MAP WESTMINSTER

WESTMINSTER'S MOBILITY ACTION PLAN

SPRING 2017

WESTMINSTER COLORADO

ATKINS

alta PLANNING + DESIGN

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PROJECT PARTIES

The City of Westminster
Gabriella Arismendi, Project Manager
Christine Gray, Project Advisor
Debra Baskett, Project Advisor

Consultant Team
Alta Planning + Design
Joe Gilpin, Principal in Charge
Sam Piper, Project Manager
Charles Creagh, Project Planner
Chloe Ward, Project Engineer
Erin David, GIS Specialist

Atkins
Andrew Iltis, Senior Transportation Planner

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CHAPTER 1:
EXECUTIVE SUMMARY

This Mobility Action Plan is intended to guide decisions about when, where, why, and how to enable active living, improve safety, and stimulate economic development through strategic investments in walking and bicycling infrastructure and enhanced transit connections.

1.1 INTRODUCTION

Westminster is a city on the move. The city's central location between Denver and Boulder has driven its development and population growth, and thousands of residents, employees, and visitors walk, bicycle, take transit, carpool and drive in the community daily. In the past, transportation improvements in the city focused primarily on improving access for motor vehicles. Simultaneously, the City developed a robust trail network with a primarily recreational focus. In recent years, communities across the United States, including Westminster, have recognized the benefits of developing connected networks that facilitate active modes of transportation, such as walking and bicycling, and have begun to prioritize investments in these modes.

A well-connected multimodal transportation network, where people have convenient access to transit, sidewalks, bikeway facilities, and multi-use trails, requires intentional planning. MAP Westminster, Westminster's *Mobility Action Plan*, is the result of a comprehensive assessment of strategies to improve the safety, convenience, and enjoyment of walking, bicycling, and taking transit in the city. The Plan builds directly upon other recent planning efforts, and was developed in collaboration with City Staff, local stakeholders, and the general public. The Plan is an *Action Plan*, intended to guide decisions and investments about when, where, why, and how to develop a transportation network that provides true mobility choice by prioritizing bicycle and pedestrian improvements in Westminster. The plan's recommendations, once implemented, will help connect the community, provide realistic and safe travel options for residents, and take advantage of great community assets, such as the new Downtown Westminster, RTD B Line at Westminster Station, the U.S. 36 bus rapid transit, and the community's numerous parks, trails, shopping destinations and more.

1.2 PLAN VISION AND GOALS

A vision statement outlines what the city wants to be. It concentrates on the future and is a source of inspiration. The following vision statement, developed in coordination with the Project Steering Committee and the public, guides MAP Westminster:

MAP WESTMINSTER VISION: The City of Westminster delivers walking, bicycling, transit, driving and carpooling options that support active living for people of all ages and abilities, provide for safer and healthy transportation, and improve the economic and physical health of the City and its citizens.

The implementation of MAP Westminster will help the City continue to become a community that offers true mobility choice

MAP Westminster Goals

Goals help guide the City towards fulfilling the Project Vision, and relate to existing and newly-launched efforts. The following goals, developed through the planning process, will serve to guide the implementation of MAP Westminster.

Goal 1: Experience – Deliver a walking, bicycling, transit and driving environment that is attractive and low-stress for all modes of transportation.

Goal 2: Safety - Improve walking and bicycling safety through the design and maintenance of roadway improvements.

Goal 3: Connectivity - Develop a balanced transportation system that includes convenient mobility options that enable citizens of all ages and abilities to access community and regional destinations easily and comfortably.

Goal 4: Health and Economics - Prioritize increasing multi-modal trips, reducing the need to own or drive a personal vehicle to improve local air quality, economics, overall health and quality of life in Westminster.

Goal 5: Programs – Create a culture that supports walking, bicycling, transit and ridesharing use by increasing the awareness and value of these modes through education, encouragement, enforcement, evaluation, and equity programs.

Goal 6: Regional Collaboration - Prioritize the leveraging of funding for multimodal infrastructure, and combine multi-modal improvements with other capital improvement projects to continually implement the plan's recommendations to immediately enhance multimodal options in Westminster.

1.3 PLANNING PROCESS

The process for developing the plan's recommendations was divided into three phases: Existing Conditions Analysis, Needs Assessment, and Recommendations. The existing conditions analysis resulted in a thorough understanding of what it is like to walk, bicycle, access transit and drive in Westminster today. The Needs Assessment built on this foundation, and identified where there is demand for multimodal transportation, and assessed the supply of facilities that link these areas. Recommendations were developed following the conclusion of the needs analysis. Being a Mobility Action Plan, the recommendations focus on projects that fill critical gaps in the network to improve mobility for pedestrians, bicyclists and transit users. Specific emphasis was also placed on improving connections to the community's assets, including Downtown Westminster, Westminster Station, the bus rapid transit (BRT) line along U.S. 36, and the city's numerous parks, trails, shopping destinations and more.

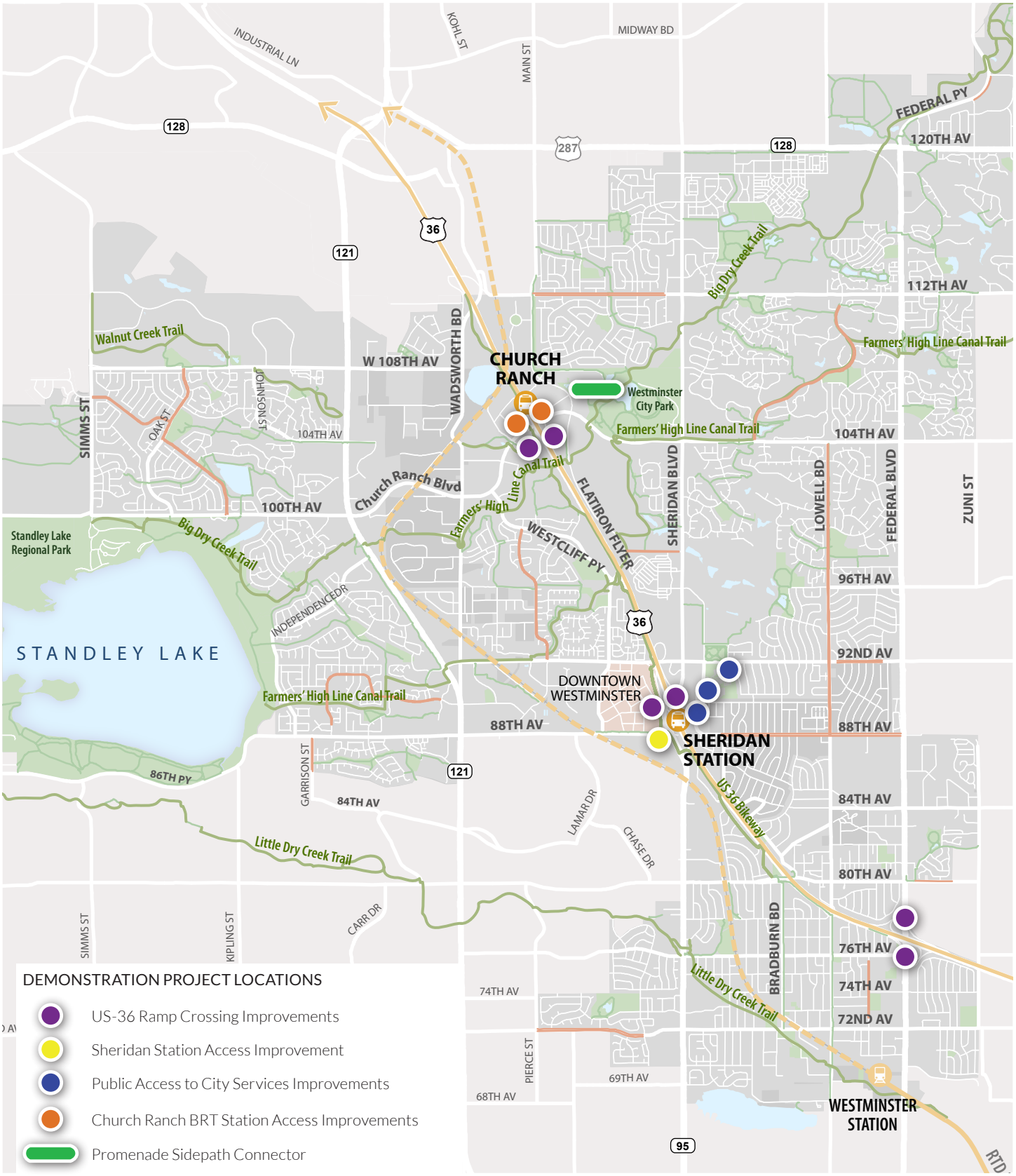
1.4.1 Recommendations

The development of the network recommendations was an iterative and collaborative process. The needs of all roadway users, including the safety and comfort of people walking, bicycling, accessing transit, and driving, must be balanced with roadway characteristics and corridor constraints. The Plan's recommendations provide guidance that can be used to progress projects towards implementation. Some recommendations are conceptual, and additional coordination will be needed for implementation.

In total, over 80 recommended projects are identified in this Plan. To support implementation, planning level cost estimates were prepared for these projects, and the projects were prioritized. The Plan concludes with a presentation of five demonstration projects that can be implemented in the short term to immediately improve mobility in key areas of Westminster. For these projects, conceptual diagrams of proposed improvements were prepared to advance them towards implementation.

NETWORK RECOMMENDATIONS DEVELOPMENT

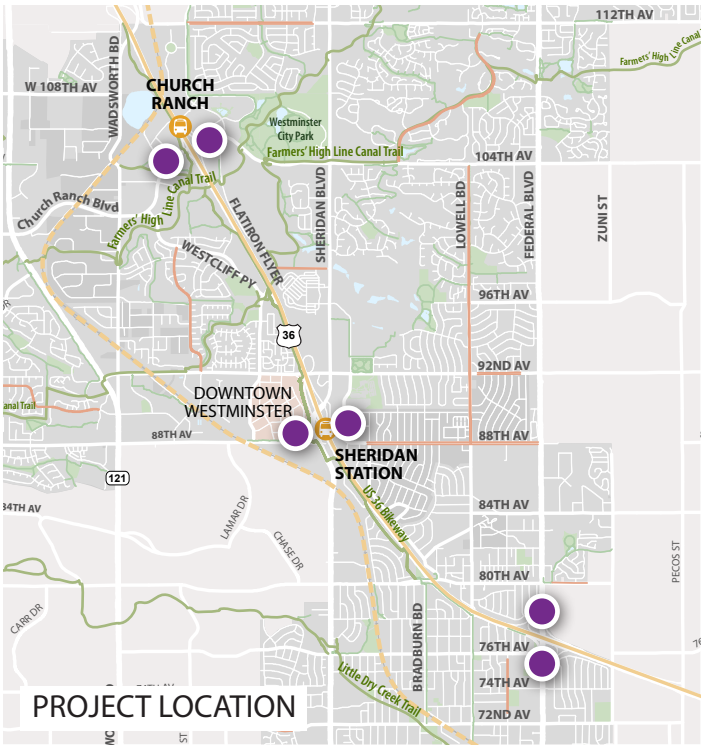
MAP 1.1: DEMONSTRATION PROJECT LOCATIONS



US 36 Ramp Crossing Improvements

Project Overview

US 36 travels north/south through Westminster, and many of the city's major destinations and transit hubs are located along the corridor. This project aims to improve pedestrian crossing conditions where the US 36 on- and off-ramps intersect Church Ranch Boulevard/104th Avenue, Sheridan Boulevard, and Federal Boulevard. Improvements at the ramp crossings vary by location, but in general, they are focused on increasing the visibility of pedestrians, slowing vehicles as they exit and enter the ramps, and increasing the yield compliance of vehicles when pedestrians are attempting to cross the roadway.[1]



1 *Ramp crossing improvements for the US 36 and Church Ranch Boulevard West Ramps and US 36 and Sheridan Boulevard North East Ramp are detailed in the 2017 Federal Highway Safety Program (HSIP) application. The design for the US 36 and Church Ranch Boulevard West Ramps should be replicated on the East Ramp.*

Sheridan Bus Rapid Transit Station Access Improvements

Project Overview

Sheridan Station provides access to the Flatiron Flyer Bus Rapid Transit (BRT) line as well as local bus service, and is adjacent to Downtown Westminster. Additionally, the US 36 Bikeway connects to Sheridan Station and then crosses 88th Avenue at-grade and continues north. Improving access between Sheridan Station, the US 36 Bikeway and Downtown Westminster at 88th Avenue will make bicycling and walking between these destinations more comfortable. The improvements at this location are detailed in the city's 2017 CDOT Highway Safety Improvement Program application. Improvements are focused on increasing the visibility of pedestrians, slowing vehicles as they exit and enter the ramps, and increasing the yield compliance of vehicles when pedestrians are attempting to cross the roadway. The project includes the construction of a raised crosswalk, as displayed in the photo simulation below.

Public Access to City Services Improvements

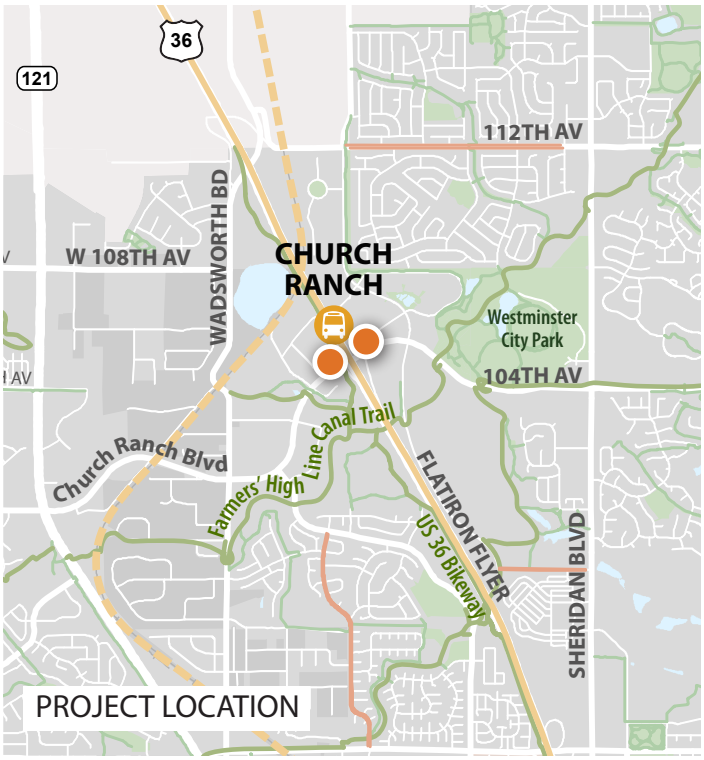
Project Overview

Yates Street provides an important connection between Sheridan Station and the city's public services, located within the city hall campus. In addition, there is pedestrian crossing demand between the city hall campus and Westminster Center Park at Xavier Street and 92nd Avenue, but a marked crossing at this location does not exist. This project includes pedestrian access improvements at three locations. Each will improve connectivity to the city hall campus. The improvements include installing a Pedestrian Hybrid Beacon and marked crosswalk at 92nd Avenue and Xavier Street, installing a mid-block crosswalk at Yates Street and 91st Avenue, and making 88th Place and Yates Street a four-way stop-controlled intersection with marked crosswalks. Additional details of these improvements are provided on the conceptual plan illustrations and photosimulations.

Church Ranch Bus Rapid Transit Station Access Improvements

Project Overview

The recently constructed Bus Rapid Transit (BRT) stations in Westminster provide new mobility options for people in the city. Currently, there is no sidewalk leading from 104th Avenue to Church Ranch BRT Station on the east side of US 36, and while a sidewalk does exist on the west side, it is circuitous and pedestrians have been observed walking along the grass to the station, as this route is more direct. This project would construct direct sidewalk connections to the station platforms on both sides of US 36 from 104th Avenue north to the stations.



Promenade Sidepath Connector

Project Overview

The Big Dry Creek Trail provides a comfortable bicycle and pedestrian facility for neighborhoods east of Westminster Boulevard, and the Promenade Drive Sidepath provides a link towards the Church Ranch BRT Station. Currently, there is no direct bicycle/pedestrian connection between the Big Dry Creek Trail (south of 108th Avenue) and the sidepath on the north side of Promenade Drive. This project would construct a new connection between these trails. The project includes removing and replacing existing gravel sections of trail with a concrete shared-use path, and constructing new sections of shared-use path. The project also includes constructing a culvert to bridge over an existing ditch.

1.5 NEXT STEP RECOMMENDATIONS

Westminster is strategically improving its transportation network. Bicycle, pedestrian and transit connections are integral to future development in existing neighborhoods and business districts. In the future, private developers may be required to construct mobility infrastructure for their projects. This plan recommends the following policies and programs be put in place in order to advance mobility in the city.

1. Integrate MAP Westminster Prioritization Criteria and Project Recommendations into the CIP and budget development process.

2. Continue funding the MAP Westminster project list. Commensurately, plan for and budget operations and maintenance funding for non-motorized infrastructure.

3. Formalize the adoption, recommendation, and benchmarking of citywide mobility policies, including:

- Complete Streets – Policies that enable the safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities.
- Vision Zero – Projects that aim to achieve a transportation system with no fatalities in the roadway system.

4. Include active transportation network language into City documents:

- Comprehensive Plan
- Design Guidelines
  - School zone and neighborhood design policies
  - Access Management Policy
- Zoning Ordinances
  - Pedestrian overlay districts and form based code districts
- Specific Area Plans
- Create Standards and Specifications for mobility elements. Examples of mobility elements include:
  - Crosswalks
  - Speed tables
  - Bike lanes (all types)
  - Sidewalks
  - Bus stops
- Residential Service Commitment applications

5. Support implementation of active transportation programs:

- Bicycle wayfinding
- Safety education initiatives
- City active transportation web page

6. Enhance data collection efforts that support bicycle and pedestrian infrastructure and programs, including:

- Bicycle and pedestrian count program
- Bicycle and pedestrian crash data

CIP Prioritization Criteria

Opportunities to integrate bicycle and pedestrian infrastructure into capital improvement projects should be identified early in the planning and design process. This will help to ensure that non-motorized improvements are built as part of capital projects. To facilitate this process, the following criteria shall be used by city staff to identify capital improvement projects that enhance mobility for people walking, bicycling, or taking transit:

1. Improves Safety: The project addresses identified safety problems for one or multiple modes of travel in Westminster's transportation system, based on field work, stakeholder, and public input.

2. Improves Mobility Experience: The project results in a walking, bicycling, transit and/or driving environment that is attractive, and low-stress for one or more modes of transportation.

3. Improves Connectivity through Walking, Biking and/or Transit: The project provides a new walking, bicycling or transit connection, or improves upon an existing connection, to transit stations, job centers, activity centers, neighborhoods, schools, public parks, open spaces, trails, and other recreational destinations.

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CHAPTER 2:
EXISTING CONDITIONS

2.1 INTRODUCTION

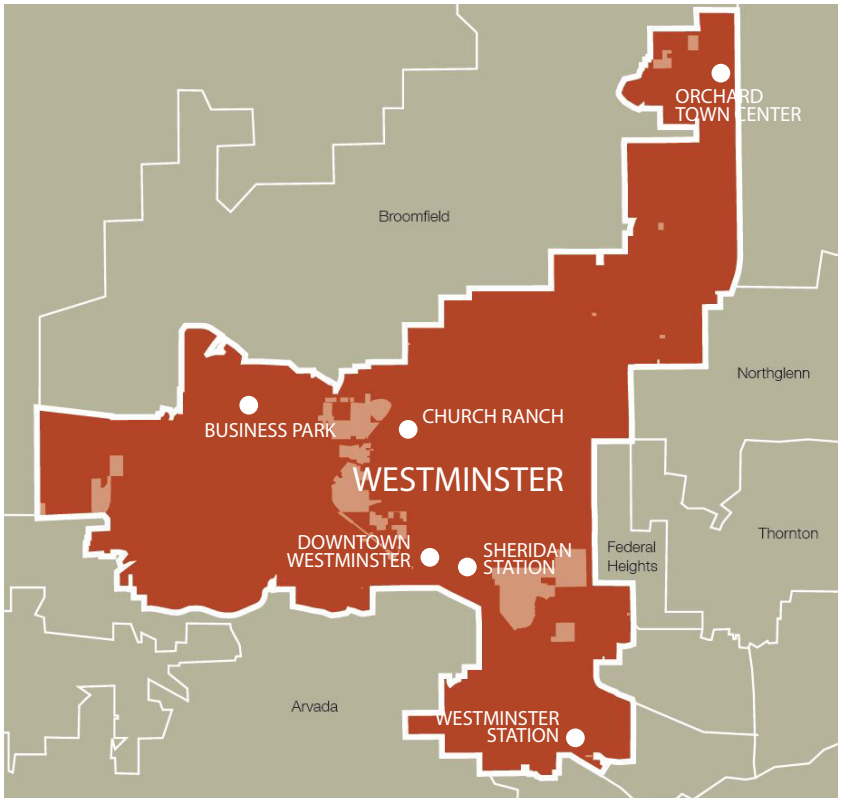
The City of Westminster has embarked on a path to improve transportation options for its residents. As the population grows and increased pressure is placed on the city's transportation infrastructure, the city is seeking to shift trips to active modes of transportation, including walking, bicycling, transit and carpooling, and maximizing the efficiency of the roadway network for motor vehicles. A thorough assessment of current conditions for these modes is critical to developing recommendations to improve them. This chapter describes the existing roadway, pedestrian, bicycling, and transit conditions in Westminster.

2.1.1 Study Area

The City of Westminster, located northwest of Denver, is within Jefferson and Adams Counties and features a diversity of residential neighborhoods, a network of beautiful parks and open spaces, unique cultural and civic assets, and thriving retail and commercial corridors. Westminster has grown considerably over the past fifty years, from a small community of less than 2,000 people in the 1940s into a mid-size suburban city home to about 110,000 people today. As its population has grown, so has traffic congestion. To keep pace with this growth, the city has prioritized roadway-widening projects to accommodate increasing demand. Roadway projects have been funded through a combination of sources, including the City's Capital Improvement Program, the Denver Regional Council of Governments (DRCOG), and the Colorado Department of Transportation (CDOT). Westminster coupled its roadway improvements with a commitment to environmental stewardship and today, boasts over 3,000 acres of preserved land and 74 miles of shared use paths. The proliferation of trails in the city largely resulted from the establishment of a sales tax approved in 1985, which provided funding for open space preservation and trail development. Extensions of the sales tax continue to be approved, signifying that residents truly value access to the outdoors and trails.

In addition to valuing open space, citizens have also placed a high value on quality transit options. In 2004, a regional sales tax increase was approved that provided funding to implement a Bus Rapid Transit (BRT) system along US Highway 36 (US 36), which would include two stations in Westminster, as well as a commuter rail line through the city. The BRT line opened in 2016, and the first of three planned commuter rail stations opened in the summer of 2016. Construction of these facilities indicates that the city is committed to providing multimodal options.

MAP 2.1 WESTMINSTER STUDY AREA



MAP Westminster focuses on the City of Westminster and the unincorporated areas within its boundaries. The plan also focuses on creating strong multimodal connections to several development and transit efforts converging in the city, to maximize the return on these investments.

Land Use and Development

Westminster's built environment has a significant impact on walking, bicycling, and transit access. Over the course of its development, Westminster, like most American suburbs, pursued a regulatory practice of separating land uses by function. Commercial, industrial, and residential uses were concentrated in geographically separate areas of the city. The placement of residential neighborhoods, commercial and retail centers, and larger employment centers in separate areas can increase the distance between them. This affects mode choice and connectivity between residential neighborhoods and important community destinations, such as retail and commercial centers, parks, and schools. New efforts, such as the Downtown Westminster mixed-use development, are aimed at reversing this trend and converting Westminster into "the next Urban Center on the Front Range."[1] Other mixed-use development projects are identified in Map 2.1.

1 *http://www.downtownwestminster.us/*

Westminster, like many suburban communities, has developed in a manner that separates uses by function, including residential, commercial, and industrial. This separation of uses impacts mobility within the city, and Westminster has been proactive in recent years to improve multimodal transportation and create more mixed-use, transit oriented developments (Image: Westminster Blvd looking west).

Roadway Network Development

The foundation of the city's transportation network is its road system, which is comprised of local, collector, and arterial roadways. Regional access is provided by Interstate 25 (I-25) and US 36, as well as multiple state routes including:

- Wadsworth Parkway (State Highway 121)
- 120th Avenue (US 287/State Highway 128)
- Sheridan Boulevard (State Highway 95 south of US 36)
- Federal Boulevard (US 287)

As the population has increased in the city, congestion city-wide has increased in step, especially along the city's arterials. The city's policy has been to identify roadways that are operating over capacity (as indicated by a poor vehicle Level of Service at intersections) and then reduce congestion along these roadways by adding additional travel and turn lanes. Westminster's major arterials are very wide now, with some intersections that are ten lanes across, such as Sheridan Boulevard and 104th Avenue. This policy has managed peak-hour congestion in the short term, but with build-out population expected to be 123,900, population and consequential traffic is estimated to grow 14 percent.[2] Some roadways can be widened to accommodate this growth, but others cannot (such as 92nd Avenue), and additional measures are necessary to effectively manage traffic congestion, such as shifting drive alone trips to transit, carpooling, bicycling and walking.

Traffic Congestion Perpetuates Itself

The city has developed within a regional super-grid of arterial roadways spaced at approximately 1-1/2 miles (north-south) and 1 mile (east-west) intervals. Commercial and employment development has been concentrated along these arterial roadways, while residential development has been concentrated between them. Earlier residential subdivisions included multiple connections to the arterial network, maintaining a high degree of accessibility. Subdivisions developed in the 1980s in Westminster were constructed around cul-de-sacs with single-point connections to the arterial grid. This type of development has several effects—some are intended, while others are unintentional results:[3]

- They limit vehicular traffic within the development but provide only few routes to access destinations outside of the neighborhood, which may not be the most convenient or direct route.
- This poor connectivity also results in out-of-direction travel routes for pedestrians, thereby increasing travel distances and reducing the practicality and convenience of walking.
- Since some neighborhood residents have only one arterial street option to reach other destinations in Westminster, vehicular traffic is concentrated on a limited number of arterial streets.
- This, in turn, increases traffic on the arterial streets, and as volumes increase, it makes walking and biking along them less comfortable.
- Over time, congestion worsens on the arterial streets, and additional lanes are added to mitigate congestion.
- This, in turn, makes the arterial street network even less comfortable for walking and biking, further shifting what could be walk and bike trips to driving trips, and the cycle repeats itself.

More recently, the city has been requiring multiple access points for new subdivisions, and continues to prioritize these types of improvements.

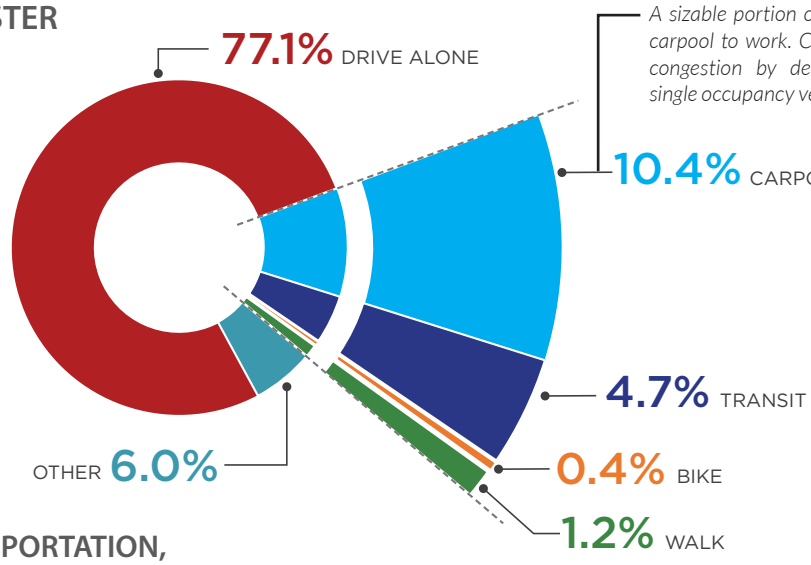
2 *Westminster Comprehensive Roadway Plan Update*

3 *Designing Walkable Urban Thoroughfares: A Context Sensutuve Approach; Chapter 3*

MOBILITY IN WESTMINSTER - A SNAPSHOT

Chart 2.1 COMMUTE MODE SHARE IN WESTMINSTER

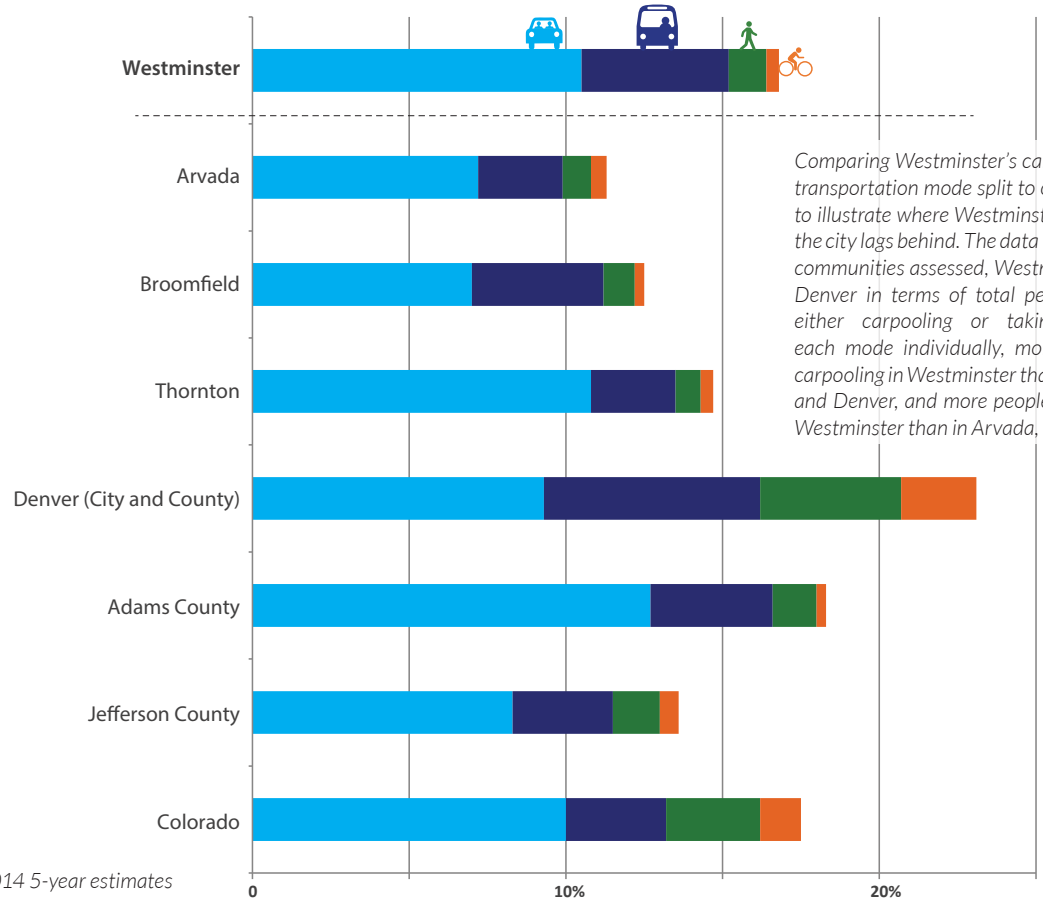
The number one goal for transportation included in the Westminster's Comprehensive Plan is to "develop a balanced transportation system." Currently, the transportation system in Westminster is skewed towards driving alone. By investing in active transportation infrastructure, and improving transit connections, Westminster's transportation system can become more balanced. Although Journey to Work data does provide insight into mode choices, there are limitations to it, as described on page 1-4.



A sizable portion of Westminster's residents carpool to work. Carpooling helps to reduce congestion by decreasing the number of single occupancy vehicle trips.

Chart 2.2 ACTIVE TRANSPORTATION, TRANSIT & CARPOOL RATES

Westminster vs. other jurisdictions



Comparing Westminster's carpool, transit, and active transportation mode split to other communities helps to illustrate where Westminster is a leader and where the city lags behind. The data indicates that of the peer communities assessed, Westminster is second only to Denver in terms of total percentage of commuters either carpooling or taking transit. Comparing each mode individually, more people commute via carpooling in Westminster than in Arvada, Broomfield, and Denver, and more people commute via transit in Westminster than in Arvada, Broomfield or Thorton.

Graphic Source: ACS 2014 5-year estimates

American Community Survey Journey to Work Data

The American Community Survey (ACS) Journey to Work data measures changes in mode share over time. However, the ACS only collects transportation information about the main mode of transportation for trips from home to work. It excludes trips made by those outside of the workforce, including children, retirees, unemployed residents, and stay-at-home parents. It also excludes trip purposes such as shopping, going to and from school, and recreational outings. Lastly, it only represents the primary mode of transportation to work and does not reflect the mode choices of people who use more than one mode of transportation weekly, or who link multiple modes to complete a single trip. Though it does have limitations, it is useful for comparing general preferences for the primary commute to work mode. Recommended next steps include creating more granular data sets that provide better insight into mode choice, such as travel surveys administered by the city, Regional Transporation District (RTD) and DRCOG.

