit 9: Existing Bicycle Infrastructure

EXHIBIT 9. EXISTING BIKE FACILITIES



Programs and Policies

Within its subdivision ordinance, the City of Lubbock requires sidewalks to be built and maintained. Installation of sidewalks is required with the permit for construction of improvements on an individual platted lot or tract. The ordinances do not require developers to construct bicycle facilities.

The West Texas Cycling Association, the bicycle advocacy group for West Texas, plans and regularly hosts rides in Lubbock. These rides vary from easy to fast pace and occur several times a week starting from multiple locations throughout Lubbock. The weekday rides are held in the Spring, Summer, and Fall months; and the weekend rides are held year-round.

Citibus, which operates nine public bus routes throughout Lubbock, supports bicycling. Their bike policy states that all buses are equipped with external bicycle racks able to accommodate two bicycles.

Previous Planning Efforts

Walk and Bike Lubbock is intended to build upon the foundation of past transportation planning efforts in Lubbock and the surrounding region. To date, there has not been an adopted pedestrian plan developed in Lubbock. The latest planning effort for bicycles was the Lubbock Metropolitan Area Comprehensive Bicycle Plan. The key findings and recommendations of this plan are summarized in the following table.

Lubbock Metropolitan Area Comprehensive Bicycle Plan

Goals

1. **The percentage of trips made by bicycle in the Lubbock Metropolitan Area will double by 2005 and continue to increase during the life of the Comprehensive Bicycle Plan**
2. **The number of bicycle related traffic accidents will be reduced by 10 percent by 2005 and continue to decrease during the life of the Comprehensive Bicycle Plan**
3. **To increase awareness of bicycling as a viable transportation alternative both in the planning community and among the general public**

Objectives

Objective	Benefit of Updating
O-1: The new transportation facilities in the Lubbock Metropolitan Area will, at a minimum, accommodate group A cyclists.	Current best practices no longer refer to groups
O-2: In key corridors identified by the Comprehensive Bicycle Plan, all new transportation facilities in the Lubbock Metropolitan Area will also facilitate travel by bicycle for all types of cyclists in the area.	Focus is now on all ages and abilities of cyclists and pedestrians
O-3: The Comprehensive Bicycle Plan will identify strategies for accommodating bicyclists of all abilities in key corridors in the area. Recommendations for action in each of these corridors will be made.	

Objectives	
Objective	**Benefit of Updating**
O-4: The Comprehensive Bicycle Plan will identify strategies for overcoming major barriers to bicycle travel in the area.	Renewed focus on this very important issue
O-5: The Comprehensive Bicycle Plan will identify an appropriate leadership role for the MPO in implementing the plan. This will include recommendations for assisting local agencies, neighborhood groups, and user groups in developing future neighborhood and corridor plans for bicycling.	Critical for funding
O-6: The Comprehensive Bicycle Plan will identify a set of performance measures to gauge the success of the achievements of the overall goals.	Update to best practices

Progress Since 1994

Since adoption of the Lubbock Metropolitan Area Comprehensive Bicycle Plan, several projects and milestones have been completed. They are as follows:

- 1996 Statewide Transportation Enhancement Grant
  - 14 miles of bike lanes; 62.5 miles of signed routes
- 2008 – City of Lubbock built 200 – 300 feet of sidewalk and amenities to link the Arnett Benson and Jackson Mahon neighborhoods
- 2014, Phase II of North University Gateway
  - ½ mile of sidewalk, pedestrian lighting, and ADA curb ramps
  - 15 bike route signs
- 2015 Final Stage of Gateway
  - Amherst to US 84
- Five Elevated bike/pedestrian crossings along Marsha Sharp in the Texas Tech area
- Improvements to 19th Street
  - 10 feet of shared path
  - Enhanced crosswalks at Indiana, Boston, Marsha Sharp and Texas Tech Parkway
  - ADA curb ramps

As of 2017:

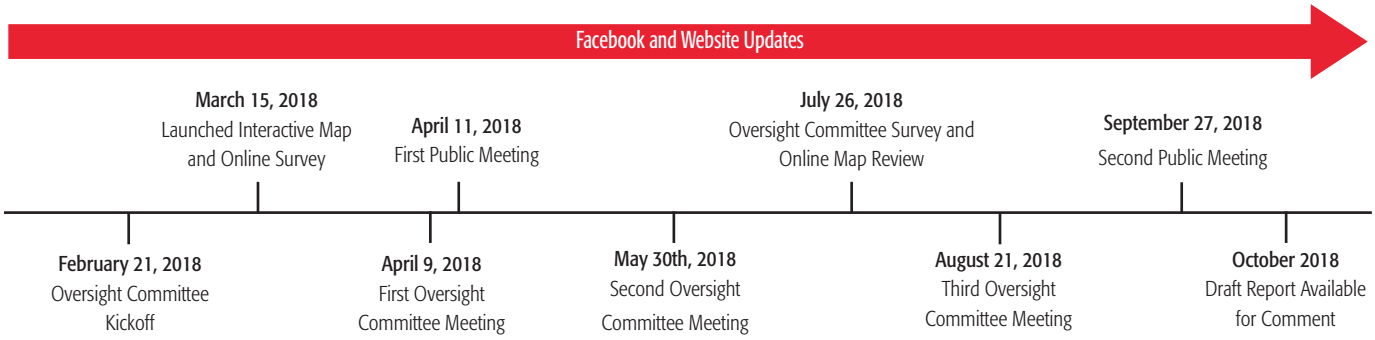
- 72.6 miles of signed bike routes
- 14.4 miles of bike lanes
- 12.2 miles of paved trails
- 15.6 miles of partially paved trails

Walk and Bike Lubbock looks to build on these successes to create a more connected and safe environment for cyclists and pedestrians.

Chapter 3: Public Engagement

To help guide the plan, the project team reached out to the public to better understand their experiences walking and biking in Lubbock, and to receive feedback on the projects they feel would be most beneficial.

The public engagement process took several different forms. These included both online and in-person opportunities to provide feedback. Below is a timeline demonstrating the process of public engagement for the Walk and Bike Lubbock Plan.



Goals of Public Engagement Plan

- Create public awareness of the BPMP and facilitate active and collaborative participation by the public
- Maintain an open and transparent process throughout the engagement effort
- Provide project information to the public in a clear and easy to access format
- Use public input and comments in the development and refinement of the Plan
- Inform and engage a broad range of diverse stakeholders in the process
- Develop a process with convenient, accessible, and exciting opportunities to get involved
- Streamline the public engagement and input collection efforts through online activities

Outreach Efforts

At the beginning of the project, an email was sent out to key stakeholders, in addition to handing out printed business cards and providing updates to the Walk and Bike Lubbock Facebook Page.

Study Oversight Committee

The Study Oversight Committee met four times over the course of developing the Walk and Bike Lubbock plan. The Study Oversight Committee included representation from the following entities and groups:

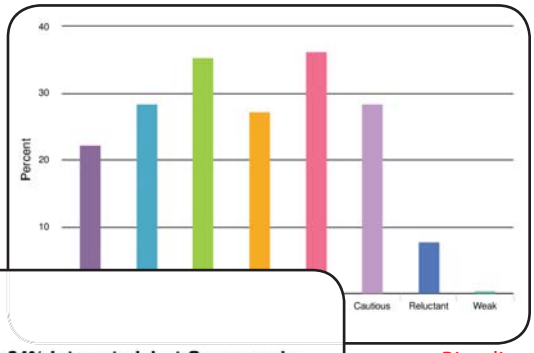
- The Lubbock Metropolitan Planning Organization
- The City of Lubbock
- The City of Wolfforth
- Citibus
- Texas Tech University
- The West Texas Cycling Association
- Lubbock County
- Texas Department of Transportation (TxDOT)

Online Survey

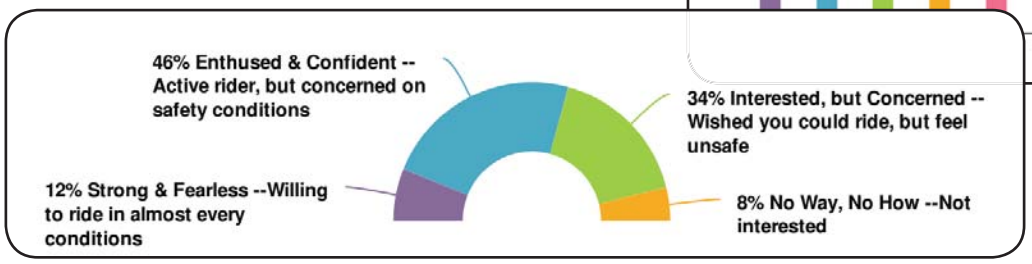
The project team developed an online survey to extend its reach and gather additional input from members of the public who could not attend the public meetings. The survey consisted of two brief questionnaires: one about bicycling in Lubbock and one about walking in Lubbock.

One of the questions asked users to describe in one word what the goal of Walk and Bike Lubbock should be. A word graphic representing the most common word responses is presented in the wordle below. As can be seen in the graphic, safety is the most frequently used word to describe the goal of the plan.

To gain a better understanding of the type of pedestrians and bicyclists that are walking and biking in Lubbock, each portion of the survey asked respondents how they would describe their confidence level while walking and biking. The results from the bicycling survey are shown in the adjacent figure, and the results for pedestrians are provided in the figure below. Based on these results, the majority of pedestrians and bicyclists responding to the survey are relatively confident, but also concerned about safety.



Bicycling Confidence



Pedestrian Confidence

Another important series of questions asked to each group related to which improvements would encourage them to walk or ride their bikes more. In response to the question "I would ride my bike more if…," the three most common answers were:

- It was safer to ride
- There were more on-street bikeways
- There were more off-street multi-use paths (greenways)

In response to the question "I might walk more if…," the three most common answers were:

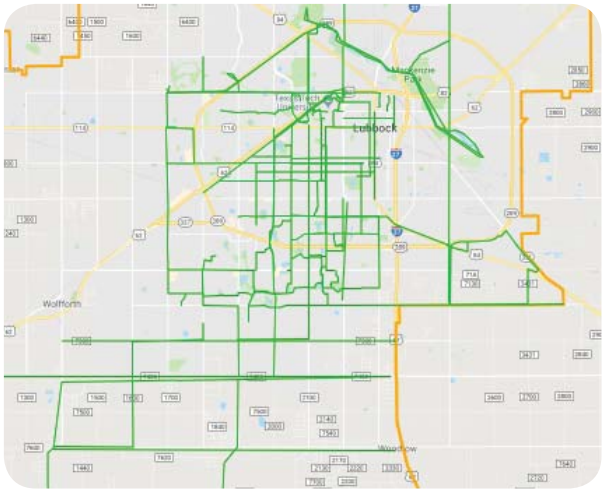
- There were complete sidewalks along my route
- There were more off-street multi-use paths (greenways)
- There were more direct pathways so I didn't have to always walk along the roadway

Interactive Map

The project team also developed an online interactive map which allowed users to draw desired walking and biking routes, desired destinations, and safety concerns to walking and biking. The interactive map received a lot of helpful feedback. The feedback for each category is summarized below.

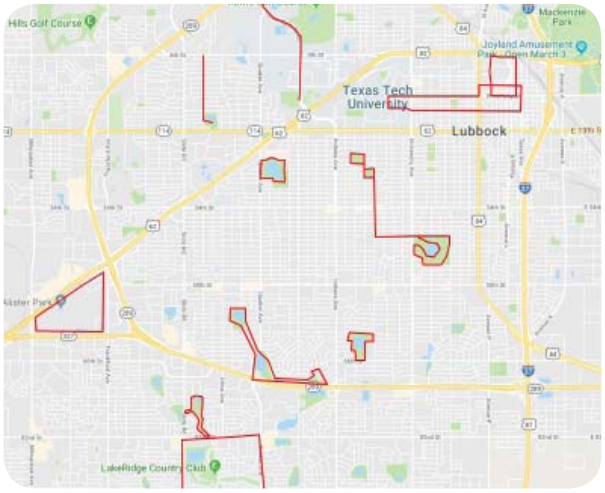
Desired Bike Routes

- Strong desire for Loop 289 Crossing from the South
- Emphasis on collectors
- Several key arterials
  - 4th Street
  - 34th Street
  - MLK Jr Boulevard
  - 114th Street



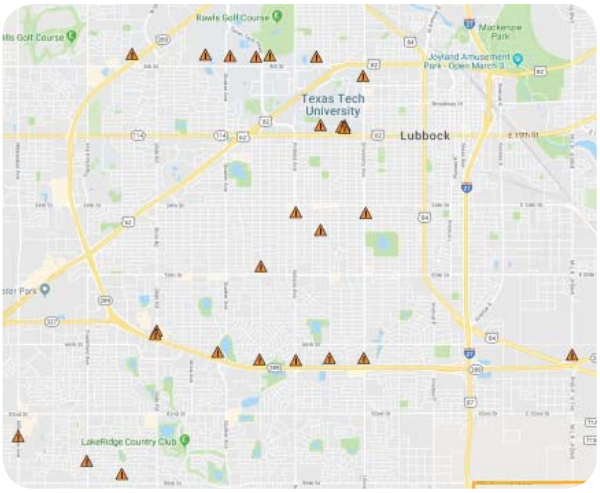
Desired Pedestrian Routes

- Focus on:
  - Parks
  - Downtown
  - Texas Tech
- High Interest in off-street trails



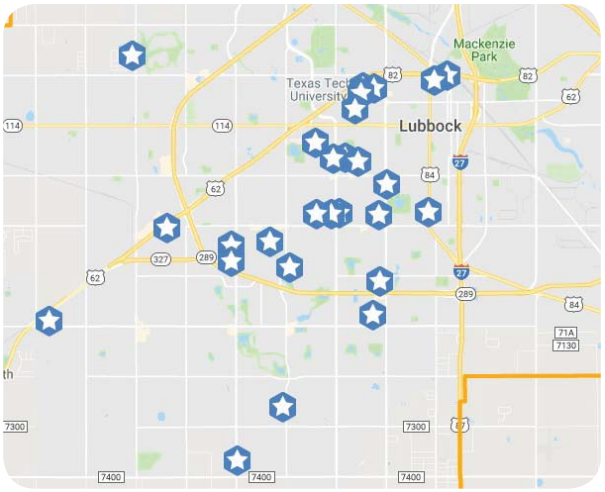
Safety Concerns

- Discontinuous bike facilities
- Need for dedicated or separated bike facilities
- Need for safe bike crossing on South Loop 289



Destinations

- Most destinations within the loop
- Some destinations to the south and to the west



Public Meetings

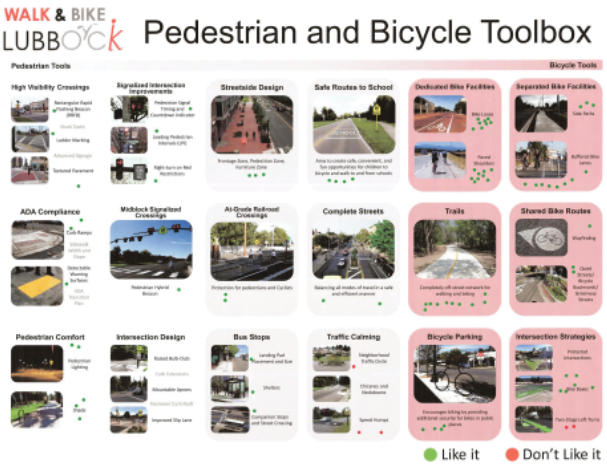
The project team held public meetings on April 11, 2018 and September 27, 2018. The April 10th meeting was held to gather feedback from the public on their experience walking and biking in Lubbock, and to understand their priorities for future projects, programs, and policies.

April 11, 2018

The April 11th meeting consisted of three feedback stations and a brief presentation, followed by discussion. The three feedback stations were:

1. Map Station – citizens drew desired routes and destinations on the maps, similar to the online interactive map

2. Thought Wall Station – citizens provided open form comments about what they thought should be included in the Walk and Bike Lubbock Plan



3. Toolbox Station – citizens provided feedback on whether they liked or disliked the proposed toolbox elements.

The strongest points of feedback received at the three stations and in the discussion during the April 10th public meeting are presented below:

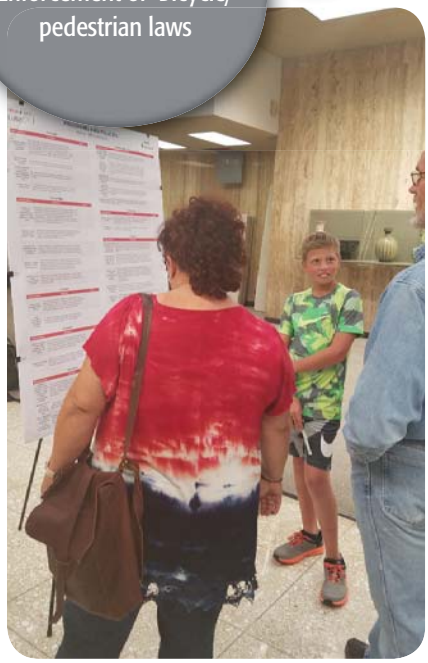
September 27, 2018

The September 27th meeting also consisted of three feedback stations and a brief presentation, followed by discussion. The three feedback stations are below. The strongest points of feedback received at the three stations and in the discussion during the September 27th public meeting are presented in the thought bubbles below:

1. The Plan Station – citizens provided feedback on the proposed Bicycle and Pedestrian Plans

Need for a bicycle/ pedestrian program coordinator

Better Education and Enforcement of bicycle/ pedestrian laws



2. Programs and Policies Station – citizens provided feedback on the proposed programs and policies of the plan

3. Implementation Station – citizens provided feedback on how bicycle and pedestrian projects should be implemented moving forward

Need for improved signage and pavement markings

Online Interactive Map Response

In addition to the public meeting, many citizens responded to the proposed bicycle and pedestrian plans via the online interactive map. The responses from the online interactive map are summarized as follows:

- Need more sidewalk connectivity
- Prefer separated facilities over on-street facilities
- In favor of bicycle/pedestrian bridge over Loop 289

Chapter 4: Toolbox

The Bicycle and Pedestrian Facility Toolbox acts as a supplement guide to the Walk and Bike Lubbock Plan and provides instruction for how to implement new bicycle and pedestrian facilities in Lubbock. The following toolbox introduces innovative bicycle and pedestrian facilities, many of which are not currently included in the City of Lubbock's design standards and specifications. This toolbox can be used by MPO and City staff during implementation of facilities identified in the Walk and Bike Lubbock Plan and also to select appropriate facilities during future roadway design.

Each roadway has unique characteristics, and this toolbox helps to identify appropriate bicycle and pedestrian solutions based on adjacent land use context, functional classification, vehicular travel speed, and existing or expected bicycle use and pedestrian demand.

The bicycle and pedestrian improvement types and design guidance in this chapter are consistent with national design standards. The following design manuals should be referenced for additional guidance:

- American Association of State Highway and Transportation Officials (AASHTO)
- Guide for the Development of Bicycle Facilities
- Federal Highway Administration (FHWA) Manual of Uniform Traffic Control Devices (MUTCD)
- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide
- Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares

Successful Implementation

Implementation relies upon a comprehensive toolbox that encourages implementation of an all ages and all abilities plan

The bicycle and pedestrian facilities covered in this toolbox include:

PEDESTRIAN TOOLS ← → BICYCLE TOOLS

- Rectangular Rapid Flashing Beacons
- Marked Crosswalks
- Curb Ramps
- Detectable Warning Surfaces
- Pedestrian Lighting
- Shade
- Pedestrian Signal Timing and Countdown Indicator
- Leading Pedestrian Intervals (LPI) Right Turn on Red Restrictions
- Pedestrian Hybrid Beacon
- Bus Stop Shelters and Landing Pads
- Companion Stops and Street Crossings
- Use of public art
- Streetside Design
- At-Grade Railroad Crossings
- Raised Bulb-Outs
- Mountable Aprons
- Improved Slip Lanes
- Roadway Lane Conversion
- Traffic Calming
- Bike Lanes
- Buffered Bike Lanes
- Shared-use Sidepaths
- Bike Boulevards
- Paved Shoulders
- Intersection Treatments
- Bicycle Parking

BIKE LANES

Description

Bike lanes are one-way facilities that typically carry bicycle traffic in the same direction as adjacent motor vehicle traffic. Bike lanes are provided for the exclusive or preferential use of bicyclists on a roadway and are identified through signage, striping, or other pavement markings. These lanes allow bicyclists to ride at comfortable speeds and encourage a position within the roadway where they are more likely to be seen by motorists. Bike lanes are typically on the right side of the street, between the outside travel lane and curb, parking lane, or road edge. While the lane distinguishes predictable areas for bicyclist and automobile movement, bicyclists may leave the bike lane to pass other cyclists or avoid debris and conflicts with other street users.

Typical Use

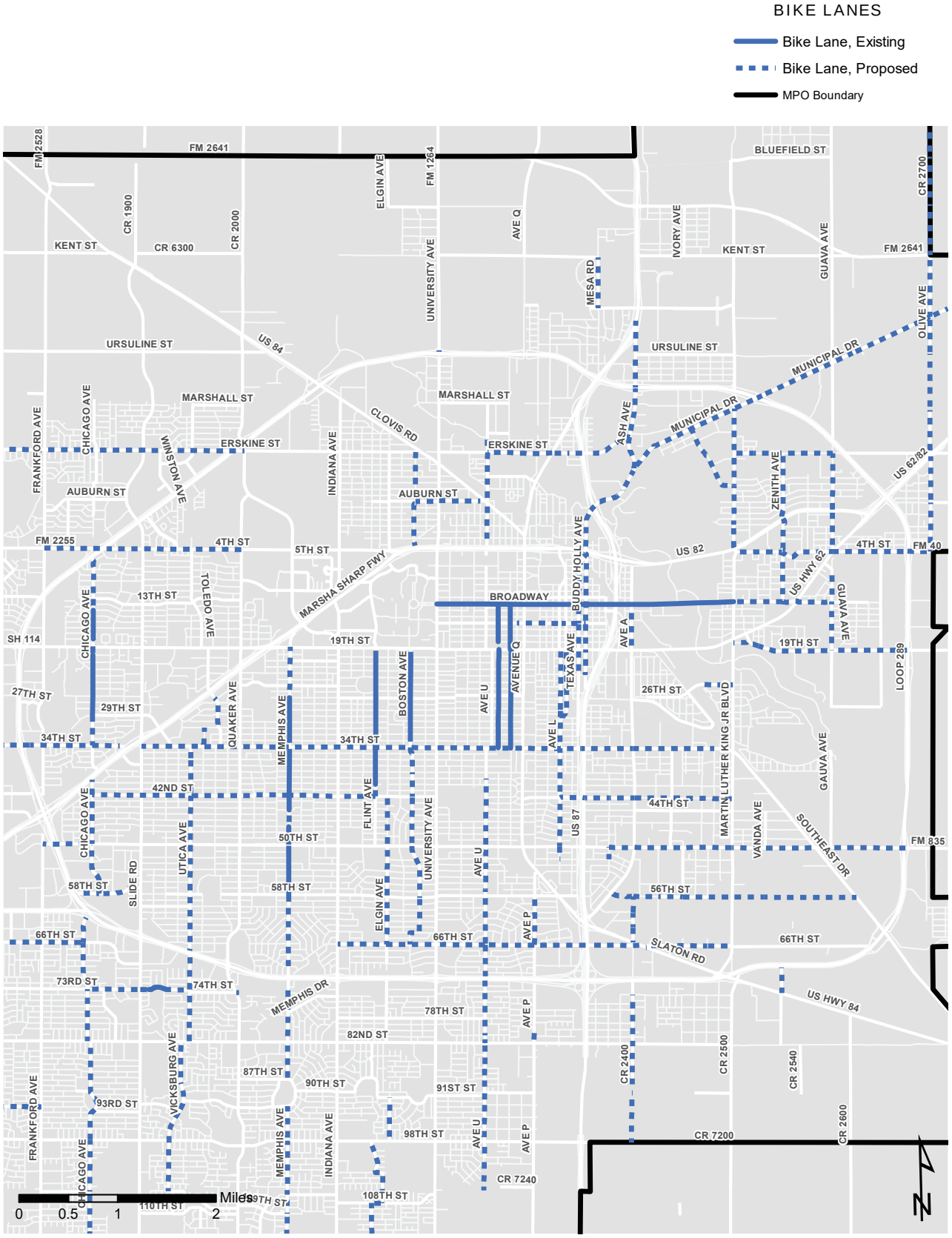
- On streets with moderate traffic volume (3,000-10,000 ADT)
- On streets with moderate travel speeds (25 - 35 mph)
- Bicycle facilities with greater separation should be considered on higher speed (>35 mph) and higher volume roadways.

Facility Benefits

- Bike lanes create a designated space for bicycle travel and increases separation from automobiles.
- Positioning of bicyclists is more predictable than on roadways without bike lanes.
- Bicyclists are able to continue riding at a comfortable speed even as vehicular traffic slows in the adjacent travel lanes.

Design Guidelines

- The desirable bike lane width adjacent to a curb face is 6 feet to allow bicyclists room to avoid potential conflicts such as wide gutters or parked cars. However, a minimum bike lane width of 5 feet is acceptable.
- The maximum width should not exceed 7 feet so that lanes are not mistaken for automobile travel lanes or parking areas.
- A solid white edge line should be placed between the bike lane and travel lane.
- Standard (MUTCD) bike lane symbols and arrows should be used to inform bicyclists and motorists of the restricted nature of the bike lane, and markings should be placed at periodic intervals to remind motorists of the presence of bicyclists.


BIKE LANES
Bike Lane, Existing
Bike Lane, Proposed
MPO Boundary
FM 2528
FM 2641
CR 1900
CR 2000
ELGIN AVE
FM 1264
AVE Q
BLUEFIELD ST
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UNIVERSITY AVE
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BIKE LANES: EXAMPLE PROJECT

Utica Ave Existing

Utica Ave Conceptual

BUFFERED BIKE LANES

Description

When sufficient roadway width is present, or if extra travel lanes are reduced, a buffer may be striped between a bike lane and travel lane to provide additional comfort for both bicyclists and motorists. This provides space for bicyclists to pass one another or ride side by side without encroaching into a motor vehicle travel lane. The buffer adds to the perception of safety and encourages greater use of the on-street bicycle network. It appeals to a wider set of bicycle users by providing added separation between motorists and bicyclists that may be traveling at substantially different speeds.

Typical Use

- Appropriate for use anywhere a standard bicycle lane is being considered
- Beneficial on streets with higher travel speeds (> 35 mph), higher travel volumes (10,000+ ADT), and higher truck traffic
- The inclusion of buffered bike lanes is best accomplished as part of retrofits of existing roadways with more travel lanes than needed.

Facility Benefits

- Creates greater separation between bicyclists and motor vehicles
- Increases the perception of safety among bicyclists
- Encourages less-skilled riders to cycle on streets with higher travel speeds and higher travel volumes

Design Guidelines

- Buffers should be delineated by two solid white lines and be at least 2 feet wide. If wider than 3 feet, chevron or diagonal hatching should also be marked.
- A 5 foot minimum bike lane is recommended.
- Bicycle markings and signage should be used the same as a conventional bike lane.

BUFFERED BIKE LANES: EXAMPLE PROJECT

34th Street Existing

34th Street Conceptual

SHARED-USE SIDEPATHS

Description

Shared-use sidepaths function like most paved trails. They are physically separated from motorized vehicular traffic, either by a landscaped buffer or a barrier, but rather than having an independent alignment, they are designed to follow roadway corridors. These facilities are particularly useful when roadway width is limited and providing an on-street bike facility is not possible. These paths are designed for two-way travel, and in addition to bicyclists, path users may include inline skaters, skateboarders and pedestrians.

Typical Use

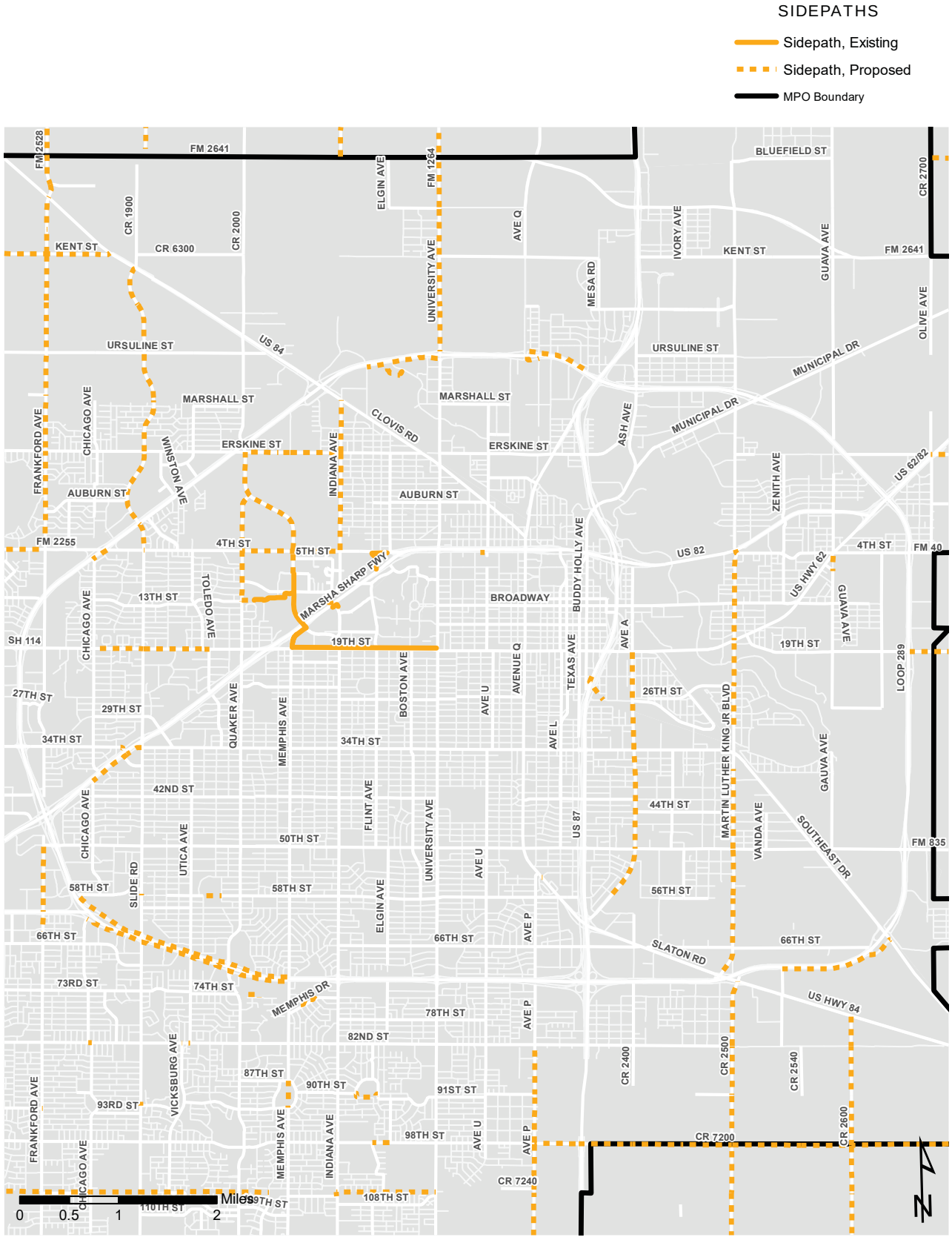
- Connecting on-street bikeways to the off-street trail network
- Continuing the on-street bike network in areas with constrained pavement width or other physical constraints
- Along higher-speed roadways with wide parkways and limited driveway and street crossings
- Providing a two-way bike route near schools or other areas that attract younger bicyclists

Facility Benefits

- Sidepaths tend to attract a wider variety of bicycle rider skills and ages due to the increased separation from vehicle traffic.
- Sidepaths can provide access to destinations along limited-access freeways where other bike facilities would be inappropriate.

