



# Broomfield Bicycle and Pedestrian Assessment

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# 1. Introduction

## Purpose

The current bicycle and pedestrian system in Broomfield includes multi-use paths, on-street bike lanes, sidewalks, and unpaved trails. The community trails are extensive, well used, and highly valued by the community. As Broomfield continues to grow, development standards are guiding new development to ensure that adequate bicycle and pedestrian infrastructure is included. The purposes of this Bicycle and Pedestrian Assessment are to:

- Inventory the existing bicycle and pedestrian facilities in Broomfield
- Identify deficiencies and missing links
- Gather public input
- Create a tiered bicycle and pedestrian network
- Identify and prioritize capital projects
- Set a path to implement Broomfield’s active transportation goals



## Relationship to Other Plans

The City and County of Broomfield completed a Comprehensive Plan update in November 2016. The Comprehensive Plan sets a vision for the community and serves as a guiding document.

### Community Vision Statement

“Broomfield is a City & County of diverse neighborhoods that inspire identity and unity, where its culture of excellence, leadership, self-

determination, and innovation is nurtured and practiced, and where its businesses thrive and its citizens of all ages and abilities are proud to live.”

### Transportation Vision

“Broomfield provides a well-connected and well-maintained multimodal transportation system that safely and effectively accommodates all modes (pedestrian, bicycle, automobile, bus, rail and freight) providing mobility for goods and people of all ages and abilities while supporting economic development, reducing dependence on the the single occupant vehicle, and minimizing environmental impacts.”

Broomfield’s Transportation Plan was updated in tandem with the Comprehensive Plan. Together, these two documents set a vision and goals for active transportation (walking and bicycling) and recreational activities in Broomfield. This Bicycle and Pedestrian Assessment is intended to provide specific project recommendations and set a path to help realize Broomfield’s bicycling and walking goals. The relevant goals from the Comprehensive Plan and Transportation Plan that guide this Assessment include:

- Promote and develop transportation alternatives to provide travel choices and mobility for people of all ages and abilities. (TS-B)
- Create and collaborate on an interconnected transportation system that facilitates safe travel for all modes, allows for seamless connections between modes, and provides linkages between neighborhoods and to neighboring communities. (TS-C)
- Encourage livable streets that are accessible, safe, efficient, and enjoyable for all people. (TS-D)
- Connect public spaces with paths and greenways within and between existing and



new areas of the community in order to provide continuous green space throughout the community benefiting wildlife, enhancing recreational experiences, and increasing Broomfield’s walkability. (OP-B)

- Use open space, parks, trails, and recreational facilities to reinforce a strong community image and identity and to improve quality of life. (OP-C)
- Promote the equitable distribution of open space, parks, recreational, and trail facilities. (OP-F)



The Comprehensive and Transportation Master Plans identify that transportation is a basic human need that affects daily quality of life. Broomfield residents pay approximately 53% of their household income to cover the cost of their housing and transportation. The Center for Neighborhood Technology research indicates these costs should remain below 45% of the household income to be affordable.

A well-connected and accessible multimodal transportation system allows residents, employees and visitors of Broomfield the freedom of personal mobility and choice of how to travel - including more affordable forms of transportation including walking, bicycling, and access to public transportation. Reducing the cost of basic living expenses increases the livability of our community.

Broomfield’s Open Space, Parks, Recreation and Trails (OSPRT) Master Plan was completed in 2005. This assessment builds from the OSPRT recommendations, with a focus on connection the trails and on-street bicycle and pedestrian accommodation.



## Overview of Public Outreach

The public outreach process for the Broomfield Bicycle and Pedestrian Assessment was focused on information gathering and asking residents to comment on existing conditions, gaps and needs, and to inform community values and desired elements of a future network of bicycle and pedestrian facilities. Another objective of the outreach was to establish awareness throughout the community about the assessment and to encourage interested members of the public to make their voices heard.

A variety of tools were used in the public outreach process. They were chosen to maximize the degree of public exposure for the project and give as large and diverse a portion of the public as possible the opportunity to get involved and provide their input. The following outreach mechanisms were used:

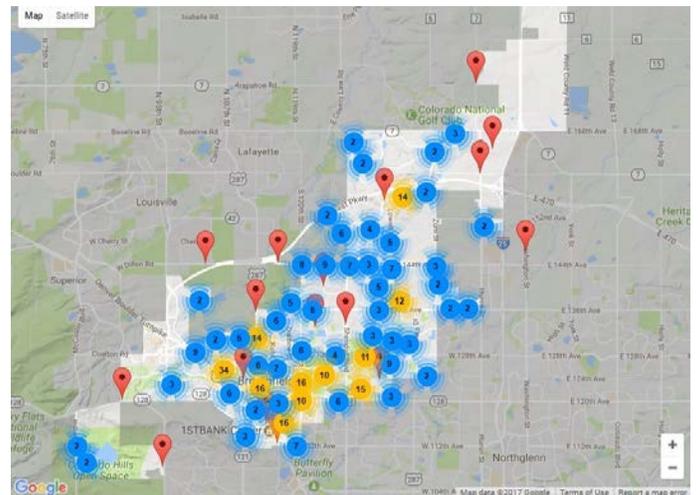
- **Project Website.** The project website was used as the primary portal of information about the Bicycle and Pedestrian Assessment and served as the primary platform for the public to provide input.
- **Public Commenting Map.** The public commenting map was hosted on the project website and provided an opportunity for the public to submit geocoded comments about bicycle and pedestrian problems and ideas.
- **Survey.** A project survey was developed to discern and analyze the major trends and issues related to walking and biking in Broomfield and to identify key community values and priorities.
- **Traditional Media.** An insert was created and sent to all city and county water customers in the monthly bill, banners were placed along trails, and advertisements ran in the local newspaper – all to direct the public to the online input tools.
- **Digital Media.** Social media platforms were used to push information about the Assessment and the online input tools.

The public outreach process provided critical input that was used to inform the overall philosophy of the bicycle and pedestrian network development, and to address the location-specific needs in the network and associated capital projects. The public input included:

**271** responses to the online survey

**392** location-specific comments on the Public Commenting Map

**460** comments from the online survey, comment map, and social media



The online survey asked respondents “What are the top three reasons you walk/bike in Broomfield?” The most frequent responses for both walking and biking were:

- Exercise/health
- See nature, experience open space
- Recreation

The survey asked respondents what type of improvements would encourage them to walk or bike more. The results are shown in



Figure 1 and Figure 2. A full summary of the public outreach process and input is included in Appendix A.

In summary, improvements that would encourage residents to walk and bicycle more include better connections, more sidewalks, trails, and bike lanes, routes in low traffic areas, safer at-grade crossings, more grade separations and more bicycle wayfinding.

## Walk. Bike. Broomfield



### Broomfield Bicycle and Pedestrian Assessment

In an effort to improve Broomfield's bicycle and pedestrian network and connections, the City and County of Broomfield is working with Felsburg Holt & Ullevig consulting firm to identify a bike and pedestrian network that integrates Broomfield's trail system with on-street bike facilities and sidewalks to create a seamless walking and biking environment.

WHAT DO YOU THINK?  
**COMPLETE** AN  
ONLINE SURVEY

SHOW WHERE YOU  
BIKE & WALK ON THE  
PUBLIC  
COMMENT **MAP**

ADD YOUR **EMAIL** TO OUR  
**CONTACT LIST**  
& GET PROJECT UPDATES



Figure 1. Survey Responses: Bike Improvements

The top-rated improvements that would encourage Broomfield residents to **BIKE** more:

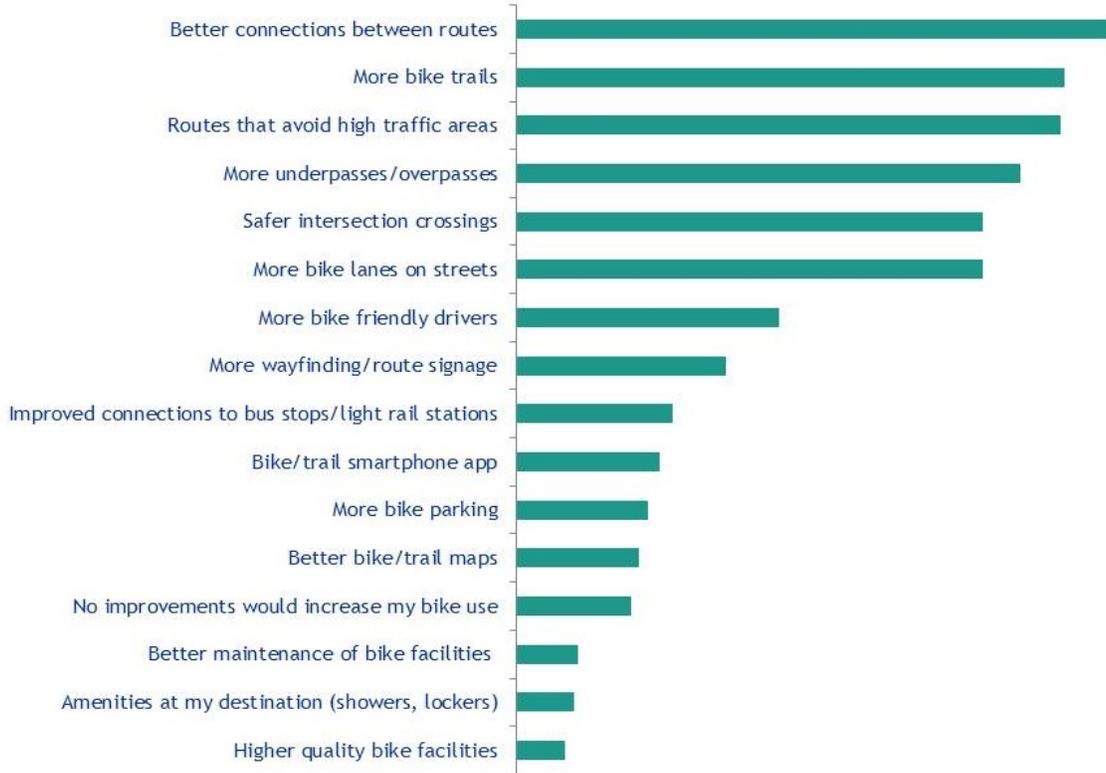




Figure 2. Survey Responses: Pedestrian Improvements

The top-rated improvements that would encourage Broomfield residents to **WALK** more:





# 1. Current Conditions

This Bicycle and Pedestrian Assessment will be one of the primary tools to guide Broomfield’s walking and bicycling through infrastructure improvements and potential programmatic efforts.

A comprehensive inventory and review of current conditions in Broomfield provides the foundation for understanding current facilities that are in place to support biking and walking in the Broomfield.

## Bicycle and Pedestrian Activity

### Commute Mode Split

The automobile remains the predominant means of travel to work for Broomfield residents; more than 77 percent drive alone to work, and 7.6 percent carpool as shown in **Figure 3**.

. Active travel modes account for less than two percent of work trips, 0.5 percent by bike, and 1.3 percent by foot. Public transit is used by 4.6% of Broomfield’s population for work trips. There is an opportunity to both increase active mode access to public transit and for public transit mode share to increase with high quality connectivity for active modes.

Source: U.S. Census Bureau, 2009–2013 American Community Survey

These data, collected by United States Census Bureau’s American Community Survey, focus specifically on the primary travel mode for commuting purposes; they do not include recreation, shopping, and other trip purposes. It is challenging to gauge the degree to which a population has embraced active transportation as a utilitarian mode.

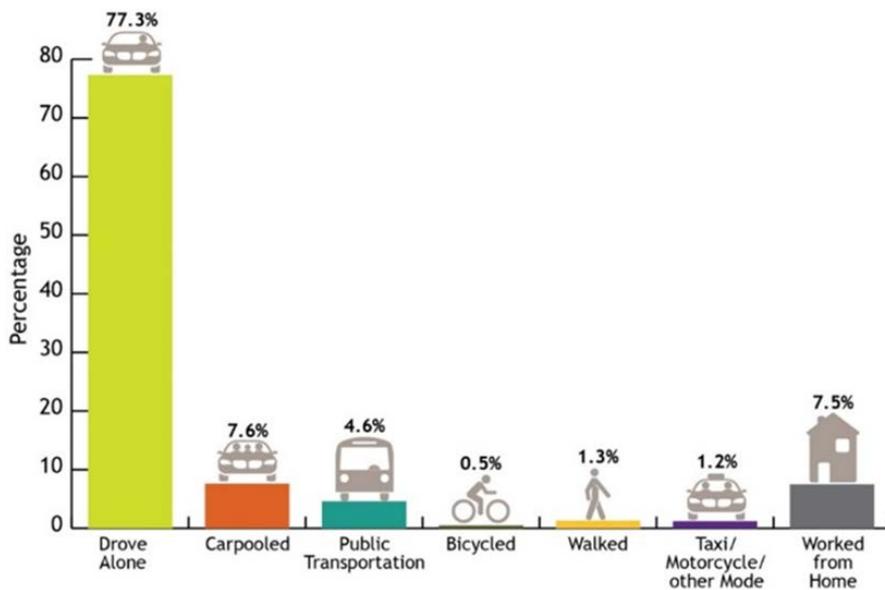


Figure 3. Means of Travel to Work



## Assessment Survey: Frequency of Walking and Bicycling

Census information regarding commute mode split does not accurately reflect how often Broomfield residents walk or ride a bicycle. The Assessment online survey focused primarily on users' current bicycling and walking habits including how often and where people walk and bicycle in Broomfield. The results of the 271 respondents are presented below. A summary of all public input is in Appendix A.

### Walking

A majority of residents (75%) self-reported walking regularly and breaks down as follows:

- 38% walk a few times a week,
- 37% walk daily
- 11% walk weekly
- 7% walk monthly
- 4% do not walk
- 2% walk bi-weekly

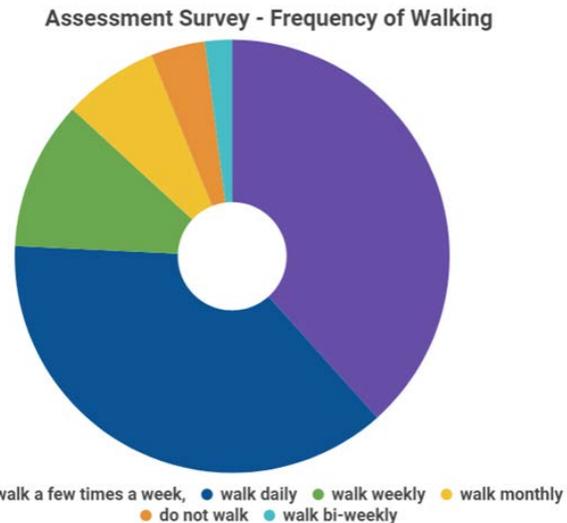


Figure 4. Assessment Survey: Frequency of Walking

The top three most common responses for where survey respondents walk:

- 76% Open Space and Trails
- 75% Around my neighborhood
- 41% Parks

When asked how long survey respondents walk (268 respondents):

- Under 5 minutes 0%
- 5-10 minutes 4%
- 11-20 minutes 11%
- 21-30 minutes 24%
- 31-40 minutes 19%
- 41-60 minutes 23%
- 60+ minutes 17%
- I don't walk 3%

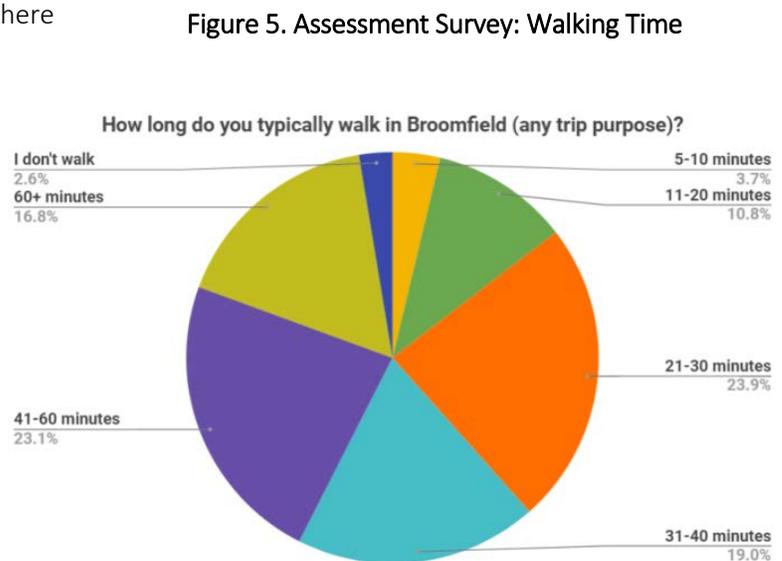


Figure 5. Assessment Survey: Walking Time



*Bicycling*

When asked how often survey respondents ride a bicycle, a majority responded that they ride a bicycle at least on the occasion:

- 29% bicycle a few times a week
- 27% bicycle once a month
- 20% do not ride a bicycle
- 12% bike once a week
- 7% bike daily
- 5% bike bi-weekly

When asked where survey respondents ride a bicycle:

- 60% Open Space & Trails
- 40% Around my neighborhood
- 15% Commute to work
- 5% Access transit

When asked how far survey respondents ride their bicycle (238 responses):

- Under 1/2 mile 9%
- 1/2-1 mile 2%
- 1-2 miles 7%
- 2-5 miles 26%
- 5-10 miles 23%
- 10-20 miles 23%
- 20+ miles 11%

Assessment Survey - Frequency of Bicycling

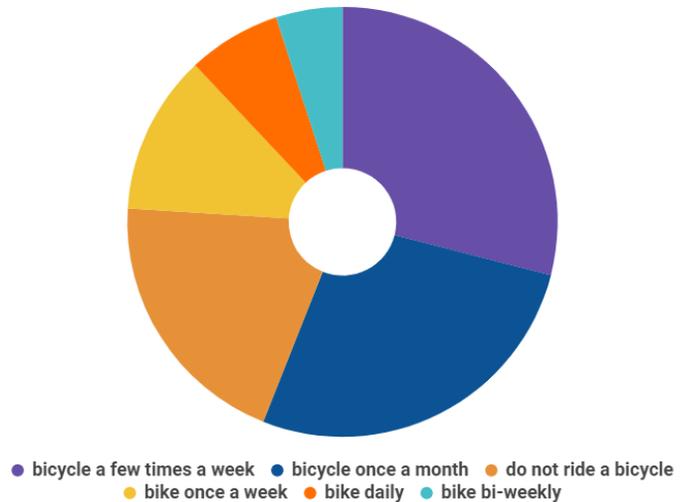


Figure 6. Assessment Survey: Frequency of Bicycling

How far do you typically bike in Broomfield (any trip purpose)?

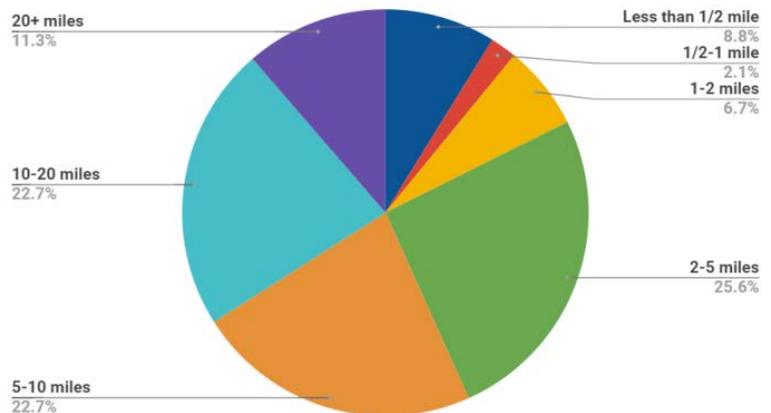


Figure 7. Assessment Survey: Bicycling Distance



### US 36 Bikeway User Counts

The recently constructed U.S. 36 Bikeway, a 12 foot wide multi-use path, officially opened March 1, 2016. The path extends 18 miles from Boulder to Westminster, providing a regional “highway for cyclists” parallel to U.S. Highway 36 and low-stress first and final mile access to Bus Rapid Transit stations along the corridor.

Trail count data for the US 36 Bikeway was obtained from a CDOT counter station located along the trail just north of Uptown Avenue, south of the US 36 and Broomfield Station and the Parkland trail access. The counter distinguishes between bicyclists and pedestrians and by direction.

Three full years of data have been collected since the counters were installed in July 2015 to June 2018.

#### Mode Split

Figure 8 shows that this section of the US 36 Bikeway is used by considerably more bicyclists than pedestrians.

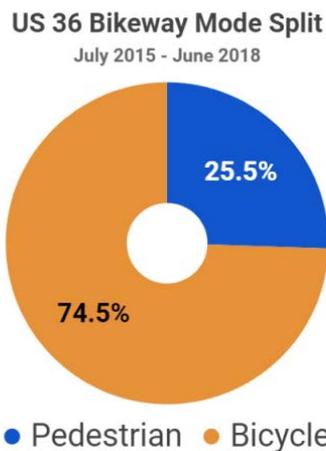


Figure 8. US 36 Bikeway Mode Split

#### Annual Bikeway Utilization

In 2016, the first full year recorded by the counter, logged 71,193 bicycle trips and 2017 recorded 72,816 bicycle trips for the year. 2018 was on track to set a new annual record; however, counts beyond June 2018 are not included due to a calibration error for the counter indicating inaccurate counts that CDOT is working to correct.

Figure 9 shows cycling counts by month for each year, showing a general trend of increased utilization each year. The highest ridership on the Bikeway is between May and September. The highest utilization occurred in the most recent recorded month: June 2018 at 11,921 bicycle trips.

In 2017 logged 14,233 pedestrian trips, in 2016 there was an error in the trip data that needs to be corrected by CDOT at this time..

Figure 10 shows pedestrian counts by month for each year. Pedestrian volumes vary greatly by month, ranging from lows in December and January and typical highs in May through September, similar to cycling.

In September and October of 2016 there was a calibration error and counts were inaccurate for those months and not included. In 2017, the most utilization occurred in August with 1,905 trips recorded. In 2018, the last month recorded was also the most number of trips recorded for the year so far, coming in a 2,119 trips.

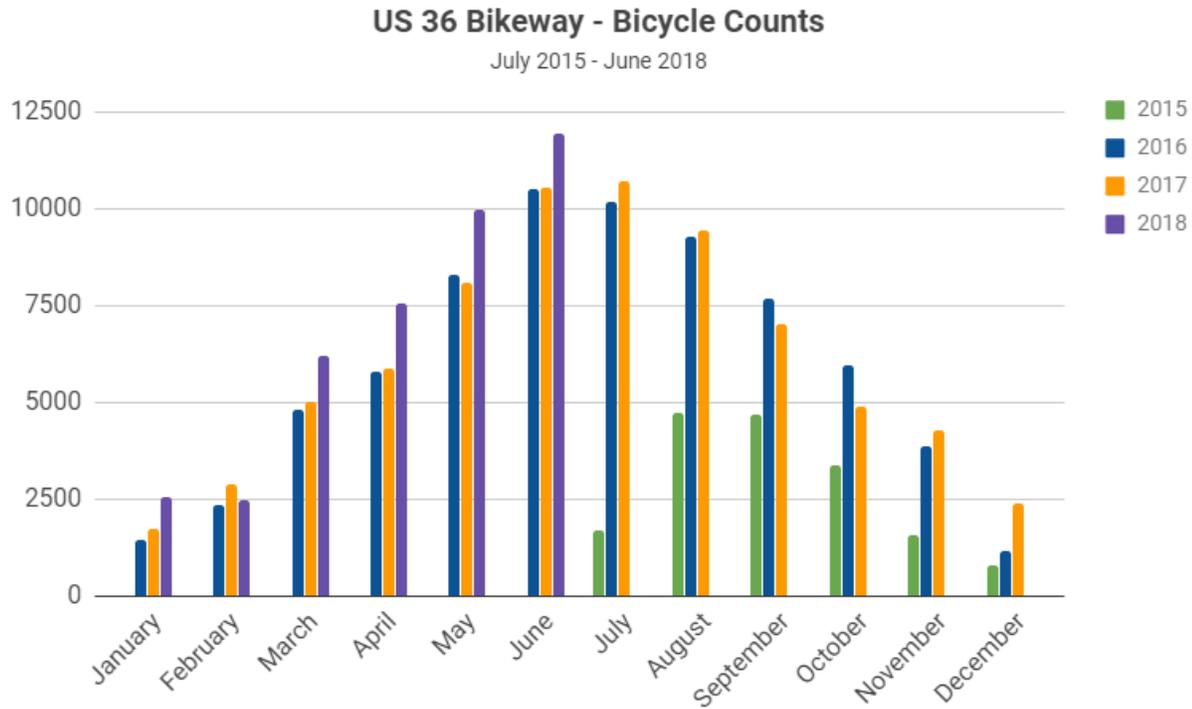


Figure 10. US 36 Bikeway Bicycle Counts

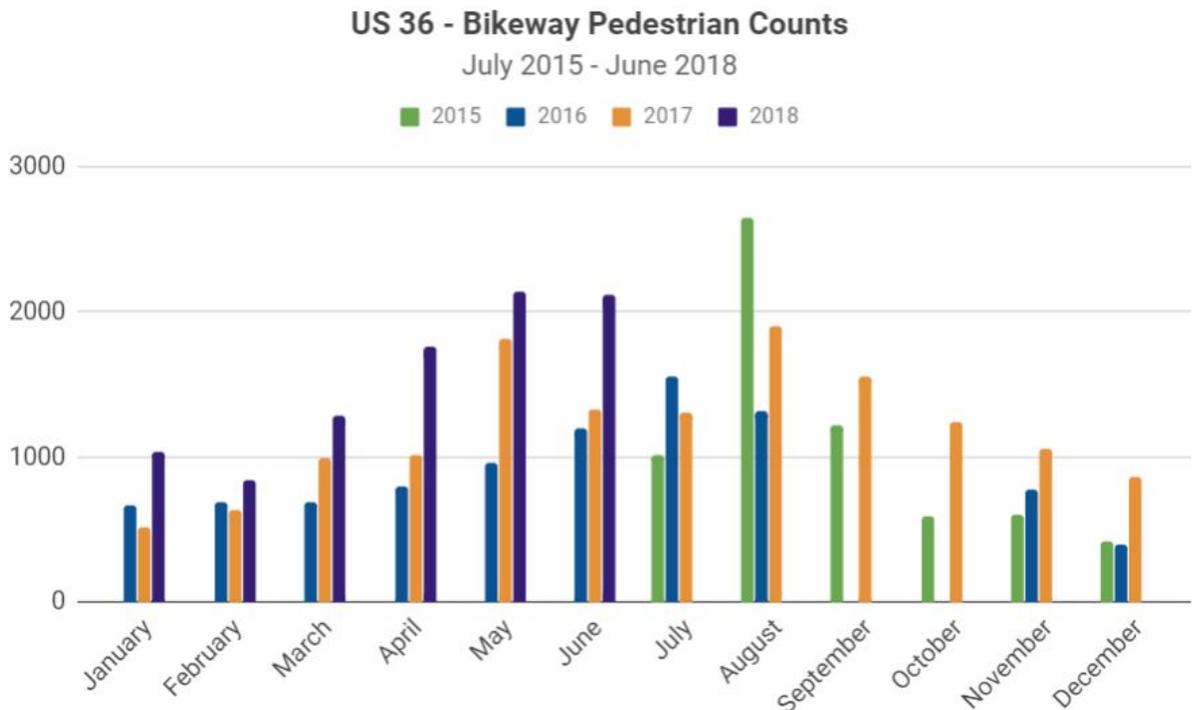


Figure 9. US 36 Bikeway Pedestrian Counts



*Weekday and Weekend Utilization*

**Figure 11** compares 2017 average hourly cycling trail volumes on weekdays versus weekends. Weekdays show steady utilization throughout the day from 7 A.M. to 6 P.M., with slight peaks midday and evening commute hours. Both the 11 A.M. and 12 P.M. hours average about 18 bicycle trips per hour.

Weekend average bicycle counts indicate about a 60% increase in average volume on Saturdays and Sundays. Peak activity on the US 36 Bikeway occurs between 9 A.M. and 2 P.M. on weekends during weekend mornings. Peak hour is at 11 AM on weekends with an average of 36 trips per hour.

**Figure 12** compares 2017 hourly averages for weekday and weekend pedestrian counts on the US 36 Bikeway. Peak hours are mid-day weekends between 11 A.M. and 1 P.M., with the similar volumes at 5 P.M. Weekday peaks at 5 P.M. with a strong showing mid-morning.



### 2017 Average Hourly Bicycle Volumes

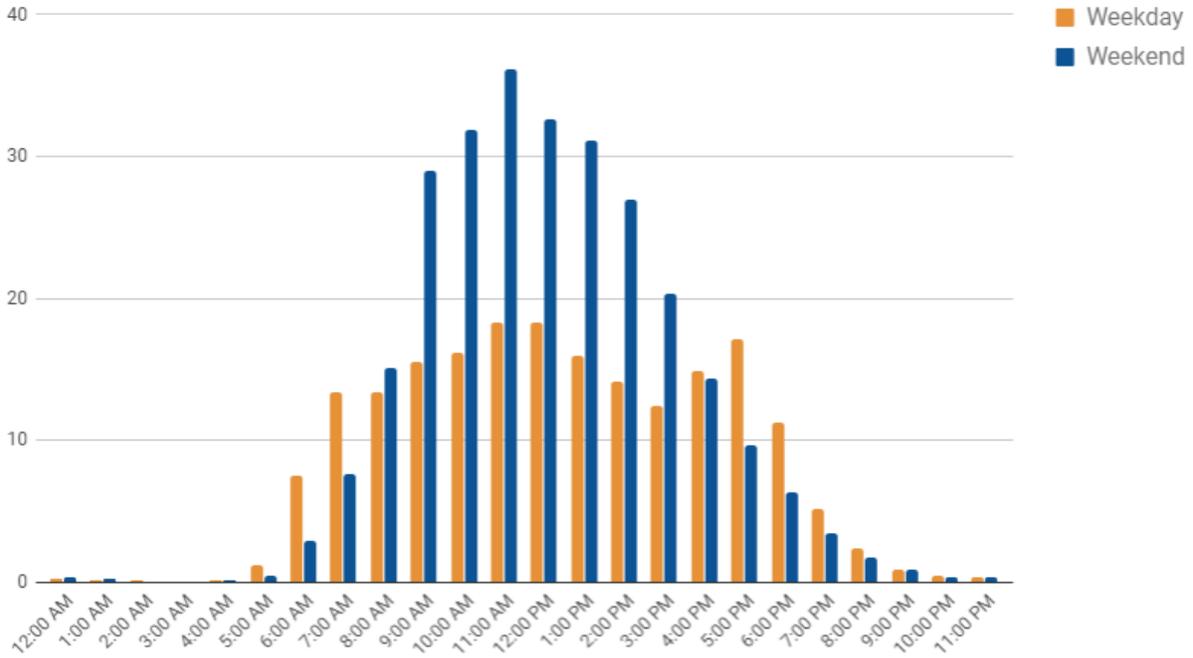


Figure 11. US 36 Bikeway Average Hourly Bicycle Volumes- Weekday & Weekend

### 2017 Average Hourly Pedestrian Volumes

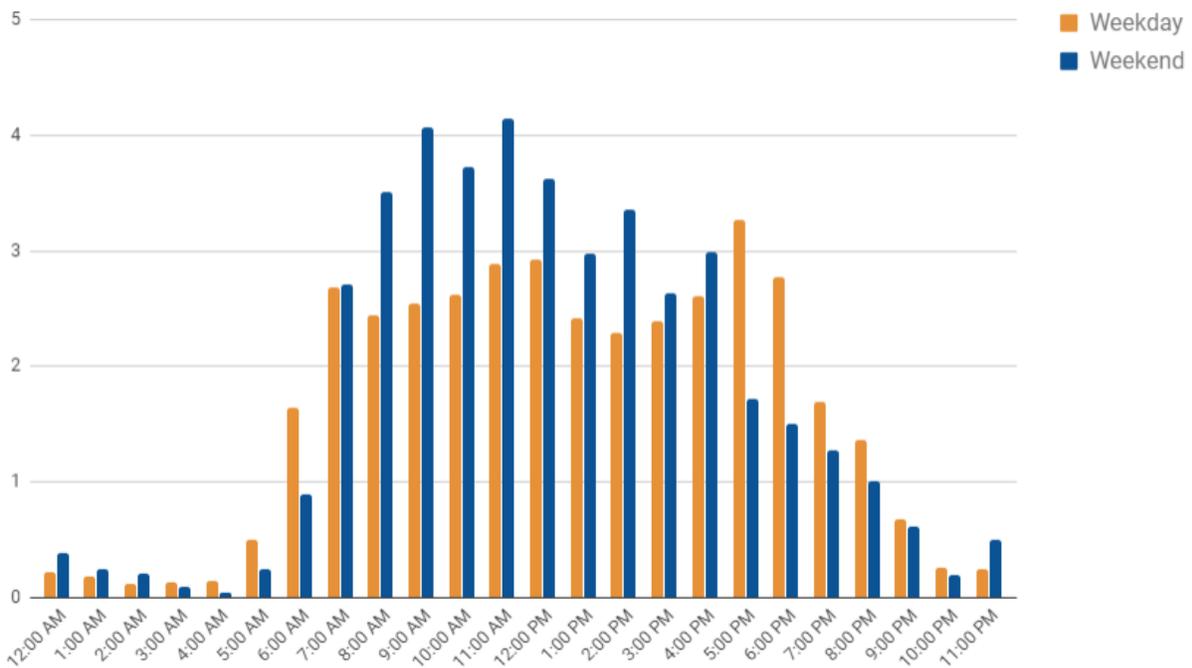


Figure 12. US 36 Bikeway Average Hourly Pedestrian Volumes- Weekday & Weekend



*Utilization by Day of the Week*

**Figure 13** shows yearly average bicycle volumes by day of the week for bicyclists from July 2015 through June 2018. Saturday and Sunday have higher utilization than weekdays. During the week, Wednesday consistently has higher utilization than other days. 2018 was showing a much higher average than previous years, though the data may be skewed as only 6 months of data were included, not entire year.

During the calendar year of 2017, weekday cycling trips averaged 170 per day and 272 trips on the weekends.

**Figure 14** shows yearly average pedestrian volumes by day of the week for pedestrians for the same time period. In 2016 there was an anomaly in the pedestrian counts for Sundays and Mondays in the months of September and October that were inaccurate and removed from the data set.

During the calendar year of 2017 average weekday pedestrians was 38 and on weekends 43.