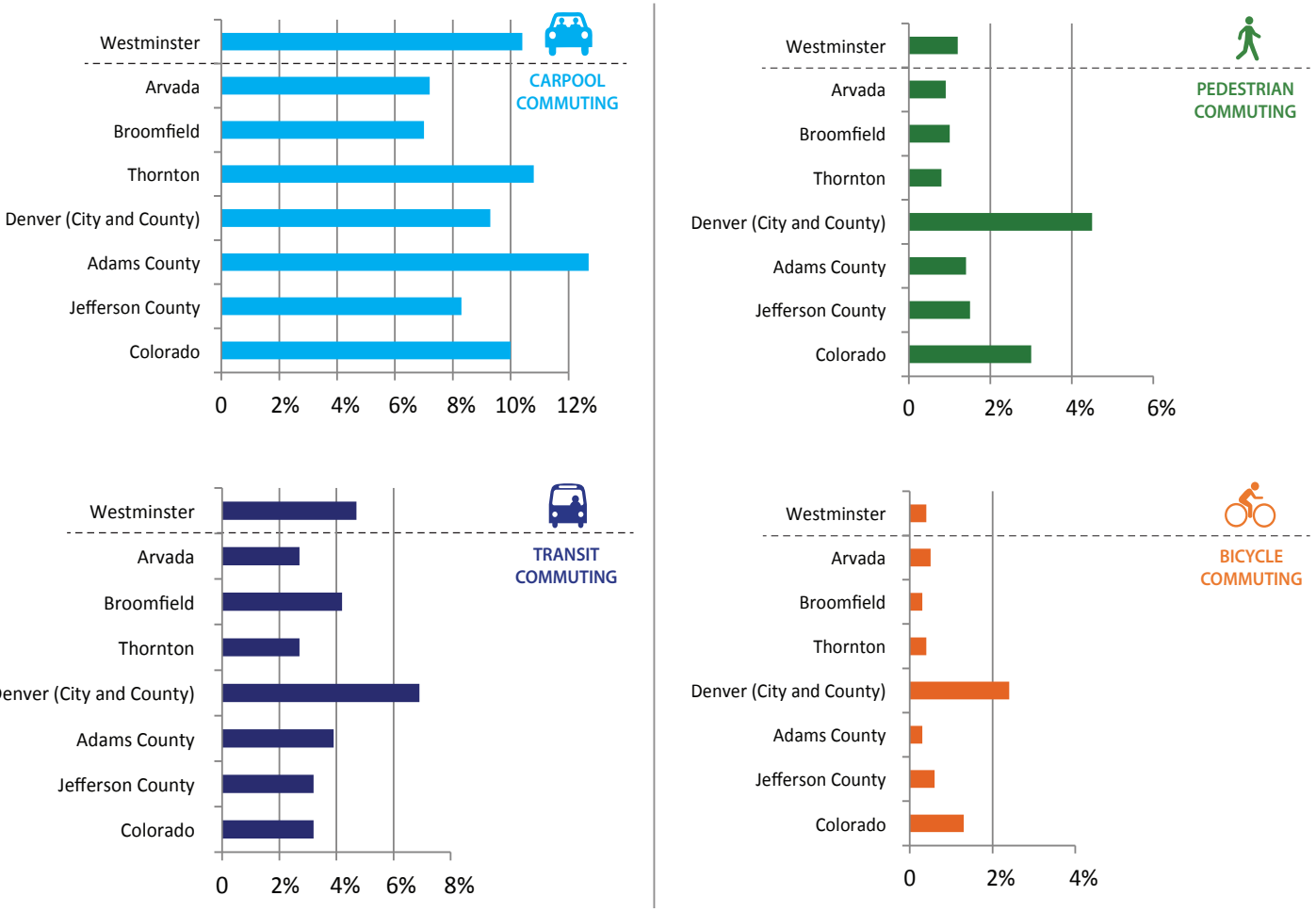
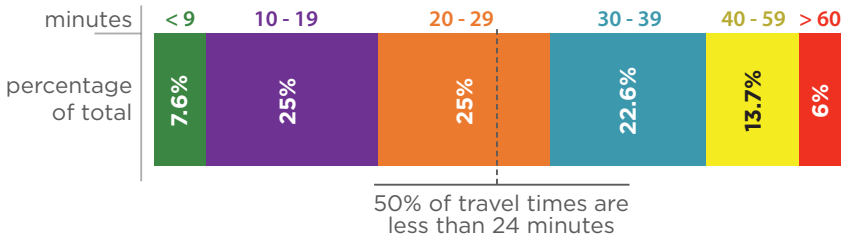


Chart 2.3 MEAN TRAVEL TIME TO WORK (all modes)



For some Westminster residents, journeys to work are relatively long (greater than 40 minutes), but others are much shorter. Shorter trips currently completed by vehicle represent trips that could potentially be shifted to walking and bicycling. Longer trips can potentially be shifted to transit or car pool trips, depending on origins and destinations.

Graphic Source: ACS 2014 5-year estimates

Review of Past Plans

As Westminster approaches its build-out limit, city leaders have focused on expanding the multimodal network to facilitate bicycle, pedestrian and transit circulation as a way to manage congestion, encourage wellness, and provide recreational opportunities in the city. Several past planning documents were reviewed, which together, focused on land use development, the transportation network, transit options, trails, and bicycle and pedestrian infrastructure. Overall, they demonstrate the city's strong commitment to improving multimodal access to destinations and neighborhoods throughout Westminster. The plans reviewed include (summaries of the plans reviewed are included in Appendix B):

- Westminster Bicycle Master Plan
- Westminster Comprehensive Plan
- Comprehensive Roadway Plan Update
- Open Space Stewardship Plan
- Trails Master Plan
- Westminster Downtown Specific Plan
- US 36 First and Last Mile Study
- DRCOG Northwest Corridor Bicycle and Pedestrian Accessibility Study

A timeline displaying the plans is displayed on pages 1-5 and 1-6.

Building a Multimodal Future

Multimodal solutions and maximizing the efficiency of the existing roadway network is necessary to successfully manage future population and traffic growth in Westminster. Over the past decade, the city has invested significant resources to improve multimodal options for its residents, including better transit, park-n-rides and bicycle and pedestrian infrastructure. MAP Westminster coincides with four major projects that will have a significant impact on mobility in the city. These include:

- Construction of Downtown Westminster, a new, mixed-use town center
- Westminster's first commuter-rail station, Westminster Station
- Opening of a BRT along the US 36 corridor, which will include two BRT stations in Westminster.
- Completion of the US 36 Bikeway, which parallels US 36 between Boulder and Westminster

These projects will make Westminster an even more appealing place in which to live and work, simplifying regional travel and providing additional amenities for residents and visitors alike. To ensure a high rate of return on these investments, multimodal connections to them must be strong. If integrated properly, these new assets can reshape Westminster's future, helping it to be less of an automobile-oriented city and more of a multimodal community. MAP Westminster will include recommendations to better link these projects via transit, walking, and bicycling to ensure they can fulfill their potential.

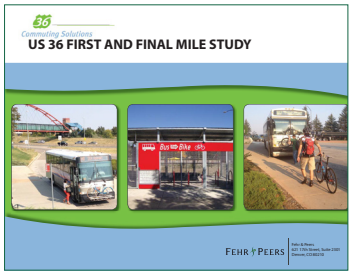
TIMELINE OF PAST PLANS

Comprehensive Roadway Plan Update (2008)

The plan's goal was to anticipate future transportation issues and develop a work program to address them. This program included adding capacity at key intersections, while also improving transit access and the bicycle and pedestrian networks.

Westminster CO 2030 Bicycle Master Plan (2011)

This bicycle master plan recommended implementation of 132 miles of new bikeway facilities over twenty years with an emphasis on new on-street facilities to connect to existing off-road trails, as well as wayfinding, bike parking, and programs.

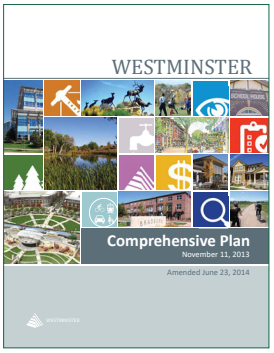


US 36 First and Final Mile Study (2013)

The plan recommends multimodal improvements to access to two park-and-ride stations, Church Ranch and Downtown Westminster, ranging from new separated grade crossings to intersection improvements and better trail connections.

Westminster Comprehensive Plan (2014)

The Comprehensive Plan was created to guide future growth in the community with a focus on redevelopment. Transportation-related recommendations included consideration of all modes when implementing future roadway improvements and increased access to transit.



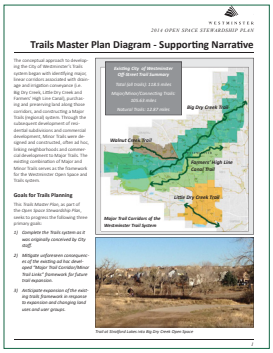
TIMELINE OF PAST PLANS

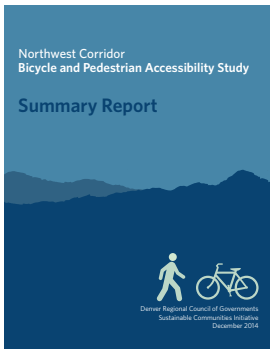
Open Space Stewardship Plan (2014)

This plan addresses preservation and maintenance of existing open space and historic buildings and recommends improving connectivity through trail connections, neighborhood trail loops, and transportation corridor connections.

Trails Master Plan (2014)

This plan addresses completion of the trail system, addressing existing connectivity issues, and expanding trails to development. Key recommendations include upgrading major trails, installing additional on-street bikeways, and creating neighborhood loops.





Northwest Corridor Bicycle and Pedestrian Accessibility Study (2014)

The planning team conducted an audit of bicycling and walking conditions within a one-mile radius of new transit stations, two of which are in Westminster, along the US 36 corridor and recommended signage improvements and identified improvements in multimodal connections to the stations.

Westminster Downtown Specific Plan (2015)

This redevelopment plan for a new Town Center includes recommendations for improvements to the surrounding street network, access to transit, and improved bicycle and pedestrian connections.

The City of Westminster has a robust sidewalk network.

2.2 PEDESTRIAN FACILITIES

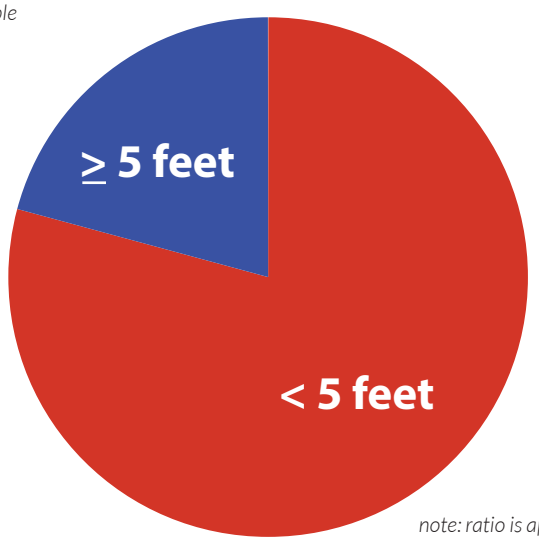
Sidewalks, marked crosswalks, and other pedestrian facilities are an integral component of the non-motorized transportation network in Westminster. These facilities support safe and comfortable travel for walkers, joggers, families pushing strollers, and persons with wheelchairs or other mobility assistive devices. Sidewalks are present along most roadways in Westminster, and range in width from 2 feet to wider than 8 feet. Some sidewalks are immediately adjacent to the roadway, while others are buffered from motor vehicle traffic by a planted strip. Where present, these planted strips are often wider along busier roadways, which help to provide additional separation from motor vehicles and an improved perception of safety and comfort for pedestrians.

2.2.1 Linear Sidewalk Conditions

Requirements in the city's zoning code and subdivision regulations have helped to create a well-connected network of sidewalks within Westminster's residential neighborhoods. The vast majority of residential neighborhoods have sidewalks on both sides of the road. One notable issue with the sidewalks within residential neighborhoods is that their widths vary substantially, with many of the sidewalks not meeting the minimum 5 feet required by the Americans with Disabilities Act. Many neighborhood sidewalks are not accessible to those with disabilities, as shown in Chart 2.4.

Chart 2.4: Ratio of ADA Accessible Sidewalks

Although Westminster has several hundred miles of sidewalk, the majority of sidewalks in Westminster do not meet the minimum 5 foot required to be ADA accessible



note: ratio is approximate

Some collectors and arterial roadways also have sidewalks on one or both sides of the roadway, such as on 112th Avenue and 104th Avenue. There are long gaps that exist along several arterial and collector roadways where sidewalks do not exist, such as on Federal Boulevard and Wadsworth Parkway. Pedestrian demand along roads that do not have sidewalks is shown by the presence of informal dirt paths that have been created by regular use. Along some with high traffic volumes and speeds, a planted buffer between the roadway and sidewalk makes walking along the roadway more comfortable. Some arterial and collector roadways have planted buffers, but others do not. Major roads without buffers are stressful to walk along, as cars are travelling relatively fast (40 mph +) within 2 to 3 feet of pedestrians walking on the sidewalks. Along many of these roads, a planted buffer cannot be installed because the roadways have been widened to their maximum extent. Adding space to the pedestrian zone would require reducing the width of the traveled way, which would impact vehicular traffic patterns.

Informal paths have been created where there is demand for a sidewalk, but where no sidewalk exists (Image: W 108th Ave west of Westmoor Dr).

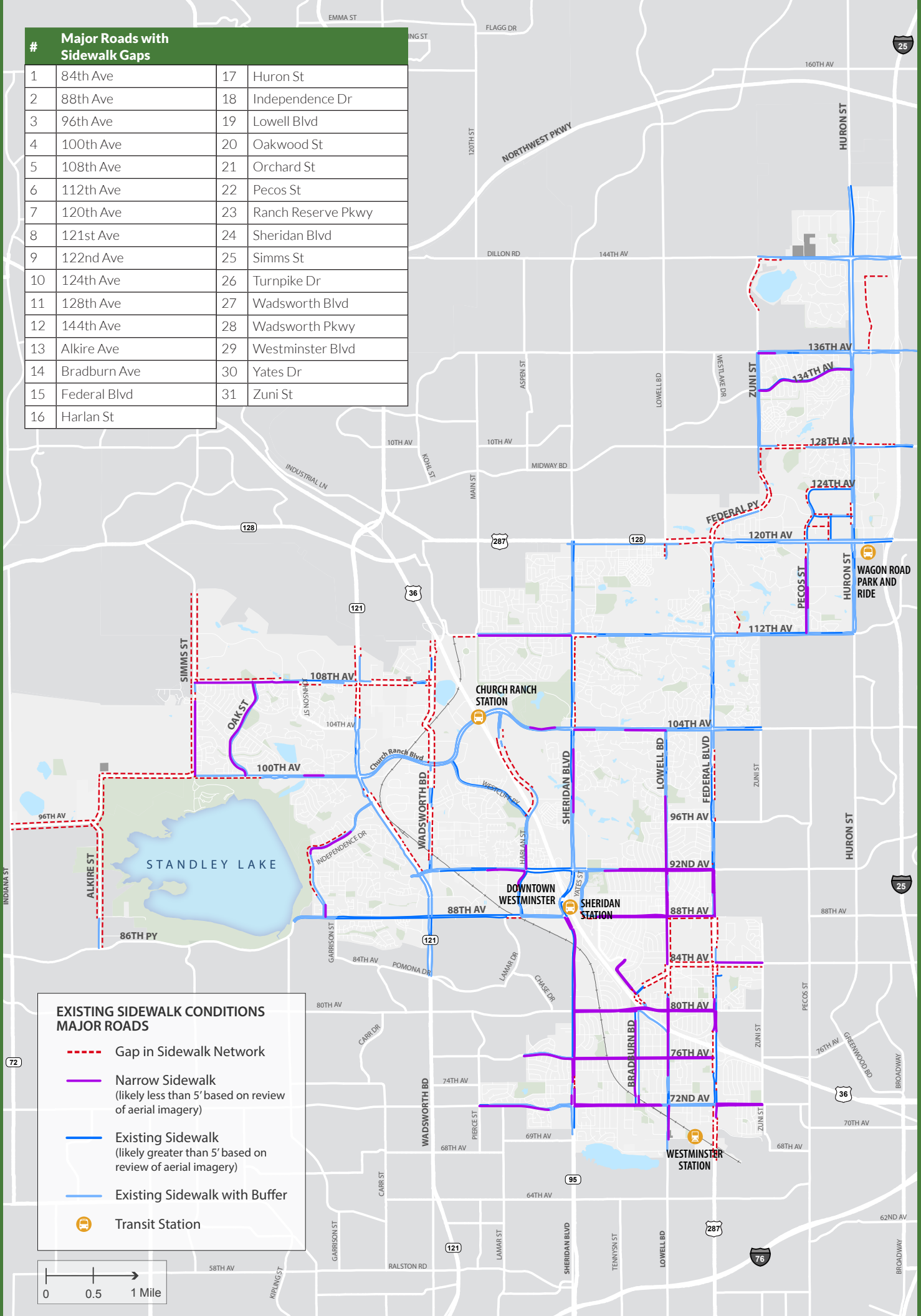
Sidewalks placed along high-volume, high-speed roads without buffers are uncomfortable to walk along (Image: 92nd Ave West of Raleigh St).

Improving the walking environment also involves enhancing the pedestrian experience. Currently, many sidewalks along arterial streets are between busy roads and long stretches of fence built for the adjacent subdivision, such as along Westminster Boulevard. Appealing pedestrian environments are characterized by visually interesting scenes, and walls of fencing along these streets make the pedestrian experience less inviting. The Denver region experiences hot, sunny weather, and the presence of street trees can provide welcome shade for pedestrians. Street trees also have a traffic-calming effect, indicating to motorists that they are driving through a pedestrian realm. Although some major roads in Westminster do have street trees (such as Sheridan Boulevard between 92nd Avenue to City Center Drive), many do not. A complete analysis of specific gaps in the pedestrian network is provided in the Gap Analysis Chapter of this report. Gaps in the sidewalk network along major roads are displayed on Map 2.2.

Many streets in Westminster are flanked by long walls of fencing which detract from the pedestrian experience (Image: Westminster Blvd north of 92nd Ave).

MAP 2.2: EXISTING SIDEWALK CONDITIONS (MAJOR ROADS)

#	Major Roads with Sidewalk Gaps		
1	84th Ave	17	Huron St
2	88th Ave	18	Independence Dr
3	96th Ave	19	Lowell Blvd
4	100th Ave	20	Oakwood St
5	108th Ave	21	Orchard St
6	112th Ave	22	Pecos St
7	120th Ave	23	Ranch Reserve Pkwy
8	121st Ave	24	Sheridan Blvd
9	122nd Ave	25	Simms St
10	124th Ave	26	Turnpike Dr
11	128th Ave	27	Wadsworth Blvd
12	144th Ave	28	Wadsworth Pkwy
13	Alkire Ave	29	Westminster Blvd
14	Bradburn Ave	30	Yates Dr
15	Federal Blvd	31	Zuni St
16	Harlan St		



EXISTING SIDEWALK CONDITIONS MAJOR ROADS

- Gap in Sidewalk Network
- Narrow Sidewalk (likely less than 5' based on review of aerial imagery)
- Existing Sidewalk (likely greater than 5' based on review of aerial imagery)
- Existing Sidewalk with Buffer
- Transit Station

0 0.5 1 Mile

The condition of sidewalks is important to the safety and mobility of all pedestrians. Sidewalks that are uneven, or which have deteriorated so that their surface is no longer smooth, pose hazards to pedestrians. These issues are exacerbated for mobility impaired users. In Westminster, where sidewalks exist, most are in good repair. Sidewalk conditions in South Westminster are generally in poorer condition than sidewalks in other sections of the city, especially along Federal Boulevard. Many of these sidewalks are only 2.5 feet wide, especially south of 88th Avenue. Recent efforts have been focused on improving sidewalk conditions in this area of the city, such as the reconstruction of Lowell Boulevard.

Sidewalks should also be clear of any obstructions that minimize the usable width of the sidewalk. Although the cross-section of most sidewalks in Westminster are clear of any obstructions, there are some instances where landscaping encroaches upon the sidewalk and where sidewalks have been built around utility poles.

Another important consideration for ensuring adequate pedestrian facilities is minimizing the impact of driveways that provide access to adjacent land uses, known as access management. Vehicles entering and exiting driveways create added stress for pedestrians. A key strategy for minimizing the impact of driveways is to consolidate the number of driveways that service an adjacent development. Several of Westminster's major roads service automobile-oriented land uses, such as strip malls and department stores, and, along these stretches of road, there are multiple instances where frequent driveways negatively impact the pedestrian experience.

Landscaping Encroachment

Image: Sheridan Blvd north of 98th Ave)

Poor Sidewalk Condition

Image: W 108th Ave near Wadsworth Pkwy

Frequent Driveways

Image: Federal Blvd south of W 74th Ave

Utility Obstructions within Sidewalk

Image: 72nd Ave

2.2.2 Existing Intersection Conditions

Crosswalks and Intersections

Crosswalk markings provide guidance for pedestrians who are crossing roadways by defining paths across intersections or other crossing points. While marked pedestrian crosswalks do not in and of themselves slow traffic or reduce pedestrian crashes, there are several reasons to install marked crosswalks, including:

- To indicate a preferred pedestrian crossing location
- To alert drivers to an often-used pedestrian crossing
- To indicate school walking routes

The City of Westminster uses a "continental style" crosswalk in most applications. This type of crosswalk exhibits a high degree of visibility for approaching motorists, and is generally accepted as the preferred crosswalk treatment type. Most major intersections in Westminster include striped crosswalks at all legs of the intersection.

The majority of signalized intersections in Westminster include push-button activated pedestrian signal heads, which alert pedestrians of the appropriate signal phase during which to cross the street. The majority of signalized intersections also include pedestrian signal heads at each crossing leg. While nearly all signalized intersections are equipped with these pedestrian feautres, pedestrian crossing distances can be very long.

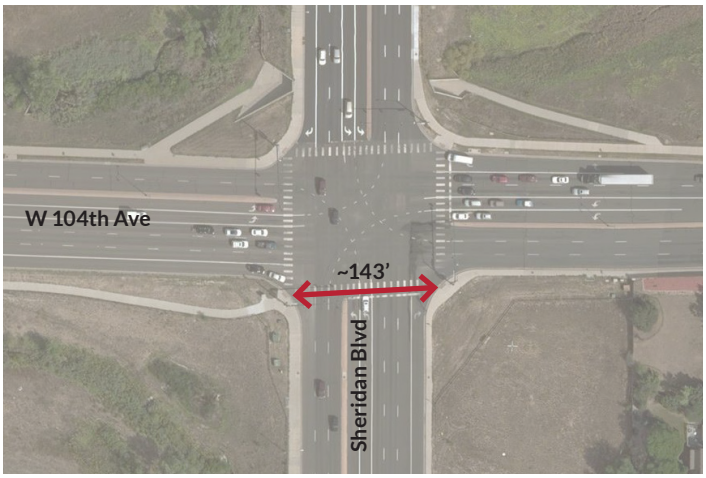
Properly designed curb ramps are key pedestrian accessibility features. Most intersections in the city are equipped with curb ramps, a key element of an accessible pedestrian system. Many ramps in Westminster do meet current standards. The vast majority of the existing curb ramps are single ramps that direct people into the intersection rather than into the crosswalk. Issues associated with this design are described in the next section, Long Crossing Distances.

Example of a typical sidewalk curb ramp in Westminster

Most major intersections in Westminster include striped crosswalks and pedestrian push buttons and signal heads, but crossing distances tend to be very long (Image: Looking west across Sheridan Blvd from Westminster City Center Marketplace at the City Center development)

Long Crossing Distances

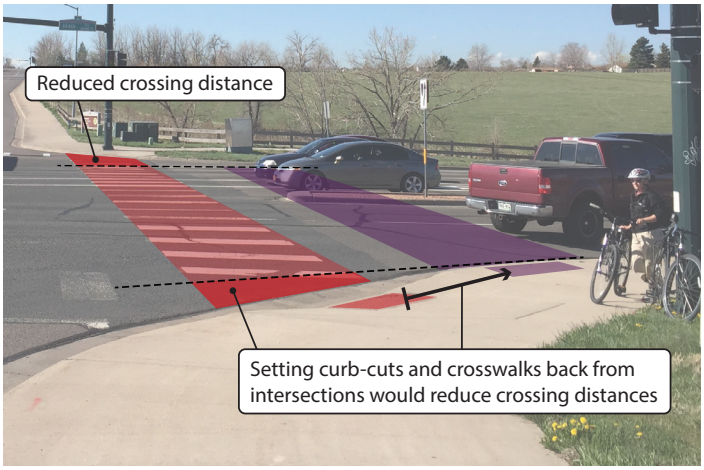
Longer crossing distances increase exposure time for pedestrians. Although the relationship is not completely linear, in general, the longer a pedestrian is exposed, the greater the risk of being struck by a vehicle when crossing an intersection. This makes crossing long intersections uncomfortable, which can discourage people from walking altogether. Most major intersections in Westminster feature very long crossing distances caused by the presence of multiple travel lanes, some of which are greater than eight lanes across.



Many major intersections in Westminster have very long crossing distances, such as this nine lane crossing at 104th Ave and Sheridan Blvd. Navigating long crossings is stressful for pedestrians.

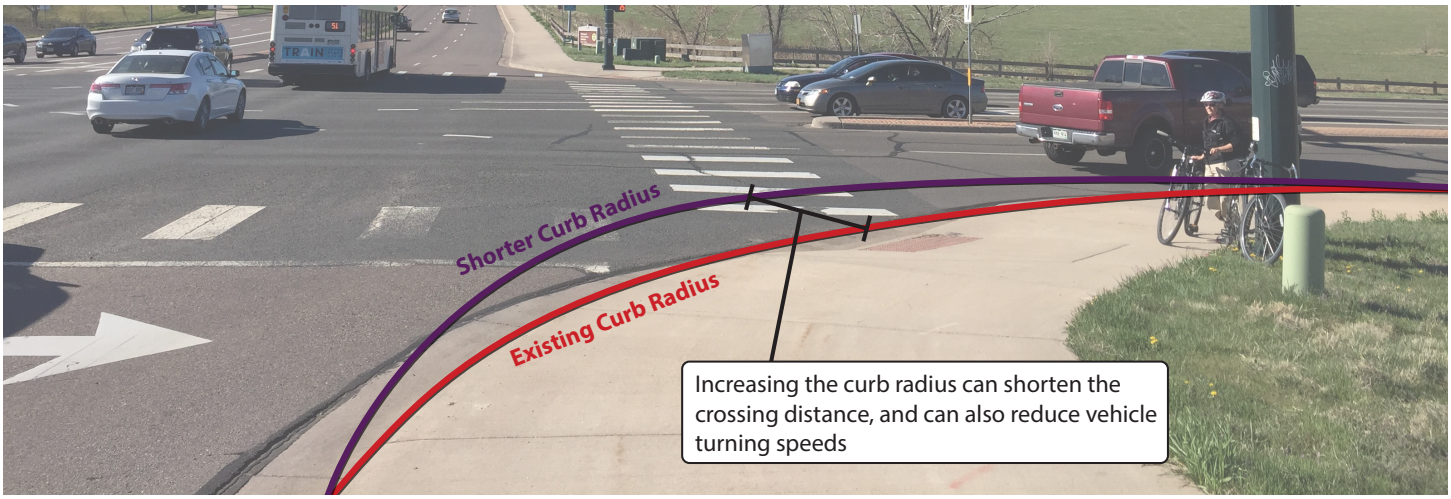
Two engineering practices in Westminster increase already long crossing distances. The first is that, at most major intersections, the curb radius is very large (about 40 feet). This design is intended to facilitate turning movements for large vehicles, such as trucks or buses. However, large turning radii also make crossing pedestrian distances longer when located at the corner, as seen in the figure below, and encourage higher vehicle turning speeds.

The second factor is that curb cuts at most major intersections in Westminster are diagonal in configuration, meaning they are consolidated at the corners of the intersection. This reduces the number of curb cuts for each corner, but places the crosswalk at the corner of the intersection where the crossing distance is the longest, as shown in the image at right. This placement also orients pedestrians diagonally into the intersection and not towards the adjacent crosswalks, an especially problematic issue for visually-impaired pedestrians.



Setting curb-cuts and crosswalks back from intersections reduces crossing distances, especially at intersections with large turning radii, like the intersection of 104th Ave and Sheridan Blvd shown above/below.

The large curb return radii at most intersections, consolidated curb cuts, and multiple through and turning lanes combined result in very long crossing distances for pedestrians. Most major roads in Westminster are posted 40 mph. These relatively high speeds coupled with long crossing distances can make crossing wide streets in Westminster challenging.



Channelized Right Turn "Slip Lanes"

Most signalized intersections in Westminster include right turn "slip lanes." The purpose of a slip lane is two-fold. It allows right turning vehicles to make a right turn movement without needing to wait for the green phase, and separates through-moving vehicles and right turning vehicles in advance of the intersection. These two factors decrease vehicle delay at the intersection.

Slip lanes divide long crossings into shorter segments, enabling pedestrians to make the crossing in phases. Another benefit of slip lanes is that there are typically no conflicts with motor vehicles when the walk signal is activated. While slip lanes do have advantages, vehicles travelling through the slip lane sometimes exhibit low yield compliance for pedestrians. Measures, such as signage, flashing beacons, and raised slip lanes, among other treatments, can can be implemented to improve yielding and the visible width of the slip lane.

Pedestrian Refuge Islands

Crossing multi-lane roadways can be challenging for pedestrians. At unsignalized intersections and at mid-block crossings where there is pedestrian crossing demand, these issues are exacerbated. Pedestrians must gauge for themselves when there is an appropriate gap in traffic before crossing. On multi-lane roadways, true gaps in traffic, or times when the pedestrian can cross the roadway without having vehicles pass in front or behind them, may be infrequent. Pedestrians tend to cross the roadway when there are perceived "holes," or when there are no oncoming vehicles in the lane the pedestrian is crossing, but there are vehicles passing their path, either in front or behind the pedestrian, as they cross the roadway. Pedestrian refuge islands help to overcome this issue, enabling pedestrians to cross when there are true gaps in traffic.

Pedestrian refuge islands allow pedestrians to make the roadway crossing in two phases, reducing the number of traffic flows a pedestrian must predict. Refuge islands are especially beneficial when gaps in the opposing directions of traffic are inconsistent. Over 75 percent of pedestrian fatalities occur at non-intersection locations.[1] "Providing raised medians or pedestrian refuge areas at pedestrian crossings at marked crosswalks has demonstrated a 46 percent reduction in pedestrian crashes. At unmarked crosswalk locations, pedestrian crashes have been reduced by 39 percent."[2] Pedestrian refuge islands are an effective tool to improve pedestrian crossing safety.

1 *NHTSA, Traffic Safety Facts 2008 Pedestrians, NHTSA, Washington, DC, 2009.*

2 *Lindley, J., Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures, FHWA, Washington, DC, July 2008.*

Most major intersections in Westminster have right turn slip lanes that channelize right-turning vehicles, which increases intersection efficiency from a vehicular standpoint but also can make crossing intersections more stressful for pedestrians (Image: Sheridan Blvd and 92nd Ave).

Pedestrian refuge islands help to improve safety for crossing pedestrians, especially on multiland roadways (Image: Aspen, CO)

The City of Westminster has installed pedestrian refuge islands (such as on Countryside Drive), but there are instances where pedestrian crossing demand exists, but no refuge islands are provided.

2.2.3 Sidewalk Policies

The Westminster Municipal Code and Standards and Specifications for the Design and Construction of Public Improvements identify specific requirements for sidewalk maintenance, sidewalk widths, sidewalk locations, guiding pedestrian traffic during construction, and requirements for installing a pedestrian push button.

Westminster Municipal Code

The City of Westminster Municipal Code provides guidance and requirements for bicycle and pedestrian facility maintenance and use.

Sidewalks (Section 8-1-10)

The city requires clear and unobstructed sidewalk paths, which encourages safe and accessible pedestrian routes, even during inclement weather. This includes a requirement (Section 8-1-10 (A)) that states that it is the responsibility of the property owner "abutting or adjoining" a sidewalk to remove snow or ice within 24 hours of the last measurable snow fall. By providing codes and requirements that outline snow removal and maintenance for sidewalks, the city is taking steps to create dependable facilities for pedestrians.

Sidewalk Use (Section 10-1-13)

Section 10-1-13 of the City's Municipal Code dedicates sidewalk use to pedestrian and non-motorized bicycles:

> (M) In Section 710, "Emerging from or entering alley, driveway, or building," subsection (3) is modified to read as follows:
>
> > *(3) No person shall drive any vehicle other than a bicycle, electric assisted bicycle, or any other human-powered vehicle upon a sidewalk or sidewalk area, except upon a permanent or duly authorized temporary driveway and except as permitted in Sections 10-1-13 and 10-1-14, W.M.C.*

Standards and Specifications for the Design and Construction of Public Improvements

Currently, the City of Westminster Standards and Specifications provides guidance and requirements for bicycle and pedestrian facilities. These include maintenance, design, and traffic control guidance that demonstrates a desire to have dependable, safe sidewalk facilities and connectivity.

Chapter 6: Roadway

The city specifies minimum sidewalk widths in Chapter 6. Sidewalk widths are shown in Table 2.1.

Chapter 6 of the Standards includes typical sections for roads that show sidewalk widths. Additionally, the following standards regarding sidewalks and ramps can be found in Section 6.20.00, Sidewalks, Curb and Gutters, Ramps, and Driveways:

- Sidewalks or bicycle paths are to be built on both sides of roadways, and must have specific widths detailed in Table 2.1 (Section B)

Table 2.1: Minimum Sidewalk Widths by Street Type

Type of Road	Required Sidewalk Width	Section of Chapter 6
Local Street	5 foot minimum from curb	6.12.01(L)
Minor Collector	5 foot minimum, detached from curb	6.13.01(M)
Major Collector	5 foot minimum, detached from curb (typical detachment is 12 feet)	6.13.02(M)
Minor Arterial	8 foot minimum, detached from curb, or as required by the City Engineer	6.14.01(K)
Major Arterial (four lanes)	8 foot minimum, detached from curb, or as required by the City Engineer	6.14.02(K)
Major Arterial (six lanes)	8 foot minimum, detached from curb, or as required by the City Engineer	6.14.03(K)

- Curb ramps are to be built at all intersections, as well as certain mid-block crossings, and must include pedestrian warning strips that indicate to mobility impaired pedestrians that they are entering the traveled way (Section E)

The city encourages maintaining dependable routes during construction (Section 6.60.02, Pedestrian Traffic): Specific counter-measures that need to be met during construction to ensure pedestrian movement are identified in Appendix A.

Chapter 8, Traffic Control

In Chapter 8, Traffic Control, of the City Standards, specifics regarding pedestrian push buttons are outlined in Section 8.35.01:

> (A) Pedestrian push-buttons shall be of the direct push-button contact type.

Pedestrian push buttons also are shown in Standard Drawing T11. Standard drawings also are provided for School Flashing Beacon Assemblies on the side of road or overhead (T19, T20, T21).

Most signalized intersections are equipped with pedestrian-actuated push buttons, and pedestrian signal heads that instruct pedestrians when it is appropriate to cross the intersection (Image: Church Ranch Blvd and 104th Ave).

Image: Sheridan Blvd at W 104th Ave

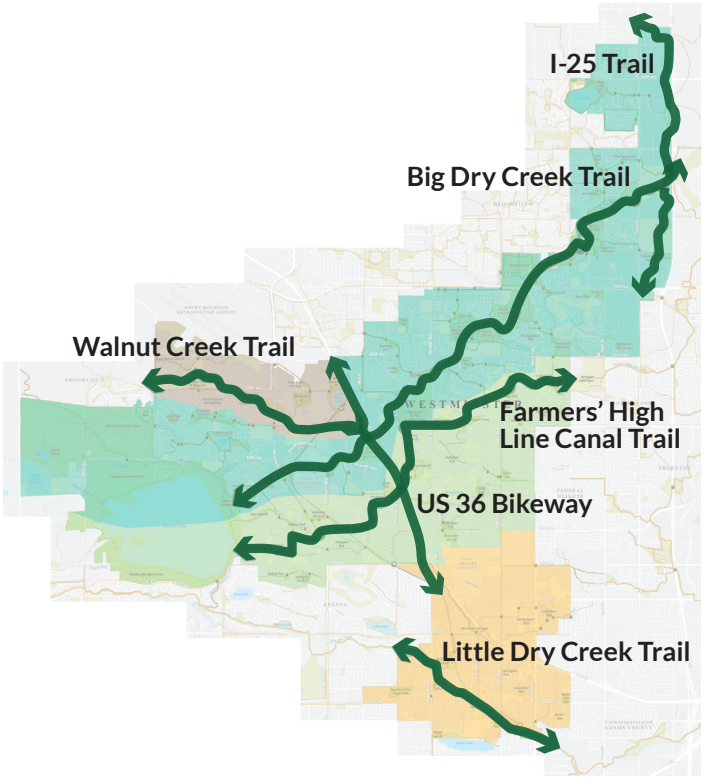
2.3 SHARED USE PATHS AND TRAILS

Shared use paths allow for two-way, off-street travel by bicyclists, pedestrians, skaters, wheelchair users, runners, persons with limited mobility, and other non-motorized users. The term "shared use path" and "trail" are often used interchangeably; however, the term "trail" can be more encompassing than "shared use path" and include natural surface trails and even sidewalks. Shared use paths are wider, hard-surface trails frequently found in parks, along rivers, and linear greenways, and typically have few conflicts with motor vehicles. They can also be located adjacent to the roadway as a "sidepath." When located within a roadway right-of-way, sidepaths must be designed to enhance safety and minimize conflict with motor vehicles, particularly at unsignalized intersections and other motor vehicle crossings.