Design Guidelines

- Sidepaths should avoid being built along roadways with frequent street or driveway crossings. At intersections, bicyclists will often be out of the line of sight of turning motorists.
- Appropriate signage and markings should be included at each driveway and street intersection to alert motorists of bicycle travel.
- Prohibiting right turns on red at sidepath crossings can reduce conflicts between drivers and bicyclists. Providing a leading pedestrian interval at crossings may be appropriate to accommodate higher levels of path use.
- Each end of a sidepath should directly connect to an on-street bike facility, another trail or path, or to a bicycle-compatible local street.
- The minimum paved width for a shared-use path is 10 feet.
- In constrained areas or when low bicycle traffic is expected, a reduced width of 8 feet may be used.
- The minimum recommended distance between a sidepath and adjacent roadway edge is 5 feet. A barrier should be provided where the separation is less than 5 feet.


SIDEPATHS
Sidepath, Existing
Sidepath, Proposed
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SHARED-USE SIDEPATHS: EXAMPLE PROJECT

BICYCLE BOULEVARDS

Description

Bicycles may be operated on all roadways, except where prohibited. However, certain roads may be more desirable for use due to low traffic speeds and volumes and do not necessitate a separated bike facility. These roadways can be designated as bicycle boulevards with route signage and pavement markings to designate shared use of the travel lanes. Traffic calming measures may also be used as a means of increasing the comfort level for bicyclists. However, bicycle boulevards should not be used as a substitute for conventional bike lanes when space permits.

Typical Use

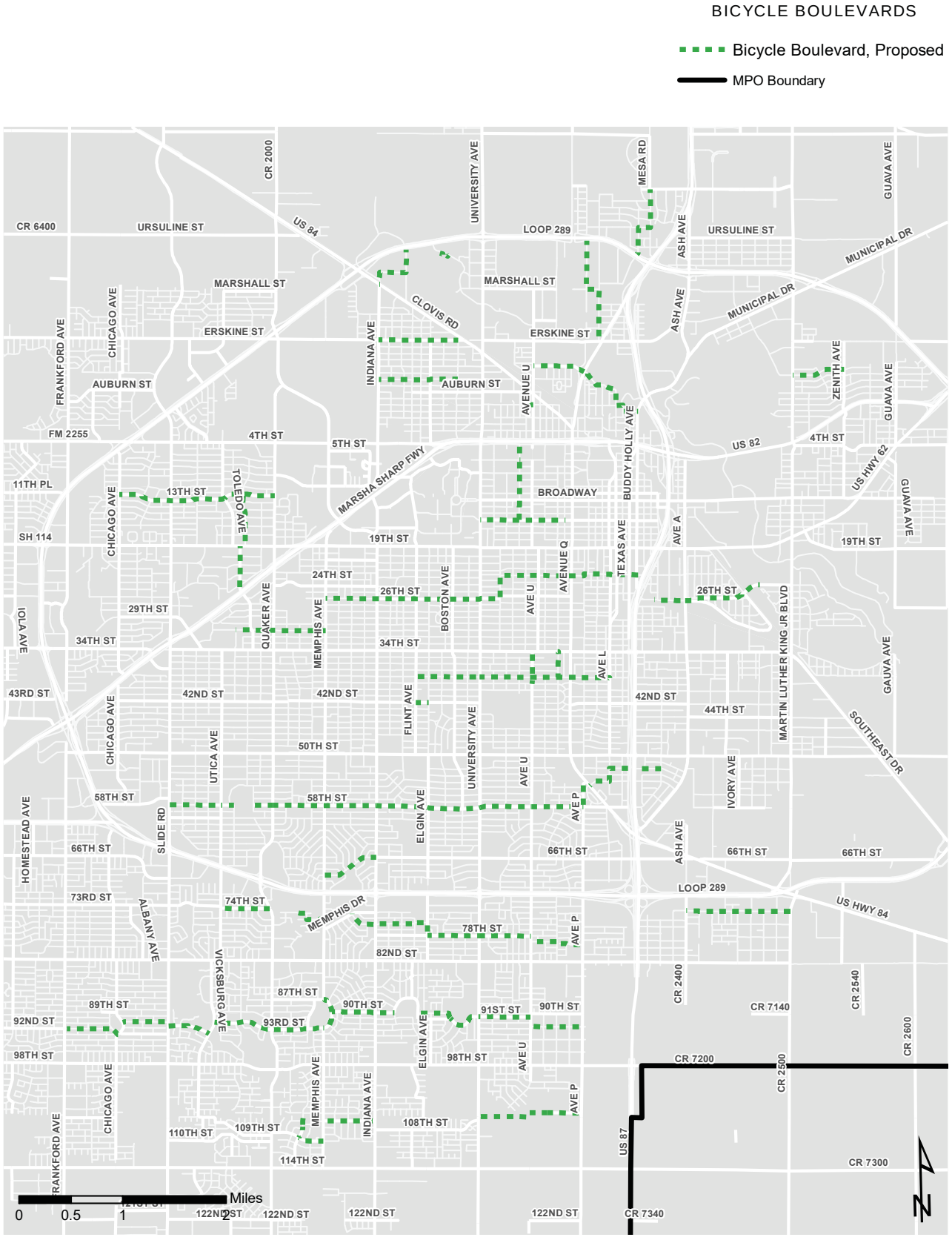
- On streets with low traffic volume (≤ 1,500 ADT preferred, 3,000 ADT maximum)
- On streets with low travel speeds
- (≤ 25 mph)
- To fill a gap or transition between bike facilities

Facility Benefits

- Bicycle Boulevards can be used to connect bicycle routes where bike lanes and sidepaths cannot be accommodated due to limited ROW
- Bicycle Boulevards typically experience side benefits for pedestrians by increasing safety through speed and volume management strategies
- Bicycle Boulevards provide an opportunity for street beautification through the implementation of green infrastructure such as street trees and other plantings.

Design Elements

- Bicycle Boulevards should ideally be 2-5 miles in length, similar to a typical urban bike trip.
- Branding the street as a Bicycle Boulevard through the use of modified street signs, shared lane markings, and wayfinding signs is recommended.
- Turns or jogs along discontinuous routes should have signs and/or markings indicating the direction of the route.
- Speed management strategies such as reduced speed limits, vertical deflection, and horizontal deflection are recommended to bring vehicle speeds closer to bicycle speeds.


BICYCLE BOULEVARDS
Bicycle Boulevard, Proposed
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BICYCLE BOULEVARDS: EXAMPLE PROJECT

58th Street Existing

58th Street Conceptual

PAVED SHOULDERS

Description

Maintaining paved shoulders on rural roadways without curbs and gutters may offer convenient connections to regional destinations, particularly for recreational cyclists. When shoulders are not constructed or maintained for bicycle use, the higher posted speeds and narrow shoulder widths on rural highways typically deter inexperienced riders. Some of the City's rural roads may eventually be reconstructed to include bike lanes, but if the road is not expected to be widened in the near future, the City can consider adding or improving paved shoulders to accommodate bicyclists.

Typical Use

- On rural roadways with higher speeds or traffic volumes.
- Improved maintenance and signage on state highway shoulders can improve rider comfort.

Facility Benefits

- Wide shoulders provide a more comfortable bicycling experience than a wide outside lane without shoulders.
- Shoulders are useful facilities for long-distance recreational cycling.
- A paved shoulder extends the life of the travel lanes.

Design Guidelines

- A paved shoulder should have a minimum of 4 feet for bicycle use, with a minimum 5 foot width when a guardrail, curb or barrier is present.
- Additional shoulder width (minimum of 8 feet) is recommended on roadways with high expected bicycle use or those with speeds above 50 mph.
- "Share the Road" signage may be used to increase motorist awareness but should not be used to indicate a bike route.
- A paved shoulder may be marked as a bike lane if it meets recommended bike lane criteria.
- Paved shoulders can be improved at intersection approaches by introducing bike lanes only at intersections to keep bicyclists to the left of right-turning vehicles.
- Raised pavement markers and rumble strips along the roadway edge can be difficult for bicyclists to maneuver around. Design of these features should provide a clear path for bicyclists to maneuver between the shoulder and adjacent travel lane.

BICYCLE PARKING

Description

The availability of bicycle parking is essential to a successful multi-modal transportation system. Leaving a bicycle unattended can easily result in damage or theft. Well-designed bicycle parking has the benefit of both preventing theft and creating an orderly appearance to sidewalks and building sites. The availability of bike racks that are conveniently located and function well make the overall experience of bicycling more enjoyable. Cities can plan for and install bike parking in various ways, including the installation of racks at public buildings and in the public right-of-way near popular destinations. Also, bicycle parking requirements for new development through the local zoning and permitting process is a cost effective way to provide bicycle parking. The location and design of bicycle parking are important to a successful bicycle implementation plan.

Typical Use

- Parking should be easily accessible from the street and protected from motor vehicles.
- Racks should be installed in an area visible to passers-by to enhance security and comfort of use.
- Parking should not block access to buildings.
- Parking locations for longer periods of time should be in a covered area, if practical.

Design Guidelines

- Racks should support a bicycle upright by its frame in two places.
- Racks should allow the frame and one or both wheels to be secured to the rack.
- Racks should be spaced appropriately from curbs, building walls, and other racks to allow ease of access and use of both sides of the rack.
- Various designs of racks may be used if they provide the same level of security, with the “inverted U” style being one of the most simple and effective.
- On-street parking spaces may be used as a bike parking corral, which can accommodate 8-12 bikes.

INTERSECTION TREATMENTS

Description

The configuration of bicycle facilities at intersections should be given extra consideration given the variety of turning movements and potential conflicts with motor vehicles. When bicycle intersection treatments are implemented appropriately, both motorists and bicyclists should be able to clearly understand how to navigate through facility transitions and intersection turning movements. Intersection improvements may include elements such as pavement markings, pavement color, medians and signage.

Typical Use

- Bicycle facilities should avoid being abruptly ended prior to an intersection
- Intersection treatments should be routinely maintained since the visibility of markings and signage enhances their effectiveness and rider safety

Facility Benefits

- Designing bicycle treatments at intersections allows travel to be direct and logical for both bicycles and motorists.
- Appropriate intersection design increases visibility of bicyclists, helps all road users anticipate travel movements and informs when travel is mixed or separated.
- Treatments are recommended for transitioning from one bicycle facility type to another

Design Elements

Intersection crossing markings

- Markings may be used to help guide bicyclists on a safe path through intersections and across driveways.
- Both shared lanes and bicycle lanes may be marked through an intersection with dotted lines. Crossing markings should match the width of the bike lane.
- Directional chevrons, bike symbols or colored pavement may be included with the dotted lines to increase visibility

INTERSECTION TREATMENTS

Design Elements

Bike Boxes

- Bike boxes may be used at signalized intersections to designate an area for bicyclists to wait ahead of traffic during red signal phases. Bike boxes are typically 10 - 16" deep, and stop lines should be used to indicate where motor vehicles should stop during a red signal.
- A "No Turn on Red" sign should be used with bike boxes to prevent vehicles from entering the bike box area.
- Bike boxes may be appropriate at intersections of major roadways where a separate right-turn lane is not present. Positioning bicycles ahead of traffic can reduce "right-hook" conflicts of turning vehicles.
- A "two-stage turn queue box" may be used to turn left at multi-lane roadways.

Two-Stage Turn Queue Box

- Turn queue boxes provide a space for bicyclists to make a left turn across an intersection with multiple lanes.
- The queue box should be placed in a protected area, typically between the bike lane and the pedestrian crossing. It may also be placed within the sidewalk space to allow turns at midblock locations.
- Colored pavement should be used in the queue box to increase visibility of the space.

Median Refuge Island

- Median refuge islands allow bicyclists to cross a two-way street one direction at a time.
- The desirable width of a median refuge is 10 feet or greater, with an area large enough to accommodate two-way bicycle travel.
- This treatment is recommended where bikeways cross streets with higher volumes and higher speeds, particularly at unsignalized intersections.
- Median refuge islands may be used to connect routes at an off-set intersection.

Bike Lanes at Intersections

- When an intersection approach has a right-turn only lane, a through bike lane should be provided to allow bicyclists to position themselves to the left of the right turn lane.
- A dotted bike lane transition area should be striped at least 50 feet before an intersection, and 100 feet before on higher speed roadways. This indicates where motor vehicles should merge into the turn lane and alerts motorists to yield to bicyclists.
- Right-turn only lanes should be as short as possible to prevent high speed traffic on both sides of the through bike lane.
- When an intersection cannot accommodate a through bike lane, bicycle travel may transition to a shared right-turn only lane. Signage and pavement markings should indicate the shared lane and that bicyclists may continue straight at the intersection.

TRAFFIC CALMING

Description

Some roadways discourage pedestrian use due to roadway design that allows unsafe driving habits. Traffic calming is a way to promote responsible motorist behavior through street design without relying on traffic control devices such as signals, signs or police enforcement. If implemented correctly, these design strategies can reduce traffic speeds, the number and severity of crashes, and noise level. Successful implementation often involves local neighborhood participation to best identify issues and explain the intent of the new design. The new street design should be predictable and easy to understand by drivers and other road users. A variety of techniques may be used together are often most effective when combined and spaced appropriately throughout an entire roadway length. For more information, refer to the U.S. Traffic Calming Manual.

Typical Use

- Traffic calming measures are typically most appropriate in neighborhood or mixed-use settings where there is a high demand for bicycle and pedestrian activity.
- Traffic calming measures are most common along collector roadways, but can be applied to arterial roadways with lower target speeds.

Facility Benefits

- Implementing traffic calming measures has the potential to significantly reduce bicycle and pedestrian related crashes.
- Traffic calming can also have an economic impact when implemented on commercial corridors with store fronts that benefit from increased bicycle and pedestrian traffic.

Design Elements

Horizontal Deflection

Speed Humps

- Speed humps are 3-4 inches high and 12-14 feet long.
- Speed humps should be no more than 500 feet apart or between slow points where the desired 85th percentile operating speed is between 25-30 mph.

Speed Tables

- Longer than speed humps and flat-topped.
- 3-3.5 inches high and 22 feet long.
- Can be used on transit and emergency response routes.

TRAFFIC CALMING

Design Elements

Horizontal Deflection

Raised Bulb-Outs
- See "Raised Bulb-Outs" Toolbox page

Chicanes
- Chicanes are a series of raised or delineated curb extensions, edge islands, or parking bays on alternating sides of a street forming an S-shaped travel way.
- Curb extensions and edge islands should be tapered at 45 degrees
- Edge lines should be marked to designate the travel lane

Neighborhood Traffic Circles
- Raised or delineated islands placed at intersections that reduce vehicle speeds by narrowing turning radii, narrowing the travel lane, and, if planted, obscure the visual corridor along the roadway.

Pinchpoints
- A pinchpoint or choker narrowing includes curb extensions or edge islands placed on either side of the street to narrow the center of the lane such that two drivers have difficulty passing through simultaneously.
- Pinchpoints should only be used where traffic speeds are already low.
- Pinchpoints should provide a clear two-way travel path of less than 18 feet (12 feet recommended)

Skinny Streets
- Narrow residential streets that require low motor vehicle speeds and accommodate travel in a bi-directional lane.
- On-street parking should be prohibited within 20 to 50 feet of the right-hand side of intersections to accommodate turning movements and increase visibility


Chicane


Neighborhood Traffic Circle

Pinchpoint

ROADWAY LANE CONVERSION

Description

Converting travel lanes is one of the methods cities can use to optimize street space to benefit all roadway users. The process of converting travel lanes to other uses is also commonly referred to as a Road Diet. The conversion requires analysis of traffic conditions to determine that an alternative lane layout is appropriate. A typical conversion involves replacing a four-lane undivided roadway (4U) with two through lanes and a center two-way left-turn lane (3U). This usually provides the necessary pavement width to provide for on-street bicycle facilities without widening the road. While there can be the concern that a lane reduction will increase travel times, when volumes are low (12-15,000 trips per day or less), a 3-lane roadway can be safer, more efficient and have improved multi-modal mobility.

Lane Conversion Candidate Factors

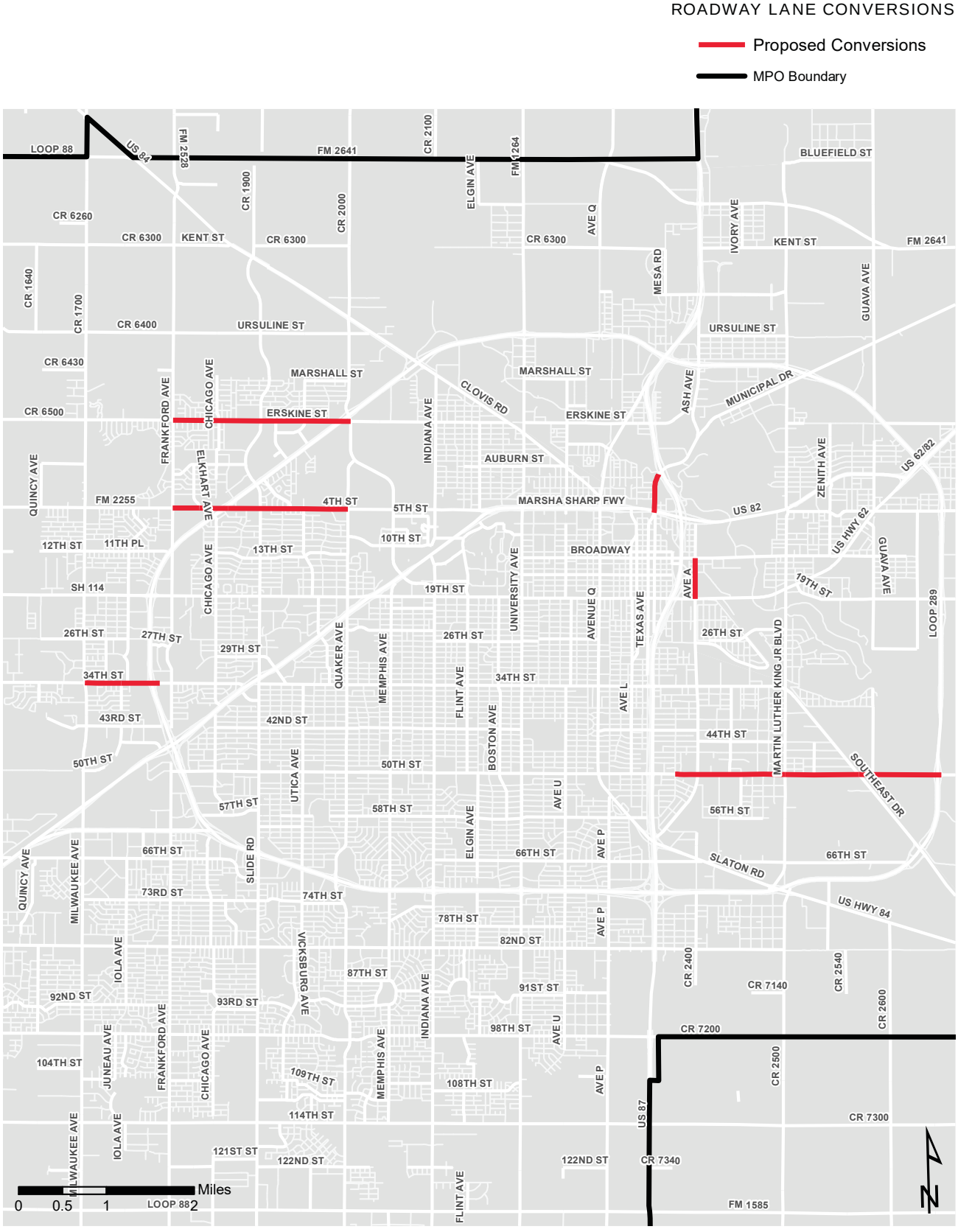
- Moderate traffic volumes (< 15,000 ADT) for a 4U→3U
- Roads with multiple safety issues (vehicle, bicycle & ped)
- Popular or priority bicycle routes
- Commercial reinvestment areas
- Main/historic streets

Benefits of Lane Conversions

- Improves safety and comfort for pedestrians by providing additional buffer from adjacent motor vehicle travel and requiring less crossing distance
- Provides room for a pedestrian refuge island
- Reduces rear-end and side-swipe conflicts by moving left-turning vehicles to a center turn lane
- Improves speed limit compliance
- Allows for on-street bicycle facilities

Design Elements

- All roadway lane conversions should be approved by Council prior to implementation
- Lane conversions and any adjustment to on-street parking should be considered on a case-by-case basis and involve community input.
- Bicycle facilities designed as part of a lane conversion should follow the standard design guidelines as outlined previously in this toolbox.
- Road diets make pedestrian crossings shorter and can be enhanced with curb extensions and mid-block pedestrian refuge islands.
- The demand for on-street parking should be considered during the design and implementation of a roadway reconfiguration.


ROADWAY LANE CONVERSIONS
Proposed Conversions
MPO Boundary
LOOP 88
US 84
FM 2528
FM 2641
CR 2100
ELGIN AVE
FM 1264
BLUEFIELD ST
CR 6260
CR 6300
KENT ST
CR 1900
CR 2000
AVE Q
IVORY AVE
FM 2641
CR 1640
CR 1700
CR 6400
URSULINE ST
MESA RD
GUAVA AVE
CR 6430
MARSHALL ST
CHICAGO AVE
FRANKFORD AVE
CR 6500
ERSKINE ST
CLOVIS RD
ASH AVE
MUNICIPAL DR
INDIANA AVE
AUBURN ST
ZENITH AVE
US 62/82
QUINCY AVE
FM 2255
ELM CREEK AVE
4TH ST
5TH ST
MARSHA SHARP FWY
US 82
US HWY 62
12TH ST
11TH PL
13TH ST
10TH ST
BROADWAY
SH 114
19TH ST
AVE A
LOOP 289
26TH ST
27TH ST
29TH ST
QUAKER AVE
MEMPHIS AVE
UNIVERSITY AVE
AVENUE Q
TEXAS AVE
34TH ST
FLINT AVE
BOSTON AVE
AVE L
MARTIN LUTHER KING JR BLVD
43RD ST
42ND ST
44TH ST
SOUTHEAST DR
50TH ST
UTICA AVE
AVE U
57TH ST
58TH ST
56TH ST
SLIDE RD
66TH ST
AVE P
SLATON RD
MILWAUKEE AVE
73RD ST
74TH ST
US HWY 84
78TH ST
82ND ST
VICKSBURG AVE
IOLA AVE
87TH ST
91ST ST
CR 2400
CR 7140
CR 2540
92ND ST
93RD ST
98TH ST
CR 2600
CR 7200
JUNEAU AVE
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N

RECTANGULAR RAPID FLASHING BEACON (RRFB)

Description

At some uncontrolled crossings, particularly those with four or more lanes, it can be difficult to achieve compliance with laws that require motorists to yield to pedestrians. Vehicle speeds and poor pedestrian visibility combine to create conditions in which very few drivers are compelled to yield. One type of device proven to be successful in improving yielding compliance at these locations is the Rectangular Rapid Flash Beacon (RRFB). When present, pedestrians activate a bright flashing beacon, which is combined with a pedestrian crossing sign.

Typical Use

- Mid-block or intersections, with or without an existing striped crosswalk.
- RRFB's are usually implemented at a high-volume pedestrian and bicycle crossings, but may also be considered for priority bicycle route crossings such as routes to schools, multifamily housing, employment centers or shopping, and locations where multi-use trails cross at mid-block locations.

Facility Benefits

- Increased yielding behavior of drivers at crosswalks when supplementing standard pedestrian crossing signs.
- Installed with minimal traffic disruption.
- Lower installation and operating costs compared to traffic signals and hybrid signals.
- Appropriate for an unsignalized intersection where a signal is not warranted.

Design Guidelines

- Design in accordance with FHWA's Interim Approval 11 (IA-21).
- Install on both sides of the roadway at the edge of the crosswalk. If there is a pedestrian refuge or other type of median, an additional beacon should be installed in the median.
- Use in conjunction with advanced stop bars and signs.
- See FHWA's *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* publication and the *Manual of Uniform Traffic Control Devices* to determine warrants for traffic control at midblock crossings.

MARKED CROSSWALKS

Description

Legal crosswalks exist at all locations where sidewalks meet the roadway, regardless of whether pavement markings are present. Drivers are legally required to yield to pedestrians at intersections, even when there are no pavement markings. There are many different styles of crosswalk striping and some are more effective than others. Ladder and continental striping patterns are more visible to drivers. Decorative crosswalks with textured pavement and high visibility striping can also be used where applicable. In addition to pavement markings, crosswalks may include signals or beacons, warning signs, raised platforms, and pedestrian countdown signals. Creating frequent, safe pedestrian crossings are a best practice, especially in urban and suburban areas.

Typical Use

- On streets with moderate traffic volume (>3000 ADT) and speeds (>20 MPH)
- On all legs of intersections in school zones, parks, plazas, senior centers, transit stops, hospitals, campuses, and major public buildings, crosswalks should be implemented regardless of traffic conditions.

Facility Benefits

- Communicates to drivers that pedestrians may be present.
- Helps guide pedestrians to locations where they should cross the street.
- Improves safety while encouraging predictable behavior.

Design Guidelines

- Design crosswalks with a minimum width of 10 feet, or the width of the approaching sidewalk, if it is greater. In areas of heavy pedestrian volumes crosswalks can be up to 25 feet wide.
- Stripe stop lines at stop-controlled and signalized intersections no less than 4 feet and no more than 30 feet from the edge of crosswalks.
- Orient crosswalks perpendicular to streets to minimize crossing distances and limit the time that pedestrians are exposed.
- Border decorative crosswalk treatments with thermoplastic edge striping to increase visibility.

CURB RAMPS

Description

The transition for pedestrians from the sidewalk to the street is provided by a curb ramp. The designs of curb ramps are critical for all pedestrians, particularly for people with disabilities. ADA standards require all pedestrian crossings be accessible to people with disabilities by providing curb ramps at intersections and mid-block crossings, as well as other locations where pedestrians can be expected to cross the street. Curb ramps also benefit people pushing strollers, grocery carts, suitcases, or bicycles.

Typical Use

- All intersections or roadways where curbs are present and pedestrians cross the street.

Facility Benefits

- Landings provide a level area with a cross slope of 2% or less in any direction for wheelchair users to wait, maneuver into or out of a ramp, or bypass the ramp altogether. Landings should be 5 feet by 5 feet. ADA regulations require that landings shall, at a minimum, be 4 feet by 4 feet.
- Correct placement improves orientation for visually impaired pedestrians by directing them toward the correct crosswalk.
- Curb ramps with the required landings provide a level area (with a cross slope of 2% or less) in any direction for wheelchair users to wait.

Design Guidelines

- Install truncated domes (the only permitted detectable warning device) on all new curb ramps to alert pedestrians to the sidewalk and street edge.
- Maximum slope: 1:12 (8.33%).
- Maximum slope of side flares: 1:10 (10%).
- Maximum cross-slope: 2% (1–2% with tight tolerances recommended).
- Direct pedestrians into the crosswalk. The bottom of the ramp should lie within the area of the crosswalk.
- Install one curb ramp for each pedestrian path of travel, also called Type II ramps or directional ramps. This is a best practice and replaces the past practice of using a single diagonal ramp, also called a Type I ramp.

DETECTABLE WARNING SURFACES

Description

Detectable warning surfaces are a hazard warning for pedestrians with low or no vision. Comprised of truncated domes and produced in colors that contrast the sidewalk or curb ramp in which they are placed, detectable warning surfaces function like a pedestrian stop line, alerting persons with vision disabilities to the presence of the street or other vehicular travel way. Detectable warning surfaces are not intended to be used for guidance.

Typical Use

- Any location where pedestrians cross into another modal zone, such as streets, bike lanes, or railroad crossings.
- At sidewalk-level transit stops to indicate boarding locations.
- At all newly constructed or altered curb ramps and blended transitions at pedestrian street crossings.

Facility Benefits

- Satisfies ADA guidelines for the public right-of-way.
- Alerts s.ome pedestrians to an adjacent conflict area

Design Guidelines

- Use in pairs that identify the beginning and ending of a crosswalk
- Install in 24-inch minimum width in the direction of pedestrian travel
- Extend the full width of the flush sidewalk-street interface at pedestrian street crossings, or crosswalks
- Use a color that contrasts with the adjoining surface, either light on dark or dark on light.

PEDESTRIAN LIGHTING

Description

Street and pedestrian lighting allows people to quickly and easily identify objects during low light or nighttime, resulting in a safer environment. Pedestrian lighting is a crucial element in providing a safe multimodal environment and ensures that a pedestrian environment is used frequently and safely, resulting in a safer and healthier community.

Typical Use

- At intersections and pedestrian crossings.
- Along pathways and trails, where pedestrians are present.

Facility Benefits

- Improves visibility of pedestrians crossing vehicular travel lanes.
- Provides safe and comfortable walking conditions at nighttime by enhancing security.
- Improves, facilitates, and encourages pedestrian traffic.

Design Guidelines

- Place lighting on the near side of curb ramps at intersections to illuminate the side of pedestrians facing approaching vehicles.
- Always provide lighting in underpasses and under bridges where pedestrians may be present.
- Consider using solar lights depending on the availability and expense of connecting to electricity.
- If unable to provide continuous lighting on trails and off street facilities, prioritize lighting at roadway crossings, trail heads and rest stops.

SHADE

Description

In hot climates such as Lubbock, high temperatures are a challenge to walkability and can cause adverse health reactions for some. Providing shade along sidewalks and other areas frequented by pedestrians creates a visually attractive environment that encourages walking and greatly increases comfort during summer months.

Typical Use

- Along sidewalks and trails
- In public plazas and parks

Facility Benefits

- Provides comfortable walking conditions and encourages walking trips.
- Many elements that provide shade, such as trees and awnings, also provide improved aesthetics, environmental benefits, shelter from rain, and intimate gathering spaces.

Design Guidelines

- Use existing and proposed structures, trees, and other vertical elements during site design.
- Encourage retail shops, office buildings, and larger multi-unit residential buildings to provide protective awnings to create shade in pedestrian zones.
- Where unable to provide continuous shade along walking corridors, place elements that provide shade in gathering spaces or at intervals to avoid long exposure to direct sunlight.
- Perform a shade analysis to determine locations where additional shade should be provided.

PEDESTRIAN SIGNAL TIMING AND COUNTDOWN INDICATOR

Description

Pedestrian signals are used to manage pedestrian crossings, typically in conjunctions with motor vehicles and bicycles. Pedestrian signal heads display three intervals of the pedestrian phase: (1) The Walk Interval, signified by the WALK indication (or the walking person symbol), alerts pedestrians to begin crossing the street. (2) The Pedestrian Change Interval, signified by the flashing DON'T WALK indication (or the flashing hand symbol accompanied by a countdown display), alerts pedestrians approaching the crosswalk that they should not begin crossing the street. (3) The Don't Walk Interval, signified by a steady DON'T WALK indication (or the steady upraised hand symbol), alerts pedestrians that they should not cross the street. Accessible pedestrian signals (APS) and accessible detectors are devices that communicate information in non-visual formats to pedestrians with visual and/or hearing disabilities. APS and accessible detectors should be considered in conjunction with visual countdown indicators and may include features such as audible tones, speech messages, detectable arrow indications and/or vibrating surfaces.

Typical Use

- Any signalized intersection or mid-block crossing locations where pedestrians may be present.