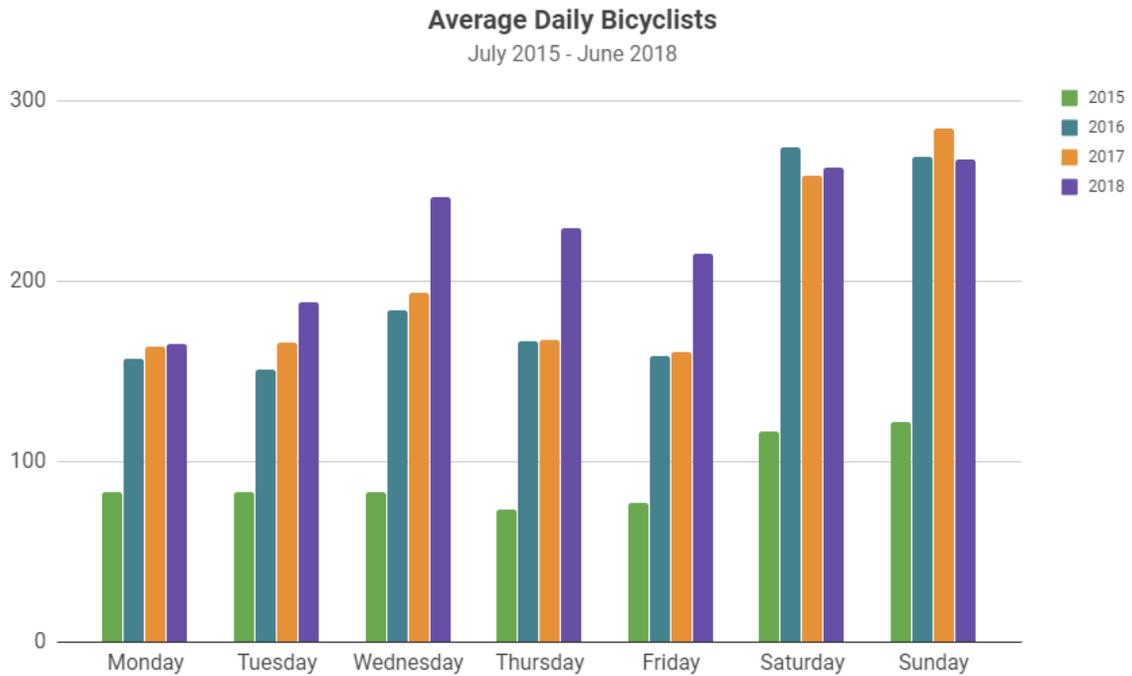


Figure 13. US 36 Bikeway Average Daily Bicyclists By Day of Week

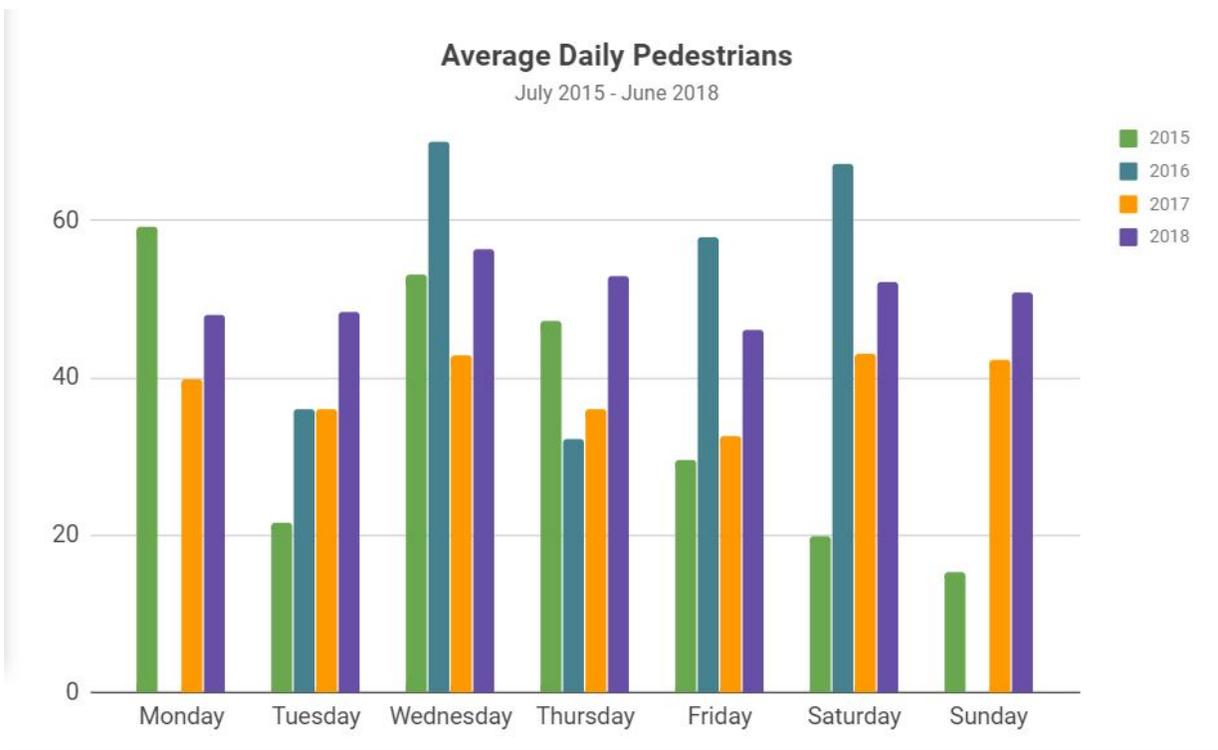


Figure 14. US 36 Bikeway Average Daily Pedestrians By Day of Week



### *Peak Utilization*

The data analysis above is an average for all days throughout the year. To understand peak utilization of the facility and the potential for increase in utilization, and how well the facility currently operates the data for peak months and days should be taken into account.

**Figure 15** shows data collected from June 2018 (the month on record with the most bicycle counts) demonstrates peak utilization on the US 36 Bikeway in Broomfield.

Daily averages for Saturdays and Sundays were observed for the month. On average, the peak hour was at 9 AM on Saturdays in June 2018, recording an average of 76 bicyclists in a single hour, followed by 65 cyclists at 11 AM and 59 at 10 AM. On Sunday, the average peak hour was at 10 AM recording an average of 51 cyclists, followed by a close average of 50 cyclists at 9 AM.

**Figure 16** shows data for average June 2018 Saturday and Sunday pedestrian activity. The peak hour is also at 9 AM on Saturday with on average of 10 pedestrians; on Sundays peak hour is also at 9 AM with an average of 8 pedestrians.



### June 2018 Weekend Average Bicycling Counts

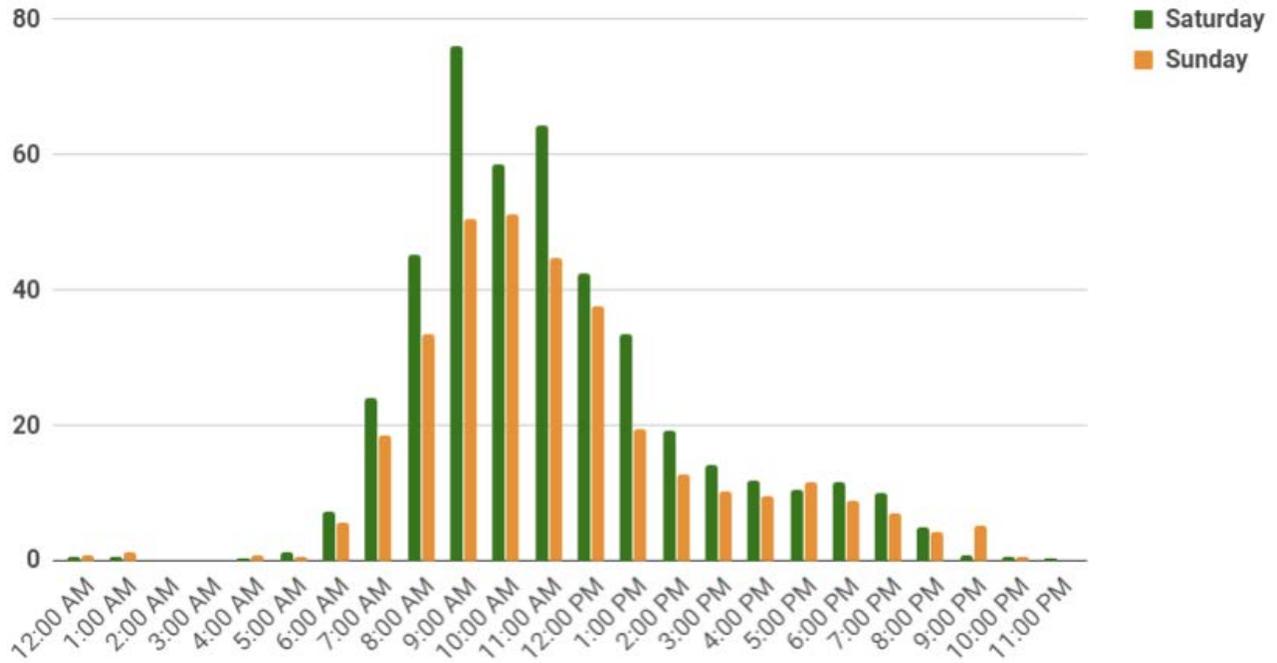


Figure 15. US 36 Bikeway June 2018 Average Hourly Weekend Bicycle Counts

### June 2018 Weekend Average Pedestrian Counts

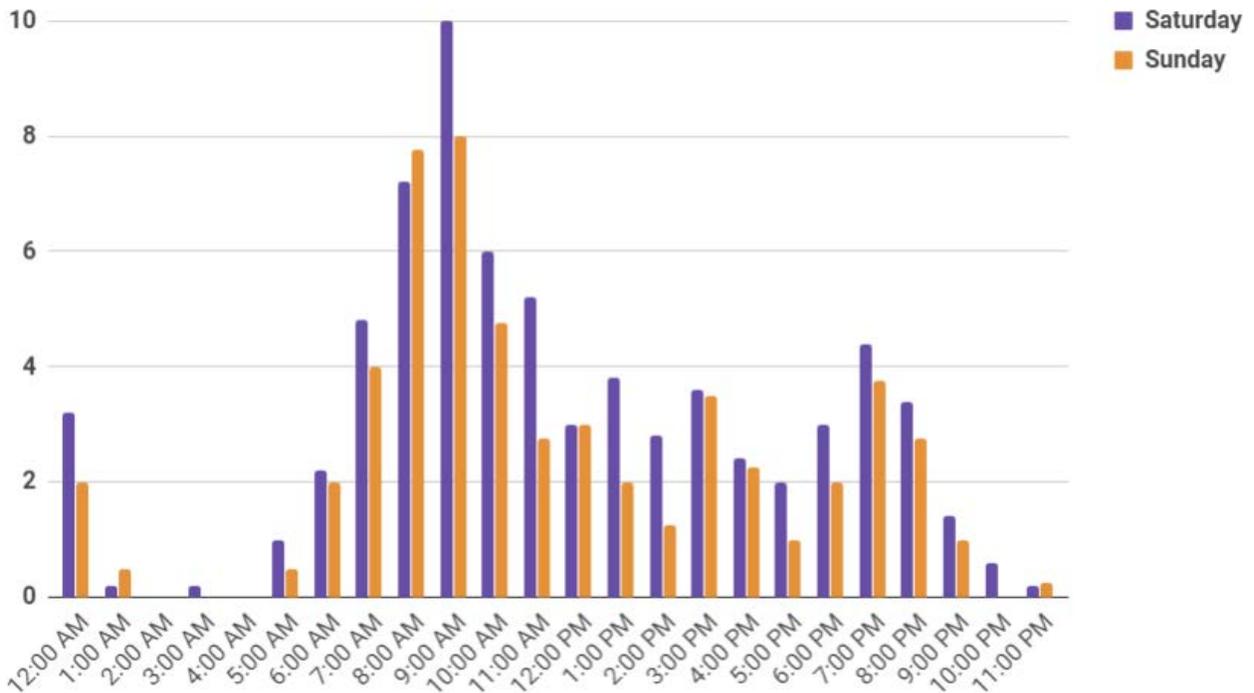


Figure 16. US 36 Bikeway June 2018 Average Hourly Weekend Pedestrian Counts



### Strava Data

A biking and running activity heat map from Strava (a leading exercise smartphone application) is shown on **Figure 17**. The heat map shows bicycle and running routing patterns. In Broomfield, the highest activity is found on Sheridan Parkway and Lowell Boulevard. High activity is also observed just outside of Broomfield on the Rock Creek and Dry Creek Trails. Broomfield is in the process of obtaining Strava data, which will allow for a greater understanding of the activity recorded by Strava.

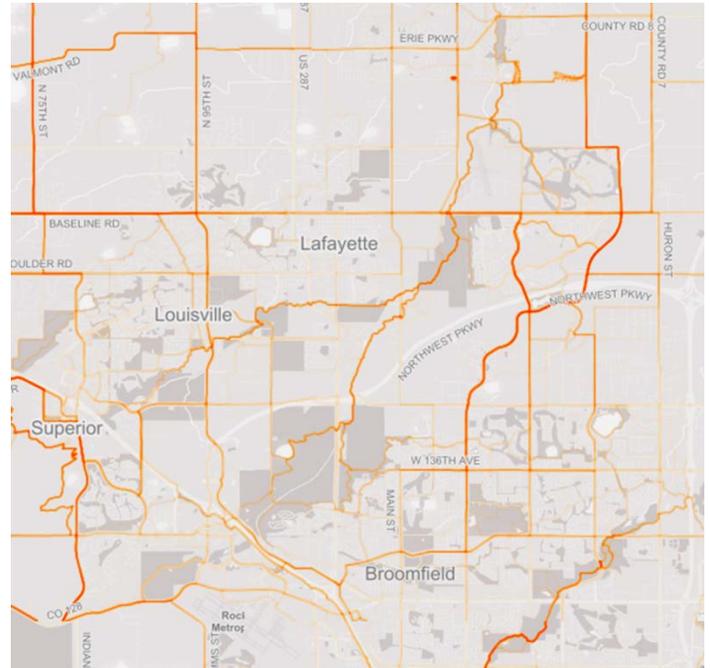
### Bike to Work Day

**Figure 18** shows a summary of counts collected on Bike to Work Day for 2015, 2016 and 2017 at the Broomfield counter on the US 36 Bikeway.

June 2016 recorded 1011 bicycle trips, June 2017 recorded 1095 trips, June 2018 recorded 1143 trips, and in 2019, 1230 trips showing a 21% increase in ridership over a four year period.

Typically Bike to Work Day is the 4<sup>th</sup> Wednesday of June and is the peak day of utilization of the facility. The day is promoted by DRCOG's Way to Go Program and associated Transportation Demand Management Organizations (TMOs) such as the northwest corridor's Commuting Solutions and Smart Commute Metro North along the I-25 corridor. Bike to Work Day celebrates everyday bicycling for commuting and utilitarian trips and is a key day to introduce and encourage new riders to try bicycling to work.

**Figure 19** demonstrates bicycling counts by hour for Bike to Work Day 2018 indicate the highest volumes of bicyclists in this location was in the 7:00 AM hour, clocking 267 bicyclists at peak hour for the day, followed by 160 bicycling trips recorded in the 8:00 AM hour and 147 trips in the 6:00 AM hour. The evening peak recorded 130 bicycling trips at 5:00 PM, 125 trips at 6:00 PM and 83 trips at 4:00 PM



**Figure 17. Strava Biking and Running Activity Heat Map**

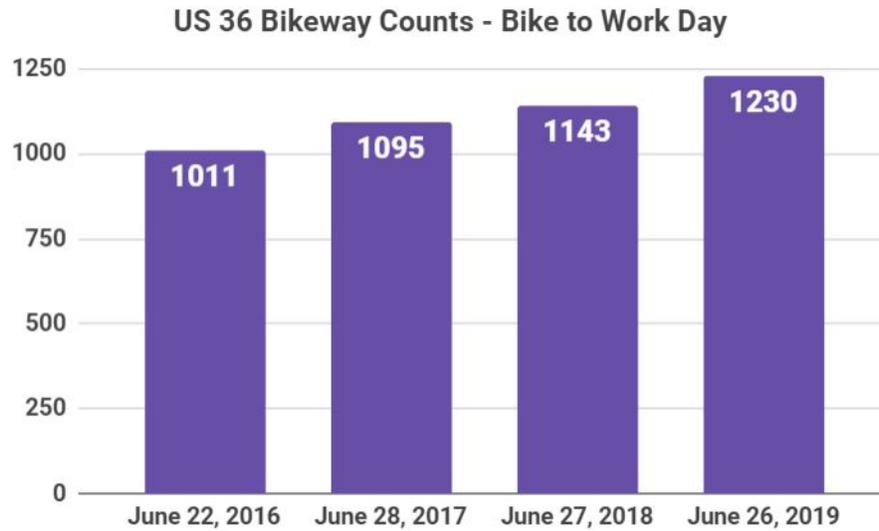


Figure 18. Bike to Work Day Bicycle Counts

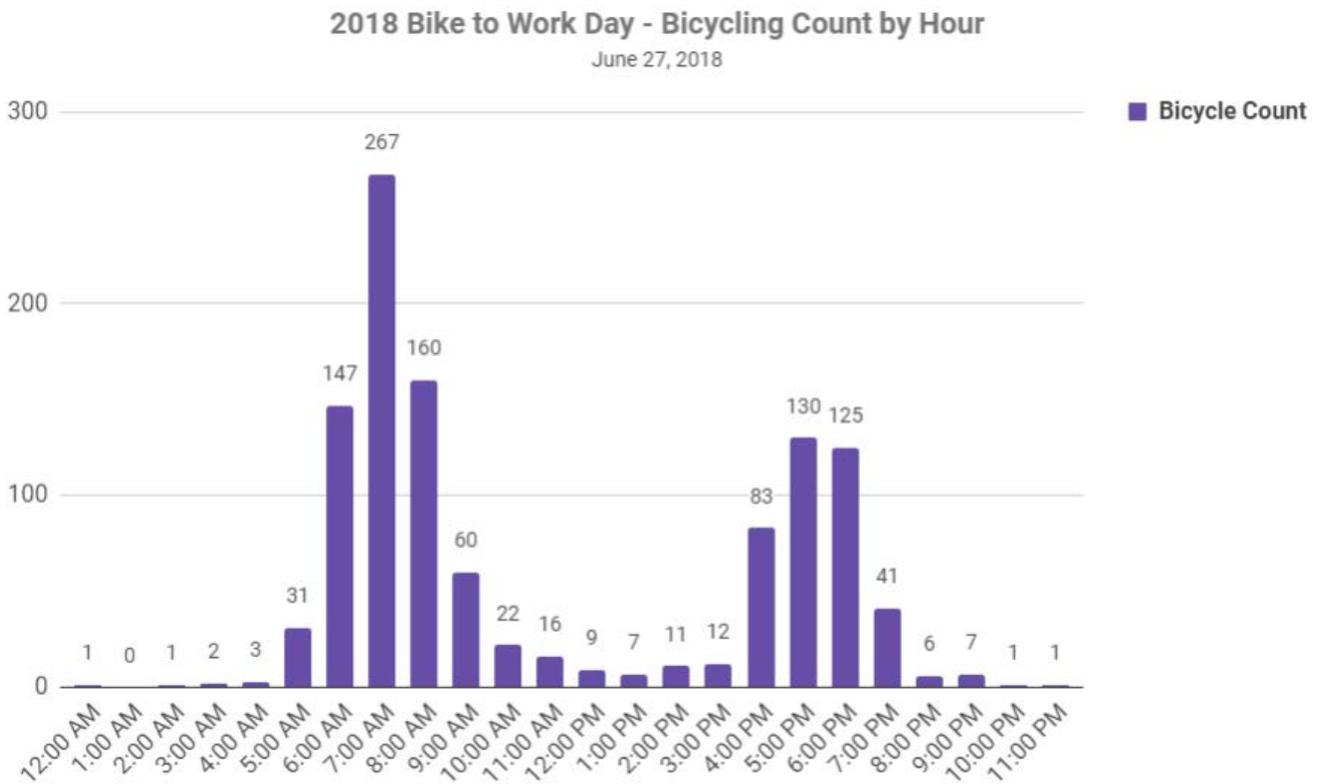


Figure 19. Bike to Work Day June 2018 Hourly Bicycle Counts



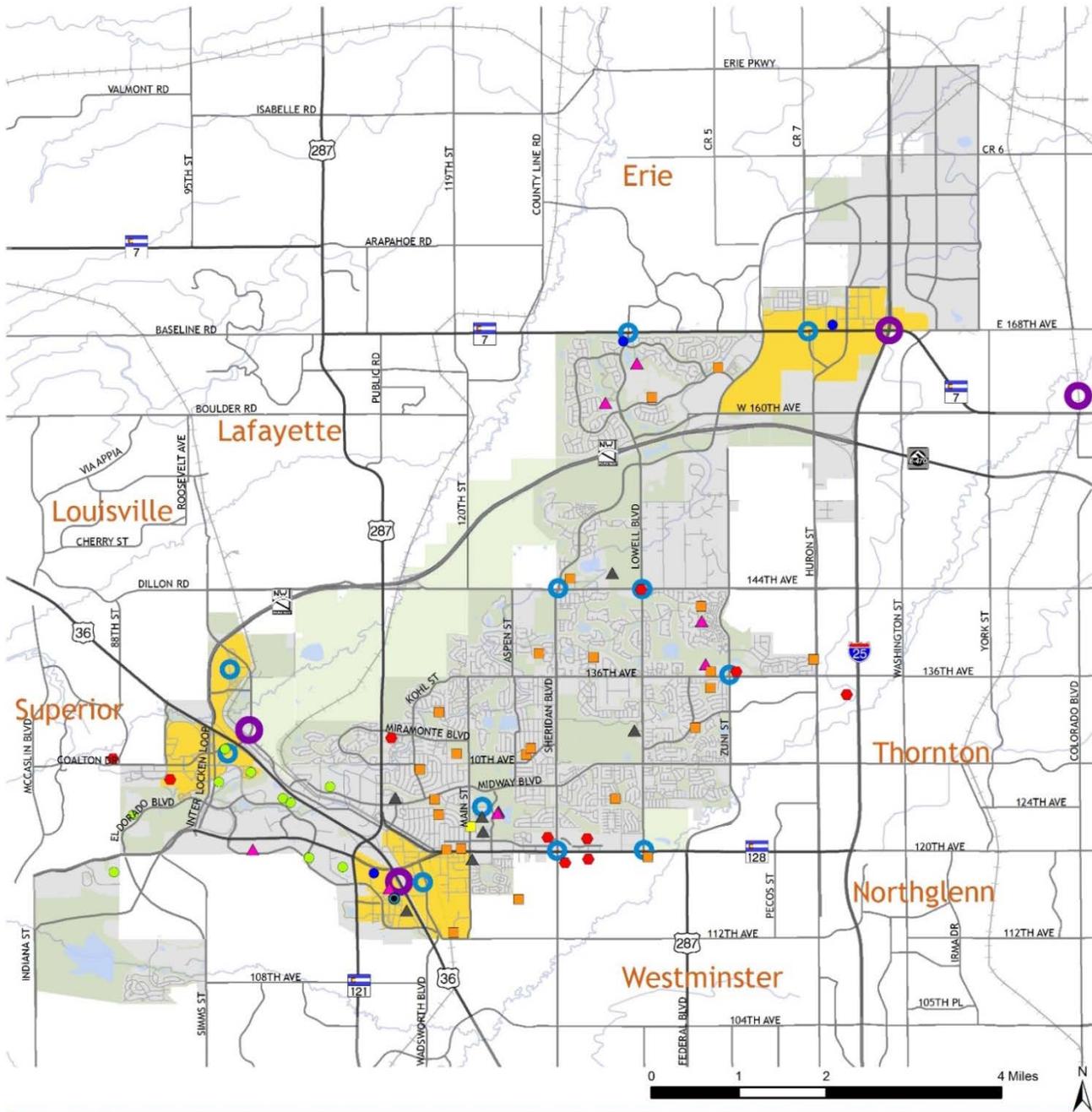
## Activity Centers

**Figure 20** highlights the primary activity centers in Broomfield – locations that are likely destinations for bicyclists and pedestrians.

The activity centers include:

- employment bases
- City facilities
- commercial areas
- libraries
- hospitals
- schools
- recreation centers
- transit hubs

Broomfield’s Transportation Plan identifies Mobility Hubs and Micro-Mobility Hubs; these mobility hubs are designated to provide strong intermodal connectivity, providing a strong interface among travel modes, including biking, walking and transit.



## LEGEND

### Activity Centers

- |   |  |   |  |   |
|---|--|---|--|---|
| <span style="color: green;">●</span> Major Employers  | <span style="color: blue;">●</span> Hospitals  | <span style="border: 1px solid purple; border-radius: 50%; padding: 2px;">○</span> Mobility Hub                                     | <span style="color: grey;">—</span> Highways | <span style="color: blue;">~</span> Creeks, Ditches, and Canals   |
| <span style="color: black;">▲</span> City Facility  | <span style="border: 1px solid blue; border-radius: 50%; padding: 2px;">●</span> Park-n-Ride | <span style="border: 1px solid blue; border-radius: 50%; padding: 2px;">○</span> Micro-Mobility Hub                                 | <span style="color: grey;">—</span> Streets  | <span style="color: blue;">■</span> Waterbody   |
| <span style="color: red;">●</span> Grocery Stores   | <span style="color: purple;">▲</span> Recreation Centers                                     | <span style="background-color: yellow; border: 1px solid black; width: 15px; height: 10px;"></span> Emerging Urban Activity Centers | <span style="color: grey;">—</span> Railroad | <span style="background-color: lightgreen; border: 1px solid grey; width: 15px; height: 10px;"></span> Open Lands |
| <span style="background-color: yellow; border: 1px solid black; width: 10px; height: 10px;"></span> Libraries | <span style="color: orange;">■</span> Schools  |   |  | <span style="border: 1px solid grey; padding: 2px;">+</span> City and County of Broomfield                        |

Figure 20. Activity Centers



## Pedestrian Demand

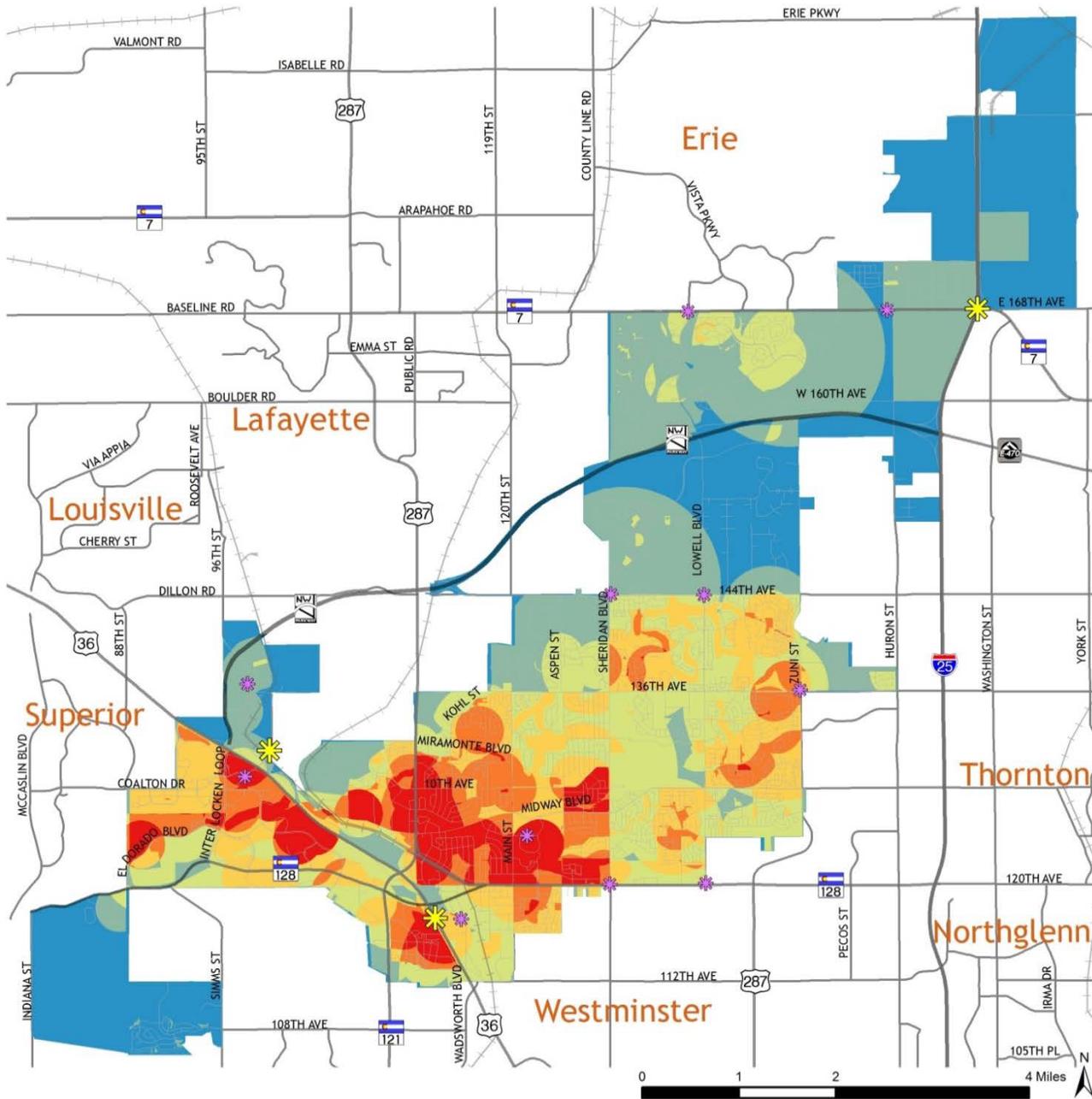
A “Pedestrian Demand Index” was developed to identify currently developed locations in Broomfield that are likely to have “high” and “very high” pedestrian demand.

The Pedestrian Demand Index was developed from inputs of:

- employment density
- population density
- zero vehicle households
- urban activity centers
- parks & open space
- recreation centers
- school zones
- transit density

The resulting subjective score of each factor was summarized resulting in a heat map depiction of countywide pedestrian demand as shown on **Figure 21**.





**LEGEND**

- Low Pedestrian Demand
- Low to Moderate Pedestrian Demand
- Moderate Pedestrian Demand
- Moderate to High Pedestrian Demand
- High Pedestrian Demand
- Very High Pedestrian Demand
- Mobility Hub
- Micro-Mobility Hub
- Highways
- Streets
- Railroad

Pedestrian Demand developed from inputs of job density, population density, zero vehicle households, urban activity centers, parks & open space, school zones, and transit density. The resulting combined subjective score was summarized through overlay of each input.

Figure 21. Pedestrian Demand Index



## Short Trip Analysis

The project team developed a tool using the DRCOG regional travel model to identify travel paths with a high portion of short-distance trips. The propensity to consider riding a bicycle may be expected for trips less than three miles, and trips less than one mile for walking trips.

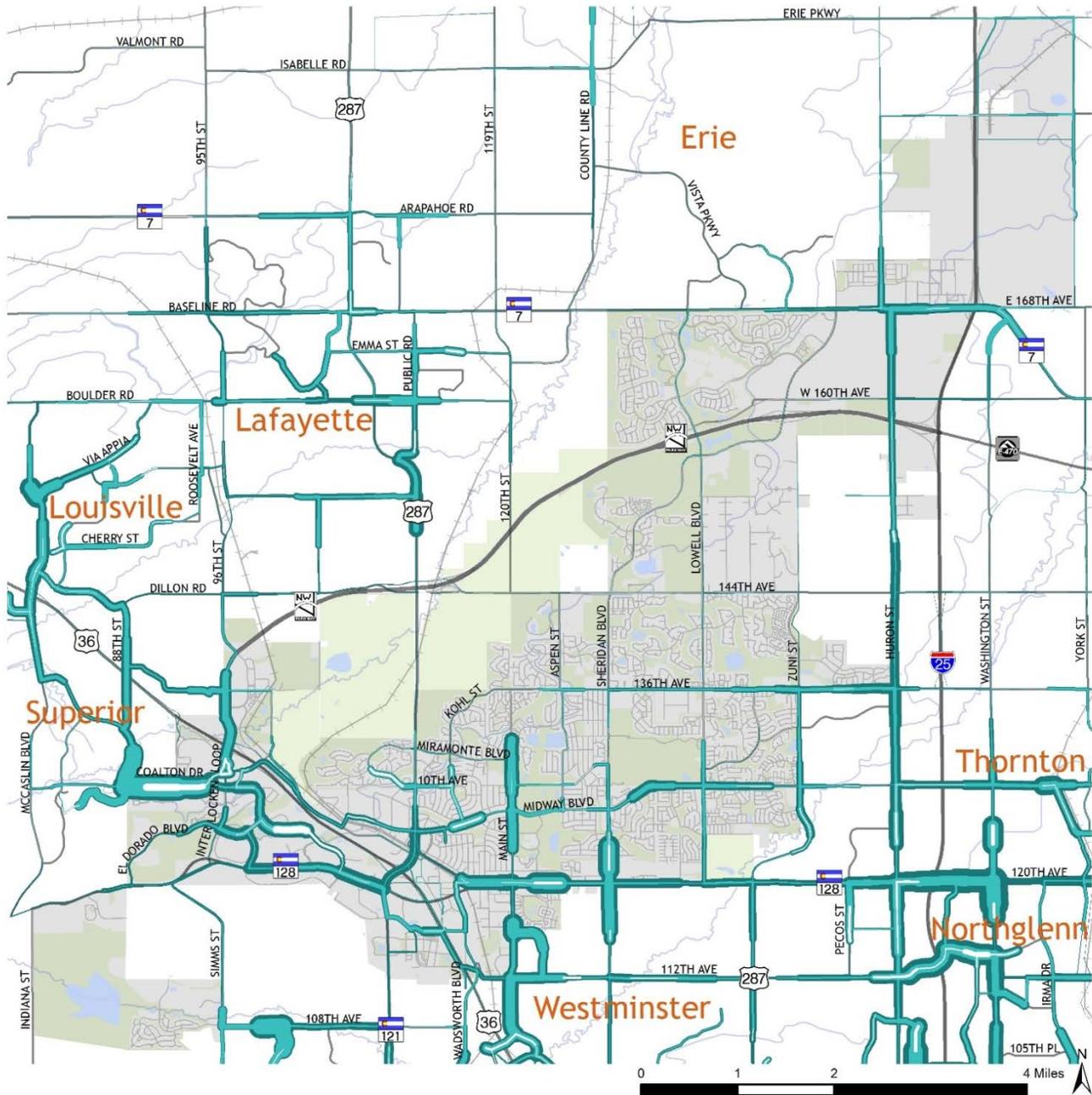
This analysis can be paired with the map of the existing bicycle and pedestrian network to identify areas with the greatest potential to add facilities to accommodate potential biking and walking trips. Many of the arterial streets have constraints and may have limited appeal to bicyclists and pedestrians, but providing facilities along parallel streets could vastly benefit the bicycle and pedestrian network, though routes are often not as direct.

**Figure 22** shows the results of the vehicular short trip analysis using DRCOG’s 2015 base year model.

**Figure 23** shows the 2040 vehicular short trip analysis.

The dark teal color represents trips that are 3 miles or shorter, the light teal represents trips that are 2 miles or shorter, and the white represents trips that are 1 mile or shorter. The thicker the width of the band, the higher the volume of the short-distance trips.

The short trip results in Arista are an anomaly – since Arista already has high numbers of biking, walking, and transit trips, the short trips (vehicular) do not show up as being particularly high.