Westminster's Trail System

More than 74 miles of trails exist within the City of Westminster. The trail system is augmented by the presence of over fifty non-motorized underpasses that enable people to cross Westminster's major arterials easily and comfortably. The trail system in Westminster largely follows a major trail and minor trail framework. The major "trunk-line" routes include the Farmers' High Line Canal, Little Dry Creek, Big Dry Creek, US 36 Bikeway and I-25 Trail and the future Walnut Creek Trail. Other minor trails serve many of the city's subdivisions, but connections between the major and minor trails are lacking.

WESTMINSTER EXISTING TRAILS



Most of the older trails in Westminster follow an east/west orientation, while the newer US 36 Bikeway and I-25 Trail follow a north/south orientation. While north-south trail connectivity remains a challenge, the city has actively taken advantage of opportunities to develop east-west corridors, and a major focus of the 2014 Trails Plan was improving north/south connections.

Most of the major trails follow an east/west orientation along historic drainage ditches, and therefore, are not ideal for reaching north/south destinations. This leaves many residential neighborhoods disconnected from the major trail network, increasing the need to travel long distances to reach them. Recently, new trails travelling north/south have been developed, including US 36 Commuter Bikeway and the I-25 Trail, which enhance mobility options for bicyclists and pedestrians travelling to destinations along these corridors.

The 2014 Trails Master Plan recommends 1) upgrading all major trails to be at least 10 feet wide and be paved to facilitate multimodal travel, 2) creating more north/south and neighborhood trail connections, and 3) implementing a cohesive wayfinding system to improve navigation. The plan also recommends installing on-street bicycle facilities to enhance connectivity between neighborhoods, destinations, and the trail network.

Trails Crossing Roadways

Many trails in Westminster cross major roadways, which are barriers to the trail's overall connectivity. The city has been proactive in addressing these potential barriers by constructing over 50 underpasses, which provide grade-separated crossings that are safe and comfortable. In instances where an underpass has not been built or is not feasible, a range of treatments have been implemented by the city, including full signals at the mid-block, mid-block crosswalks, raised crosswalks, and "trail crossing ahead" signage. The most appropriate type of crossings is dependent on the roadway context (e.g., street width, number of vehicle lanes, posted and observed speeds).

50+

The number of trail underpasses the city has constructed

TRAIL CROSSING TREATMENTS

Image: Independence St south of Independence Cir

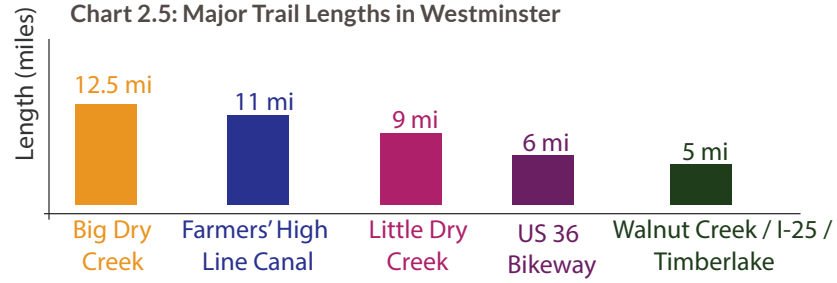
Image: Independence St south of W 94th Ave

Image: Big Dry Creek underpass at US 36 and 103rd Ave

Image: Countryside Dr at Ketner Open Space

WESTMINSTER TRAILS - A SNAPSHOT

Chart 2.5: Major Trail Lengths in Westminster

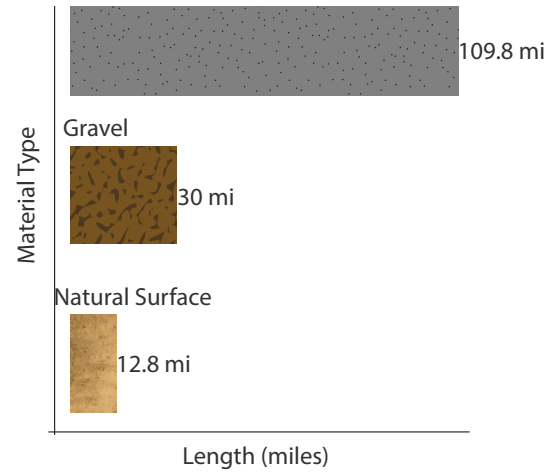


Trails in Westminster follow a major/minor trail framework. The 2014 Trails plan recommended paving all major trails in Westminster.

Chart 2.6: Comparison of Major and Minor Trail Mileage in Westminster

Major trails primarily follow an east west orientation (with the exception of the US 36 Bikeway & I-25 Trails) making commuting via the trail network in a north/south orientation challenging.

Chart 2.7: Trail Surface Material Comparison of Westminster's Trail System



The preferred surface type for a trail is dependent on the expected users. Joggers and pedestrians may prefer a softer surface, as they tend to be easier on the knees, while recreational and commuter bicyclists may prefer paved trails (concrete or asphalt) since bicyclists can roll easily on these surfaces.

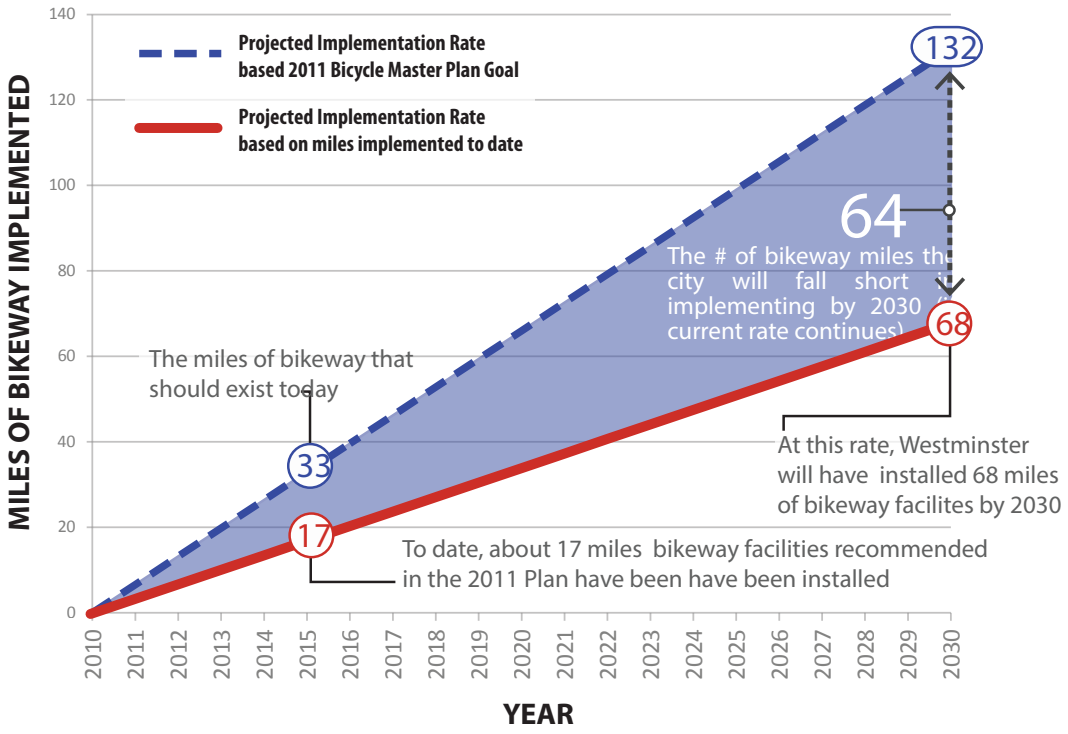
Lowell Boulevard was restriped in 2014, to include a more narrow center median, two vehicle travel lanes and bike lanes. The street now successfully operates as a complete street, with dedicated facilities for pedestrians, bicyclists and motor vehicles.

2.5 ON-STREET BICYCLE FACILITIES

On-street bikeways are important components of a bicycle network. In 2011, the city published its first Bicycle Master Plan. At the time of publication, Westminster only had only 0.1 miles of on-street bicycle facilities. The lack of on-street facilities was limiting to Westminster's multimodal transportation system, and the Bicycle Master Plan focused primarily on recommending new on-street facilities that would complement the existing trail system.

The primary goal of the plan was to make Westminster a place where bicycling could become a viable transportation alternative, resulting in a healthier, more vibrant and sustainable city. The plan's recommendations were envisioned to be implemented over a 20 year period, so that over time, bicycling would increasingly become a safer and more desirable mode of transportation and recreation. As of 2016, 17 miles of bicycle facilities had been installed in Westminster.

Chart 2.8: Rate of Bikeway Implementation, Current vs. 2011 Bicycle Master Plan Goal



Since the publication of the 2011 Bike Plan, 17 miles of bikeway facilities have been installed. Though this represents progress, the rate of bikeway implementation lags behind the rate identified in the Bike Plane needed to reach the goal of 132 miles of bikeways by 2030.

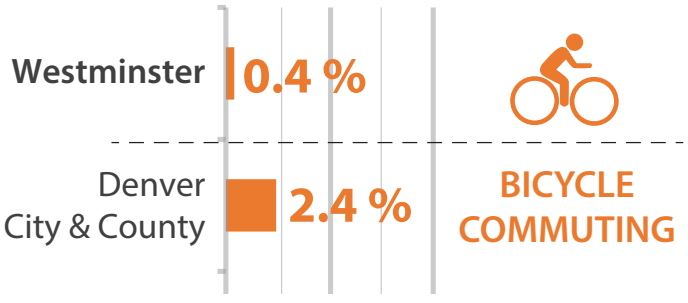
In total, the plan recommended 132 miles of new bikeway facilities, including bike lanes, bike routes, shared lanes, and new shared use paths and sidepaths. These facilities were to be implemented in three phases: short-term, mid-term and long-term. The plan also included recommendations to improve wayfinding in the community. A review of existing wayfinding conditions concluded Westminster's bikeway wayfinding was relatively sparse and incomplete, with a lack of consistency among signage types and placement policies. The plan included several recommendations to standardize and improve bicycle wayfinding throughout Westminster. In addition to wayfinding, the plan also included recommendations to improve bicycle parking options in the city, which is a critical component of all bicycle networks. To help shape a culture that supports bicycling in Westminster, the plan also identified a series of programming recommendations. These programs were grouped into categories, including education, encouragement, enforcement, and evaluation. Additional recommendations included in the bike plan are discussed in Appendix A.

Five years after the plan's publication, Westminster has implemented 17 miles of on-street bicycle facilities. Much progress still needs to be made to expand the on-street bicycle network if the 2011 Plan's vision can be realized by 2030, as can be seen in the chart on page 2-17.

Increasing the miles of bicycle facilities will also help to increase the percentage of people commuting by bike.

Chart 2.9

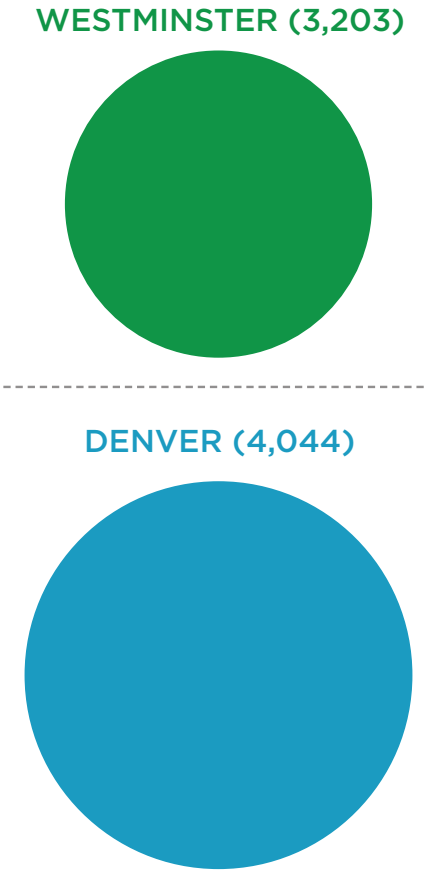
COMPARATIVE COMMUTE SHARE BICYCLING



POPULATION DENSITY & BICYCLING

Population density is an important factor known to support bikeable cities. Westminster is about as dense as Denver, but its bicycle mode share is much less. Although Denver differs demographically and culturally, it has prioritized bicycling, and this has supported its comparatively higher bicycle mode share. If Westminster prioritized bicycling to the same degree, based on its population density, it could expect the bicycle mode share to rise.*

Chart 2.10: Comparative Population Densities
(people per square mile):



**Denver has 130 miles of on-street bike lanes*

2.5 TRANSIT

Transit is a key component of the Denver region's mobility, servicing over 2.87 million people in the region and providing transportation for approximately 4.7 percent of Westminster residents for their commute to work trip. It is a key contributor to a regional transportation system that offers a range of transportation options, particularly when combined with walking and biking. Transit service in Westminster can be divided into four primary categories:

- Fixed-route local bus service
- BRT Service along US 36
- RTD's commuter rail service
- A Lift Dial-a-Ride Program

The subsections that follow describe how and where people in the city access and use transit service.

2.5.1 Local Bus Service

Westminster has 14 local bus routes serving residents throughout the city. Eight of the routes run every day of the week, two routes run Monday through Saturday, and four routes serve commuters during the work-week. Depending on the route, riders can expect the buses to come every 15 to 60 minutes between 4:15am and 2:00am. Table 2.2 has a more detailed description of service offered by each individual route.

Table 2.2: Westminster Local Bus Routes (Sorted by Average Daily Ridership)

Route	Description	Days of Operation	Span of Service (Weekdays)	Span of Service (Saturdays)	Span of Service (Sundays)	Peak Frequency (Weekdays)	Peak Frequency (Saturdays)	Peak Frequency (Sundays)	Avg. Line Ridership/ Day**
FF	Flatiron Flyer	Monday - Sunday	4:15a - 2:00a	5:00a - 3:04a	6:00a - 1:45a	10 mins	15 mins	30 mins	5062
31	Federal BLVD	Monday - Sunday	4:13a - 2:04a	4:19am - 2:03am	4:16am - 2:07am	15 mins	15 mins	30 mins	4199
12	Downing/N. Washington	Monday - Sunday	4:16a - 1:01a	4:26a - 12:56a	5:40a - 12:36a	14 mins	30 mins	60 mins	2624
76	Wadsworth BLVD	Monday - Sunday	4:26a - 2:00a	5:52a - 1:58a	5:56a - 2:02a	15 mins	30 mins	30 mins	2581
120X	Wagon Road/ Thornton Express	Monday - Saturday	4:35a - 11:46p	7:20a - 11:47p		10 mins	30 mins		1872
51	Sheridan BLVD	Monday - Sunday	4:43a - 1:11a	5:13a - 1:15a	6:16a - 1:15a	30 mins	30 mins	30 mins	1779
122X	Wagon Road/Civic Center Express	Monday - Friday	*5:35a - 6:50p			5 mins			1446
AB	Boulder/DIA	Monday - Sunday	3:10a - 1:59a	3:10a - 12:45a	3:10a - 12:48a	20 mins	60 mins	60 mins	884
92	92nd Avenue	Monday - Sunday	4:52a - 11:14p	7:15a - 11:12p	8:14a - 8:12p	30 mins	30 mins	60 mins	871
L	Longmont/Denver	Monday - Saturday	4:45a - 11:28p	8:35a - 12:07p		30 mins	90 mins		865
90L	Sheridan Station to Civic Center	Monday - Friday	6:00a - 9:00a						822
100	Kipling Street	Monday - Saturday	4:45a - 11:10p	6:37a - 8:08p		30 mins	60 mins		812
8	North Broadway/ Huron	Monday - Sunday	4:55a - 10:03p	6:03a - 8:03p	8:04a - 8:02p	30 mins	60 mins	60 mins	767
72	72nd Avenue	Monday - Saturday	5:28a - 9:10p	8:41a - 6:38p		60 mins	60 mins		763
120	120th Avenue/ Brighton	Monday - Friday	4:45a - 10:25p			30 mins			374
AA	Wagon Road/DIA	Monday - Sunday	3:05a - 11:58p	3:37a - 11:50p	3:37a - 11:50p	30 mins	60 mins	60 mins	369
128	Broomfield/ Wagon Road	Monday - Friday	5:35a - 7:10p			30 mins			282
112	West 112th Avenue	Monday - Sunday	6:00a - 11:00p	8:04a - 8:01p	8:04a - 8:02p	30 mins	60 mins	60 mins	195
80	80th Avenue	Monday - Friday	5:47a - 7:10p			60 mins			140
31L	North Federal Limited	Monday - Friday	*5:47a - 6:13p			15 mins			87
104	West 104th Avenue	Monday - Friday	5:50a - 7:43p			60 mins			81
80L	West 80th Limited	Monday - Friday	*6:18a - 6:15p			30 mins			51

*31L - 5:47a - 7:26a & 4:23p - 6:13p; 122X 5:35a - 9:07a & 3:09p - 6:50p; 80L 6:18a - 7:35a & 5:02p - 6:15p
**Based on the 2015 Weekday Total (source: RTD)

WESTMINSTER BUS SHELTERS

Providing attractive bus stops improves the appeal of using transit. Bus stops in Westminster have a range of treatments, from single poles with no benches to robust shelters with seating areas, bicycle parking, and real-time bus information. Stops along high volume routes should be standardized to offer shelters, benches and other amenities.

Bus stops marked by lone poles on the side of busy roads with no pedestrian infrastructure make taking transit less appealing

Benches at bus stops are an enhancement, but sidewalks should also be provided so those with disabilities can access the station

Bus shelters provide a place of refuge for people waiting for the bus. US 36 Commuting solutions, in collaboration with the City, received a grant through DRCOG to build and operate a Bus-then-Bike shelter to be located on the westbound side of the Westminster Center Station. Access will be available through public, paid memberships.

2.5.2 Bus Rapid Transit

As part of the US 36 Express Lane Project, the "Flatiron Flyer" BRT line was implemented in coordination with other improvements aimed at managing congestion along US 36. The BRT system is now operational and travels upon dedicated high-occupancy vehicle lanes to minimize travel times. The first phase of the project was completed in 2010. The second phase was completed in 2016. Convenient and direct BRT service is now available along US 36 between Denver and Boulder.

In addition to the provision of BRT lanes, the Express Lane Project also included the construction of six new transit stations along US 36 to serve the system, known as FasTracks stations. These transit stations connect to dedicated bus off-ramps from US 36, which increase the efficiency of the bus service. These stations are Park-n-Ride facilities as well, enabling commuters to drive, park, and take transit to their final destination. The stations offer many modern amenities, including real-time bus information, ticket vending machines, and architecturally uniform canopies. All six stations provide transit service to an average of 14,428 passengers per weekday, an increase of 45 percent from previous bus service along the corridor (as of August 2015). The stations also service local routes, making them regional transportation hubs.

Two stations are located in Westminster: Church Ranch Station and Sheridan Station. Church Ranch Station, located in the northwest corner of Westminster, provides 396 vehicle parking spaces, six bicycle racks, and six bicycle lockers, and services 760 riders per day. It provides service to two local BRT routes that run between Denver and Boulder on one local bus route. Near Downtown Westminster, a major residential and retail development that is under construction and described as the "next urban

Church Ranch Station

Sheridan Station

center on the Front Range," Sheridan Station serves a growing residential, commercial, and retail sector. The station provides service to five BRT lines that run between Denver and Boulder and eight local bus routes. The station currently provides 1,310 parking spaces, twenty-seven bicycle racks, and twenty-six bicycle lockers. It services 4,680 riders per day, making it one of the busiest Park-N-Ride stations in the entire RTD bus network.

2.5.3 RTD Commuter Rail (B Line)

Part of the RTD Commuter Rail (B Line) runs through Westminster. A 6.2-mile segment of B Line runs between Denver Union Station and Westminster Station at 70th Avenue and Irving Street. An additional 35 miles will be constructed north of Westminster in later phases to expand the Northwest Rail Line to Church Ranch, Flatiron, Louisville, Boulder Junction, and Downtown Longmont.

There are a total of three Northwest B Line stations that are planned to be located within Westminster's boundaries:

- Westminster Station (70th Avenue & Irving Street): Complete
- Downtown Westminster (88th Avenue & Harlan Street)
- Church Ranch (US 36 north of The Shops at Walnut Creek)

In support of transit-oriented development in the area, the Westminster Comprehensive Plan suggests streetscape improvements for bicyclists and pedestrians, and new, high-density, mixed-use developments to be built around Westminster Station. Specifically, the Comprehensive Plan's goals for Westminster Station include:

- Establish a vibrant, mixed-use district that will act as a neighborhood and community destination
- Provide a multimodal circulation network that prioritizes access to transit and connectivity throughout the Westminster Station focus area
- Create a well-defined, engaging public realm

The new transit-oriented development surrounding the Westminster Station includes a new parking garage funded by the city and RTD. The three-story structure supplies the area with over 600 parking spaces and has the capacity to expand to almost 1,200 spaces.

2.5.4 Park-N-Ride Facilities

There are three Park-N-Ride facilities in Westminster. These include Sheridan Station, Church Ranch and Wagon Road. Sheridan Station and Church Ranch provide service to the US 36 BRT line. Multiple efforts have been focused on improving multimodal access to the Park-N-Rides. These improvements are identified in Appendix A. The details of each station are outline below:

Church Ranch

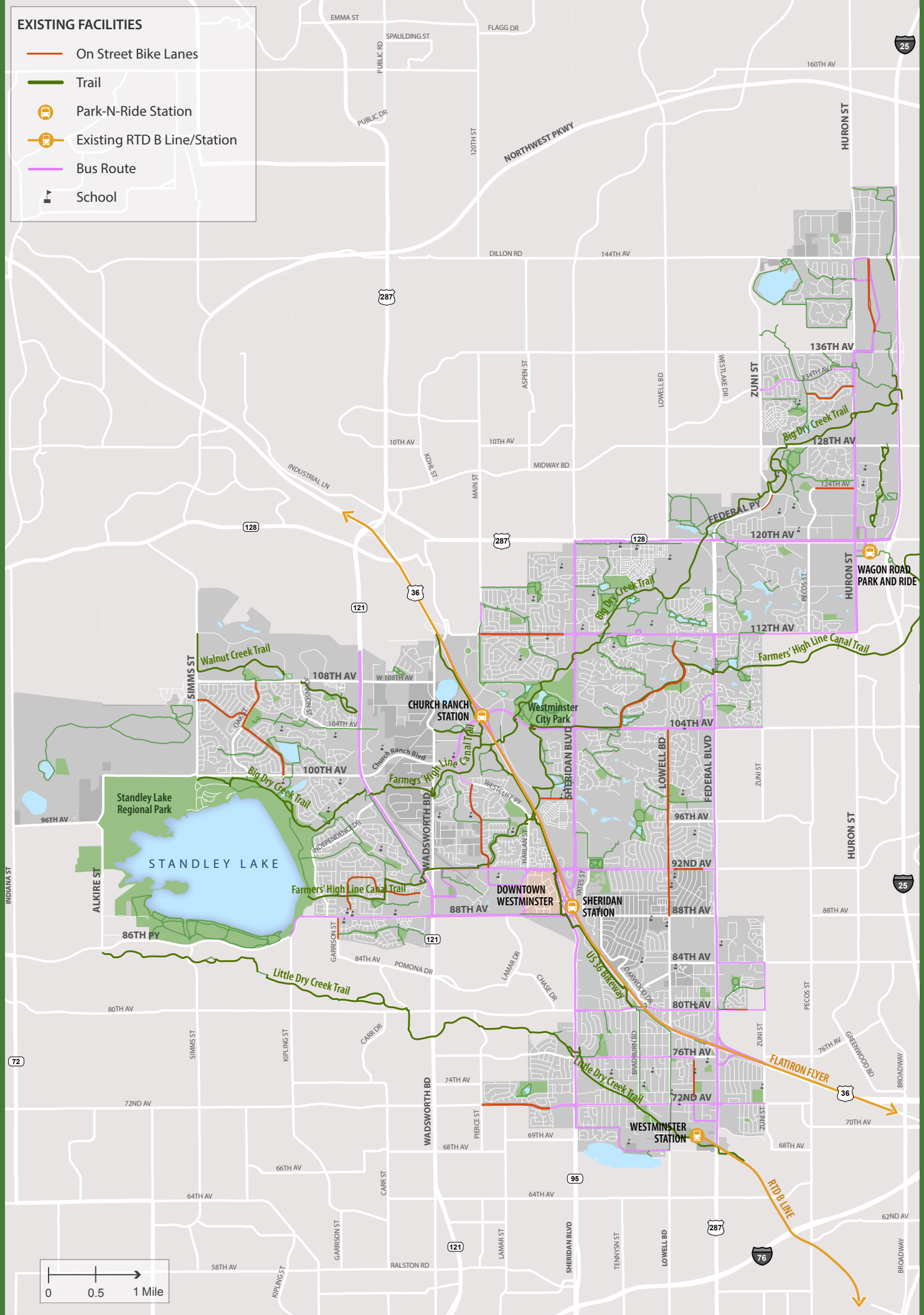
- Regional Bus Routes: FF1 and FF3
- Car Parking Spaces: 396
- Bike Racks: 9

Sheridan Station

- Regional Bus Routes: FF1, FF3, FF4, FF5, FF6, L
- SkyRide Routes: AB and ABA
- Car Parking Spaces: 1310
- Bike Racks: 26

Wagon Road

- Local Bus Routes: 8, 12, 120, and 128
- Express Bus Routes: 120x and 122x
- SkyRide Routes: AA
- Car Parking Spaces: 1540
- Bike Racks: 20


EXISTING FACILITIES
On Street Bike Lanes
Trail
Park-N-Ride Station
Existing RTD B Line/Station
Bus Route
School
MAP 2.3: EXISTING BIKEWAY, TRAIL AND TRANSIT CONDITIONS
Walnut Creek Trail
Big Dry Creek Trail
Farmers' High Line Canal Trail
Little Dry Creek Trail
Standley Lake Regional Park
STANDLEY LAKE
CHURCH RANCH STATION
Westminster City Park
DOWNTOWN WESTMINSTER
SHERIDAN STATION
WESTMINSTER STATION
WAGON ROAD PARK AND RIDE
US 36 Bikeway
FLATIRON FLYER
RTD B LINE
NORTHWEST PKWY
FEDERAL PY
WESTCLIFF PY
INDEPENDENCE DR
Church Ranch Blvd
SIMMS ST
WADSWORTH BD
SHERIDAN BLVD
LOWELL BD
FEDERAL BLVD
ZUNI ST
HURON ST
ALKIRE ST
INDIANA ST
PECOS ST
BROADWAY
136TH AV
128TH AV
120TH AV
112TH AV
108TH AV
104TH AV
100TH AV
96TH AV
92ND AV
88TH AV
86TH PY
84TH AV
80TH AV
76TH AV
72ND AV
70TH AV
68TH AV
66TH AV
64TH AV
62ND AV
58TH AV
144TH AV
160TH AV
DILLON RD
MIDWAY BD
RALSTON RD
0
0.5
1 Mile

2.6 ROADWAYS AND TRAFFIC

The foundation of the city's transportation network is its road system, which is comprised of local, collector and arterial roadways. Regional access is provided by Interstate 25 (I-25) and US US 36 as well as multiple state routes including:

- Wadsworth Parkway (State Highway 121)
- 120th Avenue (US 287/State Highway 128)
- Sheridan Boulevard (State Highway 95 south of US 36)
- Federal Boulevard (US 287)

The 2008 Comprehensive Roadway Plan Update also provides an assessment of existing traffic conditions and identifies short-term improvements. Street widening, intersection upgrades, and multimodal integration are discussed in this plan.

Although this approach can relieve congestion, wide roads act as barriers for those who are not travelling in personal vehicles, and Westminster's 2014 Comprehensive Plan acknowledges that roadway improvements should consider impacts for all modes when changes are proposed. Many newer policies are promoted throughout the document, and together, they would help to alleviate congestion by creating a more connected and walkable Westminster.

2.6.1 Street Widening

The 2008 Roadway Plan Update recommends widening nine sections of arterials. Recommended widening projects are shown in Table 2.3.

Table 2.3: Streets recommended to be widened

Street	Section	Widen To
Federal Boulevard	80th Avenue to 104th Avenue	Six lanes
Federal Parkway	120th Avenue to 128th Avenue	Four lanes
Sheridan Boulevard	72nd Avenue to 104th Avenue	Six lanes
Wadsworth Parkway	92nd Avenue to 108th Avenue	Six lanes
136th Avenue	Zuni Street to Huron Street	Four lanes
128th Avenue	Federal Boulevard/Zuni Street to Interstate 25	Four lanes
120th Avenue	Sheridan Boulevard to Pecos Street	Six lanes

Widening roadways does not necessarily equate to improving pedestrian or bicycle facilities. The recommendations outlined for widening roadways in the Comprehensive Roadway Plan Update are based predominantly on increasing the motorized vehicle capacity of the roadway. However, with new projects, there is an opportunity to enhance connectivity for multiple travel modes.

The 2008 Roadway Plan Update recommends that new roadway projects include "Complete Streets" elements—facility enhancements for people walking, bicycling, and using transit. Where bicycle facilities are added, adequate separation is recommended to minimize the impacts of traffic on bicyclist comfort.

2.6.2 Intersection Upgrades

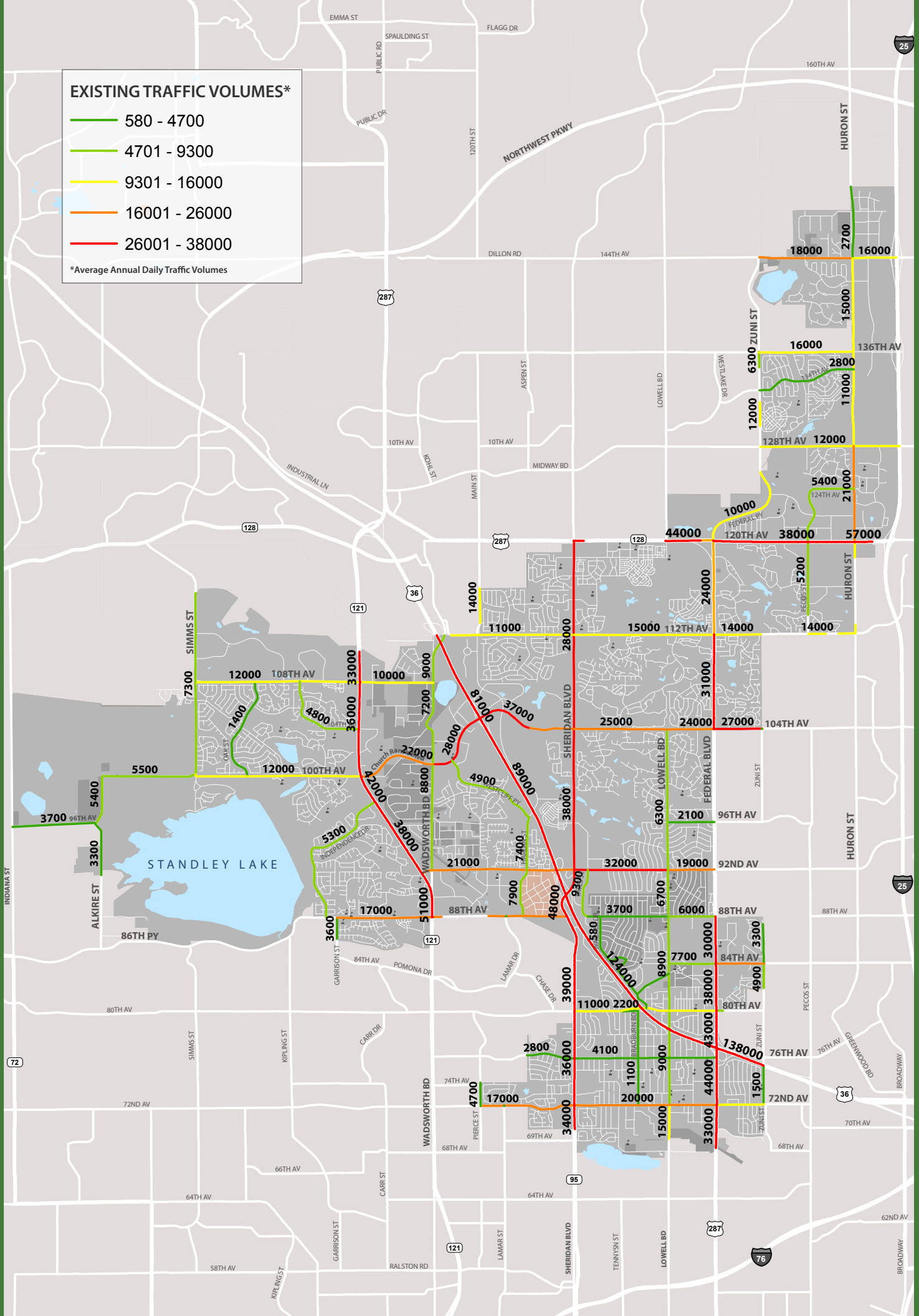
The 2008 Roadway Plan Update also recommends intersection upgrades based on the Level of Service (LOS) analysis conducted. LOS is graded from "A" to "F," where LOS A is free-flowing traffic, and LOS F is standstill congestion. Recommendations are provided for intersections that were experiencing a rating of LOS D or worse. The intersections specified in the plan are:

- Federal Boulevard and 84th Avenue: Add a third northbound and southbound through lane, and southbound, eastbound, and northbound dual left-turn lanes
- Federal Boulevard and 92nd Avenue: Add a third northbound and southbound through lane, and dual left-turn lanes for all directions (2016 project)
- Federal Boulevard and 104th Avenue: Add a third northbound and southbound through lane, and dual left-turn lanes for all directions (2016 project)
- Federal Boulevard and 120th Avenue: Add a northbound through and right-turn lane, a third through lane for eastbound and westbound, and dual left-turn lanes for eastbound and southbound
- Simms Street and 100th Avenue: Realign the intersection
- Sheridan Boulevard and 88th Avenue: Add a third northbound and southbound through lane
- Wadsworth Parkway and 100th Avenue: Add a third northbound and southbound through lane, and southbound and eastbound dual left-turn lanes (Complete)

Adding through lanes and turn bays addresses vehicular transportation concerns, but does not necessarily improve the city's multimodal vision. Large intersections are particularly difficult to navigate as a pedestrian or a cyclist.

Map 2.4 displays the Average Annual Daily Traffic Volumes (AADT) on Westminster's arterial and collector roadways.

MAP 2.4: TRAFFIC VOLUME AND ROADWAY WIDTH



2.6.3 Most Congested Arterial Streets

Increased availability of multimodal transportation options are needed to help manage congestion in Westminster. Table 2.4 shows the city's most congested arterial streets. This plan intends to help manage congestion by helping the City to develop transportation options that serve people across the study area. Improved active transportation connections, especially when integrated with the transit network, can help accomplish this goal.