Facility Benefits

- Countdown indicators inform pedestrians of the amount of time in seconds that is available to safely cross during the flashing DON'T WALK interval. Motorists also use the countdown indicators to manage their travel through an intersection.
- Pedestrian signals, which are installed lower than traffic signals, making them easier for pedestrians to see, especially children, adults of shorter stature, and people in wheelchairs.
- Increases the prominence of the pedestrian network with this important element of pedestrian traffic control.

Design Guidelines

- Minimize the time that pedestrians must wait with signal timing. Long wait times encourage pedestrians to cross against the signal.
- Allocate enough time for pedestrians of all abilities to safely cross the roadway. The MUTCD specifies a pedestrian walking speed of 3.5 feet per second, which benefits children, some people with disabilities, and others who walk more slowly.
- In areas with higher pedestrian activity, such as near transit stations, Main Streets, and school zones, program in a pedestrian cycle at every signal phase, rather than having to push a button to call for a pedestrian phase.

LEADING PEDESTRIAN INTERVALS (LPI)

Description

The Leading Pedestrian Interval is a technique used to allow pedestrians to enter the intersection prior to vehicular traffic. Between three to seven seconds of additional walk time is added to the start of the pedestrian phase, which the red phase vehicular traffic remains in place. With this additional time, pedestrians to travel far enough to establish their position ahead of the turning traffic before the turning traffic is released. LPIs are not needed where there are protected right or left turns.

Typical Use

- At intersections with high volumes of pedestrians and conflicting turning vehicles.
- Locations with a large number of pedestrians who walk slower.

Facility Benefits

- Enhance the visibility of pedestrians in an intersection.
- Reinforces the pedestrian right-of-way, especially in areas with high volumes of turning vehicles during the permissive phase of the signal cycle.
- Leading Pedestrian Interval's are relatively low in cost and only require minor adjustments to signal timing.

Design Guidelines

- Give pedestrians a minimum head start of 3-7 seconds, depending on the total crossing distance.
- Provide enough time for pedestrians to cross at least one lane of traffic before the turning traffic is released.
- Pairing Leading Pedestrian Interval's with other pedestrian treatments, such as bulb-outs, increase their effectiveness at intersections.

RIGHT TURN ON RED RESTRICTIONS

Description

Minimizing conflicts between motor vehicle and pedestrian movements is one of the primary challenges for traffic signal design. Motorist making a right turn on red are typically intent on looking for traffic on their left and as a consequence are unaware of pedestrians crossing in the crosswalk. Restricting right turns on red is low cost and simple method to improve safety and comfort for pedestrians during the crossing phase. This can be accomplished by adding the appropriate "NO TURN ON RED" sign, or using more effective measures include adding a red ball in the center of the sign or providing a red turn arrow in addition to the sign.

Typical Use

- In downtown areas with high levels of walking and bicycling.
- Locations with substantial pedestrian volumes or a high number of pedestrians who walk slower.

Facility Benefits

- Decreases crashes at intersections with high pedestrian volumes.
- Increases overall comfort level for pedestrians crossing at intersections.

Design Guidelines

- Pair *No Right Turn On Red* signs with leading pedestrian intervals to reduce conflicts during the permissive phase for turning vehicles.
- Where pedestrian volumes are very high, add an exclusive pedestrian phase.
- Use a variable sign that turns on and off for locations where limiting right turns on red is only necessary for certain times of the day.

PEDESTRIAN HYBRID BEACON

Description

Pedestrian hybrid beacons, including the High-intensity Activated Crosswalk Beacon (HAWK), are a type of signal that allows pedestrians and bicyclists to stop traffic to cross high-volume arterial streets. This type of signal may be used in lieu of a full signal that meets any of the traffic signal control warrants in the MUTCD. It may also be used at locations which do not meet traffic signal warrants but where assistance is needed for pedestrians or bicyclists to cross a high-volume arterial street.

Typical Use

- The MUTCD recommends minimum volumes of 20 pedestrians or bicyclists an hour for major arterial crossings (volumes exceeding 2,000 vehicles/hour).
- Logical crossing locations at high speed multi-lane roadways.
- Any unsignalized designated crossings of roadways with six or more lanes.

Facility Benefits

- Improves safety and motorist compliance at intersections with high traffic volumes and high frequencies of pedestrian crashes, including those near schools and shopping areas.
- Improves pedestrian connectivity by providing safe and comfortable pedestrian crossings at busy arterials.

Design Guidelines

- At all arterial crossings in pedestrian and bicycle networks and for path crossings if other engineering measures are found inadequate to create safe crossings.
- Use “hot” pushbutton actuators (respond immediately) in convenient locations for all users, and abide by other ADA standards.
- Use passive signal activation, such as video or infrared detection.
- See FHWA’s *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* publication and the *Manual of Uniform Traffic Control Devices* to determine warrants for traffic control at midblock crossings.

RAISED BULB-OUTS

Description

Raised bulb-outs, also known as curb extensions, neckdowns, or bump-outs, are created by extending the sidewalk at corners or mid-block. Curb extensions are intended to increase safety, improve visibility at crossing locations, calm traffic, and provide extra space along sidewalks for users and amenities, such as street furniture, benches, plantings, and trees. In addition to shortening crossing distances, curb extensions can be used to change the geometry of intersections resulting in smaller corner radii and slowing turning motor vehicles at intersections.

Typical Use

- At intersections with high volumes of pedestrian traffic.
- Near schools, at unsignalized crossings, or where street parking already exists.

Facility Benefits

- Shortens crossing distance for pedestrians.
- Improves visibility for pedestrians crossing the street.
- Provides traffic calming by slowing motor vehicle speeds when turning right and/or narrowing travel lanes.
- Emergency access is often improved through the use of curb extensions because intersections are kept clear of parked cars.

Design Guidelines

- The minimum length of a bulb-out is the width of the crosswalk, allowing the curvature of the bulb-out to start after the crosswalk to deter parking.
- The length of a curb extension can vary depending on the intended use (i.e., stormwater management, transit stop waiting areas, parking restrictions).
- Bulb-outs extend approximately the width of a parked car (or about 6' from the curb).
- Maintain safe width for motor vehicle and bicycle travel lanes.
- Consider the turning needs of emergency and larger vehicles in bulb-out design.

MOUNTABLE APRONS

Description

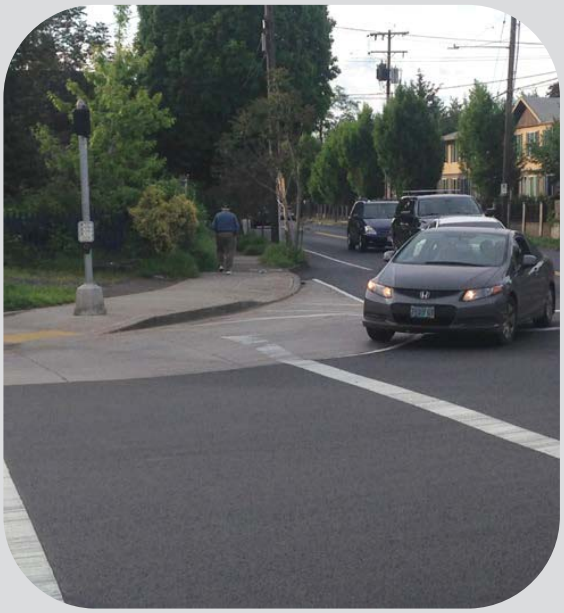
Mountable aprons are used in locations where tighter turning radii benefit intersection safety, but larger vehicles need wider radii. Accommodating large vehicles while keeping intersections as compact as possible, requiring design flexibility and engineering judgment. Each intersection is unique; the approach and departure angels, the number of travel lanes, the presence of a median, etc., are site-specific and impact corner design. Mountable aprons, or truck pillows, provide tighter radii that are still navigable by larger vehicles.

Typical Use

- Intersections with high volumes of pedestrians crossing at crosswalks.

Facility Benefits

- Provides safer and shorter crossing distances for pedestrians.
- Deter passenger vehicles from making higher-speed turns, but accommodate the occasional large vehicle without encroachment or off-tracking into pedestrian areas.



Design Guidelines

- Make mountable truck aprons visually distinct from the adjacent travel lane and sidewalk.
- At signalized intersections, assume that a large vehicle will use the entire width of the receiving lanes on the intersecting street.
- Design the mountable apron based on the types of vehicles using the intersection, with considerations to relative volumes and frequencies. In most cases, the curb radii are based on a Single Unit vehicle with a 42-foot turning radius.

IMPROVED SLIP LANES

Description

Free-flowing right-turn lanes, or slip lanes, are often unsignalized and are conflict points for pedestrians, especially when the design allows motorists to maintain high speeds through the turn and do not optimize sight lines around the crosswalk. Well designed slip lanes control vehicular speed, keep crossing pedestrians within sight lines of turning motorists, and reduce pedestrian exposure to the roadway. Design features include sharper angles that require slower vehicle speeds, large "pork chop" islands that allow adequate space for pedestrians and curb ramps, raised crosswalks, and high visibility crosswalk marking and signs.

Typical Use

- Intersections with high volumes of right turning vehicles across a pedestrian pathway.
- Intersections with existing right-turn slip lanes across a pedestrian pathway.

Facility Benefits

- Allows motorists and pedestrians to easily see one another while navigating slip lanes in part due to slower vehicle speeds.
- Improves sight lines for motorists entering oncoming traffic from slip lanes.

Design Guidelines

- Orient crosswalks at a 90 degree angle to the slip lane to optimize sight lines.
- Position crosswalks at least one car length behind the intersecting roadway to allow vehicles space to wait for a gap in oncoming traffic after passing through the crosswalk.
- Provide a sharper angle at which the slip lane enters the street in order to lower vehicle speeds and increase sight lines. This makes it easier for motorists to see crossing pedestrians and oncoming traffic.
- Consider a raised crosswalk in addition to geometry improvements of slip lanes.

STREETSIDE DESIGN

Description

Streetside design is an approach to supporting multiple functions of the space between the street and property line. Sidewalks are the canvas for streetside design, which plays a critical role in the character, function, enjoyment, and accessibility of neighborhoods, main streets, and other community destinations. In addition to providing space for pedestrians separated from motor vehicles, street trees and other plantings, stormwater infrastructure, street lights, and bicycle racks offer places for people to gather, stroll, shop and eat, etc. There are three primary zones that typically make up an active streetside: Frontage Zone, Pedestrian Zone, and Amenity Zone.

Typical Use

- Commercial corridors with high pedestrian volumes.
- Mixed-use developments.
- High-density residential areas.

Facility Benefits

- Creates a vibrant streetscape with active uses adjacent to the sidewalk.
- Promotes a lively street environment and adds economic value by enabling private commercial activity to spill into the public environment of the street.
- Provides attractive elements such as landscaping and/or rain gardens that collect stormwater runoff from adjacent roads and sidewalks.

Design Guidelines

- The Frontage Zone immediately abuts the property line (usually buildings) and may be occupied by front porches, stoops, architectural features, displays, café seating, etc. Frontage Zones vary in width from a few feet to several yards.
- Also known as the “walking zone,” the Pedestrian Zone is the sidewalk space used for active travel. It must be kept clear of any obstacles and be wide enough to comfortably accommodate expected pedestrian volumes including those using mobility assistance devices.
- The Amenity Zone, or “landscape zone,” lies between the curb and the Pedestrian Zone and includes street lights, trees, bicycle racks, parking meters, signposts, signal boxes, benches, trash and recycling receptacles, and other elements.

AT-GRADE RAILROAD CROSSINGS

Description

Many urban areas served by light rail transit, commuter rail, and freight trains include at-grade railroad crossings. Providing appropriate treatments insure that bicyclists and pedestrians are safely navigation these crossings. Treatment devices include warning signs, flashing lights or active warning devices, pavement markings, channelization devices, detectable warnings, gate arms, and pedestrian gates. Providing crossing treatments, or a combination of treatments, is an important design element and defines safe crossing locations for pedestrians. Providing consistency among materials, pavement marking colors, and treatment selections can also help pedestrians easily recognize and navigate safe crossing locations.

Typical Use

- Locations where roadways or sidewalks cross railroad tracks.

Facility Benefits

- Provides safe crossings and alerts pedestrians when trains are approaching an at-grade crossing.

Design Guidelines

- Place crossings perpendicular to railroad tracks.
- Add pedestrian gate arms or active warning signals at locations near parks or other areas with high pedestrian volumes.
- Pedestrians and bicyclist often take the shortest path from where they are to where they want to go. Implement barriers or fences to channelize users to the safest crossing location.

BUS STOP SHELTERS AND LANDING PADS

Description

Stops with shelters and cover protect people from sun, wind, and rain and also provide additional seating and lighting. Stops that include shelters improve the level of safety and comfort for transit users, thereby improving the transit experience. Depending on their location and number of daily riders, stops may include benches, information signage, bike racks, trach receptacles, and public art. All bus stops must conform to ADA standards and include adequately sized landing pads that allow buses to load passengers in wheelchairs. Properly designed and equipped bus stops provides a predictable and comfortable transit experience for all users.

Typical Use

- At existing and proposed bus stop locations.

Facility Benefits

- Provides a comfortable waiting space for transit users.
- Increases the visibility of transit.
- Landing pads provide easy accessible routes for users in wheelchairs.
- Can increase ridership.

Design Guidelines

- Design shelters to accommodate all users, especially those who rely on mobility devices.
- Take advantage of the physical forms adjacent to stops, such as large awnings of businesses, to save space.
- Consider weather when choosing a shelter design to provide protection from the elements, but ensure visibility by using transparent materials or an open design.
- Provide a minimum 4-foot clear continuous space around shelters.
- Provide a stable and level landing pad at boarding and alighting areas. Landing pads shall be a minimum of 8’ deep by 5’ wide.
- Connect landing pads to adjacent sidewalks or other accessible routes.

COMPANION STOPS AND STREET CROSSINGS

Description

Companion bus stops are pairs of stops that serve people traveling in either direction. When well-placed, companion stops provide the same relative ease of access to and from nearby destinations. Since transit users typically travel to and from the same stops, boarding and alighting on both sides of the street, companion stops should be located near one another. Bus stop locations should be selected in order to minimize the number of crossings for pedestrians getting to and from transit stops wherever possible, and crossings near these stops should be prioritized for improvements.

Typical Use

- Bus stops near intersections or mid-block crossings.

Facility Benefits

- Provide familiar and predictable transit connections.
- Increases safety for transit users getting to and from bus stops.

Design Guidelines

- Place stops in apposing directions near one another so passengers alight at an adjacent location to where they boarded.
- Pair far-side stops in one direction and near-side stops in the other direction, reducing the number of street crossings for pedestrians.
- For stops on one way streets, pair stations with stops on adjacent streets.

PUBLIC ART

Description

Art in public spaces can take many forms from painted pavement to sculpture to gateway infrastructure. Selecting the location for public art should be based on a specific objective such as place-making, serving as a catalyst for change, enhancing what exists, or responding to community priorities. In doing so, the art creates an opportunity for residents to contribute to the design of their public space. Certain treatments, such as decorative crosswalks or murals, can be easy to install, due to the low cost of design and installation.

Typical Use

- Painted crosswalks
- Wayside sculptures
- Integration with parks and play space
- Functional infrastructure elements, such as shade structures and bridge or structural aesthetic treatments

Facility Benefits

- Enhances public space and improves aesthetics.
- Acts as a landmark and improves place-making by reflecting a communities identity with infrastructure and form in a public space.
- Can act as a catalyst for community involvement and engagement.
- Provides a sense of ownership and identity in a community or neighborhood.

Design Guidelines

- Refer to MUTCD and FHWA guidelines when implementing art in pavement markings or crosswalks to comply with retroreflective properties and other requirements. Implementation should not diminish the effectiveness or the legal requirements of a crosswalk. The best rule of thumb is to maintain the clarity of the transverse lines and reduce the intensity of color between these lines.
- Public engagement should take place during the design process to ensure that the art reflects the communities identity and desires.
- Use anti-skid materials when implementing art in areas where pedestrian, bicycle, and vehicular traffic may be present.

Chapter 5: Plan

Why Plan for Bicyclists?

Planning for bicyclists is essential for fostering active transportation habits within a community. There are many benefits from bicycling, including:

Economy	The presence of bicycle trails, bicycle parking, and other bicycle facilities signals to potential residents and business owners a higher quality of life, which can lead to an increase in economic activity
Environment	The addition of bicycle facilities to an area has the potential to replace vehicle trips with bicycle trips, reducing emissions and contributing to cleaner air
Health	An improved bicycle network will encourage more bicyclists of all ages and abilities to ride for work, school, or leisure, improving the overall health of the community
Livability	Bicycle facilities can greatly increase the livability of historically underrepresented communities, especially by providing a safe means of transportation for able-bodied citizens who do not own a motor vehicle
Mobility	Bicycle facilities improve mobility by adding another option for transportation and by providing potentially more convenient routes than what might be available via transit or motor vehicle
Safety	The addition of bicycle facilities has the dual effect of calming traffic and providing separation between motor vehicles and bicyclists and pedestrians

The Lubbock region can encourage residents to take advantage of these benefits by improving the safety and quality of their bike lanes and trails.

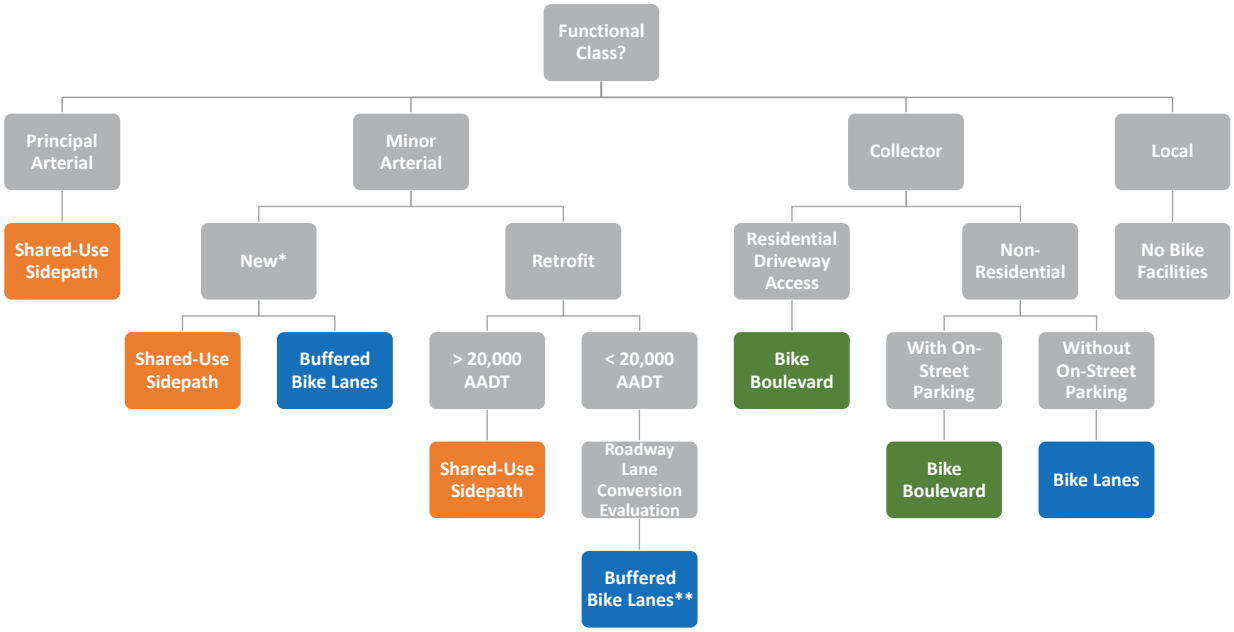
In Texas, it can often feel too dangerous to ride a bicycle if the only option is to share facilities with vehicles. By separating bike lanes from vehicular traffic, bicyclists can ride with a more comfortable sense of safety. Increased signage and wayfinding also helps bicyclists navigate their network, if it is their first time encountering it. Riders of all ages and abilities are more likely to use their bicycle network if they feel accommodated and comfortable while riding.

How to Choose Facility Types?

There are several factors to consider when deciding what bicycle facility type is appropriate for a corridor. These include, but are not limited to, the road's functional classification, traffic volume, and presence of driveways and/or on-street parking.

Speed limit and traffic volumes have a considerable influence on which type of facility should be selected. Separated facilities should be considered on streets with a speed limit over 35 mph and high traffic volumes. If a street has a lower speed limit of 25 to 35 mph and moderate traffic volume, dedicated or shared facilities can accommodate safe bicycle travel. If a street has low speed limit along with low traffic volumes, then it is reasonable to plan for only shared facilities.

A flowchart is provided on the next page to help determine which type of facility is most suited for each road type and traffic condition. This process is most helpful if there is a desire for a bicycle facility on a route not designated on the Bicycle Plan, or if there is a desire to deviate from the Bicycle Plan for any reason. For more guidance on how to choose the appropriate facility type, refer to the Bicycle Toolbox in Chapter 4.



*Based on the City of Lubbock Master Thoroughfare Plan

**Buffered bike lanes to be implemented only if roadway lane conversion is determined to be appropriate based on roadway capacity analysis

Bicycle Plan

The central vision of this plan is to promote a bicycle network that is continuous, complete, and connected. This can be achieved by ensuring that the future network accommodates trips fully from a bicyclist's origin to their destination, free of gaps or unfinished segments.

The goals of this plan are achieved by the following key design considerations:

- Designing for all ages and abilities by providing mostly dedicated and separated bicycle facilities
- Creating improved connections between the outer and inner loop of the city
- Planning future infrastructure that accommodates bicycles and pedestrians without the need to retrofit

It is important to note that this section was from a regional perspective, and does not currently include a section regarding Texas Tech's bicycle network. An individual plan for the campus will part of Texas Tech's Master Plan.

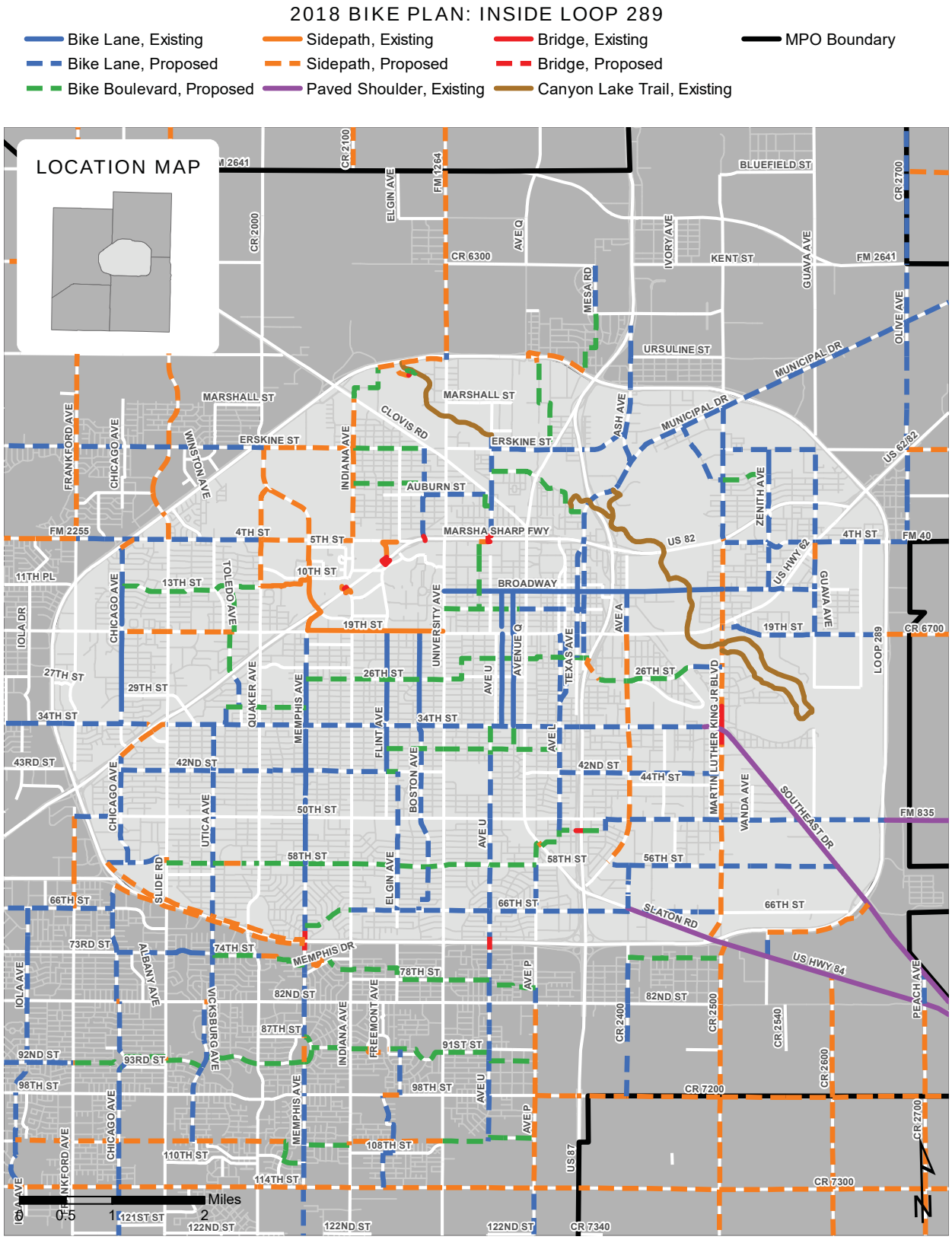
Inside Loop 289

The focus of the Bicycle Plan is divided between two distinct areas of Lubbock:

1. Inside Loop 289
2. Outside Loop 289

Inside Loop 289, most of the roadway infrastructure is built out, and bicycle projects consist of retrofitting existing roads with bicycle facilities. The Bicycle Plan for the inner loop is presented in **Exhibit 10.**

Exhibit 10: Bicycle Plan for Inside Loop 289

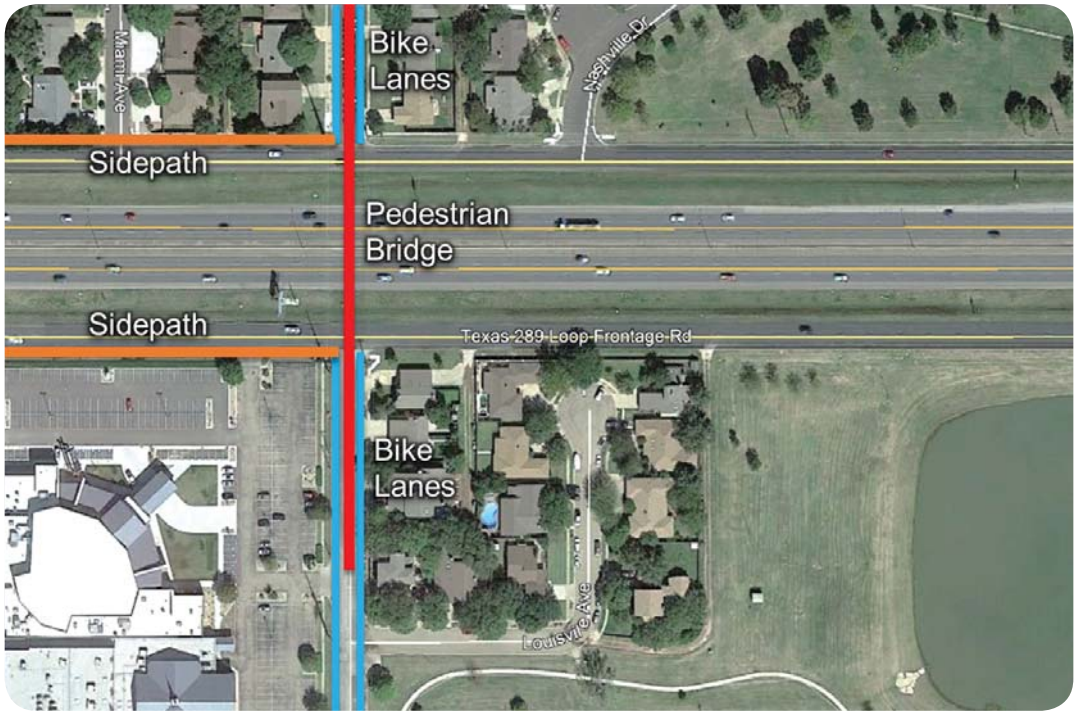


Bridging the Gap

During the public engagement process, one of the main concerns repeated in comments from survey respondents and attendants at the public meetings was the need for a safe crossing at Loop 289. Early in the preliminary planning process, the project team identified Memphis Avenue as a key north-south corridor for bicyclists due to its length, lower speeds, lower volumes and ability to accommodate bike lanes. However, Memphis Avenue does not currently cross Loop 289. Based on these observations, the project team developed a concept to construct a bicycle and pedestrian overpass bridge along Memphis Avenue to create a safe way for users to cross Loop 289. The following sections present the two concept designs developed as potential options for this crossing.

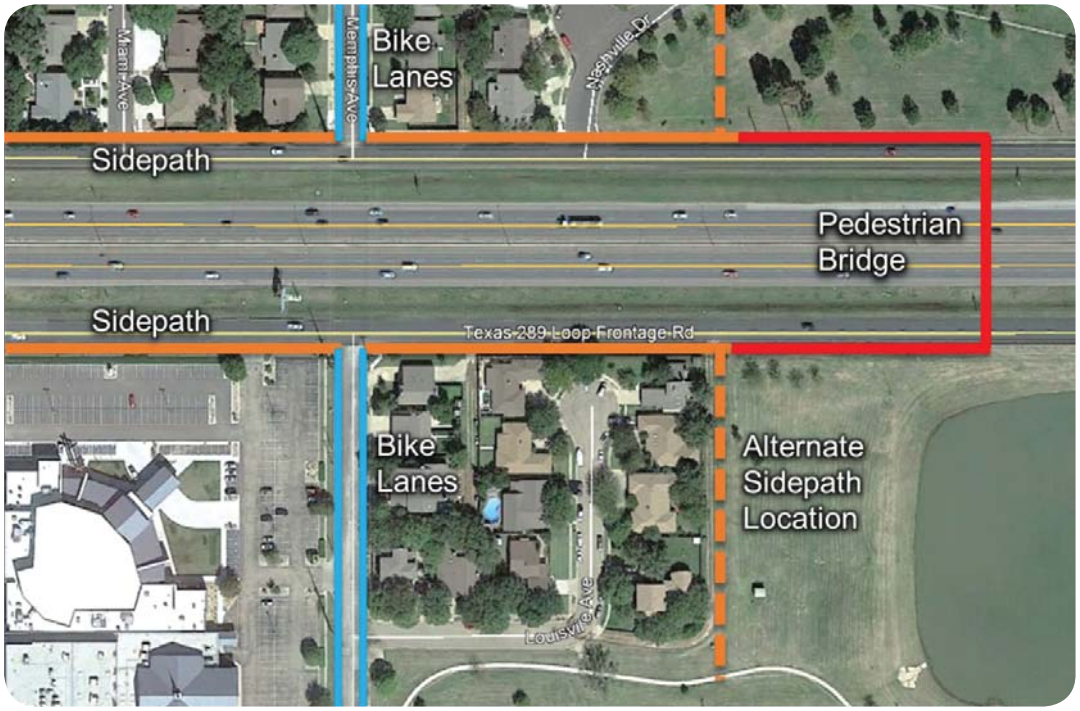
OPTION 1

Option 1 for this bicycle/pedestrian bridge is proposed to be located in the middle of Memphis Avenue. This option allows for a simple, direct, and safe crossing over Loop 289. Due to the slope needed to achieve necessary vertical clearance, the entrance and exit for the crossing are set farther back from the Loop.