**LEGEND**

- Highways
- Streets
- ~ Creeks, Ditches, and Canals
- Waterbody
- Open Lands
- City and County of Broomfield

**2015 Vehicular Trip Demand within 1, 2, and 3 Miles**

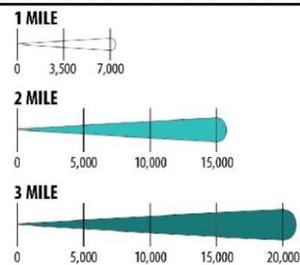
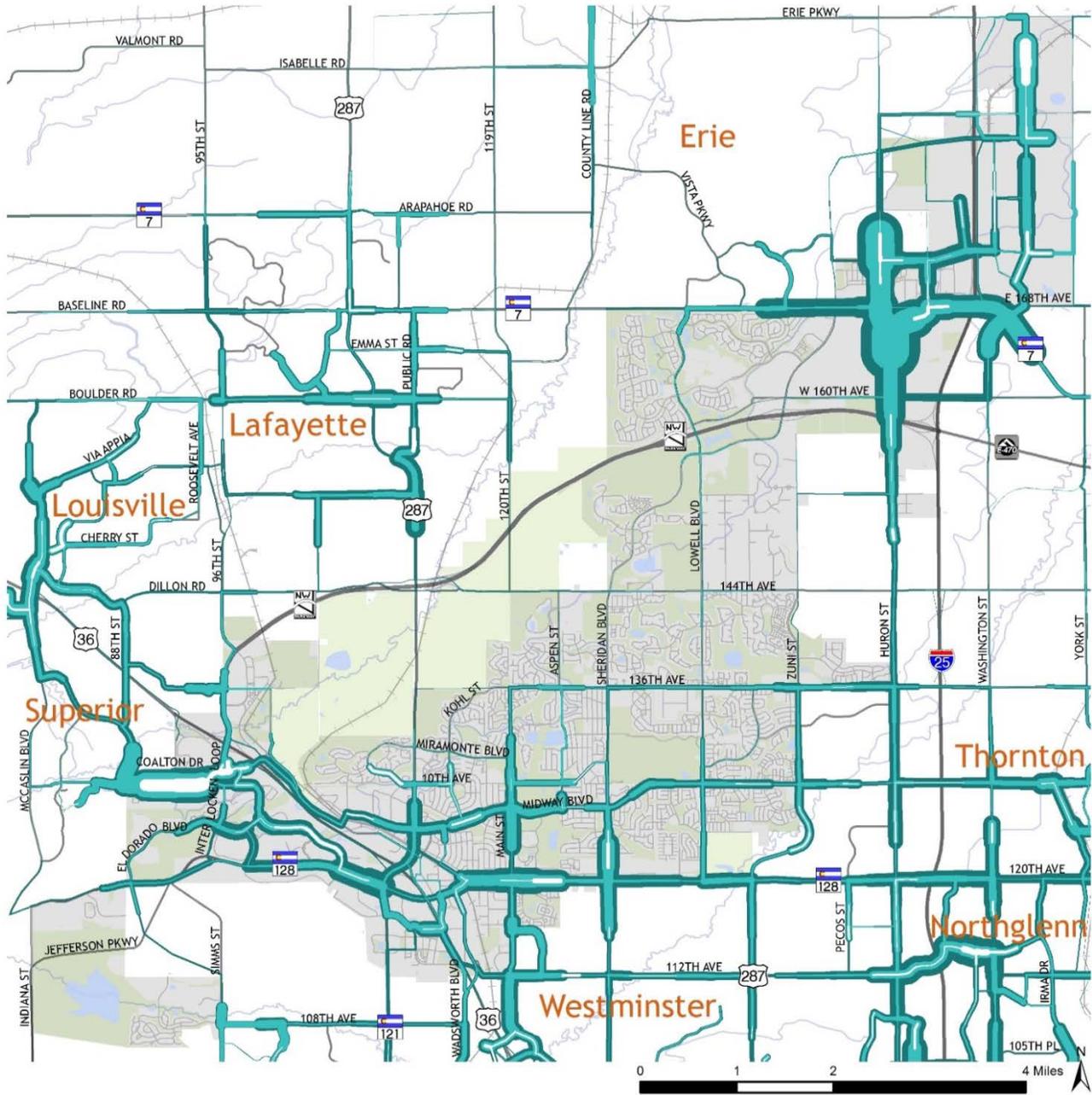


Figure 22. 2015 Short Trip Analysis



### LEGEND

- Highways
- Streets
- Creeks, Ditches, and Canals
- Waterbody
- Open Lands
- City and County of Broomfield

### 2040 Vehicular Trip Demand within 1, 2, and 3 Miles

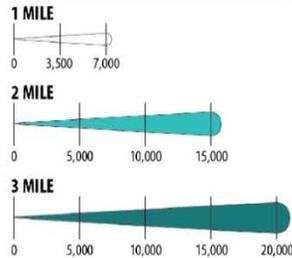


Figure 23. 2040 Short Trip Analysis



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## Collision History

Given the increased vulnerability of bicyclists and pedestrians compared to motor vehicle occupants, safety is of paramount concern when evaluating and planning improvements for an active transportation network. Five years of bicycle and pedestrian crash data in Broomfield were collected and mapped on **Figure 24**. Because these data only include reported collisions involving a motor vehicle, crashes that either were not reported or only involved bicyclists and pedestrians are not accounted for.

During the five year period of 2012 through 2016 there were:

- 80 vehicular collisions involving a bicyclist or pedestrian
- 50 of these crashes resulted in injury to the bicyclist or pedestrian
- 3 of the crashes resulted in pedestrian fatalities

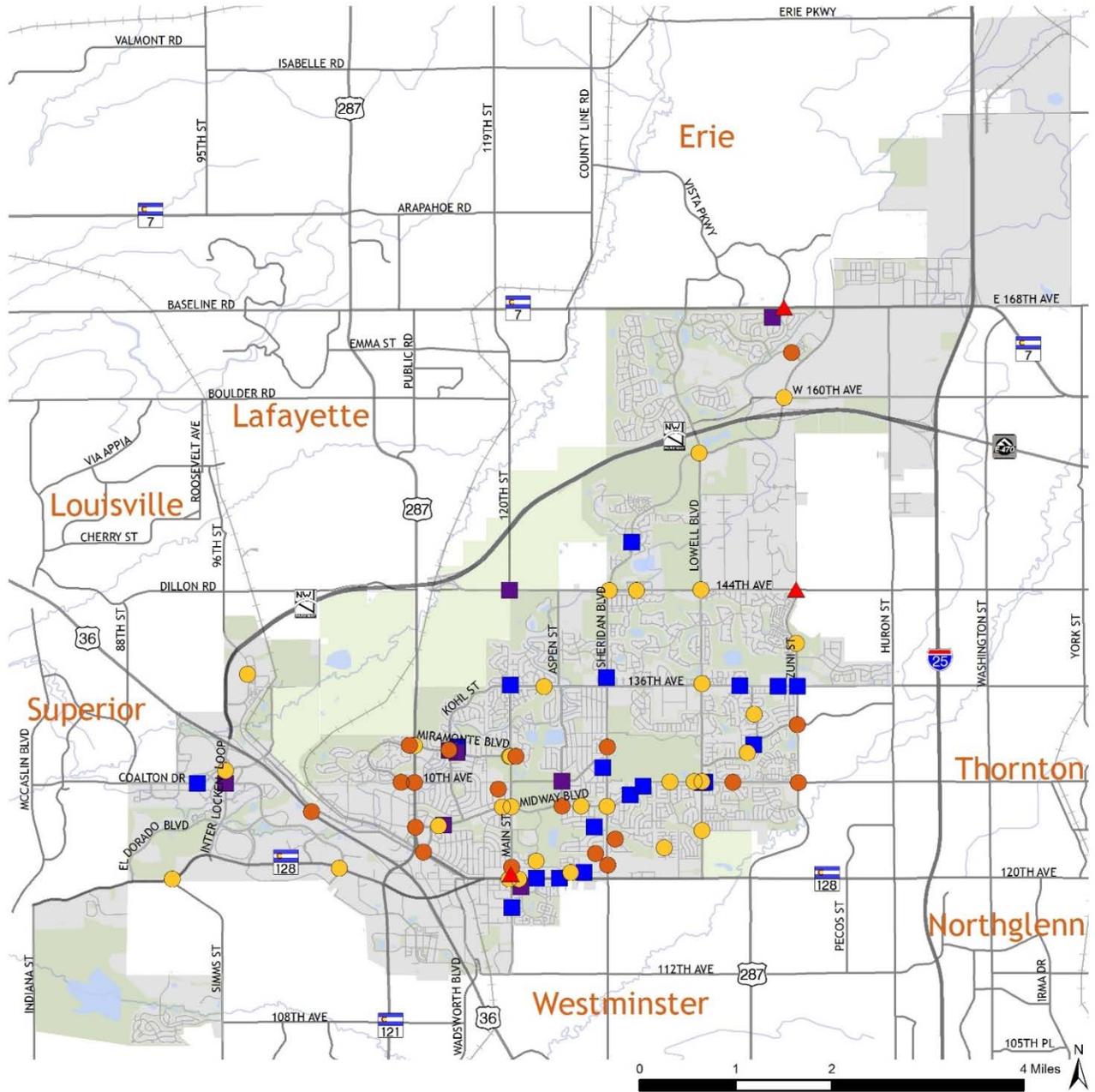
It can be noted that the State of Colorado does not record the severity of injuries sustained, such as a range from complaint of pain, visible injury and

serious injury. All injury types are recorded as the same.

A more detailed breakdown analysis of reported pedestrian and bicyclist involved vehicular collisions for the most recent five year period from 2013-2017. In this five year period there was 1 pedestrian fatality, 26 bicyclist injuries, 24 pedestrian injuries, and 29 property damage only collisions, for a total of 69 collisions.

**Figure 25** shows pedestrian involved collisions by year and **Figure 26** shows a summary of total pedestrian involved collisions by type.

**Figure 27** shows bicycle involved collisions by year and **Figure 28** Shows a summary of total bicycle involved collisions by type.



**LEGEND**

**Crash Severity (2012-2016)**

- ▲ Fatality Involving Pedestrian (3)
- Injury Involving Pedestrian (19)
- Injury Involving Bicycle (31)
- Property Damage Involving Pedestrian (8)
- Property Damage Involving Bicycle (19)

- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals

- Waterbody
- Open Lands
- City and County of Broomfield

Figure 24. Bicycle and Pedestrian Collision History



### Pedestrian Involved Collisions Reported

2013 - 2017 by Year

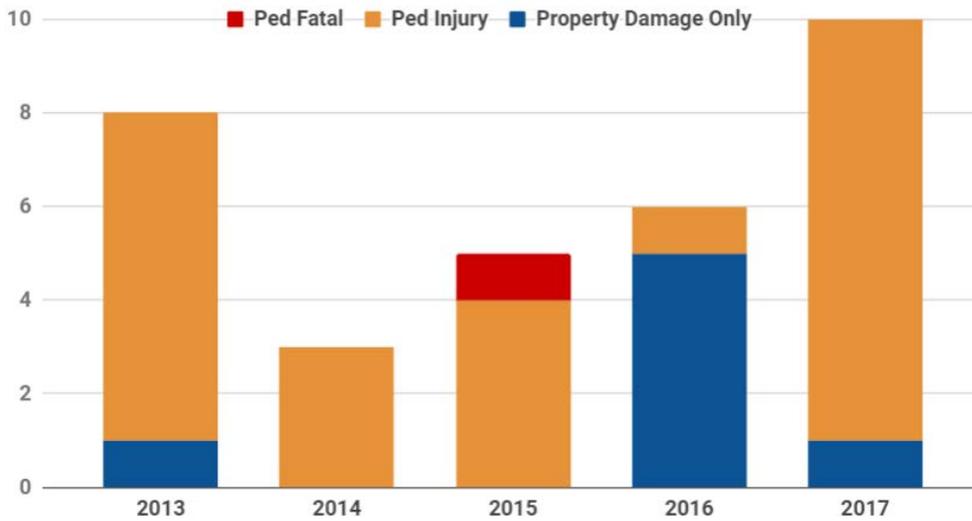


Figure 25. Reported Pedestrian Involved Collisions By Year

### Pedestrian Involved Collisions Reported

2013 - 2017 Summary by Type

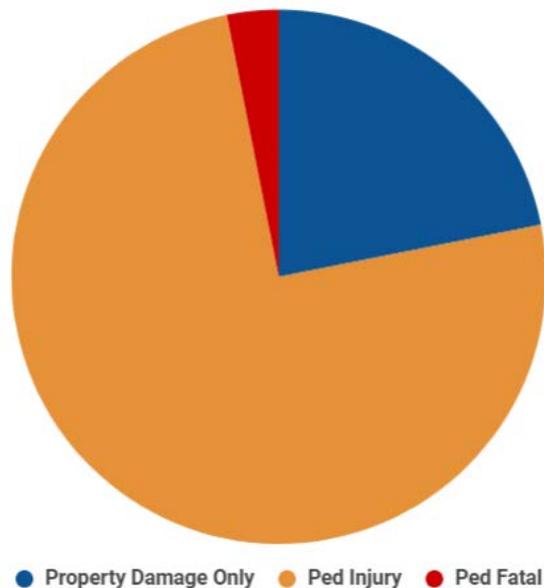


Figure 26. Reported Pedestrian Involved Collisions by Type



### Bicycle Involved Collisions Reported

2013 - 2017 by Year

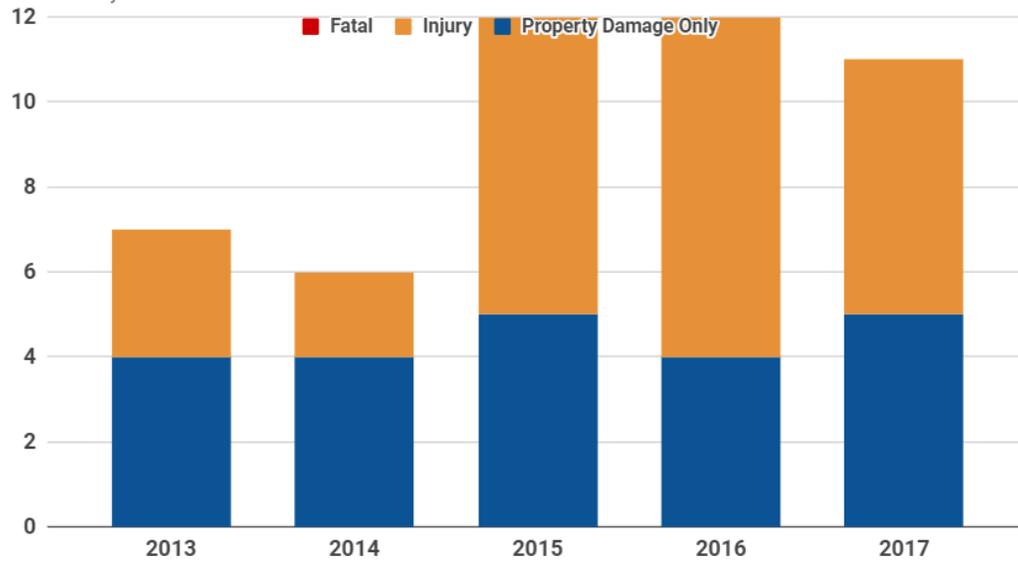


Figure 27. Reported Bicycle Involved Collisions By Year

### Bicycle Involved Collisions Reported

2013 - 2017 Summary by Type

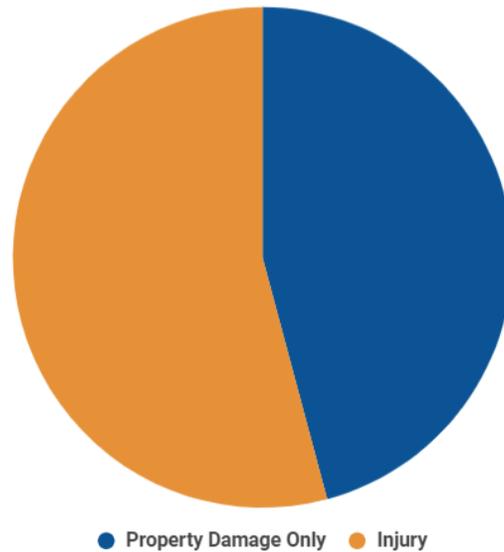


Figure 28. Reported Bicycle Involved Collisions by Type



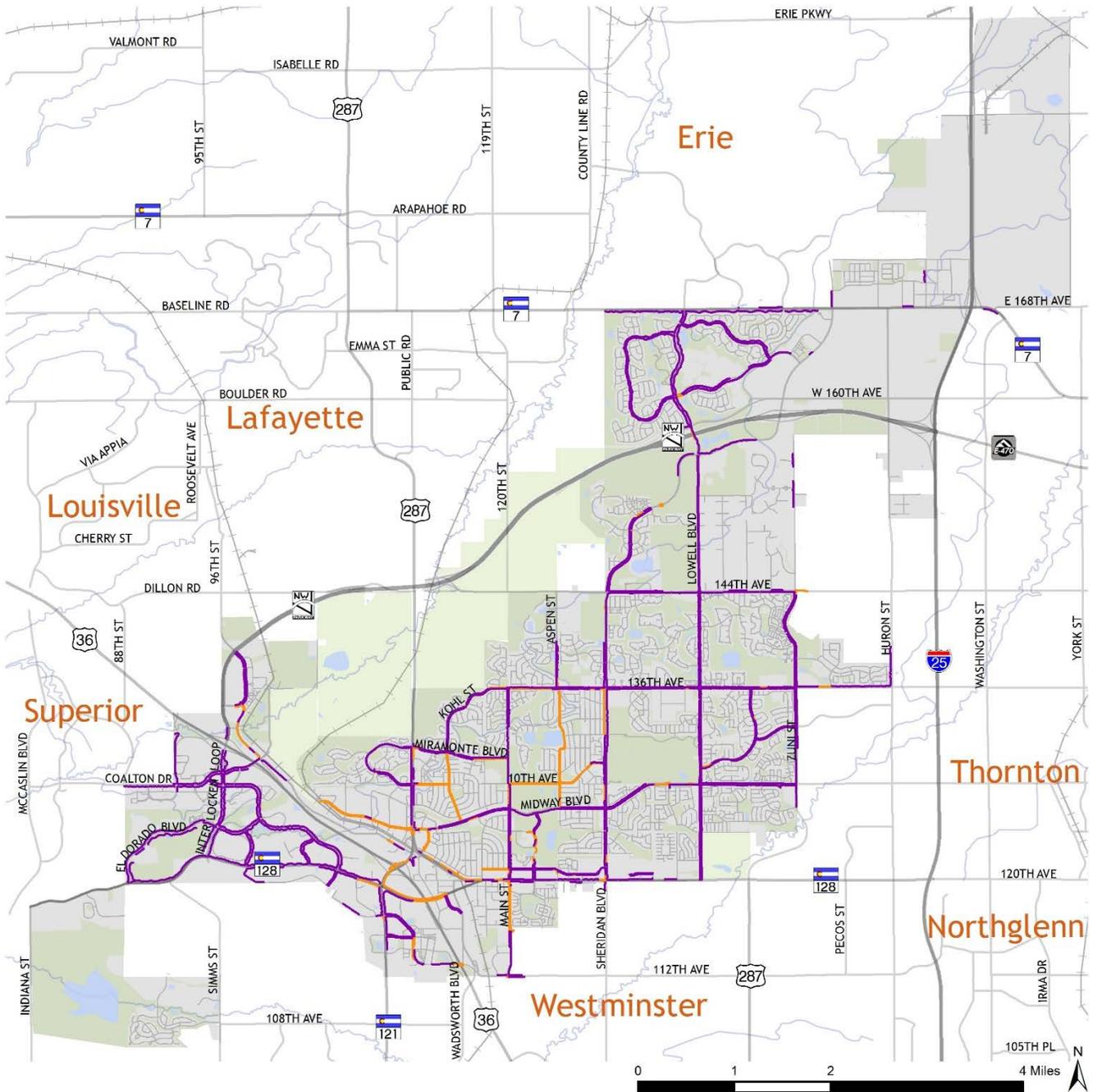
## Sidewalk Inventory

Walking is the most basic form of transportation and is, at some point, a portion of all trips whether they be by auto, bicycle, or transit. A comprehensive inventory of sidewalk conditions was completed; Broomfield now has a comprehensive inventory of key attributes for all sidewalks adjacent to roadways classified as Connector or higher. The sidewalk inventory shown on **Figure 29** includes location and side of the street, sidewalk width, whether the sidewalk is attached or detached to the curb, and the width of the buffer (for detached sidewalks).

The sidewalk inventory is color coded by attached versus detached. Approximately 80 percent of sidewalks on Broomfield’s Connector and Arterial streets are detached from the curb. The remaining 20 percent are attached to the curb—a less desirable condition for pedestrians. The sidewalk inventory was used to identify missing sidewalk segments, which are shown on **Figure 30**.

Also highlighted on the map are the sidewalks in several of the older neighborhoods in Broomfield where the sidewalks along the local streets are substandard. These sidewalks are “Hollywood” style – approximately two feet wide with rolled curb - and do not allow for two people to walk side-by-side on the sidewalk.



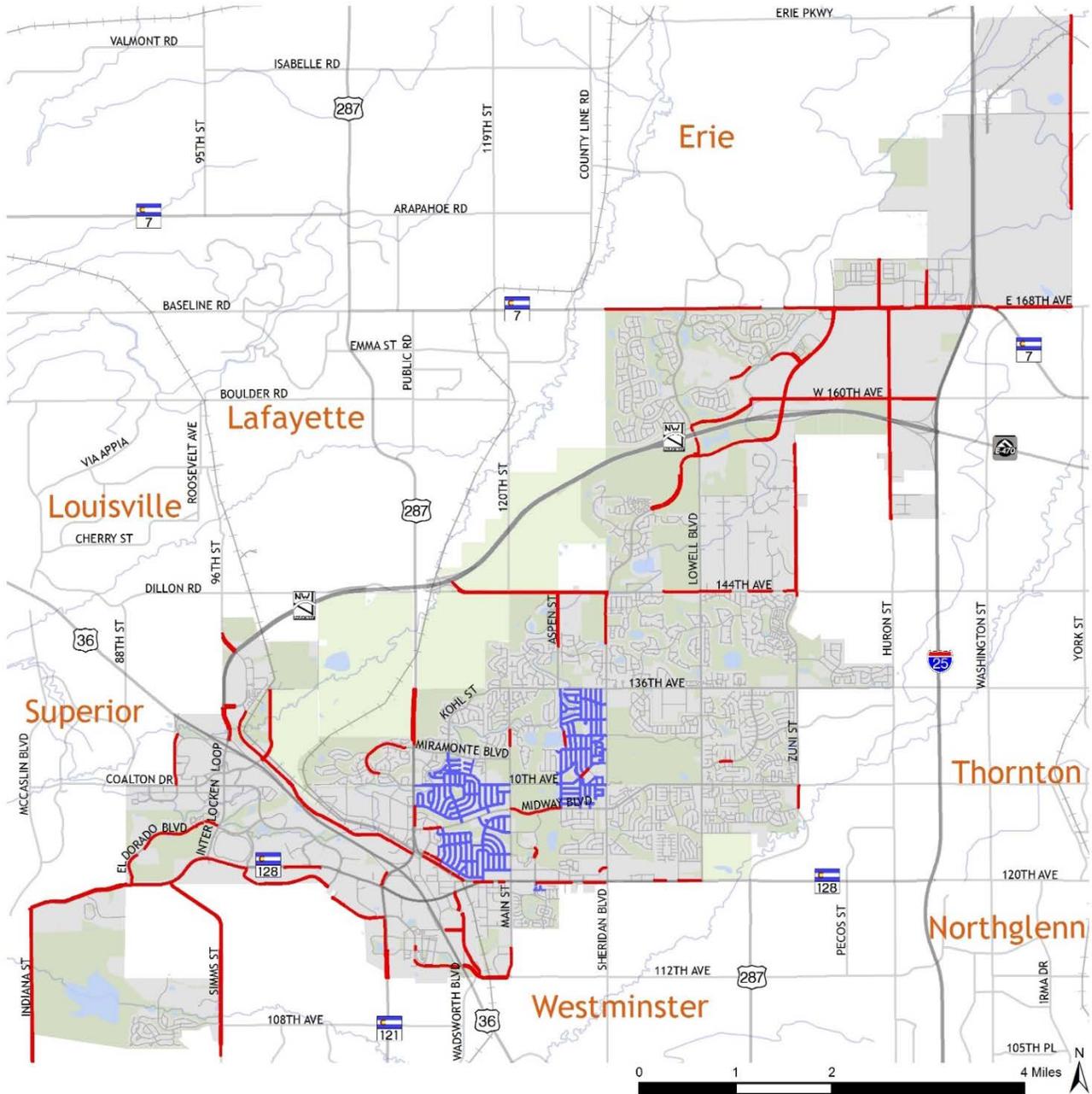


**LEGEND**

- Attached Sidewalk\*
- Detached Sidewalk\*
- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals
- Waterbody
- Open Lands
- City and County of Broomfield

Note: The line width of sidewalks is based on sidewalks existing on one side of street or on both sides of the street. \*Attached versus detached sidewalks shown for functional road classification of connector and above roadways.

Figure 29. Sidewalk Inventory



**LEGEND**

- Missing Sidewalk Segments
- Substandard Sidewalks < 4 feet
- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals
- Waterbody
- Open Lands
- City and County of Broomfield

Note: The line width of missing sidewalk segments is based on sidewalk segments existing on one side of street or on both sides of the street.

Figure 30. Missing & Substandard Sidewalks



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## On-Street Bicycle and Trail Inventory

The current bicycle system in Broomfield includes multiuse paths, on-street bike lanes, and unpaved trails. The community trails, identified in **Figure 31**, are extensive, well used, and highly valued by the community. The trail system includes many grade-separated crossings of major roads, enabling safe and efficient crossings for bicyclists and pedestrians.

**Figure 32** shows that over 70 percent of Broomfield’s arterial street system includes bike lanes providing on-street point A to B opportunities for travel. Broomfield looks for opportunities to expand the on-street network during construction of new roads and when repaving existing roads to create new and improved lanes.

Broomfield’s current street standards include bike lanes for minor and major arterial streets, and connector streets through multifamily residential and commercial areas.

Several sections of bike lanes in Broomfield are substandard – the bike lane width is less than the corresponding street standard. In some locations, a bike lane has been striped in one direction of a street, but not in the other direction. These substandard bike lanes are highlighted on **Figure 33**.



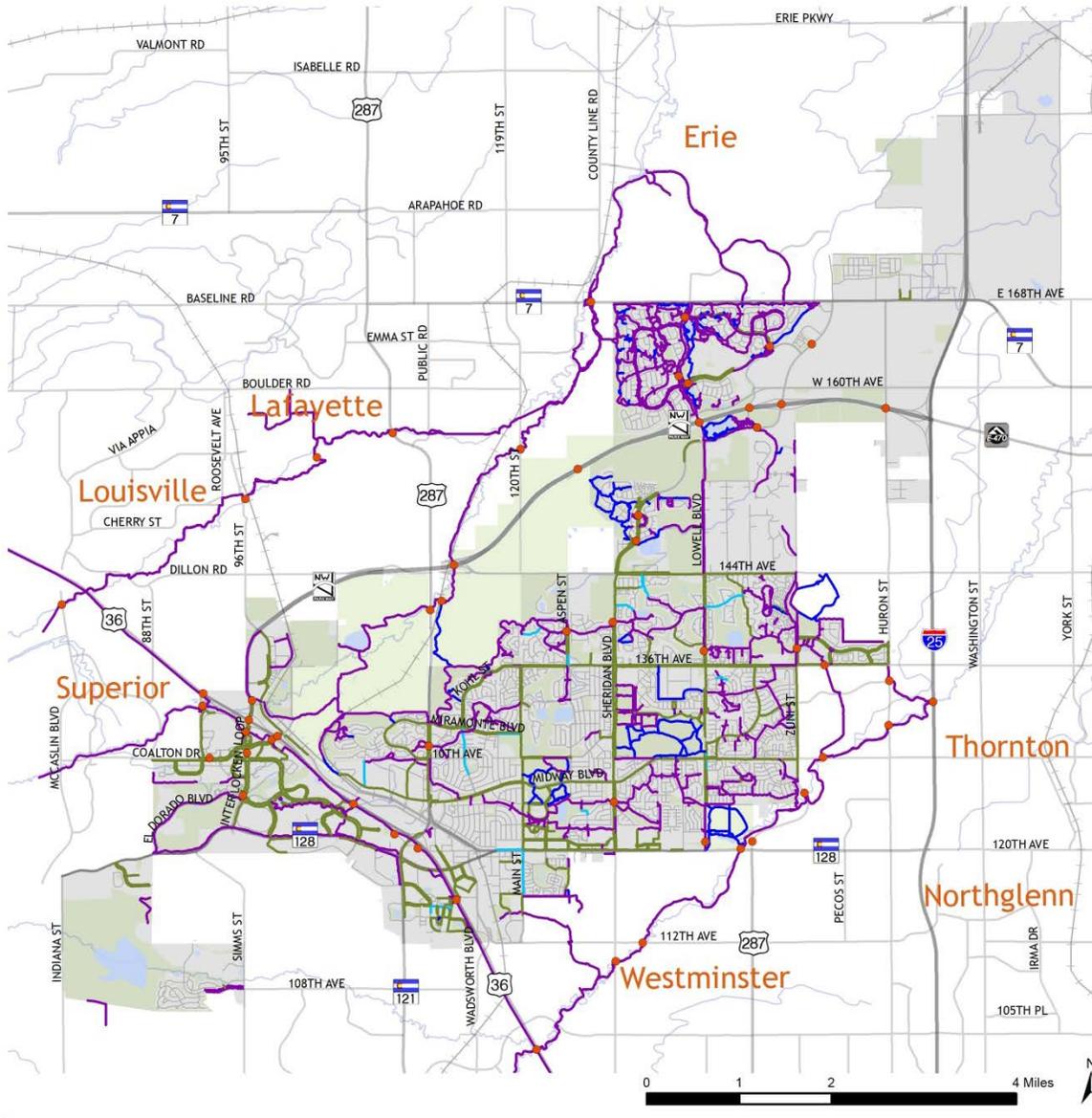
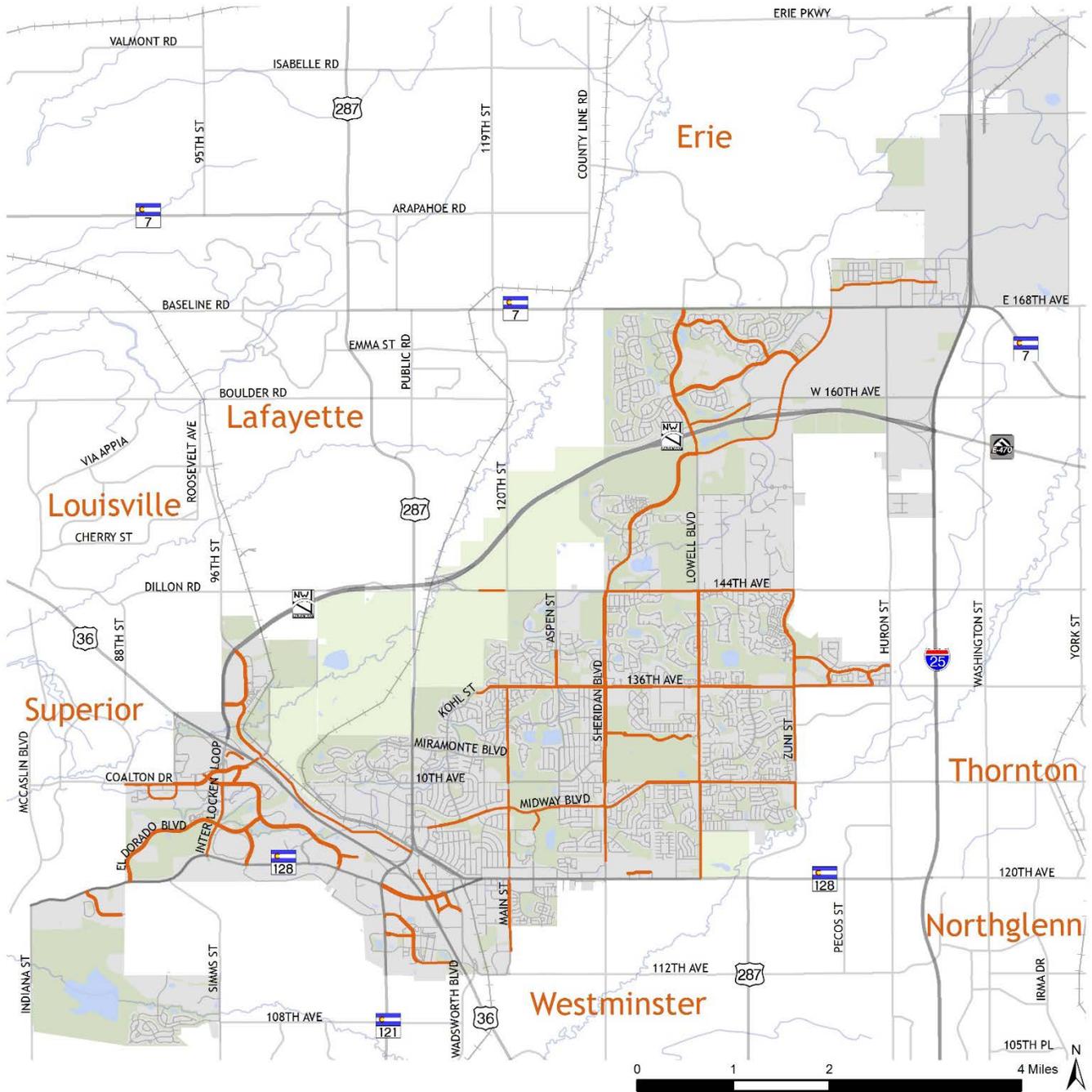


Figure 31. Existing Trails



**LEGEND**

Existing On-street Bike Lane

Highways

Waterbody

Streets

Open Lands

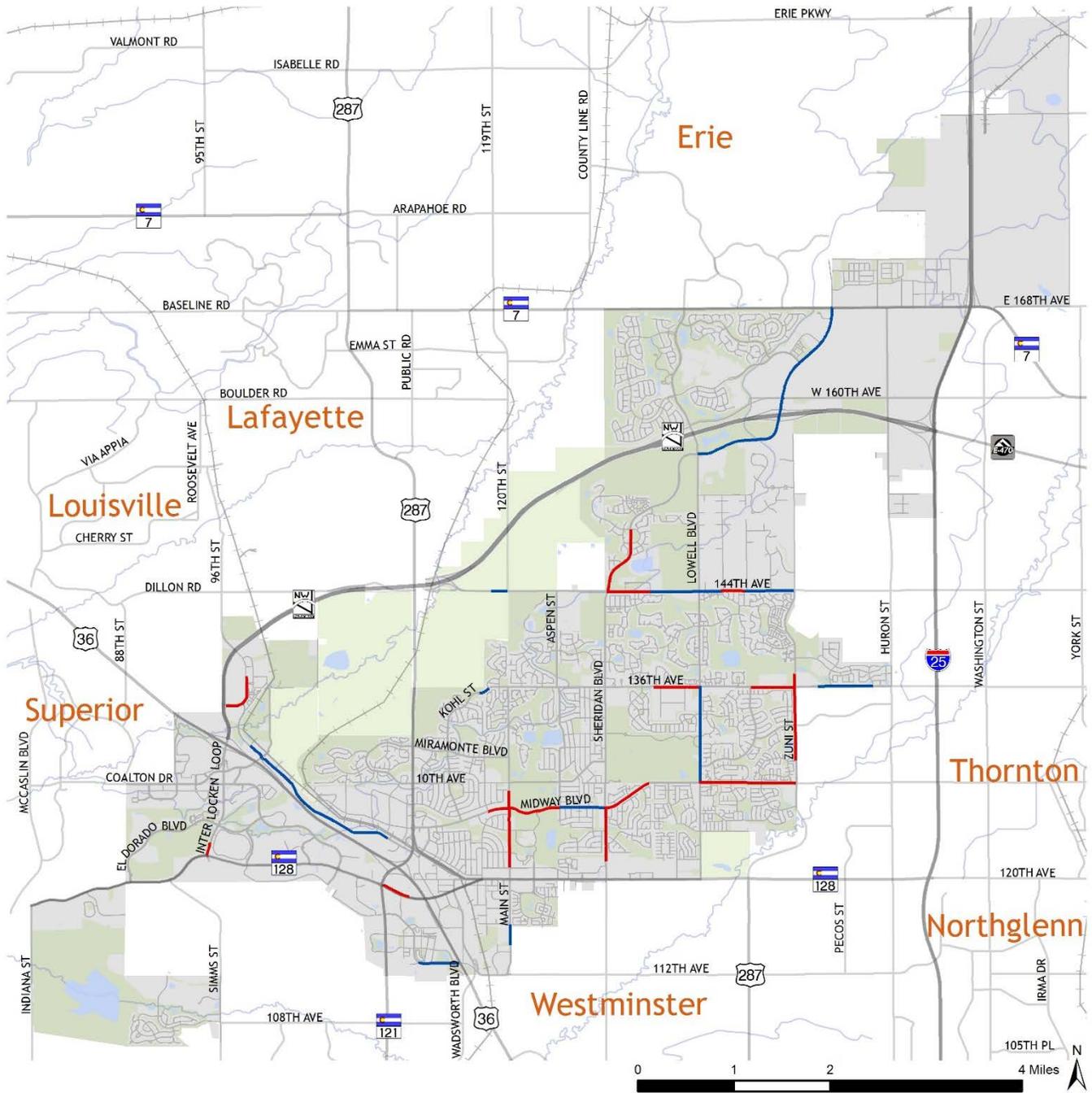
Railroad

City and County of Broomfield

Creeks, Ditches, and Canals

Note: The line width of on-street bike lanes is based on bike lanes existing on one side of street or on both sides of the street.