Table 2.4: Westminster's Most Congested Arterial Streets

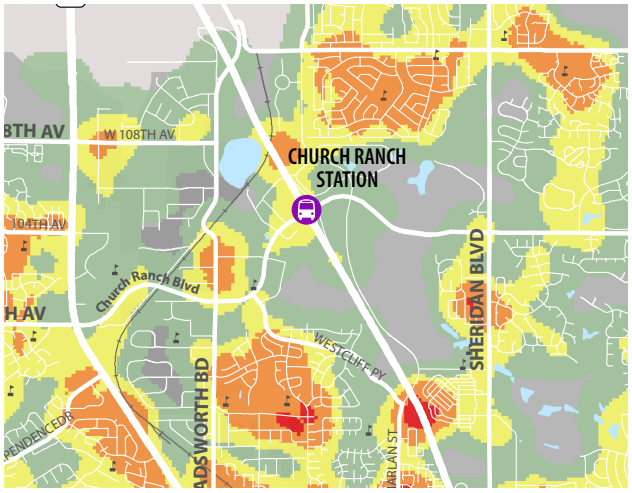
Street	Lanes	Average Daily Traffic (ADT)	% Over Threshold of Congestion (1)	% Over General Daily Traffic Capacity (2)
Sheridan Boulevard - 88th Avenue to US 36	4	53,789	73.5%	49.4%
120th Avenue - Lowell Bvd. to Federal Blvd.(3)	4	47,662	53.7%	32.4%
Wadsworth Parkway - 92nd Ave. to I 00111 Ave.	4	43,775	41.1%	21.6%
120th Avenue - Federal Blvd. to Pecos St. (3)	4	43,063	38.9%	19.6%
120th Avenue - Huron St. to 1-25	6	62,183	35.2%	17.3%
Sheridan Boulevard - 88th Ave. to 80th Ave.	4	41,628	34.3%	15.6%
120th Avenue - Sheridan Blvd. to Lowell Blvd. (4)	4	41,213	32.9%	14.5%
Federal Boulevard - 84th Ave. to 80th Ave.	4	41,150	32.7%	14.3%
104th Avenue - US 36 to Westminster Blvd	4	40,006	29.1%	11.1%
Sheridan Boulevard - 80th Ave. to 76th Ave.	4	39,877	28.6%	10.8%
Federal Boulevard - 70th Ave. to BNSF Railroad	4	36,424	17.5%	1.2%
Sheridan Boulevard - 73rd Blvd. - 73rd Ave. to 76th Ave.	4	35,222	13.6%	0
Federal Boulevard - US 36 to 74th Ave.	6	51,280	11.5%	0
Sheridan Boulevard - 104th Ave. to 96th Ave.	4	32,671	5.3%	0
Federal Boulevard - I 04th Ave. to 92nd Ave.	4	31,489	1.6%	0
Church Ranch Boulevard - US 36 to 103rd Ave.	4	31,320	1.0%	0

1) The threshold for congestion is 31,000 ADT for a 3-4 lane road and 46,000 ADT for a 5-6 lane road.
2) The General Daily Traffic capacity is 36,000 ADT for a 3-4 lane road and 53,000 ADT for a 5-6 lane road.
3) To be widened to 6 lanes in 2016
4) 120th Avenue is 3 eastbound lanes in Westminster

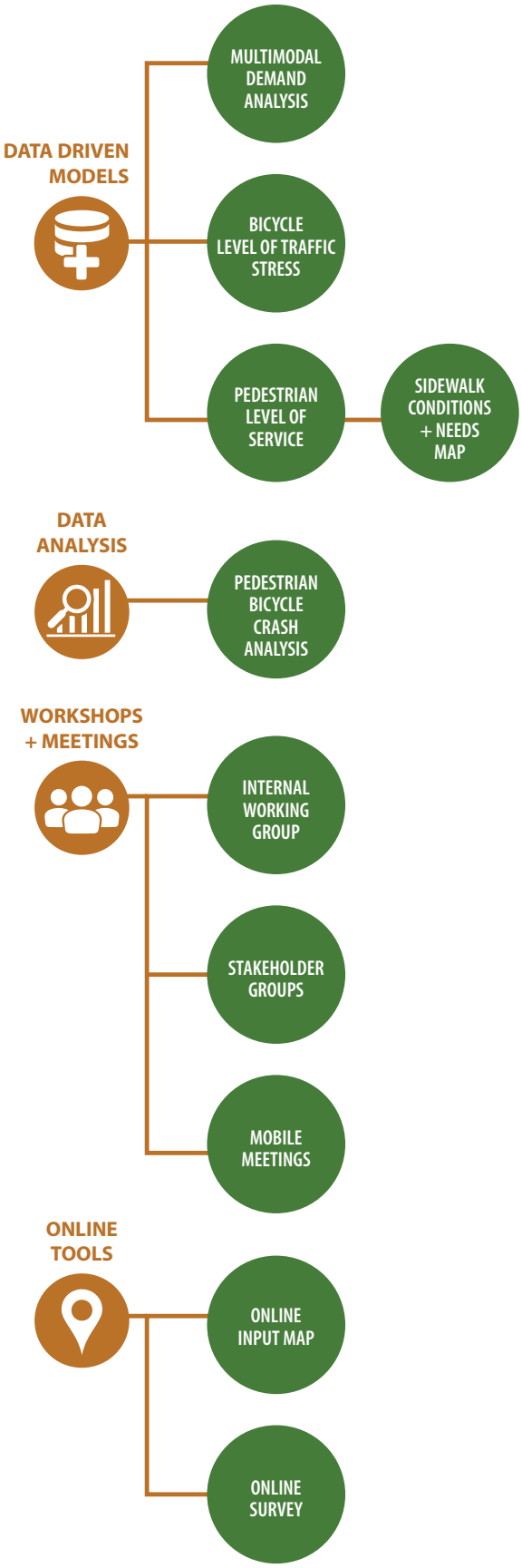
CHAPTER 3:
NEEDS ASSESSMENT

3.1 INTRODUCTION

The existing conditions chapter created a baseline for the conditions that people walking, bicycling and taking transit experience in Westminster. This chapter builds on this foundation, and identifies where there is demand for multi-modal transportation and assesses the supply of facilities that link these areas. The assessment of the demand and supply for multimodal infrastructure was informed by several layers of information, ranging from data-driven models and a crash analysis, to qualitative data collected through in-person workshops and online tools. These layers combined illustrate where the most significant needs for improvement exist, by indicating areas of the city where there is demand for infrastructure but where insufficient or no facilities are provided. This chapter describes each of these layers in detail.



Both quantitative and qualitative sources of data and information were analyzed to assess the needs for multimodal transportation in Westminster.



3.2 MULTIMODAL SUITABILITY INDEX

The data-driven models described in this chapter use existing conditions data within Geographic Information System (GIS) to assess the demand and supply for multimodal transportation in Westminster. Three tools formed the basis for this analysis:

- Multimodal Demand Analysis (demand) analyzes origins and destinations of resident trips (Map 3.1)
- Level of Bicycle Traffic Stress (supply) analyzes what physical on-street infrastructure currently exists (Map 3.2)
- Pedestrian Level of Service and Sidewalk Conditions Analysis (Maps 3.4 and 3.5)

By analyzing both the demand and supply for multimodal transportation in Westminster, an array of potential improvement opportunities become apparent. This data-driven analysis was complemented by a robust public involvement process, described on pages 3-11 to 3-20.

3.2.1 Multimodal Demand Analysis

The Multimodal Demand Analysis model provides a general understanding of expected multimodal activity by analyzing spatial data representative of origins and destinations in the city.[1] It results in a composite sketch of demand for walking, bicycling and transit use in Westminster, which is displayed on Map 3.1). In the model, multimodal demand is influenced by where people live, work, play, learn, and access transit.

Where people live

This input includes 2010 census block-level density of home locations. These locations represent potential trip origin locations. More trips can be made in areas with higher population density if conditions are right. "Live" trip hot spots are dispersed throughout Westminster, driven by the fact that a large percentage of the city's land use is residential. Concentrated areas include the neighborhoods east of Standley Lake, South Westminster, southeast of US 36, the neighborhoods between 92nd Avenue and 88th Avenue, west of US 36, and the multi-family Canyon Chase Housing Development.

Where people work

This input is based on 2010 total employment numbers by census block. Depending on the type of job, this category can represent both trip attractors (i.e., retail stores or cafes) and trip generators (i.e., office parks and office buildings) in terms of base employment population. Hot spots for the "work" analysis include the area around Downtown Westminster, the area around Westminster High School, along 72nd Avenue and between Sheridan Boulevard and Federal Boulevard, and Park Center and Westmoor Business Park.

Where people play

This input is a combination of varied land use types and destinations. Overlays such as retail destinations and parks contribute to this category. "Play" hotspots are dispersed throughout the city, due to the many parks, trails and open spaces connecting to most neighborhoods. Particular areas of heat are located in the neighborhoods east of Standley Lake, South Westminster, and the neighborhoods to the east of US 36 between 120th and 104th Avenues.

Where people learn

This input represents where students K-12, at community college, or at university go to school. "Learn" hotspots are concentrated around the schools in Westminster, including the high schools in South Westminster, middle and elementary schools in the neighborhoods between Standley Lake and US 36, and the schools bounded by 120th Avenue and 112th Avenue on the north and south, and Main Street and Federal Boulevard on the east and west.

Where people access transit

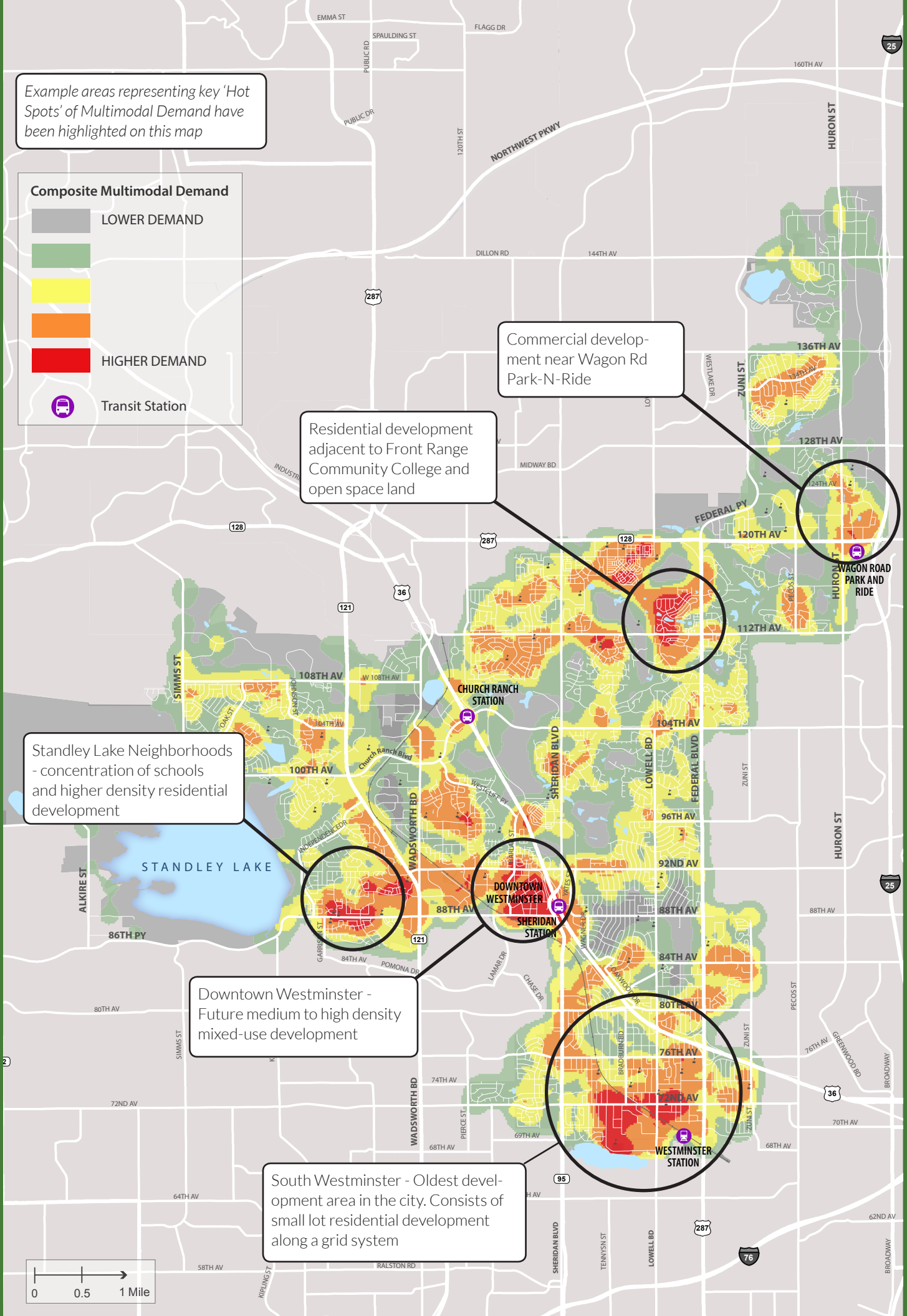
This input assesses areas with demand based upon the presence of transit stops (bus, commuter rail, and bus rapid transit) and park-n-rides and usage. It is modeled to reflect demand for Westminster Station, which opened in summer 2016. Transit hotspots are located around the major transit hubs in the city, including Church Ranch Station, Sheridan Station, Wagon Rd Park-N-Ride, and Westminster Station. Data for the transit input was provided by the RTD.

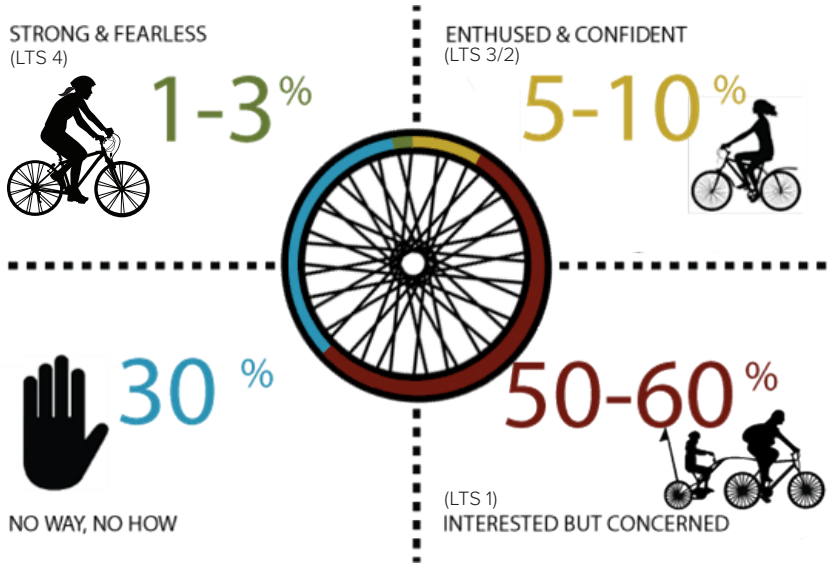
3.2.2 Composite Demand

The composite demand analysis for Westminster was developed by overlaying the factor outputs and applying standard weights to each factor. This analysis shows that the highest potential for multimodal travel demand exists in South Westminster, especially along 72nd Street, Downtown Westminster and the neighborhoods east of Standley Lake, and the neighborhoods bounded by 120th Avenue and 112th Avenue on the north and south, and Main Street and Federal Boulevard on the east and west. The composite demand results are displayed on Map 3.1, and the areas with more demand will be assessed in the recommendations chapter to determine if adequate multimodal facilitates service these areas.

1 The Multimodal Demand Analysis model was developed by Alta Planning + Design, Inc., with review and input from the scholastic community and practitioners across the US. This model has been used in numerous North American cities to assess the demand for walking and bicycling.

MAP 3.1: MULTIMODAL COMPOSITE DEMAND SCORE





Research into bicycling mode choice has indicated that all Westminster residents generally fall into four categories: Strong and Fearless riders, who will ride despite challenging traffic conditions (1-3%); Enthused and Confident riders, who will ride in most traffic conditions but prefer dedicated bicycle facilities (5-10%); Interested but Concerned Riders, who would ride but only if comfortable bicycle facilities are provided (50-60%); and those who will never ride a bicycle, for personal or physical reasons (30%). This research indicates that the majority of people in the United States (56-73%) would bicycle if dedicated bicycle facilities were provided. However, only a small percentage of Americans (1-3%) are willing to ride if no facilities are provided.

Source: Roger Geller, City of Portland Bureau of Transportation. Four Types of Cyclists. http://www.portlandonline.com/transportation/index.cfm?&a=237507. 2009; 2 D ill, J ., M cNeil, N . F our Types o f C yclists? Testing a Typology t o Better Understand Bicycling Behavior and Potential. 2012.

3.2.3 Bicycle Conditions - Level of Traffic Stress Analysis

A bicycle network is likely to attract a large portion of the population if its fundamental attribute is low-stress connectivity. In other words, a network should provide direct routes between origins and destinations that do not include links that exceed one's tolerance for traffic stress. Each user is different and will tolerate different levels of stress in their journey, so this analysis should be used as a general guide rather than an absolute truth.

The methods used for the Level of Traffic Stress Analysis were adapted from the 2012 Mineta Transportation Institute (MTI) Report 11-19: *Low-Stress Bicycling and Network Connectivity*. The approach outlined in the MTI report uses the following variables to classify roadways:

- posted speed limit
- the number (and width) of travel lanes
- the presence of bicycle lanes
- Average Annual Daily Traffic Volumes

The Bicycle Level of Traffic Stress Model has become the industry standard for assessing comfort levels of bicycle networks and has been employed in many US cities, across urban, suburban, and rural contexts.

In figure 3-8, road segments are classified into one of four levels of traffic stress (LTS) based on these factors:

- LTS 1 is assigned to roads that would be tolerable for all ages and abilities, including children and elderly adults, to ride
- LTS 2 roads are those that could be comfortably ridden by the mainstream adult population
- LTS 3 is the level assigned to roads that would be acceptable to current "enthused and confident" bicyclists
- LTS 4 is assigned to roadway segments that are only acceptable to "strong and fearless" bicyclists, who will tolerate riding on roadways with higher motorized traffic volumes and speeds

Images displaying LTS scores 1 to 4 in Westminster are displayed on page 3-5.

In general, streets with separated bicycle facilities or streets with very low volume (<3000 vehicles per day) and speeds (<25 miles per hour) would qualify as a low-stress (LTS 1) bikeway, while roadways shared with motor vehicle traffic operating at high speeds and volumes would receive a higher-stress score. The results of the LTS analysis help to identify existing areas with a high level of service, as well as focus areas for improvement. The LTS analysis is specifically focused on the street environment. Adjacent shared-use paths (if present) offer a more comfortable facility type that is not reflected it the LTS score.

LTS provides an intuitive framework to describe the benefits of bicycle infrastructure and demonstrates that some roadways may require more intervention than others to provide a truly comfortable experience. For example, the only time a standard bike lane is considered all ages and abilities is a 6 -foot-wide facility on a roadway with posted speed of 30 mph or lower, and the best score achievable on a roadway with four or more travel lanes without installing a separated bike lane is LTS 3.

Level of Traffic Stress Scores

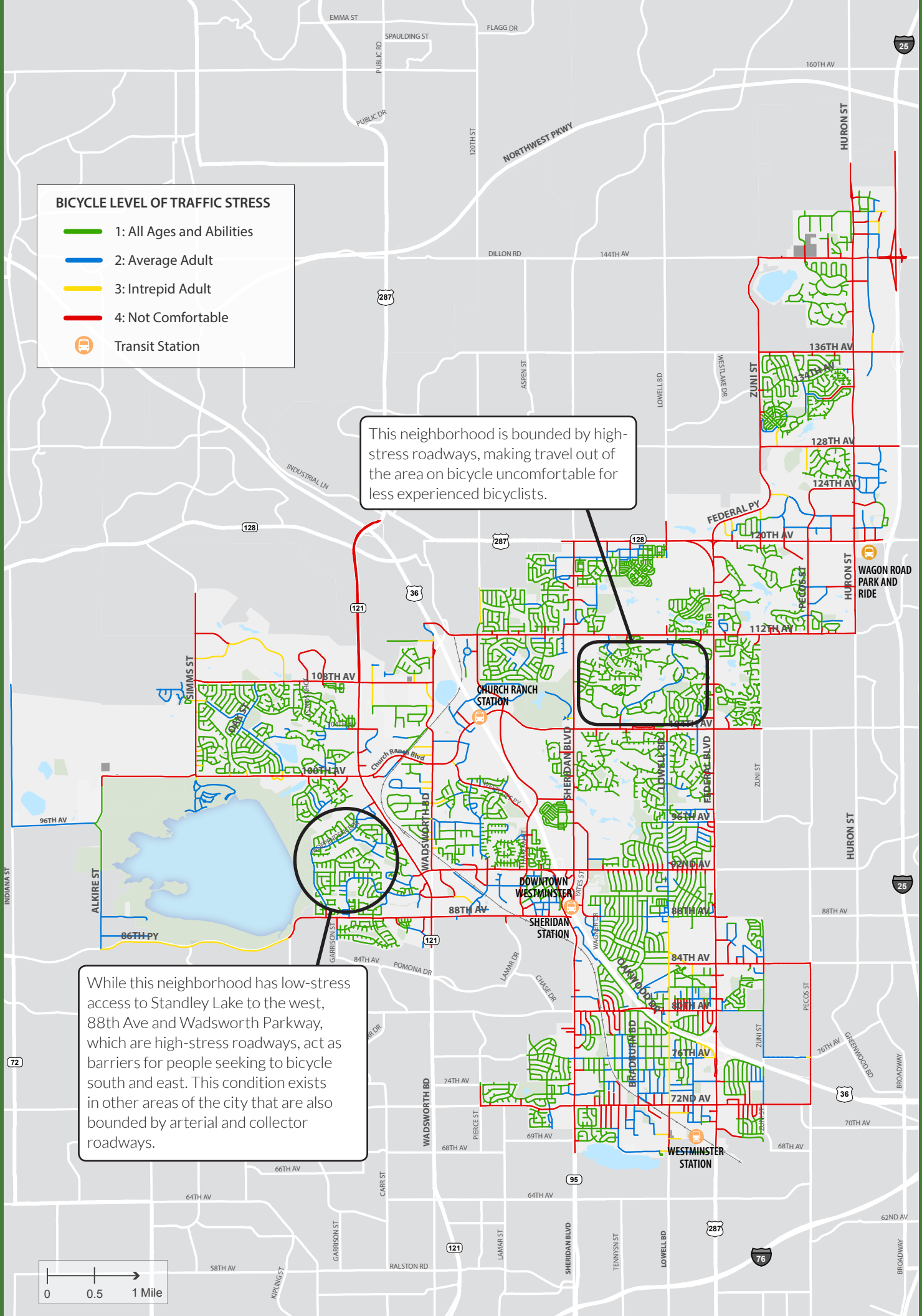
Residential streets, such as Owens St, are low-volume and low-speed (25 MPH speed limit) and are comfortable for a wide range of bicyclists, including children and older adults, even without dedicated facilities (source: Google Streetview)

Bicycle lanes with no on-street parking and moderate speeds/volumes can be attractive for the mainstream population, as in this example on Lowell Blvd (30 MPH speed limit), north of 97th Ave.

Collector roadways tend to carry more traffic and have higher speeds, making riding along them more stressful and comfortable only for more capable bicyclists (Image: Lowell Blvd south of 88th Ave) Image: Google Streetview)

Sharing the traffic lane or riding in the shoulder on streets with high traffic volumes and speeds is not comfortable for the majority of bicyclists (Image: Wadsworth Pkwy south of 108th Ave, 55 MPH speed limit)

MAP 3.2: BICYCLE LEVEL OF TRAFFIC STRESS



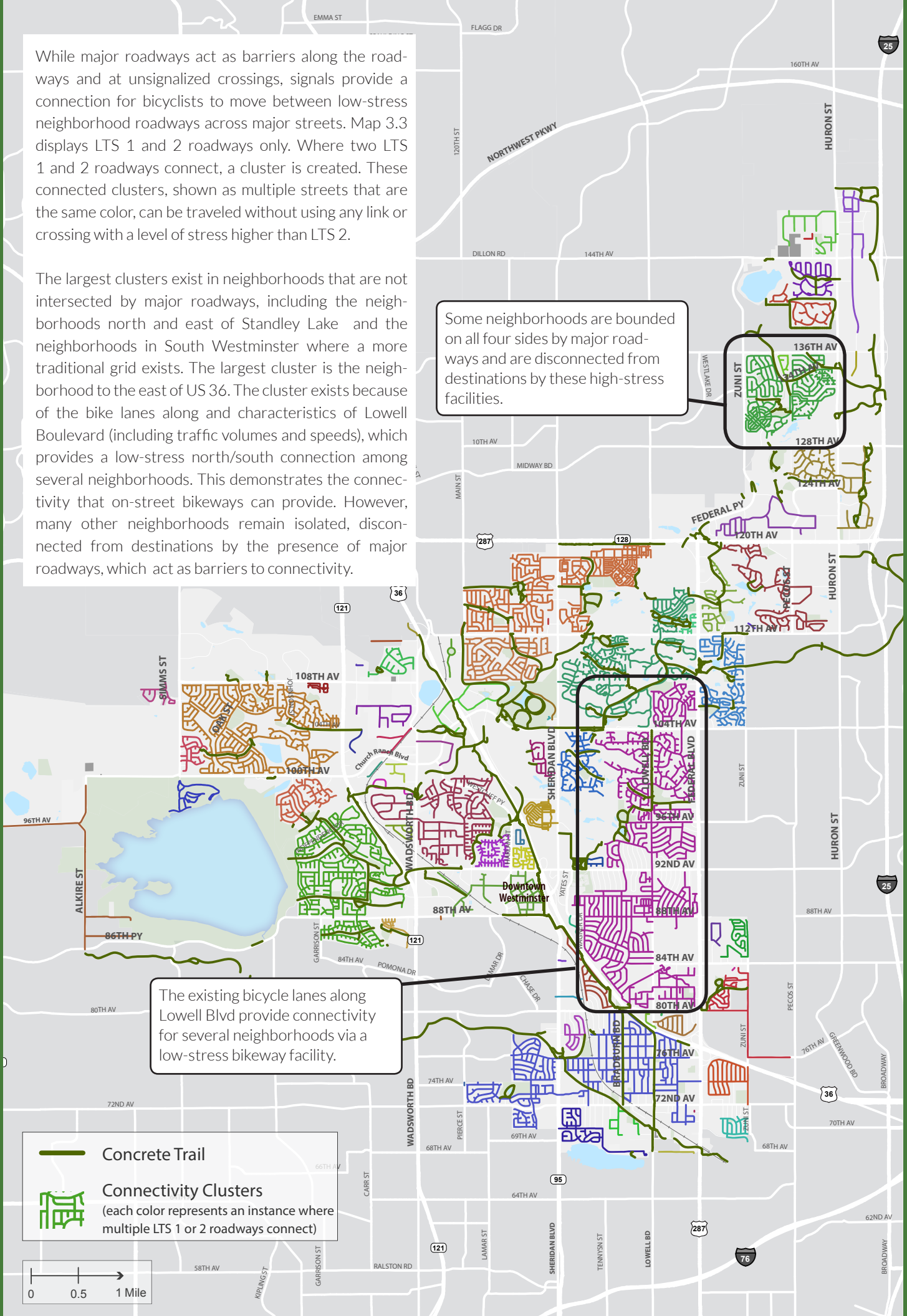
MAP 3.3: BICYCLE LEVEL OF STRESS CLUSTERS

While major roadways act as barriers along the roadways and at unsignalized crossings, signals provide a connection for bicyclists to move between low-stress neighborhood roadways across major streets. Map 3.3 displays LTS 1 and 2 roadways only. Where two LTS 1 and 2 roadways connect, a cluster is created. These connected clusters, shown as multiple streets that are the same color, can be traveled without using any link or crossing with a level of stress higher than LTS 2.

The largest clusters exist in neighborhoods that are not intersected by major roadways, including the neighborhoods north and east of Standley Lake and the neighborhoods in South Westminster where a more traditional grid exists. The largest cluster is the neighborhood to the east of US 36. The cluster exists because of the bike lanes along and characteristics of Lowell Boulevard (including traffic volumes and speeds), which provides a low-stress north/south connection among several neighborhoods. This demonstrates the connectivity that on-street bikeways can provide. However, many other neighborhoods remain isolated, disconnected from destinations by the presence of major roadways, which act as barriers to connectivity.

Some neighborhoods are bounded on all four sides by major roadways and are disconnected from destinations by these high-stress facilities.

The existing bicycle lanes along Lowell Blvd provide connectivity for several neighborhoods via a low-stress bikeway facility.

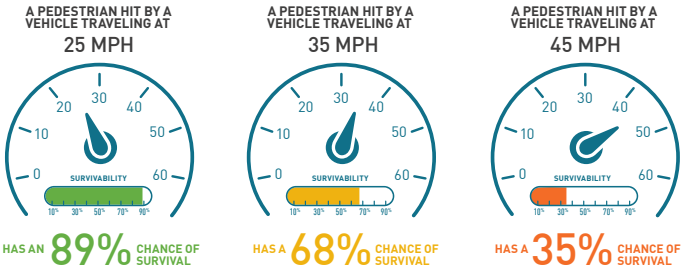


3.2.4 Pedestrian Conditions - Level of Service Analysis

The Pedestrian Level of Service Analysis (PLOS) treats segments and intersections separately. A level of service was identified for each major roadway segment in the study area, and intersections were examined along roadways with a functional classification of "collector" or "arterial" as well. These higher-order roadways present the greatest obstacle to pedestrians, and more data was available for analysis along these corridors.

Analysis Methodology

The selected segment-based PLOS analysis is rooted in the concept that a doubling of travel speed results in a four-fold increase in stopping time and resulting crash severity. According to a review of pedestrian crash severity studies, speed has the following impact on pedestrian fatalities:



Tefft, B. C. *Impact speed and a pedestrian's risk of severe injury or death.* Accident Analysis & Prevention 50 (2013) 871-878.

Dedicated facilities for pedestrians, such as sidewalks and shared use paths, are essential in creating safe travel conditions for pedestrians. This PLOS analysis is based primarily on safety and does not consider factors of the built environment known to make walking an attractive and preferred form of transportation. While built environment factors are not explicitly considered, lower posted speeds and more dedicated pedestrian space will typically correlate with places people want to walk based on the surrounding land uses and urban form (e.g., residential neighborhoods and commercial uses in urban areas with lower-speed traffic).

The segment-based PLOS analysis measures pedestrian safety using four factors: posted speed limit, roadway width (number of travel lanes), pedestrian buffer (on-street parking or bicycle lanes), and the presence of sidewalks. Planting strips also provide an effective buffer and were included in this analysis. Table 2.1 outlines the scoring methodology of the PLOS analysis. The PLOS follows a five-point scale, with 1 representing the highest comfort level. Generally, more pedestrian space on a lower speed roadway segment correlates to a higher comfort level. Where sidewalks are only provided on one side of the roadway, pedestrian comfort degrades on multi-lane roadways since pedestrians are forced to cross more than two lanes of traffic to reach that sidewalk. Bicycle lanes or on-street parking act as buffers between pedestrians and motor vehicle traffic, increasing comfort.

Table 3.1: PLOS Scoring Table

Pedestrian Space along Roadway	Speed Limit (mph)					
	<= 25 mph***		30 - 35 mph		>= 40 mph	
	2 lanes	> 2 lanes	2 lanes	> 2 lanes	2 lanes	> 2 lanes
Complete sidewalk* on both sides next to a buffer**	1	1	1	1	2	3
Complete sidewalk *on both sides	1	1	2	3	3	4
Complete sidewalk* on one side next to a buffer**	2	2	2	3	3	4
Complete sidewalk on one side	2	3	3	4	4	5
No dedicated space next to a buffer*	2	3	3	4	4	5
No dedicated space	2	3	4	5	5	5

Most Comfortable

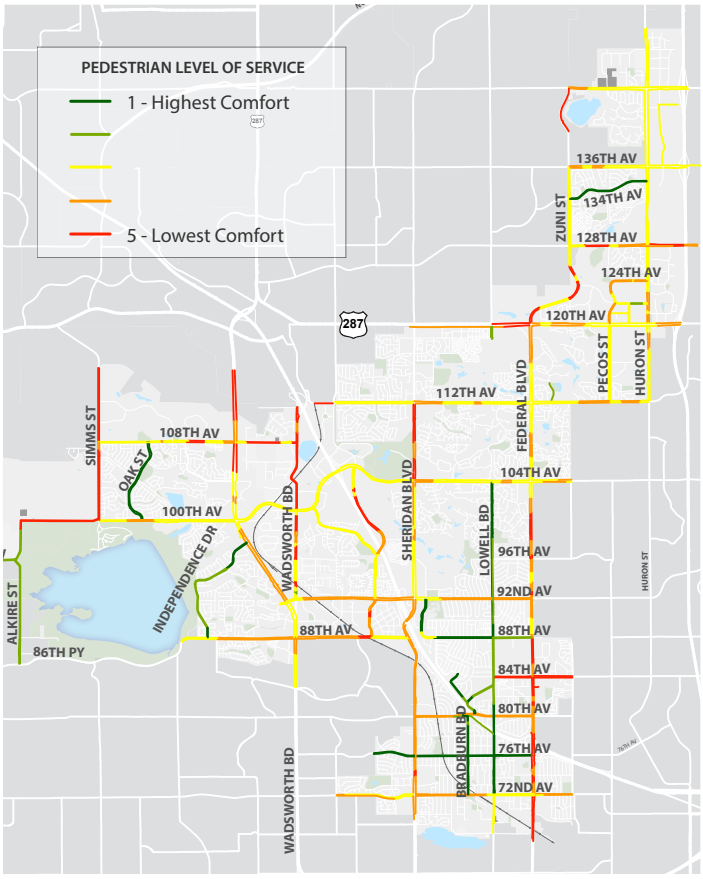
Least Comfortable

**A complete sidewalk is defined as a continuous segment without significant gaps that would impede travel by a person with a mobility impairment. This definition does not consider cracking or heaving that would impede travel or result in failure to meet acceptable travel conditions as defined by ADA regulations. Driveways may be counted as part of the continuous surface as long as there are no gaps in the paved surface.*

***Bicycle lanes and/or on-street parking.*

****Scores also apply to 30 mph roadways with traffic calming.*

MAP 3.4 PLOS ANALYSIS



PLOS Analysis Results

The PLOS analysis assessed sidewalk conditions along the major roadways in Westminster. The planning team geocoded sidewalk data along major north/south and east/west roadways in Westminster. This data was used to perform the PLOS analysis. These roadways carry relatively heavy traffic volumes, and speeds along them tend to be high. These factors combined cause most of the sidewalks analyzed to score PLOS 3-5, even when a buffer is present. Sidewalks that do not have buffers separating the sidewalk from the roadway and segments where a sidewalk existed on only side of the roadway resulted in generally poorer scores.

Sidewalk Gaps and Needs Map

The PLOS model assesses how comfortable it is to walk along major roadways in Westminster. While some roadways are comfortable to walk along, equipped with 5-foot-wide minimum sidewalks that are Americans with Disabilities Act (ADA) accessible and include a buffer between the sidewalk and roadway, many do not. Long segments of major roadways lack sidewalks, and there are also many instances where an existing sidewalk is not wide enough to meet current ADA accessibility requirements. The sidewalk conditions, and areas where sidewalk improvements are needed in Westminster, are displayed on Map 3.5.