OPTION 2

Option 2 for this bridge connects the north and south end of Memphis Avenue in a U-shape design, rather than a straight line. In order to accommodate this design, the bridge must be built just east of Memphis Avenue within existing park space. Shared-use sidepaths would be used to connect Memphis Avenue to the bridge. This option also provides an opportunity to route bicyclists and pedestrians off-street and through the parks on either side of Loop 289 via off-street trails.



Outside Loop 289

Outside Loop 289, the roadway infrastructure is still being built in many areas. This allows for opportunities to incorporate bicycle lanes into new roadway projects from the beginning. Some projects, particularly in the southwest area, will still be retrofit projects on existing roadways.

The bicycle plan outside the loop was based largely on the Master Thoroughfare Plan, due to the number of planned roadways that have not been built yet. Many of the thoroughfares planned outside the loop are Modified Principal Arterials, which incorporate a shared-use sidepath within the right-of-way by design. All of these future roadways were designated as future shared-use paths in the bicycle plan.

The Bicycle Plan outside Loop 289 is presented in four maps. They are as follows:

- **Exhibit 11 – Outside Loop 289 (Northwest)**
- **Exhibit 12 – Outside Loop 289 (Northeast)**
- **Exhibit 13 – Outside Loop 289 (Southwest)**
- **Exhibit 14 – Outside Loop 289 (Southeast)**

Exhibit 11: Outside Loop 289 (Northwest)

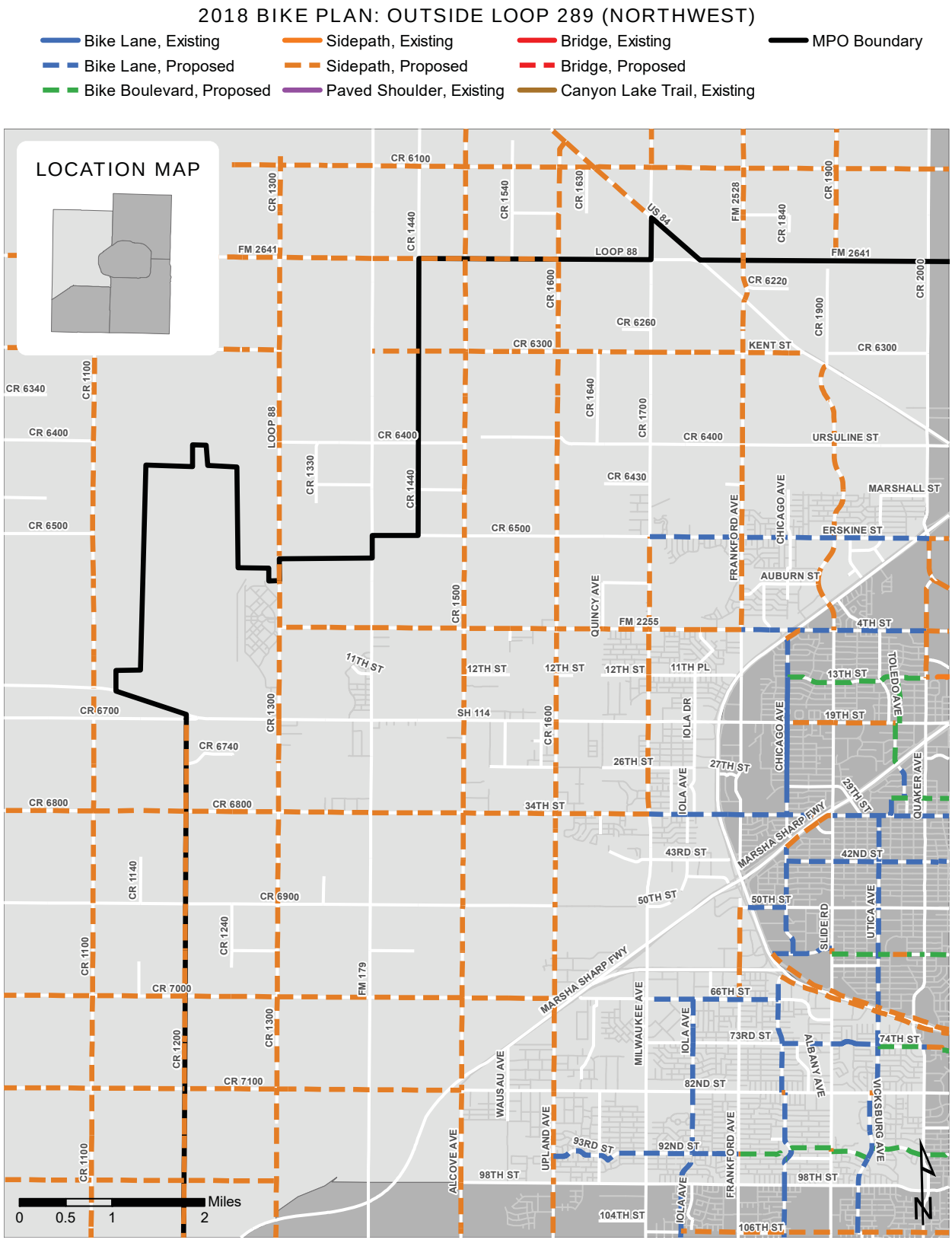


Exhibit 12: Outside Loop 289 (Northeast)

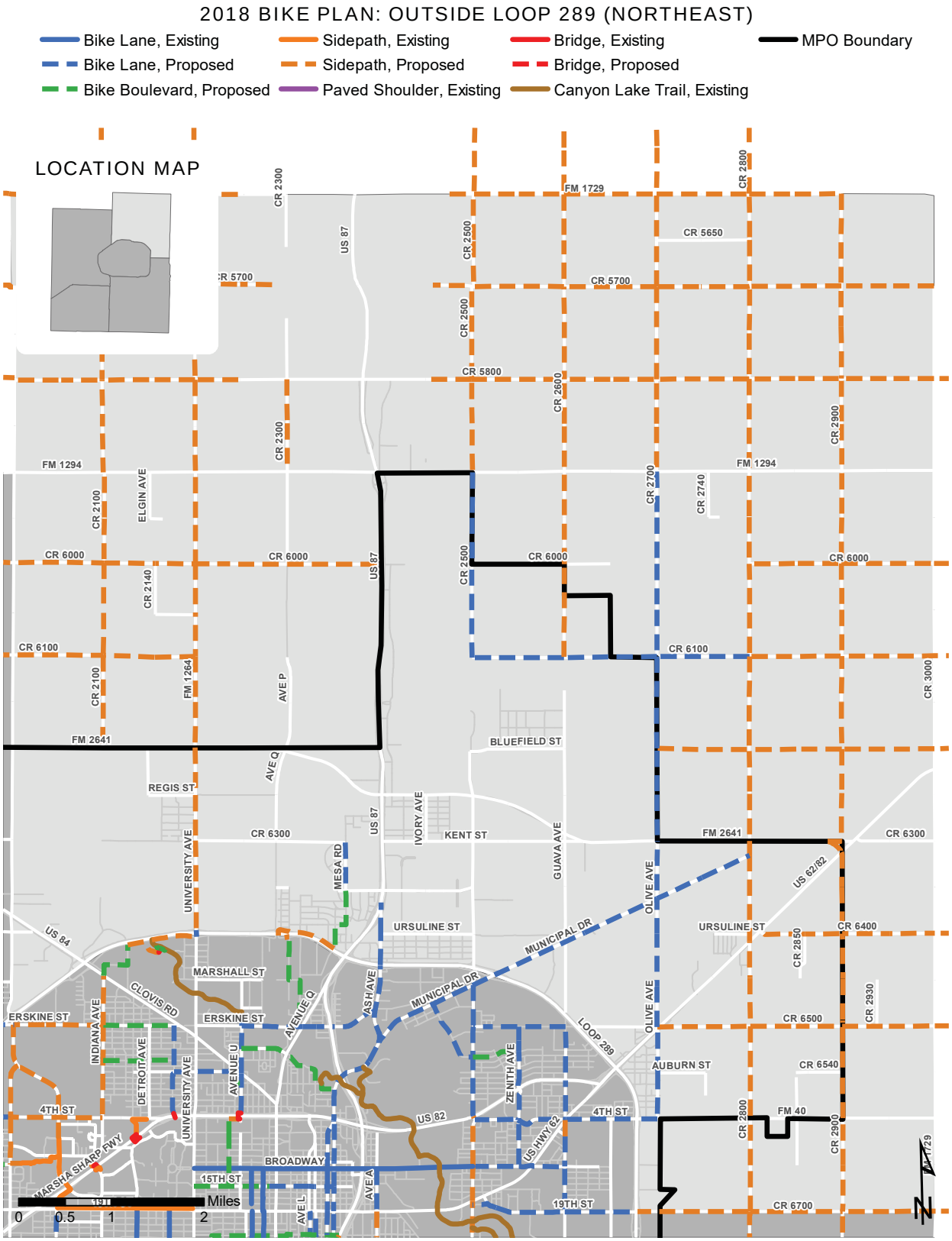


Exhibit 13: Outerside Loop 289 (Southwest)

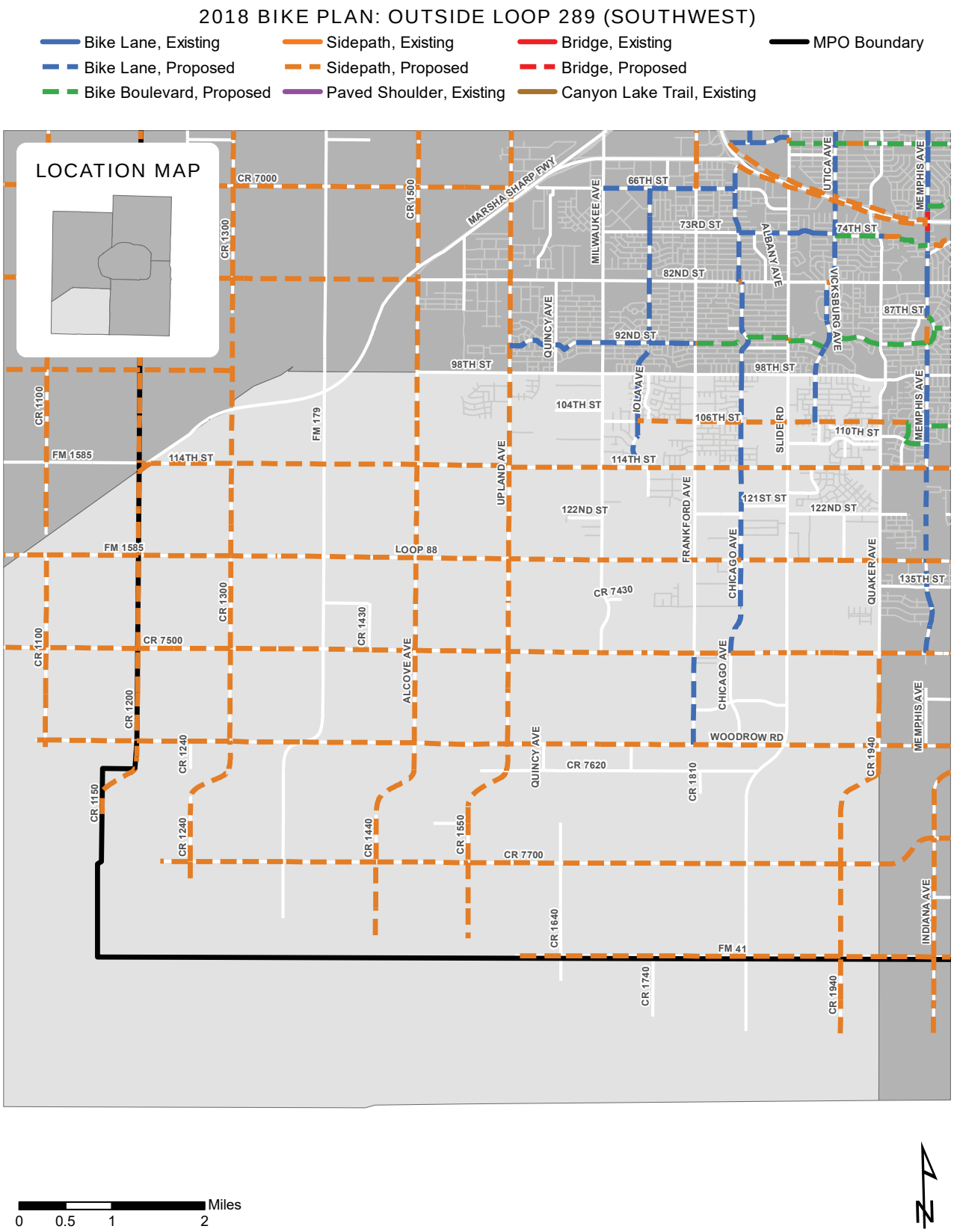
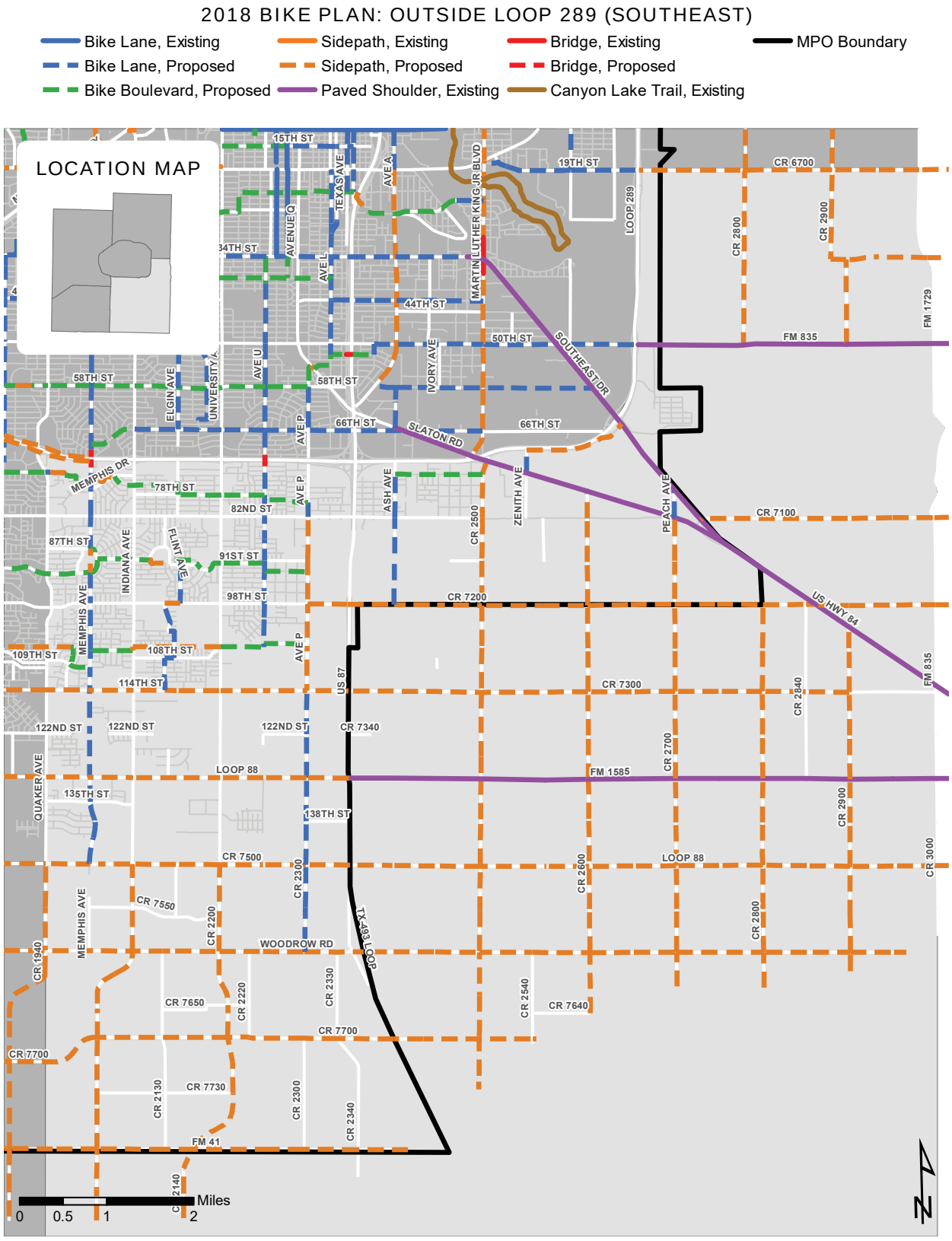


Exhibit 14: Outerside Loop 289 (Southeast)



Summary

This updated bicycle plan heavily expands upon the current bicycle network in Lubbock. A larger focus in this update plan was given to the area around and outside the inner loop in this plan, and provided a better framework for the region's bicycle network. Compared to the previous plan, which focused on the inside portion of the loop, the updated plan is larger in scale and adds over 500 lane-miles of new bicycle facilities. This was achieved by focusing on converting shared facilities into separated ones, adding much more mileage to the network. The table below compares the lane miles of each bicycle facility type of the previous plan to the updated plan.

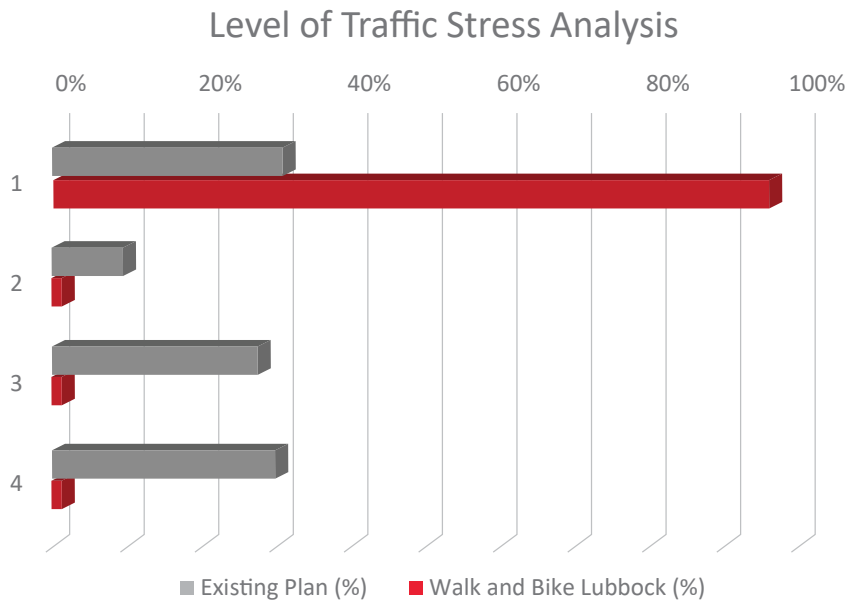
	1994 Bicycle Master Plan		2018 Update Plan	
Facility Type	Previous Plan (Miles)	Percent of System	Updated Plan (Miles)	Percent of System
Bike Routes/Bike Boulevards	132.25	79%	32.21	5%
Bike Lanes	18.56	11%	121.96	18%
Sidepaths/Trails	16.35	10%	526.72	77%
Total	167.16	100%	680.89	100%

* Bicycle Plan is based on City of Lubbock MTP and includes facilities outside the Lubbock MPO boundaries

Level of Stress Analysis

The level of traffic stress (LTS) is a measure of how comfortable it is to bicycle on a given roadway network or segment. It is based on the type of roadway, traffic volumes, speed, and the type of bicycle facilities present (if any). It is scored on a scale of 1-4, with 1 being the most comfortable conditions and 4 being the least comfortable. The project team evaluated the LTS of the previous Bike Plan and compared it to the LTS of the proposed Bicycle Plan presented in this document. Based on the results of the LTS evaluation, the proposed bicycle plan will increase the percentage of roadway miles on the bicycle network with a stress level of 1 from 31% to 96%, as shown below.

LTS	Target Bicycle User Type
1	All Ages and Abilities
2	Interested but Concerned (Mainstream Adults)
3	Enthused and Confident (Adult Commuters)
4	Strong and Fearless (Long-Distance Recreational Bicyclists)



Preliminary Cost Comparison

The table below displays the approximate per mile planning level cost of constructing the new bicycle network. These per mile costs were used to estimate system wide costs, which are separated into new and retrofit projects both inside and outside the loop. In this case, retrofit projects are defined as modifications to existing roadways, including new sidepaths. New projects are defined as bicycle facilities to be incorporated into future roadways and future widening projects.

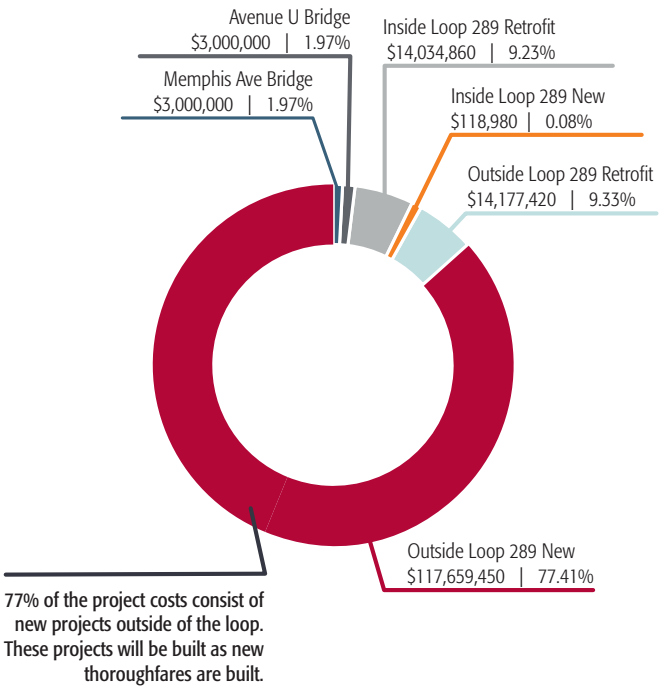
Inside the loop, most bicycle projects are retrofits to existing infrastructure, with some new facilities. Outside the loop, most projects are facilities planned on future roadways and can be incorporated into the cost of the roadway when it is constructed. Given this understanding, the need for dedicated funding for bicycle projects is relatively insignificant compared to the amount of facilities that can be implemented with other projects. It is important to note that the per mile cost estimates are not exact, and the actual design and construction costs may vary by project.

Bicycle Facility	Planning Level Cost* (per mile)
Bike Boulevards (signing and marking)	$6,000
Bike Lanes (Signing and marking)	$35,000
Bike Lane Roadway Lane Conversion** (signing, marking and travel lane reconfiguration)	$50,000-$150,000
10' Shared-Use Sidepath (on both sides of road)	$650,000

*These values represent planning level cost estimates based on past experience. No design or engineering has been performed.

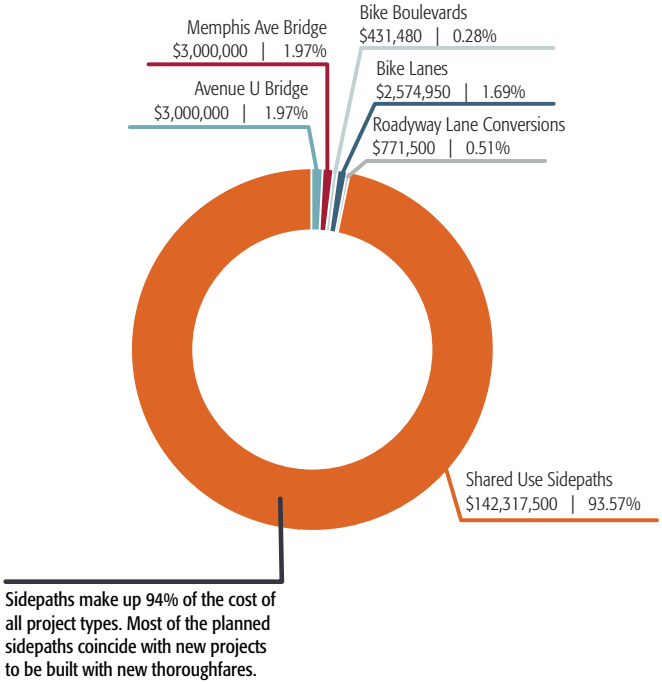
**Planning level cost varies depending on the type of separation buffer implemented with the bicycle facility.

Bicycle Plan Cost Comparison by Project Type and Location



77% of the project costs consist of new projects outside of the loop. These projects will be built as new thoroughfares are built.

Bicycle Plan Cost Comparison by Facility Type



Sidepaths make up 94% of the cost of all project types. Most of the planned sidepaths coincide with new projects to be built with new thoroughfares.

Why Plan for Pedestrians?

During most trips, all travelers become pedestrians for at least a short distance. Whether it's walking from the parking lot, walking to the bus stop, walking to school, walking to work, walking to a restaurant, or taking a stroll with family members — many residents living and working in Lubbock walk to some extent on a regular basis. However, the pedestrian network, which includes sidewalks, ramps near intersections, and pedestrian crossing signals, can make the pedestrian experience either pleasant or uncomfortable. A pedestrian network that makes walking uncomfortable will influence how confident people feel walking, and thus the likelihood that people will walk.

The eight Cs presented in Chapter 1 provide an effective checklist for determining if proposed changes to the pedestrian network will fulfill this plan's vision and accompanying benefits to the environment, health, livability, mobility, and safety.

Economy	A complete pedestrian network comprised of sidewalks, trails, and frequent places to safely cross the street can increase property values and contribute to walkable neighborhoods that are rich in desirable locations. Walkabout neighborhoods can lead to an increase in economic activity. According to a study completed by the Robert Wood Johnson Foundation, property values have shown an increase of $700 to $3,000 for each additional point on WalkScore.
Environment	A complete pedestrian network in neighborhoods has the potential to replace vehicle trips with walking trips, reducing emissions and contributing to cleaner air.
Health	An improved pedestrian network will encourage people of all ages and abilities to walk, whether to school, during the day while at work, or for exercise with friends, improving the overall health of the community.
Livability	A complete pedestrian network can greatly increase the livability of historically underrepresented communities, especially by providing a safe means of transportation for able-bodied citizens who do not own a motor vehicle.
Mobility	A complete pedestrian network improves mobility by adding another option for transportation, including easier access to public transit. Pedestrian connections between destinations that are away from streets can shorten walking trips and connect neighborhoods in a tangible way.
Safety	A complete pedestrian network mitigates safety risks pedestrians take when walking along roads with no sidewalks or enough places to cross the street.

Improving both Pedestrian and Bicycle infrastructure will enable the Lubbock Region to be efficient in how it addresses changes that impact alternative transportation. The pedestrian component of this plan will give the City a blueprint for how to systematically improve Lubbock's pedestrian network.

Using the Pedestrian Toolbox: Responding to Pedestrian Needs

Similar to determining the appropriate infrastructure for the bicycle network, developing an effective pedestrian network requires considering factors such as the context, safety and mobility needs. Toolbox elements described in Chapter 4 provide the range of pedestrian network facilities and strategies available and identifies typical uses.

This section applies toolbox elements to some common concerns that arise when people use or want to use the pedestrian network and provides general guidance on which toolbox elements to consider. Additional guidance on using toolbox elements is provided within the context of the stated concern.

These common concerns are:

- Discontinuous Sidewalk
  - Concern: The sidewalk ends
- Infrequent or No Safe Crossings
  - Concern: I cannot cross the street safely
- High Vehicular Speeds
  - Concern: Motorists are traveling too fast
- Dangerous Intersections
  - Concern: I feel uncomfortable crossing at the intersection
- Auto-Oriented Parking Lots
  - Concern: I don't have a safe place to walk in a parking lot
- Inadequate Rail Crossings
  - Concern: There is no sidewalk or way to know if a train is coming

> I sometimes walk down to the local park with my daughter. There are sidewalks along park of the way so sometimes I have to walk on the street. I wish I could walk on the sidewalk the whole way. Drivers are not very friendly and don't give a lot of space while I'm walking on the street. Also, if there is a sidewalk it goes up and down at every block which is very hard to walk with a stroller on.
>
> - Lubbock Resident

Discontinuous Sidewalk

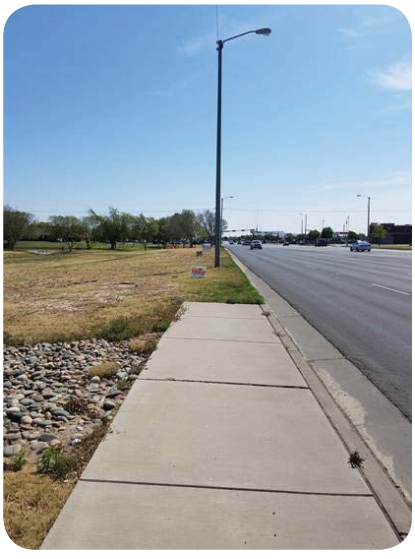
Concern: The sidewalk ends.

A continuous pedestrian network means that a pedestrian walking can expect to find sidewalks and crosswalks along their entire route without having to cross the street or travel on a different, parallel street. Sidewalk gaps and sparsely equipped pedestrian crossings affect mobility choices, even for short trips such as walking to a bus stop, to school, or to the grocery store.

Discontinuous Sidewalk Implementation Countermeasures

Maintaining and completing the existing sidewalk network is equally as important as new standards for where sidewalks should be built. Doing this takes time to identify gaps, then develop a plan to address the gaps. This could be addressed through building a sidewalk inventory to identify and document the existing network and prioritize larger improvement projects. See **Chapter 6, Implementation** for more information.

Crossing signals can be used for mid-block and intersection crossings. Other considerations for the type of crossing signals to install include surrounding land uses, the types of pedestrians (such as pedestrians who might walk more slowly), and the speed and volume of the roadway.



Infrequent or No Safe Crossings

Concern: I cannot cross the street safely.

Safe crossings are most effective by placing them at frequent enough intervals to allow direct routes and reduce pedestrian trip lengths to desired destinations. A safe crossing can be achieved by installing additional signage or signalization that creates an identified space for pedestrians to utilize.

Frequency of Crossings

Establishing enough pedestrian crossings increases the likelihood that people use the crossing instead of choosing a location where the risk of conflicts with motor vehicles may be high. This includes crossings at corners and midblock crossings, as appropriate. When block lengths are long, such as greater than a quarter mile, mid-block crossings help facilitate pedestrian access. The National Association of City Transportation Officials' (NACTO) Urban Streets Design Guidelines recommends that crosswalks be "determined according to the pedestrian network, built environment, and observed desired lines. In general, if it takes a person more than 3 minutes to walk to a crosswalk, wait to cross the street, and then resume his or her journey, he or she may decide to cross along a more direct, but unsafe or unprotected, route.

Defining the Crosswalk

According to the Federal Highway Administration (FHWA), "a crosswalk at an intersection is defined as the extension of the sidewalk or the shoulder across the intersection, regardless of whether it is marked or not. The only way a crosswalk can exist at a midblock location is if it is marked. Most jurisdictions have crosswalk laws that make it legal for pedestrians to cross the street at any intersection, whether marked or not, unless the pedestrian crossing is specifically prohibited."

Crossing Signals

Crossing signals can be used for mid-block and intersection crossings. Other considerations for the type of crossing signals to install include surrounding land uses, the types of pedestrians (such as pedestrians who might walk more slowly), and the speed and volume

Infrequent or No Safe Crossings Implementation Countermeasures

The following table describes Pedestrian Toolbox countermeasures for infrequent or no safe crossings and when they should be used.

Pedestrian Toolbox Element	Mid-block	Intersection	Considerations
Marked Crosswalk	X	X	High visibility crosswalk markings are a best practice for visibility to pedestrians, bicyclists, and motorists, especially along thoroughfares.
			Mid-block crossings are needed for bus stops that are greater than 200' from an intersection.
Curb Ramps	X	X	One curb ramp for each pedestrian path of travel is preferred to a fan or diagonal curb ramp often used at intersection corners.
			Curb ramps should be wide enough to accommodate people traveling in both directions, including people using mobility devices such as a wheelchair.
Pedestrian Lighting	X	X	Street lights should illuminate the pedestrian crossing
Leading Pedestrian Intervals (LPI)		X	At intersections with high volumes of pedestrians and conflicting turning vehicles.
			Locations with large numbers of pedestrians who walk slower such as near schools and senior living areas.