Figure 32. Existing On-Street Bike Facilities



**LEGEND**

-  Substandard Bike Lane Width
-  Bike Lane On One Side Only

-  Highways
-  Streets
-  Railroad
-  Creeks, Ditches, and Canals

-  Waterbody
-  Open Lands
-  City and County of Broomfield

Note: The line width of substandard bike lanes is based on substandard bike lanes existing on one side of street or on both sides of the street.

Figure 33. Substandard Bike Lanes



## Types of Bicyclists

The general population can be classified into four types of cyclists based on their attitudes towards cycling:

1. "Strong & Fearless"
2. "Enthused & Confident"
3. "Interested but Concerned"
4. "No Way, No How"

The primary factors that decide into which of the four categories an individual falls include comfort level with various bicycle facility types and traffic levels and degree of experience with cycling. While initially developed specifically for Portland, Oregon, recent research applies the notion of attitudes toward cycling at the nationwide level.<sup>1</sup>

Most people who ride bicycles fall into either the "Strong & Fearless" or "Enthused & Confident" categories.

"Strong & Fearless" riders are those who ride regardless of the surrounding conditions. They feel comfortable sharing the road with motor vehicles and represent approximately 4 to 7 percent of the general population.

"Enthused & Confident" riders are comfortable in most conditions but prefer to use designated bicycle facilities rather than mixing with vehicle traffic. About 5 to 9 percent of the population falls into this category.

The largest proportion of the general population, over half, is classified as "Interested but Concerned." These are people who would like to bicycle more but have significant safety concerns and are hesitant to share the road with vehicles. They are not comfortable around high-volume and high-speed traffic. Due to reservations about how safe bicycling is, and despite their desire to do so, many of the people in this category do not bicycle regularly or

think of themselves as "bicyclists," though they may occasionally ride a bicycle at home or on vacation. This is the target population that new facilities should be designed for to encourage new riders. If a bicycle facility is comfortable for the "interested but Concerned" population, it will be comfortable the other categories of bicyclists as well.

### Interested but Concerned

*51-56% of the population*



### Enthused and Confident

*5-9% of population*



### Strong and Fearless

*4-7% of population*



<sup>1</sup> Dill, J. and McNeil, N., Revisiting the Four Types of Cyclists, Transportation Research Board No. 2587, 2016.



The remainder of the population is classified as “No Way, No How” because they are either unable or uninterested in riding a bicycle.

### Level of Traffic Stress (LTS) Analysis

Providing low-stress alternatives to streets with high speeds and traffic volumes is a vital attribute of a bicycle network that attracts a range of ages and abilities including those who are in the “Interested but Concerned” category of the population. With that in mind, the Mineta Transportation Institute developed the bicycle Level of Traffic Stress (LTS) tool to assess the comfort level associated with bicycling on specific on-street facilities. The tool uses roadway characteristics, including traffic speeds and volumes, number of through lanes, and, if applicable, bike lane width, to calculate a grade on a scale of 1 to 4, with each grade corresponding to the level of comfort. The LTS scale has been modified for Broomfield to include a fifth rating – LTS 5. Streets rated LTS 5 are not suitable for biking – these are arterial streets with high traffic volumes and speeds and without bike lanes.

- LTS 1 – Little traffic stress, suitable for most all cyclists, including children
- LTS 2 – Minimal interaction with traffic; suitable for most adult cyclists
- LTS 3 – Exclusive riding zone or shared lane with low speeds; welcome to many current cyclists
- LTS 4 – High traffic stress; only suitable for “strong and fearless” riders
- LTS 5 – Not suitable for biking

The LTS on all streets classified as Connector and higher in Broomfield were analyzed, regardless of whether or not a bicycle facility exists.

**Figure 34** displays the calculated LTS scores for each road. The low-stress bicycle network is the portion of the overall street network with LTS scores of 1 or 2. The low stress routes are comfortable for most all bicyclists, including the “Interested but Concerned” population. Currently, this network of low-stress streets is spread sporadically throughout Broomfield

with minimal continuity. Most of Broomfield’s major and minor arterials (even those with bike lanes) have speeds and/or volumes too high to provide comfortable cycling conditions without improvements,

Because trails are separated from vehicular traffic, Broomfield’s extensive trail network can also be classified as low stress (LTS 1). As shown on **Figure 35** the trail network considerably expands the available low stress bicycling network in Broomfield. Additionally, although not analyzed, the local streets in Broomfield generally carry low traffic volumes with low speeds and can be considered a part of the existing low stress network.

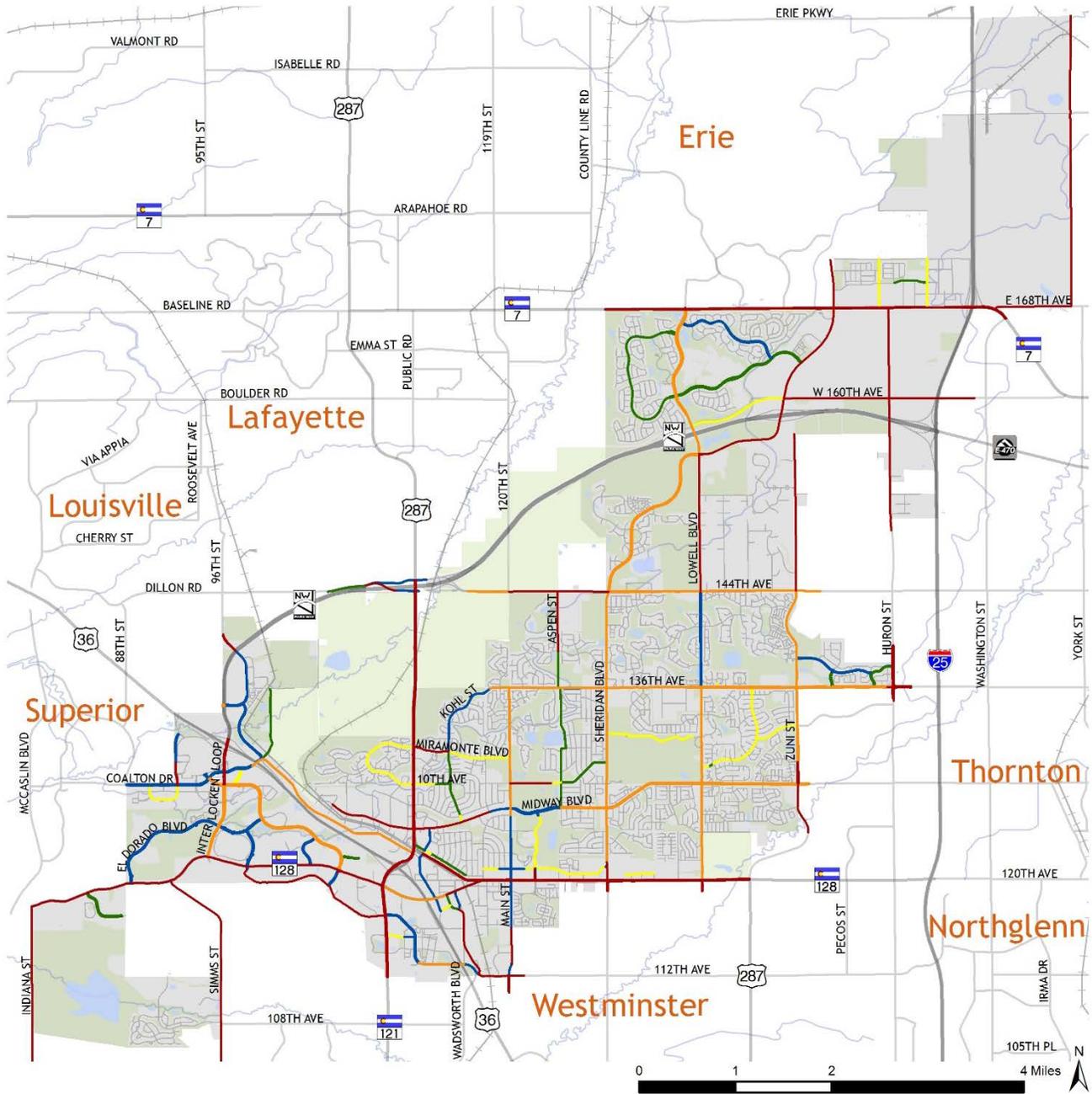
### Shared-use Path Level of Service

Off-street trails are inherently less stressful for non-motorized travel than on-street facilities. However, overcrowding and frequent mixing of different user types can lead to uncomfortable conditions along trails. The Shared-use Path Level of Service (SUPLOS) tool was developed by the Federal Highway Administration as a means for determining when trails should be widened and separation of user types should be provided. Using inputs including trail width and the frequency of encounters between a cyclist and other users, the tool calculates a grade between A (Excellent) and F (Failing). A grade of D indicates a trail that is near capacity and warrants consideration for separation of user types.

The SUPLOS tool was used to assess the US 36 Bikeway in Broomfield. The two primary variables required to conduct this analysis are trail width and directional hourly volumes. The US 36 Bikeway is 12’ wide east of Interlocken Loop, however, the section west of Interlocken Loop, through Frank Varra park, is only 8’ wide. If cycling trips are similar to the data collected at US 36/Parkland access it is estimated that weekend peak hour volumes are approximately 44 users per hour (northbound) and 28 users per hour (southbound) resulted in a SUPLOS grade of B for both directions of the US 36 Bikeway east of Interlocken Loop, and a grade of C for both directions west of Interlocken Loop. As activity



increases on the US 36 Bikeway the narrow section west of Interlocken Loop through Frank Varra Park needs to be widened to safely accommodate the mix of different trail users with varied skills and abilities.



**LEGEND**

Level of Traffic Stress (LTS)

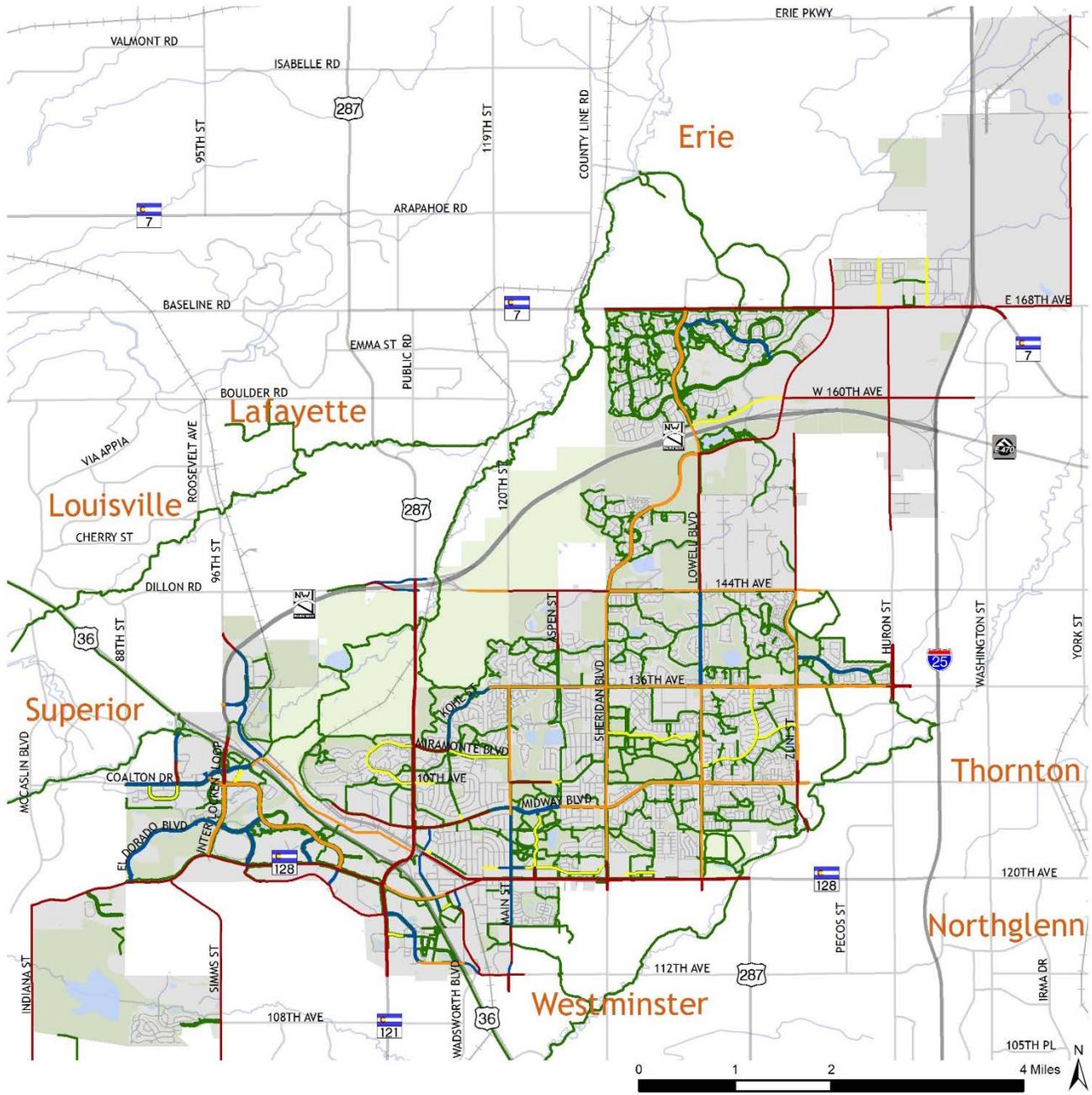
- LTS 1
- LTS 2
- LTS 3
- LTS 4
- LTS 5

- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals

- Waterbody
- Open Lands
- City and County of Broomfield

Note: The LTS analysis framework assesses, on a scale from 1 to 5, the stress level of cycling on road segments based on factors including road width, traffic speed, and the degree of separation between cyclists and automobiles. LTS 1 indicates a segment with minimal traffic stress that is suitable for almost all cyclists, including children, while LTS 5 indicates a segment with significant traffic stress that is only suitable for experienced and dedicated cyclists.

**Figure 34. Street Network Level of Traffic Stress**



**LEGEND**

Level of Traffic Stress (LTS)

- LTS 1
- LTS 2
- LTS 3
- LTS 4
- LTS 5

- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals

- Waterbody
- Open Lands
- City and County of Broomfield

Note: The LTS analysis framework assesses, on a scale from 1 to 5, the stress level of cycling on road segments based on factors including road width, traffic speed, and the degree of separation between cyclists and automobiles. LTS 1 indicates a segment with minimal traffic stress that is suitable for almost all cyclists, including children, while LTS 5 indicates a segment with significant traffic stress that is only suitable for experienced and dedicated cyclists.

**Figure 35. Street Network + Trails Level of Traffic Stress**



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## 2. Bike and Trail Network

### Network Development Process

Achieving the bicycle and pedestrian related goals established in Broomfield's Comprehensive Plan requires the development of a connected bike and trail network. A range of guiding factors were considered to identify a tiered network of on-street bike and trail facilities.

Incorporation of previously proposed facilities, including identified Capital Projects

Consideration of public input

Focus on low-stress facilities and parallel routes to busy streets

Emphasis on providing connections to schools, transit, and trail system

Spacing of roughly one-half mile between facilities

### Building from Previous Plans

As a starting point for developing recommendations to enhance Broomfield's bicycle network, existing facilities within the County and previously proposed facilities from other plans (e.g., Broomfield's Transportation Plan and the Open Space, Parks, Recreation and Trail Master Plan and the 2017 5-Year Capital Improvement Program Plan) were compiled and incorporated in the network routes as appropriate.

The Broomfield Transportation Master Plan calls for the network to be:

- Multimodal
- Well-connected
- Well-maintained
- Safe
- Accommodate people of all ages and abilities

- Reduce dependency on the single occupant vehicle
- Support economic development

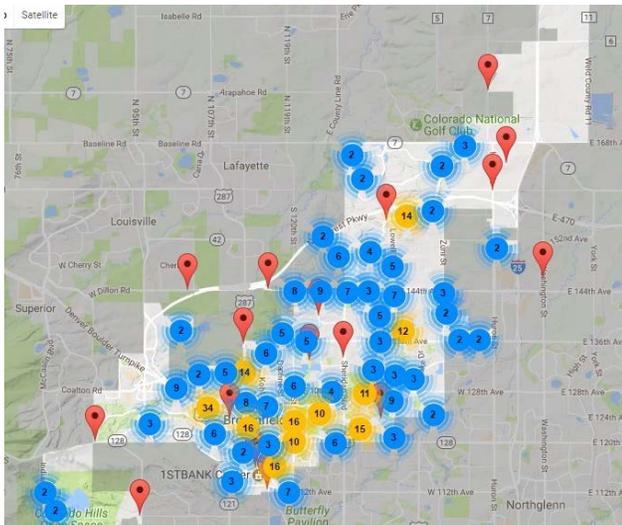
With these factors in mind, in order to strive to achieve the vision the active transportation network should focus on building attractive, low-stress facilities that enable our residents, employees and visitors to walk and bicycle to key community destinations for utilitarian trips, including access to transit, as well as for recreational trips, enjoyment and health.

### Public Input

Another important factor of network development was public input. The survey results helped to inform the overall philosophy of the network development: a focus on improving connectivity and avoiding high traffic areas.

Location-specific comments from the online public outreach were helpful in identifying areas in Broomfield with inadequate bicycle access or significant safety issues. Several locations drew a particularly high degree of attention from the public. Multiple facility additions and upgrades were proposed in each of these areas to provide a more comfortable cycling experience and to connect them to the rest of the network. Locations with the highest frequency of comments included:

- Access to/from the US 36 Bikeway & Bus Rapid Transit stations
- Access to/within Civic Center
- Access to/within County Commons
- Midway / Hoyt Street railroad overpass
- Industrial Lane
- Midway Boulevard
- Dillon Road
- Sheridan Parkway
- Nickel & Commerce Streets
- 120<sup>th</sup> Avenue / US 287



Screen capture of online comments

### A Low Stress Network

The overarching focus of the development of the network was providing a low level of stress because an effective bicycle network should provide comfortable options to as many people as possible. Building a low-stress network is also consistent with Broomfield Transportation Master Plan policy and the public input received to create a connected network that avoids high traffic areas and roads.

The best opportunity to attract new bicyclists and for current bicyclists to ride more often is to provide low stress bikeways that are comfortable and accessible to the “Interested but Concerned” population. The Bicycle Level of Traffic Stress analysis was used to identify routes targeted for additions and upgrades to Broomfield’s bicycle network that would provide increased access for people who are interested in riding a bicycle but concerned with a low- stress route option. Many of the proposed low-stress routes run parallel to major arterials such as 120<sup>th</sup> Avenue, US 287, and Sheridan Road along slower, less busy streets to avoid the high stress environment of high speed, high traffic streets. This is the base network identified that will be updated as necessary.

Lowest stress bicycle facilities include off street trails, paths, low volume neighborhood streets and bikeways. On collectors or arterials, separated

bikeways, also known as protected bikeways, provide the highest level of comfort. Where separate facilities are not feasible due to physical or financial constraints, on-street bike lanes can be enhanced with buffered bike lanes.

**Chapter 4** Bicycle Improvement Toolbox outlines various bicycle treatment solutions based on context and opportunities that the right of way provides. A key component when selecting roadway treatments should be the consideration of how the facility is maintained through intersections for safety and comfort.

For roadway crossings, grade separation provides the highest level of comfort, safety and efficiency (reduced delay) at major crossings and other physical barriers such as highways, railroads and waterways. The Bikeway along US 36 was constructed with minimal at-grade crossings as a “highway for cyclists” in Broomfield all crossing are grade separated.

Grade separations are ideal, but also the most expensive solution. Crossing treatment solutions for intersections and mid-block where grade separation is not feasible are outlined in both the pedestrian and bicycle toolboxes.





## A Connected Network

Connectivity, both between bicycle facilities and to important destinations, is a vital component of a bicycle network. Disjointed and inconsistent facilities interrupted by high stress streets and crossings make it difficult for cyclists to identify comfortable routes, reducing the likelihood they will choose to bike. Due to the crucial nature of continuity, ensuring that no existing or proposed facilities led to dead-ends or left cyclists stranded on high-stress roads was an important consideration during network development. Providing low-stress connections to destinations commonly accessed by bicycle, notably schools and transit stations, was also emphasized. Enhancing connectivity between the bike and trail networks was a primary focus as well.

## Spacing

One of the challenges of developing a comfortable bicycle network is providing direct connections to locations of interest while also avoiding high-stress roads. If people must travel significantly out of their way by bike to stay on low-stress facilities, they will be less inclined to choose cycling as a mode. With this in mind, a maximum spacing of approximately one-half mile between parallel low-stress facilities was used as a general rule during network development



## Recommended Network

### Major Trail Corridors

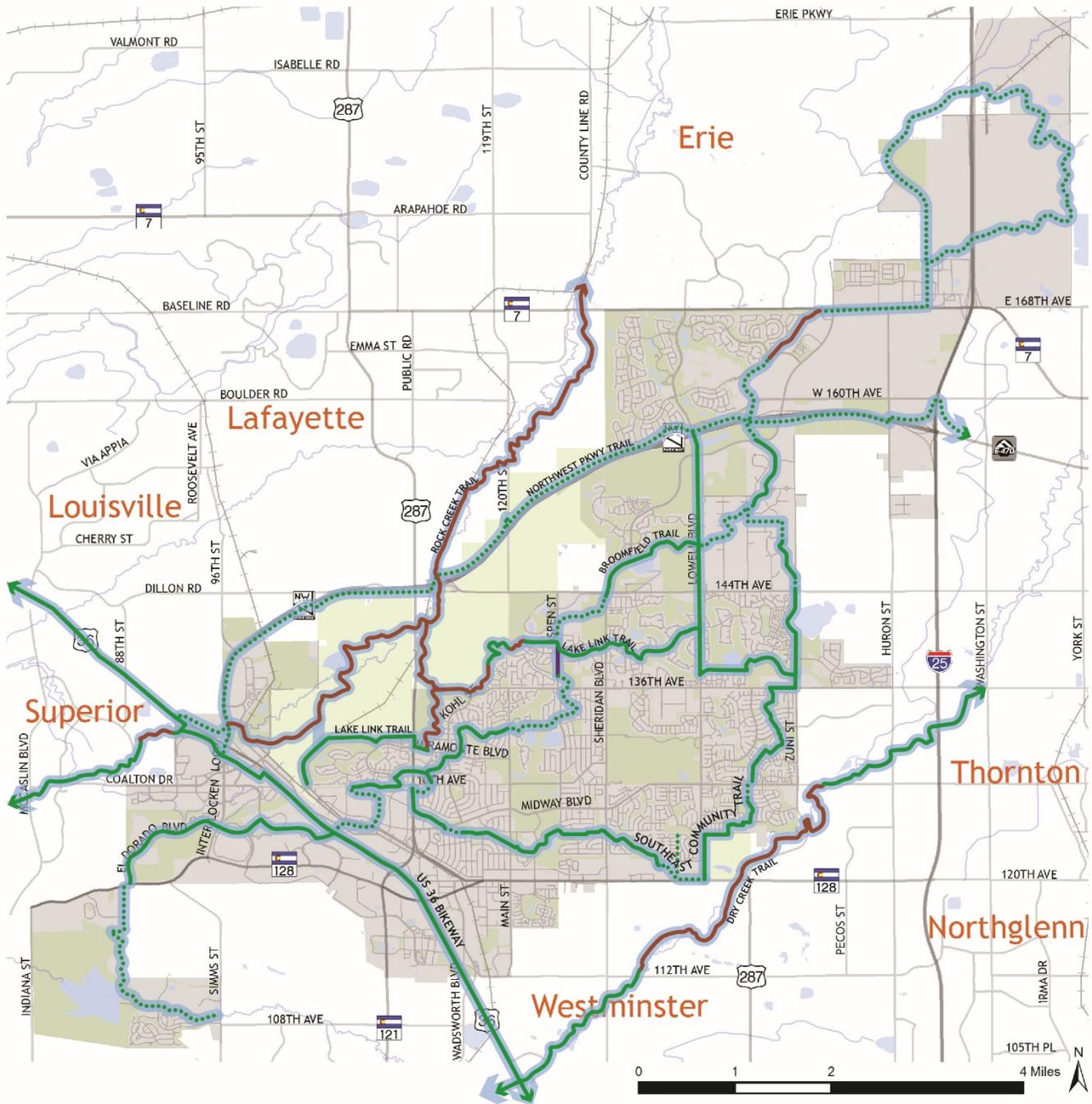
Broomfield has an extensive trail network in place, and the trails provide a low stress experience for bicyclists and pedestrians to travel for recreational and utilitarian purposes. The Major Trail Corridors, as shown on **Figure 36**, will serve as the first tier of the bike network in Broomfield. The Major Trail Corridors includes:

- The **Broomfield Trail**, which ultimately will provide connections from the southwestern to northeastern areas of Broomfield. The alignment follows the community ditch corridor and offers scenic and wildlife viewing opportunities. Access to major shopping centers, employment centers, schools, city hall, parks, recreation centers, and open space are provided along the route.
- The **Lake Link Trail**, which connects water features throughout Broomfield.
- The **Southeast Community Loop Trail**, which connects the Civic Center to the southwestern edge of Broomfield and to the new neighborhoods to the north.
- The **US 36 Bikeway** which extends from Boulder to Westminster, providing a regional “highway for cyclists” parallel to U.S. Highway 36.
- The **Rock Creek Trail** which extends in a southwest to northeast direction along the western edge of Broomfield.
- The **Dry Creek Trail** which also extends southwest to northeast, and skirts the southern edge of Broomfield.
- The future **Northwest Parkway Trail** which will parallel the tollway and will eventually connect to the C-470/E-470 Trail around the Denver metropolitan area.

While much of the Major Trail Corridors exist, there are several sections that need to be constructed to complete the network. While there are many additional trails that exist and that are planned in Broomfield, these trails provide a high level of continuity and allow for longer-distance biking. Another major regional trail is planned along State Highway 7, with a vision to connect Boulder to Brighton, as well as numerous trails and connections in the north area of Broomfield . These major trail networks should also be coordinated with neighboring cities and counties for continuity across the metro area.

Designs of new trail connections should take into consideration appropriate widths for use by a variety of users, including pedestrians of all ages and abilities, including mobility devices and different bicycle devices as described in **Chapter 4 Rider Operating Parameters and Bicycle Types** to increase comfort and safety for all. Standards and specifications should be reviewed and updated accordingly.





**LEGEND**

- Existing
- ..... Proposed
- Multi Use Path (Hard Surface)
- Trail (Soft Surface)
- On-Street Bike
- Major Trail Corridor

Figure 36. Major Trail Corridors



## Low Stress Network

The next tier of the bike network is the Low Stress Network. **Figure 37** shows the low stress routes in addition to the Major Trail Corridors.

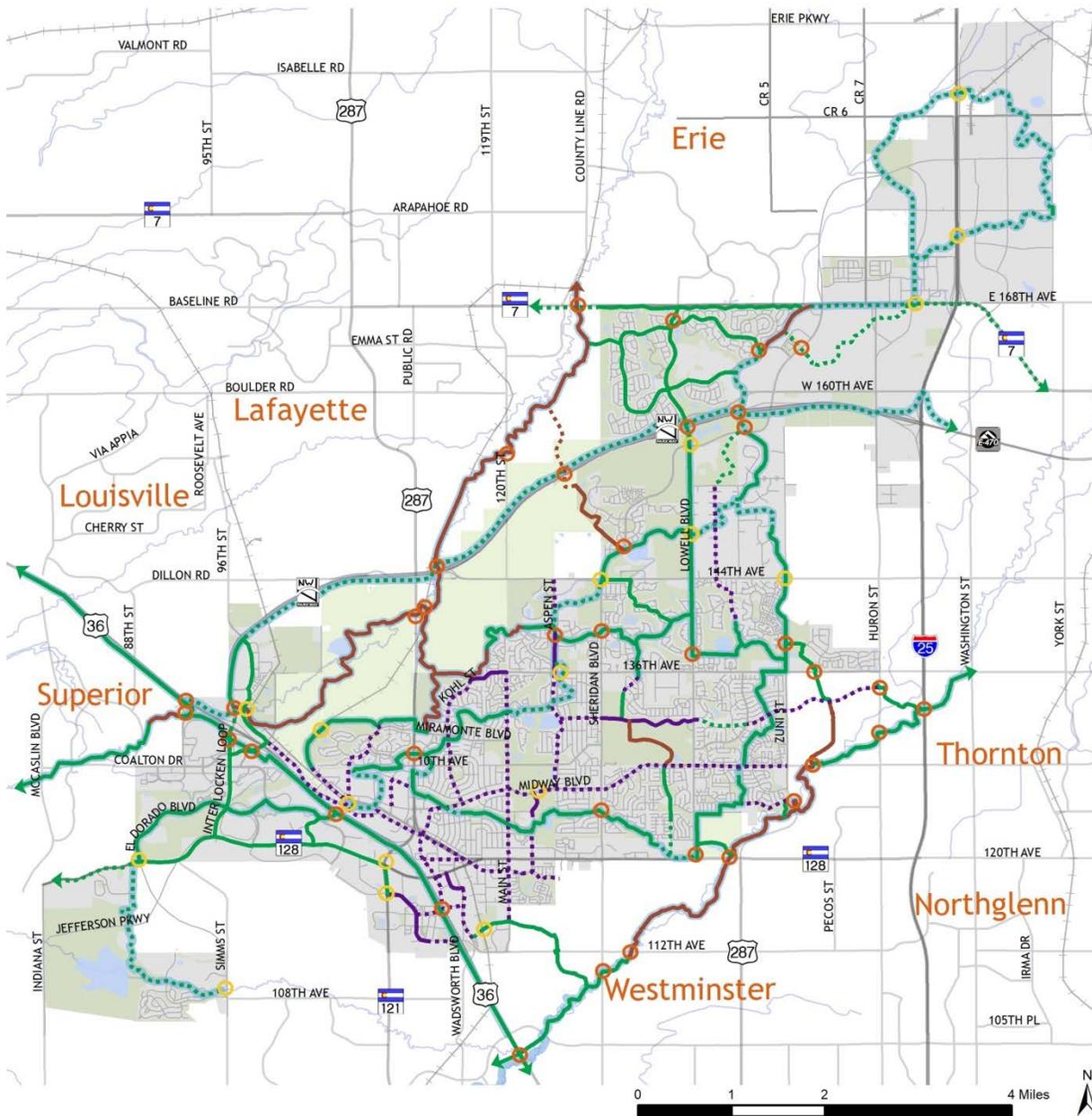
The Low Stress Network is composed of on-street and trail facilities that complement the Major Trail Corridors. Much of the low stress network exists; however, bicyclists may not be aware of these low-stress options to connect them to their destinations and/or to the Major Trail Corridors.

There remain some trail segments that need to be constructed on this network, and several of the on-street routes will require striping bike lanes and/or pavement markings to designate them as shared roadways or signed neighborhood bicycle routes. Alternatively, where feasible and appropriate for street context, off-street or protected facilities should be considered to provide a higher level of comfort. Wayfinding will help make this network more navigable and apparent to locals and visitors.

The proposed low stress network of on-street segments is a starting point for Broomfield. As opportunities arise each neighborhood should be assessed for identification and evaluated for its connectivity to the overall network and appropriate treatments available in the Pedestrian and Bicycle Toolboxes to promote walking and bicycling. This network will be updated over time.

Broomfield is fortunate to have many grade-separated bicycle and pedestrian crossings of major arterials and State/US Highways, enabling safe crossings with significant time savings for trail users. The Low Stress Network is designed to take advantage of the existing underpasses, and also identifies locations for future grade-separated crossings to further reduce conflicts and delays at major street crossings.





**LEGEND**

- Existing
- ..... Proposed
- Multi Use Path (Hard Surface)
- Trail (Soft Surface)
- On-Street Bike
- Major Trail Corridor
- Existing Grade-Separated Crossing
- Proposed Grade-Separated Crossing

Note: This is a living map document and will be updated periodically.

Figure 37. Low Stress Network



### Arterial Bike Lane Network

The third tier of the bike network is the Arterial Bike Lane Network. Over 70 percent of Broomfield’s arterial street system includes bike lanes providing direct point A to B opportunities for bicycle travel, particularly for the “Strong and Fearless” and many “Enthusied and Confident” riders who are comfortable riding alongside traffic.

The Arterial Bike Lane Network, is shown on **Figure 38**. The arterial bike lane network needs to be evaluated for opportunities and strategies to widen bicycle lanes, provide buffered striping and enhance with appropriate intersection treatments where feasible to further increase comfort.

Suggested strategies to improve the arterial bike lane network include prioritizing the arterial network for bicycles, developing the ideal striping alignments and intersection treatments. The improved facilities could be implemented with the annual pavement maintenance opportunities (with additional budget provided) and/or as a separate Capital Improvement Project to remove striping on segments or entire corridors and replacing with improved striping. The Capital Improvement Project route allows for the process to include the thoughtful evaluation of appropriate markings and treatments identified in the Bicycle Toolbox. Once the new striping and markings are complete, it will be renewed on a regular basis with the annual striping & markings maintenance program.



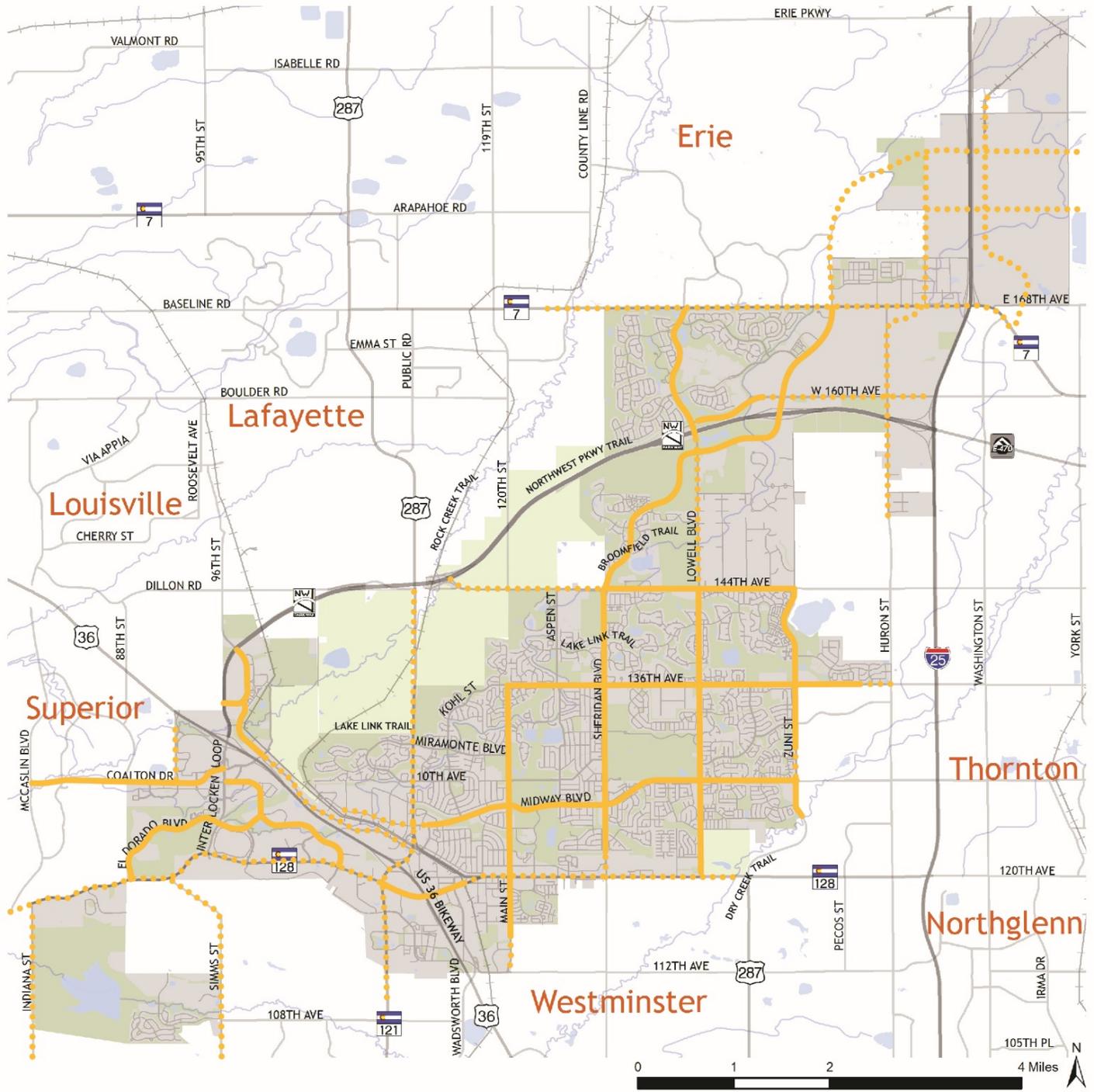
Buffered Bike Lane Example



Cyclist in Broomfield



Burrard Street, Vancouver, BC



**LEGEND**

- Existing Arterial Bike Lane Network
- ..... Proposed Arterial Bike Lane Network

Figure 38. Arterial Bike Lane Network



## 3. Pedestrian Improvement Toolbox

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### Land Use Typology Framework

The built environment is an important consideration when determining needed/appropriate pedestrian infrastructure improvements for a given location. To help inform solutions that make sense for different place types, land use typologies have been identified to better understand contextual needs of pedestrians in Broomfield.