MOST COMFORTABLE

LEAST COMFORTABLE

(Image: Lowell Blvd)

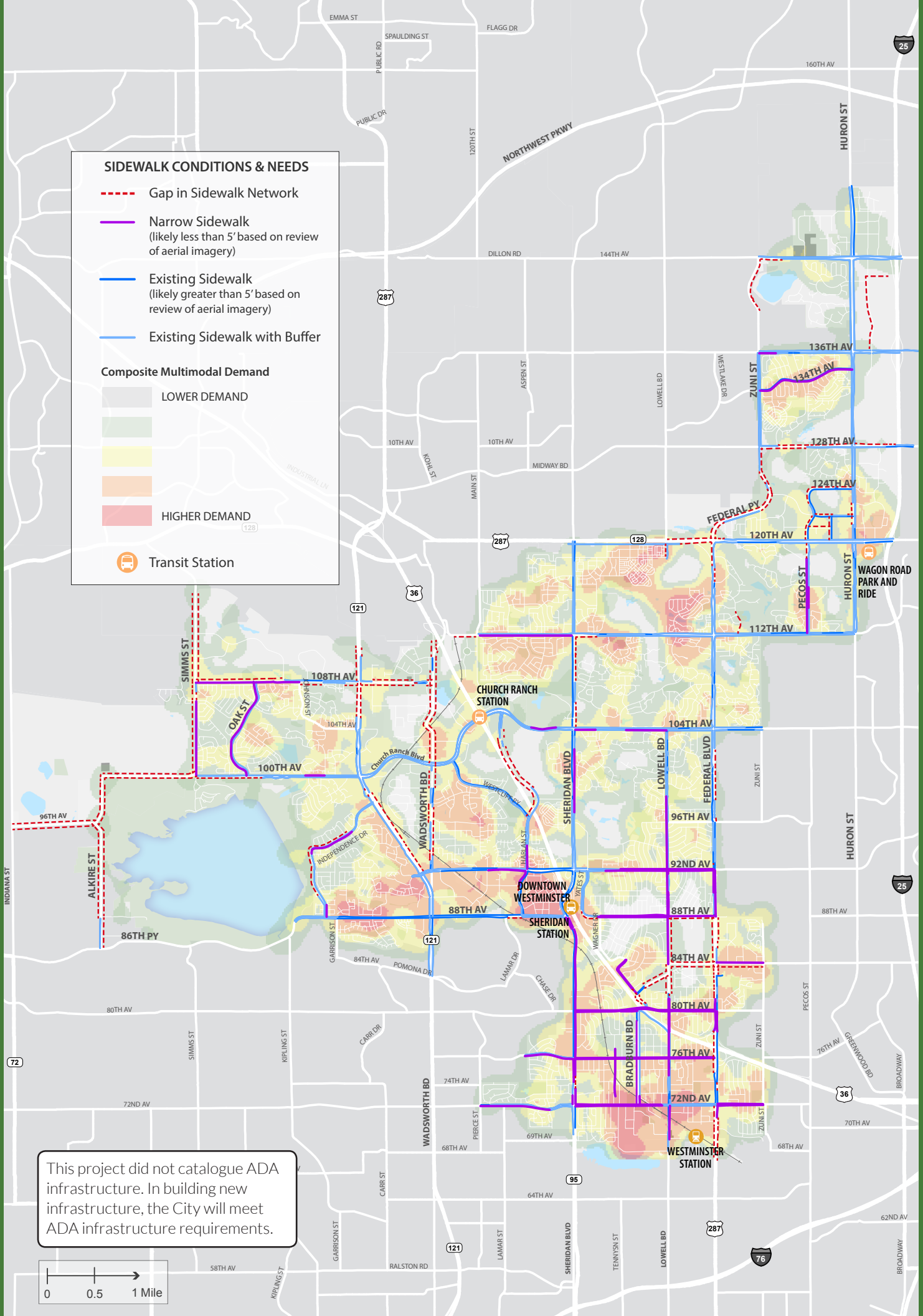
(Image: Independence St)

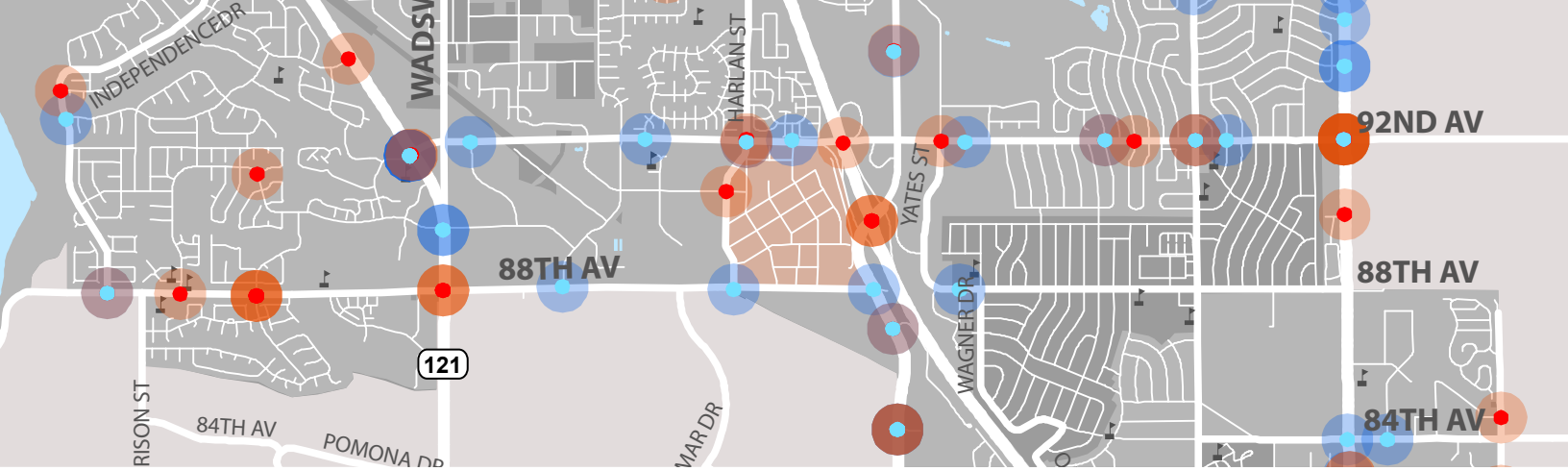
(Image: 112th Ave)

(Image: Sheridan Blvd)

(Image: Federal Blvd)

MAP 3.5: SIDEWALK CONDITIONS + NEEDS





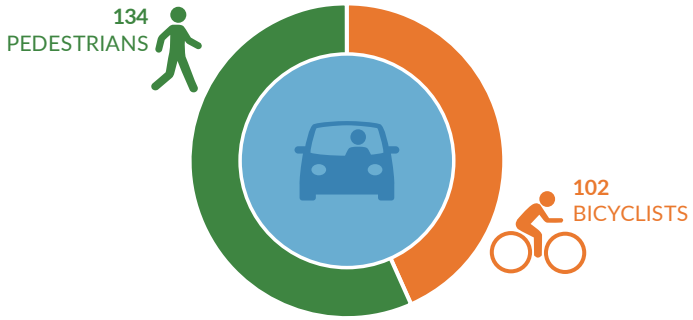
3.3 PEDESTRIAN AND BICYCLE COLLISIONS

Safety is the highest priority for the transportation system. This study provides an analysis of historical trends of crashes occurring within the City of Westminster, Colorado, between January 2010 and April 2015. Raw crash data were provided by the City (collected initially from police reports) and summarized to identify trends in collision types and locations for pedestrian, bicycle, and vehicular travel modes. As part of a multimodal access plan for the City—a report focusing on making recommendations for transit, bicycling, and walking—this study focuses more specifically on those transportation modes, touching only briefly on vehicular crashes for comparison purposes. It also does not account for collisions or near-collisions that were not reported to law enforcement.

During the period studied, a total of 12,187 total crashes were reported, 134 crashes involving pedestrians, 102 crashes involving bicycles, with the remainder involving only motor vehicles. Exhibit 1 shows the percentage of crashes in the City of Westminster reported for each mode of transportation.

In the five-plus years studied, thirty-one fatalities occurred that were related to transportation. Although a majority of these were motor-vehicle fatalities, pedestrian and bicycling modes have much higher fatality rates per the total count of fatalities reported, as shown in the Severity of Collision graphic. In Westminster, pedestrians are twenty-six times more likely to be killed in a crash and eight times more likely to be injured than people driving a motor vehicle. Bicyclists are ten times more likely to be killed during a crash on a bicycle and six times more likely to be injured than motor vehicle drivers. These exhibits show the importance of prioritizing safety for pedestrians and bicyclists across the transportation network.[1]

TOTAL COLLISIONS WITH MOTORISTS



SEVERITY OF COLLISIONS

	TOTAL	% OF PED CRASHES	TOTAL	% OF BIKE CRASHES	TOTAL	% OF CAR CRASHES
FATALITIES	7	5.2%	2	2.0%	22	0.2%
SERIOUS INJURIES	85	63.4%	49	48.0%	942	7.9%

1 *The data was provided by the Westminster Police Department and only includes Westminster police-reported crashes.*

Where Collisions Occur

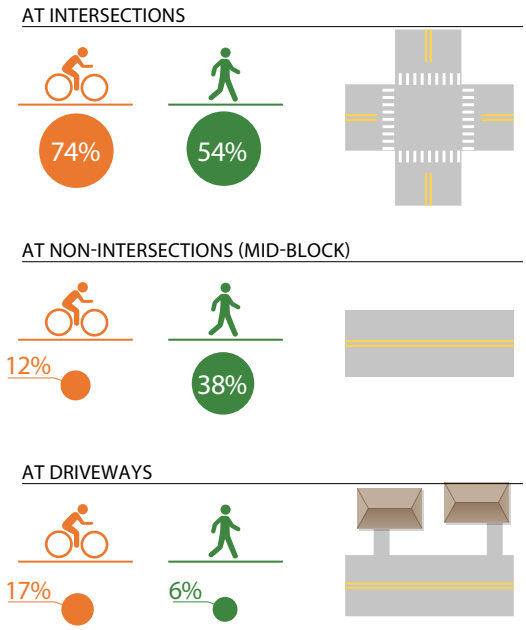
The majority of motorist collisions with both bicyclists and pedestrians occurred at intersections.

Of the 134 pedestrian-related crashes reported, 54 percent occurred at an intersection or were related to an intersection location. Pedestrian-related crashes occurring at driveways, parking lots, and highway interchanges make up less than 10 percent of pedestrian crash locations. This trend is fairly consistent with national trends for crashes involving a pedestrian because intersections are where pedestrians most commonly interact with vehicles.

Based on crash data, there is a high rate of crashes where pedestrians are attempting to cross the roadway midblock or not at an intersection. Close to 55 percent of the pedestrian crash reports at non-intersection locations noted that the pedestrian entered the roadway, indicating that the pedestrian was trying to cross the roadway.

The majority (74 percent) of bicycle-related crashes occurred at an intersection or were intersection-related. Of the remaining bicycle crashes, 12 percent occurred at non-intersections, and 17 percent occurred at driveways.

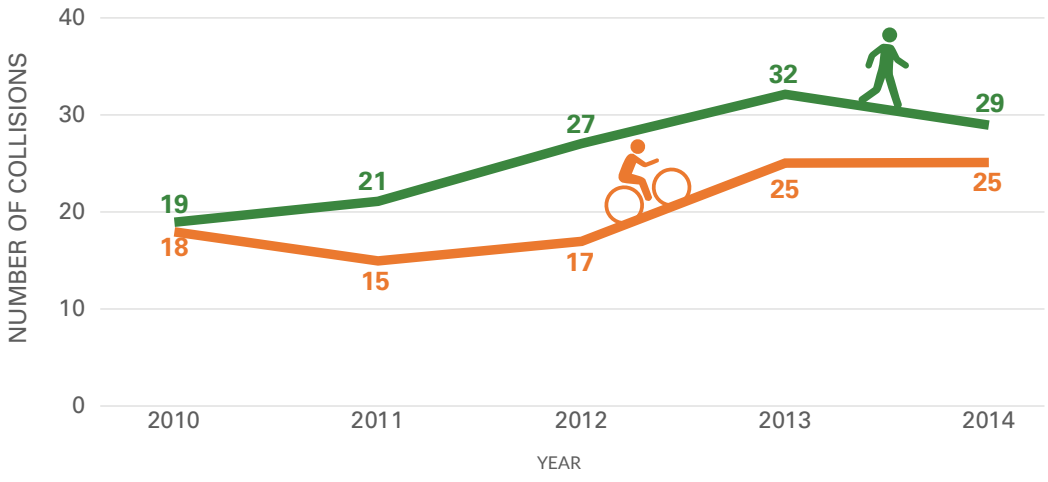
LOCATION OF COLLISIONS ALONG ROADWAYS



Frequency of Collisions

The frequency of motor vehicle collisions with pedestrians and bicyclists increased over the five years analyzed. Pedestrians had a slightly higher number of collisions than bicyclists in all years. Motor vehicle collisions with pedestrians peaked in 2013, and declined slightly in 2014. Between 2010 and 2014, pedestrian collisions increased by 53 percent. Motor vehicle collisions with bicyclists peaked in 2013, and the frequency of collisions increased by 39 percent between 2010 and 2014. In 2014, the same number of bicycle collisions were recorded as 2013.

ANNUAL COLLISIONS WITH MOTORISTS



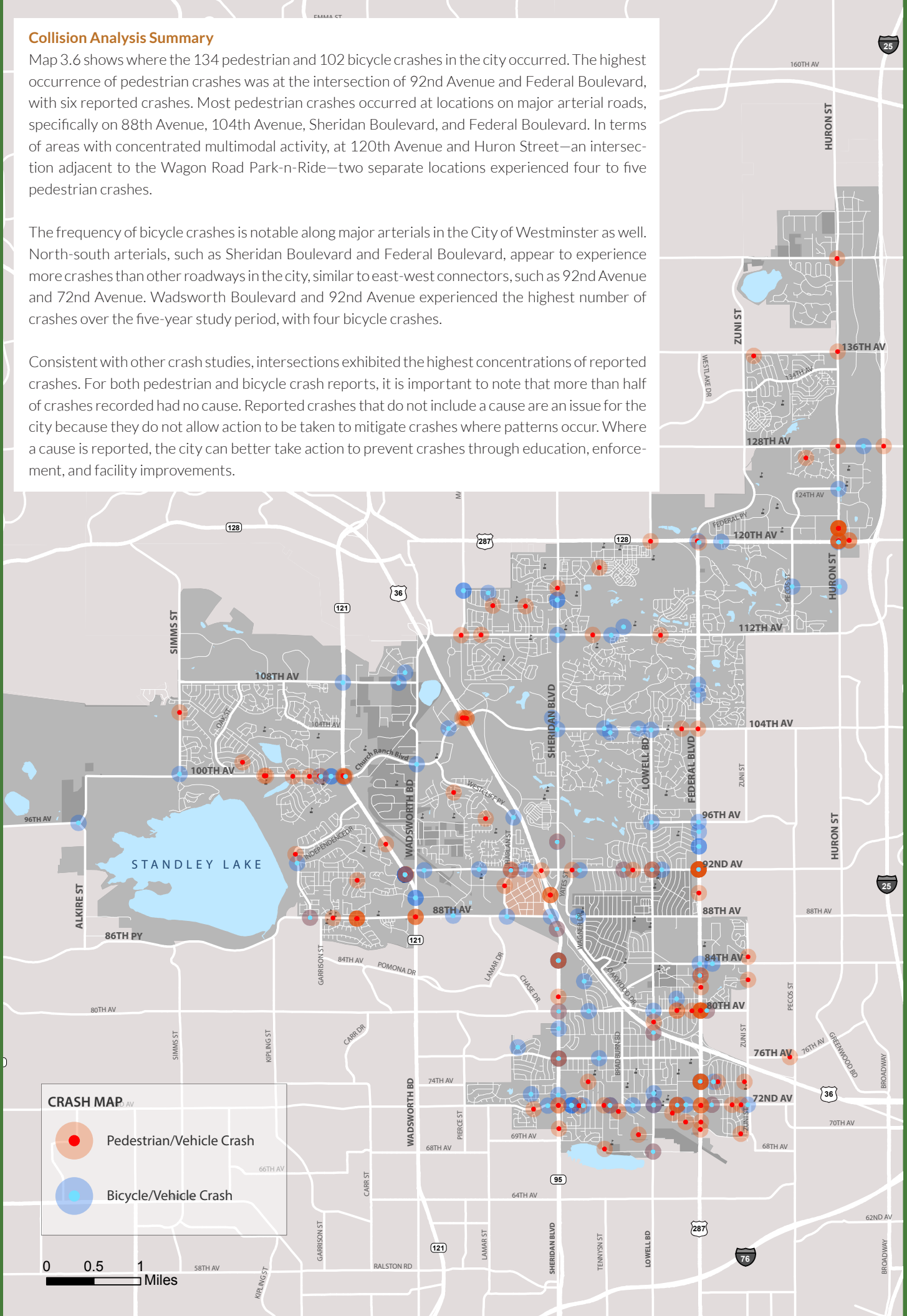
MAP 3.6: MULTIMODAL COMPOSITE DEMAND SCORE

Collision Analysis Summary

Map 3.6 shows where the 134 pedestrian and 102 bicycle crashes in the city occurred. The highest occurrence of pedestrian crashes was at the intersection of 92nd Avenue and Federal Boulevard, with six reported crashes. Most pedestrian crashes occurred at locations on major arterial roads, specifically on 88th Avenue, 104th Avenue, Sheridan Boulevard, and Federal Boulevard. In terms of areas with concentrated multimodal activity, at 120th Avenue and Huron Street—an intersection adjacent to the Wagon Road Park-n-Ride—two separate locations experienced four to five pedestrian crashes.

The frequency of bicycle crashes is notable along major arterials in the City of Westminster as well. North-south arterials, such as Sheridan Boulevard and Federal Boulevard, appear to experience more crashes than other roadways in the city, similar to east-west connectors, such as 92nd Avenue and 72nd Avenue. Wadsworth Boulevard and 92nd Avenue experienced the highest number of crashes over the five-year study period, with four bicycle crashes.

Consistent with other crash studies, intersections exhibited the highest concentrations of reported crashes. For both pedestrian and bicycle crash reports, it is important to note that more than half of crashes recorded had no cause. Reported crashes that do not include a cause are an issue for the city because they do not allow action to be taken to mitigate crashes where patterns occur. Where a cause is reported, the city can better take action to prevent crashes through education, enforcement, and facility improvements.



3.4 STAKEHOLDER AND PUBLIC OUTREACH

The planning team led multiple meetings to gather opinions from the community. Residents, visitors, and project stakeholders were able to provide feedback through workshops and mobile meetings held throughout Westminster. Feedback collected through the stakeholder workshops is summarized on page 3-12, and the summary of the mobile meetings is included on pages 3-13 to 3-14.

Internal Working Group

The internal working group, comprised of city staff from various departments, met early in the planning process to identify barriers to mobility in the community

Stakeholder Workshops

Two stakeholder workshops were held in May 2016 with representatives from community organizations and businesses in Westminster to understand challenges to mobility and opportunities to overcome these challenges.

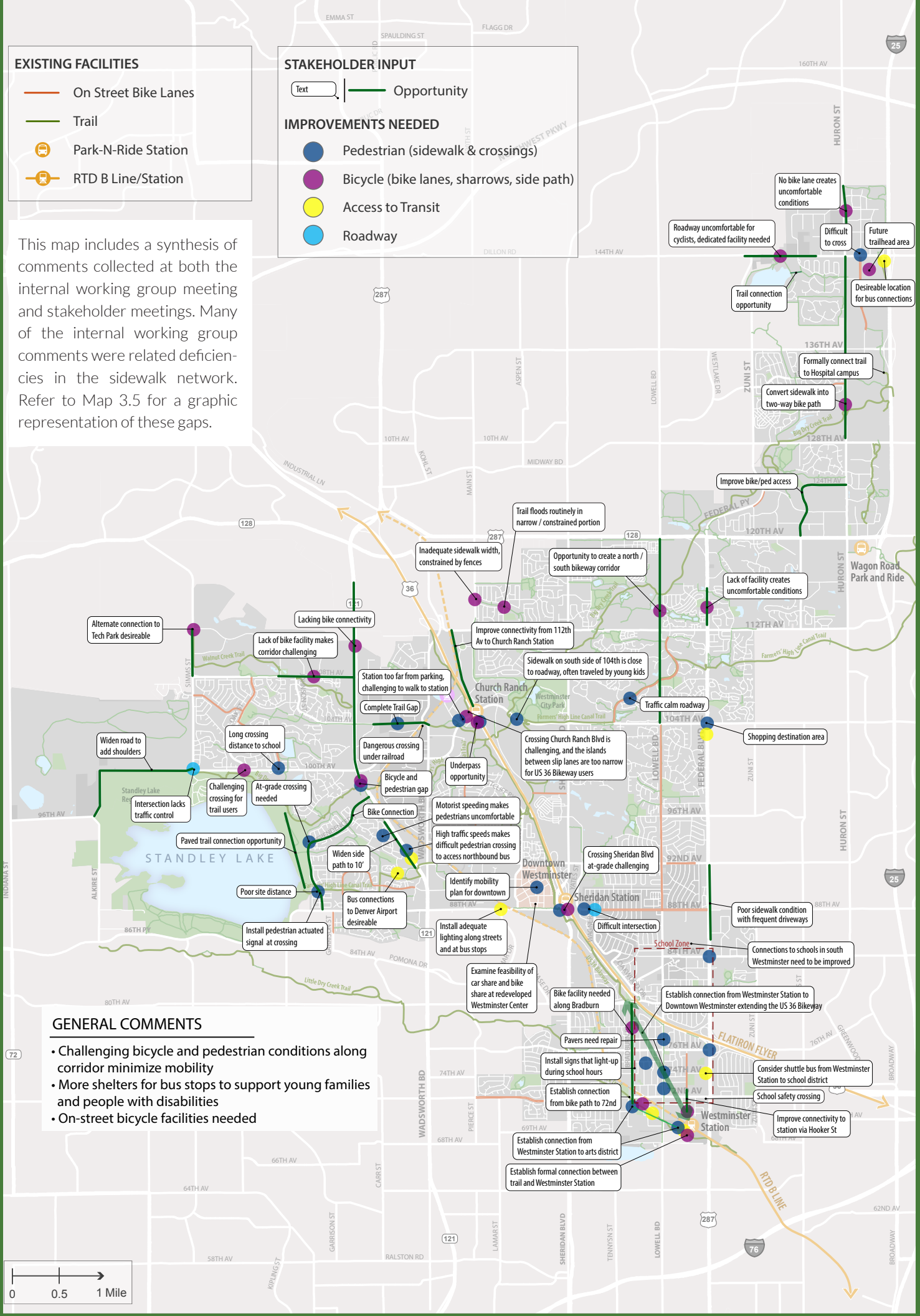
Mobile Meetings

Three mobile meetings were held in May. These meetings brought the project to the public and were held at a library, a grocery store, and a BRT station in an effort to get a wide range of input from a diverse group of residents and visitors in Westminster.

3.4.1 Workshops

Three workshops were held to assess challenges to mobility in Westminster, and opportunities to overcome these challenges. The first meeting was held with representatives from various departments within the city, including Public Works, Community Development, Parks, Recreation and Libraries. The representatives identified issues from varying viewpoints, but, generally, consistent themes were articulated. After this meeting, two additional workshops were held with stakeholder groups, including community and business leaders. At each of these meetings, a presentation was given outlining the existing conditions analysis, and a workshop was conducted that asked attendees to identify challenges to mobility in Westminster. Having representatives from different backgrounds resulted in a robust set of comments that clearly highlighted areas of need in the community. The feedback collected during the internal working group meeting and stakeholder workshops is summarized on Map 3.7.

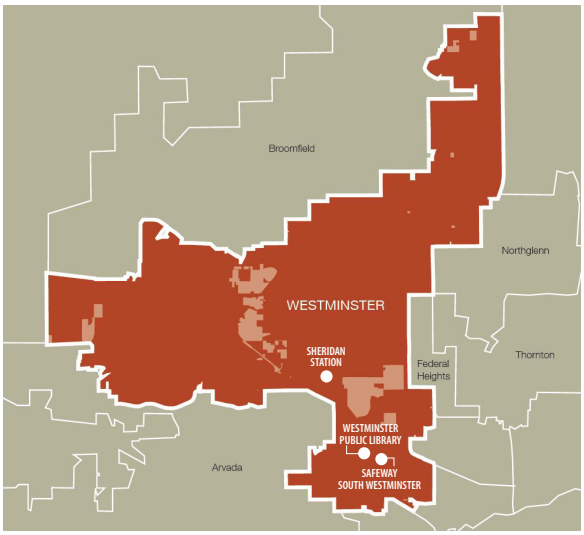
MAP 3.7: STAKEHOLDER FEEDBACK



3.4.2 Mobile Meetings

Three mobile meetings were held over the course of the project. The difference between a mobile meeting and a conventional public meeting, is that with a mobile meeting, the project is moved to locations where Westminster residents already are rather than requiring that they take time to attend a specific project meeting. For these meetings, a booth was set up at three public locations throughout Westminster, including Community Pride Day (at the Irving Street Public Library), the South Westminster Safeway, and Sheridan Station. A large vinyl map of the city was provided at each location, and as people walked by the map, they were asked if they wanted to provide input on the project. Specifically, people were asked to place post-it notes on the maps representing desired improvements related to walking, bicycling, trails, transit and roadway enhancements. In total, **over 180 comments were placed on the map**. A summary of the feedback collected during these meetings is displayed on Map 3.9.

MAP 3.8 MOBILE MEETING LOCATIONS

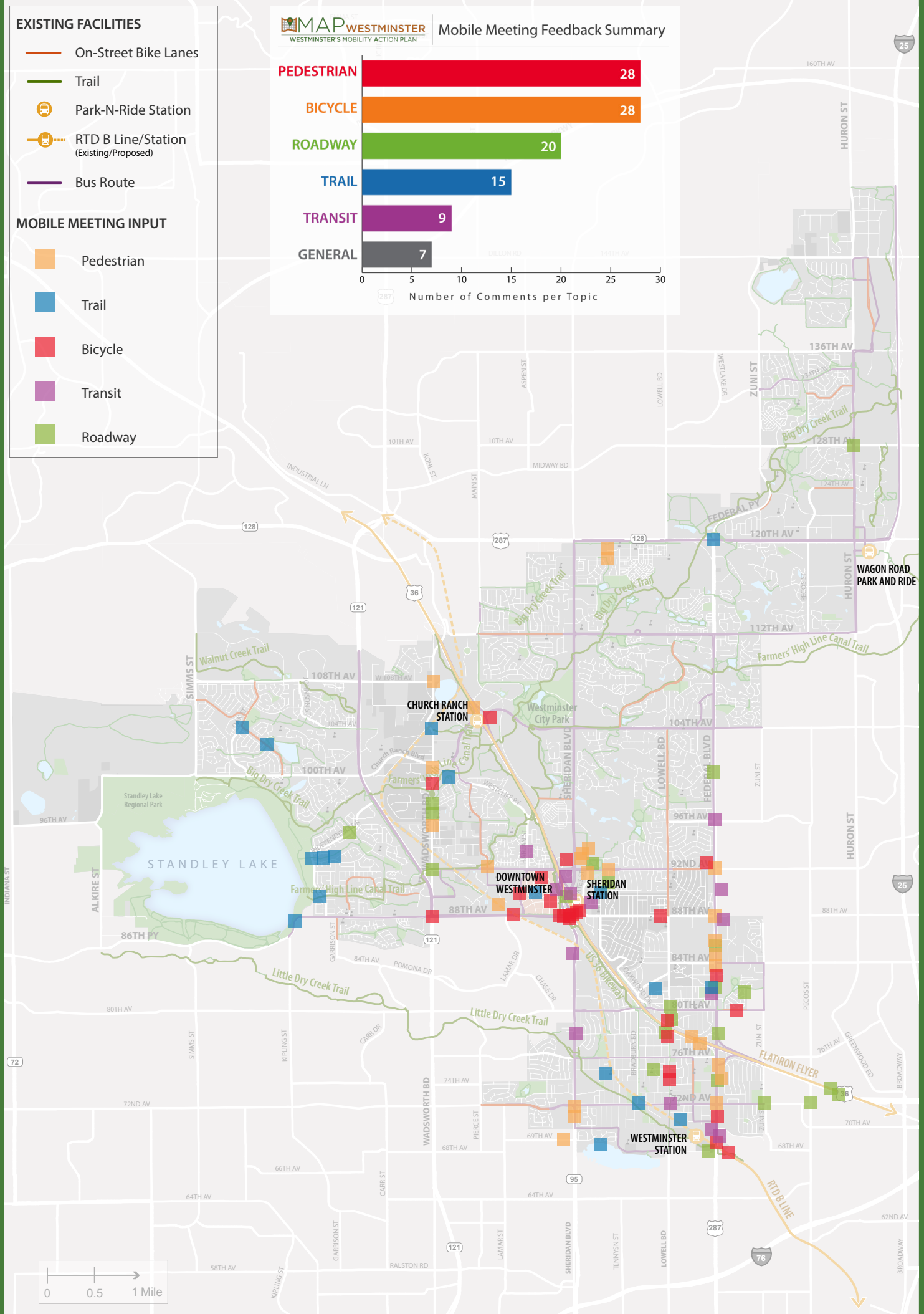


Community Pride Day Mobile Meeting (May 14)

South Westminster Safeway Grocery Store Mobile Meeting (May 14)

Sheridan Station Park-n-Ride Bus Station Loading Area Mobile Meeting (May 19)

MAP 3.9: MOBILE MEETING INPUT



3.4.3 Online Engagement Tools

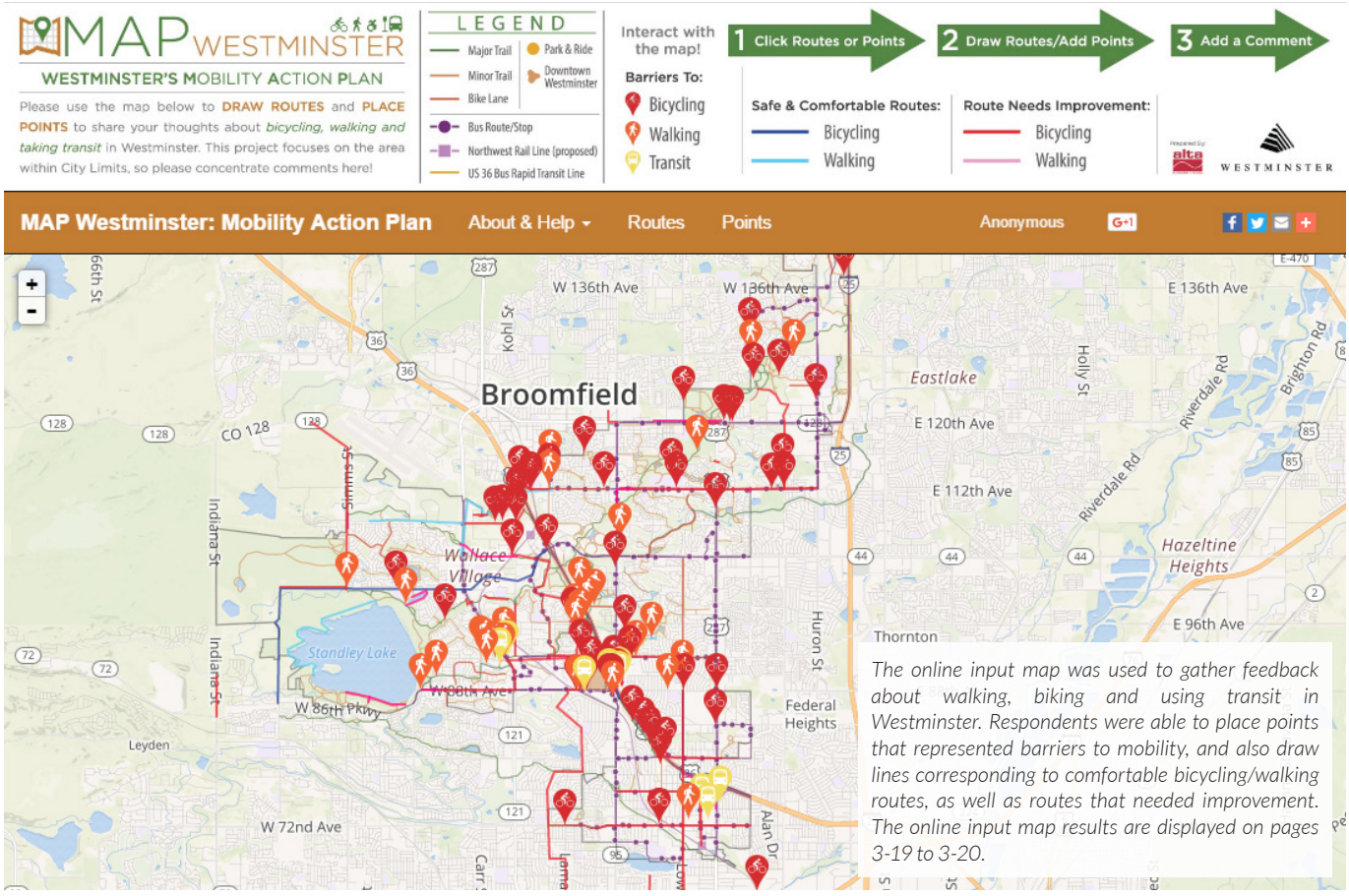
Westminster residents were invited to comment on the existing bicycling infrastructure through two online means: a traditional question and answer survey and a map-based survey. The question and answer survey, available through the project webpage, collected user responses that were then tabulated by the team, while the online mapping tool allows residents to comment on specific locations. Analysis of the community responses are detailed in this section.

Online Survey Results

The online question and answer survey, which was deployed in April 2016 and closed at the end of June 2016, was available in both English and Spanish and received 225 total responses. Respondents were asked sixteen questions about their transportation habits and demographic information. Residents identified their primary transportation mode for work and errands, their frequency of non-car transportation use and destinations, and their reasons for taking alternate modes of travel. The survey also provided an opportunity to share obstacles to travelling using alternate modes of transportation and priorities for future transportation investment.

Similar to census data, most respondents commute to work by driving alone, though transit, bicycling, and walking mode share were higher in the online survey than census commute to work data. Residents indicated that their primary reasons to walk or bicycle were for health benefits (88 percent of respondents) and time outdoors (75 percent). The survey also suggests that utility and recreational biking and walking far outpace active transportation commuting in Westminster, and highlights that there is likely a significant amount of walking and bicycling activity that is not being captured in commute to work census data. While 54 percent of respondents indicated that they do not currently use transit, those that did identified environmental impacts and multitasking as their primary reasons for using it.

The top barriers to bicycling or walking identified were safety related, with traffic speed (56 percent), difficult crossings (53 percent), and inconvenient routes (44 percent) topping the list. Time was the primary barrier to transit usage (63 percent). Residents requested most investment in paved paths and trails (59 percent) and improved crossings (51 percent). The results of the survey are included in Appendix C.



The online input map was used to gather feedback about walking, biking and using transit in Westminster. Respondents were able to place points that represented barriers to mobility, and also draw lines corresponding to comfortable bicycling/walking routes, as well as routes that needed improvement. The online input map results are displayed on pages 3-19 to 3-20.