Pedestrian Signals	Rectangular Rapid Flashing Beacon (RRFB)	X	X	Any unsignalized designated crossings of roadways with five or fewer lanes.
				High volume pedestrian and bicycle crossings along priority pedestrian/bicycle routes.
	Pedestrian Hybrid Beacon (HAWK)	X	X	Any unsignalized designated crossings of roadways with seven or more lanes.
				The MUTCD recommends minimum volumes of 20 pedestrians or bicyclists an hour for major arterial crossings.
Pedestrian Signal Timing and Countdown Indicator		X	X	Any signalized intersection or mid-block crossing where pedestrians are present.
Right turn on Red Restrictions			X	Areas with high levels of walking and bicycling, or with pedestrians who walk slower, such as downtown or at a college campus.
Leading Pedestrian Intervals (LPI)			X	At intersections with high volumes of pedestrians and conflicting turning vehicles.
				Locations with large numbers of pedestrians who walk slower such as near schools and senior living areas.

FHWA offers the table below as a guide for when to use the toolbox elements described above based upon the number of travel lanes, vehicle speeds, and number of daily vehicles.

Roadway Configuration	Speed Limit								
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
2 lanes*	❶ 2 3 4 5 6	❶ ❸ 5 6 7	❶ ❸ 5 6 ❼	❶ 3 4 5 6	❶ ❸ 5 6 7	❶ ❸ 5 6 ❼	❶ 3 4 5 6 7	❶ ❸ 5 6 7	❶ ❸ 5 6 ❼
3 lanes with raised median*	❶ 2 3 4 5	❶ ❸ 5 7	❶ ❸ 5 ❼	❶ 3 4 5 7	❶ ❸ 5 ❼	❶ ❸ 5 ❼	❶ ❸ 4 5 7	❶ ❸ 5 ❼	❶ ❸ 5 ❼
3 lanes w/o raised median†	❶ 2 3 4 5 6 7	❶ ❸ 5 6 7	❶ ❸ 5 6 ❼	❶ 3 4 5 6 7	❶ ❸ 5 6 ❼	❶ ❸ 5 6 ❼	❶ ❸ 4 5 6 7	❶ ❸ 5 6 ❼	❶ ❸ 5 6 ❼
4+ lanes with raised median‡	❶ ❸ 5	❶ ❸ 5 7	❶ ❸ 5 ❼	❶ ❸ 5 7	❶ ❸ 5 ❼	❶ ❸ 5 ❼	❶ ❸ 5 ❼	❶ ❸ 5 ❼	❶ ❸ 5 ❼
4+ lanes w/o raised median‡	❶ ❸ 5 6 7 8	❶ ❸ 5 ❻ 7 8	❶ ❸ 5 ❻ ❼ 8	❶ ❸ 5 ❻ 7 8	❶ ❸ 5 ❻ ❼ 8	❶ ❸ 5 ❻ ❼ 8	❶ ❸ 5 ❻ ❼ 8	❶ ❸ 5 ❻ ❼ 8	❶ ❸ 5 ❻ ❼ 8

*One lane in each direction †One lane in each direction with two-way left-turn lane ‡Two or more lanes in each direction

Given the set of conditions in a cell,

❶ Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restriction on crosswalk approach, adequate nighttime lighting levels
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Pedestrian Hybrid Beacon
8 Road Diet

This table was developed using information from: Zegeer, C. V., Stewart, J. R., Huang, H. H., Lagerwey, P. A., Feaganes, J., & Campbell, B. J. (2005), Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines (No. FHWA-HRT-04-100); Manual on Uniform Traffic Control Devices, 2009 Edition, Chapter 4F. Pedestrian Hybrid Beacons; the Crash Modification Factors (CMF) Clearinghouse website (http://www.cmfclearinghouse.org/); and the Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) website (http://www.pedbikesafe.org/PEDSAFE/).

Pedestrian Crash Countermeasures

High Vehicular Speeds

Concern: Motorists are traveling too fast

Vehicular speeds affect safety and comfort for all travelers along roadways in Lubbock, especially pedestrians. The Pedestrian Toolbox includes elements to both reduce vehicular speeds along the road and at intersections. The key to reducing speeds is increasing friction using traffic calming and streetside design. Incorporating streetside elements can cause motorists to slow down, mitigating the effect of speed in an auto-pedestrian crash.

Reducing Speeds Along the Road

Historically, posted speed limits have been established by a set of calculations and factors that do not always account for pedestrians or adjacent land use. Actual speeds can be influenced by roadway design, which is the concept embodied by target speed. Target speed differs from design speed in that design elements are used as the primary mechanism of regulating speed as opposed to posted signs. The following table describes Pedestrian Toolbox speed management elements and when they should be used.

High Vehicular Speeds Implementation Countermeasures

The following table describes Pedestrian Toolbox countermeasures for high vehicular speeds and when they should be used. The following table describes Pedestrian Toolbox speed management elements and when they should be used.

Pedestrian Toolbox Element	To Slow Speeds	To Mitigate the Effect of Speed	Considerations
Traffic Calming	X		Medians and curbside extensions that change the path of travel
			Raised crosswalks or intersections
			Street trees or other visual or tangible ways to narrow the field of vision
			Gateway treatments such as traffic circles with civic elements
Streetside Design	X	X	Street trees and other features such as benches, pedestrian-oriented design, historical information, and public art create a more comfortable environment for pedestrians
			Bus shelters provide a more comfortable environment for riders and can be part of an overall streetside design

Streetside design along University Avenue

Traffic calming along Flint Avenue

Dangerous Intersections

Concern: I feel uncomfortable crossing at the intersection.

Best practices for intersection design and operation is to slow motor vehicle speeds to reduce crash risk between all travelers. Higher speeds affect motorists' ability to see and react to other roadway users, including the most vulnerable: pedestrians.

While pedestrians are especially at risk of being hit by a motorist making a left turn across a crosswalk, they are also at risk of being hit by motorists turning right on a red light. Techniques to reduce crash risks include reducing crossing distances, slowing motor vehicle speeds, and prohibiting motor vehicles from traveling across crosswalks when pedestrians are present.

Improved right-turn crossing

Dangerous Intersections Implementation Countermeasures

The following table describes Pedestrian Toolbox dangerous intersection treatment elements and when they should be used.

Pedestrian Toolbox Element	To Slow Speeds	To Mitigate the Effect of Speed	Considerations
Shortening crossing distances	X	X	Shorter pedestrian crossing distances result from: ▪ Reducing the curb radii ▪ Extending the curb through a bulb-out ▪ Installing a median half-way across a long crossing
			Curb extensions (bulb-outs) can help define on-street parking
			Tight corner radii can accommodate larger vehicles with: ▪ Truck aprons ▪ Bike lanes (especially with buffers)
Operations: No Right turn on Red; permissive (or protected) right- or left-turn phases		X	To be considered where there are large numbers of pedestrians or near schools where children cross
			Can be implemented throughout the day or during peak hours only
			Can be combined with a leading pedestrian interval
			Permissive turns can be leading (i.e., occurring before the walk phase begins) or lagging (i.e., occurring after the walk phase ends)
Slip lane design	X	X	Tighter turning radii and narrow slip lanes can slow motor vehicle speeds and reduce crossing distances.
			Consider converting the slip lane to sidewalk space.

Auto-Oriented Parking Lots

Concern: I don't have a safe place to walk in a parking lot.

Few parking lots are designed with pedestrians in mind, even though all users walk through them at least twice – going to their destination, then coming back to their car. Subdivision and development ordinances can be revised to require pedestrian (and bicyclist) pathways in parking lots. In doing so, three other requirements should be reviewed:

1. the number of parking spaces required;
2. opportunities for shared parking; and
3. parking lot driveway consolidation.

City ordinances set minimum parking requirements for commercial and larger, multi-family developments based upon the anticipated number of motor vehicles the development will generate and anticipated parking occupancy. As cities re-think the way they view pedestrian and bicyclists networks, there is a trend to better define space for these modes in the public right-of-way and large parking lots. When walking in a large parking lot between one's parked car and the building entrance, there is typically not a defined space for pedestrians to use, unless they have parked in a handicapped space. Motorists often are surprised to see pedestrians in motor vehicle travel lanes and can become impatient if they slow speeds or impede access to a parking spot.

Since pedestrians make the trip between car and front door twice, they would benefit from defined space that is safe and direct. This type of space can mitigate various safety risks:

- Parked cars can block the line-of-sight for both pedestrian and motorists;
- People walking along a parking lot aisle with motorists pulling in or backing out creates uncertainty for pedestrians and motorists; and
- People crossing an aisle-way or driveway at the head of a parking lot can be as problematic for them as crossing a moderately busy street.

Illustration of a typical supermarket parking lot without pedestrian pathways

Auto-Oriented Parking Lots Implementation Countermeasures

Some companies are responsive to requests from municipalities to include low impact design features into their parking lots. In doing so, they can incorporate pedestrian walkways. For example, some low impact design features include:

- Providing a sidewalk down the full length of the parking lot every other aisleway
- Providing direct pathway between the adjacent sidewalk and store entrance
- Providing a painted pathway between the parking aisles and the building entrance

These concepts are illustrated in the photos on the next page :

Examples of Improved Pedestrian Accommodations in Parking Lots

Painted Pedestrian Pathway

Sidewalk-to-Storefront Pathway

Full length aisleway sidewalks

Commercial establishments may be hesitant to reduce the number of parking spaces, even if the number exceeds required minimums. On most days, however, motorists tend to park as close as possible to the building entrance in very large parking lots, leaving spaces unused even. Weather and a desire to minimize walking distances are likely factors in the decision where to park. In addition, wide interior aisleways allow more maneuvering space for motorists, especially at locations where there is a greater number of SUVs and trucks. Parking minimum requirements set by zoning codes often limit the amount of space available for walkways and bikeways. In order to provide a safer environment for pedestrians in parking lots, the following may be considered:

- Reducing or removing required minimum parking stalls for some uses
- Require that walkways be included in parking lots with more than 25 stalls
- Require walkways every 150' or every three parking aisles for lots more than 25,000 square feet

Planning for pedestrians in this context should also include travel between locations within a close proximity and travel between residential neighborhoods and commercial areas.

Pathways between buildings. Parking lot layout and buildout should not create awkward routes for pedestrians. For example, if a convenience store and a restaurant are located next to each other, but motorists are required to make a circuitous route through parking lots around a curbed, landscaped area, there should be a short, direct non-motorized path through the landscaped area for people walking and bicycling. Shared parking should also be provided in the zoning code so that patrons can park once and walk among businesses and services clustered together.

From neighborhoods. When residential neighborhoods are located adjacent to retailers with large parking lots, establishing connections between these neighborhoods and retailers can result in a different parking lot design for existing locations and inform building layout during the development phase. For example, in Minneapolis (MN) the Quarry Shopping Center was built with walkways between buildings, so that people walking from nearby destinations do not have to walk around retailer buildings and through parking lots.

Example of shopping center with well-defined pedestrian pathways

Inadequate Rail Crossings

Concern: There is no sidewalk or way to know if a train is coming.

Railroad crossings are especially important to ensure that all users are aware of a train approaching, and aware of having to cross the tracks, which can pose a physical challenge for certain pedestrians.

Inadequate Rail Crossings Implementation Countermeasures

Elements that can be used to improve railroad crossings include:

- Ensuring that crossings are perpendicular to train tracks
- Adding pedestrian gates or arms
- Implementing barriers or fences to channelize users to the safest crossing.
- Public Education Campaign

Well-equipped railroad crossing in rural Ohio town

Railroad line owners are partners in establishing safe crossings, as they work to increase safety and manage their liability.

Dunbar-Manhattan Heights Crossing Example

Lubbock has several freight rail lines operated by BNSF and the West Texas and Lubbock railroads. All lines concentrate in the Dunbar-Manhattan Heights neighborhood and adjacent areas, owing to a rail yard. Land uses in the area are a mix of industrial and residential. There are limited opportunities to cross this rail yard. The primary location is along 24th Street where this a small, uninviting sidewalk. Improving the 24th crossing and exploring other safe crossing opportunities closer to 34th Street is recommended. In addition, there are no level (i.e., at- no barriers to prevent people walking along or crossing the tracks which can create unsafe conditions.

The map below shows an example of where a safe pedestrian rail-crossing could be implemented to provide another path for pedestrians between the Dunbar-Manhattan Heights neighborhood and other areas west of the train tracks.

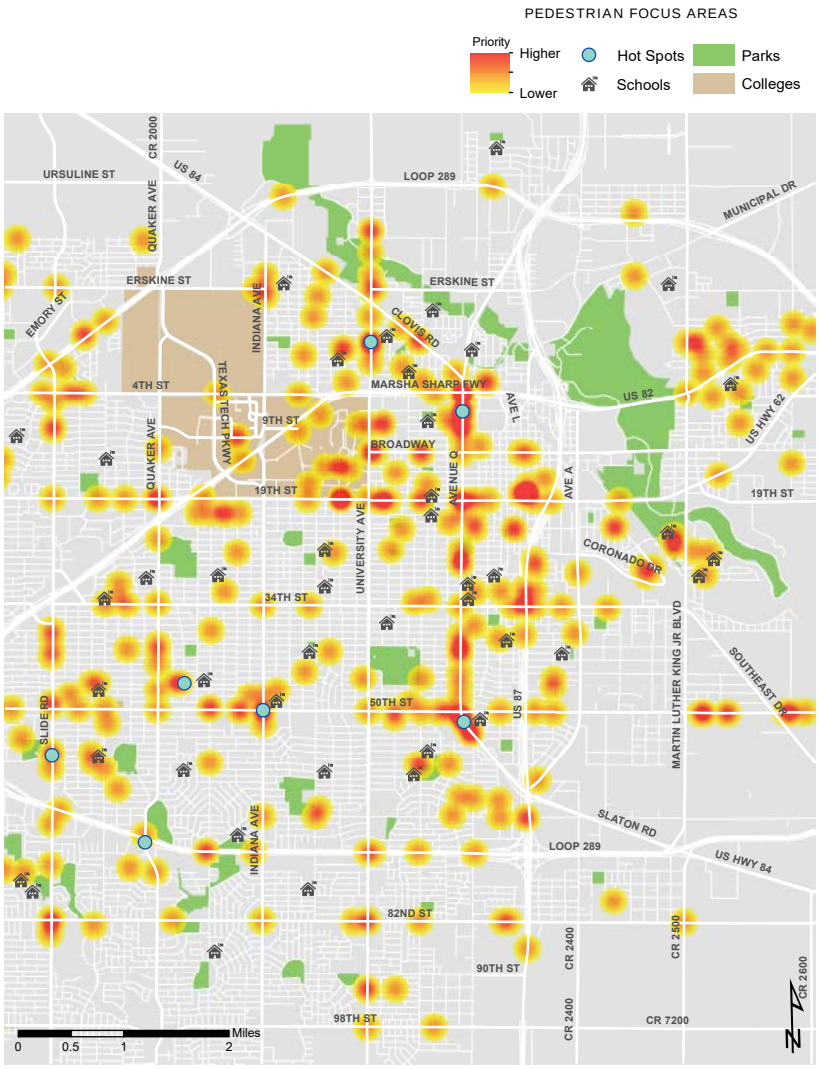
Pedestrian Plan

How does all this work in Lubbock?

While it is unrealistic to immediately implement pedestrian network improvements along every roadway and at every intersection in Lubbock, certain locations have a higher need for pedestrian infrastructure. For Lubbock's Pedestrian and Bicycle Master Plan, the toolbox was applied to about two dozen example locations based on a set of criteria. The four basic criteria used for determining priority locations were:

- More than four pedestrian crashes between 2012 and 2017
- Located along a transit route
- Located near schools and other amenities
- High proportion of households that do not own a vehicle and older adults

The map shown to the right shows the result of the data-driven prioritization. Selecting which of these areas to use as examples for applying the toolbox was the next step.



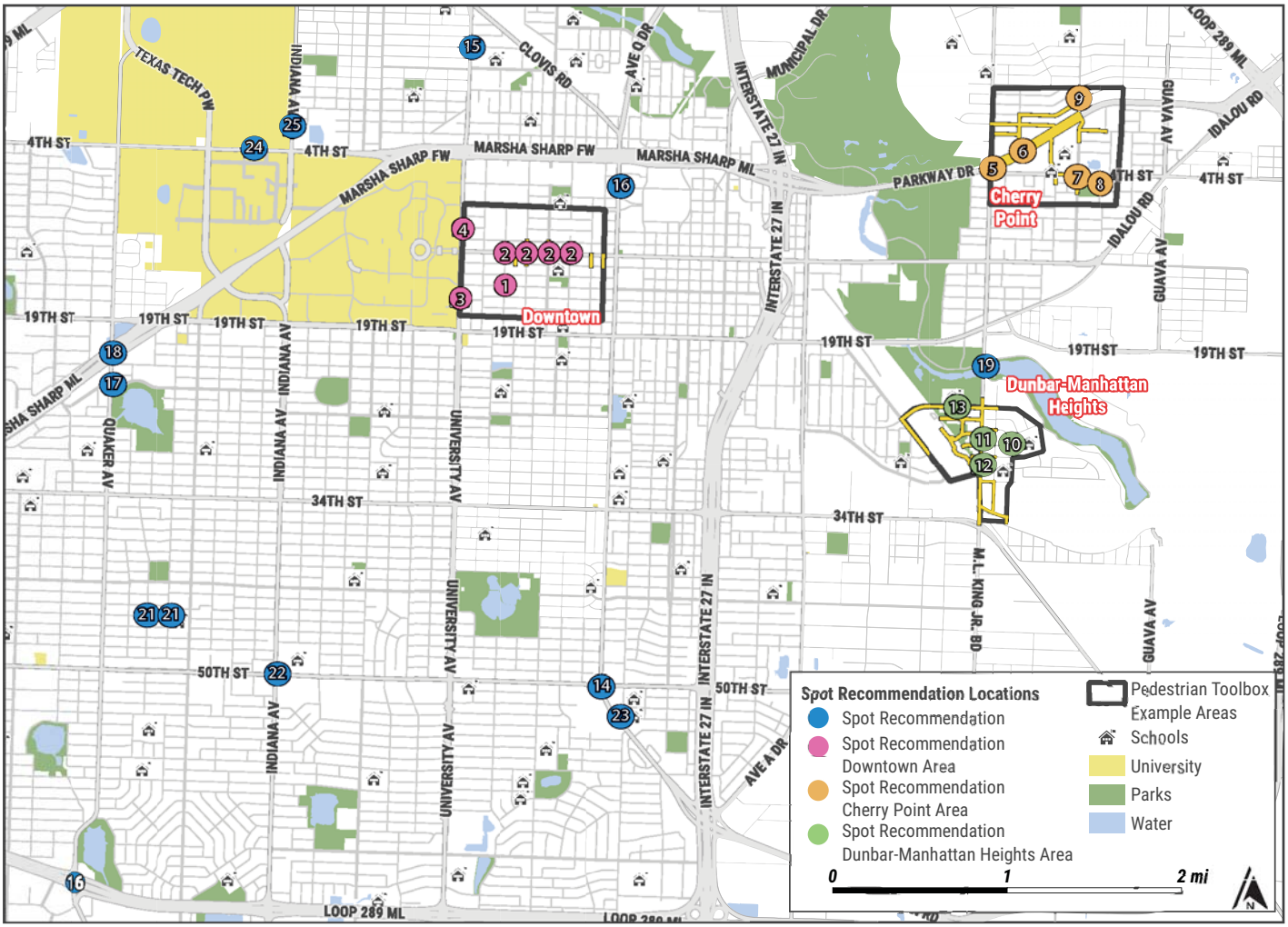
The Pedestrian Plan: Implementation Examples

The Pedestrian Plan included in here provides tools for future action through resources, examples, and policy direction. It reflects answers to several questions such as:

- What are the goals for the eight Cs, especially continuous, connectivity, coherent, compliant?
- What types of facilities that benefit pedestrians and encourage walking make sense for Lubbock?
- Are there priority networks? Or priority destinations?
- How do we establish an implementation plan based on priority networks and destinations?
- How soon will the resources included here be used?

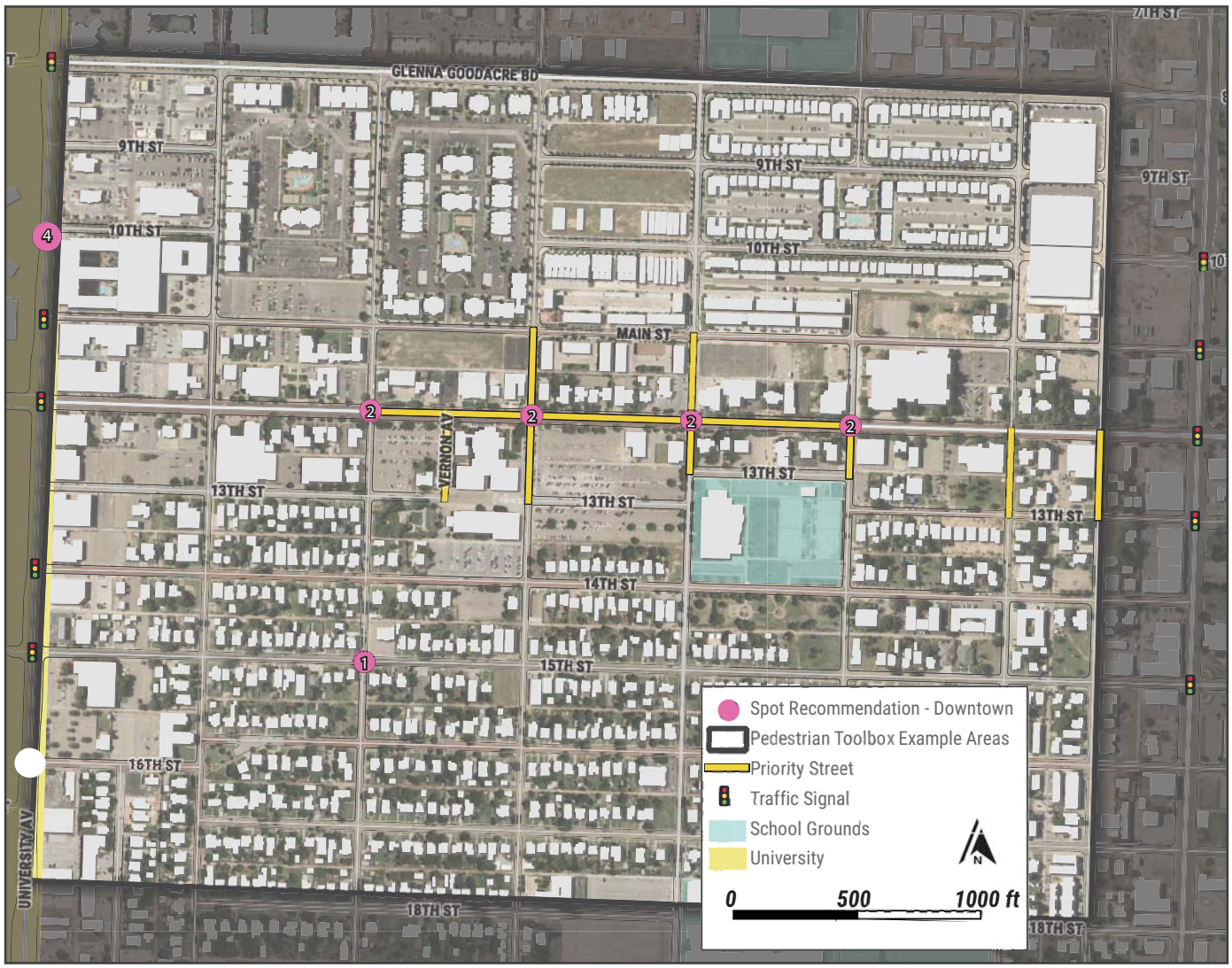
Applying the Pedestrian Toolbox and Counter Measures

The prioritization and toolbox resources described in above sections were applied to a series of locations identified through the prioritization process. These example locations serve as a model for identifying and implementing projects going forward. The location selected, shown on the Citywide overview map below and the accompanying table, represent typical issues for pedestrians with respect to safety, comfort and connectivity. The locations were selected, based on the data-driven analysis described above and stakeholder input, provide an opportunity to apply a range of facility types included in the toolbox. The project team visited each location shown in the map above and applied infrastructure elements from the pedestrian toolbox. Following overview map is a series of maps which display at concept-level these infrastructure elements. The below table shows toolbox elements used in the example areas.



	Map Number	Improvement Location	Bus Stop Shelter and Landing Pads	Curb bulb outs, curb radii	Curb Ramps and detectable warning surface	Marked Crosswalks	Medians	Multiuse Trails	Other turn restrictions	Pedestrian capacity at corners	Pedestrian Hybrid Beacon	Pedestrian Signal	Pedestrian Signal Timing and Countdown Indicator	Rectangular Rapid Flash Beacon	Road Diet, Roadway re-allocation	Sidewalks	Slip lane modification	Stop signs
Priority Areas		**Downtown**	●	●	●	●						●						
	1	Avenue W and 15th St		●	●													
	2	Broadway St at Study Area Intersections	●	●	●	●												
	3	University Ave and 16th St			●	●						●						
	4	University Ave and 10th St			●	●						●						
		Cherry Point		●	●	●	●				●			●		●		●
	5	MLK Jr. Blvd and Parkway Dr		●	●	●										●		
	6	Redbud Ave and parkway Dr			●	●	●				●							●
	7	Zenith Ave and E 4th St		●	●	●										●		●
	8	Beech Ave and E 4th St		●	●	●								●		●		●
	9	Zenith Ave and E Auburn St		●	●	●	●											●
		Dunbar-Manhattan Heights		●	●	●	●				●			●		●		
	10	Teak Ave and E 27th St		●	●	●										●		
	11	MLK Jr. Blvd and Canyon Lake Dr		●	●	●	●				●							
	12	MLK Jr. Blvd and E 29th St		●	●	●					●							
	13	E 24th St and Oak Ave		●	●	●	●											
Spot Improvements	14	50th St and Avenue Q			●	●	●						●			●		
	15	University Ave and Baylor Street			●	●	●				●					●		●
	16	Avenue Q and Mac Davis Lane		●	●	●	●		●									
	17	Quaker Ave and 24th St		●	●	●	●		●							●		
	18	Quaker Ave and Ramps to Marsha Sharp Freeway			●	●										●	●	
	19	ML King Jr. Blvd and Canyon Lake Dr			●	●	●				●				●	●		
	20	Quaker Ave and Loop 289				●							●					
	21	45th St and Orlando Ave		●	●	●												
		45th St and Nashville Ave		●	●	●												
	22	50th St and Indiana Ave					●			●						●		
	23	Avenue Q and Avenue P		●	●	●										●		
	24	4th St west of Joliet Ave			●		●	●			●				●			
	25	Indiana Ave south of 2nd Place			●	●	●	●			●							

Pedestrian Toolbox Example Areas – Downtown

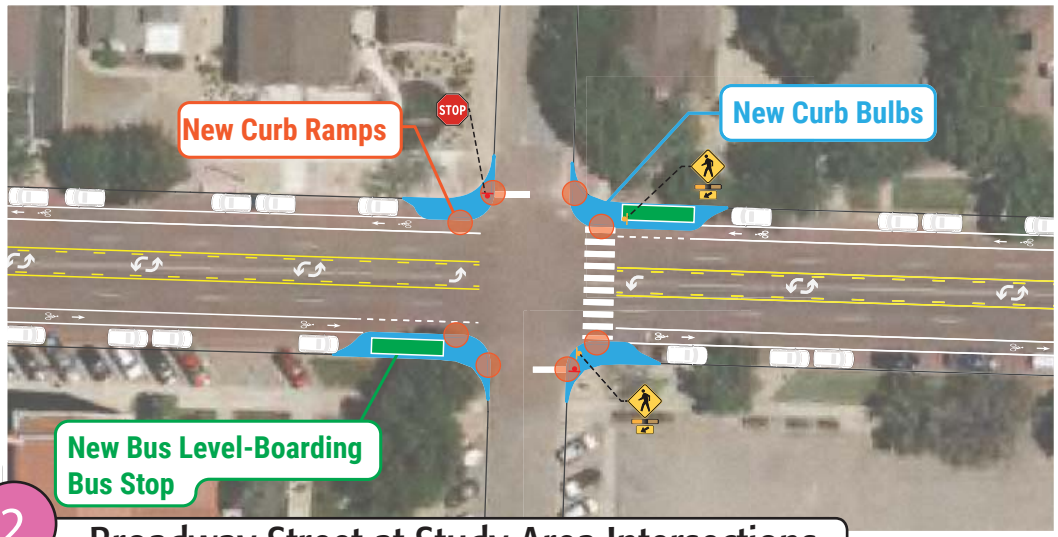


Downtown Spot Improvements

1 Avenue W and 15th Street

RECOMMENDATIONS

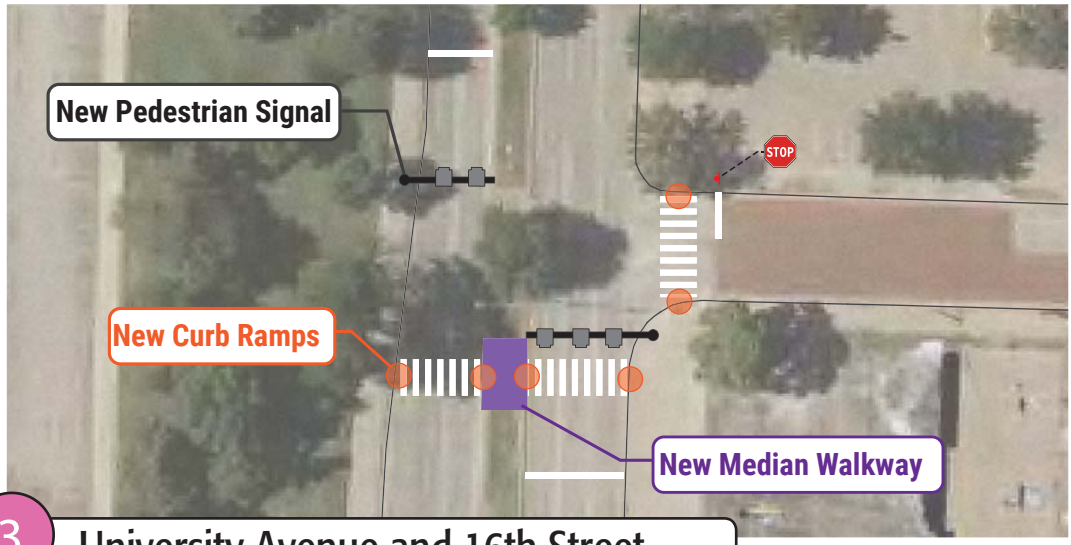
- Construct curb bulbs with ADA ramps to shorten pedestrian crossing distance to slow turning vehicle speeds
- Curb bulbs will need to designed to work with the existing traffic circle to allow motorists to safely travel through the intersection