The eight typologies each have different uses, characteristics, opportunities and challenges. Following the overview of typologies, pedestrian improvement options are identified along with key considerations. **Table 1** highlights the improvements most appropriate for each pedestrian typology.

Table 1. Land Use Typologies

Typology	Characteristics
<p><b>Transit Station Areas</b></p>  <p>Locations surrounding bus or bus rapid transit (BRT) stations, or areas adjacent to these stations that can be improved to ease access to transit and encourage use of alternative modes.</p>	<p><b>Uses:</b> Mixed-use, office, residential</p> <p><b>Characteristics:</b> Multimodal accessibility, high pedestrian demand</p> <p><b>Opportunities:</b> Multimodal accessibility, active transportation amenities and pedestrian accommodations</p> <p><b>Challenges:</b> Congested access points in morning and evening peak hours</p> <p><b>Examples:</b> US 36 &amp; Flatiron Station, US 36 &amp; Broomfield Station</p>
<p><b>School Zones</b></p>  <p>Locations where elementary, middle, and high schools are located and children are using sidewalks and crossings to get to and from school.</p>	<p><b>Uses:</b> Typically within residential neighborhoods</p> <p><b>Characteristics:</b> Minor destination, typically accessed through residential area</p> <p><b>Opportunities:</b> Traffic calming, flashing beacons, crosswalks, neighborhood and trail connections</p> <p><b>Challenges:</b> Vulnerable population that requires safe crossings, may be a lack of pedestrian infrastructure, arterials are major barriers for bicycle and pedestrian access, lack of street connections may require longer walking distances</p> <p><b>Examples:</b> Emerald Elementary, Broomfield Heights Middle School, Legacy High School</p>
<p><b>Main Streets/Urban Centers</b></p>  <p>Designated locations with a mix of uses that are active and vibrant socially, economically, and physically.</p>	<p><b>Uses:</b> Office, retail, residential, entertainment, and civic uses</p> <p><b>Characteristics:</b> Major destination, multimodal accessibility, high pedestrian activity</p> <p><b>Opportunities:</b> Active transportation amenities, improved bicycle and pedestrian accommodations</p> <p><b>Challenges:</b> Pedestrian safety, turning vehicles, high vehicular volumes</p> <p><b>Example:</b> Arista</p> <p><i>*Broomfield has three locations identified as "Emerging Urban Centers" as defined by DRCOG</i></p>



Typology	Characteristics	
<h3 data-bbox="142 296 521 331">Suburban Commercial</h3>  <p data-bbox="670 344 906 632">Typically located adjacent to arterial streets with a mix of retail and office uses. The retail centers emphasize access via automobile and often have large surface parking lots.</p>	<p data-bbox="938 325 1382 352"><b>Uses:</b> Retail and some office/service uses</p> <p data-bbox="938 373 1385 468"><b>Characteristics:</b> Within or adjacent to residential neighborhoods, limited access points, large surface parking lots</p> <p data-bbox="938 489 1450 548"><b>Opportunities:</b> Improved bicycle and pedestrian access and amenities (e.g., bike racks)</p> <p data-bbox="938 569 1450 627"><b>Challenges:</b> Long blocks, often adjacent to high-speed arterials, high frequency of accesses</p> <p data-bbox="938 648 1386 676"><b>Example:</b> Grocery-store based retail areas</p>	
<h3 data-bbox="142 705 375 741">Business Park</h3>  <p data-bbox="670 753 914 911">Low density commercial and industrial uses located in suburban areas on large parcels of land.</p>	<p data-bbox="938 737 1219 764"><b>Uses:</b> Office and industrial</p> <p data-bbox="938 785 1406 879"><b>Characteristics:</b> Campus style business area, often with limited access to amenities and retail uses</p> <p data-bbox="938 900 1414 995"><b>Opportunities:</b> Improved street connections, intersection and mid-block crossings, and bicycle and pedestrian accommodations</p> <p data-bbox="938 1016 1438 1110"><b>Challenges:</b> Curvilinear streets, lack of street connectivity, missing sidewalks, long distances between land uses, large set-backs</p> <p data-bbox="938 1131 1166 1159"><b>Example:</b> Interlocken</p>	
<h3 data-bbox="142 1220 597 1262">Early Suburban Residential</h3>  <p data-bbox="683 1274 906 1562">Residential neighborhoods built in Broomfield prior to 1985 have different infrastructure and development patterns than those developed later.</p>	<p data-bbox="938 1257 1419 1285"><b>Uses:</b> Residential (single-family, multi-family)</p> <p data-bbox="938 1306 1451 1400"><b>Characteristics:</b> Older neighborhoods, residential grid, curvilinear streets, substandard pedestrian infrastructure</p> <p data-bbox="938 1421 1406 1545"><b>Opportunities:</b> Neighborhood connections/trails, improved bicycle and pedestrian accommodation, traffic calming, and lane repurposing</p> <p data-bbox="938 1566 1419 1690"><b>Challenges:</b> Curvilinear streets, narrow sidewalks, limited access points, cut-through traffic, lack of connectivity to adjacent neighborhoods and commercial uses</p> <p data-bbox="938 1711 1442 1770"><b>Example:</b> Broomfield Heights (First and Second Filing)</p>	

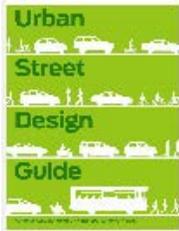


Typology	Characteristics
<h3 data-bbox="142 296 586 331">Late Suburban Residential</h3>  <p data-bbox="527 344 906 533">Residential areas developed after 1985 that consist of predominantly single-family and multi-family residences. Small scale neighborhood retail, parks, and civic uses may be present.</p>	<p data-bbox="938 323 1419 354"><b>Uses:</b> Residential (single-family, multi-family)</p> <p data-bbox="938 373 1425 468"><b>Characteristics:</b> Newer neighborhoods with curvilinear streets, cul-de-sacs, and sidewalks that meets Broomfield’s current standards</p> <p data-bbox="938 487 1448 581"><b>Opportunities:</b> Neighborhood connectors/trails, improved bicycle and pedestrian accommodation, traffic calming</p> <p data-bbox="938 600 1435 724"><b>Challenges:</b> Curvilinear streets, limited access points, cut-through traffic, lack of connectivity to adjacent neighborhoods and commercial uses</p> <p data-bbox="938 743 1341 774"><b>Examples:</b> Anthem Ranch, Broadlands</p>
<h3 data-bbox="142 800 428 835">Rural Residential</h3>  <p data-bbox="670 848 911 1003">Primarily single-family residences on large lots located outside of the urban or suburban areas.</p>	<p data-bbox="938 827 1398 888"><b>Uses:</b> Single-family residential, agricultural, office</p> <p data-bbox="938 907 1416 1001"><b>Characteristics:</b> Varies depending on use and proximity to bicycle and pedestrian facilities and activity centers</p> <p data-bbox="938 1020 1435 1144"><b>Opportunities:</b> Varies depending on local uses, proximity to destinations, and desire of the neighborhood to incorporate bicycle and pedestrian accommodation</p> <p data-bbox="938 1163 1438 1224"><b>Challenges:</b> Lack of street connectivity, missing sidewalks</p> <p data-bbox="938 1243 1260 1274"><b>Examples:</b> Original Broomfield</p>



## Pedestrian Improvement Opportunities

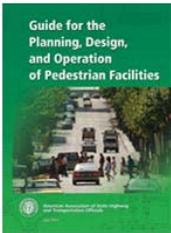
The pedestrian improvements identified herein are intended to serve as a guide to improve pedestrian accommodation in different land use contexts. The publications listed below were used as reference documents in identifying pedestrian improvement opportunities in Broomfield and are excellent resources for planning and design guidance to implement safe, comfortable accommodations for pedestrians. **Table 2** highlights the improvements that are most appropriate within Broomfield’s eight land use typologies. The treatments described below could be paired with traffic calming elements as identified in Broomfield’s Traffic Mitigation Program.



National Association of City Transportation Officials (NACTO)  
Urban Street Design Guide (2013)



U.S. DOT  
Federal Highway Administration  
Signal Timing Manual (2008)



American Association of State Highway and Transportation Officials (AASHTO)  
Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004)



U.S. DOT  
Federal Highway Administration  
Manual on Uniform Traffic Control Devices (2009)

Table 2. Pedestrian Improvement Opportunities by Land Use Typology

Pedestrian Improvement	Transit Station Areas	School Zones	Main Streets/ Urban Centers	Suburban Commercial	Business Park	Early Suburban Residential	Late Suburban Residential	Rural Residential
Corners and Curb Radii	✓		✓	✓	✓			
Speed Control		✓				✓	✓	
Curb Extensions	✓	✓	✓	✓	✓			
Midblock Crossings	✓	✓	✓			✓	✓	
Pedestrian Refuge Islands	✓		✓	✓	✓			
Marked Crosswalks	✓	✓	✓	✓	✓	✓	✓	✓
Curb Ramps	✓	✓	✓	✓	✓	✓	✓	✓
Pedestrian Hybrid Beacons	✓	✓	✓	✓				
Activated Warning Flashers	✓	✓	✓	✓	✓	✓	✓	✓
Pedestrian Signal Timing	✓	✓						
Accessible Pedestrian Signals	✓	✓	✓	✓	✓			✓
Neighborhood Connections	✓	✓		✓		✓	✓	
Hollywood Sidewalk Transitions		✓				✓		



### Preferred Sidewalk Zone Widths

The width of sidewalk zones will vary based on things such as the street type, volume of pedestrians, and surrounding land uses. Critical zonal considerations for the “sidewalk zone” include:

1. Frontage Zone – the area directly adjacent to the building, including both the structure and the façade. It functions as an extension of the building to include entryways, door swings, sidewalk café patios and sandwich boards.
2. Pedestrian Through Zone – the portion of the sidewalk where the has an accessible pathway. This zone provides a safe, clear pedestrian pathway parallel to the street.
3. Amenity Zone – the area between the sidewalk and the buffer zone that often includes things such as street lights, tree wells, bike racks, benches, kiosks, trash cans, and bus stops.
4. Enhancement/ Buffer Zone – the area between the amenity zone and the roadway that creates additional separation between the pedestrians and vehicular traffic. This zone could include features such as curb extensions, on-street bicycle lanes, separated bike lanes, parklet patios or on-street parking.



#### Key Considerations:

- Desired minimum sidewalk width is 6’ in urban settings. Where sidewalk is directly adjacent to moving traffic, 8’ minimum is preferred.
- Minimum sidewalk width for multi-family residential areas (detached or attached) is 8’; 10’ is preferred
- In urban or commercial areas a range of 8’-12’ is desired
- Minimum width of 2’ for buffer zones
- If bicycle traffic is anticipated on the sidewalk 10’ minimum is preferred, 12’ for multi-use trail corridors



Source: NACTO Urban Street Design Guide



## Corners and Curb Radii

Corner radii are a critical factor when considering pedestrian exposure when crossing the street. The smaller the corner radii, the shorter the crossing distance, reducing pedestrian exposure in the intersection and takes less time to cross the street resulting in improved pedestrian safety and reduced vehicular delay.

### *Key considerations:*

- Smaller curb radius expands the pedestrian area, improving curb ramp alignment
- Turning speeds should be limited to 15 mph or less
- Standard curb radii are 10-15', but smaller corner radii are preferred
- The design vehicle is a frequent user of the street, and dictates minimum required turning radius, a control vehicle is an infrequent large user. Consider adopting both a design vehicle and control vehicle standard based on context specific street types and revise Engineering Standards and Specifications accordingly.





### Curb Extensions

Curb extension is an umbrella term that encompasses several different treatments and applications. Curb extensions decrease the overall width of the roadway resulting in traffic calming and increased pedestrian comfort. Pedestrian safety is improved by increasing visibility and reducing the crossing distance for pedestrians. The five types of curb extensions are illustrated in **Table 3**.

Table 3. Curb Extensions

Curb Extension	Key Considerations	Illustration
<b>Midblock</b> (i.e., pinchpoints)	<ul style="list-style-type: none"> <li>• Can aid in adding midblock crossings on low-volume streets with high pedestrian demand</li> <li>• Crossings do not need to be marked unless volumes exceed 2,000-3,000 vehicles/day</li> </ul>	
<b>Gateways</b> (i.e., neckdowns)	<ul style="list-style-type: none"> <li>• Increases pedestrian visibility, reduces crossing distance, and activates pedestrian space</li> <li>• Can be used to mark a transition to a low-speed street</li> <li>• Length of the curb extension should be equal to the width of the crosswalk and 1-2' narrower than the parking lane</li> </ul>	
<b>Offset</b> (i.e., chicanes)	<ul style="list-style-type: none"> <li>• Often used on residential streets and low-volume urban center streets to provide traffic calming</li> <li>• Increases the amount of public space on a street</li> <li>• May require additional signing and striping</li> </ul>	
<b>Bus bulbs</b>	<ul style="list-style-type: none"> <li>• Aligns bus stops with parking lanes, allowing buses to stop and board passengers in the travel lane</li> <li>• Desired length of the equivalent of two buses in locations with frequent bus service</li> </ul>	
<b>Conventional</b>	<ul style="list-style-type: none"> <li>• Recommended when on-street parking is present to increase visibility and reduce crossing distance</li> <li>• Adds an amenity zone space resulting in increased pedestrian comfort</li> </ul>	



### Midblock Crossings

Midblock crossings are often installed in locations where pedestrians are already crossing to access parks, schools, retail and other destinations. Midblock crossings are positioned within a block rather than at an intersection and alert motorists that they are in a pedestrian zone and result in increased pedestrian safety.

*Key considerations:*

- Critical to stripe the crosswalk to ensure driver awareness of pedestrians
- Curb extensions, signage, and landscaping can increase safety for pedestrians
- Crossings can be unsignalized, have actuated pedestrian signals, Pedestrian Hybrid Beacons or active warning flashers
- Fixed-time signals or passive detection are preferred in areas with high pedestrian volumes



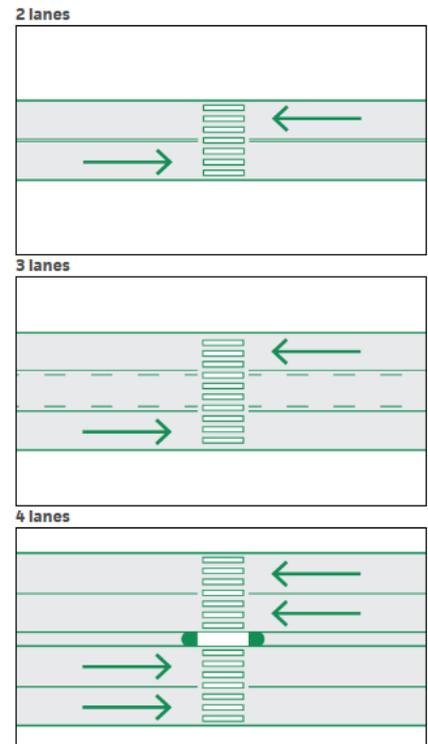
Source: pedbikeimages.com

### Pedestrian Refuge Islands

Pedestrian refuge islands are located in the median of the roadway and provide a protected place for pedestrians to wait while crossing the street. The refuge islands reduce the overall crossing distance of the street allowing those walking at slower speeds to cross the street intervals.

*Key considerations:*

- Used on moderate to high volume and high speed streets
- Used at signalized and unsignalized intersections
- Desirable width of median refuge is 10' or greater and length should be 6' or greater
- Can be used in conjunction with active warning flashers or Pedestrian Hybrid Beacon signals
- Dependent on location, can have traffic calming affect when right-of-way is used to narrow the street



in

As the number of travel lanes increases, pedestrians feel more exposed and less safe entering the intersection. For unsignalized crossings, higher speeds and volumes may necessitate the use of a median at narrower cross-sections.

Source: NACTO Urban Street Design Guide



## Marked Crosswalks

Drivers are legally required to yield to pedestrians at intersections, even when there are not pavement markings. The presence of marked crosswalks alerts drivers to the possible presence of pedestrians and directs pedestrians where to safely cross the street. Crosswalks can be enhanced by adding curb extensions to shorten the crossing distance and enhancements such as hybrid beacons can be added at locations with high-speeds and volumes. At signalized intersections, signal timing is important, especially in locations with high pedestrian activity.



### Key considerations:

- There are many different types of crosswalk markings – ladder and continental are most visible to drivers
- Crosswalks should be located on all legs of an intersection
- Crosswalks should be at least 10' wide or the width of the approaching sidewalk

## Curb Ramps

Curb ramps provide a transition from the sidewalk to the street for pedestrians and are required by the Americans with Disabilities Act (ADA). They are located at intersections and mid-block crossings and often at transit stops. Sidewalks in older neighborhoods may not have curb ramps and/or they are noncompliant with ADA standards. Curb ramps While curb ramps benefit people with disabilities, they are also helpful for people pushing strollers, older adults that have challenges with stairs, and bicycles.

### Key considerations:

- Curb ramps should direct pedestrians into the crosswalk
- Older sidewalks may not have curb ramps or they may be noncompliant with ADA standards
- New curb ramps must include detectable warnings (truncated domes) that extend the full width and depth of the ramp
- Curb ramps that lead to each crosswalk of an intersection are preferred over a single ramp for multiple crosswalks; the separate ramps improve physical orientation for the visually impaired
- Wider curb ramps are preferred in areas with high pedestrian volumes and/or bicycle use

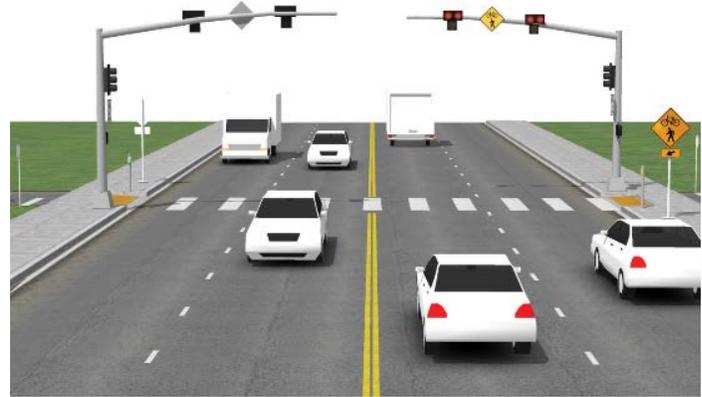




### Pedestrian Hybrid Beacon (PHB)

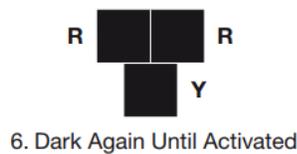
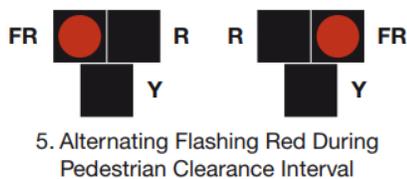
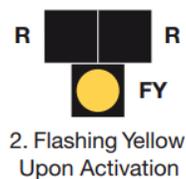
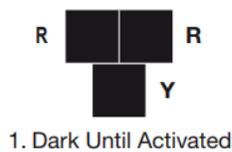
Pedestrian Hybrid Beacon (PHB, also known as High-intensity Activated Crosswalk Beacon (HAWK) are traffic control devices located at unsignalized intersections or mid-block crossings to stop roadway traffic so pedestrians and bicyclists can safely cross the street.

The signals are dark for motorists unless they are activated and then move to solid/flashing yellow and red cycles to allow for safe pedestrian crossing and to warn vehicles to stop. The use of Pedestrian Hybrid Beacon minimizes vehicle delay and improves pedestrian comfort and safety.



#### Key considerations:

- Often used in high pedestrian locations such as school zones
- Used when signal warrants are not met or traffic signals are not desired
- Recommended by MUTCD for arterials with more than 2,000 vehicles per hour and 20 pedestrians or bicyclists per hour at major crossings
- May also consider potential increased use of crossing with installation of signal
- Marked crosswalks must be used in conjunction with the signal



- Legend
- SY** Steady yellow
  - FY** Flashing yellow
  - SR** Steady red
  - FR** Flashing red

Source: FHWA Safety Program



### Active Warning Beacons

Active warning beacons are flashing lights that are used in conjunction with warning signs to alert motorists of the presence of pedestrians. Active warning beacons are located at unsignalized intersections or at midblock crossings. Active warning beacons can be user-activated through a push button or through passive detection.



*Key considerations:*

- Used in locations with high safety concerns but to be avoided in locations with sight distance constraints
- Used on two-lane and multi-lane roadways
- Active warning beacons are installed on the side of the roadway, unless there is a center island or median, then a secondary beacon must be installed
- Rectangular Rapid Flash Beacons (RRFBs) are a type of active warning beacon that use an irregular flash pattern (similar to emergency vehicle flashers)

### Pedestrian Signal Timing

*Leading Pedestrian Interval*

Leading pedestrian interval (LPI) signal timing allows the pedestrian phase to start a few seconds before the adjacent through vehicular movement. This allows pedestrians an opportunity to establish a presence in the crosswalk and reduces conflicts with turning vehicles.

*Lagging Pedestrian Interval*

Similar to a leading pedestrian interval, the lagging pedestrian interval begins several seconds after the adjacent through vehicular movement to allow the waiting right-lane queue lane to clear before the pedestrian walk signal. Applicable at locations with high right-turn movements or where there is an exclusive right-turn lane.

*Key considerations:*

- Longer cycle lengths that include additional pedestrian phases can increase vehicular delay
- MUTCD specifies a 3.5' per second pedestrian design speed to accommodate for vulnerable populations
- Typically installed in locations with high pedestrian activity

### Accessible Pedestrian Signals

Consideration for the needs of all populations is critical when designing pedestrian signals. Older adults, children, and people with disabilities may walk at a slower speed and require additional crossing time. As pedestrian signals are installed, replaced or modified, they should include accessible pedestrian signal (APS) pushbuttons and pedestrian displays such as audible tones, verbal messages, and/or vibrating information for the visually and hearing impaired.

*Key considerations:*

- MUTCD specifies a 3.5' per second design speed for pedestrians to accommodate vulnerable populations
- A pedestrian phase should accompany all signal phases in locations with high pedestrian activity (e.g., mobility hubs, urban centers)
- Self-actuated pedestrian signals can be used in locations with lower pedestrian activity





## Neighborhood Connections

Identifying the “missing links” and short gaps within a neighborhood that connect the community internally and to transit, schools, and commercial uses will aid in enhancing the pedestrian environment for recreational and utilitarian purposes. Many suburban residential neighborhoods were not built with a traditional grid network, which increases travel times due to curvilinear streets and cul-de-sacs. A sidewalk or trail connection that provides a direct link to a local school would decrease travel time and encourage use of active modes to get to/from school. Trail connections or multi-purpose paths may be appropriate if there is a missing link that could be connected through a park or open space. These locations can often be easily identified as they are often worn due to high volumes of pedestrian use – also known as goat trails.

### *Key considerations:*

- Neighborhood connection improvements should be prioritized by land use, with access to transit station areas, school zones, and adjacent commercial uses the most important
- Sidewalk connectors should be a minimum of 6' wide
- Consider input from neighbors and schools; they know their neighborhood the best and where the gaps are





### Hollywood Sidewalk Transition

Some of the older neighborhoods in Broomfield, included in the “Early Suburban Residential” land use typology, have wide streets with very narrow sidewalks and slanted curb faces. There are two alternatives for considering and prioritizing improvements in these locations: 1) opportunistic, 2) access.

*Key considerations:*

Opportunistic considerations:

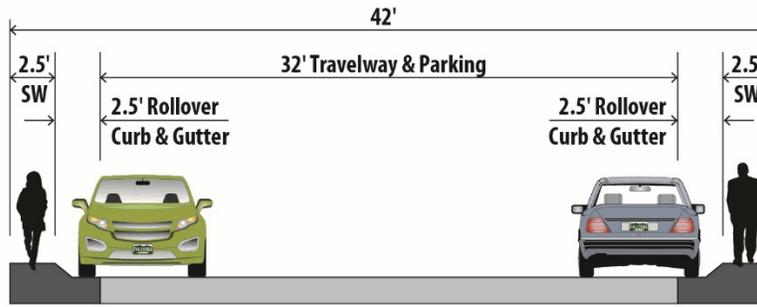
- Improve sidewalks in key locations when projects require underground utility repairs
- When resurfacing roadways, stripe bike lanes to increase vehicle distance from pedestrians

Access considerations:

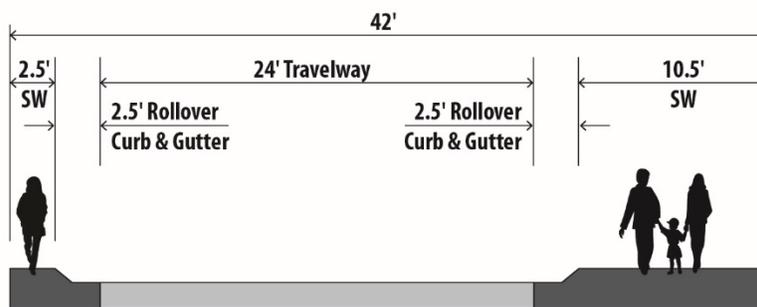
- Assess sidewalk inventory in neighborhoods with narrow two foot Hollywood curbs to identify and prioritize the most critical links (e.g., access to transit, within school zones, connections to adjacent communities and commercial uses)
- Consider improving connections to trails based on those with the highest pedestrian volumes



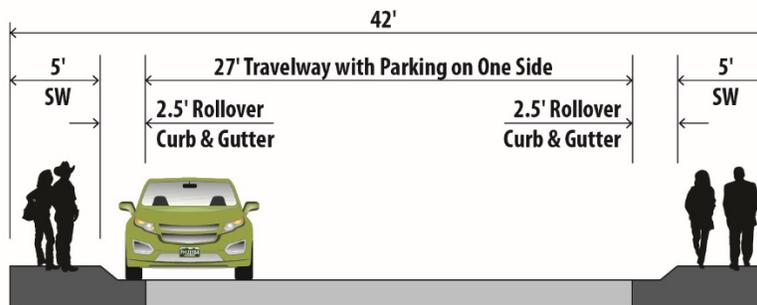
**Figure 39.** shows three potential options for reconfiguring these streets to provide wider sidewalks. These options may not convey the full options that could be available to a particular street segment. The appropriate configuration will depend upon the context of the street and adjacent uses and the level of demand for on-street parking.



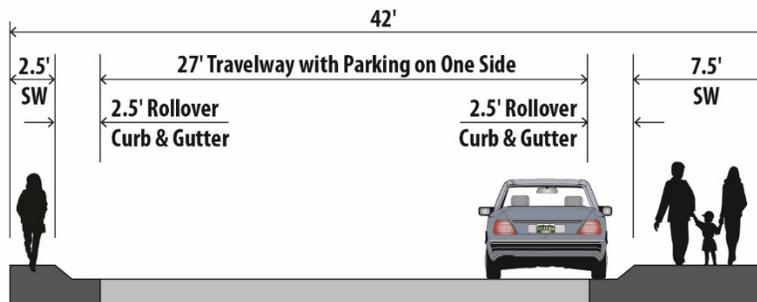
Existing



OPTION 1: Multi-Use Path on One Side



OPTION 2: Standard Sidewalks with Parking On One Side



OPTION 3: Wide Sidewalk on One Side with Parking on One Side

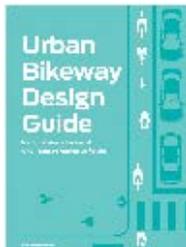
Figure 39. Hollywood Sidewalk Transition Option



## 4. Bicycle Improvement Toolbox

The bicycle improvements identified are intended to serve as a guide to improving bicycle accommodations in Broomfield. The publications listed below were used as reference documents in identifying bicycle improvement opportunities in Broomfield; they are excellent resources for the planning and design of safe, comfortable accommodations for bicyclists. It should be noted that the American Association of State Highway and Transportation Officials 2012 *Guide for the Development of Bicycle Facilities* is currently being updated and is slated for completion in 2019 or 2020.

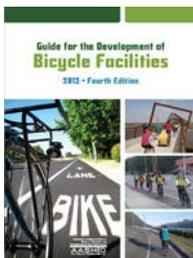
### Bicycle Improvement Resources



*National Association of City Transportation Officials (NACTO)*  
Urban Bikeway Design Guide, 2<sup>nd</sup> Edition (2014)



*U.S. DOT  
Federal Highway Administration*  
Signal Timing Manual (2008)



*American Association of State Highway and Transportation Officials (AASHTO)*  
Guide for the Development of Bicycle Facilities, 4<sup>th</sup> Edition (2012)



*U.S. DOT  
Federal Highway Administration*  
Manual on Uniform Traffic Control Devices (2009)



*Association of Pedestrian and Bicycle Professionals (APBP)*  
Essentials of Bike Parking, Selecting and Installing Bicycle Parking that Works (2015)



*National Association of City Transportation Officials (NACTO)*  
Designing for All Ages and Abilities (2017)



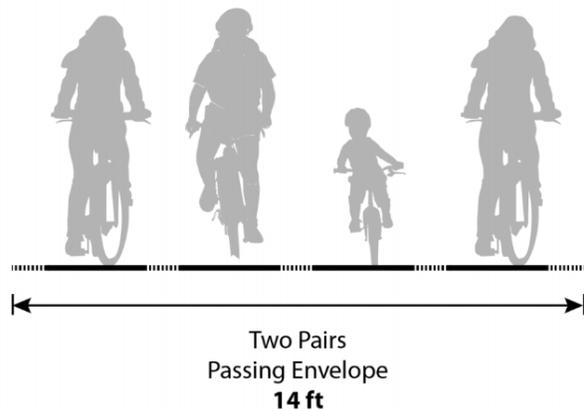
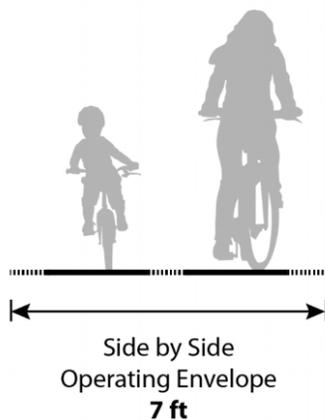
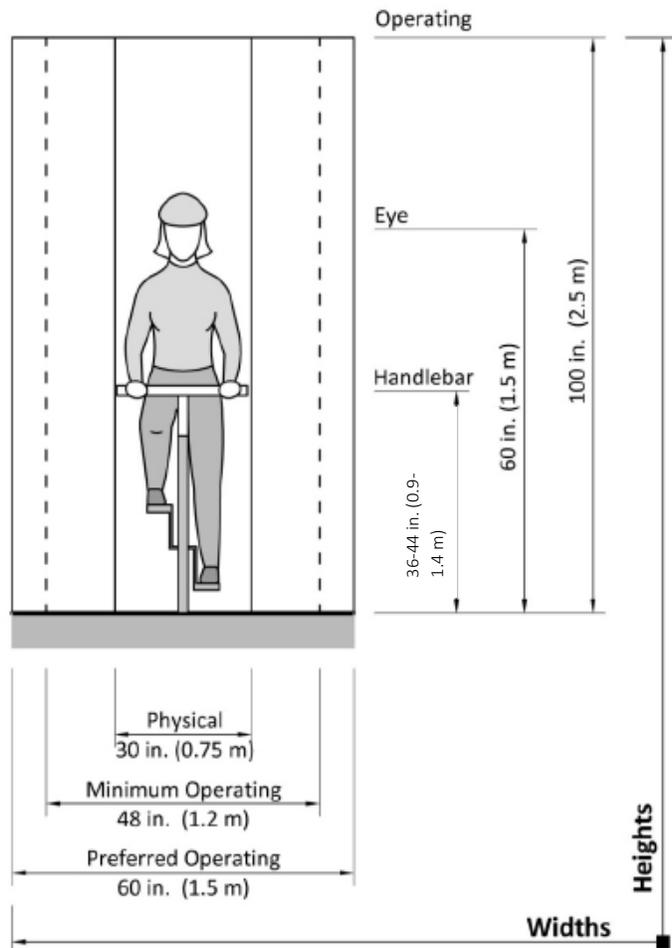
## Rider Operating Parameters and Bicycle Types

It is important to consider varying operating abilities, bicycle types, and trip types when developing bicycle facilities. Users range from adults to children, all of which utilize and prefer a variety of bicycle types. Additionally, bicyclists may be using a facility for recreation or utilitarian purposes, which may impact the need and desire to use different types of facilities.

### Operating Parameters

A minimum operating width of 4' is required for bicycle facilities, 5' is preferred. Additional operating width may be needed in some situations (e.g., steep grades and/or curves), and shy distance is needed when the facility is adjacent to parked cars, railings, or other verticals. Increasing widths to allow for side-by-side riding of facilities increases sociability and reduces conflicts on two-way facilities.

As shown at right, the typical physical operating space in which a bicycle operates is 30", with a minimum operating width of 48" and a preferred width of 60".



Source: AASHTO's Guide for Development of Bicycle Facilities, 2012

### Bicycle Types

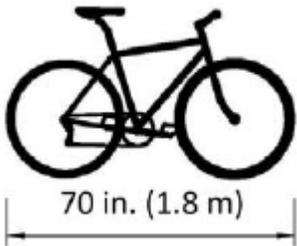
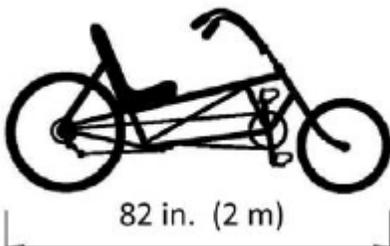
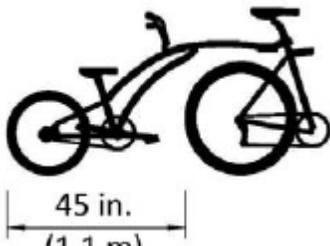
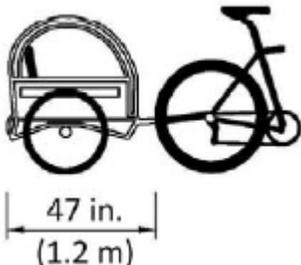
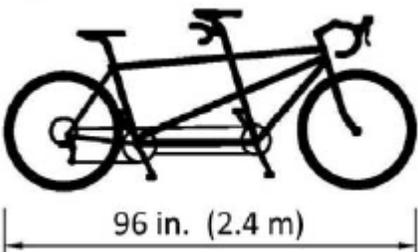
A variety of bicycles and bicycle accessories exist that need to be considered. **Table 4** summarizes the sizes of typical bicycles; an adult typical bicycle is 70 inches in length while an adult tandem bicycle is 96 inches in length. A typical bicycle with a child trailer could be expected to be approximately 117 inches, or about 9 feet, 9 inches in length.