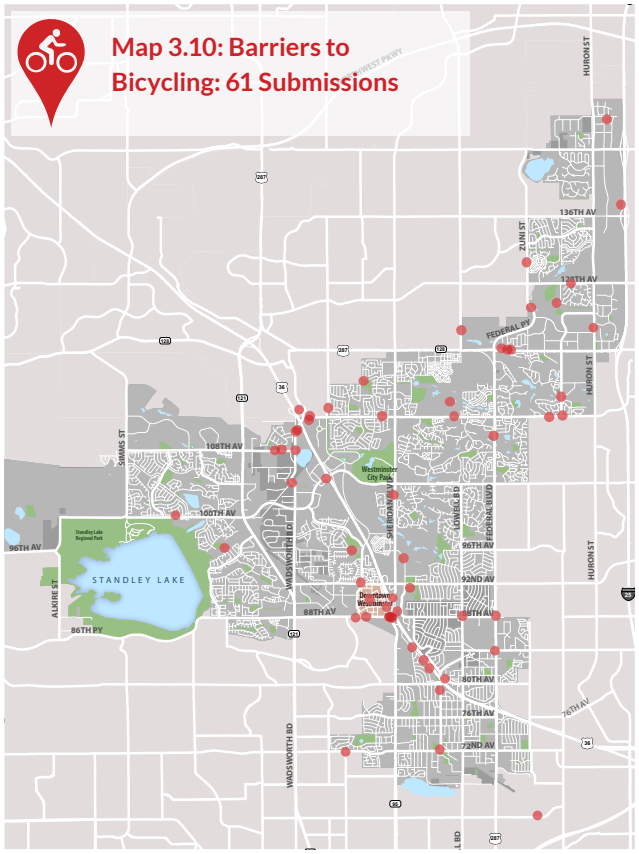
Online Input Map Results

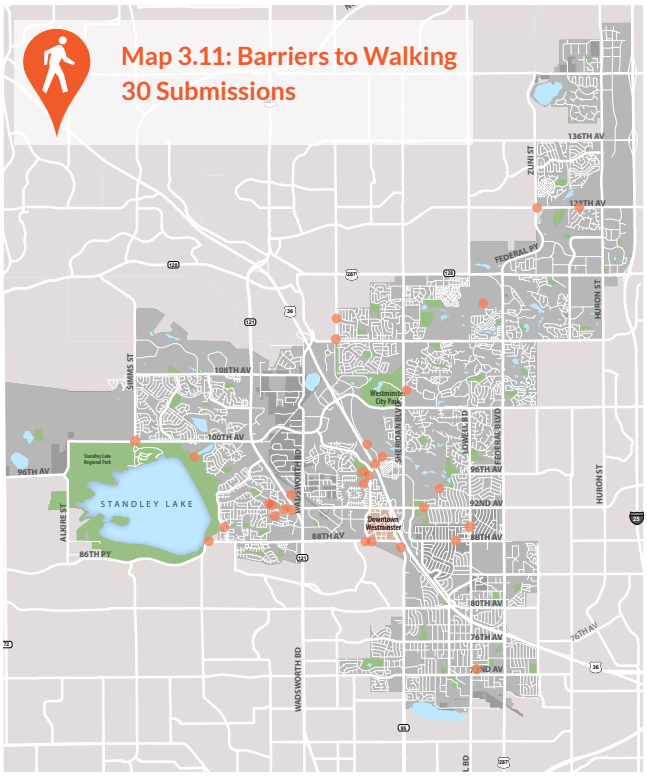
The online mapping software, Wikimapping, allows users to draw lines and drop points within an online map, and add comments to other people's input. Subsequent visitors can add additional comments and agree or disagree with existing comments. The online input map used for Map Westminster included the following base layers: existing street, bikeway and transit infrastructure.

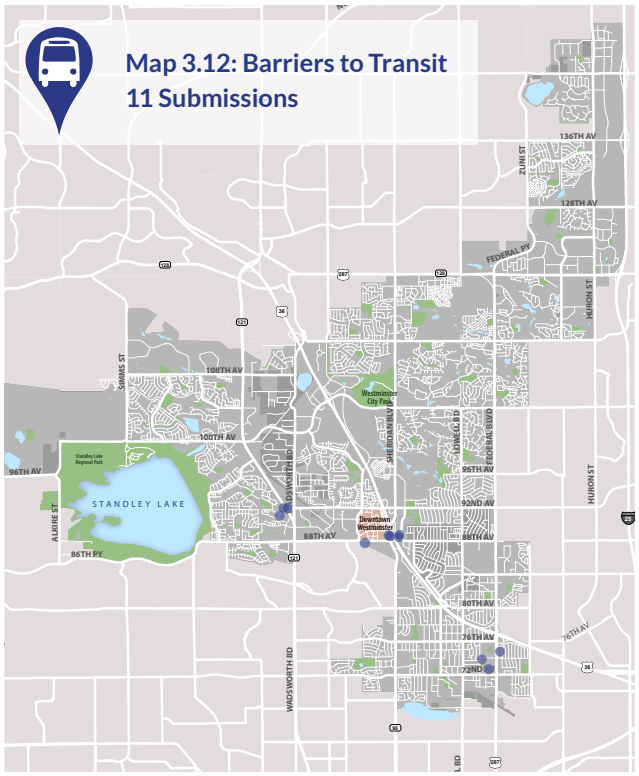
Residents were asked to identify barriers to bicycling, walking, or using transit and also draw lines corresponding to comfortable bicycling/walking routes, as well as routes that needed improvement. In total, 246 individuals participated with the map.

Conflict Areas

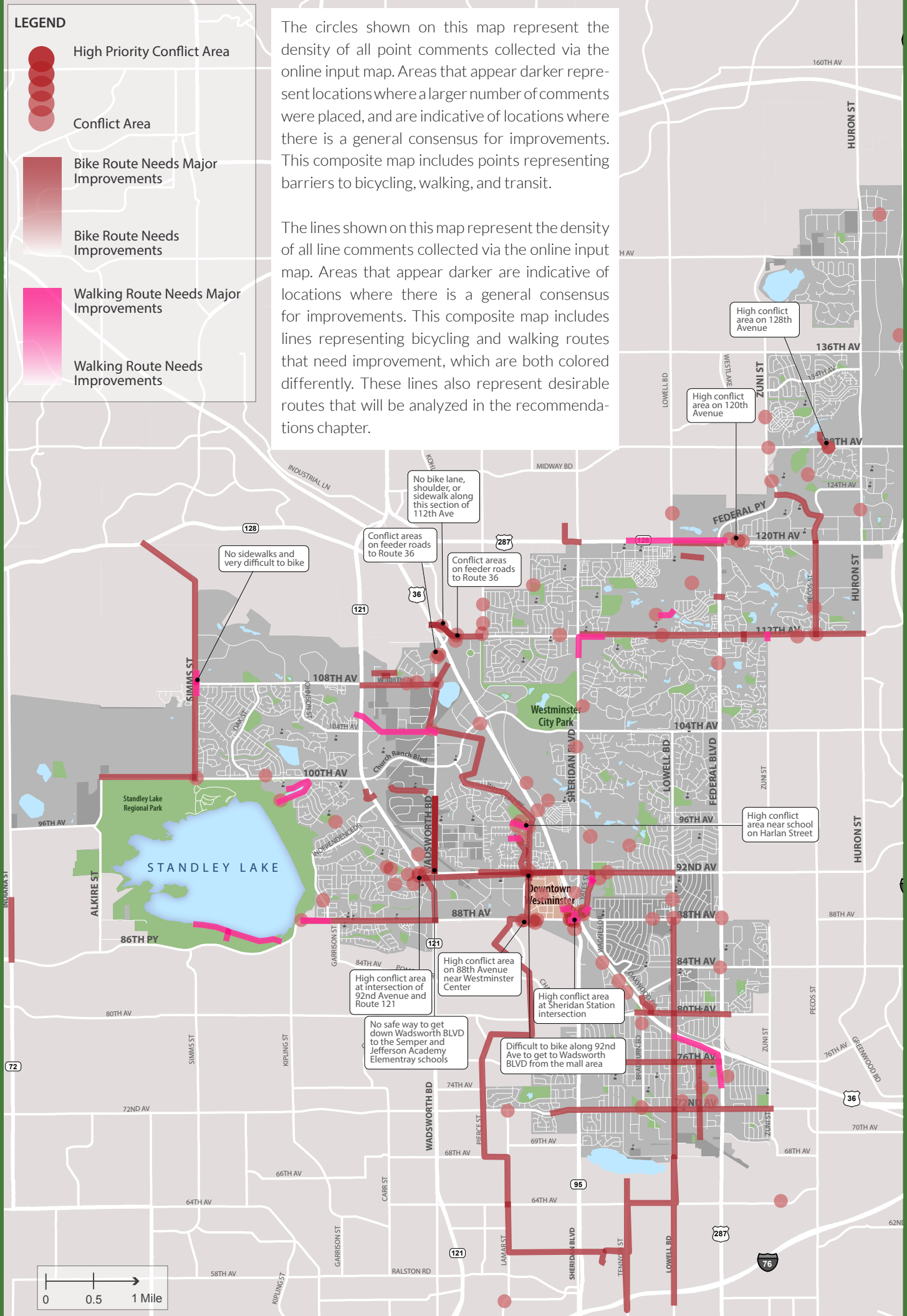
Maps 3.10 to 3.12 display conflict areas identified by the online map respondents. Each map displays the feedback collected by point class, including Barriers to Bicycling (Map 3.10), Barriers to Walking (Map 3.11), and Barriers to Transit (Map 3.12). The points have been made transparent in these maps so that locations where multiple points were place are darker, helping to indicate areas of concentrated need. Map 3.13 displays all of these points as a composite map.







MAP 3.13: POINT FEATURE COMPOSITE MAP



3.5 NEEDS ANALYSIS CONCLUSION

Evaluating both data-driven models and community input, Westminster exhibits some areas that have adequate multimodal facilities. However, there are needs for multimodal infrastructure improvements along major roads, connectivity between neighborhoods, and better access to transit. The following bullets summarize the key findings from each layer of the Needs Analysis.

DATA DRIVEN MODELS

MULTIMODAL DEMAND ANALYSIS

- Demand was found to be dispersed throughout the community and concentrated in Westminster's more dense residential neighborhoods, commercial corridors, transit hubs, and near Downtown Westminster.
- Ensuring strong multimodal connections are available to high-demand areas is paramount.

BICYCLE LEVEL OF TRAFFIC STRESS

- Most neighborhood streets scored Level of Traffic Stress of either 1 or 2, indicating that they are comfortable for a wide range of bicyclists, regardless of their age and ability, since they tend to be primarily low-speed and low-volume roads.
- Arterials and collectors were found to be more stressful, scoring an LTS of 3 or 4, and act as barriers to connectivity for on-street bicyclists.
- Improvements along these roadways need to be prioritized to reduce barriers to mobility.
- Trails help to increase connectivity, but some low-stress clusters are not serviced by the paved trail system and remain isolated.

PEDESTRIAN LEVEL OF SERVICE + SIDEWALK CONDITIONS + NEEDS MAP

- Of the roadways analyzed, those with buffers along lower-volume/-speed roads were found to be the most comfortable. Many arterials carry relatively heavy traffic volumes at moderately high speeds, causing most of the sidewalks analyzed to score PLOS 3-5.
- Although many arterials and collectors are equipped with sidewalks that have buffers, many others have no sidewalks, or the existing sidewalks do not meet ADA standards—improvements need to be prioritized along these roadways.

DATA ANALYSIS

PEDESTRIAN BICYCLE CRASH ANALYSIS

- In Westminster, pedestrians are twenty-six times more likely to be killed in a crash and eight times more likely to be injured than people driving a motor vehicle, indicating that walking/bicycling is more dangerous than driving and highlighting the need for better walking/bicycling infrastructure.
- Over the crash study period from 2010 to 2014, pedestrians crashes increased by 53 percent, and bicycle collisions increased by 39 percent, emphasizing the need to more rapidly implement bike/pedestrian improvements to counteract this rise.
- The majority of both pedestrian and bicycle collisions occurred at intersections (74 and 54 percent respectively) along the arterial roadway network, highlighting where improvements are needed most, especially for pedestrians.

WORKSHOPS + MEETINGS

INTERNAL WORKING GROUP

- Critical gaps in the sidewalk network along arterial and collector streets exist—efforts should be focused on closing these gaps.
- Several intersections represent challenging crossings, especially along the arterial/collector network—efforts should focus on improving crossing conditions.
- Trail network needs to provide better connectivity if it is to be used for transportation.

STAKEHOLDER GROUPS

- Develop connections from Downtown to the Westminster Station, and other points south.
- Improve sidewalk conditions in South Westminster, and enhance connectivity to destinations in the area, especially to schools.
- Complete gaps in the trail network to facilitate multimodal mobility.
- Install on-street bike infrastructure along key corridors in Westminster.
- Make crossing improvements across the city's arterial and collector network.

MOBILE MEETINGS

- Segments of sidewalk need to be repaired and widened, and gaps in the sidewalk network need to be closed.
- Better multimodal connections need to be made to destinations and neighborhoods within South Westminster and to Sheridan Station and Westminster Station.
- Crossing the arterial network can be challenging for bicyclists and pedestrians.
- Key north/south and east/west on-street bicycle facilities need to be installed.

ONLINE TOOLS

ONLINE INPUT MAP

- Barriers to bicycling/difficult bicycling routes were the most frequent input.
- Barriers along US 36 were prevalent in responses, especially near the park-n-ride facilities.
- Desire for more on-street bicycle facilities was strong, especially along north/south corridors (Simms Street/Wadsworth Boulevard/Lowell Boulevard and 112th/92nd and within South Westminster).

ONLINE SURVEY

- Residents indicated that their primary reasons to walk or bicycle were for health benefits (88 percent of respondents) and time outdoors (75 percent).
- The top barriers to bicycling or walking identified were safety related, with traffic speed (56 percent), difficult crossings (53 percent), and inconvenient routes (44 percent) topping the list; time was the primary barrier to transit usage (63 percent).
- Residents requested most investment in paved paths and trails (59 percent) and improved crossings (51 percent).

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CHAPTER 4: RECOMMENDATIONS

4.1 INTRODUCTION

This chapter presents overall network recommendation for MAP Westminster, and concludes with a series of implementation next steps, including funding sources, project prioritization and cost estimates.

The development of the network recommendations was an iterative and collaborative process. The multimodal network must establish seamless, connected routes that link people to their destinations. Recommended improvements must consider the existing environment, as well as the planned or expected future context. The needs of all roadway users, including the safety and comfort of people walking, bicycling, and accessing transit, must be balanced with roadway characteristics and corridor constraints. The outcome of this collective process represents a practical approach to improving the Westminster's multimodal network over time. The majority of this plan's recommendations provide guidance that can be used to progress projects towards implementation. Some recommendations are conceptual, and additional coordination will be needed for implementation. All recommendations are subject to change and refinement as site conditions and development patterns change, and as other adjacent or intersecting projects are implemented. Additionally, some projects may require feasibility studies to verify routing or applicability.

4.2 OVERALL RECOMMENDATIONS

Overall recommendations are classified into one of four categories: Trail Projects, Bicycle Projects, Pedestrian Projects, and Complete Street Projects. Within each category, several types of improvements are recommended. The specific improvements are presented in the project description tables, which are included in Appendix A. The following section summarizes the types of improvements proposed.

Trail Recommendations

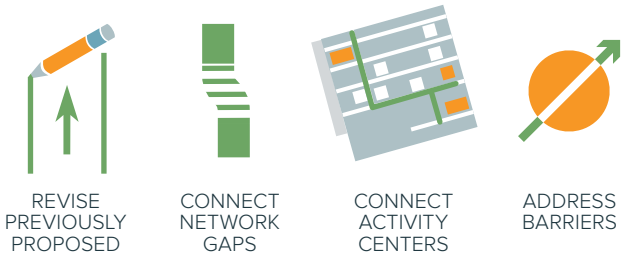
These projects are intended to improve the connectivity of the trail system, and upgrade existing trails to make them more compatible for utilitarian trips. Within this category, multiple improvements are recommended, including:

NETWORK RECOMMENDATIONS DEVELOPMENT

1 EXISTING CONDITIONS ANALYSIS

2 NEEDS ANALYSIS

3 RECOMMENDATIONS DEVELOPMENT



- Shared Use Paths – Includes the construction of new shared use paths where they currently do not exist. All shared use path recommendations should be constructed in conformance with AASHTO guidelines.
- Trail Surface Material Upgrades – Includes upgrading the trail surface material of gravel trails to concrete, which requires removal of the existing gravel trail, and installing a new, concrete surface. Concrete trails are more appropriate for bicyclists who are using the trail system for active transportation purposes.
- Reconstruct Sidewalks into Sidepaths – Includes widening existing sidewalks to 10 feet minimum, which requires removal of the existing sidewalk, and installing a new, concrete shared use path
- Spot Improvements – In addition to the linear trail improvements, several types of spot improvements are included in the project descriptions as well. The range of spot improvements are described on pages 4-3 to 4-5.

Bicycle Recommendations

These projects are intended to improve access for bicyclists from neighborhoods to destinations throughout Westminster. They will also provide connections to existing trails, helping to expand the multimodal network. Some of the types of bikeway improvements recommended already exist in Westminster. These facilities include:

- Bike Lanes – This type of facility provides a dedicated space within the roadway for bicyclists to travel, and uses signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists, and have been found to decrease stress levels for both groups.
- Shared Roadways - Shared roadways use pavement markings and signage to communicate to motorists and bicyclists to operate within the same travel lane, either side by side or in a single file, depending on the roadway configuration. Typically, this facility is used to connect other bikeways (usually bike lanes), or designate preferred routes through high-demand corridors.

While these facility types exist in Westminster, new bikeway facility types are recommended as part of this plan, including neighborhood greenways and buffered bicycle lanes.

Neighborhood Greenways

Neighborhood Greenways are local streets with low motorized traffic volumes and speeds that have been designated as bicycle routes. Neighborhood greenways should have a maximum posted speed of 25 mph and target motor vehicle volumes of less than 1,500 vehicles per day (with a maximum 3,000 vehicles per day). Many streets in Westminster exhibit these characteristics already, and minor modifications, such as the addition of signage and pavement markings, could cost-effectively designate key corridors as neighborhood greenways. These improvements, combined with modifications at major intersections, make this type of facility intuitive and comfortable for a wide range of people to ride a bicycle or walk.

Buffered Bike Lanes

Many streets is Westminster, which already exhibit low volumes and speeds, could be designated neighborhood greenways through the application of shared lane marking and signage.

Buffered bike lanes are conventional bike lanes that are enhanced through the application of a diagonally striped buffer space. While not providing physical separation, this creates a wider buffer area between vehicles and bicyclists than a conventional six inch bike lane stripe. By providing the buffer, bicyclists ride further away from vehicles, and this facility type provides a higher level of comfort compared to conventional bike lanes as traffic volumes and speeds increase. Buffered bicycle lanes can be enhanced through the application of flexible posts to provide physical separation from motor vehicle traffic.

Buffered bike lanes provide more separation from motor vehicles than conventional bike lanes, and help to maintain comfort levels for bicyclists on higher speed and volume roadways.

Pedestrian Recommendations

These projects are intended to improve pedestrian access in Westminster. Pedestrian improvements include constructing new sidewalks where they currently do not exist, constructing wider sidewalks, or improving crossing conditions at locations where crossing the roadway can be uncomfortable or challenging. The range of pedestrian improvements include:

- Sidewalks – These projects would fill gaps in the sidewalk network, constructing 5 to 8 foot wide sidewalks in areas of Westminster where they currently do not exist. Along arterial and collector roadways, which carry higher traffic volumes, it is recommended that sidewalks be separated from the roadway by a grass buffer.
- Spot Improvements - In addition to the linear sidewalk improvements, several types of spot improvements are included in this category of recommendations. The range of spot improvements are displayed on pages 4-3 to 4-5.

Complete Street Projects

These projects are focused on improving bicycle, pedestrian, and transit connections along major corridors in the community. Projects within this category represent key corridors that should be studied further to analyze issues and develop block-by-block solutions to improving bicycle and pedestrian access. These corridors tend to carry high traffic volumes, and many of them corridors are constrained, meaning that the roadways have been widened to their maximum possible extent within the existing right-of-way. To improve conditions, travel lane narrowing or reallocation may be required to meet the needs of all users. The trade-offs associated with these changes will be identified when these projects are studied in more detail. Potential reconfiguration options and a high-level assessment of proposed improvements are provided for each project.

Spot Improvements

Within each of the four categories, spot improvements are also recommended for many of the projects. The spot improvements should be installed with the linear facilities as a single project. Generally, the spot improvements make crossing roadways more comfortable. The range of spot improvements included in the recommendations are described below.

Crosswalks – Some crossing locations would benefit from the installation of a crosswalk where they were missing, or upgrading an existing crosswalk to have higher visibility.

Yield Lines – This treatment clearly indicates the point at which motorists should yield in advance of a crosswalk. On multi-lane approaches yield lines should be set back far enough so that both lanes can see crossing pedestrians.

Median Refuge Island - A median refuge island reduces the exposure time experienced by a pedestrian in an intersection. While these islands may be used on both wide and narrow streets, they are generally applied at locations where speeds and volumes make crossings challenging, or where three or more lanes of traffic make pedestrians feel exposed or unsafe in the intersection. Median refuge islands have been proven to improve safety of pedestrians crossing mid-block.

Rectangular Rapid Flashing Beacons (RRFBs) – RRFBs use an irregular flash pattern similar to emergency flashers on police vehicles and can be installed on either two-lane or multi-lane roadways. RRFBs are used to alert drivers to yield where pedestrians and/or bicyclists have the right-of-way crossing a road. RRFBs drastically improve motor vehicle yielding compliance over no beacon and even considerably over older steady flashing yellow beacons. RRFBs can be either user or sensor activated.

Raised Crossings - Raised crossings, or speed tables, can be installed mid-block or in channelized right turn lanes. Their purpose is to slow motor vehicle speeds by vertically deflecting vehicles. Speed tables are distinct from speed humps, in that they are longer, and flat topped, with a height of 3-3.5 inches and length of 22 feet. If installed mid-block, raised crossing can be combined with curb extensions to narrow the roadway and decrease the crossing distance for pedestrians. Speed tables have been found to be an effective treatment to both increase yield compliance of crossing pedestrians and moderate vehicle speeds.

Pedestrian Hybrid Beacons – Pedestrian Hybrid Beacons provide a high level of comfort for crossing users through the use of a red-signal indication to stop conflicting motor vehicle traffic. Hybrid beacon installation faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation. Hybrid beacons are used to improve non-motorized crossings of major streets in locations where side-street volumes do not support installation of a conventional traffic signal. Hybrid beacons can operate in areas of heavy traffic and multiple travel lanes where a RRFB would be less effective

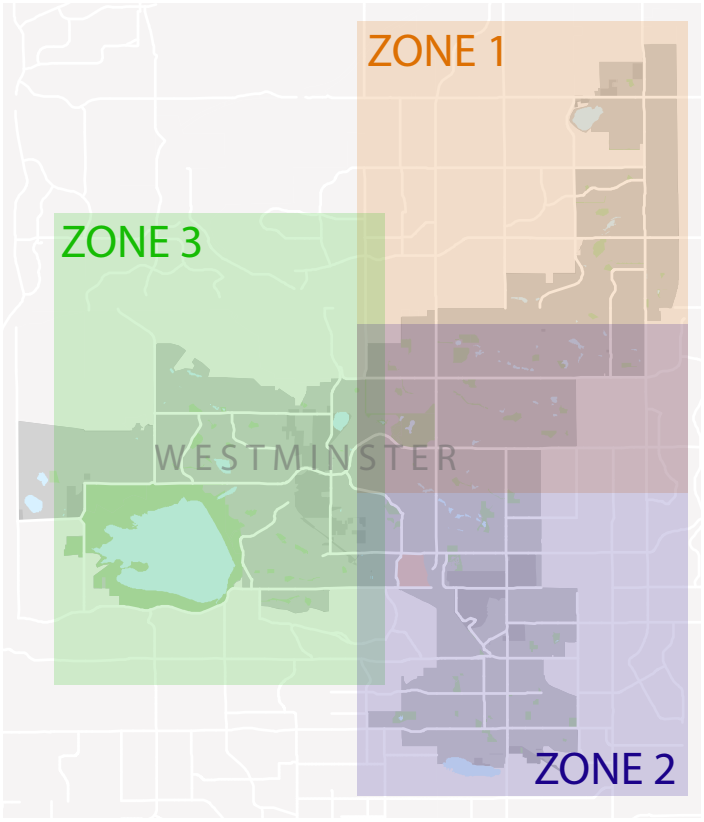
Full Traffic Signals - Signalized crossings use a red-signal indication to stop conflicting motor vehicle traffic. A full traffic signal provides standard red-yellow-green traffic signal heads for all legs of the intersection.

Underpass - Bicycle/pedestrian underpasses provide critical links by providing grade-separated crossings of major barriers, such as railroads and major roadway corridors. There are no minimum roadway characteristics for considering grade separation. Depending on the type of facility or the desired user group, grade separation may be considered in many types of projects, though the cost to implement such facilities is significant.

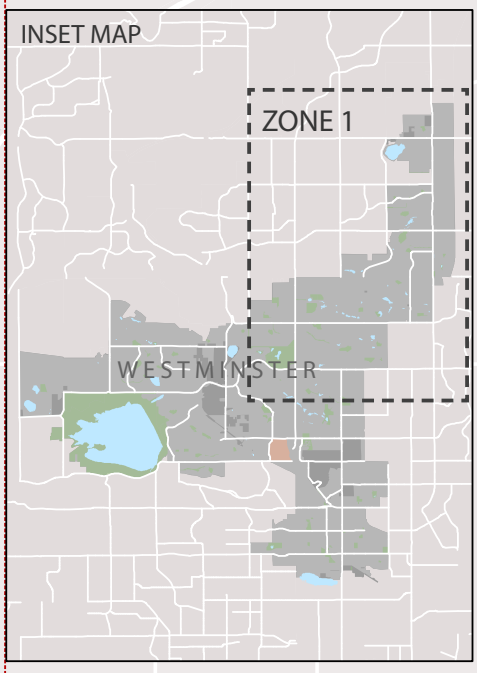
4.2.1 Mapping Recommendations

Recommendations for MAP Westminster are presented in three zones. The division of the city into three zones was done to simplify the presentation of information. Maps 4.2 to 4.4 display the recommendations by zone, and Appendix A includes tables of the recommendations divided by Zone and Project Category. Details for each project are provided in the table, including a project ID, description of the project, project extents, cost and prioritization score. Being a Mobility Action Plan, recommendations are focused on projects that should be implemented in the near term, providing multimodal connections between key activity generators in the city. Recommendations from past plans are included on these maps as well, to ensure that other proposed recommendations from these plans are implemented as opportunities arise, in addition to MAP Westminster projects.

MAP 3.1 RECOMMENDATION ZONES



MAP 4.2: ZONE 1 RECOMMENDATIONS



EXISTING CONDITIONS

- Trail Underpass
- Trail Head
- On Street Bike Lanes
- Concrete Trail
- Gravel Trail
- Natural Surface Trail
- Sidewalk Gap (Major Road)
- Sidewalk (Major Road)
- Park-n-Ride Station
- School

MAP WESTMINSTER RECOMMENDATIONS

- Complete Street Projects
  Inclusive of pedestrian and bicycle improvements; dashed line denotes bicycle facility recommendation
- Pedestrian Projects
- Bicycle Projects
- Trail Projects

PROPOSED FACILITIES

From Open Space Stewardship Plan and Bicycle Master Plan

- Trail
- Side Path
- Bike Lanes
- Shared Lane Markings
- Signed Route

BROOMFIELD

NORTHGLENN

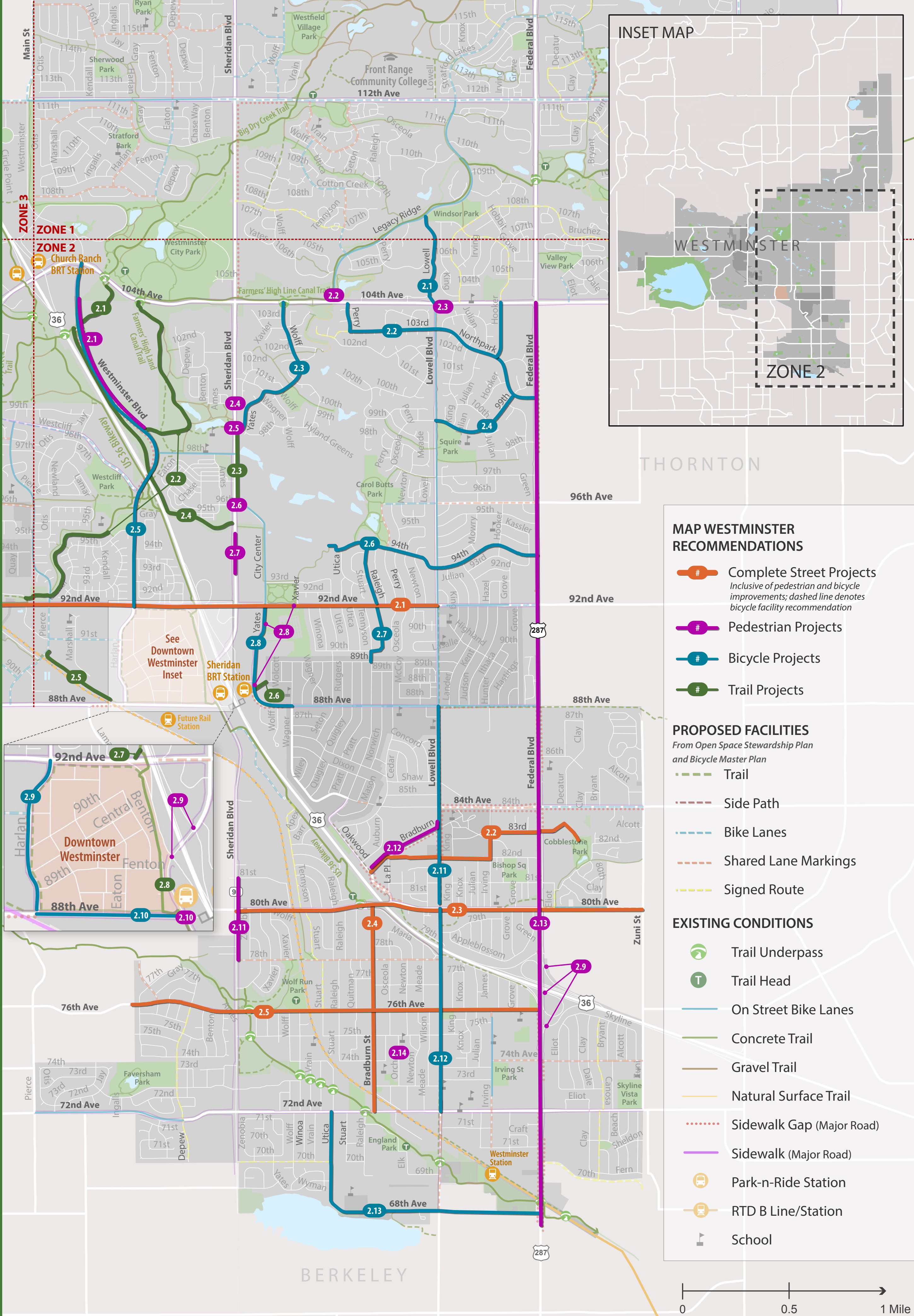
ZONE 3

ZONE 1

ZONE 2

0 0.5 1 Mile

MAP 4.3: ZONE 2 RECOMMENDAITONS




INSET MAP
ZONE 3
WESTMINSTER
EXISTING CONDITIONS
Trail Underpass
Trail Head
On Street Bike Lanes
Concrete Trail
Gravel Trail
Natural Surface Trail
Sidewalk Gap (Major Road)
Sidewalk (Major Road)
Park-n-Ride Station
RTD B Line/Station (Proposed)
School
MAP WESTMINSTER RECOMMENDATIONS
Complete Street Projects
Inclusive of pedestrian and bicycle improvements; dashed line denotes bicycle facility recommendation
Pedestrian Projects
Bicycle Projects
Trail Projects
PROPOSED FACILITIES
From Open Space Stewardship Plan and Bicycle Master Plan
Trail
Side Path
Bike Lanes
Shared Lane Markings
Signed Route
MAP 4.4: ZONE 3 RECOMMENDATIONS
BROOMFIELD
ARVADA
STANDLEY LAKE
Standley Lake Regional Park
Westmoor
Westmoor Business Park
Walnut Creek Trail
Rocky Mountain Greenway Trail
Big Dry Creek Trail
Little Dry Creek Trail
Farmers' High Line Canal Trail
Simms St
Wadsworth Pkwy
Wadsworth Blvd
Main St
108th Ave
100th Ave
96th Ave
92nd Ave
90th
88th Ave
86th Ave
Church Ranch Blvd
Barber
Independence Dr
Alkire St
Church Ranch BRT Station
Future Rail Station
Lower Church Lake
Westbrook Park
Dover Sq Park
Nottingham Park
ZONE 3
ZONE 2
ZONE 1
0
0.5
1 Mile

4.3 PROJECT PRIORITIZATION

For MAP Westminster, projects were prioritized based upon scoring criteria. These criteria are described in Table 5.1, and were determined in coordination with the project steering committee. Project descriptions and scores are provided in Appendix A.

Overall, as Westminster improves the transportation network, bicycle, pedestrian and transit connection facilities should be integral to the projects. Furthermore, when developers introduce new projects, they may be required to construct mobility infrastructure that is located on or adjacent to the streets that they are developing, as an alternative to other road capacity projects. This can be an added benefit to the city, as Westminster will not have to pay for the construction of these facilities. Additionally, when new projects are proposed internally, these criteria should be part of the internal assessment process.

TABLE 5.1: PROJECT PRIORITIZATION CRITERIA

Criteria	Description
Improves Safety and Mobility	Projects that addresses identified safety problems for one or multiple modes of travel in Westminster's transportation system, based on field work and stakeholder/public input, resulting in a lower-stress walking, bicycling, and/or transit environment, qualified for this prioritization criterion.
Improves Connectivity	Projects that provide a new walking, bicycling or transit connection, or improves upon an existing connection, to transit stations, job centers, activity centers, neighborhoods, schools, public parks, open spaces, trails, and other recreational destinations qualified for this criterion.
Demonstrates Cost Effectiveness	Projects that require relatively little capital investment, and due to its lower cost, have fewer barriers to implementation qualified for this criterion.
Demonstrates Ease of Implementation	Projects that require minimal roadway reconfiguration, has an existing funding source/project that it can be implemented under, or coincides with an existing City project, qualified for this criterion.

4.4 COST ESTIMATES

Planning level construction cost estimates for the overall project recommendations are included in Appendix A. Being a planning level assessment, project unknowns exist, and therefore a high and low cost estimate is provided. This broad range of potential costs is appropriate given the level of uncertainty in the design at this point in the planning process. Engineering costs, and any property acquisition costs (if applicable), are not included in the cost estimate. The following provides greater detail on some of the associated cost estimates.

For the Demonstration Projects, more detailed cost estimates are provided, which do include estimated engineering costs. These costs are included in Chapter 5: Demonstration Projects.

Sidewalks

Cost to construct a foot of sidewalk was estimated to be $60 to $100 per linear foot for a 5 foot sidewalk, and $100 to $160 per linear foot for a 8 foot sidewalk, depending on complexity.

Shared Use Paths

Path construction can require a high level of preparation – purchasing property, engineering design, and coordination with many stakeholders. Costs for a new shared use path typically range from $120-$200 per linear foot, depending on complexity. Projects that require minimal grading and pavement will run at the lower end of the range, where projects that require culverts, bridges, retaining walls or other expensive improvements will fall toward the upper end of the estimate.