2 Broadway Street at Study Area Intersections

RECOMMENDATIONS

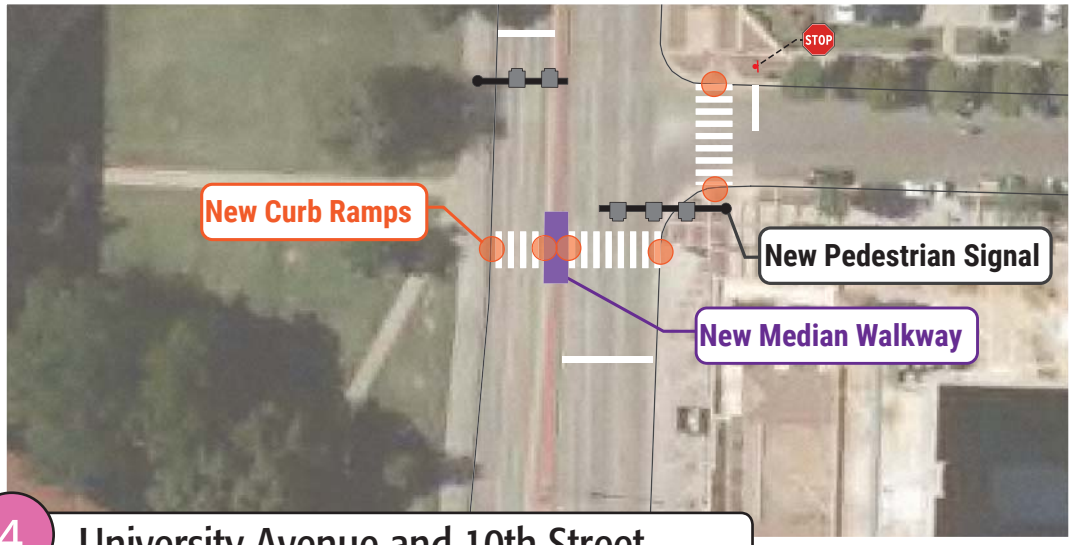
- Install curb bulbs to shorten pedestrian crossing distance and turning vehicle speeds and provide level-boarding at bus stops



3 University Avenue and 16th Street

RECOMMENDATIONS

- Install pedestrian signal and coordinate with existing traffic signals
- Install high-visibility crosswalks with pedestrian crossing signage, modified existing median to accommodate pedestrian travel, and ADA ramps



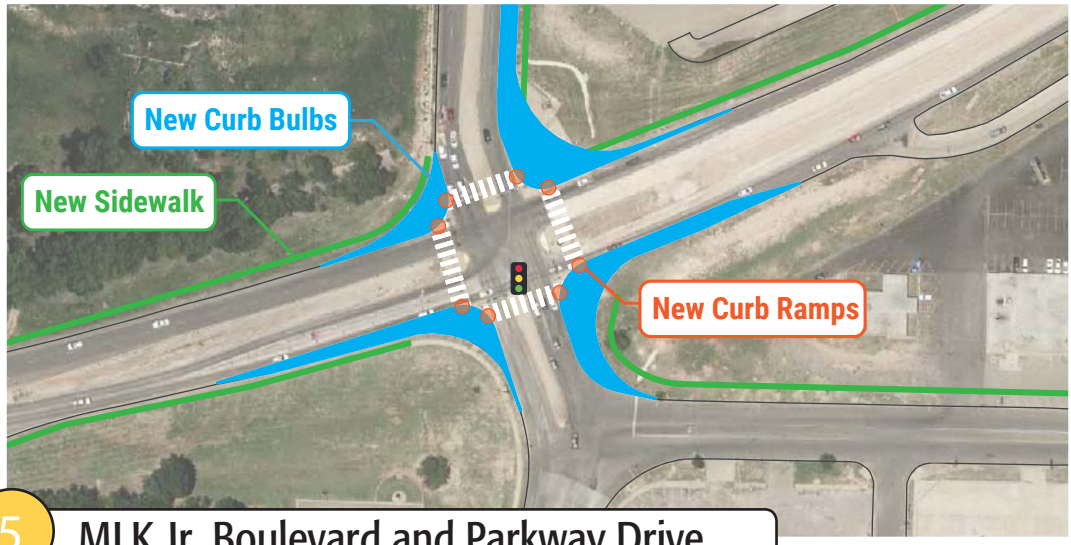
4 University Avenue and 10th Street

RECOMMENDATIONS

- Install pedestrian signal and coordinate with existing traffic signals
- Install high-visibility crosswalks with pedestrian crossing signage, modified existing median to accommodate pedestrian travel, and ADA ramps

Pedestrian Toolbox Example Areas – Cherry Point

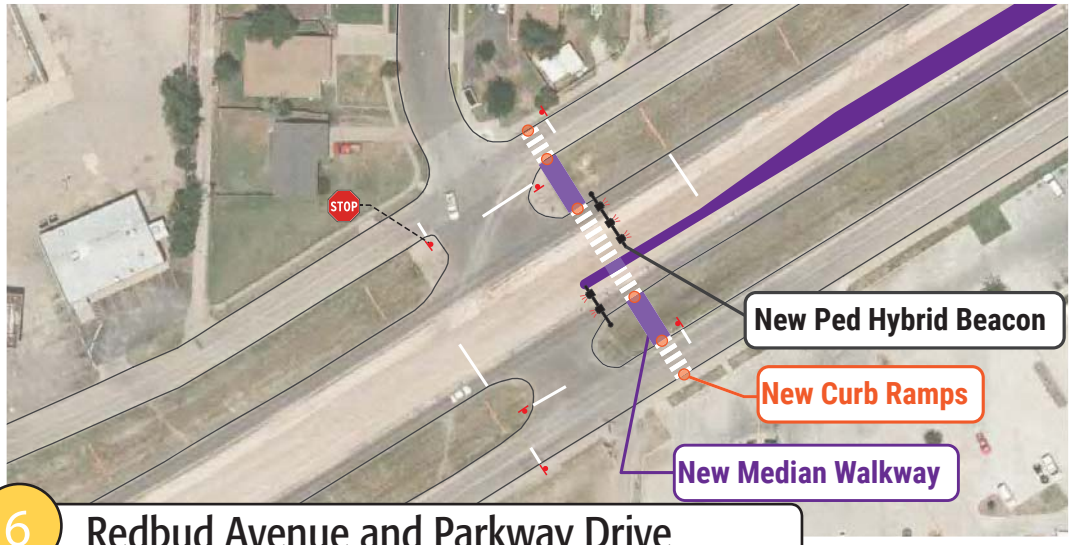
Cherry Point Spot Improvements



5 MLK Jr. Boulevard and Parkway Drive

Recommendations

- Construct curb bulbs with high-visibility crosswalks and ADA ramps to shorten pedestrian crossing distance to slow turning vehicle speeds
- Install sidewalks to fill existing sidewalk gaps



6 Redbud Avenue and Parkway Drive

Recommendations

- Install Pedestrian Hybrid Beacons with stop bars and crosswalks
- Install stop signs at cross streets
- Modify existing medians to provide pedestrian walkways with ADA ramps

7 Zenith Avenue and E 4th Street

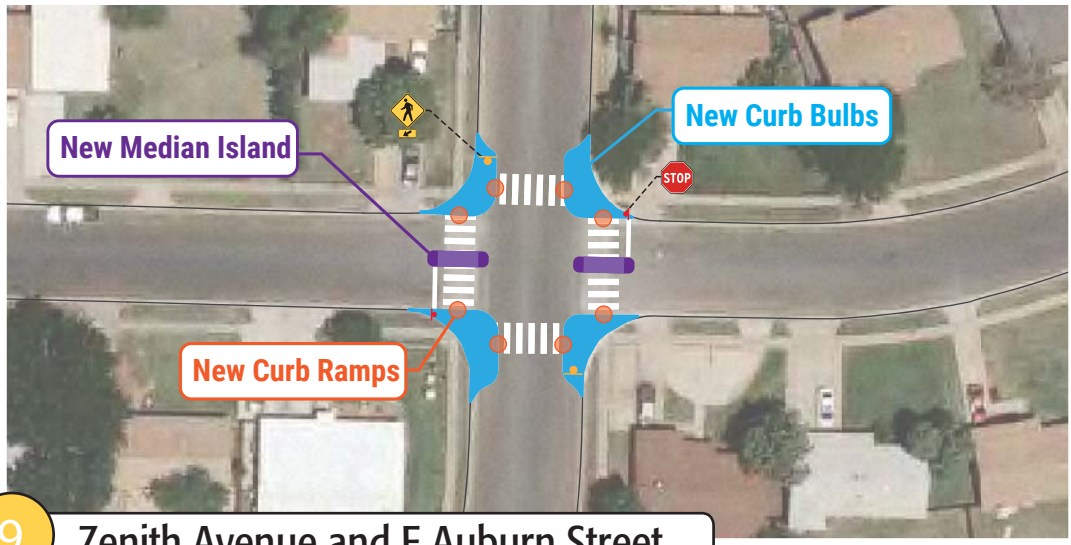
Recommendations

- Construct curb bulbs with ADA ramps to shorten pedestrian crossing distance and slow turning vehicle speeds
- Install high-visibility crosswalks with crossing signage and stop signs on Zenith Avenue
- Construct sidewalks to fill existing sidewalk gaps

8 Beech Avenue and E 4th Street

Recommendations

- Construct curb bulbs with ADA ramps to shorten pedestrian crossing distance and slow turning vehicle speeds
- Install high-visibility crosswalks with RRFBs and stop signs on Beech Avenue
- Construct sidewalks to fill sidewalk gaps



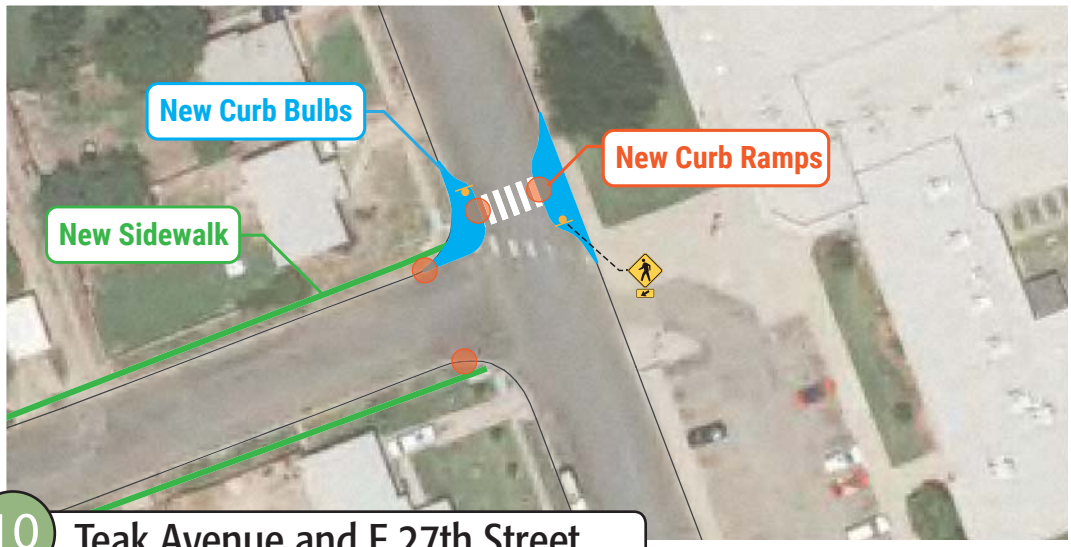
9 Zenith Avenue and E Auburn Street

Recommendations

- Construct curb bulbs with ADA ramps to shorten pedestrian crossing distance and slow turning vehicle speeds
- Install high-visibility crosswalks with crossing signage
- Construct a median crossing island

Pedestrian Toolbox Example Areas – Dunbar-Manhattan Heights

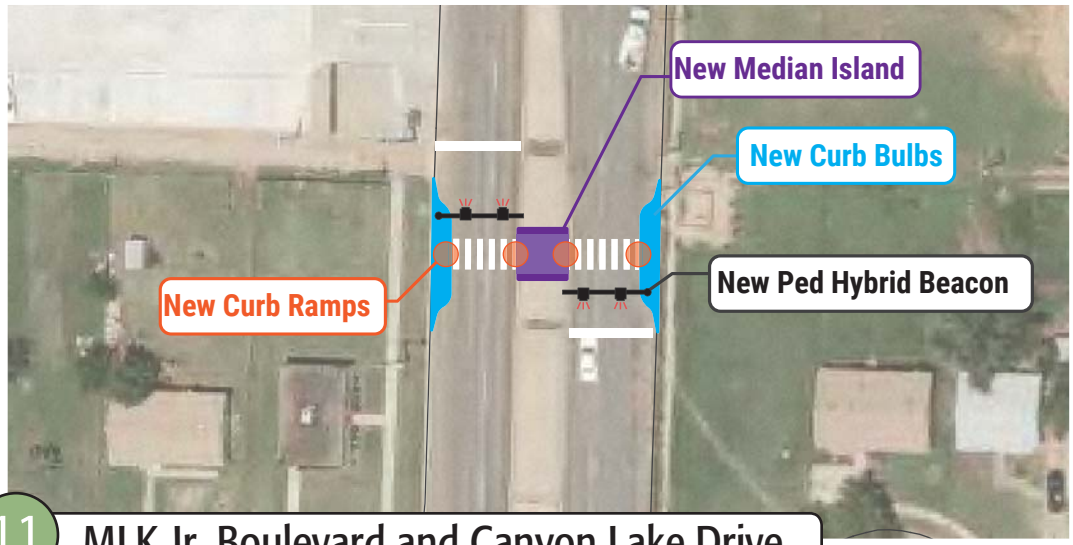
Dunbar-Manhattan Heights Spot Improvements



10 Teak Avenue and E 27th Street

Recommendations

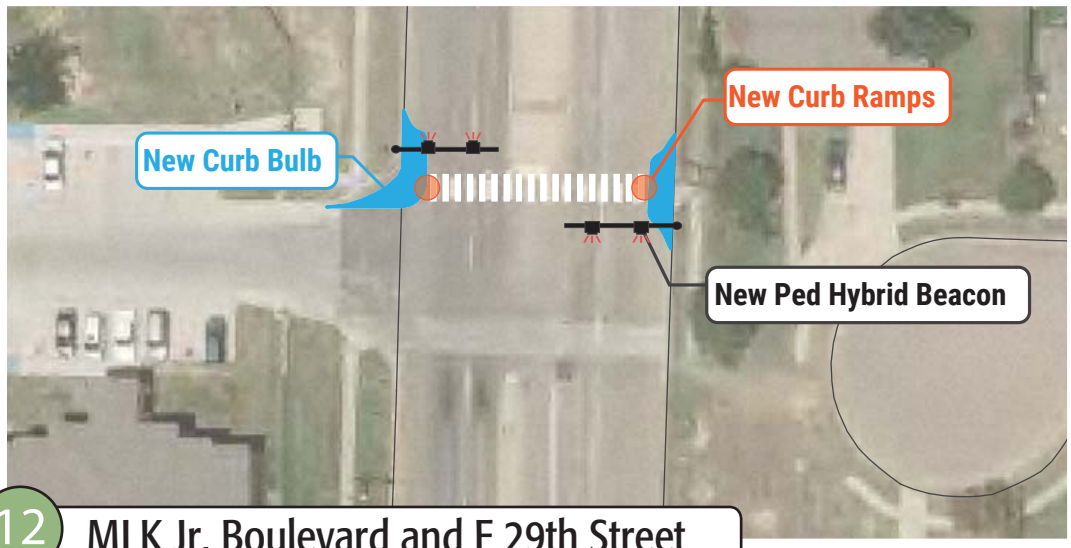
- Construct curb bulbs to shorten pedestrian crossing to Dunbar Middle School
- Install high-visibility crosswalks with pedestrian crossing signage
- Install new ADA curb ramps at crossings
- Construct sidewalks along E 27th Street



11 MLK Jr. Boulevard and Canyon Lake Drive

Recommendations

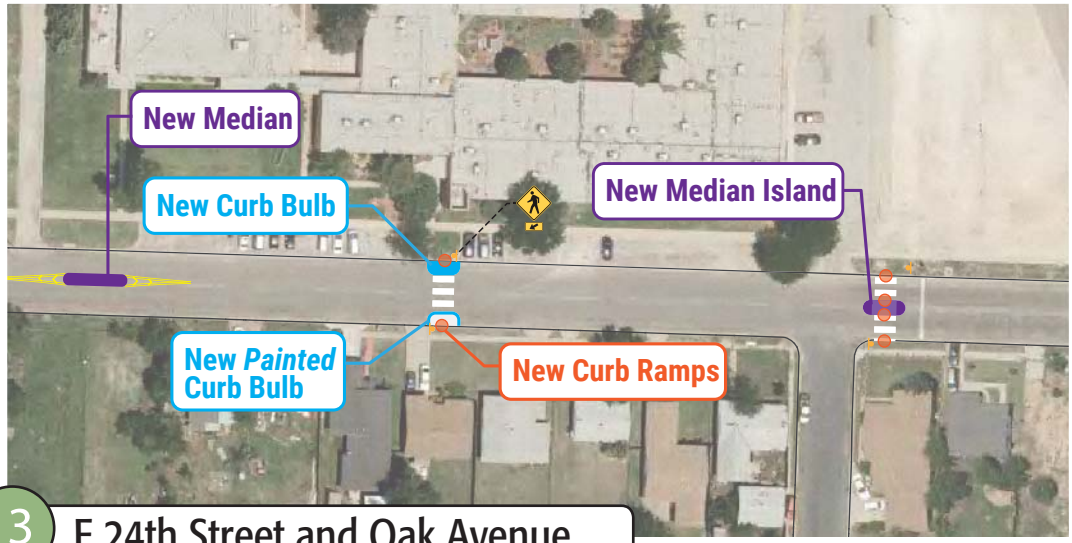
- Install high-visibility crosswalks with pedestrian crossing signage, pedestrian median island, and ADA ramps
- Install Pedestrian Hybrid Beacons with stop bars



12 MLK Jr. Boulevard and E 29th Street

Recommendations

- Construct curb bulbs with ADA ramps to shorten pedestrian crossing distance and slow turning vehicle speeds
- Install high-visibility crosswalks with Pedestrian Hybrid Beacons to improve crossing and provide a better connection to existing bus stops

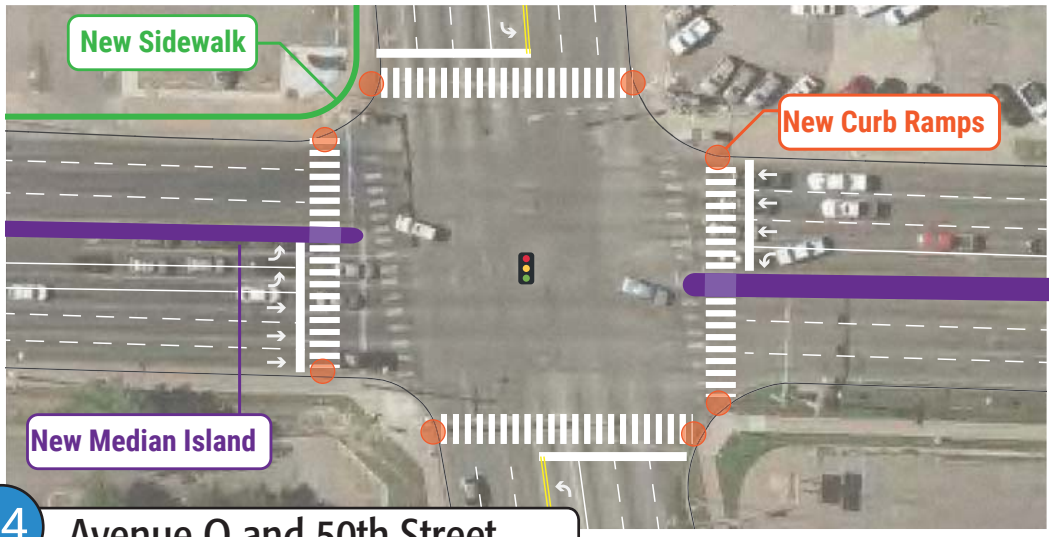


13 E 24th Street and Oak Avenue

Recommendations

- Install pedestrian crossing signage and construct curb bulbs (concrete and painted) with ADA ramps to shorten pedestrian crossing distance and slow turning vehicle speeds
- Install medians to slow vehicle speeds along E 24th Street

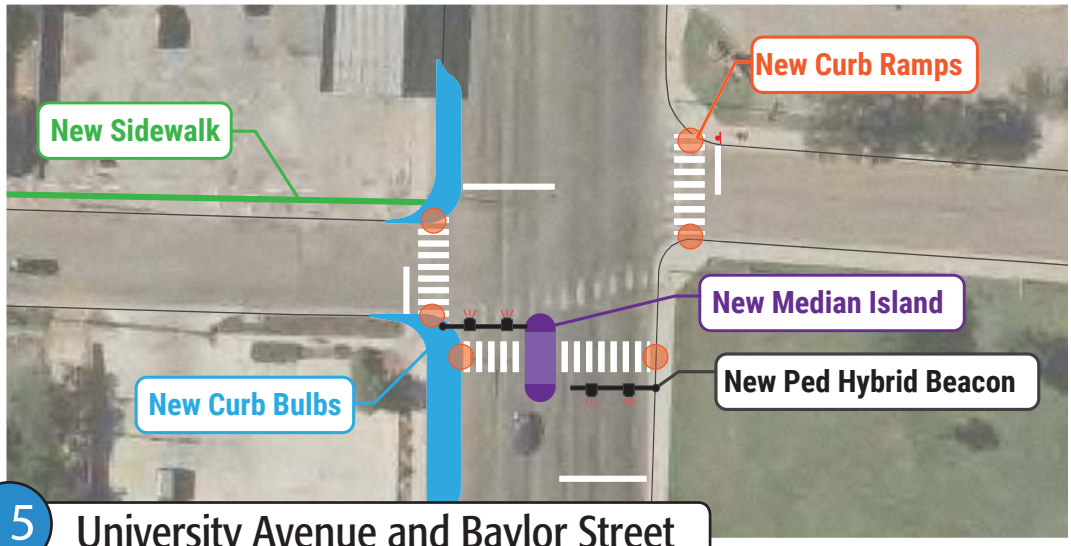
Pedestrian Toolbox Example Areas – Spot Improvements



14 Avenue Q and 50th Street

Recommendations

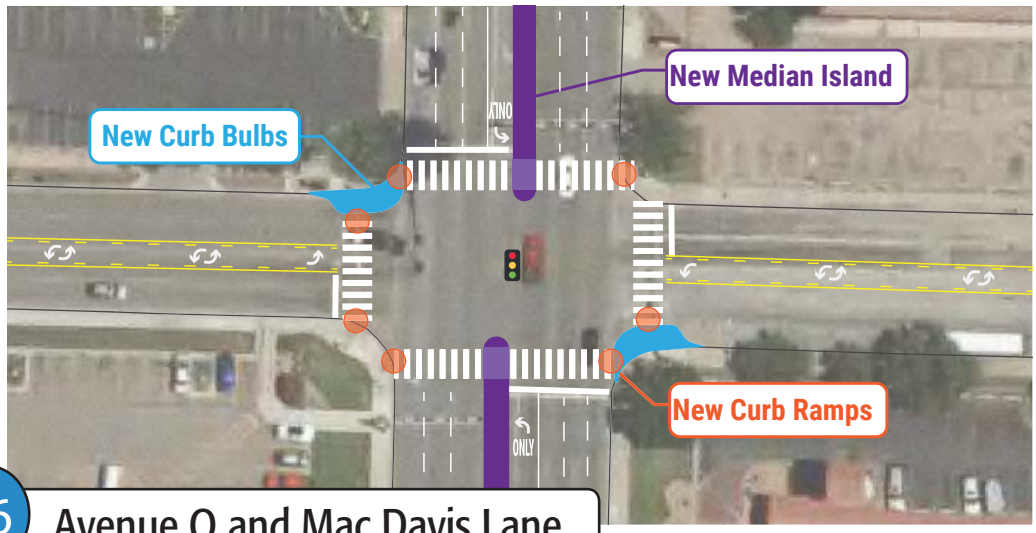
- Install high-visibility crosswalks with new median crossing islands, pedestrian crossing signage, and ADA curb ramps
- Construct sidewalk to fill existing sidewalk gap
- Install pedestrian push buttons and ensure appropriate pedestrian crossing signal times
- Install six-foot pedestrian island to cross 50th Street



15 University Avenue and Baylor Street

Recommendations

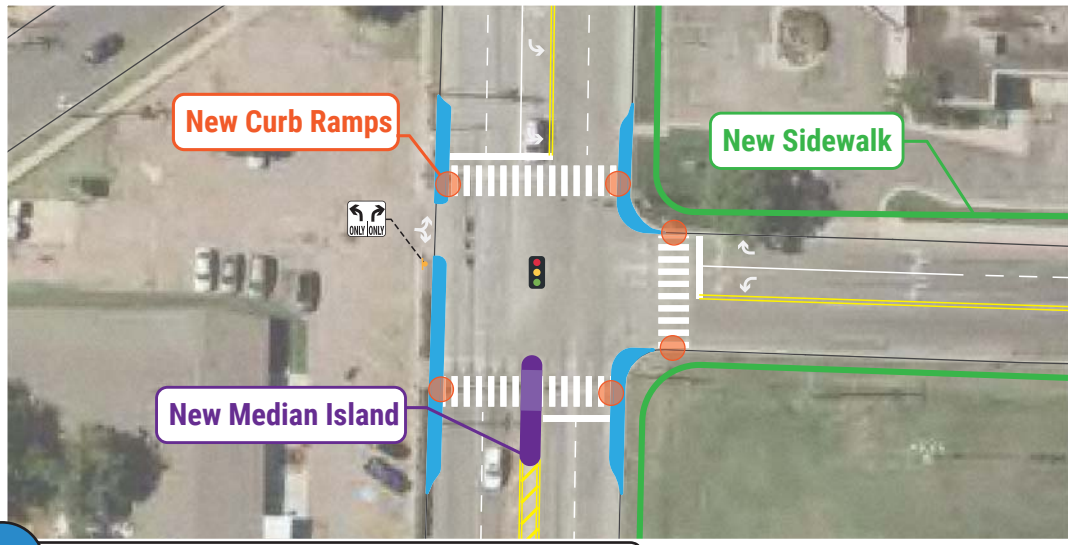
- Install Pedestrian Hybrid Beacons with stop bars
- Construct median island with ADA ramps and high-visibility crosswalk
- Install sidewalk to fill existing sidewalk gap



16 Avenue Q and Mac Davis Lane

Recommendations

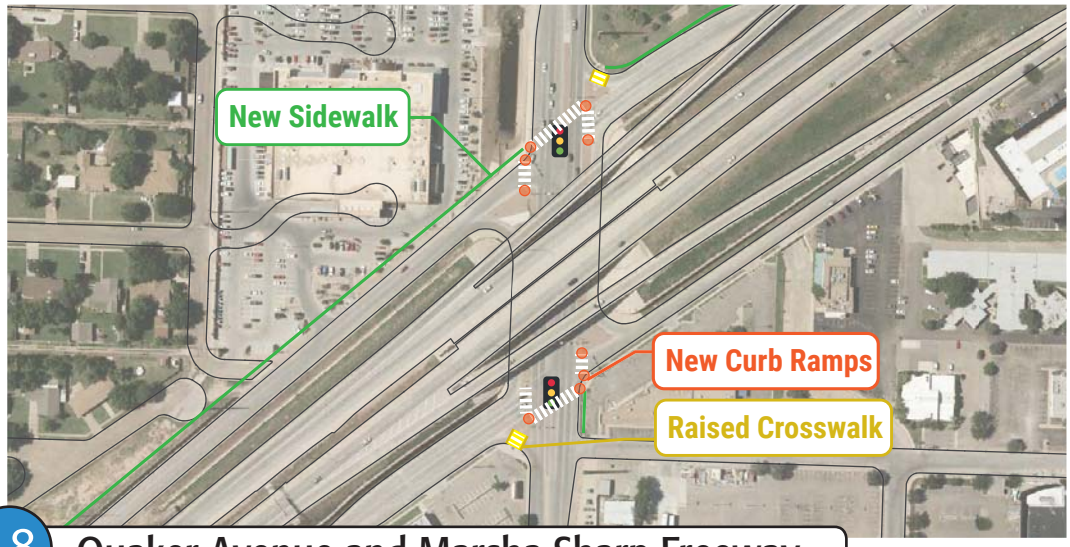
- Install high-visibility crosswalks with curb bulbs, pedestrian crossing signage, pedestrian crossing islands, and ADA ramps
- Stripe 'RIGHT ONLY" lanes on cross streets to accommodate curb bulbs
- Install new median island with consideration for entire length of Avenue Q left-turn offsets
- Roadway lane conversion on Mac Davis Lane



17 Quaker Avenue and 24th Street

Recommendations

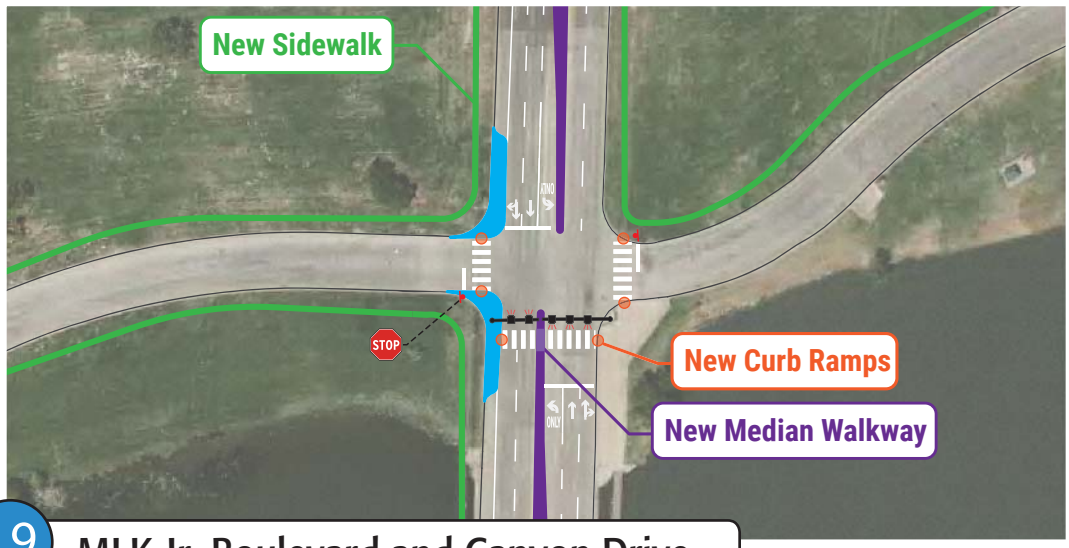
- Install high-visibility crosswalks with curb bulbs and ADA ramps
- Install "LEFT ONLY" and "RIGHT ONLY" signage at driveway
- Construct sidewalks to connect to fill existing sidewalk gaps
- Install median crossing island where there is an existing striped median
- Stripe "LEFT ONLY" and "RIGHT ONLY" lanes on 24th Street