It is important to consider the variety of bicycle types that could be used by riders of all ages and abilities in design of bicycle facilities, to make them attractive, accessible and safe including ramps, intersection treatments, refuge medians, and curves on steep grades etc.

Another consideration is the accommodation of facility speed design, access and safety for electric bicycles, including accommodation of end of trip facilities. Electric bicycles overcome many significant barriers to bicycling including distance, grades, time, and physical effort, overall increasing the accessibility of cycling as a part of a healthy, active lifestyle for transportation and recreation. Early research into e-bicycles indicates:

- e-bikes are used for utilitarian travel including commuting to work and shopping;
- have replaced car trips on journeys of up to 15 miles;
- help to overcome constraints imposed by geography in the context of longer distance trips and in hilly areas; and
- potentially suit older riders, or individuals who have a medical condition such as arthritis, which makes riding a bicycle difficult.<sup>2</sup>

Table 4. Typical Bicycle Types and Sizes

Adult Typical Bicycle	Adult Single Recumbent Bicycle	Additional Length for Trailer Bike
		
Additional Length for Child Trailer	Width for Child Trailer	Adult Tandem Bicycle
		

Source: AASHTO’s Guide for Development of Bicycle Facilities, 2012

<sup>2</sup> Jennifer Dill and Geoffrey Rose, *E-bikes and Transportation Policy: Insights from Early Adopters* (TRB 2011), 2



## Bicycle Facility Types

A bicycle facility refers to the treatments applied to the right-of way to accommodate bicycling. To create a low-stress network a variety of context-sensitive bicycle facility types are used to provide everyone, regardless of their experience or confidence with cycling, a comfortable and attractive experience that encourages everyday bicycling.

**Table 5** provides a summary of the possible bicycle facility types for Broomfield, ordered from least separation from motor vehicle traffic to greatest separation. Specific information on each facility type including considerations and design guidelines follows.

**Table 5. Bicycle Facility Types**

Shared Roadway	
	<p>Signed bicycle routes, possibly including shared lane markings, or ‘sharrows’; only suitable along streets with low traffic speeds and volumes, such as neighborhood, local or collector streets.</p>
Bicycle Boulevard / Neighborhood Bikeway	
	<p>Streets with low motorized traffic volumes and speeds. This facility is differentiated from the shared roadway as it is given a higher designation and designed to give bicycle travel priority; slows and/or reduces traffic through use using traffic calming treatments and/or traffic diversions.</p>
On-Street Bicycle Lane	
	<p>Exclusive space for bicyclists indicated by using striping, symbols, and signage; intended for one-way travel and typically provided in both directions on two-way streets.</p>
Buffered Bicycle Lane	
	<p>Exclusive space for bicyclists with an additional flush, painted buffer zone between bicycle and motor vehicle traffic (and/or parked vehicles) for additional separation.</p>
Separated Bicycle Lane	
	<p>Exclusive space for bicyclists physically separated from motor vehicle traffic with bollards, landscaping, and/or vertical differences; may be street or sidewalk-level but are distinct from both; may be one-way or two-way.</p>
Shared-Use Path	
	<p>Shared-use path physically separated from motor vehicle traffic and used by all non-motorized modes; typically constructed parallel to streets within existing right-of-way.</p>



## Shared Roadway

Shared lane markings (or “sharrows”) are pavement markings used to denote shared bicycle and motor vehicle travel lanes. The markings encourage bicyclists to position themselves safely in lanes that are too narrow for a vehicle and bicycles to comfortably travel side by side in the same traffic lane. The marking alerts drivers to the potential presence of bicyclists. The marking may also indicate proper roadway positioning for bicyclist along routes and through difficult segments. Along bicycle routes, the markings can provide a wayfinding element.

The markings are two chevrons positioned above a bicycle symbol, placed where the bicyclist is anticipated to operate. In general, this is a design solution that should only be used in locations with low traffic speeds and volumes as part of a signed route or bicycle boulevard. Shared lane markings should not be considered a substitute for bike lanes or other higher class bicycle facilities types.

### Key Considerations

- Typically used on local, collector, or minor arterial streets with low traffic volumes.
- Typically, feasible within existing right-of-way and pavement width even in constrained situations that preclude dedicated facilities.
- May be used as interim treatments to fill gaps between bicycle lanes or other dedicated facilities for short segments where there are space constraints.
- May be used to clarify bicycle movement or positioning in challenging environments such as through an intersection or a combined bike lane / right turn lane where right of way is constrained or other challenging
- May be used for downhill bicycle travel in conjunction with climbing lanes intended for uphill travel.
- Typically supplemented by wayfinding signage.



### Design Guidelines

- Intended for use only on streets with posted speed limits of up to 25 mph and traffic volumes of less than 4,000 vehicles per day.
- May be used as a temporary solution on constrained streets with up to 10,000 vehicles per day until a more appropriate bikeway facility can be implemented. Maximum posted speed of street of 35 mph.
- Intended for use on lanes up to 14’ wide (up to 13’ preferred). For lanes 15’ wide or greater, stripe a 4’ bicycle lane instead of using shared lane markings.
- Desirable to center shared lane markings along the centerline of the outside travel lane; where parking is permitted ensure marking is outside the door zone of parked vehicles.



## Neighborhood Bikeways

The primary goal of neighborhood bikeways, also known as, bicycle boulevards is to prioritize bicycle travel while discouraging motor vehicle traffic and maintaining low motor vehicle speeds. These treatments are typically applied on quiet streets, often through residential neighborhoods. Treatments vary depending on context, but often include traffic diverters, speed attenuators such as speed humps or chicanes, pavement markings, and signs. This facility type is also known as neighborhood greenways, among other locally-preferred terms. Neighborhood Bikeways are a key facility for the Low Stress Network.

### *Key Considerations*

- Applying neighborhood bikeway treatments to designated routes makes them more attractive and likely to attract cyclists of all abilities.
- Stop signs or traffic signals should be placed along the neighborhood bikeway in a way that prioritizes the bicycle movement, minimizing stops for bicyclists whenever possible.
- Neighborhood bikeway treatments include traffic calming measures such as street trees, traffic circles, chicanes, and speed humps. Traffic management devices such as diverters or semi-diverters can redirect cut-through motor vehicle traffic and reduce traffic volume while still enabling local access to the street.
- Additional treatments for major street crossings may be needed, such as median refuge islands, rapid flash beacons, bicycle signals, and pedestrian hybrid beacon signals.
- Communities often implement treatments on one pilot corridor to measure the impacts and to gain community support. The pilot program typically includes before-and-after crash studies, motor vehicle counts, and bicyclist counts on both the designated neighborhood bikeway and parallel streets. Findings from the pilot program can be used to justify bicycle boulevard treatments on other neighborhood streets.

### *Design Guidelines*

- Preferred maximum average daily traffic of 1,500 vehicles.
- Maximum average daily traffic of 3,000 vehicles.
- Target speeds for motor vehicle traffic are typically around 20 mph.
- A maximum 15 mph speed differential between bicyclists and vehicles is preferred.



## On-Street Bicycle Lane

Conventional on-street bicycle lanes provide a dedicated on-street space for bicyclists using pavement markings and signage. Bicycle lanes are for one-way travel and are normally provided in both directions on two-way streets or on one side of a one-way street.

Broomfield updated its standard roadway cross sections in 2018. The updated sections identify bicycle lanes for Sheridan Parkway and all major and minor arterials. The widths are between 5' and 6', not including the curb and gutter

### Key Considerations

- Bicycle lanes can be used on one-way or two-way streets.
- Contra-flow bicycle lanes may be used to allow two-way bicycle travel on streets designated for one-way motor vehicle travel to improve bicycle network connectivity.
- Stopping, standing, and parking in bicycle lanes may be problematic in areas with high parking demand and deliveries and ride hailing (e.g., commercial areas).
- Wider bicycle lanes or buffered bicycle lanes are preferable at locations with high parking turnover and encourages motorist compliance with Colorado's 3' to pass law.
- Bicycle lanes can be placed on the left side of one-way streets and some median-divided streets, resulting in fewer conflicts between bicyclists and motor vehicles, particularly on streets with heavy right-turn volumes, on-street parking, and/or frequent bus service.



### Design Guidelines

- The minimum width of a bicycle lane adjacent to a curb is 5' not including the gutter pan (4' in highly constrained locations); a desirable width is 6'.
- The minimum width of a bicycle lane adjacent to parking is 5'; a desirable minimum width is 6'; ideal width is 7.5' to minimize door zone conflicts.
- Optional parking T's or hatch marks can highlight the door zone on constrained corridors with high parking turnover to guide bicyclists away from motor vehicle doors.
- Where bicycle lanes cross in front of a minor roadway or private drive, changing a solid white bicycle lane line to a dotted line should be used to inform roadway users of a potential conflict zone.



## Buffered Bicycle Lane

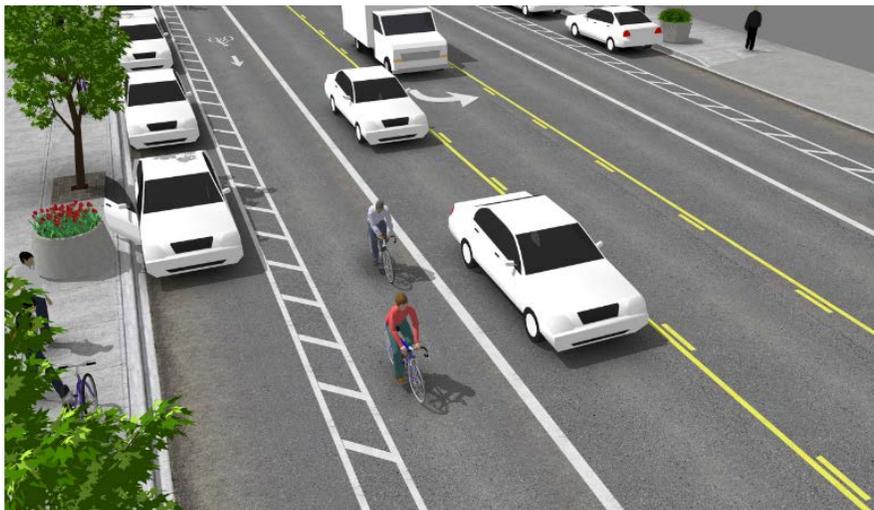
Buffered bicycle lanes are created by painting or otherwise creating a flush buffer zone between a bicycle lane and the adjacent travel lane. While buffers are typically used between bicycle lanes and motor vehicle travel lanes to increase bicyclists' comfort, they can also be provided between bicycle lanes and parking lanes in locations with high parking turnover to discourage bicyclists from riding too close to parked vehicles. Additionally the buffer provides increased compliance with Colorado's three foot law, which requires motorists to provide at least three feet clearance from a bicycle while passing.

### Key Considerations

- Typically installed by reallocating existing street space.
- Can be used on one-way or two-way streets.
- Used on streets with higher travel speeds and volumes and/or expected presence of larger vehicles.
- Used on streets with extra available lane widths.
- Consider placing buffer next to parking lane where there is commercial or metered parking.
- Buffered bicycle lanes allow bicyclists to ride side by side or to pass slower moving bicyclists.

### Design Guidelines

- Consider placing buffer next to travel lane where speeds are 30 mph or greater or when traffic volume exceeds 6,000 vehicles per day.
- The minimum operating width of a buffered bicycle lane adjacent to parking or a curb is 4' exclusive of gutter; a desirable width is 6'.
- The minimum buffer width is 18". There is no maximum width. Diagonal cross hatching should be used for buffers less than 3' in width. Chevron cross hatching should be used for buffers greater than 3' in width. Typical buffer widths are 3' to 5'.
- Where there is 7' of roadway width available for a bicycle lane, a buffered bicycle lane should be installed instead of a conventional bicycle lane to avoid drivers confusing it as a motor vehicle lane. For example 5' with a 2' buffer would accommodate a 7' buffered bicycle lane.





## Separated Bicycle Lane

Separated bicycle lanes (also known as cycle tracks or protected bicycle lanes) are physically separated from adjacent motor vehicle lanes by a vertical or horizontal element, while remaining distinct from the sidewalk. They eliminate conflicts with all other user types and should be considered on streets with high volumes and high posted speeds. Separated bicycle lanes may be sidewalk level, street level, or at an intermediate level between the street and sidewalk.

### Key Considerations

- Sidewalk level separated bicycle lanes:
  - May encourage pedestrian encroachment unless discouraged with a continuous sidewalk buffer.
  - Requires no transition for raised bicycle crossings at driveways, alleys, or streets.
  - May provide level landing areas for parking, loading, or bus stops along the street buffer.
  - May reduce maintenance needs and simplify snow plowing operations.
- Intermediate level separated bicycle lanes:
  - Preserve separation between bicyclists and pedestrians.
  - Ensures a detectable edge is provided for people with visual impairments.
  - May reduce maintenance needs by prohibiting debris build up from roadway runoff but may complicate snow plowing operations.
  - May require careful consideration of drainage design and in some cases require catch basins to manage bicycle lane runoff.
- Street level separated bicycle lanes:
  - Preserve separation between bicyclists and pedestrians.
  - Ensures a detectable edge is provided for people with visual impairments.
  - May increase maintenance needs to remove debris from roadway runoff unless street buffer is raised. May complicate snow plowing operations.
  - May require careful consideration of drainage design and in some cases require catch basins to manage bicycle lane runoff.



*One-way Separated Bike Lane*



*Two-way Separated Bike Lane*

### Design Guidelines

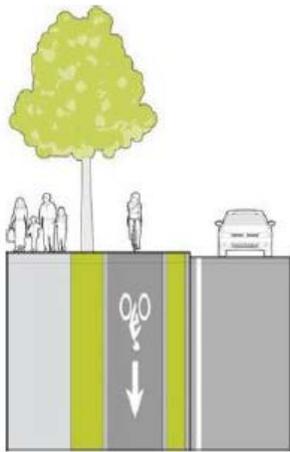
- Physical separation may be provided with flexposts/bollards, raised medians, parking, or an elevation difference between the street and bicycle lane.
- If used, flexposts and bollards should be placed in the center of the buffer zone between the bicycle lane and motor vehicle lane and installed every 20'.
- Where parking is used to separate the bicycle lane from motor vehicle traffic, a buffer space of at least 3' between the parking and bicycle lanes should be provided.
- If placed at sidewalk-level, a minimum buffer of 3" between the bicycle lane and sidewalk should be provided to discourage pedestrian encroachment.
- Separated bicycle lanes may be designed to accommodate one-way or two-way traffic.



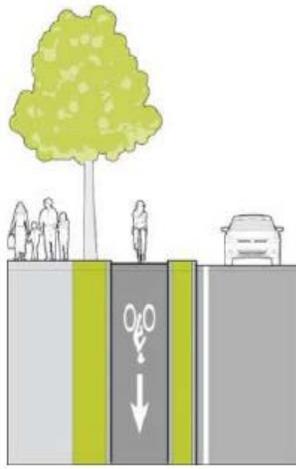
- *Two-way separated bicycle lanes* may be considered on streets with few accesses along one side and on one-way streets. *Two-way separated bicycle lanes* should be a minimum of 8' wide, with a preferred width of 10-12'.
- *One-way separated bicycle lanes* should be a minimum of 5' wide, with a preferred width of 7'.
- Separated bicycle lanes should have the same symbols as conventional bicycle lanes, but signage is not required. Two-way separated bicycle lanes should have yellow striped centerlines.

### ONE-WAY SEPARATED BIKE LANES

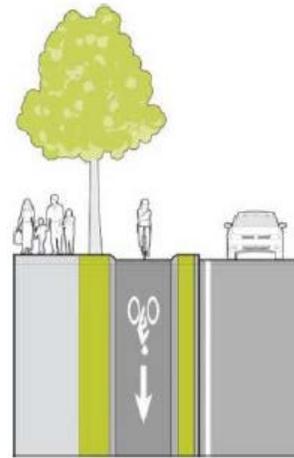
One-way separated bike lanes in the direction of motorized travel provide intuitive and simplified transitions to existing bike lanes and shared travel lanes.



One-way Sidewalk-level Separated Bike Lane



One-way Intermediate-level Separated Bike Lane

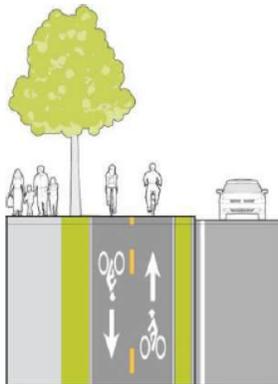


One-way Street-level Separated Bike Lane

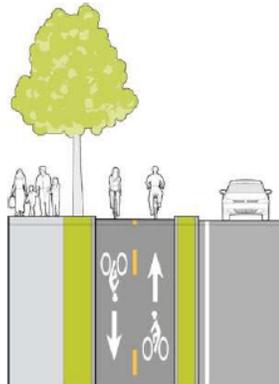
### TWO-WAY SEPARATED BIKE LANES

Two-way separated bike lanes will require special attention to transition the contra-flow bicyclist into existing bike lanes and shared travel lanes.

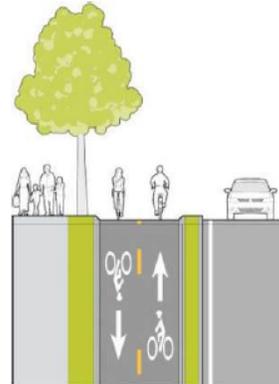
Depending on context, motorists may not expect bicyclists to approach crossings from both directions. For this reason, two-way separated bike lanes may require detailed treatments at alley, driveway, and cross street crossings to enhance the safety of these crossings.



Two-way Sidewalk-level Separated Bike Lane



Two-way Intermediate-level Separated Bike Lane



Two-way Street-level Separated Bike Lane

Source: Arapahoe County Bicycle and Pedestrian Design Guide, 2017

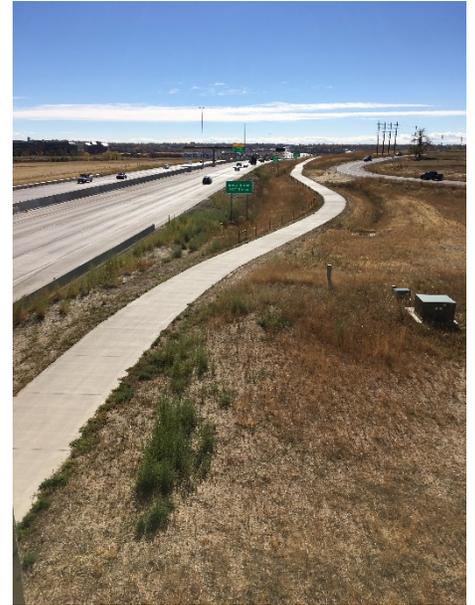


## Shared-Use Path

Shared-use paths are physically separated from motor vehicle traffic and intended to accommodate both bicyclists and pedestrians. They should be considered along streets with high volumes or high posted speeds with no street space to accommodate for a safe on-street facility. Shared-use paths are generally the most attractive to users of all ages and abilities on higher speed and volume roads.

### Key Considerations

- Shared-use paths may be desirable along high-volume or high-speed roadways where it is impractical to provide safe and comfortable on-street facilities
- Shared-use paths may present increased conflicts between path users and motor vehicles at intersections and driveway crossings.
- Shared-use paths typically have a lower design speed for bicyclists than on-street facilities and may not provide appropriate accommodation for more confident bicyclists who desire to travel at greater speeds. Design should consider greatest accommodation for all users and safety.
- Large numbers of driveways or intersections along a shared-use path corridor can decrease bicycle travel speeds, and traffic signals can increase delay for bicyclists on off-street facilities compared to bicyclists using on-street bicycle facilities.
- Consideration of grade separations where feasible decreases delay and reduces potential on-street conflicts.
- Shared-use paths generally should not be considered a substitute to accommodating more confident bicyclists within the roadway, except in the most constrained conditions.



US 36 Bikeway

### Design Standards

Broomfield's 2005 Open Space, Parks, Recreation and Trails (OSPRT) Master Plan<sup>3</sup> identifies minimum design standards for 'Detached and Attached Sidewalks'. An 8' minimum width is identified for detached sidewalks that are anticipated to carry multi-use traffic. The Plan is anticipated to be updated in the upcoming years and this dimension may be updated accordingly. The Plan also states that because of potential conflicts on a narrow surface and the lack of separation from vehicular traffic, attached sidewalks should not be designated as multi-use paths.

- Shared-use path minimum width of 8' and should be considered only in constrained conditions
- Preferred width of 10'-12'-14' depending on volumes and potential frequency of user conflicts.
- Typically separated from the adjoining roadway and curb; preferred minimum buffer width of 5'.
- Reduce conflicts by minimizing the number of driveway and street crossings present along a shared-use path.
- Ramps should match width of path and strive to maintain directionality of path to reduce out of direction maneuvers.

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<sup>3</sup> <https://www.broomfield.org/DocumentCenter/View/2110/OSPRT-FINAL-APPROVED-DOCUMENT>



## Pavement Markings

Pavement markings are used to visually illustrate the potential presence of bicyclists and to increase safety; they also provide wayfinding and route delineation for bicyclists. Pavement markings for bicyclists include symbols and colored pavement.

### *Key Considerations*

- Standard pavement markings include shared lane markings, helmeted bicyclist symbol, and bicycle lane arrows.
- Four different treatments are used for colored bicycle facilities:
  - *Paint* – colored paint that may have additives such as colored glass beads for reflectivity or sand for skid resistance. Low cost, however, easily worn and requires ongoing maintenance and reapplication due to vehicle wear and weather.
  - *Durable Liquid Pavement Markings (DPLM)* – durable epoxy and Methyl Methacrylate coating that is typically applied as a paint or spray. Properties can be added to make the coating skid resistant and reflective. More durable than paint but higher cost.
  - *Thermoplastic* – durable plastic overlay made from polymer resins that liquifies and hardens. Can be used to delineate facilities or pavement markings such as bicycle lane symbols, arrows, etc. Higher cost, may not be as durable on roads that are snowplowed.
  - *Standard Asphalt with Colored Pigment* – asphalt is colored with pigment and typically installed as a thin layer over traditional asphalt to decrease costs. Considered a durable treatment but will fade over time.
- Pavement markings require varying levels of maintenance depending on materials used.
- Critical that all marked bikeways are kept free of debris and potholes.

### *Design Guidelines*

- All pavement markings should conform with specifications in the most recent version of the MUTCD.
- Any colored pavement markings should be green and applied to the road surface to identify conflict zones with, increase bicyclist visibility and emphasize priority.
- Standard white bicycle lane lines should be provided along colored bicycle lane to maintain continuity and to increase nighttime visibility.



## Intersection Treatments

Major street crossings are often the most stressful part of a bicycle trip. Even when a robust network of low-stress facilities is provided, the need to occasionally cross multiple lanes of heavy, high-speed traffic while cycling can be enough to dissuade people from biking.

Designing intersections to safely accommodate bicyclists requires minimizing conflict with motor vehicles, heightening visibility, and clearly establishing right-of-way. Appropriate intersection treatments will vary based on the characteristics of the intersecting streets and the presence or absence of bicycle facilities; the following are common treatments that make intersections safer and more comfortable for bicyclists.

### Through Bicycle Lanes

Through bicycle lanes are used at intersection approaches to correctly position both bicyclists and right-turning motor vehicles to minimize conflicts. Depending on the intersection configuration and what type of bicycle facility is present, a variety of striping and signage techniques are used to signify an approaching merge or conflict location and to alert both bicyclists and motorists to watch for each other.

#### Key Considerations

- Typically used on streets with right-side bicycle facilities and right-turn only lanes.
- Through bicycle lanes are preferable to shared right-turn/bicycle lanes that require bicyclists and motorists to mix with each other at intersections.

#### Design Guidelines

- The desired width of a through bicycle lane is 6', with a minimum of 4'.
- Through bicycle lanes should be supplemented with appropriate MUTCD signage, such as R4-4 'Begin Right Turn Yield to Bikes'.
- The merging area of a through bicycle lane should have dashed striping on either side and may be colored green as well.
- The merging area should begin at least 50' ahead of the intersection and end at least 25' ahead of the intersection.
- Right-turn lanes should be as short as possible.



### Bicycle Boxes

A bicycle box provides dedicated space between the crosswalk and vehicle stop line where bicyclists can wait during the red light at signalized intersections. The bicycle box allows a bicyclist to take a position in front of motor vehicles at the intersection, which improves visibility and motorist awareness, and allows bicyclists to “claim the lane”. Bicycle boxes aid bicyclists in making turning maneuvers at the intersection and provide more queuing space for multiple bicyclists than that provided by a typical bicycle lane.

#### Key Considerations

- Typically used in locations with high volumes of turning movements by bicyclists and motor vehicles, especially in locations with frequent left-turn movements by bicyclists and right turns by motorists.

- If a bicycle box is located in front of a vehicle lane, the right-turn on red movement must be restricted through signage and enforcement.

*Design Guidelines*

- Bicycle boxes are typically painted green and are a minimum of 10’ in depth and span the entire width of the travel lane(s).
- Bicycle box design should be supplemented with appropriate signage according to the latest version of the MUTCD.
- Bicycle box design should include appropriate signalization adjustment in determining the minimum green time.
- Where right-turn lanes for motor vehicles exist, bicycle lanes should be designed to the left of the turn lane.
- Right turns on red should be prohibited for bicyclist safety.



**Two-Stage Turn Queue Boxes**

Two-stage turn queue boxes help facilitate left turns from a right-side bicycle facility for bicyclists at multi-lane signalized intersections. Bicyclists wishing to turn left proceed into the intersection as if crossing straight through but stop in the turn queue box until the signals change.

*Key Considerations*

- Typically used in locations with high volumes of left-turning bicyclists.
- Implementation is easiest on streets with on-street parking or separated bicycle lanes where there is space for bicyclists to stop without impeding through traffic.
- Two-stage turn queue boxes may result in increased delay for bicyclists.
- Right-turn on red movements must be restricted through signage and enforcement.

*Design Guidelines*

- Turn queue boxes should be painted with green and include a bicycle stencil and a turn arrow.
- Turn queue boxes should be located in a protected area outside of through vehicle lanes, bicycle lanes, and crosswalks.
- Turn queue boxes should be a minimum of 10’ wide in the through direction and a minimum of 6.5’ wide in the turning direction.

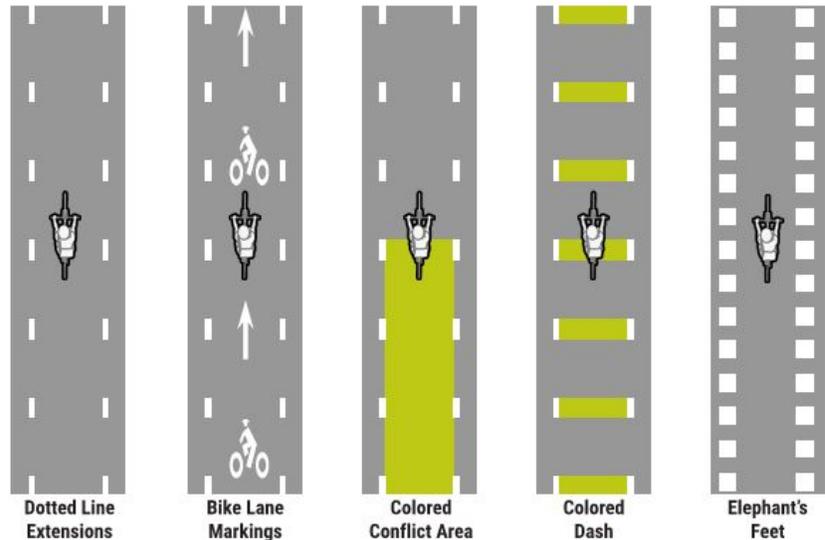


## Conflict Zone Considerations

Conflict zone markings may include green colored pavement, added warning signs, and yield lines for motor vehicle traffic. The desired outcome is increased awareness of the presence of bicyclists. Conflict zone treatments will be different in different locations based on roadway volumes, speeds, number of accesses, etc.

### Key Considerations

- Special pavement markings are the most common treatment for improving visibility and heightening the awareness of all roadway users in potential conflict zones. Simple dotted lane lines may be sufficient in some locations, but more noticeable green pavement should be considered in high-traffic areas or crossings with complex layouts.



### Facility Transitions

Transitions between different bicycle facility types require special attention and design considerations, especially when they require bicyclists to switch sides of the street. Conflict zone markings should be used wherever such transitions occur to alert all users that the roadway cross-section is changing, and bicyclists may be required to cross motor vehicle traffic. When the facility transitions occur at a signalized street intersection, bicyclists should be given a dedicated phase to cross without conflicting with motor vehicle traffic. Additional signage, raised crossings, bicycle signals, and two-stage turn boxes may be considered as well. At transitions between on-street and off-street facilities, wide curb ramps are needed to provide a smooth transition.

## Bicycle Detection and Signals

Bicycle movements may be controlled by the same signal phases that control motor vehicle movements, by pedestrian signals, or by bicycle-specific traffic signals to minimize vehicle conflicts and to improve crossing safety. Traditional three lens signal heads with green, yellow, and red bicycle stenciled lenses can be installed at standard signalized intersections. Flashing beacons are often used at unsignalized intersections to enhance bicyclist crossings. Signals and beacons may be activated passively through detection or manually by a push-button.

### Bicycle Detection

Automated detection can improve efficiency and reduce travel delay for bicycles in addition to increasing convenience and safety for bicyclists. There are five primary types of bicycle detection in use today:



- Loop detectors – induction loop embedded in the pavement
- Video detection – video camera aimed at bicyclist approaches that is calibrated to detect bicyclists
- Microwave – miniature microwave radar that picks up non-background targets
- Infrared detection – identify bicyclists by infrared radiation patterns they emit and are typically placed on one side of a facility
- Push buttons – self actuated buttons mounted to posts for actuation by bicyclists



Source: [www.bikepedimages.com](http://www.bikepedimages.com)

#### Key Considerations

- Detector sensitivity needs to be monitored and adjusted as necessary to ensure appropriate detection of bicyclists
- On streets with bicycle lanes and bikeable shoulders, detection should be located in locations where bicyclists are anticipated to travel/wait (typically in a bicycle box or immediately behind the stop bar in the bicycle lane)
- Signs and stencils are needed to direct bicyclists how to position their bicycle to activate signal if the detection is not in a dedicated bicycle lane, shoulder, or separated bike
- Push-button activation should have appropriate accompanying signage and be located so that bicyclists can activate the signal without dismounting

#### Bicycle Signals

Bicycle-specific signals may be appropriate to provide additional guidance and/or separate phases for bicyclists. Bicycle signals, in conjunction with advanced bicycle detection, can improve movement of bicyclists through intersections.

#### Key Considerations

- Bicycle signals are often considered at intersections with dedicated on-street bicycle facilities and high-volume turning movements
- Bicycle signals are typically accompanied by R10-10b signs.
- Signal timing must be designed so that there are no conflicting motor vehicle movements during the bicycle phase.
- A stationary, or “standing”, bicyclist entering the intersection at the beginning of the green indication can typically be accommodated by increasing the minimum green time on an approach
- A moving, or “rolling”, bicyclist approaching the intersection towards the end of the phase can typically be accommodated by increases to the red times (change and clearance intervals)



Source: [www.bikepedimages.com](http://www.bikepedimages.com)



## Signage and Wayfinding

Wayfinding signs are typically placed at decision points along bicycle routes – at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

### Benefits of Wayfinding Signage

When bicycle facilities are low stress, safe, and easy to navigate, the likelihood of attracting more “interested but concerned” riders for all trip types goes up. The following provides a summary of some of the key benefits of wayfinding signage:

- Familiarizes users with the bicycle network
- Identifies the best routes to destinations
- Overcomes a “barrier to entry” for infrequent bicyclists
- Signage that includes mileage and travel time to destinations may help minimize the tendency to overestimate the amount of time it takes to travel by bicycle
- Visually indicates to motorists that they are driving along a bicycle route and should use caution
- Passively markets the bicycle network by providing unique and consistent imagery throughout the jurisdiction/region

### Wayfinding Goals

Successful wayfinding allows users to reach their destinations efficiently and without confusion. Goals to be considered while developing a wayfinding signage program include:

- Simple messages – all information on wayfinding signs should be clear and concise. It should convey the message in as few words and graphics as possible. Since these



## Wayfinding

NACTO defines wayfinding as a system of comprehensive signing and/or pavement markings used to guide bicyclists to their destinations along preferred bicycle routes.

## WalkBoston Wayfinding Treatment Case Study



According to a Wayfinding Summary Report dated June 2017, WalkBoston utilized funding from the Massachusetts Department of Public Health to implement an on-street pavement marking wayfinding system. The project launched in 2014 with the implementation of three prototype on-street wayfinding decals to better understand durability and outcomes of the decals being used on different surface types. Additionally, the public was able to provide feedback and reactions to the prototypes. Overall, WalkBoston has had positive feedback and inquiries from other agencies indicating positive outcomes. Additional information about the decal prototype can be found at <https://walkboston.org/what-we-do/wayfinding/>.

signs are typically viewed as users are moving along a bicycle facility, people need to read and absorb the information quickly.

- Predictability – providing predictable information allows for users to anticipate and absorb information quickly. Wayfinding signs that include the same design, message, and branding, allowing for users to focus on content.
- Provide connections – the ultimate goal of wayfinding signage is to provide connections for all users and to allow them to integrate into the community – whether for social, recreation, or commute purposes. Understanding the direction and distance of other cities, trails, and key activity centers improves the user experience and will encourage bicycling for future trips.

### Wayfinding Signage Standards

NACTO’s *Urban Bikeway Design Guide* provides guidance on the three general types of wayfinding signs used for bicycle routes. **Table 6** provides a summary of their purpose, typical information provided, and placement guidance. The MUTCD provides bicycle sign guidance (Section 9B.20) and should be referenced to inform the application and placement of wayfinding signs (Section 9B.01).

**Table 6. Wayfinding Signage Guidance**

	Purpose	Information	Placement
<p><b>Confirmation Signs</b></p> 	<p>Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.</p>	<p>Can include destinations and distance/time. Do not include arrows.</p>	<p>Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign). Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.</p>
<p><b>Turn Signs</b></p> 	<p>Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings</p>	<p>Include destinations and arrows.</p>	<p>Near-side of intersections where bicycle routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.</p>
<p><b>Decision Signs</b></p> 	<p>Mark the junction of two or more bikeways. Inform bicyclists of the designated bicycle route to access key destinations.</p>	<p>Destinations and arrows, distances, and travel times are optional but recommended.</p>	<p>Near-side of intersections in advance of a junction with another bicycle route. Along a route to indicate a nearby destination.</p>



Additionally, providing information about key destinations is of critical importance to a wayfinding program. Key activity centers for consideration include:

- RTD transit stations
- Schools
- Local or regional parks and trails
- Civic and community destinations
- Major retail and employment centers

## Bicycle End-of-Trip Facilities & Amenities

### Bicycle Parking

Bicycle parking comes in many forms and is instrumental in attracting people to cycle for recreation, commute, and utilitarian purposes. Bicycle parking ensures that riders have a convenient, safe, and secure location to store their bicycles, both short-term and long-term. Broomfield has policy that encourages development to consider the inclusion of bike parking, but no requirements for short or long-term bicycle parking. Considerations for the various types of bicycle parking options are included in Table 5.