Neighborhood Greenways

The costs assume that the project consists of wayfinding signs every quarter-mile, and roadway markings about every 200 feet. The low cost estimate assumes $400 per installed sign and $30 per installed painted marking, and the per mile estimate is roughly $12,100. The high cost estimate assumes $400 per installed sign and $300 per thermoplastic marking, and the per mile cost is roughly $26,400. Thermoplastic markings are recommended, as paint markings will typically wear out completely in less than one year. Intersection improvements are estimated based on the level of complexity. In general, the more that concrete and signal work is required, the more expensive the improvement will be. Some neighborhood greenways include short sections of other facility types, such as shared use paths or bicycle lanes, and these additional segments are included in the overall project cost estimate. All segments for individual projects should be implemented simultaneously.

Bicycle Lanes

Painting a bicycle lane on a road with sufficient width costs roughly $10,000 per linear mile ($5,000 in one direction) for paint striping and painted stencils, representing the low end of the cost estimate range. For such retrofit projects, some may require few or no other changes to the roadway configuration, however some may require lane configuration or orientation changes. This can be done by removing the existing road markings and applying new ones, or it also may be included as part of a routine resurfacing. The high range of the cost estimate includes thermoplastic tape striping and thermoplastic markings, and roughly costs $60,000 per linear mile ($30,000 in one direction). additional features such as buffers or separated bike lanes, increase the cost further.

Rectangular Rapid Flash Beacons (RRFBs)

These cost about $15,000 for a pair of solar powered beacons and pedestrian buttons.

Median Refuges

Median cost will vary depending on the overall design, Typically a median with pedestrian accommodations will range from $13,000 to $18,000.

Hybrid Beacons

Hybrid Beacons cost substantially more than a RRFB, however less than a full signal. Hybrid Beacons are estimated to cost about $80,000.

Raised Crosswalks

Raised crosswalks range in cost depending on the length and width of the crosswalk. Costs can range from $5,000 to $10,000 for a raised crosswalk.

Underpasses

Underpasses can range significantly in cost, depending on the number of lanes that the underpass is built beneath, and the individual complexities of the design. Costs can range from $400,000 for a two lane underpass to upwards of $1,000,000 on a four lane or more underpass.

4.5 FUNDING SOURCES

This section provides an overview of available federal, state, and local funding sources. Most funding sources are competitive and require the preparation of applications. For multi-agency projects, applications may be more successful if prepared jointly with other local and regional agencies. The majority of non-local public funds for bikeway and pedestrian projects are derived through a core group of federal and state programs. In addition to federal, state, and regional funding sources, Westminster could dedicate local funds for active transportation improvements through a variety of measures, in addition to the $100,000 set-aside the city has already established. Westminster should also take advantage of private-public partnerships to fund projects identified in this Plan as well.

Table 4.1: Federal funding sources

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
Surface Transportation Block Grant Program (STBGP)	Bicycle and pedestrian improvements, among others	Varies	CDOT and MPO	With the passage of the 2016 Federal Transportation Bill, Fixing America's Surface Transportation Act (FAST Act), the former Surface Transportation Program (STP) has become the Surface Transportation Block Grant Program (STBGP), which now includes Transportation Alternatives Program funding (described below). The Denver Regional Council of Governments (DRCOG) accepts concept reports for consideration of programming funds. This program has a state and an MPO component.
Transportation Alternatives Program (TAP)	Bicycle and pedestrian improvements only	Funds can be used for construction, planning and design of on and off-road bicycle and pedestrian facilities	CDOT and MPO	The FAST Act combines the former TAP (which included the former Recreational Trails and the Safe Routes to School programs) into the STBGP (above). Though program requirements will stay roughly the same, total funding has been slightly increased. Most projects have an 80/20 federal/local match split, and can include sidewalks, paths, trails (including Rails-to-trails), bicycle facilities, signals, traffic calming, lighting and safety infrastructure, and ADA improvements. Unless a state opts out, it must use a specified portion of its TA funds for recreational trails projects. Since the DRCOG Metro Area is larger than 200,000 people, funds are distributed based upon competitive applications by the MPO to municipalities.
Highway Safety Improvement Program (HSIP)	Infrastructure and program safety improvements	Public road with a correctable crash history, expected to reduce crashes, positive cost-benefit ratio, or, a systemic safety project	CDOT	Program purpose is to reduce fatalities and serious injuries on public roads through infrastructure and programs. Like SSIP, HSIP can fund low cost, systemic improvements if benefit-cost is met.
Transportation Infrastructure Finance and Innovation Act (TIFIA) Loans	Large projects	Varies	USDOT	While not a competitive grant funding source, these loans do provide financing options, including credit assistance in the form of direct loans, loan guarantees, and standby lines of credit for large, surface transportation projects of national or regional significance, as well as public-private partnerships.
Transportation Investments Generating Economic Recovery (TIGER)	Shovel ready, surface transportation projects	Positive estimated cost-benefit ratio meeting federal transportation goals, benefitting country as a whole	USDOT, State and Local Gov'ts	Approvals for the eighth round of TIGER, totalling $500 million, were signed into law in 2015 and applied for in 2016. Projects involving highways, bridges, bicycle and pedestrian facilities, transit, rail, and intermodal are eligible. Detailed application must be completed. Projects are highly competitive, and require a minimum 20 percent local match funding. Westminster applied for a TIGER grant to fund three underpasses along US 36 in 2016.
Partnership for Sustainable Communities	Bicycle and Pedestrian infrastructure	Project must fulfill Livability Principles	EPA, HUD, and USDOT	Joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). It is based on five Livability Principles, one of which explicitly addresses the need for pedestrian and bicycle infrastructure. It is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities

Table 4.2: Federal Funding Sources (continued)

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
Community Development Block Grants (CDBG)	Street improvements	Best if project benefits low or moderate-income populations	HUD and Local Gov't	Funds can be used for reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities and paying for planning and administrative expenses. Trails and greenway projects that enhance accessibility are an ideal fit for this funding source. CDBG funds could also be used to write an ADA Transition Plans.
Community Transformation Grants	Bicycle and Pedestrian Infrastructure and Programs	Projects and programs aimed at increasing physical activity to reduce risk of disease	CDC	Community Transformation Grants, administered through the Center for Disease Control (CDC), support community–level efforts to reduce chronic diseases such as heart disease, cancer, stroke, and diabetes. Active transportation infrastructure and programs that promote healthy lifestyles are a good fit for this program, particularly if the benefits of such improvements accrue to population groups experiencing the greatest burden of chronic disease.
Federal Transit Administration (FTA) Funding	Bicycle and pedestrian infrastructure	Project must enhance or be related to public transportation facilities	FTA	Multiple FTA funding sources exist. Most FTA funding can be used to fund pedestrian and bicycle projects "that enhance or are related to public transportation facilities."
Additional Federal Funding	Varies	Varies	Varies	The landscape of federal funding opportunities for pedestrian and bicycle programs and projects is always changing. A number of Federal agencies, including the Bureau of Land Management, the Department of Health and Human Services, the Department of Energy, and the Environmental Protection Agency have offered grant programs amenable to pedestrian and bicycle planning and implementation, and may do so again in the future. For up-to-date information about grant programs through all federal agencies, see: http://www.grants.gov/

Table 4.3: State/Regional Funding Sources

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
Highway User Tax Fund (HUFT)	CDOT, County and Municipal transportation projects	Varies	CDOT	Colorado's Highway Users Tax Fund collects revenues from motor fuel excise taxes, annual vehicle license and registration fees, and passenger-mile taxes on vehicles. Revenues from the fund are disbursed to recipients, including Westminster, based on a formula prescribed by statute.
State Highway Fund (SHF)	CDOT	Varies	CDOT	The State Highway fund is a subset of the HUTF that is administered by CDOT for the maintenance of the state's highway system. The fund also generates revenue through interest earnings on the fund balance. The SHF can also be used for matching available federal highway construction funding.
State General Fund	CDOT	Varies	CDOT	The State General Assembly has provided mechanisms that can be used to allocate General Fund revenues for transportation projects, including direct transfers. Another mechanism, passed in 2009 by the General Assembly, creates a trigger of transfers from the General Fund to the HUTF when Colorado personal income grows 5 percent or more in a calendar year.
Department of Local Affairs (DOLA) Grants and Loans	Public facility and service needs	Varies	DOLA	The Local Government Financial Assistance section manages a number of grant and loan programs within the Department of Local Affairs specifically designed to address public facility and service needs. Through coordination and outreach with the department's field offices, grant and loan resources are distributed on both a formula and discretionary basis depending upon applicable state statutory provisions, federal requirements and/or program guidelines.
Statewide Transportation Improvement Program (STIP)	Transportation projects, including bicycle and pedestrian infrastructure	Varies	MPO and CDOT	The Statewide Transportation Improvement Program (STIP) is CDOT's short-term capital improvement program, providing project funding and scheduling information for the department and Colorado's metropolitan planning organizations. CDOT, as well as the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) approve the STIP.

Table 4.3: State/Regional Funding Sources (Continued)

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
Metropolitan Planning Organization Transportation Improvement Program (TIP)	Transportation projects, including bicycle and pedestrian infrastructure	Varies	MPO	MPOs are responsible for planning and prioritizing all federally funded transportation improvements within an urbanized area. DRCOG is the Metropolitan Planning Organization (MPO) for Westminster and surrounding urban areas. MPOs maintain a long-range transportation plan (LRTP) and develop a transportation improvement program (TIP) to develop a fiscally constrained program based on the long-range transportation plan. This Plan recommends that Westminster continues to work closely with MPO to ensure pedestrian, bikeways and transit improvement projects recommended in this Plan are listed in the TIP.
Colorado Safe Routes to School	Infrastructure and non-infrastructure (program) projects	Projects that improve access for children to walk and bike to school	CDOT	Safe Routes to School (SRTS) was established in 2005 through Federal legislation to enable and encourage children, including those with disabilities, to walk and bicycle to school; to make walking and bicycling to school safe and more appealing; and to facilitate the planning, development and implementation of projects that will improve safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. CDOT manages the Colorado SRTS program. In 2015, the CDOT approved the continuation of the SRTS program by committing to fund the program with $2 million for infrastructure projects and $0.5 million for non-infrastructure projects. Grants are awarded through a statewide competitive process.
GOCO Grants	Bicycle and Pedestrian Planning and Infrastructure Improvements		GOCO	GOCO invests a portion of Colorado Lottery proceeds to help preserve and enhance the state's parks, trails, wildlife, rivers and open spaces. GOCO manages several grant programs that provide funds for bicycle and pedestrian planning and infrastructure projects. GOCO's planning grant program offers competitive planning grants up to $75,000 to help entities develop strategic master plans for outdoor parks and recreation projects, trails, or site-specific plans (applicants must provide at least 25% of the total project cost in matching funds). GOCO also manages Trail Grants that can be used to fund large and small trail projects and trail planning and maintenance. Lastly, GOCO manages The Connect Initiative, which funds projects focused on connecting existing trail gaps, constructing new, highly demanded trail systems, and providing better walkable and bikeable access for youth and families to existing outdoor recreation opportunities.

Table 4.4: Local Funding Sources

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
General Fund	Maintenance, Capital Improvements List projects	Projects should incorporate active transportation accommodation	Local Gov't	The General Fund is often used to pay for maintenance expenses and limited capital improvement projects. Projects identified for reconstruction or re-pavement as part of the Capital Improvements list should also incorporate recommendations for bicycle or pedestrian improvements in order to reduce additional costs.
Bond Financing	Varies	Varies	Varies	Bonds are a financing technique and not a funding source. Money is borrowed against a source of revenue or collateral (i.e. parcel tax revenue). Bonds do not increase total funding, but rather shift investment from future to present.
Special Assessments or Taxing Districts	Varies	Varies	Local Gov't	Special assessments are additional property taxes that are self- imposed on properties close to a new transportation facility or service. They can be used as a dedicated annual revenue stream for funding operations or bonded against under the right set of circumstances. The assessment is levied against parcels in an area that receives a special benefit that can be clearly identified and measured. Implementation of special tax districts can be challenging and before this mechanism can be considered an option, affected local landowners and businesses would need to buy into the premise that the tax is worth the value that the infrastructure or service improvement provides. Nationally, special tax districts are one of the most common forms of value capture for transportation projects.

Table 5.4: Local Funding Sources

Funding Opportunity	Eligible Project Types	Qualifications	Lead Agency	Funding Source Detail
Business Improvement Area of District	Varies	Projects should benefit surrounding businesses' customers	TBD	Trail, pedestrian, and bicycle improvements can often be included as part of larger efforts aimed at business improvement and retail district beautification. Business Improvement Areas collect levies on businesses in order to fund area wide improvements that benefit businesses and improve access for customers. A portion of this revenue could be used to fund bicycle and pedestrian improvements.
Development and Impact Fees	Varies	Varies	Local Gov't	Development impact fees are one-time charges collected from developers for financing new infrastructure construction and operations, and can help fund bicycle and pedestrian improvements. Impact fees are assessed through an impact fee program.
Sales Tax	Varies	Varies	Local Gov't	Local governments can choose to exercise a local option sales tax, and use the tax revenues to provide funding for a wide variety of projects and activities. No sales tax is currently established in the Billings Area, but if there ever is, a small portion of the funds being directed towards transportation should be dedicated for active transportation projects. State approval required to enact local sales tax.
Property Tax	Open space acquisitions	Varies	Local Gov't	Property taxes generally support a significant portion of a local government's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance open space system acquisitions. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. It should be noted that other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.
Excise Tax	Varies	Varies- could specifically focus on tourism	Local Gov't	Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation-related activities.
Tax Increment Financing	Infrastructure projects	Projects should specifically benefit the TIF area	Local Gov't	Tax Increment Financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., shared use path) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to support the debt created by the original public improvement project.
Street User Fees	Infrastructure projects	Varies	Local Gov't (Public Works)	Many cities administer street user fees through residents' monthly water or other utility bills. The revenue generated by the fee can be used for operations and maintenance of the street system, and priorities would be established by the Public Works Department. This approach could be more equitable than property taxes, which just impact property owners.
In Lieu of Fees	Open space or trail projects	Varies	Local Gov't	Developers often dedicate open space or trail projects in exchange for waiving fees associated with park and open space allocation requirements in respect to proposed development.

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CHAPTER 5:
DEMONSTRATION PROJECTS

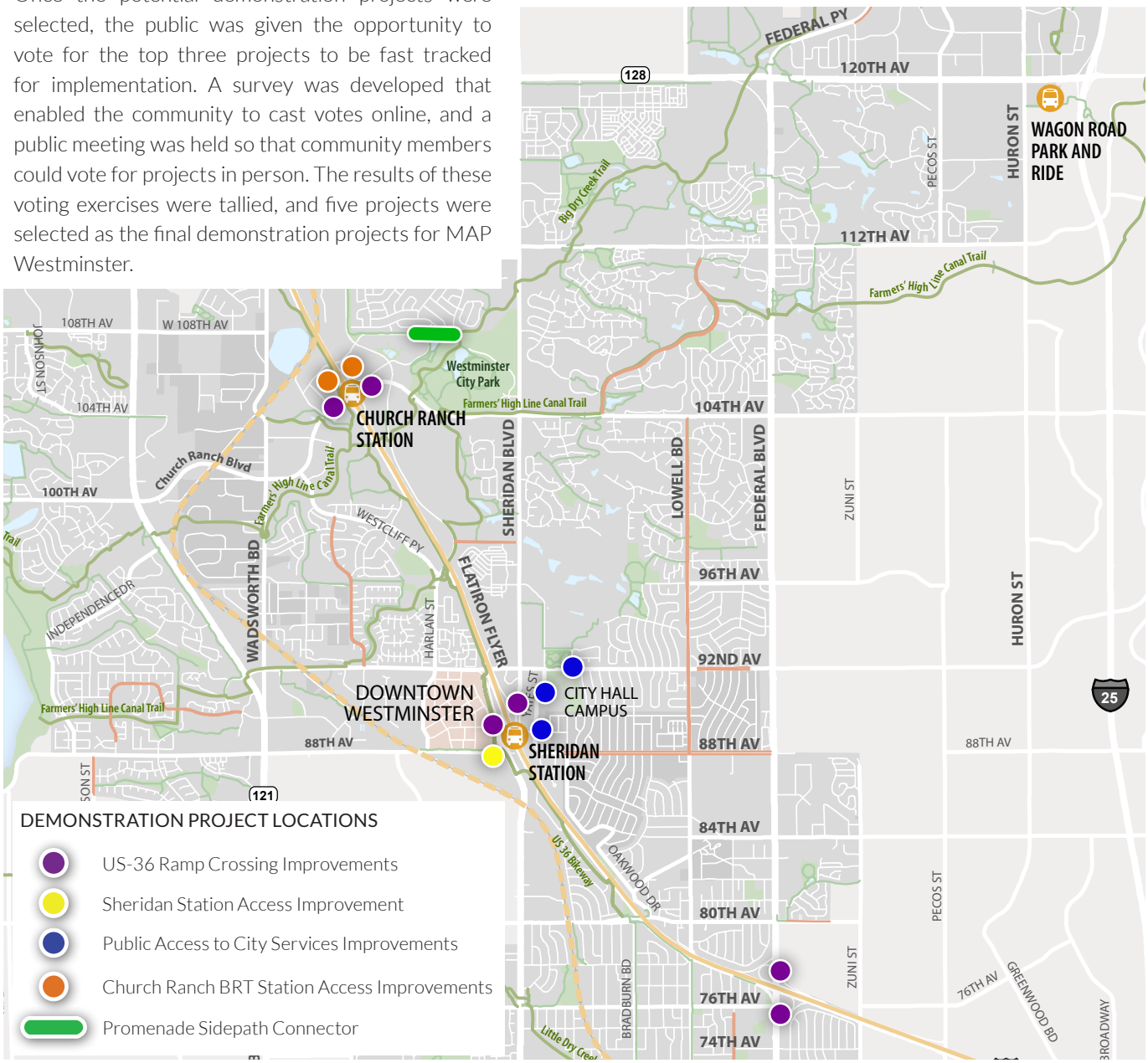
5.1 DEMONSTRATION PROJECTS

One of the primary objectives of MAP Westminster was to identify projects that could be implemented in the near term. Once the overall recommendations were finalized, 13 projects were selected by the project steering committee as potential demonstration projects. These projects were selected based upon community input collected throughout the planning process, and also represented lower-cost improvements that could be feasibility implemented within the next one to two to five years.

Once the potential demonstration projects were selected, the public was given the opportunity to vote for the top three projects to be fast tracked for implementation. A survey was developed that enabled the community to cast votes online, and a public meeting was held so that community members could vote for projects in person. The results of these voting exercises were tallied, and five projects were selected as the final demonstration projects for MAP Westminster.

Map 5.1 displays the name and location of the five demonstration projects, some of which include improvements at multiple locations. Project descriptions, conceptual graphics of the proposed improvements, and cost estimates are provided in this chapter for each project. The proposed improvements are conceptual, and additional analysis, design, and engineering is necessary to advance the projects towards implementation. Due to this, all proposed concepts are subject to modification.

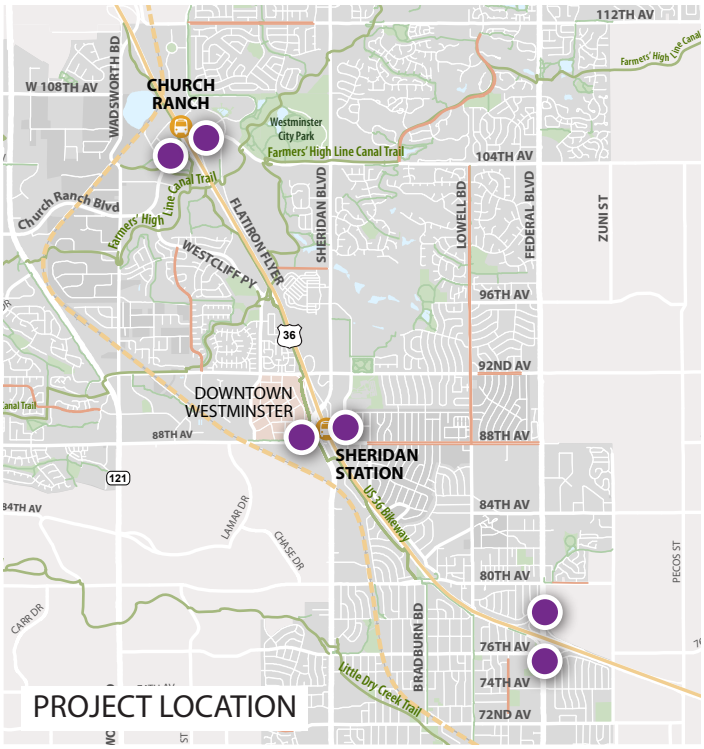
MAP 5.1: DEMONSTRATION PROJECTS



US 36 Ramp Crossing Improvements

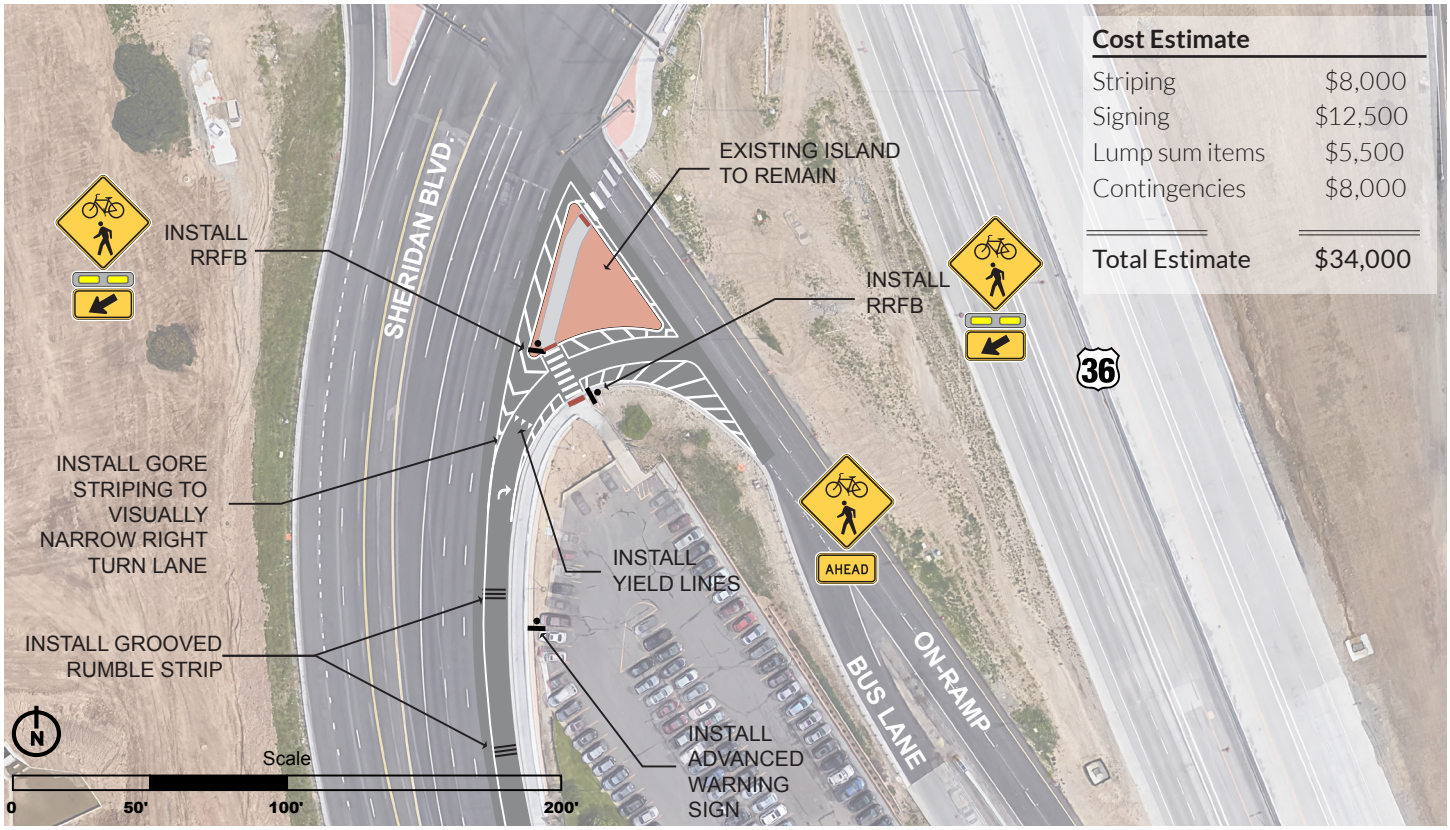
Project Overview

US 36 travels north/south through Westminster, and many of the City's major destinations and transit hubs are located along the corridor. This project aims to improve pedestrian crossing conditions where the US 36 on- and off-ramps intersect Church Ranch Boulevard/104th Avenue, Sheridan Boulevard, and Federal Boulevard. Improvements at the ramp crossings vary by location, but in general, they are focused on increasing the visibility of pedestrians, slowing vehicles as they exit and enter the ramps, and increasing the yield compliance of vehicles when pedestrians are attempting to cross the roadway.[1]

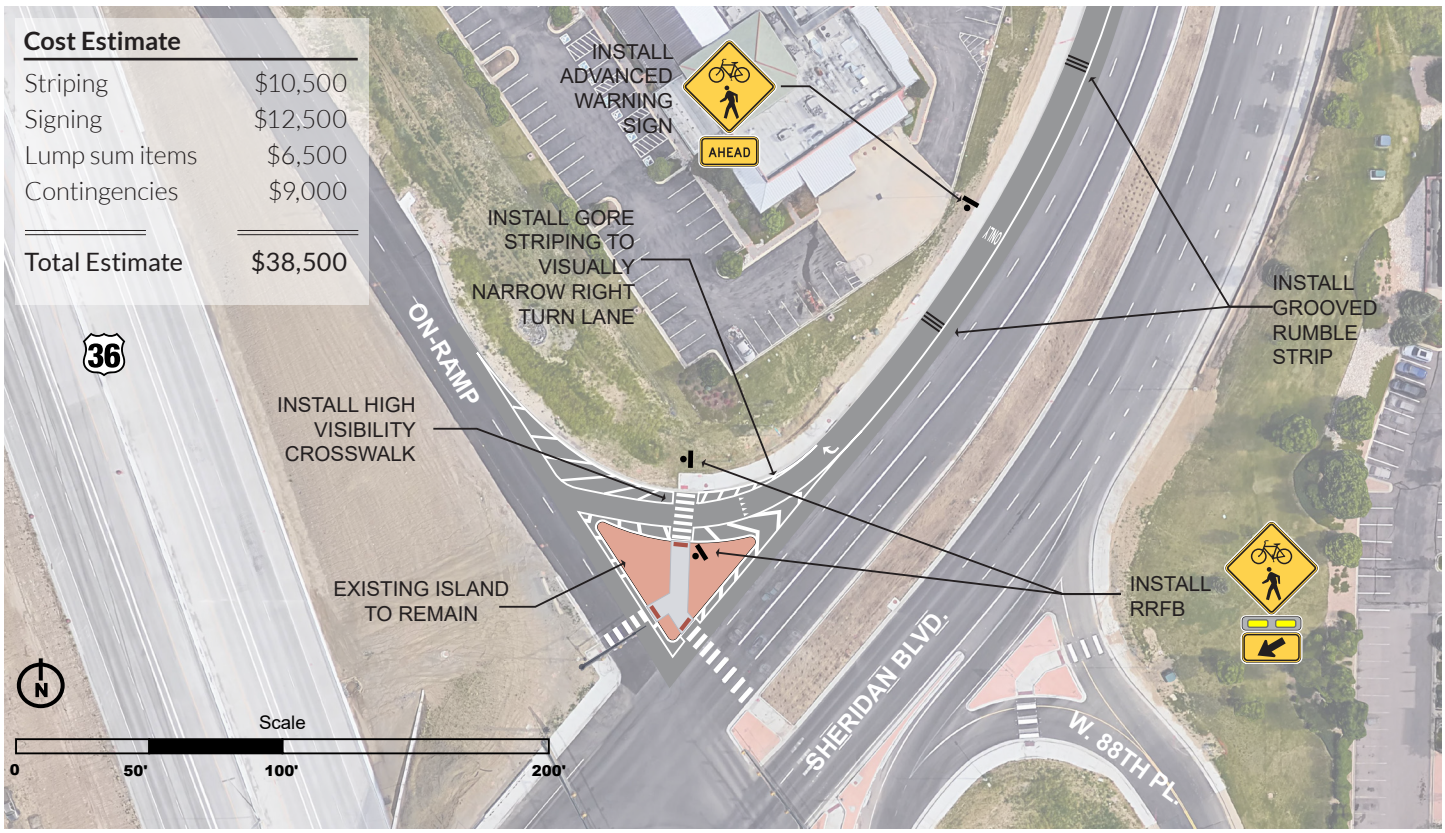


1 *Ramp crossing improvements for the US 36 and Church Ranch Blvd. West Ramps and US 36 and Sheridan Blvd. North East Ramp are detailed in the 2017 Federal Highway Safety Program (HSIP) application. The design for the US 36 and Church Ranch Blvd West Ramps should be replicated on the East Ramp.*

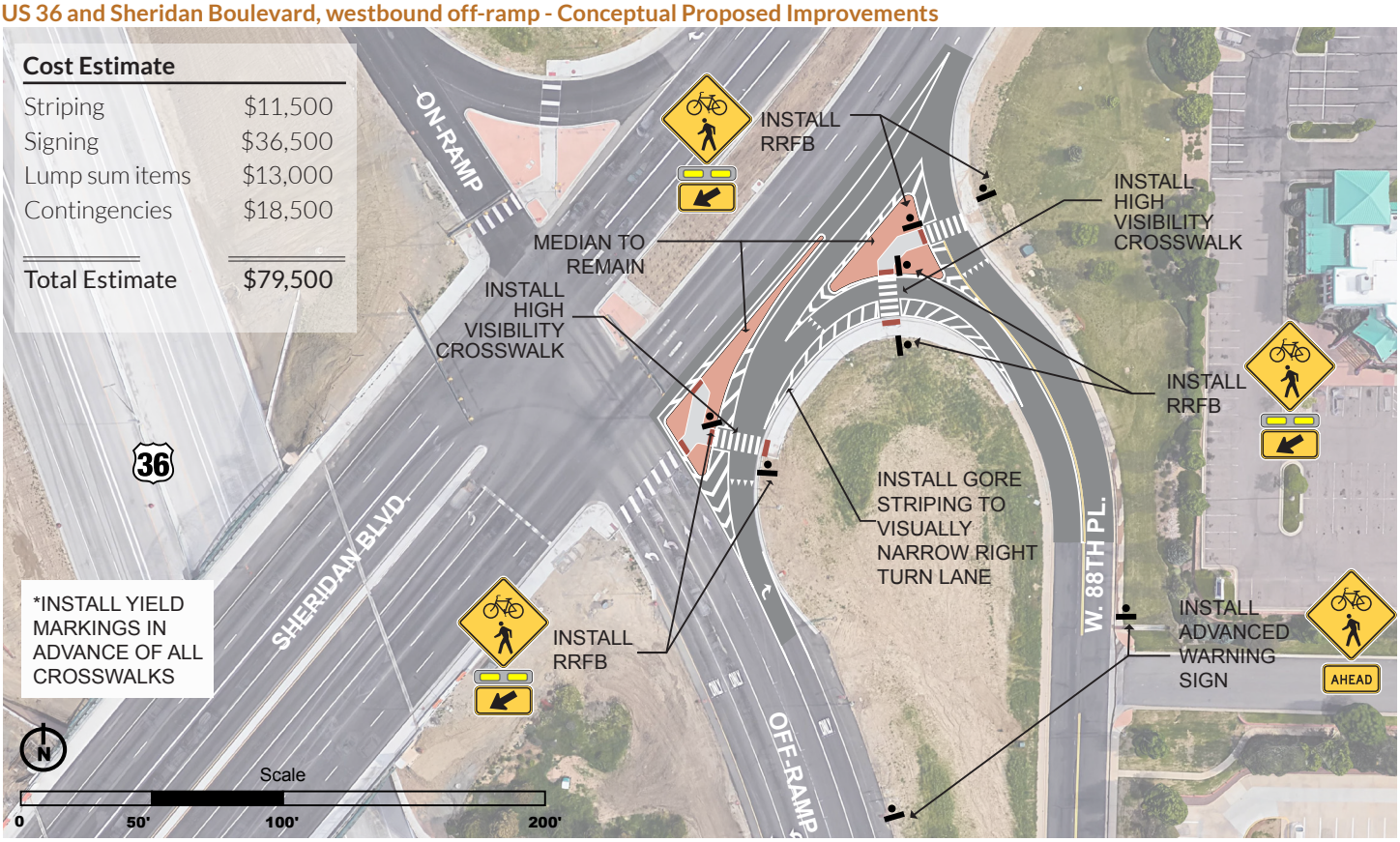
US 36 and Sheridan Boulevard, eastbound on-ramp - Conceptual Proposed Improvements



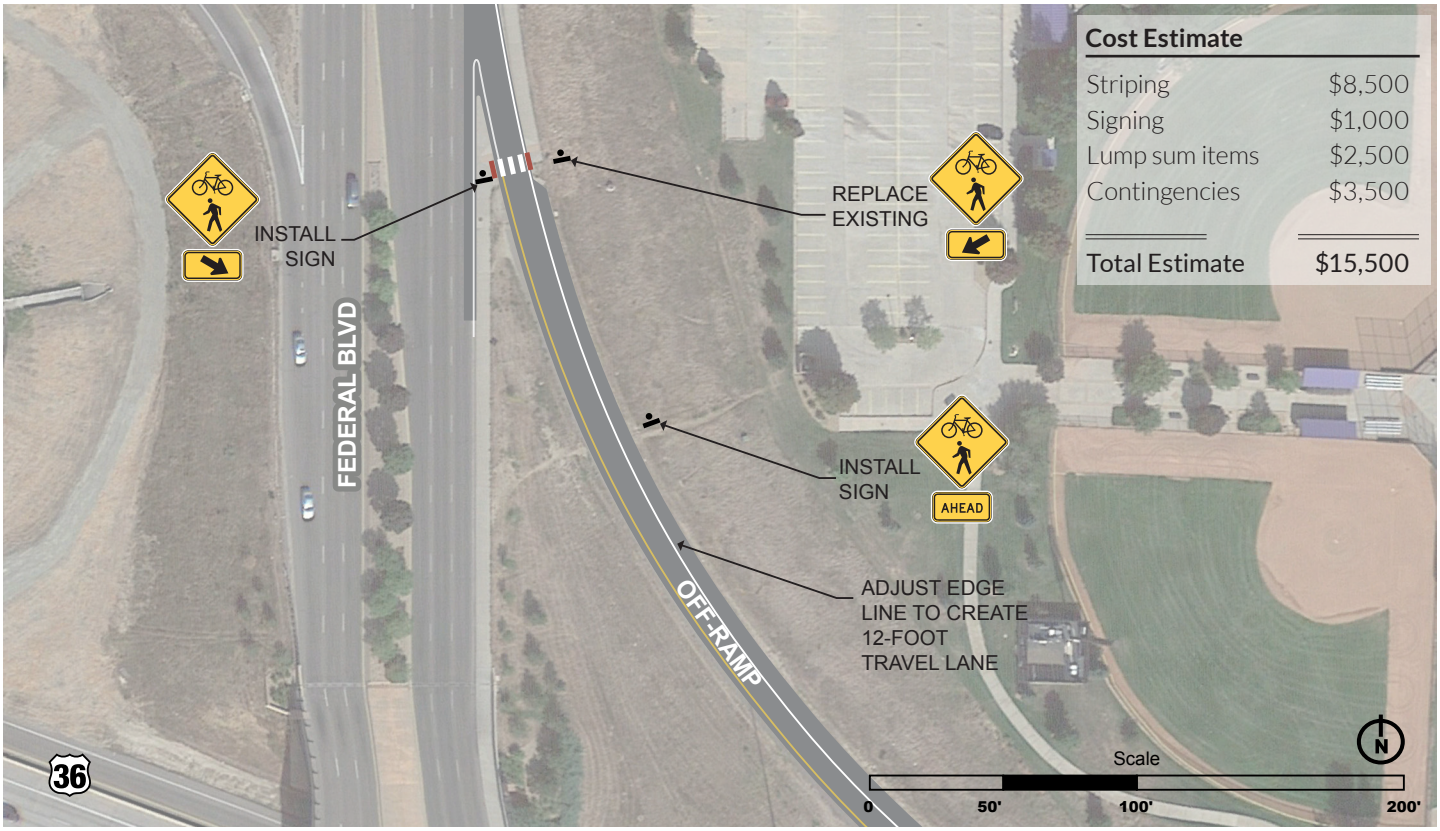
US 36 and Sheridan Boulevard, westbound on-ramp - Conceptual Proposed Improvements