18 Quaker Avenue and Marsha Sharp Freeway

Recommendations

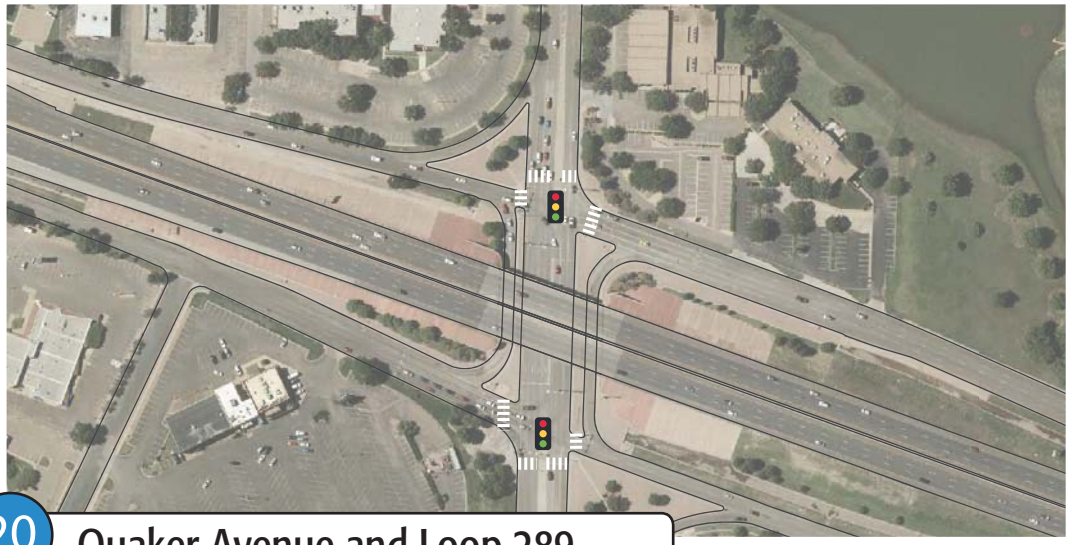
- Install high-visibility crosswalks with pedestrian crossing signage, ADA ramps, and pedestrian push buttons
- Install raised crosswalks at slip lanes to slow turning vehicle speeds and improve yield rates
- Construct sidewalks to connect to fill sidewalk gaps



19 MLK Jr. Boulevard and Canyon Drive

Recommendations

- Install new Ped Hybrid Beacons with stop bars
- Remove outside lane on west side of street and install high-visibility crosswalks with pedestrian crossing signage, modified median to accommodate pedestrians, and new ADA ramps
- Construct sidewalks to fill existing sidewalk gaps



20 Quaker Avenue and Loop 289

Recommendations

- Install high-visibility crosswalks with pedestrian crossing signage
- Install pedestrian push buttons at crossings
- Several push buttons are further than 10-foot from curb, adjust signal timing to accommodate the extra walking distance

21 45th Street and Orlando Avenue

Recommendations

- Install high-visibility crosswalks with pedestrian crossing signage and stop signs on 45th Street
- Install new ADA curb ramps at crossings
- Install curb bulbs to shorten crossing distances and slow turning vehicle speeds

21 45th Street and Nashville Avenue

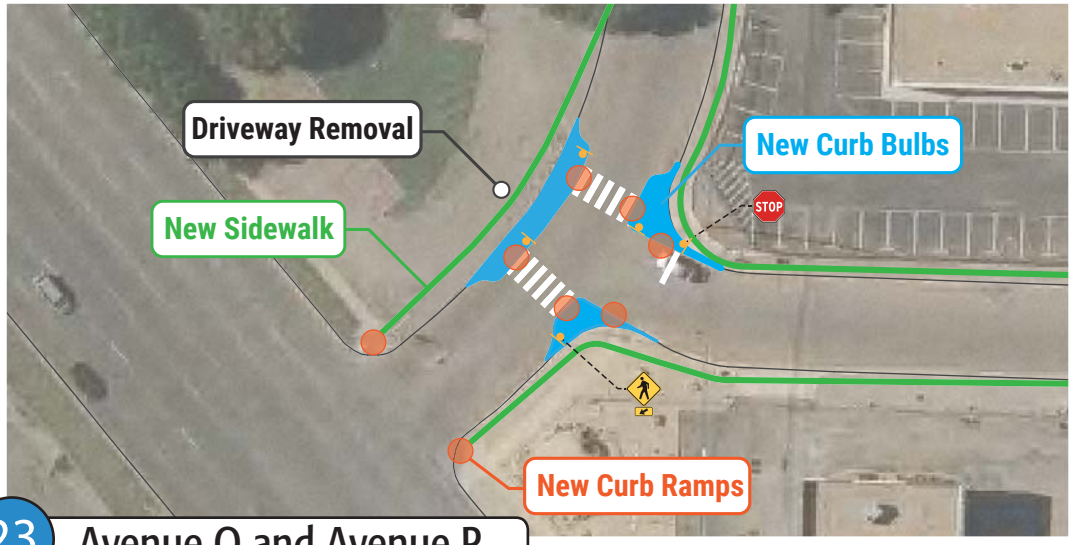
Recommendations

- Install high-visibility crosswalks with pedestrian crossing signage
- Install new ADA curb ramps at crossings
- Install curb bulbs to shorten crossing distance and vehicle turning speeds

22 50th Street and Indiana Avenue

Recommendations

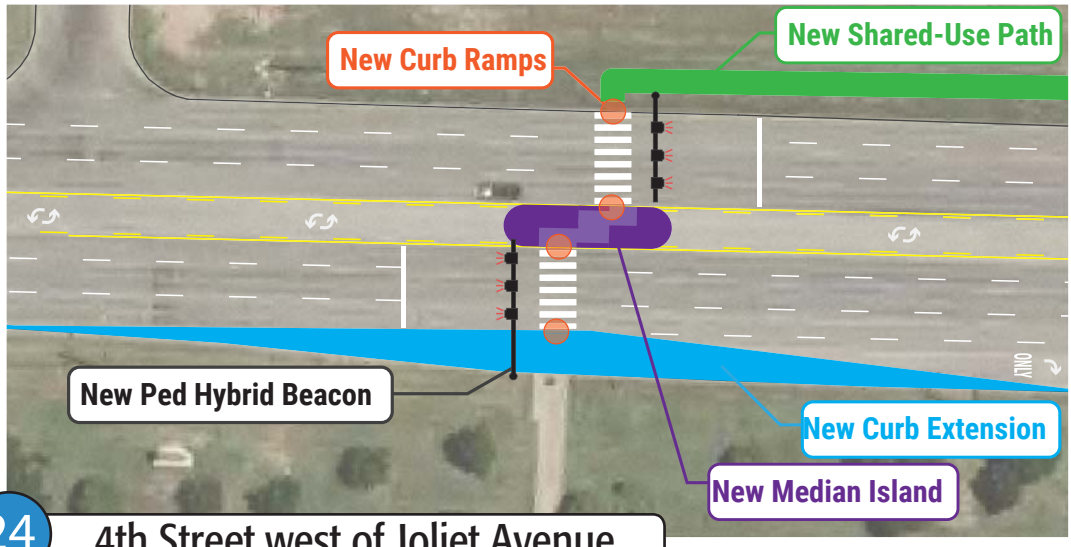
- Install pedestrian median islands and ADA ramps
- Construct new sidewalk to connect to existing pedestrian network
- Widen pedestrian space at corners to improve accessibility around utility poles
- Consider six-foot median to maintain dual left-turn lanes



23 Avenue Q and Avenue P

Recommendations

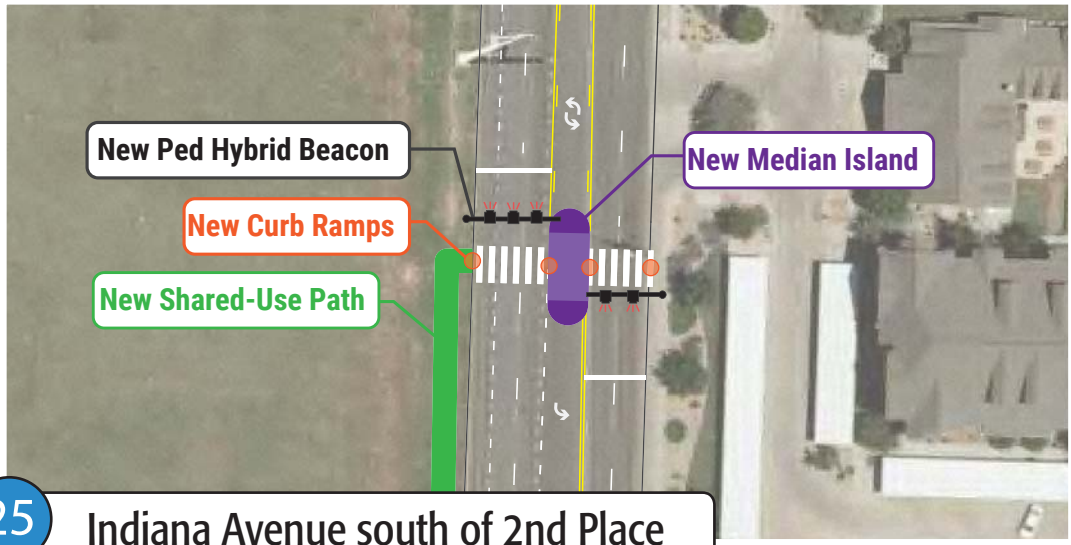
- Install curb bulbs (driveway consolidation required)
- Install high-visibility crosswalks with pedestrian crossing signage
- Install new ADA curb ramps at crossings
- Construct sidewalks to fill existing sidewalk gaps



24 4th Street west of Joliet Avenue

Recommendations

- Install high-visibility crosswalks with pedestrian crossing signage, pedestrian crossing island, and ADA ramps
- Construct new share-used path to connect to student housing to the east
- Install new Pedestrian Hybrid Beacon with stop bars
- Shorten right turn lane to accommodate pedestrian crossing



25 Indiana Avenue south of 2nd Place

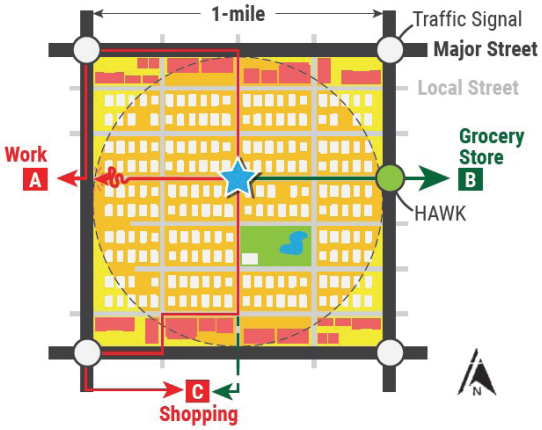
Recommendations

- Install high-visibility crosswalks with pedestrian crossing signage, pedestrian crossing island, and ADA ramps
- Construct new share-used path to connect to Texas Tech University
- Install new Pedestrian Hybrid Beacon with stop bars

Corridor-long: Re-thinking the Thoroughfare

Understanding and Unlocking Lubbock's One-mile Grid

Lubbock's grid of thoroughfare and collector streets function to accommodate and facilitate the movement of large quantities of vehicles, at high speeds, for long distances. Posted speed limits range from 40 MPH to 50 MPH. The resulting 80 feet or so provides ample space for motor vehicle but can serve as a barrier for people to walk across.



Typical one-mile grid in Lubbock

Local streets function in the opposite way, in that these streets are used for shorter trips, have slower moving vehicles, and have lower traffic volumes. Local streets can provide an excellent walking environment for pedestrians because of slower moving vehicles, lower traffic volumes, and more comfortable crossing conditions. Local street crossings are smaller than arterial and collector street intersections because the right of way width and the number of lanes is significantly smaller. These roadway characteristics often lead to safer and more comfortable environments for pedestrians and are often very appealing to walk along.

While local streets can provide comfortable walking conditions, they do not provide direct or convenient access to popular destinations especially when there are not safe and convenient crossings at major streets. Safe crossing opportunities need to be available to pedestrians where it is convenient for them to cross. Distances between existing crossings that are too far can result in people choosing to cross at unsafe locations or choosing to not make the potential trip on-foot.

The figure above represents a typical Lubbock neighborhood comprised of predominately residences with some commercial land uses on the periphery. Most everyday destinations are located outside or along thoroughfares and collectors. For example, walking to work (location A) can be challenging and inconvenient in this neighborhood. Waking in a straight-line west leads to an unsignalized intersection at a major street. Crossing a major street without a signal can be challenging and uncomfortable for most people. Major streets that have five to seven lanes are even more uncomfortable and potentially risky to attempt to cross. Walking to the nearest signalized intersection to safely cross can more than double the walking distance and time. Conversely, walking to the grocery store (B) is convenient and easy because there is a Pedestrian Hybrid Beacon that requires vehicles to stop for pedestrians to cross the street. Location C illustrates the potential network improvement for pedestrians if a crossing with some type of signal is available at a location directly across from a shopping area. Without this crossing, pedestrians will need to walk out of their way to the nearest traffic signal to make their trip.

Thoroughfares provide ample space for motor vehicles but can be a barrier for walking between neighborhoods

Over time and in conjunction with changes to the bicycle network, Lubbock's thoroughfares and collectors can become more comfortable for people to walk along and safe to cross. Changes include well-established pedestrian-friendly infrastructure such as:

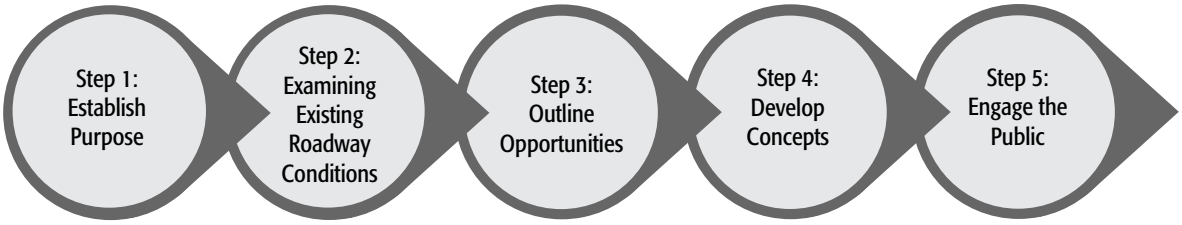
- Wider, continuous sidewalks with buffer space between the street
- Pedestrian-scale street lights, benches, more trees and other street-scape features for protection against the heat and wind
- Bus stop build-outs based on universal design principals (which also meets ADA guidelines)
- More places to cross the street with signals that create space between motor vehicles
- Shorter crossing distances by re-purposing areas of the roadway for pedestrian islands
- Traffic calming in places where congestion can increase the crash risk for all travel modes

Corridor Level Analysis

The optimal way to improve thoroughfares to safely accommodate bicycles and pedestrians is to incorporate bicycle and pedestrian-friendly elements in the design from the beginning. However, there are still many opportunities to retrofit existing thoroughfares in Lubbock. The following section details an example on 50th Street of how to approach this process.

Retrofit Process

For existing roadways that need to be retrofitted to provide enhanced walkability we recommend the following process:



Step 1: Establish Purpose

The fundamental first step to any project is establishing its purpose. The purpose of the project will shape the outcome and define the success of the result. By establishing the purpose of the project from the beginning, a unified vision of success can be shared and promoted by transportation officials, key stakeholders, and the public.

Step 2: Existing Roadway Conditions

A corridor evaluation should begin with an evaluation of existing conditions. This may include the following elements:

- Number of lanes
- Speed limit
- Traffic volumes
- Distance between crossings
- Streetside conditions (sidewalks, sidewalk buffers, shade)
- Bus routes
- Driveway density
- ADA compliance of existing structures
- Location of utility poles, drainage elements, and other obstructions
- Existing crossing opportunities

Step 3: Opportunities

After performing an existing conditions evaluation, opportunities for improvements can be considered based on the existing constraints. These opportunities may include:

- Current traffic volumes indicate a feasibility for a lane reduction
- Available streetside width for sidewalks, sidepaths, sidewalk buffers, or other streetside design elements
- Existing pedestrian desire lines where a Pedestrian Hybrid Beacon, RRFB, or unsignalized crossing could be implemented (Adjacent to schools, parks, and other public facilities.)
- Opportunity to upgrade bus stops to bus shelters or improve access to bus stops/shelters

Step 4: Concepts

Upon identifying a viable candidate corridor for pedestrian improvements and exploring existing opportunities, various concepts can be developed. These concepts can help both the public and stakeholders envision potential improvements and drive the decision-making process.

Step 5: Public Involvement

Since corridor improvements have the potential to significantly impact business owners and residents, getting input and involvement from the public and stakeholder is key. A multi-format approach is usually best in this case. This includes:

- Letters
- Public meetings
- Email blasts
- Social media
- Project website

A Case Study: A Look at 50th Street

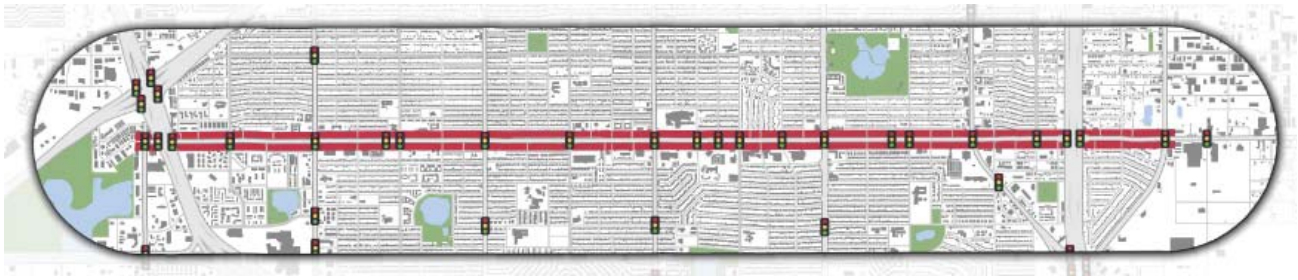
This section provides a glimpse of how the pedestrian-friendly infrastructure listed above can be used on one corridor, 50th Street between Frankfort Avenue and Avenue A. This is an example of how to apply the retrofit process to existing thoroughfares in Lubbock.

50th Street today is a typical thoroughfare with Route 6 Citibus operating along a major portion

The Bicycle Plan recommends converting the outside lanes of 50th Street between Avenue D and Loop 289 to buffered bike lanes. Improved pedestrian conditions can accompany and complement this change. The more typical portion of 50th Street is west of Avenue D and can also be modified to better serve pedestrians.

These changes would include:

- Increase the number of safe opportunities to cross the street from 20 to 30.
- Shorten crossing distances by 1,320 feet. The max distance between existing and proposed crossings is roughly ¼ miles apart. Existing signalized crossings are typically spaced every ½ mile, so adding Pedestrian Hybrid Beacons and RRFBs between existing signals reduces the crossing distance by one-quarter mile (1,320 feet).
- Increase sidewalk widths to 6 feet, allowing at least two people to walk together sociably, including children walking to school.
- Increase the space between the sidewalk and motor vehicle travel by three feet, and up to six feet where there is a bicycle lane.



50th Street case study corridor

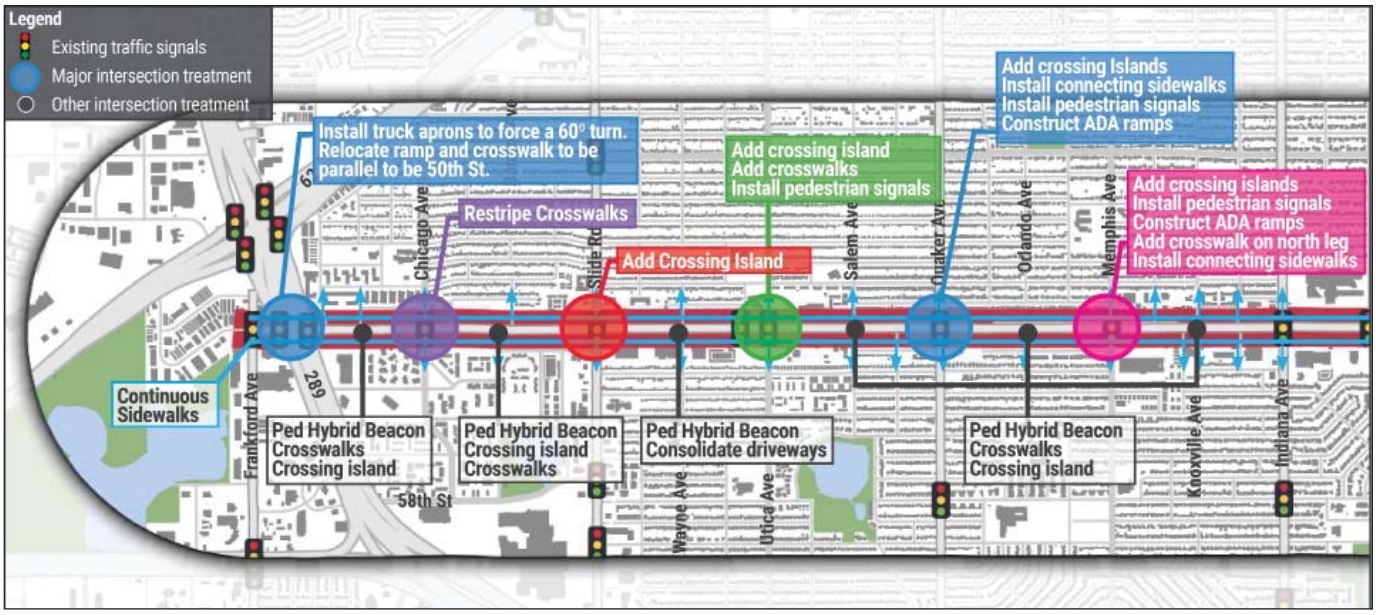
Existing Roadway Conditions

Characteristic	Description
Number of lanes	**5-7 lanes** are the typical cross section along this corridor. This may contribute to an uncomfortable walking environment and poses safety risks for pedestrians. **Wide right of way** means there are long distances for pedestrians to cross. The greater distance a pedestrian must cross, the more at risk they are for being involved in a crash, and the more inconvenient and uncomfortable the crossing experience will be. Reconfiguring the right of way to limit pedestrian exposure to moving vehicles can improve pedestrian crossings.
Speed limit	**40 mph** is the posted speed limit along the corridor. Higher speed limits have a strong and positive relationship to increased crash risk and severity for pedestrians.
Traffic Volumes	**50th Street** currently experiences moderate to light traffic volumes east of IH-27 and moderate to heavy traffic volumes west of IH-27.
Distance Between Crossings	**1-mile** is the **typical** walking distance between traffic signals without a controlled or enhanced pedestrian crossing between traffic signals. This makes crossing the street challenging and sometimes not possible.
Streetside Conditions	**Sidewalk gaps** are present along 50th Street and on intersecting streets that discourage and, in some cases, prohibit some people from being able to make trips as a pedestrian. There are visible "goat paths" that have developed from people walking on the grass where there is not a sidewalk. These goat paths show that there is demand for sidewalks and that people want to make trips as pedestrians, but don't have the infrastructure to support their trips.

Characteristic	Description
Streetside Conditions	**Lack of tree canopies** along 50th Street contribute to higher surface temperatures and greater discomfort for pedestrians. Trees can block the sun and lower the atmospheric temperature along the sidewalk and contribute to a more comfortable environment to walk in. **Sidewalk buffers** that separate the sidewalk from the street are often too narrow or nonexistent. Sidewalk buffers provide pedestrians with a higher level of comfort and safety when walking next to a major street.
Transit Routes/ Amenities	**Bus shelters** are present at only some of the bus stops. Waiting for a bus next to a wide street without any protection from the sun can discourage people from walking and using transit. Additionally, there are several locations with bus stops that are located very close to each other. Bus stop consolidation and relocations can help improve transit access and improve bus service times.
Driveway Density	**Driveway crossings** are a frequent challenge along 50th Street. Driveways can be viewed as barriers and high-risk locations. Driveways require pedestrians and motorists to interact while a motorist is either entering or exiting a parking lot. This interaction increases the risk of a crash. Reducing the number of driveways limits the number of interactions between both modes and can improve pedestrian safety. Additionally, some driveways have sloped surfaces, raised sidewalks without ramps that make it difficult for some people to travel on. Providing a level and straight surface without any obstacles can greatly improve the pedestrian environment.
ADA Compliance	**A lack of curb ramps** at intersections is a common characteristic along 50th Street. Curbs ramps make it accessible for everyone to be able to cross the street and access the sidewalk. Some curb ramps are outdated and are not ADA complaint, making it challenging or impossible for people of all abilities to use.
Presence of Obstructions	**Utility poles** along the sidewalks, driveways, and corners are barriers for pedestrians and can make walking on the sidewalk challenging or impossible. These barriers can also act as a shield, blocking the view of motorists and pedestrians that can increase the risk of a crash. **Large drainage treatments** at Avenue A prevents people from being able to safely stand on corners, and in some cases pedestrians must cross three legs of an intersection rather than crossing just one leg, increasing their exposure to moving vehicles. These drainage features are not unique to 50th Street but are present at several other locations throughout Lubbock.
Existing Crossing Opportunities	**Few crossing opportunities** along 50th Street means people must travel much farther in order to reach their destinations. In some cases, people will choose to cross the street at unmarked crosswalks. These uncontrolled crossings along roadways with 5-7 lanes can be challenging and risky for pedestrians. More often than not, people will choose to not make the trip because the extra distance, time, inconvenience, and perception of risk of making the trip on-foot is greater compared to other modes of transportation.

Develop Concepts: West of Indiana Avenue Example

The figure below displays a sample of treatment concept focused on improving the pedestrian network along 50th Street west of Indiana Avenue. Much of this portion has existing sidewalks. Some areas lack an adequate buffer space to separate motorists and pedestrians and some spots have utilities, uneven sidewalks, and vegetation encroaching the pedestrian space. Driveway consolidation should be explored along the eastern portion of this study area. Typical treatments along this portion of 50th Street aim to provide crossings controlled for pedestrians where there are no traffic signals. In addition, this concept aims at providing more comfortable and accessible crossings at signalized intersections.



Recommendations along 50th Street west of Indiana Avenue

Develop Concepts: East of Indiana Avenue Example

Figure 8 displays a collection of potential treatments that can improve the pedestrian network along 50th Street from Indiana Ave to Avenue A. This area of 50th Street has more commercial land uses and driveways that impact the pedestrian realm than in Figure 7. Typical concepts for this portion of 50th St consist of reducing lane widths at major intersections, installing Pedestrian Hybrid Beacons (HAWKS) at uncontrolled crossings, installing pedestrian signals, and installing curb bulbs. Additional analysis to consolidate driveways, side street access control should be explored, and reducing the number of lanes along 50th Street.

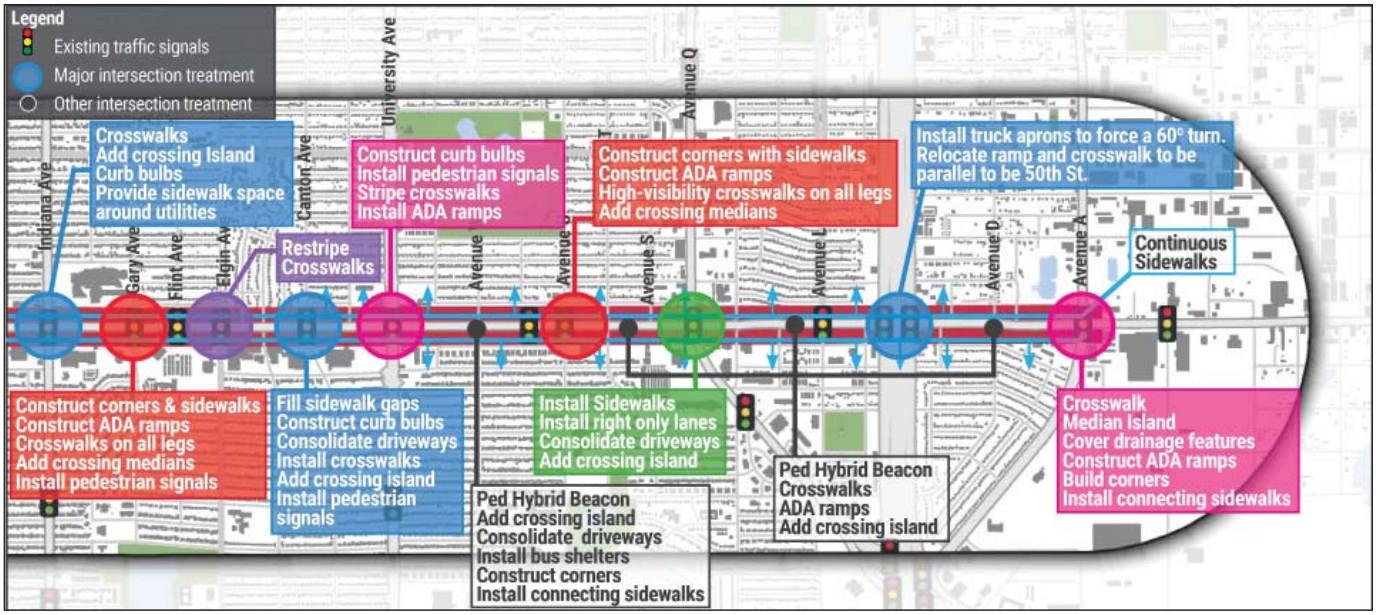


Figure 8. Recommendations along 50th Street east of Indiana Avenue

Engage the Public

This example illustrates the process and types of treatments to improve 50th Street to provide an all ages and abilities route. However, this example was illustrative of the process and techniques to upgrade a corridor for pedestrian enhancement. Further public involvement and analysis would be recommended on the proposed improvements prior to implementation.

Summary

High Level Cost of Implementation

Unit costs for the most common pedestrian toolbox elements range vary, depending on the type of material and typical unit used for costing. These costs are valid as of the date of this plan and may change to reflect current prices in Lubbock at the time of implementation.

Toolbox Element	Unit Cost
Sidewalk, 5 feet wide	» $40 per linear foot » Typical 600-foot block of 5-foot wide sidewalk would be $24,000 per side
Bus stop outfitted with shelter, landing pad, light, and trashcan	» Standard shelter with bench and light = $15,000 » Shelter pad (min 15′ x 6′; using sidewalk cost) = $750 » ADA-compliant landing pad (5′ x 8′; using sidewalk cost) = $350
Pedestrian-oriented lighting along 600-foot block face with 30 to 50-foot spacing per IESNA standards	» Pole and installation (includes permit and inspection; service drop) = $2,500 » Typical 600-foot block with about 15 lights (depending on the location) = $37,50
Shade trees along 600-foot block face, planted 30 feet apart (2.5-inch caliper tree installed with staking, 2-foot depth topsoil, 3-inch depth mulch, watering bag and 2 years' watering)	» $1,000 each » Typical 600-foot block with 14-20 trees (depending on the location) = $14,000 to $20,000
Rectangular Rapid Flash Beacon	» $20,000 for a set of two
High visibility crosswalk, 10 feet wide	» $10 per linear foot
Pedestrian Hybrid Beacon	» $200,000 for a set of signals
Curb ramp (ADA-compliant), 4-foot wide	» $2,000 to 4,000 each » A typical intersection with two curb ramps on each of four corners = $16,000 to $32,000
Right turn on red restriction	» $500 for sign post
Raised Curb extension (Bulb Outs)	» $20 per square foot

Chapter 6: Implementation

Project Prioritization

To begin the process of prioritizing projects, the project team met with the Transportation Advisory Committee and the Transportation Policy Committee to discuss the key components of the bicycle and pedestrian master plan. In the meeting, the joint committee members expressed a desire to prioritize a larger number of smaller projects first, in addition to a small number of catalytic projects. The bicycle and pedestrian response to these initial projects would help to guide further projects in the future. The following sections discuss the high priority bicycle and pedestrian projects identified by the project team.