**Table 7. Bicycle Parking Needs and Types**

	User Needs	Preferred Types	Placement
Long-Term Bicycle Parking	<ul style="list-style-type: none"> <li>• Security</li> <li>• Protection from weather</li> </ul>	<ul style="list-style-type: none"> <li>• Bicycle lockers</li> <li>• Sheltered secure enclosure</li> </ul>	Varies with context, but typically located and designed to meet the needs of employees, residents, and public transit users
Short-Term Bicycle Parking	<ul style="list-style-type: none"> <li>• Close proximity to destination</li> <li>• Ease of use</li> <li>• Readily available and visible</li> </ul>	<ul style="list-style-type: none"> <li>• Inverted U</li> <li>• Post and ring</li> <li>• Wheel well secure</li> </ul>	To meet the needs of short-term users, it is recommended that short-term parking be less than 50' from an entrance/destination

Broomfield is home to two stations serving the US 36 Flatiron Flyer Bus Rapid Transit service. Bicycle parking at each of the stations includes a combination of short and long term bicycle parking:

*US 36 and Broomfield*

- 9 bicycle racks (18 bicycle parking spaces)
- 16 bicycle lockers

*US 36 and Flatirons*

- 8 bicycle racks (16 bicycle parking spaces)

Additional short-term bicycle parking is available at many municipal buildings, parks and commercial retail locations. Currently, Broomfield does not have a written policy requirement for development to include bicycle parking or required minimums for short or long term bicycle parking to accommodate visitors, customers and employees.



As bicycle facilities expand, consideration should be given to providing easy to use, safe, and secure bicycle parking. Detailed information about types of racks, placement, and installation can be found in the *Essentials of Bike Parking* produced by the Association of Pedestrian and Bicycle Professionals<sup>4</sup>.

### Short-term Bicycle Parking

Effective short-term bicycle parking should be located close to the entrance and visible. Weather protection and lighting are also important factors in location selection. Consideration to quantity depends on land-use and destinations. Broomfield may consider development of ordinance or development guidelines for minimum bicycle parking requirements.

### Long-term Bicycle Parking

The US 36 First and Final Mile study conducted by Commuting Solutions, a local non-profit transportation demand organization, in conjunction with corridor communities along US 36 in 2013. The study aimed to identify key projects and programs that reduce the difficulty and challenges faced by suburban transit passengers experience in accessing regional transit stations and activity centers such as employment, housing, shopping and recreation near the stations. The top three corridor strategies identified included secure overnight bicycle parking at regional transit stations, wayfinding signage and Eco Passes.

The 2014 Northwest Corridor Pedestrian and Bicycle Accessibility Study further refined the overnight secure bicycle parking concept as well as wayfinding branding and signage for the US 36 corridor. The plan identified 4 locations for secure bicycle parking in Broomfield including: two at US 36 & Broomfield Station and two at US 36 & Flatiron Station. Each shelter would be located on each side of US 36 for convenient access. Commuting Solutions secured a grant from DRCOG to fund Broomfield’s first secure bicycle parking shelter for US 36 and Broomfield station, which will be constructed in 2018. The remaining three remain to be prioritized for funding opportunities.



<sup>4</sup> [https://cdn.ymaws.com/www.apbp.org/resource/resmgr/Bicycle\\_Parking/EssentialsofBikeParking\\_FINA.pdf](https://cdn.ymaws.com/www.apbp.org/resource/resmgr/Bicycle_Parking/EssentialsofBikeParking_FINA.pdf)



## Rack Type

Currently Broomfield does not have standard rack type for municipal facilities or standard requirement for private development. There are some basic criteria that should be followed when selecting a rack type to ensure ease of use, security, and proper utilization to maximize capacity. Performance criteria for bicycle parking racks as noted by the Association of Pedestrian and Bicycle Professionals:

- Supports bicycle upright, without putting stress on wheels
- Accommodates a variety of bicycle types and attachments such as trailers
- Allows locking of frame and at least one wheel with a U-lock
- Provides security and longevity features appropriate for the intended location
- Rack use is intuitive, especially for first time users

Ensuring that public and private bicycle racks adhere to these criteria supports a bicycling culture by providing people with a safe place to secure their property upon reaching their destination. Ensuring that popular destinations such as government facilities, recreational facilities, transit stations, local employers and businesses have secure bicycle racks was noted from public input gathered. Broomfield may consider adopting bicycle parking minimums for short and long-term bicycle parking for new development as well a rack type standard.

The following rack types are recommended on **Figure 40**. Wheel-well secure racks are the most intuitive to use for a typical bicycle, easiest to use to allow locking of both the frame and front wheel to the rack and support the front wheel of the bicycle from getting knock over and creates the most neat and orderly looking bicycle parking spaces.

Proper installation of racks is required to ensure proper use and reduce encroachments into pedestrian through spaces. *APBP: Essentials of Bike Parking (2015)* provide guidance on racks types and recommended installation dimensions for a variety of typical location types.

## Beyond Bicycle Parking

To support bicycling, the provision of amenities at workplaces, schools, shopping and business centers and even parks or along trails that support people bicycling include:

- Safe and convenient access
- Shower facilities
- Changing rooms
- Lockers for personal storage
- Courtesy equipment (such as benches, hair dryers, towel service, hooks etc.)
- Air and repair equipment
- Drinking water / water bottle refill stations
- Toilets
- Outlets to charge electric bicycles

Broomfield currently does not have requirements, but encourages development to include end of trip facilities, including bicycle parking and amenities beyond bicycle parking. For public amenities along trails or parks there is no dedicated fund to improve and maintain facilities upon request. Public comment received through the Assessment indicated location specific and general comments regarding secure long-term bicycle storage, bicycle parking, bathroom facilities, water bottle refill stations, benches on trails, and outdoor workout stations.

**RACKS FOR ALL APPLICATIONS**

When properly designed and installed, these rack styles typically meet all performance criteria and are appropriate for use in nearly any application.

**INVERTED U**  
also called  
staple, loop



Common style appropriate for many uses; two points of ground contact. Can be installed in series on rails to create a free-standing parking area in variable quantities. Available in many variations.

**POST & RING**



Common style appropriate for many uses; one point of ground contact. Compared to inverted-U racks, these are less prone to unintended perpendicular parking. Products exist for converting unused parking meter posts.

**WHEELWELL-SECURE**



Includes an element that cradles one wheel. Design and performance vary by manufacturer; typically contains bikes well, which is desirable for long-term parking and in large-scale installations (e.g. campus); accommodates fewer bicycle types and attachments than the two styles above.

**HIGH-DENSITY RACKS**

These rack styles do not meet all performance criteria but may be appropriate in certain constrained situations.

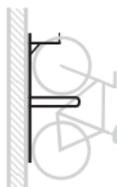
High-density rack systems can maximize the use of limited parking space, but they don't work for all users or bicycles. If installing these racks, reserve additional parking that accommodates bicycles with both wheels on the ground for users who are not able to lift a bicycle or operate a two-tier rack, or for bikes that are not compatible with two-tier or vertical racks.

**STAGGERED WHEELWELL-SECURE**



Variation of the wheelwell-secure rack designed to stagger handlebars vertically or horizontally to increase parking density. Reduces usability and limits kinds of bikes accommodated, but contains bikes well and aids in fitting more parking in constrained spaces.

**VERTICAL**



Typically used for high-density indoor parking. Not accessible to all users or all bikes, but can be used in combination with on-ground parking to increase overall parking density. Creates safety concerns not inherent to on-ground parking.

**TWO-TIER**



Typically used for high-density indoor parking. Performance varies widely. Models for public use include lift assist for upper-tier parking. Recommend testing before purchasing. Creates safety concerns not inherent to on-ground parking, and requires maintenance for moving parts.

Figure 40 – APBP Recommended Bicycle Rack Types

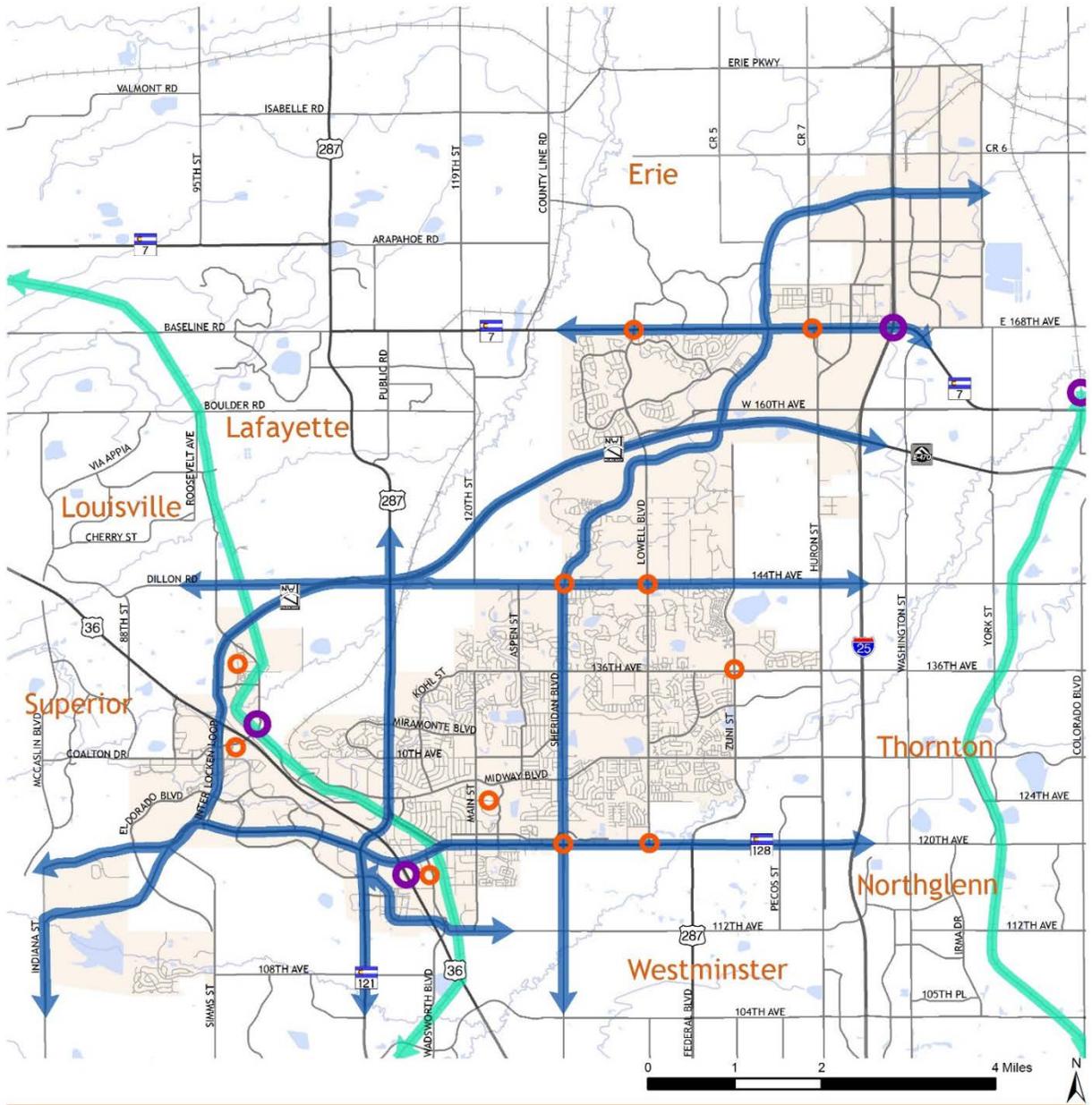


### Future Mobility Hub Considerations

Broomfield's 2016 *Transportation Plan* identifies 15 mobility hubs to serve as "major" and "minor" intermodal connectivity locations. Major- and micro-mobility hubs often emerge to support and provide access to major activity centers such as shopping centers, transit stations, recreation facilities, schools, etc., but are also dependent on land use, amenities, and connectivity options making each hub unique. For bicycle travel to be viable, especially for commuters, it is critical to have strong connectivity among modes. Intermodal connectivity allows a seamless transportation system facilitating easy and efficient movements among modes.

An example of intermodal connectivity is the U.S. Highway 36 & Broomfield BRT Station located at U.S. Highway 36 and Arista Place. This location serves as a Park-n-Ride for transit users, provides access to a variety of transit services (Flatiron Flyer BRT, local bus service, and Call-n-Ride), interfaces between the on-street and off-street bicycle network (U.S. 36 Bikeway and on-street bicycle lanes), and has adequate pedestrian infrastructure and provides wayfinding/traveler information. Intermodal connectivity points can also include a variety of public and/or private sector driven mobility options to support community needs such as electric vehicle charging stations, carsharing, bike parking, and bikesharing.

Consideration for bicycle connections, end-of-trip amenities and secure bicycle parking that interact with future mobility hubs will be a key to the success of the bicycle network. RTD's framework for Mobility Hubs and First & Final Mile Strategic Plan are key documents to consider.



Source: Broomfield GIS Department; CDOT; FHU GIS Department

**LEGEND**

- MobiHub
- Micro-MobiHub
- Key Corridors
- Key Rail Corridors
- Highways
- Streets
- Railroad
- Waterbody
- Creeks, Ditches, and Canals
- City and County of Broomfield

Figure 41. Future Mobility Hubs



## Grade Separation

Underpasses and overpasses are the safest type of crossing for bicyclists as they eliminate conflicts with motor vehicles; they are appropriate to consider when crossing a street with a wide cross section and high speeds and traffic volumes, and/or when the crossing is near an activity center or trail expected to attract a lot of active users. As shown in **Figure 37**, Broomfield has 22 existing grade separations that support the bicycle and pedestrian network. An additional 20 locations have been identified for future separation. Grade-separated crossings vary widely in terms of design, construction, and cost. Broomfield should consider opportunities to expand the network of overpasses and underpasses; future roadway construction and/or reconstruction projects are an opportune time to consider the addition of new grade separations when feasible.



Minimum hard surface path widths need to be re-evaluated, using the newest guidance available, for appropriate width for usage by different types of trail users of all ages and abilities to reduce conflicts, increase safety on high demand days and hours, wider paths also promote trail courtesy. Consideration of crusher fine shoulders for walking should be considered on key trail segments with high existing and potential pedestrian activity to promote separation of users as well as provide a softer walking and jogging surface

### Usage Considerations

The need and cost of grade-separated crossings are highly dependent on context. However, there are additional factors to be included in the planning and construction of grade separated crossings. **Table 8** provides a summary of the key benefits and challenges to be considered followed by **Table 9**, which summarizes Broomfield’s grade separated crossing design standards identified in the 2005 OSPRT Master Plan.

**Table 8. Grade Separated Crossing Considerations**

Benefits	Challenges	Siting Considerations	Design Considerations
<ul style="list-style-type: none"> <li>Increases user comfort and improves experience</li> <li>Reduces barriers and increases network connectivity</li> <li>Minimizes bicycle/vehicular conflict</li> <li>Reduces in fatal and serious bicycle crashes</li> <li>Opportunity to create a visual icon/community gateway</li> </ul>	<ul style="list-style-type: none"> <li>Costly to design and construct</li> <li>May pose a personal security risk if not well lit</li> <li>Susceptible to flooding (underpasses)</li> <li>Routine maintenance required for usability (sand and debris removal)</li> <li>Potential bicycle/pedestrian user conflict</li> <li>May attract transient populations</li> </ul>	<ul style="list-style-type: none"> <li>Proximity to desired travel route; no out of direction travel</li> <li>Availability of alternate crossings</li> <li>Perceived risk of crossing at-grade</li> <li>Distance/time to access and cross</li> </ul>	<ul style="list-style-type: none"> <li>Drainage</li> <li>Utilities</li> <li>Soil conditions</li> <li>Environmental impacts</li> <li>Adjacent property impacts</li> <li>Constructability/structure type</li> <li>User safety and security (e.g., lighting)</li> <li>Vertical ascent/descent to reach crossing, ADA accessibility</li> </ul>



Table 9. Grade Broomfield Grade Separated Crossing Design Standards

Bridge/Overpass	Underpass
<p>Minimum vehicle clearance under structure if crossing right of way:</p> <ul style="list-style-type: none"> <li>• 17' typical</li> <li>• 23' at railroad tracks</li> </ul>	<p>Minimum clearance for users:</p> <ul style="list-style-type: none"> <li>• 10' for non-equestrian use trails</li> <li>• 12' for equestrian use trails</li> </ul>
<p>Minimum width:</p> <ul style="list-style-type: none"> <li>• 8' clear trail surface</li> <li>• 10' clear for maintenance vehicle access</li> <li>• Consider additional 1' – 2' clearance from trail width on each side of trail to verticals such as railings</li> </ul>	<p>Minimum width:</p> <ul style="list-style-type: none"> <li>• 12' trail surface with 1' stamped concrete rumble strip on each side</li> <li>• May consider wider for maintenance vehicle access and safety</li> </ul>
<p>Maximum slope:</p> <ul style="list-style-type: none"> <li>• 5%</li> </ul>	<p>Maximum slope:</p> <ul style="list-style-type: none"> <li>• 5%</li> </ul>
<p>Railings and fences on structure:</p> <ul style="list-style-type: none"> <li>• 42" for pedestrian only facilities</li> <li>• 54" for multi-use facilities</li> <li>• 12' for structures with equestrian use</li> </ul>	<p>Railing and fences on structures:</p> <ul style="list-style-type: none"> <li>• 42" for pedestrian only facilities</li> <li>• 54" for multi-use facilities</li> </ul> <p>Separation for underpasses with natural drainage features:</p> <ul style="list-style-type: none"> <li>• It is preferable to avoid walls separating the drainage from the pedestrian trail, as the underpass will have a more open character that improves safety and visibility as well as appearance. If walls are necessary, heights should be minimized</li> <li>• Boulders should be used for retainage where feasible, and landscaping should be compatible with the natural character of the drainage way. Temporary closure of the underpass during relatively infrequent peak flood events is preferable to constructing large retaining walls</li> </ul>

Source: Adapted with clarifications from Broomfield's 2005 OSPRT Master Plan, Exhibit 8.5



## 5. Safe Routes to Schools Evaluation

Improving children's safety while walking and bicycling to school can help to encourage walking and biking and provide many benefits to the community including:

- Improving the walking and bicycling conditions around schools and neighborhoods
- Reducing cars and traffic around schools
- Health benefits for students and parents
- Bringing families, neighbors, school officials and community leaders together
- Inspiration to try taking more active trips on foot or bicycle for other purposes, contributing to the development of a lifelong habit and community wide norm of incorporating physical activity into daily life

According to the National Center for Safe Routes to School, in 1969 48% of children ages 5 to 14 regularly walked or rode a bicycle to school. Approximately 41% of children lived within one mile of school, 89% usually walked or bicycled to school. In 2009 that overall percentage of children ages 5 - 14 walking and bicycling to school has declined to 13%. In 2009, 31% live within one mile of school and only 35% of these children usually walk or bike to school.

The generational shift in the decline in walking and bicycling to school has occurred gradually over time, understanding the current factors that contribute to parents' travel to school decision is key to breaking down the barriers. The U.S. Centers for Disease Control conducted a national survey of the most common barriers, which included: distance to school (61%), traffic related danger (30%), weather (18%), crime danger (11%), opposing school policy (6%), other (15%).

A comprehensive approach to supporting and sustaining a culture of children and families walking and bicycling takes a multi-prong and time tested approach to support long term changes in the way students and parents choose to travel to and from

school and school culture attitudes around active transportation. The Six E's of Safe Routes to School are:

- Evaluation
- Engineering
- Education
- Encouragement
- Enforcement
- Equity

Currently, in Broomfield, the only schools that have active Safe Routes to School programming are the elementary and middle schools of Boulder Valley School District.

This Safe Routes to School Assessment is focused on the engineering aspect of building a program. The walking and bicycling environments around the following schools were evaluated, with a focus on how comfortable and safe these environments are for children:

- Academy of Charter Schools\*
- Aspen Creek School
- Birch Elementary School
- Broomfield Academy
- Broomfield High School\*
- Broomfield Heights Middle School
- Centennial Elementary School
- Coyote Ridge Elementary School
- Emerald Elementary School
- Holy Family High School
- Jefferson Academy High School
- Kohl Elementary School
- Legacy High School
- Meridian Elementary School
- Mountain View Elementary School
- Nativity School
- Prospect Ridge K-12 School
- Ryan Elementary School\*
- Thunder Vista P-8
- Westlake Middle School



The City and County of Broomfield’s maps of suggested walking routes were reviewed for the available schools. The maps reviewed for this assessment are available online.

Schools listed above with an asterisk (\*) do not have walking route maps. These maps, developed by Broomfield staff, indicate turns for suggested routes, the locations of all-way stop-controlled intersections, flashing beacons near school zones, traffic signals, school crossings and/or crosswalks, and pedestrian-activated crossings. Some of the maps also show underpasses for shared-use paths or pedestrian facilities like sidewalks.

In reviewing the school walking route maps, the project team found most of the suggested walking routes to be logical. The walking map review allowed for identification of more heavily-traversed walking routes and the crossings that may be most used by students.





## Approach to Identifying Infrastructure

Priority routes were developed based upon the suggested walking routes from Broomfield’s maps, sidewalk or trail connections to residential neighborhoods, and logical connections that are desirable paths for students. A majority of the priority routes were within the one-half mile network distance from the school campus. The network distance is the distance traveled using existing sidewalk or trail infrastructure, and better represents actual walking distances than the straight-line distance from the school. Both the one-half mile and one-quarter mile network distances are illustrated in the school bike and pedestrian network maps, included in **Appendix B**.

Many of the school campuses are located within a few blocks of each other, as shown on **Figure 41. 1**. In some cases, priority routes overlap, and these have been extended to combine priority routes from adjacent schools. The selected priority routes could in many cases serve multiple campuses, and improvements to infrastructure along these routes would benefit students walking to multiple schools. Additionally, the one-half mile straight-line distance has been illustrated in our maps, in order to understand the limitations on walking or biking due to the geometry of the existing bike and pedestrian networks around each school campus. Based upon the priority networks and the network distances, the project team identified a comprehensive list of identified challenges to bicycling and walking around the schools. Several factors were considered while developing infrastructure recommendations including:

- Crosswalks
- Priority route sidewalk conditions
- Accessible ramps
- Major street intersections

These items were reviewed and included on the Broomfield network maps for each school. The following describes these factors in more detail.

## Crosswalks

Intersections of priority routes within the one-quarter mile and one-half mile network distance buffers were assessed using aerial imagery and a desktop review to determine if marked crosswalks are provided. Additional intersections within the one-quarter mile network buffer were also reviewed based upon the proximity of the intersection to the school.

Each intersection was classified based upon the number of crosswalks that were present. Three categories were identified. Intersections that had marked crosswalks for all of the sidewalk segments at the intersection were classified as “All”. If a crosswalk was present at the intersection but not all of the sidewalks were linked with a marked crosswalk, the intersection was classified as “Partial.” Finally, intersections without any crosswalks were classified as “None.” These three designations are shown in the maps with colored asterisks at the identified intersections (**Appendix B**).

## Priority Route Sidewalk Conditions

Although sidewalks exist in the majority of Broomfield, the condition of the sidewalks was reviewed along the recommended priority routes. Three categories were created for the sidewalk condition:

- Standard
- Trail
- Needs evaluation

Standard sidewalks are at least five feet in width and allow for two students to walk side-by-side, or for a student to walk side-by-side with an accompanying parent.

The trail designation was given to existing paved trails or shared-use paths that provide connectivity through off-street infrastructure. In general, trails in Broomfield are of adequate width and add value to the schools and community by enhancing the non-motorized network.

Lastly, sidewalks that need evaluation were identified and are illustrated for priority networks



for each school. Sidewalks in this category are generally narrow “Hollywood”-style rolled curb attached sidewalks, approximately two feet wide, and are attached to the back of a mountable curb. These types of sidewalks reduce the comfort of pedestrians and do not provide adequate space for two people to walk side-by-side and do not meet minimum ADA requirements for through pedestrian space.

### Accessible Curb Ramps

Intersections within the one-half mile network distance were analyzed to determine whether ADA compliant curb ramps appeared to exist for all roadway crossings and if a detectable warning strip was present on existing ramps. Intersections were designated as needs evaluation or compliant.

A needs evaluation designation was given to intersections that did not provide ramps and/or detectable warning strips on both sides of the street for all crossings. ADA curb ramp compliance is not only essential for the accessibility of students but also for school staff, parents, and other family members that may travel to the school campuses by foot.

### Major Street Intersections

Several roadways were identified as major streets within the City and County of Broomfield. Most of these streets have higher traffic volumes, increased speeds, and are classified as arterials or connectors. Intersections of the recommended priority routes and roadways classified as major streets were identified. Several of these intersections are in close proximity to school campuses and should be designed with facilities to ensure safe crossing for children who walk or bike to school from the surrounding neighborhoods. Where these major intersections coincide with priority routes, the presence of crosswalks and ADA ramps is noted in the maps as outlined above.





## Improvement Recommendations

Based on the evaluations and spatial analyses, recommendations were developed to improve the safety and comfort of Broomfield students who bike or walk to school, and to encourage more students to do so.

Priority routes were identified using existing on-street or off-street walking networks. Infrastructure improvements are categorized as one of the following:

- Widening or improving sidewalks that need evaluation
- Enhancing pedestrian crossings at intersections
- New off-street connections

Although these recommendations focus on pedestrian infrastructure, most school children will ride bicycles on the sidewalk rather than in the street. Therefore, these enhancements to the walking environment will improve bicycling accommodations for children as well, if the sidewalk is built to accommodate safe walking and bicycling movements by providing adequate width and intersection treatments.

It may be helpful to go through the evaluation step first with the school(s) and/or district to provide insight to what changes might encourage more walking and bicycling the process may also assist with prioritizing infrastructure and scoping appropriate improvements.

Improvements on priority routes are listed in alphabetical order and do not imply any prioritization. It can be used as tool when evaluating school areas as a guide for evaluating potential improvements.

### Sidewalks that Need Evaluation

There are several locations with sidewalks that need evaluation in close proximity to schools. Widening sidewalks that are currently narrow will improve the pedestrian safety and comfort, as well as provide greater accessibility.



Table 10 lists the priority route streets that have sidewalks that need evaluation. Also shown in the table are the linear feet of improvement needed

(including sidewalks on both sides of the street), and the schools that would benefit from these improvements.



Table 10. Sidewalks that Need Evaluation on Priority Routes

Route Name	From Street	To Street	Linear Feet	School Benefitted
10th Avenue	Ash Street	Dexter Street	4,654	Birch Elementary School
10th Avenue	Highway 287	Hemlock Way	5,438	Kohl Elementary School, Broomfield High School, Nativity School
11th Avenue	Ash Street	Birch Street	2,080	Birch Elementary School
11th Avenue	Laurel Street	Miramonte Street	2,790	Kohl Elementary School, Broomfield High School
3rd Avenue	Laurel Street	Garnett Street	3,020	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
3rd Avenue Drive	Midway Boulevard	Emerald Street	1,370	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
4th Avenue	Jade Street	Garnett Street	1,458	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
6th Avenue	Emerald Street	Daphne Street	632	Kohl Elementary School, Broomfield High School, Nativity School
9th Avenue	Hemlock Way	Emerald Street	1,650	Broomfield High School, Kohl Elementary School, Nativity School, Emerald Elementary School
9th Avenue	Birch Way	Sheridan Boulevard	2,332	Birch Elementary School
Ash Street	6th Avenue	10th Avenue	2,178	Birch Elementary School
Birch Street	10th Avenue	14th Avenue	6,296	Birch Elementary School
Birch Street	Midway Boulevard	10th Avenue	3,360	Birch Elementary School
Birch Way	9th Avenue	10th Avenue	1,160	Birch Elementary School
Daphne Street	Midway Boulevard	6th Avenue	706	Kohl Elementary School, Broomfield High School, Nativity School
Dexter Street	10th Avenue	Northmoor Drive	1,010	Birch Elementary School
Dillon Rd	Fenton St	Sheridan Boulevard	3,576	Holy Family High School
Eagle Way	Emerald Street	Main Street	3,366	Kohl Elementary School, Broomfield High School, Nativity School
Elmhurst Place	Garnette Street	Emerald Street	1,238	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
Emerald Street	1st Avenue	3rd Avenue Drive	4,818	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
Emerald Street	6th Avenue	Miramonte Street	4,252	Kohl Elementary School, Broomfield High School, Nativity School
Garnett Street	1st Avenue	4th Avenue	4,880	Emerald Elementary School, Nativity School, Kohl Elementary School
Hemlock Way	10th Avenue	Kohl Street	2,396	Kohl Elementary School, Broomfield High School, Nativity School
Kohl Street	Midway Boulevard	Miramonte Boulevard	7,990	Broomfield High School, Kohl Elementary School, Nativity School, Emerald Elementary School



Route Name	From Street	To Street	Linear Feet	School Benefitted
Main St	W 120th Ave	W 118th Ave	2,190	Broomfield Academy, Emerald Elementary School, Nativity School, Kohl Elementary School
Perry Street	121st Street	Deadend (future trail)	1,200	Mountain View Elementary School, Academy of Charter Schools
W 120th Ave	Emerald Street	Larimer Street	5,694	Broomfield Academy, Emerald Elementary School, Nativity School
W 1st Ave	Laural Street	Emerald Street	5,074	Broomfield Academy, Emerald Elementary School, Nativity School
W 1st Ave	Emerald Street	Main Street	3,052	Broomfield Academy, Emerald Elementary School, Nativity School



### Intersection Crossing Improvements

Improving crossings at the intersections surrounding each school campus should be prioritized to ensure the safety of students, parents, and school staff.

Criteria used in the analysis of intersections along priority routes included:

- Proximity to school campus
- Existing crosswalks
- Major street intersections
- ADA curb ramp compliance

The recommended priority intersection improvements were developed based upon a qualitative review of these criteria. General recommendations for all listed intersections are focused on ensuring that crosswalks are marked as appropriate and curb ramps meet ADA standards.

In addition to providing marked crosswalks, signage, and ADA-compliant ramps, major street intersections and high-use pedestrian locations adjacent to school campuses should be evaluated for the appropriateness of enhanced pedestrian crossing treatments and/or facilities. These facilities may include curb extensions, raised crosswalks, hybrid pedestrian treatments such as Pedestrian Hybrid Beacons, also known as High-Intensity

Activated crosswalk (HAWK) signals or rectangular rapid flash beacons (RRFBs), pedestrian refuge islands, or other facilities that increase the safety of pedestrians at designated crossings.

Evaluation should be based on frequency of crossings by pedestrians, sight distances for pedestrians and motorists, crossing distances for pedestrians, motor vehicle volumes, and prevailing motorist speeds. It should be noted that not every intersection is required to have marked crosswalks but that intersections identified should be reviewed for appropriate markings by the City Traffic Engineer.

**Table 11** identifies the recommended intersection improvement locations at major street intersections, based on the absence of marked crosswalks and the need to evaluate for crosswalk markings and ADA-compliant ramps. Each of the locations identified in **Table 11** has non-compliant ADA ramps.

**Table 12** identifies all locations at connector and local street intersections that were identified as needing evaluation for crosswalks and ADA-compliant ramps. While these locations may not currently have full crosswalks and/or ramps, they should not necessarily be targeted for improvements.

**Table 11.** Major Street Intersections Needs Evaluation for Crosswalk and ADA-compliant Ramps

Crosswalk	Route 1	Route 2	School(s) Affected
Partial	Broadlands Dr	136 <sup>th</sup> Ave	Coyote Elementary School
No	136 <sup>th</sup> Ave	Trail	Legacy High School, Westlake Middle School
Partial	135 <sup>th</sup> Ave	Westlake Dr	Legacy High School, Westlake Middle School
No	Westlake Dr	Grove Way	Legacy High School, Westlake Middle School
No	Grove Way	Westlake Dr	Centennial Elementary School
No	116 <sup>th</sup> Ave	Main St	Jefferson Academy High School
Partial	Birch St	10 <sup>th</sup> Ave	Birch Elementary School
No	Dexter St	10 <sup>th</sup> Ave	Birch Elementary School
Partial	Lotus Way	Kohl St	Broomfield High School, Kohl Elementary School, Nativity School
No	Laurel St	10 <sup>th</sup> Ave	Kohl Elementary School
No	Marble St	10 <sup>th</sup> Ave	Kohl Elementary School
Partial	132 <sup>nd</sup> Cir	Westlake Dr	Centennial Elementary School, Westlake Middle School



Crosswalk	Route 1	Route 2	School(s) Affected
No	133 <sup>rd</sup> Ave	Westlake Dr	Centennial Elementary School, Westlake Middle School
Partial	Main St	2nd Ave	Broomfield Academy, Emerald Elementary School, Nativity School
Partial	144th Ave	Sheridan Blvd	Holy Family High School
Partial	144th Ave	Lowell Blvd	Holy Family High School
Partial	144th Ave	Karly Way	Holy Family High School
No	Middle Peak Dr	Lowell Blvd	Thunder Vista P - 8, Prospect Ridge Academy
Partial	Main St	119th Ave	Broomfield Academy, Emerald Elementary School, Nativity School
No	Sheridan Blvd	Spyglass Dr	Holy Family High School

**Table 12. Minor Street Intersections Needs Evaluation for Crosswalks and ADA-compliant Ramps**

Crosswalk	Route 1	Route 2	School(s) Affected
Partial	BROOKSIDE DR	ASPEN CREEK DR	Aspen Creek Elementary School
Partial	ASPEN CREEK DR	PTARMIGAN DR	Aspen Creek Elementary School
No	PTARMIGAN DR	Trail	Aspen Creek Elementary School
Partial	MEADOWBROOK DR	ASPEN CREEK DR	Coyote Elementary School, Aspen Creek Elementary School
No	TEAL CREEK CT	ASPEN CREEK DR	Coyote Elementary School, Aspen Creek Elementary School
Partial	SAGE BRUSH CT	BROOKSIDE DR	Coyote Elementary School, Aspen Creek Elementary School
No	MEADOWBROOK DR	PTARMIGAN DR	Coyote Elementary School, Aspen Creek Elementary School
Partial	MADISON LN	MCKAY PARK CI	Meridian Elementary School
Partial	MCKAY PARK CI	MCKAY PARK DR	Meridian Elementary School
No	LAKE VISTA DR	WATERSIDE LN	Meridian Elementary School
Partial	WATERSIDE LN	FAIRWIND LN	Meridian Elementary School
No	FAIRWIND LN	Trail	Meridian Elementary School
Partial	FAIRWIND LN	MCKAY PARK CI	Meridian Elementary School
No	MCKAY PARK CI	MCKAY LANDING PY	Meridian Elementary School
Partial	MCKAY PARK CI	Trail	Meridian Elementary School
No	134TH AV	Trail	Legacy High School, Westlake Middle School
No	132ND CT	Trail	Centennial Elementary School
No	ALCOTT ST	BRYANT WY	Legacy High School, Westlake Middle School
No	BIRCH ST	Trail	Birch Elementary School
Partial	BIRCH ST	11TH AV	Birch Elementary School
No	10TH AV	EMERALD ST	Broomfield High School, Kohl Elementary School, Nativity School
No	9TH AV	EMERALD ST	Broomfield High School, Kohl Elementary School, Emerald Elementary School, Nativity School
Partial	HEMLOCK WY	9TH AV	Broomfield High School, Kohl Elementary School, Emerald Elementary School, Nativity School
Partial	6TH AV	DAPHNE ST	Broomfield High School, Kohl Elementary School, Emerald



Crosswalk	Route 1	Route 2	School(s) Affected
			Elementary School, Nativity School
No	6TH AV	KOHL ST	Emerald Elementary School, Nativity School, Kohl Elementary School
No	4TH AV	Trail	Emerald Elementary School, Nativity School, Kohl Elementary School
Partial	3RD AV	GARNET ST	Emerald Elementary School, Nativity School, Broomfield Academy
Partial	ELMHURST PL	GARNET ST	Emerald Elementary School, Nativity School, Broomfield Academy
Partial	3RD AVENUE DR	EMERALD ST	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
Partial	BERYL WY	EMERALD ST	Emerald Elementary School, Nativity School, Broomfield Academy
No	EMERALD ST	DAPHNE WY	Emerald Elementary School, Nativity School, Broomfield Academy
No	2ND AV	IRIS ST	Emerald Elementary School, Nativity School, Broomfield Academy
No	3RD AV	HEMLOCK ST	Emerald Elementary School, Nativity School, Broomfield Academy
No	3RD AV	IRIS ST	Emerald Elementary School, Nativity School, Broomfield Academy
No	3RD AV	JADE ST	Emerald Elementary School, Nativity School, Broomfield Academy
No	3RD AV	KOHL ST	Emerald Elementary School, Nativity School, Broomfield Academy
Partial	IRIS ST	10TH AV	Broomfield High School, Kohl Elementary School, Nativity School
Partial	JADE ST	10TH AV	Broomfield High School, Kohl Elementary School, Nativity School
No	HEMLOCK WY	FLINT WY	Broomfield High School, Kohl Elementary School, Nativity School
No	FLINT WY	GARNET ST	Broomfield High School, Kohl Elementary School, Nativity School
No	FERN AV	FOREST VIEW ST	Mountain View Elementary School
No	FERN AV	PERRY ST	Mountain View Elementary School
No	WHIPPOORWIL ST	FERN AV	Mountain View Elementary School
No	RIVERA ST	FERN AV	Mountain View Elementary School
Partial	135TH AV	CLAY PL	Legacy High School, Westlake Middle School
Partial	CAPITAL CT	BROADLANDS DR	Coyote Elementary School
No	SUNLIGHT LN	BROADLANDS DR	Coyote Elementary School
No	BROADLANDS DR	LONGS CT	Coyote Elementary School
No	CRESTONE CI	BROADLANDS DR	Coyote Elementary School
No	HEMLOCK ST	4TH AV	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
No	IRIS ST	4TH AV	Emerald Elementary School, Nativity School, Kohl Elementary School, Broomfield Academy
No	FLINT WY	9TH AV	Broomfield High School, Kohl Elementary School, Emerald Elementary School, Nativity School
No	GARNET ST	9TH AV	Broomfield High School, Kohl Elementary School, Emerald Elementary School, Nativity School



Crosswalk	Route 1	Route 2	School(s) Affected
No	INDIAN PEAKS PY	Trail	Prospect Ridge Academy
No	115TH AV	JAY ST	Ryan Elementary School
No	115TH AV	INGALLS ST	Ryan Elementary School
No	115TH AV	HARLAN ST	Ryan Elementary School
Partial	115TH AV	114TH PL	Ryan Elementary School
No	115TH AV	DEPEW WY	Ryan Elementary School
Partial	115TH AV	DEPEW CT	Ryan Elementary School
No	118TH PL	NEWTON ST	Academy of Charter Schools
No	118TH PL	OSCEOLA ST	Academy of Charter Schools
No	118TH PL	QUITMAN ST	Academy of Charter Schools
No	118TH PL	BADBURN BD	Academy of Charter Schools
No	PERRY ST	121ST PL	Mountain View Elementary School, Academy of Charter Schools
No	1ST AVE	AGATE WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	BERYL WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	CORAL WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	DAPHNE WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	EMERALD ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	EMERALD ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	FLINT WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	GARNET ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	HEMLOCK ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	HEMLOCK WAY	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	IRIS ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	KAHOL ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	LAUREL ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	1ST AVE	JADE ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	2ND AVE	IRIS ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	2ND AVE	HEMLOCK ST	Broomfield Academy, Emerald Elementary School, Nativity School
No	144TH AVE	AUGUSTA DR	Holy Family High School
No	144TH AVE	KARLY WAY	Holy Family High School



Crosswalk	Route 1	Route 2	School(s) Affected
No	CRAFTSMAN WAY	SPYGLASS DR	Holy Family High School
No	BUNGALOW WAY	SPYGLASS DR	Holy Family High School
No	COTTAGE WAY	SPYGLASS DR	Holy Family High School
No	WRIGHT WAY	SPYGLASS DR	Holy Family High School
No	MISSION WAY	SPYGLASS DR	Holy Family High School
No	AUGUSTA DR	SPYGLASS DR	Holy Family High School
No	AUGUSTA DR	NELSON DR	Holy Family High School
No	AUGUSTA DR	FAIRWAY LN	Holy Family High School
No	SHERIDAN BLVD	CRIMSON STAR DR	Holy Family High School
No	FAIRWAY LN	AUGUSTA DR	Holy Family High School



### New Connections

Gaps within the sidewalk and trail network were identified through the mapping of the one-quarter and one-half mile network distances. There are several neighborhoods that are in close proximity to school campuses but require a greater travel distance due to barriers or gaps in the existing network.