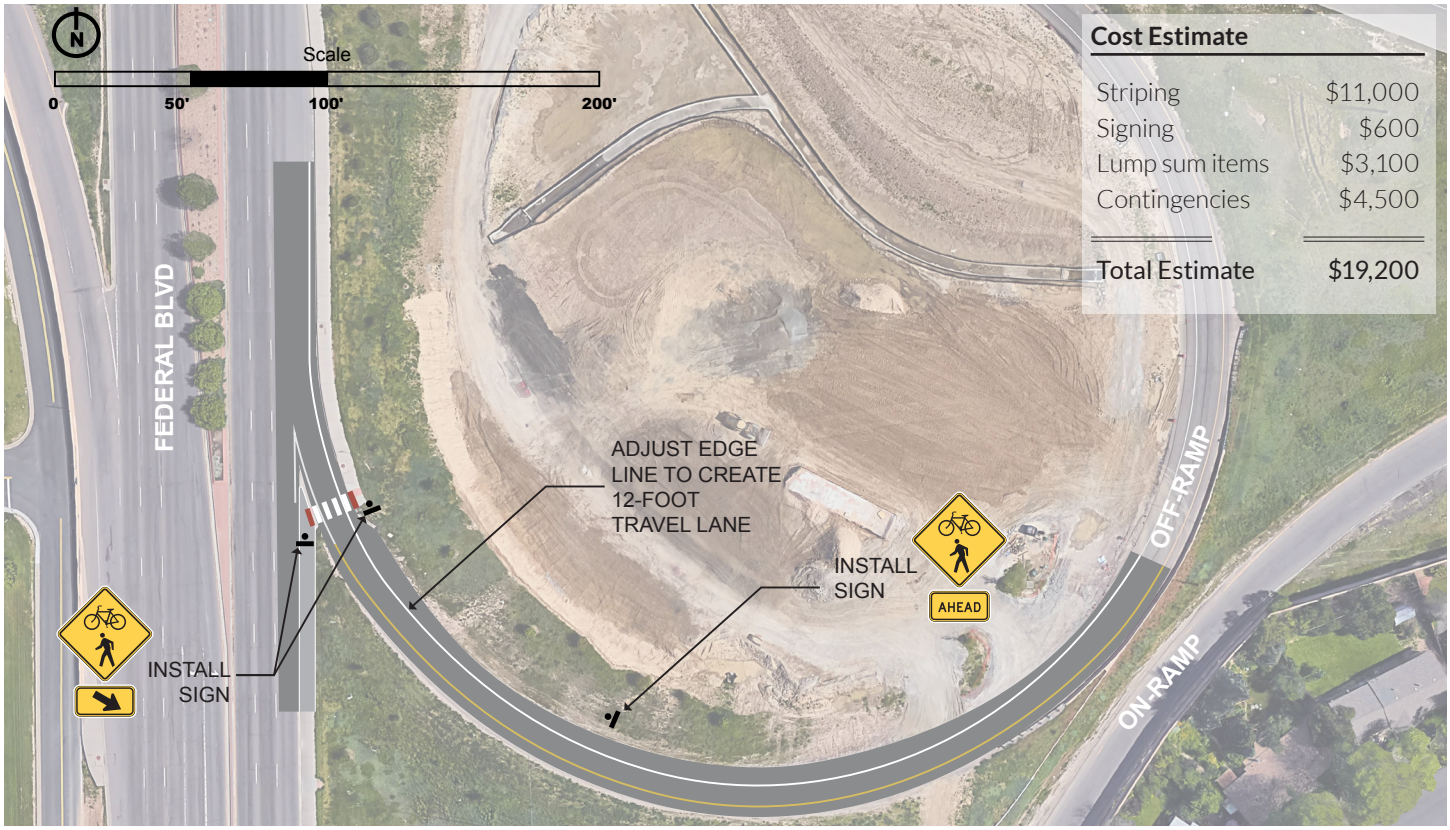
US 36 and Sheridan Boulevard, westbound off-ramp - Conceptual Proposed Improvements



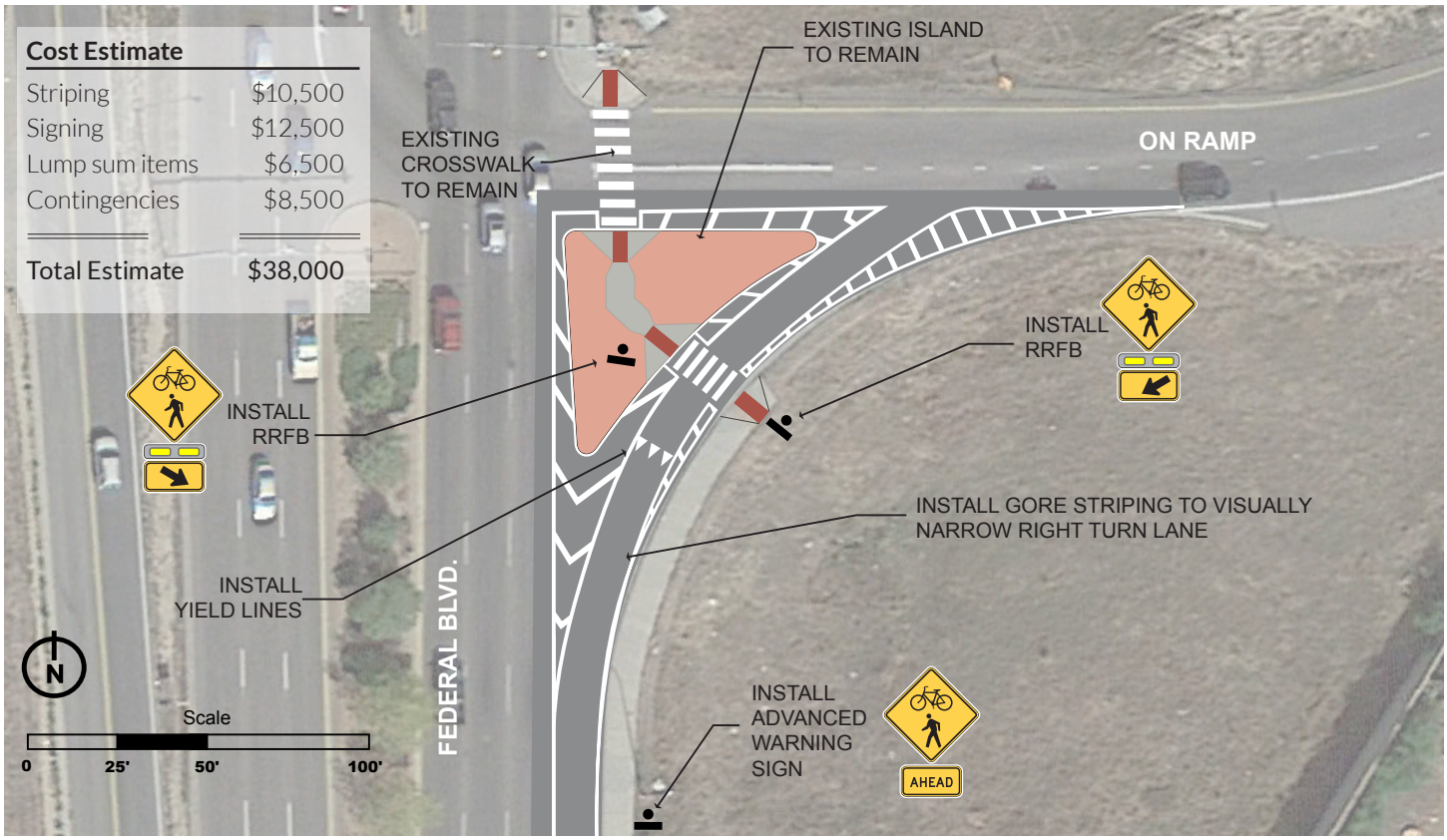
US 36 and Federal Boulevard, westbound off-ramp - Conceptual Proposed Improvements



US 36 and Federal Boulevard, eastbound off-ramp - Conceptual Proposed



US 36 and Federal Boulevard, eastbound on-ramp- Conceptual Proposed Improvements



Sheridan Bus Rapid Transit Station Access Improvements

Project Overview

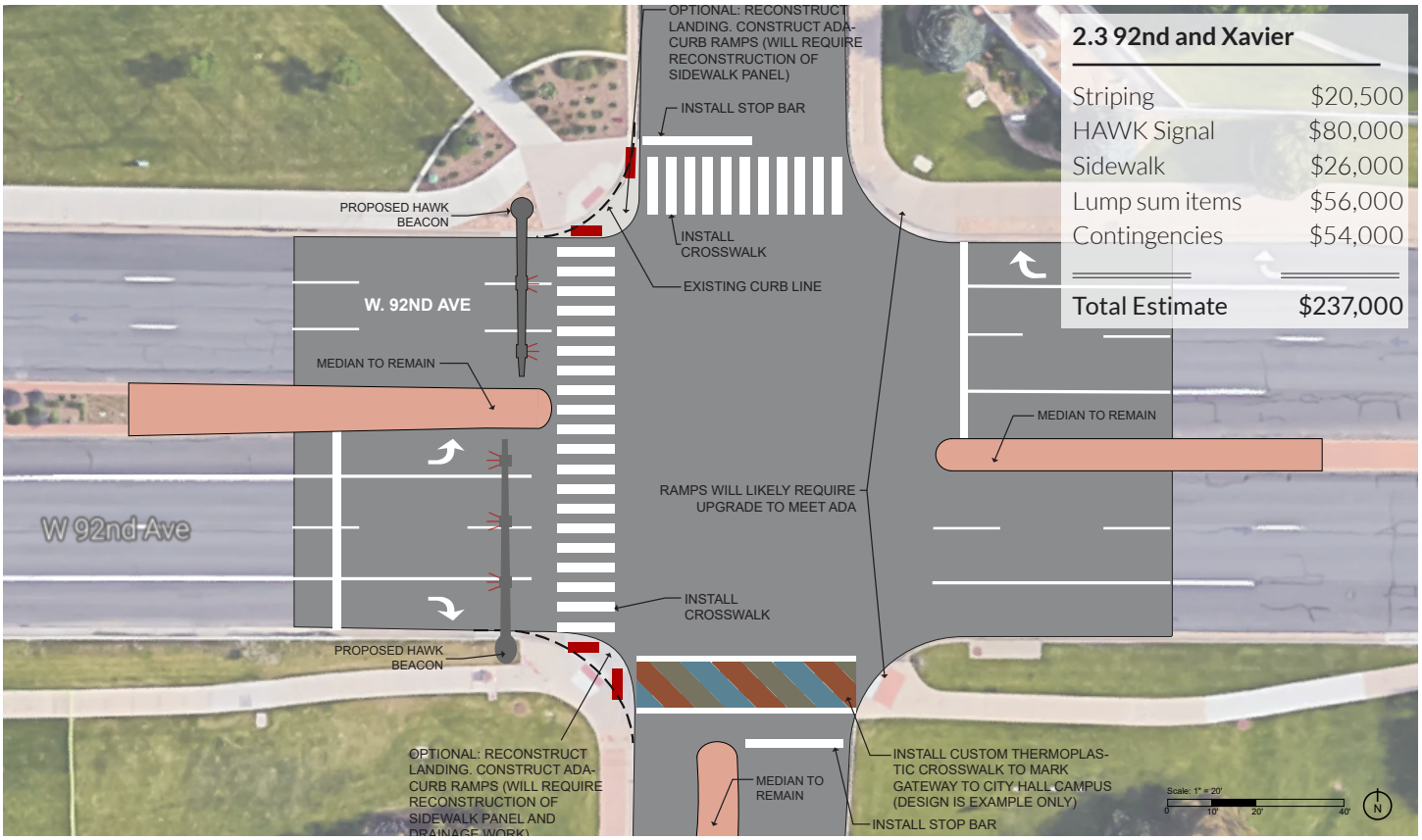
Sheridan Station provides access to the Flatiron Flyer Bus Rapid Transit (BRT) line as well as local bus service, and is adjacent to Downtown Westminster. Additionally, the US 36 Bikeway connects to Sheridan Station and then crosses 88th Avenue at-grade and continues north. Improving access between Sheridan Station, the US 36 Bikeway and Downtown Westminster at 88th Avenue will make bicycling and walking between these destinations more comfortable. The improvements at this location are detailed in the city's 2017 CDOT Highway Safety Improvement Program application. Improvements are focused on increasing the visibility of pedestrians, slowing vehicles as they exit and enter the ramps, and increasing the yield compliance of vehicles when pedestrians are attempting to cross the roadway. The project includes the construction of a raised crosswalk, as displayed in the photo simulation below.

Public Access to City Services Improvements

Project Overview

Yates Street provides an important connection between Sheridan Station and the city's public services, located within the city hall campus. In addition, there is pedestrian crossing demand between the city hall campus and Westminster Center Park at Xavier Street and 92nd Avenue, but a marked crossing at this location does not exist. This project includes pedestrian access improvements at three locations. Each will improve connectivity to the city hall campus. The improvements include installing a Pedestrian Hybrid Beacon and marked crosswalk at 92nd Avenue and Xavier Street, installing a mid-block crosswalk at Yates Street and 91st Avenue, and making 88th Place and Yates Street a four-way stop-controlled intersection with marked crosswalks. Additional details of these improvements are provided on the conceptual plan illustrations and photo simulations.

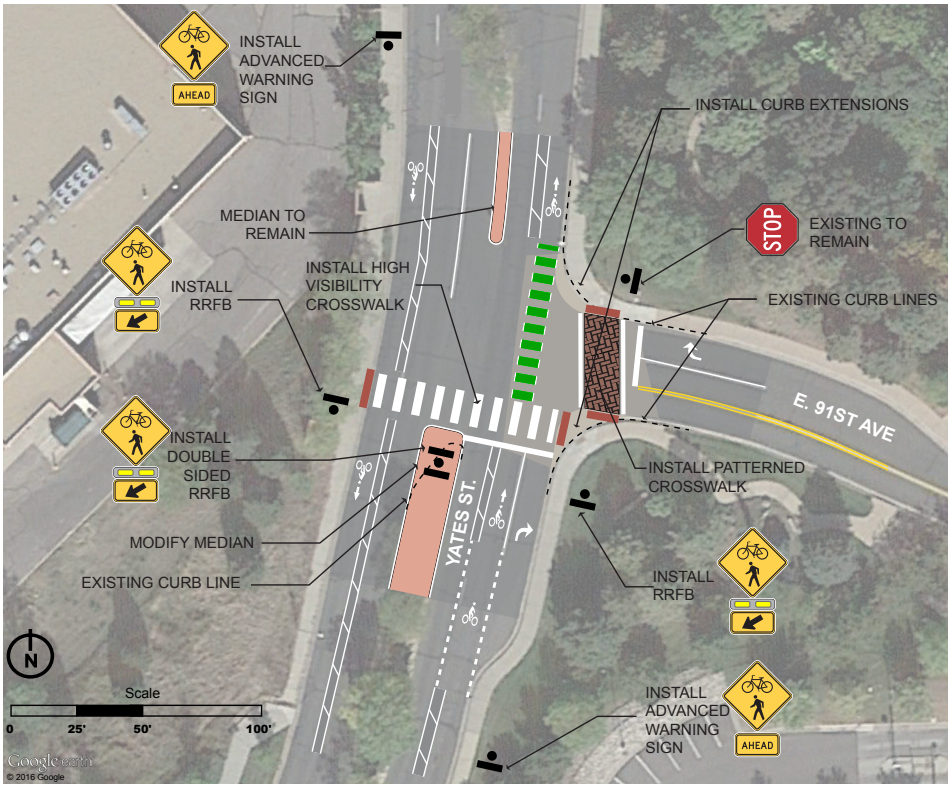
92nd Avenue and Xavier Street - Conceptual Proposed Improvements



2.3 92nd and Xavier

Striping	$20,500
HAWK Signal	$80,000
Sidewalk	$26,000
Lump sum items	$56,000
Contingencies	$54,000
Total Estimate	**$237,000**

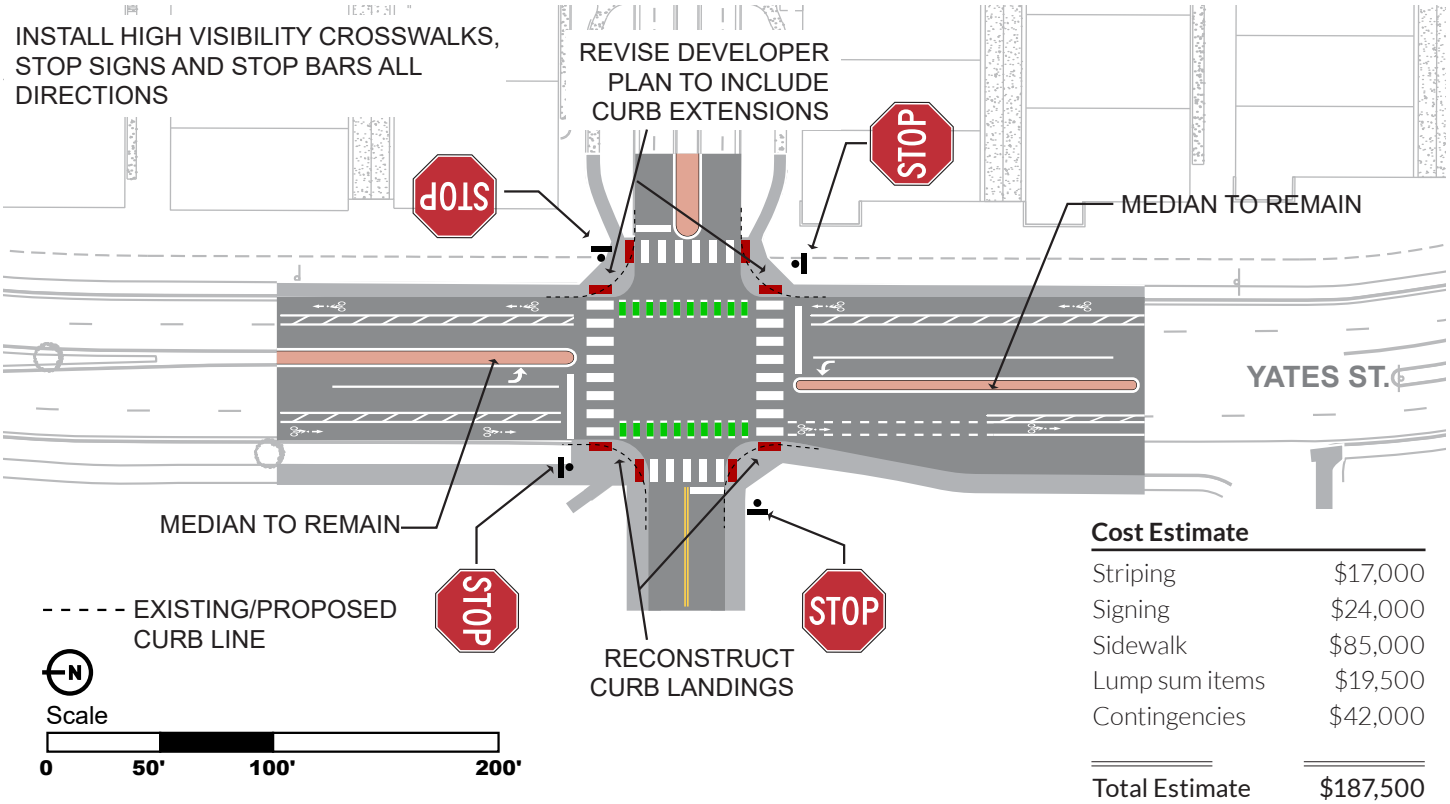
Yates Street and W 91st Avenue - Conceptual Proposed Improvements



Cost Estimate

Striping	$10,500
Signing	$24,500
Sidewalk	$14,000
Lump sum items	$13,500
Contingencies	$18,500
Total Estimate	$81,000

Yates Avenue and W 88th Place - Conceptual Proposed Improvements



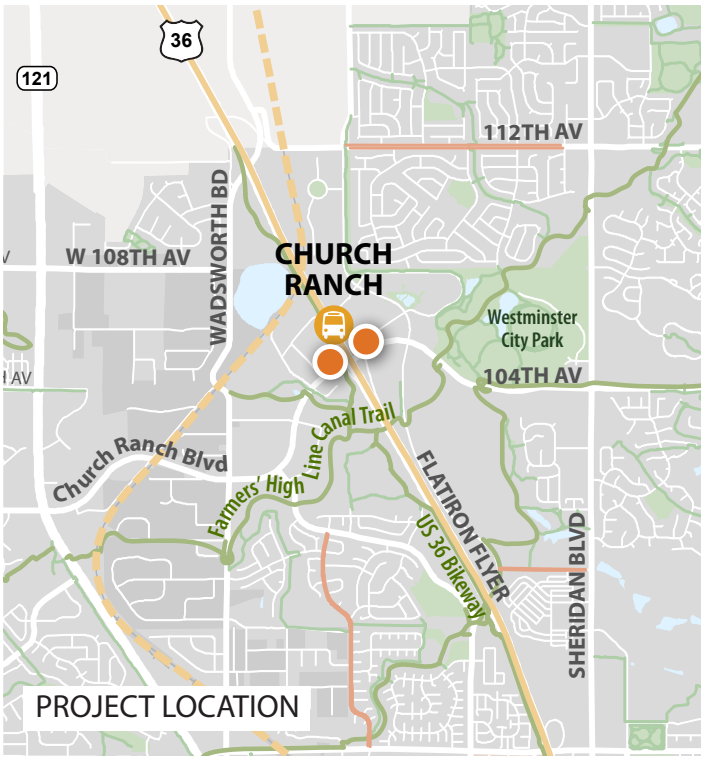
Cost Estimate

Striping	$17,000
Signing	$24,000
Sidewalk	$85,000
Lump sum items	$19,500
Contingencies	$42,000
Total Estimate	$187,500

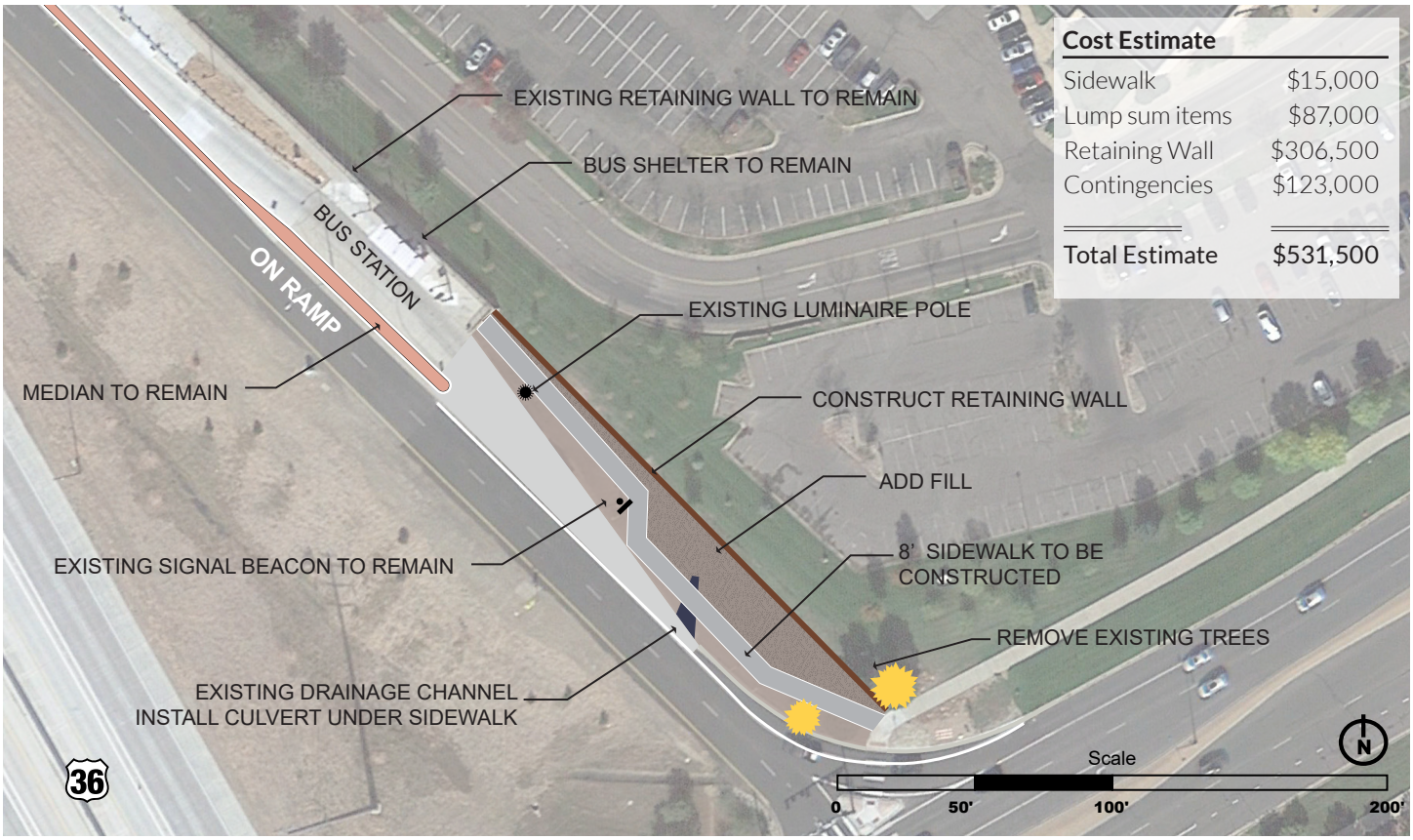
Church Ranch Bus Rapid Transit Station Access Improvements

Project Overview

The recently constructed Bus Rapid Transit (BRT) stations in Westminster provide new mobility options for people in the city. Currently, there is no sidewalk leading from 104th Avenue to Church Ranch BRT Station on the east side of US 36, and while a sidewalk does exist on the west side, it is circuitous and pedestrians have been observed walking along the grass to the station, as this route is more direct. This project would construct direct sidewalk connections to the station platforms on both sides of US 36 from 104th Avenue north to the stations.



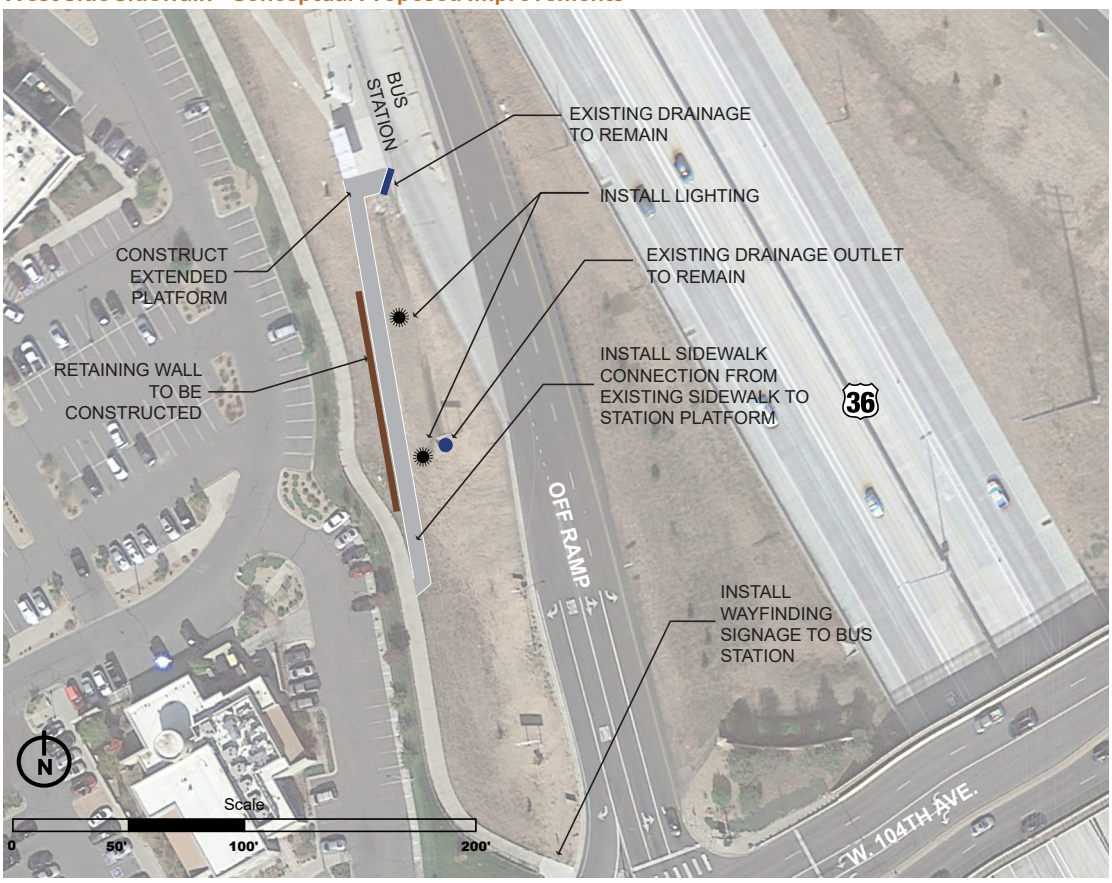
East Side Sidewalk - Conceptual Proposed Improvements



Cost Estimate

Sidewalk	$15,000
Lump sum items	$87,000
Retaining Wall	$306,500
Contingencies	$123,000
Total Estimate	$531,500

West Side Sidewalk - Conceptual Proposed Improvements



Cost Estimate

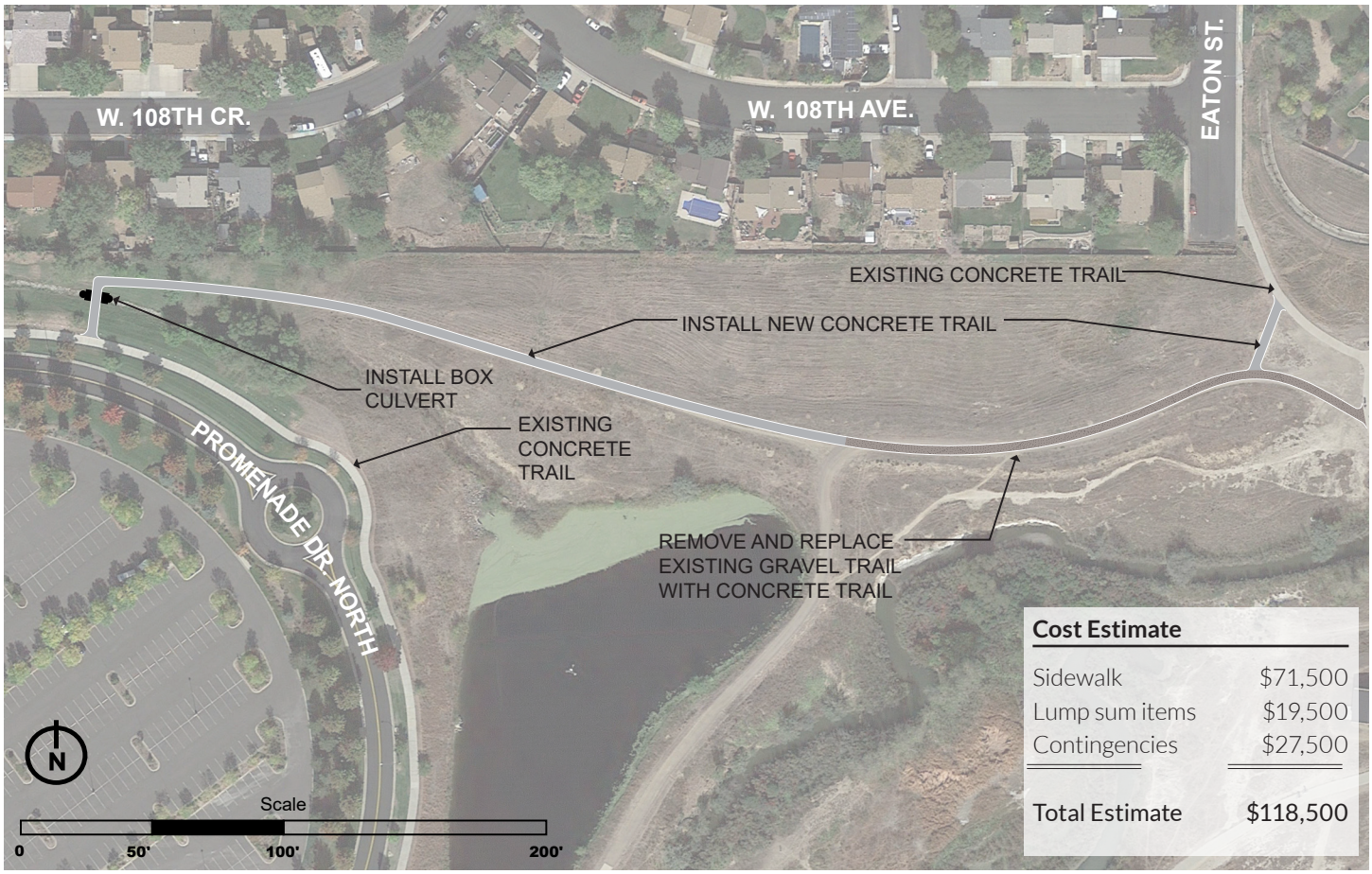
Sidewalk	$12,500
Lighting	$2,500
Retaining Wall	$106,000
Lump sum items	$33,000
Contingencies	$46,000
Total Estimate	$200,000

Promenade Sidepath Connector

Project Overview

The Big Dry Creek Trail provides a comfortable bicycle and pedestrian facility for neighborhoods east of Westminster Blvd., and the Promenade Drive Sidepath provides a link towards the Church Ranch Station. Currently, there is no direct bicycle and pedestrian connection between the Big Dry Creek Trail (south of 108th Avenue) and the sidepath on the north side of Promenade Drive. This project would construct a new connection between these trails. The project includes removing and replacing existing gravel sections of trail with a concrete shared-use path, and constructing new sections of shared-use path. The project also includes constructing a culvert to bridge over an existing ditch.

Promenade Sidepath Connector - Conceptual Proposed Improvements



Cost Estimate

Sidewalk	$71,500
Lump sum items	$19,500
Contingencies	$27,500
Total Estimate	$118,500