Bicycle Network

For the bicycle network, the project team identified two high priority catalytic projects which have the potential to make a significant impact to the bicycle network immediately. These projects are:

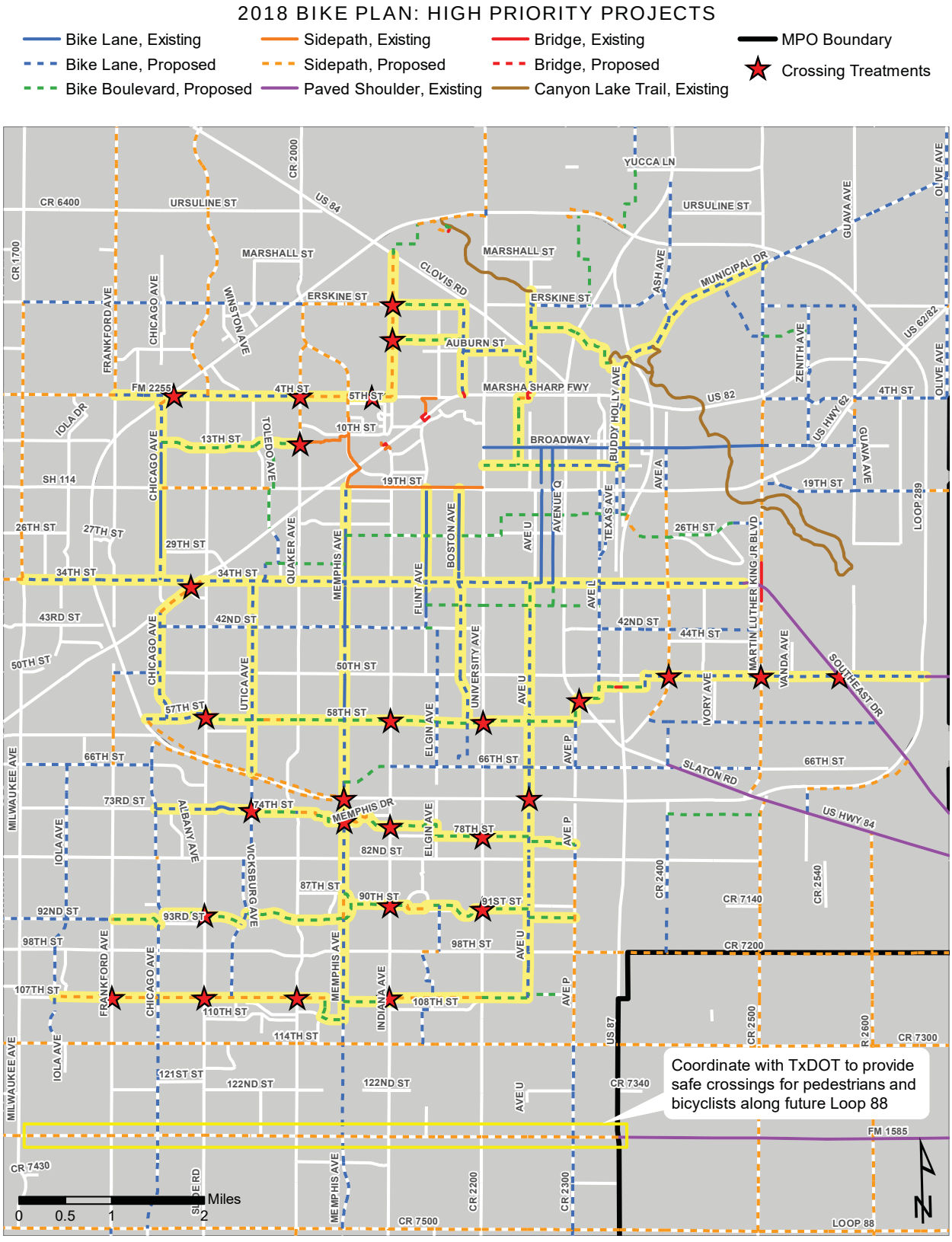
1. The Memphis Avenue bicycle/pedestrian bridge
2. A pedestrian/bicycle shared-use path in the existing utility easement between 98th Street and 114th Street.

In addition to the catalytic projects, several key corridors were identified as high priority projects. The high priority projects consist of bike lane and bike boulevard corridors which are intended to fill in some critical missing links in the network early on. These include bike lanes along Memphis Avenue, buffered bike lanes along 34th street, and a bike boulevard along 58th street.

The projects identified as high priority are intended to be implemented early in the process and will serve to establish a baseline level of bicycle connectivity in the region. Projects not identified as high priority are to be built out later in the process, or built with new roads as the roadway network develops.

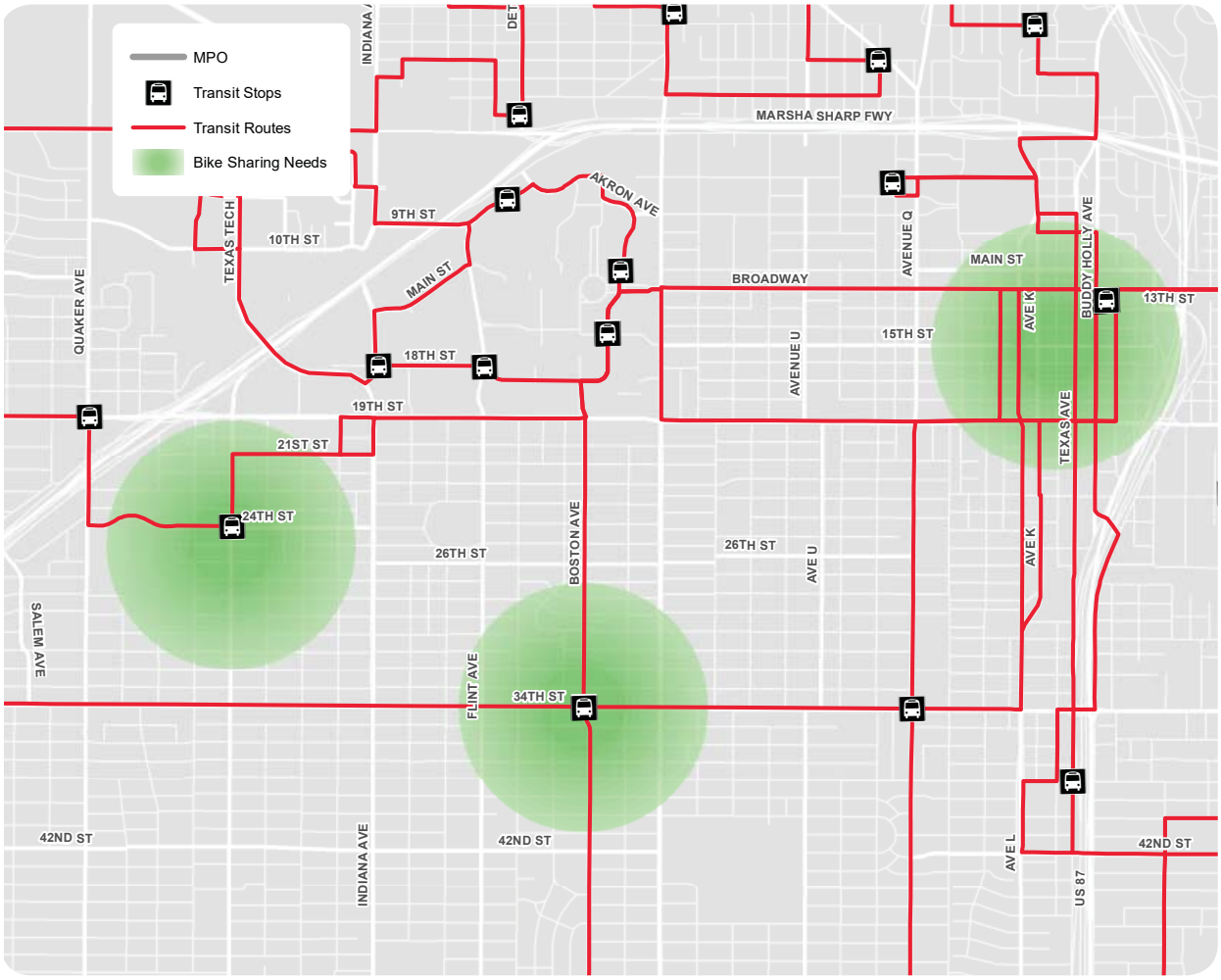
The bicycle high priority projects are presented in **Exhibit 15**.

Exhibit 15: Bicycle High Priority Projects



Bike Sharing

In addition to pursuing the high priority bicycle projects, another component of the bicycle network that can quickly increase bicycle connectivity is to expand bike sharing beyond the Texas Tech University Campus. Expanding bike sharing allows for short trips to be completed via bicycle for people who live or work near a bike sharing station. Several locations have been identified as potential areas to introduce bike sharing stations. These locations were based on proximity to transit routes and in areas with high potential pedestrian activity, such as Downtown Lubbock. Texas Tech campus already has bike sharing and is not shown as a location. The potential bike sharing locations are shown below.



Pedestrian Network

Based on the project team's evaluation and feedback from the public and project committees, the pedestrian network in Lubbock faces three main challenges:

1. Continuity (sidewalk gaps)
2. ADA Compliance
3. Lack of dedicated funding for pedestrian improvements

Currently, there is a dedicated funding source set aside for ADA related improvements. This funding is designated to address individual spot improvements throughout the City, but an ADA transition plan has not been performed. In addition, a thoroughfare inventory of existing sidewalk gaps has not been completed, and there isn't a specified funding source to address sidewalk gaps. Based on these observations, the project team identified the following as the top priority investments in the pedestrian network:

1. Perform a sidewalk gap inventory
2. Complete an ADA Transition Plan
3. Set aside a dedicated funding source for pedestrian facility improvements.
4. Make improvements to the pedestrian example areas provided in Chapter 5.
5. Evaluate Pedestrian Connectivity in eastern Lubbock and Tech Terrace.

Programs and Policies

In addition to investing in new facilities and maintenance, the successful implementation of the plan will require complimentary programs and policies which can help to create an all-around better experience for bicyclists and pedestrians in Lubbock. The project team and project committees worked together to identify programs and policies which align with the vision and goals established in Chapter 1 of this plan. These programs and policies are presented in the following tables.

Similar to the bike and pedestrian projects, high priority programs and policies which are anticipated to have the greatest immediate impact have been identified within each category. These are recommended to be implemented in the short-term time frame in or order to act as catalysts to other programs and policy changes. These priority programs and policies are shown in red bold.

Coherent	
Regularly update crosswalks and add new crosswalks.	While crosswalks do not need to be striped to be legal, striped crosswalks serve two important purposes, especially when combined with other crossing treatments: they show pedestrians where to cross and they tell motorists to expect pedestrians. Keeping crosswalk stripes fresh makes them visible during the day and night, so annual maintenance is important. High visibility striping is a best practice across streets with higher traffic volumes and speeds.
Upload the Bike Plan to a mobile web application	By uploading the Bike plan to an interactive mobile application, bicyclists can view routes are near them based on their location in real time.
Update standards to evaluate pedestrian and bicycle walkability within a parking lot.	By updating standards for parking lots, pedestrians can be more safely accommodated while still providing adequate parking for vehicles.
Develop a Bicycle Signage Plan	**The development of a bicycle signage plan will allow for the uniform implementation of standard signage and wayfinding, making it less difficult for bicyclists to follow bicycle routes.**

Comfortable	
Develop and promote pedestrian and bicycle circulation systems in parking lots	People walk in parking lots all the time, yet except for pathways from handicapped parking spaces, there are no designated places for pedestrians to travel to and from their cars and from bus stops on the street side edges. Motorists are often bewildered about why pedestrians are in their way; pedestrians are confused about why they are at risk. Designating walking routes does not have to reduce the total number of available parking spaces.
Establish a local Safe Routes to School program	Safe Routes to School programs promote safe walking and bicycling to and from schools to improve the health and well-being of school children. Resources and guidance are provided for project applicants through TxDOT's TAP program.
Identify and prioritize locations for bicycle rack installation	Properly installed and conveniently-located bicycle racks encourage bicyclists to park their bicycles in secure and convenient locations. Adequate bicycle parking also reduces the likelihood of damage that may result from locking bicycles to trees, sign posts, or other objects.
Regularly update the City's traffic calming policy	Traffic calming policies enable jurisdictions to retrofit streets with physical and visual features that reduce travel speeds and, in turn, make streets safer and more comfortable environments for bicyclists. Existing traffic calming measures are outlined in the City of Lubbock's Neighborhood Traffic Management Program.
Identify up to five Safety Improvement Corridors	Using crash data to isolate bicycle and pedestrian crashes, safety improvement corridors can be identified. These corridors would become candidates for bicycle and pedestrian improvements aimed at increasing safety.

Compliant	
Update curb ramps to meet ADA; replace corner steps with curb ramps	Curb ramps that meet current ADA standards are needed to fully meet the needs of people with disabilities. Compliant curb ramps also assist people traveling strollers, carts, on bicycles, and other wheeled items. Best practices call for one curb ramp in each path of travel designed for the specifics of the location.
Develop PROWAG Guidelines	PROWAG (Public Rights-of-Way) guidelines are intended to address public ROW elements that can pose unique challenges to accessibility, including sidewalks and streets, curb ramps, and wheelchair capabilities in parking conditions.

Complete	
Adopt a local Complete Streets policy.	Complete Streets policies establish a process which requires planning and designing for all roadway users, including pedestrians, bicyclists, transit users, and motorists. A local Complete Streets policy would supplement TxDOT's Complete Streets policy and would be specifically applicable to City-owned streets.
Adopt Thoroughfare Cross Sections with Bicycle Facilities	In addition to a complete streets policy, having standard cross sections which include bicycle facilities can greatly increase the completeness and connectivity of the Bicycle network.

Connected	
Develop an approach to the pedestrian network based on the existing motor vehicle thoroughfare network	The one-mile thoroughfare network grid works for motor vehicle travel, but is not fine enough for pedestrians. Using the thoroughfare network, develop a similar approach to the pedestrian network that identifies maximum distances between signalized crossings, complete sidewalks with a minimum width, and sufficient buffers to the roadway.
Implement Bicycle Parking Requirement Within Zoning Code	Implementing a Bicycle Parking Requirement within the zoning code will help to ensure that bicyclists have a safe place to store their bikes when they reach their destination.
Update Standards to evaluate pedestrian and bicycle connectivity to new development	Requiring the evaluation of bicycle and pedestrian activity to new development will help to ensure bicyclists and pedestrian have adequate options for reaching their destination. For example, how to students in a new residential development walk to school safely?

Constructible and Maintainable	
Regularly update local street design standards to reflect national best practices.	Local street design standards dictate how roadways can be built according to the local Complete Streets policy. Road design guidelines often control the inclusion and design of bicycle infrastructure.
Develop a pedestrian and bicycle facility maintenance program	A bicycle and pedestrian facility maintenance program can help to keep an inventory of bicycle and pedestrian facilities and their conditions, enabling the prioritization and implementation of facility maintenance. Maintenance cycles and triggers should be based on the impact of surfaces and debris on bicyclists and pedestrians, rather than thresholds used for motor vehicle travel lanes.
Develop Standard Details for Bicycle Facility Pavement Markings	Having a standard for Bicycle Facility Pavement Markings will ensure that the bicycle network is uniform and continuous throughout the City
Incorporate recommendations into all New, Reconstruction, and Maintenance Projects	The most efficient and cost-effective way to build a bicycle and pedestrian network is to include bicycle and pedestrian facilities as part of other ongoing roadway projects. This includes new, reconstruction, and maintenance projects.
Evaluate and Identify Funding Sources	Evaluating and identifying potential funding sources such as federal and state grants is a critical step toward feasibly implementing new pedestrian and bicycle facilities.

Continuous	
Perform a Sidewalk Inventory	Conducting an inventory of all existing sidewalks can lead to improvements in safety, walkablilty, and convenience. Establishing a uniform inventory can also help to ensure uniform physical characteristics (pavement markings, slopes, compliances, etc.).
TxDOT Outer Loop Coordination	Coordinate with TxDOT to ensure that the outer loop is built with multiple north-south bicycle connections mind.

Culture	
Create a Bicycle and Pedestrian Advisory Commission including staff representative.	A Bicycle and Pedestrian Advisory Commission consists of volunteers who provide guidance and leadership concerning bicycle and pedestrian issues to MPO staff. The Bicycle and Pedestrian Advisory Commission would meet regularly to discuss strategies to improve bicycling and walking conditions in Lubbock.
Incorporate bicycle and pedestrian safety into driver education and training courses.	Including bicycling and pedestrian safety in the curriculum of driver education and traffic school courses will increase motorist awareness about laws pertaining to bicyclists and pedestrians. It will also teach motorists how to safely share the roadway with bicyclists and safely respect pedestrians when crossing the roadway or traveling along the side of a road without a sidewalk or trail.
Become a Walk Friendly Communities Walk Friendly Community.	Similar to the League of American Bicyclists awards, Walk Friendly Communities recognize cities with varying levels infrastructure, programs and overall culture to make walking an attractive options. The program is based on five strategy areas: Community Data and Evaluation, Planning and Policy, Engineering and Design, Education and Encouragement, and Law Enforcement. http://walkfriendly.org/
Become a League of American Bicyclists Bicycle Friendly Community.	The League of American Bicyclists awards varying levels of the Bicycle Friendly Community designation to applying communities. Bicycle Friendly Communities have demonstrated progress in making bicycling a safe and convenient means of transportation and recreation.
Require bicycle education in schools.	Introducing bicycle education into school curriculum provides students with the knowledge and skills to ride a bicycle safely, while also establishing bicycling as a social norm. Early education can instill bicycling confidence in youth before they learn how to operate motor vehicles.
Deploy bicycle patrols.	Bicycle patrols provide officers with more opportunities for positive interaction with the public, while also normalizing bicycling as a form of transportation. Bicycle officers can employ reverse ticketing campaigns where they provide information or safety equipment to bicyclists instead of ticketing
Plan and execute Open Streets events.	Open Streets events temporarily close streets to motor vehicular traffic allowing the street to be used for a variety of pedestrian, bicyclist, and recreation activities. These events build community while celebrating the use of non-motorized transportations.

Culture	
Create a Bicycle Pedestrian Program and hire a Program Coordinator.	The role of a local Bicycle Pedestrian Program and the Program Coordinator is to promote bicycling and walking through encouragement, engineering, and design. The Program Coordinator is also responsible for advocating for bicycling and walking in transportation planning processes.
Support International Walk to School Day (October) and National Bike to School Day (May)	These events in the fall and spring are used as springboards for getting more students to walk and bike to school and to gain support from policy and decision makers about safer and more complete infrastructure. In the fall 2017, 202 Texas schools participated in International Walk to School Day; in May 2018, 39 school participated in Bike to School Day. Participating communities include Amarillo, Plano, Houston and surrounds, and Dallas-Ft. Worth and surrounds.
Distribute bike lights, helmets, and bells.	Bike lights, helmets, and bells are important features of safe bicycling. Distribution of safety equipment will promote responsible bicycling behavior and create safer conditions for both bicyclists and motorists sharing the roadways.
Create a local Bicycle Benefits program.	Bicycle Benefits is a program designed to reward individuals and businesses alike for their commitment to creating a more livable and sustainable community. Bicyclists benefit by receiving discounts from participating businesses, and businesses benefit from increased customer traffic.
Conduct police training on bicycle and pedestrian safety.	Police departments should provide officers with training to improve their understanding of bicyclists' and pedestrians' rights and responsibilities. Increased knowledge will allow officers to properly enforce laws that prevent crashes and enhance safety for all road users.
Conduct regular bicycle and pedestrian counts.	Regular bicycle and pedestrian counts can guide planning and funding decisions. Counts can also be used to quantify the benefits of investments in bicycle and pedestrian infrastructure. The challenge is to conduct counts in a way to supports increases in walking and biking, especially roadway crossings. For example, identifying locations where pedestrians and bicyclists are crossing without visible crossing facilities is one way to know where bicycle and pedestrian infrastructure is needed.
Create a Nexus Between Complete Streets and Vision Zero	Actively working to promote the principles of complete streets and active transportation can be done as part of a broader effort to strive to accomplish the goal of vision zero, which is to have no serious injuries or fatalities involving road traffic.

Funding Options and Strategies

The purpose of this section is to provide funding information for the City to help develop a funding strategy for bicycling and walking infrastructure and programs. This section begins the process of identifying funding options and opportunities as resources for the strategy.

Funding that is available for pedestrian or bicycle projects can be categorized based on the project phase, the target user, and the funder. Each project phase can be funded separately and from diverse sources. For example, a project is often identified initially during a planning process such as the one resulting in this plan. As priority projects progress through implementation, there are funding opportunities for design phases and for construction. Project location also affects which funding programs to target, such as roadway, bridges, intersections, trails, and wayside facilities. Targeting specific user types is another way to identify funding sources. For example, there are opportunities that focus on pedestrian and bicycle facilities, while others are for transit systems. Many smaller projects can be combined into larger, more complex projects that can require a mix of funding sources: federal, state, local and philanthropic foundation.

The table below presents a handful of the most common funding sources for pedestrian and bicycle projects. Funding from Lubbock's General Fund or CIP should be considered early in the process, as this funding typically has fewer restrictions than federal or state funding.
Federal and state grant programs are available, as well. These projects usually require local matching funds from between 20% to 50%, depending on the specific source and other eligibility factors. Details for the three most common federal and state programs are in the below table. A more comprehensive list of funding sources is included in the Appendix.

Program Name	Administered by	General Provisions
BUILD (formerly the TIGER program)	Federal program coordinated by TxDOT	» 80% funding in urban areas; 100% in rural areas » $5 million minimum award in urban areas; maximum $25 million per project, $150 million per state » Applications evaluation on merit criteria relative to ▪ Safety ▪ State of good repair ▪ Economic competitiveness ▪ Quality of Life ▪ Innovation ▪ Partnership ▪ Non-federal revenue for transportation infrastructure investment » Application cycle (for 2019 awards) ▪ Call for applications spring 2018 (??) ▪ Applications due July 19, 2018 ▪ Award announcements mid-December 2018 More information is available here (webinar).

Program Name	Administered by	General Provisions
Transportation Alternatives Set-Aside (formerly the Transportation Alternatives Program – TAP) (also see the FHWA website)	MPOs and TxDOT are responsible for selecting projects independent of one another: Metropolitan Planning Organizations (MPO) (large urbanized areas with populations over 200,000) administer TA Set-Aside funds according to their needs. TxDOT administers TA Set-Aside funds for locally sponsored bicycle and pedestrian infrastructure projects in communities less than 200,000 **The Lubbock Metropolitan Planning Organization is the Lubbock MPO.**	» Includes all projects and activities that were previously eligible under TAP, encompassing smaller-scale transportation projects such as: ▪ Pedestrian and bicycle facilities ▪ Recreational trails ▪ Safe routes to school projects ▪ Community improvements such as historic preservation and vegetation management, ▪ Environmental mitigation related to storm-water and habitat connectivity » Allows an urbanized area with a population of more than 200,000 to use up to 50% of its sub-allocated TA funds for any STBG-eligible purpose » Eliminates TAP's "Flexibility of Excess Reserved Funding" provision (which allowed the use of excess TAP funds for any TAP-eligible activity or for projects eligible under the Congestion Mitigation and Air Quality Improvement Program)
Recreational Trail Program	TX Department of Parks & Wildlife, under FHWA approval	» Maximum $200,000 for non-motorized trail grants » October 1 application deadline for fall 2018 » Up to 80% of project cost » Maximum of $200,000 for non-motorized trail grants » Eligible projects include ▪ New recreational trail construction ▪ Existing trail improvements ▪ Trailhead or wayside facilities development ▪ Trail corridor acquisition

Other sources of funding to consider include philanthropic foundations such as those established by Walmart, Rails to Trails, and the National Parks and Recreation Association. Local businesses may be a source for responding to small funding requests as part of their community service programs.

Program Priorities and Organizational Capacity

The consideration of multiple funding sources allows the MPO to work on more than one implementation approach. A combination of larger and more complex projects that require significant funding and smaller projects with lesser funding needs should be pursued. While a large project such as the Memphis Avenue bicycle and pedestrian bridge is an important connection in the bicycle network for which BUILD funding should be pursued, smaller projects and programs can begin to shift the community's perception of Lubbock towards being more pedestrian- and bicycle-friendly, i.e., its Culture. For example, a more visible safe routes to school program with monthly walk and roll to school days supported by crossing guards at key locations and strong media coverage reaches people of all ages. Public art and crosswalk design will engage other parts of the community and can be funded through foundation grants or a '1% arts' line item in the MPO's operating budget.

Municipalities that are most successful in receiving grants to support their transportation system have the organizational capacity to track funding opportunities and apply for grants. This work is often done by staff in the City Manager's Office or by City Council staff, coordinating with a designated staff person in streets or engineering, planning, or parks and recreation. This plan recommends the MPO to establish a bicycle and pedestrian coordinator position. This person would be responsible for the overall management of both infrastructure and programs related to walking and bicycling, and would also work to identify and apply for infrastructure project funds.

Additional Funding Sources

Three primary funding sources were highlighted in the previous section of this chapter. The following are additional funding sources, with a brief overview of the program.

Funding Source	Overview
Section 402 State and Community Highway Safety Grant Program	The Section 402 program provides grants to states to improve driver behavior and reduce deaths and injuries from motor vehicle-related crashes. The program is jointly administered by the National Highway Traffic Safety Administration and the Federal Highway Administration at the federal level and by State Highway Safety Offices at the state level.
Metropolitan and Statewide Planning and Nonmetropolitan Transportation Planning (5303, 5304,5305)	This funding source is three different programs that are financed with federal funding from both FHWA and FTA, administered by TxDOT. This grant provides funding for multimodal transportation planning in metropolitan areas and states. Plans should be cooperative, continuous, and comprehensive and result in long-range plans and short-range prioritized programs. Plans can and should incorporate bicycle and pedestrian facilities, however funding is for planning only (not infrastructure).
Texas County Transportation Infrastructure Program	TxDOT has received applications from counties for a grant under the County Transportation Infrastructure Fund Grant Program (Program), which was created by the 83rd Legislature in Senate Bill 1747, and is being administered by TxDOT. TxDOT finalized application review and has calculated eligible grant awards for all eligible applicant counties.
Highway Safety Improvement Program (HSIP) in Texas	HSIP funds are available for safety projects aimed at reducing traffic fatalities and serious injuries. Bike lanes, roadway shoulders, crosswalks, intersection improvements, underpasses and signs are examples of eligible projects. Projects in high-crash locations are most likely to receive funding. States that have identified bicycle safety and pedestrian safety as Emphasis Areas are more likely to fund bicycle and pedestrian safety projects. HSIP funds are available through the TxDOT. This funding is available to TxDOT staff and local governments, and can be used to make improvements on any public roadway.

Funding Source	Overview
Surface Transportation Block Grant (STBG)	The STBG provides flexible funding that may be used by states and localities for projects to preserve and improve the conditions and performance on any federal-aid highway, bridge, and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. Larger Metropolitan Planning Organizations control a share of the funds to distribute locally through a competitive process.
Congestion Mitigation and Air Quality Improvement (CMAQ) Program in Texas	The CMAQ program supports transportation projects that to contribute air quality improvements and provide congestion relief. TxDOT sub-allocates a portion of available CMAQ funds to Metropolitan Planning Organizations in U.S. EPA-designated air quality areas through the Metropolitan Planning Organizations and Large Cities Program. Bicycling and walking projects can be funded through this program because of their link to air quality improvements.
ArtPlace National Creative Placemaking Fund	The National Creative Placemaking Fund invests in planning and development projects where arts and culture play a central role. ArtPlace funds a variety of creative placemaking projects across the United States. Since 2011, the National Creative Placemaking Fund has invested in 227 projects across 152 communities of all sizes in 43 states and the District of Columbia.
Rivers, Trails, and Conservation Assistance Program	This program, administered by the National Park Service, helps to connect Americans to their parks, trails, rivers, and other places. When a community asks for assistance with a project, NPS staff provides free, on-location facilitation and planning expertise from conception to completion. Assistance can include visioning and planning, developing concept plans for trails, parks and natural areas, setting priorities and identifying funding sources.
Bike Shop Sponsorships	Trail and bicycle programs have a positive effect on the economy. Many of those who benefit would like to give back. Bike shops are often willing to donate a portion of their proceeds towards community events or the completion of a particular project.
Boy Scouts of America	The Boy Scouts of America is one of the nation's largest youth development organizations. The BSA provides a program for young people that builds character, trains them in the responsibilities of participating citizenship, and develops personal fitness.
Bristol-Myers Squibb	The Bristol-Myers Squibb Foundation promotes health equity and seeks to improve the health outcomes of populations disproportionately affected by serious diseases by strengthening health care worker capacity, integrating medical care and community-based supportive services, and mobilizing communities in the fight against disease.
Crowdfunding	Crowdfunding focuses on raising money for projects through many small donations, typically via the internet. Websites, such as gofundme.com, ioby.com and indiegogo.com, allow fundraising campaigns to be easily established. In 2014, Memphis raised $70,000 in this way to build a separated bicycle lane. In 2015, Denver launched a crowdfunding campaign focused on corporate donors for the planning and design of bicycle facilities.

Funding Source	Overview
Home Owners Associations	As more and more communities recognize the benefits of biking and walking, they are willing to support extensions of existing systems or connections to their neighborhood. Home Owners Associations and other neighborhood groups are often willing to fund all or part of a project to hasten its completion.
Knight Foundation	The Knight Foundation funds projects and programs related to communities, attracting and keeping talented people in them, expanding economic opportunity and creating a culture of engagement in addition to arts programming focused on weaving the arts into the fabric of communities to engage and inspire the people living in them. The Foundation works in 26 communities where brothers John S. and James L. Knight owned newspapers.
National Recreation and Park Association (NRPA)	NRPA routinely partners with foundations to provide grants for projects in parks, such as the Walk With Ease Grant, which is a partnership between the NRPA and the Centers for Disease Control, or the NFL Play 60 After-School Kick Off Grant, a partnership with the NFL Network to fund fields, equipment and staff. Additional fundraising resources and strategies are also provided.
People for Bikes Grant	People for Bikes Grants support bicycle infrastructure projects and advocacy initiatives that make it easier and safer for all people to ride. Most grant funds are awarded towards infrastructure projects such as bike paths, lanes, trails, and bridges, and end-of-trip facilities such as bike racks, bike parking, and bike storage.
The Conservation Fund	The Conservation Fund provides loans for land acquisition to support the creation of bicycle and pedestrian facilities. Their loan program offers flexible financing as well as sustained and expert technical assistance to organizations aiming to protect key properties in their communities.
Walmart Foundation	Walmart Foundation provides significant funding for projects that align with their key focus areas: Opportunity, Sustainability, and Community. In addition, staff are encouraged to participate in volunteer projects and can provide smaller levels of financial support.
Workplace Giving	Workplace giving programs let employees donate to the charities they care about, primarily through payroll deductions, often contributing a few dollars per paycheck. Once a year, the donor decides which issues and organizations are most important to them and contributes accordingly. Donations through workplace giving enables organizations to spend less time and money fundraising and more time working toward their goals. EarthShare is an example non-profit which coordinates campaigns focused on the environment. The Combined Federal Campaign is another example program, which focuses on federal and military donors.
Southwest Airlines Heart of the Community Program	Launched in 2014 with lead partner Project for Public Spaces, the Heart of the Community grants provide financial and technical assistance to local community partners who seek to bring new life to their public spaces through collaboration. The program funds activities focused on place-making in a downtown core. Funded projects focus on physical and programmatic improvements to publicly accessible outdoor space that can be completed within one year of award.
ArtPlace National Creative Placemaking Fund	The National Creative Placemaking Fund invests in planning and development projects where arts and culture play a central role. ArtPlace funds a variety of creative placemaking projects across the United States. Since 2011, the National Creative Placemaking Fund has invested in 227 projects across 152 communities of all sizes in 43 states and the District of Columbia.
County Highway Safety Program	This program provides funds to counties for highway safety treatments or corrective activity designed to alleviate a safety problem or potentially hazardous situation. The County Engineers Association of Ohio (CEAO) serves as the program manager and is responsible for project selection, funding criteria, and program priorities.