**Table 13** identifies several new connections that may be considered to improve the sidewalk and trail network and capture additional residential neighborhoods within a comfortable walking distance from Broomfield schools. These connections should be further evaluated to determine if they should be wide (10' minimum) trail-type connections or narrower (5' minimum) sidewalk-type connections.

**Table 13. Recommended New Connections**

Adjacent School	Connection
Broomfield Heights Middle School	Two connections are proposed to connect Daphne Street to the Gate 'N Green neighborhood to the east.
Aspen Creek Elementary School	Connect Fox Ridge Drive through an off-street paved trail behind the school to the existing trail south of the campus.
	Formalize trail connection between Teal Creek Drive and Sage Brush Court.
Mountain View Elementary School	Develop connections to the west of the school to link to Forest View Street and Hawthorne Drive.
Holy Family High School	Ensure students have access through the gate on the eastern side of Sheridan Pkwy, northwest of the track.



## The Six E's of a Comprehensive Safe Routes to School Program

A comprehensive approach to supporting children and families walking and bicycling to school goes beyond infrastructure improvements such as crosswalks, sidewalk and bike racks. A multi-prong and time tested approach supports long term changes in the way students and parents choose to travel to and from school and school culture attitudes around active transportation. The following strategic approach is adapted from is from the Safe Routes to School National Partnership, more information can be found at [www.saferoutespartnership.org](http://www.saferoutespartnership.org):

### Evaluation

Long-term Safe Routes to School programs should kick-off with a thorough evaluation of the situation with the school and/or district. The information gathered from this evaluative process can inform an accurate snapshot of the realities of student perception, concerns of parents, assessment of the physical environment around the school, including a scan of the policies that may or may not support walking and bicycling.

There are numerous methods for quickly collecting this information. Surveys of parents help reveal why parents are driving their children to school instead of allowing them to walk or bicycle, and will provide insight into what changes might encourage a shift in their behavior. Student surveys elicit the attitudes of the youth, and help demonstrate how to craft a program that will be appealing to the younger generation.

It's also important to know, before Safe Routes to School interventions begin, what percentages of students are walking, biking, taking the bus, being driven alone, and carpooling to school. Taking this baseline measurement will help you gauge the effects of the program on student travel choices. Student in-class travel tallies, including a record of the weather and time of year, should be taken throughout several days in September and May of each school year.

Evaluation data are key to determining the scope and the success of a Safe Routes to School program. Using surveys to inform a baseline of information is a great starting point to understanding travel choices at the school or district and provide the foundation for an effective, targeted Safe Routes to School program. The National Center for Safe Routes to School provides a national system for collecting standardized Student Travel Tally and Parent Survey information. The platform can also generate summary reports to easily share findings with stakeholders ([www.saferoutesinfo.org](http://www.saferoutesinfo.org))

### Engineering

During the evaluation process, survey data will likely indicate that there are significant concerns about the designs of streets, intersections, lack of sidewalks/crosswalks/signage or poorly timed traffic lights. Improvements to the built environment through engineering are a critical component of Safe Routes to School. Many successful programs include a thorough community assessment of the physical barriers for children walking and bicycling to school.

Safe Routes to School programs often organize [walking and bicycling audits](#) so that parents and school administrators can join city transportation officials and police officers in walking the routes to school and identifying everyday problems that children encounter and address concerns voiced in the surveys. These audits, sometimes referred to as "walk-a-bouts", can also identify opportunities such as short-cuts and preferred routes that children could take to schools.

Through a community-wide approach to engineering, a wish list of capital improvements can be generated and separated into two categories: short-term improvements and long-term improvements. Short-term improvements such as landscaping maintenance, altering the timing of traffic lights, painting crosswalks or



installing stop signs are immediate fixes which can be done on a small budget within a short time frame, often through the use of a city's general funds. Long-term needs such as installing sidewalks, pathways, bridges and reconstructing intersections should be prioritized as part of the capital improvement plan for the city.

## Education

Education is always an important component for programs that seek long-term, institutional cultural shift. As Safe Routes to School is multi-disciplinary in nature, there are vast opportunities for educational outreach to students, parents, school staff and the community.

Partnerships with local groups and organizations, such as Bicycle Colorado, can assist with developing and sustaining [bicycle and pedestrian safety training](#) in the classroom and in the field to teach children the basics associated with walking and bicycling with traffic. Young elementary school children (6-8 years old) are taught skills such as how to cross the street, not to dart in front of cars and how to look for cars when walking past driveways. When children reach the fourth and fifth grades (8-10 years old), they are often taught the basics of bicycling, including balancing, signaling, following traffic rules and how to properly wear a helmet. Sometimes partnerships with local law enforcement can be created. Police officers can be brought into schools to instruct children what to do when approached by a stranger, and many police officers will also help with traffic safety training.

Through educational programs, parents are asked to follow the rules of the road when they are driving, walking and bicycling. They are encouraged to practice walking and bicycling with their children, as traffic safety is learned behavior that can only be acquired through hands-on experiences. Additionally, driver safety campaigns can extend to high school students and to the entire community, so that everyone becomes aware of the fact that children are walking and bicycling and that sharing the road can be a matter of life or death.

## Encouragement

Special events have been proven effective in inspiring students, parents, elected officials and school leaders to try something new, which often results in the development of ongoing programs to encourage walking and bicycling. [Walk to School Day](#) and [Bike to School Day](#) are some of the most popular events taking place at schools across the country each year.

Contests, which can foster individual and classroom competition, also help to get kids out of cars and onto feet and bikes. Other successful encouragement programs facilitate ways for parents to walk and bicycle with groups of children who live together in a neighborhood. Through the formation of "walking school buses" and "[bike trains](#)," parents can take turns transporting groups of children eliminating many parental fears of walking and bicycling by ensuring a supervised commute and creating strong community cooperation. Schools can regularly collect travel data from students and submit to the national database to provide on-going evaluative information to track behavior changes and effectiveness of programmatic efforts.



## Enforcement

An active partnership with local law enforcement to ensure that traffic laws are obeyed in the vicinity of schools (this includes enforcement of speeds, yielding to pedestrians in crosswalks and proper walking and bicycling behaviors) can help foster better communication between both schools and city traffic engineers. They may provide assistance in initiating community enforcement such as crossing guard programs and student safety patrols. Enforcement increases awareness and reduces the frequency of crime and traffic safety problems. Examples include enforcing traffic violations, enforcing pick-up and drop-off procedures, addressing environmental concerns such as abandoned houses, litter and dogs, and creating neighborhood watch programs.

## Equity

Ensuring that Safe Routes to School initiatives are benefiting all demographic groups, with particular attention to ensuring safe, healthy, and fair outcomes for students with disabilities, low-income students, Native American students, students of color, female students, LGBTQ students, students whose families speak a language other than English, homeless students, and other demographic groups. It is important to support safe, active, and healthy opportunities for all children and families. Equity concerns should be incorporated throughout the other E's to understand and address obstacles, create access, and ensure safe and equitable outcomes.



## 6. Creating a Walk and Bicycle Friendly Community

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### What is a Bicycle Friendly Community?

The League of American Bicyclists (League), a national organization, began a program to evaluate and assist communities throughout the United States to understand what it takes to create a bicycle friendly community. A community recognized by the League as a BFC<sup>SM</sup> is one that encourages people to bicycle for transportation and recreation through what is known as the The Five Es:

- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation

This five pronged approach, similar to the Safe Routes to School program, emphasizes that to create and sustain a bicycle friendly community and culture, strategic programmatic efforts beyond building infrastructure are key to success.

### The Building Blocks of Bicycle Friendly Communities

Each year the League solicits applications from interested communities to apply for a designation; each community receives a report card and may receive a designation from Honorable Mention, Bronze, Silver, Gold, Platinum to Diamond Level. In addition to community evaluations, businesses, universities and states may also apply. According to the League the application process helps communities create new partnerships and momentum for bicycle improvements, allows them to gather essential bicycle-related data in one place, and the result will show political leadership how each community stacks up against similar communities all over the nation. In addition, each applicant receives customized feedback and technical assistance. For more information about the Bicycle Friendly America Program, visit: <https://bikeleague.org/bfa>

Below is a brief description of each of the 10 Building Blocks that appear on the League of American Bicyclists Bicycle Friendly Community report cards.

- **High Speed Roads with Bicycle Facilities** - This building block reflects the reported bicycle facilities on roads with posted speed limits of more than 35 mph.
- **Total Bicycle Network mileage to Total Road Network Mileage** - This building block reflects the entirety of bicycle facilities, located on and off-road, divided by the reported centerline miles of all roadways. The average Bronze community has a ratio of roughly 1 mile of bike network for every 4 miles of road network.
- **Bicycle Education in Schools** - This building block reflects the percentage of elementary, middle, and high schools that offer bicycle education and the type of education offered at each school. Prevalence and type are used to create descriptive categories, with the average Bronze having average Bicycle Education in Schools.
- **Share of Transportation Budget Spent on Bicycling** - This building block reflects the reported percentage of each community's total transportation budget, over the past 5 years, invested in bicycle projects. The average Bronze community reports that 9% of its transportation budget is invested in bicycle projects.



- **Bike Month and Bike to Work Events** - This building block reflects the number of events promoted as part of bike month in each community. The number of events is used to create descriptive categories, with the average Bronze having either average or Good Bike Month and Bike to Work Events.
- **Active Bicycle Advocacy Group** - This building block reflects reported bicycle, active transportation, and transportation equity advocacy groups. Over 90% of communities that apply report the existence of an advocacy group in their community.
- **Active Bicycle Advisory Committee** - This building block reflects whether a bicycle advisory committee exists and how often it is reported to meet. The average Bronze community has a bicycle advisory committee that meets roughly every two months.
- **Bicycle Friendly Laws & Ordinances** - This building block reflects local ordinances or state laws that are reported to protect or restrict bicyclists in each community. The number of restrictive laws is subtracted from the number of protective laws and that number is used to create descriptive categories. The average Bronze community has between acceptable and average Bicycle Friendly Laws & Ordinances.
- **Bike Plan is Current and is Being Implemented** - This building block reflects reported information on the existence of a bike plan, the age of the bike plan, whether that bike plan has goals, and whether those reported goals are being met. Nearly 70% of communities that apply report having a bike plan that is current and is being implemented.
- **Bike Program Staff to Population** - This building block reflects reported information on the number of full-time equivalent employees in each community and the population of each community. It is calculated by dividing the population of each community by the reported full time equivalent employees, so this statistic can be higher than the population of a community. It is reported in the number of thousands of residents per one full-time staff person. The average Bronze community has 77,000 residents per one dedicated staff person.

To learn more about the specific data used and how building blocks are calculated, see this [Guide to the Bicycle Friendly Community Report Card](https://bikeleague.org) available from <https://bikeleague.org>.

**Figure 42** shows the spectrum of qualifiers and key outcomes related to the League of American Bicyclists Building Blocks of a Bicycle Friendly Community.





## What is a Walk Friendly Community?

Similar to the League's Bicycle Friendly Community Program, the University of North Carolina's Highway Safety Research Center (HRSC) offers a Walk Friendly Communities Program. According to HRSC, to be truly Walk Friendly, a community must address and prioritize pedestrian needs in all program areas, from developing plans and building sidewalks to establishing and monitoring performance measures and evaluating projects. Communities should build programs that incorporate all of these strategies to comprehensively address walking and pedestrian safety.

### Strategies to Build a Walk Friendly Community

Twice a year HRSC solicits applications to the program. Communities are evaluated and if applicable given a designation from Honorable Mention, Bronze, Silver, Gold or Platinum Level. HRSC's Walk Friendly Communities Program notes that a designation as a Walk Friendly Community sets up a community as an example among peer cities and raises local awareness about the value of supporting a walkable environment. All applicant communities receive detailed technical feedback, which provides professional third party perspective on what a community is doing right and what can be improved. Communities can build HRSC's suggestions into current programs and future plans. Each community is evaluated on the following base criteria of strategies:

- **Community Data & Evaluation** - A community's ability to track and measure travel behavior, safety, the condition of its infrastructure and the impact of its projects is critical for developing performance-based programs. Having these tools at its disposal—and the staff support to do the leg-work —will enable a community to understand its strengths and weaknesses.
- **Planning and Policy** - Plans and policies serve as the framework for developing safe, comfortable and connected pedestrian networks. With comprehensive plans and policies, a community can be proactive (rather than reactive) in addressing issues of pedestrian accessibility, safety, and comfort.
- **Engineering and Design** - Designing, engineering, operating, and maintaining quality roadways and pedestrian facilities are all critical elements of becoming a Walk Friendly Community. Designers and engineers have a wide range of design solutions and technologies at their disposal that provide a safer, inviting, and more accessible street for people walking.
- **Education and Encouragement** - Education and encouragement are essential components of a well-rounded pedestrian program. These initiatives inform, inspire, motivate, or reward people for using active transportation.
- **Law Enforcement** - Communities that have created comfortable walking environments through engineering improvements or urban design features may still have safety concerns if traffic laws are not properly understood or adequately enforced. Enforcement works best when implemented in conjunction with education and awareness activities, with an approach that acknowledges and prioritizes equity.



# 7. Infrastructure Implementation Plan

## Implementation Approach

The networks identified in Chapter 3, and the improvement opportunities identified in Chapters 4 and 5 will help Broomfield to realize the vision of a well-connected bicycle and pedestrian network that encourages walking and bicycling for travel and recreation for all ages and abilities.

The implementation of the network will occur over time based on the available resources. Recognizing that more than 140 projects are needed to create the bike network and to fill in the missing sidewalk gaps, the implementation plan places a priority on connecting the network and providing the lowest stress level reasonably feasible.

The projects listed provide information to guide suggested projects to improve the network. The list is intended to be updated as needed by staff. More comprehensive planning and study need to be completed to develop a more robust list of Capital Improvement Projects for more complicated key corridors and routes.

## Prioritization of Projects

The proposed Bike Network, presented in Chapter 3, was divided into discrete projects. The list of projects is intended to be starting point and living document that may be updated regularly by staff. Additionally, sidewalk projects were identified to complete missing sidewalk segments along the Connector and Arterial street network. The resulting projects are shown on **Figure 43** and include:

- 18 previously identified Capital Improvement Program (CIP) projects
- 25 Trail projects
- 44 On-street bike projects
- 7 Intersection or crossing enhancement projects
- 11 Grade separation projects
- 40 Sidewalk projects

## Evaluation Criteria

Each project was given a score of 1, 2, or 3 for each evaluation criterion, as described in **Table 14**. A score of 1 indicates a relatively low need, while a score of 3 indicates a relatively high need. The project’s scores in the eight categories were summed for a total score ranging from 8 to 24.

## Project Scoring Results

The project evaluation criteria and scoring process were applied to the projects in two categories:

1. Bicycle Network Projects, including projects identified for the:
  - Arterial Bike Lane Network
  - Low Stress Network
  - Major Trail Network (including crossings)
2. Sidewalk Projects, these projects include the missing gaps on:
  - Connector streets
  - Arterial streets

**Appendix C** provides the full list of project scores. The City and County of Broomfield is not committed to implementing the recommendations according to the proposed prioritization. It is intended that the list of projects can be continually updated as project are completed and new project needs are identified.

The projects are prioritized to help focus resources on those projects that would provide the greatest benefits to Broomfield residents, while also providing Broomfield the flexibility to respond to changing conditions and opportunities that may arise.

The prioritized Bike Network projects are shown in **Table 15**, **Table 16**, **Table 17**, **Table 18** and the prioritized Sidewalk projects are shown in **Table 19**.





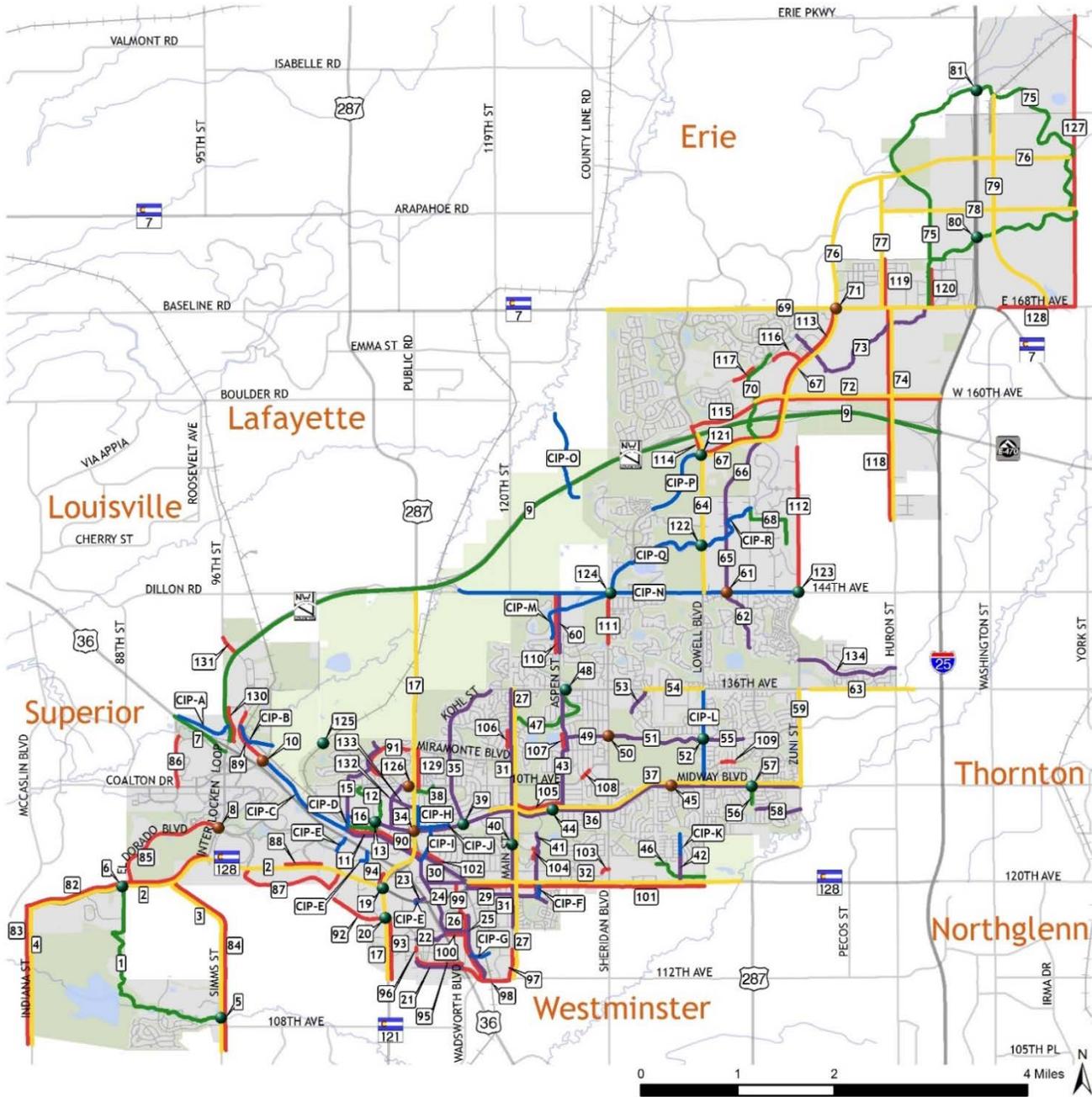
Table 14. Evaluation Criteria and Scoring Guide

	1	2	3
Collision History (5 years)	No history of bike or ped collisions within project area	1 or 2 bike or ped collisions within project area	3+ bike or ped collisions within project area
Pedestrian Demand <sup>1</sup>	Low, Low/Moderate	Moderate, Moderate/High	High, Very High
Short Trip Volume <sup>1</sup> (Future)	Low	Medium	High
School Zone <sup>2</sup>	None	Indirect Access	Direct Access
Transit	None	Access micro-mobility hub or bus stop	Access to mobility hub
Network <sup>3</sup>	Arterial Bike Lane Network	Low Stress Network	Major Trail Corridor
Cost	High Cost	Moderate cost	Low cost
Barrier Elimination	None	Barrier reduced or improved	Major barrier eliminated
Public Input (received during 2016 outreach effort)	None	Some	Many

<sup>1</sup> Pedestrian Demand and future short trip volume averaged for demand score

<sup>2</sup> Arterial bike lane projects all receive a 1 for school zone because not likely to be used by school children

<sup>3</sup> Network criterion not used for sidewalks



LEGEND

- CIP Project
- Major Trail Corridor
- Low Stress Network
- Arterial Bike Lane Network
- Sidewalk
- Underpass/Overpass
- Intersection Enhancement
- # Project ID
- Highways
- Streets
- Railroad
- Creeks, Ditches, and Canals
- Waterbody
- Open Lands
- City and County of Broomfield

Figure 43. Bicycle and Pedestrian Projects



Table 15. Bicycle Network Projects: Arterial Bike Lane Network

Zone	ID	Name	Limits	Project Type	Network	Total Score
6	27	Main Street	112th to 136th	Restripe Bike Lanes	Arterial Bike Lane Network	21
6,8	32	120th Avenue (US 287)	120 <sup>th</sup> Extension to Dry Creek Trail	Stripe New Bike Lanes	Arterial Bike Lane Network	20
4,5,6,7	17	US 287/SH 121	South Boundary to North Boundary	Restripe Bike Lanes	Arterial Bike Lane Network	19.5
4	16	West Midway	Hoyt to US 287	Stripe New Bike Lanes	Arterial Bike Lane Network	17.5
11,12	CIP-N	Dillon Rd	US 287 to Zuni	Construction	Arterial Bike Lane Network	17.25
9	54	136 <sup>th</sup> Avenue	Kohl to Lowell	Restripe Bike Lanes	Arterial Bike Lane Network	15.5
7	34	Midway	US 287	Intersection	Arterial Bike Lane Network	15.5
1,2,5	2	SH 128	Indiana to US 287	Restripe Bike Lanes	Arterial Bike Lane Network	15
13,14	67	Sheridan	Lowell to SH 7	Restripe Bike Lanes	Arterial Bike Lane Network	14.5
13	64	Lowell	144 <sup>th</sup> to n/o Sheridan Parkway	Construction	Arterial Bike Lane Network	14
12	63	136 <sup>th</sup> Ave	Lowell to Huron - westbound only	Restripe Bike Lanes	Arterial Bike Lane Network	13.5
2	8	Broomfield Trail	<u>Eldorado Blvd/Interlocken Loop</u>	Intersection	Arterial Bike Lane Network	13.5
10	59	Zuni	128 <sup>th</sup> to 136 <sup>th</sup>	Reconstruction	Arterial Bike Lane Network	13
15	74	Huron	150 <sup>th</sup> to SH 7	Construction	Arterial Bike Lane Network	12
14	71	Sheridan	SH 7	Intersection	Arterial Bike Lane Network	12
16	78	CR 4	CR 7 to CR 11 (includes a grade separated crossing of I-25)	Construction	Arterial Bike Lane Network	10.5
14,15	72	160 <sup>th</sup> Avenue	Broomfield Trail to I-25	Construction	Arterial Bike Lane Network	10
16	77	CR 7	SH 7 to Sheridan	Construction	Arterial Bike Lane Network	10
1	4	Indiana	SH 128 to southern boundary	Construction	Arterial Bike Lane Network	10
16,17	76	Sheridan	SH 7 to CR 11 (includes an interchange at I-25)	Construction	Arterial Bike Lane Network	10
1	3	Simms	SH 128 to Countryside Drive	Construction	Arterial Bike Lane Network	10



Table 16. Bicycle Network Projects: Low Stress Network

Zone	ID	Name	Limits	Project Type	Network	Total Score
7	35	Kohl	Midway to 136 <sup>th</sup>	Signing & Striping	Low Stress Network	20
7,8,10	36	Midway	Hoyt to US 287 to Zuni	Reconstruction	Low Stress Network	20
4	15	Miramonte/Oak/W 10th/ Hoyt	Lake Link Trail to Hoyt	Stripe New Bike Lanes	Low Stress Network	19.5
		Westlake Drive Bikeway	Lowell to 136th Ave	Signing & Striping	Low Stress Network	19
6	29	120th Local/Teller/119th/Greenway Drive	Commerce to Greenway Park	Reconstruction & Striping	Low Stress Network	18.5
8,9	43	Ash Street/Aspen Street	Midway to 136th to Aspen Creek Drive	Signing & Striping	Low Stress Network	18.5
		Miramonte	US 287 to Main Street	Stripe New Bike Lanes	Low Stress Network	18.5
6	30	Old US 287	Nickel to 120th Extension	Reconstruction	Low Stress Network	18.5
8	CIP-K	Perry Street	122 <sup>nd</sup> to 124 <sup>th</sup>	Trail & Bike lanes	Low Stress Network	18.5
7	CIP-I	Nickel	Midway to Industrial	Stripe Bike Lanes & Sidewalk	Low Stress Network	18
8	41	Spader/Lamar	3 <sup>rd</sup> Avenue to Greenway Dr	Stripe New Bike Lanes	Low Stress Network	18
8	44	Midway Crossing Improvements to The Field	Between Ash & Spader	Crossing Enhancements	Low Stress Network	17.5
6	24	Commerce	116 <sup>th</sup> Avenue to Nickel	Restripe Bike Lanes	Low Stress Network	17
		Commerce & Nickel Connection	Midway to US 36 Broomfield Station	Construction	Low Stress Network	17
		Kirkwall/Birch	King Soopers to 136th	Signing & Striping	Low Stress Network	17



		10th Ave/ Eagle Way	Sheridan to US 287	Signing & Striping	Low Stress Network	16.5
		10th Ave/ Miramonte	west of US 287	Signing & Striping	Low Stress Network	16.5
		Country Vista Connection	Trail behind Wal mart to across Sheridan via Yates	Trail	Low Stress Network	16
		Daphne	Midway to Kohl	Signing & Striping	Low Stress Network	16
		Emerald/ W 3rd	US 287 to Midway Blvd	Signing & Striping	Low Stress Network	16
4	11	Industrial	Hoyt to Nickel	construction	Low Stress Network	16
		Laurel	Midway to US 287	Signing & Striping	Low Stress Network	16
7	39	Midway	At Kohl	Intersection Improvements	Low Stress Network	16
5	22	Arista Place	Uptown to US 36 Ped Bridge	Signing & Striping	Low Stress Network	15.5
4	132	Burbank Street	W. Midway Blvd to W. 10th Ave	Stripe New Bike Lanes	Low Stress Network	15.5
3	10	Industrial	Industrial/Flatiron Crossing	Intersection	Low Stress Network	15.5
12	61	Irving/Shannon Drive	144 <sup>th</sup>	Intersection	Low Stress Network	15.5
12	62	Shannon Drive	144 <sup>th</sup> to Star Creek	Signing & Striping	Low Stress Network	15.5
4	133	W. 6th Avenue	Burbank St to US 287	Stripe New Bike Lanes	Low Stress Network	15.5
6	26	116 <sup>th</sup> Avenue	US 36 Ped Bridge to Old Wadsworth	Construction	Low Stress Network	15
		1st Ave.	Nickel Street to Main Street	Signing & Striping	Low Stress Network	15
		1st Ave.	Main Street to Sheridan	Signing & Striping	Low Stress Network	15
		6th Ave	Main to Burbank	Signing & Striping	Low Stress Network	15



5	23	US 36 Trail Connection at 120th	WB 120 <sup>th</sup> to US 36 Bikeway	Trail	Low Stress Network	15
10	55	132 <sup>nd</sup> Avenue Alignment	Lowell to Westlake Dr	Trail	Low Stress Network	14.5
9	51	Broomfield County Commons	Sheridan to Lowell	Signing & Striping	Low Stress Network	14.5
6		Greenway Drive	Greenway Drive Neighborhood	Signing & Striping	Low Stress Network	14.5
8	42	Perry Street	122 <sup>nd</sup> Ave to 120th	Stripe New Bike Lanes	Low Stress Network	14.5
5	19	SH 121	120th Connection Underpass under SH 121 Wadsworth	Underpass	Low Stress Network	14.5
5	21	Uptown Avenue	West of Central Ct to US 36	Construction	Low Stress Network	14.5
		US 36 Bikeway Connection	From TWELVE THOUSAND WADSWORTH FILING NO 1 Lot: 1 to US 36 Bikeway	Trail	Low Stress Network	14.5
		14th Ave Neighborhood Bikeway	Main to Sheridan	Signing & Striping	Low Stress Network	14
12	134	W. 138th Avenue	Zuni St to Huron St	Signing & Striping	Low Stress Network	14
9	50	13 <sup>th</sup> /Broomfield County Commons	Sheridan	Intersection	Low Stress Network	13.5
		Aspen Creek Drive & Durango Neighborhood Bikeway	Lake Link Trail to Broadlands	Signing & Striping	Low Stress Network	13.5
		Broadlands Neighborhood Bikeway	136th to Shannon Drive	Signing & Striping	Low Stress Network	13.5
5	20	US 287	Metro Airport Underpass	Underpass	Low Stress Network	13.5
		Aspen Creek Drive Trail	Aspen Street to Aspen Creek Elementary	Trail	Low Stress Network	13
13	65	Irving St	144 <sup>th</sup> to 152 <sup>nd</sup>	Signing & Striping	Low Stress Network	13



14,15	73	New Trail (north of SH 7)	Broomfield Trail to I-25	Trail	Low Stress Network	13
6	25	Old Wadsworth	South of 120th Ave Ext (where bike lanes terminate) to 112th Ave + segment from Uptwon Ave to south border	Construction	Low Stress Network	13
		Red Deer Trail Neighborhood Bikeway	136th to County Commons	signing & Striping	Low Stress Network	13
		Trails Ave./ Rabbit Mtn		Signing & Striping	Low Stress Network	13
13	CIP-O	Wildgrass Trail Connection	Wildgrass to Rock Creek Trail	Trail	Low Stress Network	13
9	49	13 <sup>th</sup>	Ash to Sheridan	Signing & Striping	Low Stress Network	12.5
9	53	Red Deer Trail	136 <sup>th</sup> Ave to Dog Park Entrance	Signing & Striping	Low Stress Network	12.5
11	60	Aspen Street	Aspen Creek Dr to Dillon Rd	Construction	Low Stress Network	12
10	58	Willow Run Pkwy	Columbine Meadows Park To Zuni	Signing & Striping	Low Stress Network	12
13	66	Trail Connection	152 <sup>nd</sup> to Sheridan Parkway	Trail	Low Stress Network	10
3,4	CIP-C	Industrial	Flatiron Crossing To Commerce	Reconstruction	Low Stress Network/ MCT?	17



Table 17. Bicycle Network Projects: Major Trail Network

Zone	ID	Name	Limits	Project Type	Network	Total Score
8	46	SE Community Trail	Tennyson to Lowell	Trail	Major Trail Corridor	18
3,13,15	9	NW Parkway Trail	US 36 Bikeway to I-25	Construction	Major Trail Corridor	16
14,15	69	SH 7 Regional Trail	Through Broomfield	Construction	Major Trail Corridor	16
7	38	SE Community Trail	10 <sup>th</sup> Avenue to US 287	Trail	Major Trail Corridor	16
2	7	US 36 Bikeway	Interlocken Loop to west	Trail	Major Trail Corridor	16
5		US 36 Bikeway Connection	SH 128, Interlocken Filing 24 Lot 3 or 4, Edgeview Drive	Trail	Major Trail Corridor	15.5
14	70	Broomfield Trail	NW Parkway to Indian Peaks	Trail	Major Trail Corridor	15
3	CIP-A	Rock Creek Trail	NW Parkway to US 36	Trail	Major Trail Corridor	15
3	CIP-B	Rock Creek Trail	Brainard Drive to Midway	Trail	Major Trail Corridor	15
11	CIP-M	Broomfield Trail	Aspen to Sheridan	Trail	Major Trail Corridor	14.5
		Broomfield Trail	Markel Trails	Trail	Major Trail Corridor	14.5
13	CIP-R	Broomfield Trail	Lowell to Federal	Trail	Major Trail Corridor	14
4	12	Broomfield Trail	Midway N/ Community Ditch, cross Compton, to Broomfield Trail east of Richard Steele Park	Trail	Major Trail Corridor	14
16,17	75	Broomfield Trail	SH 7 to I-25 (including loop on east side of I-25)	Trail	Major Trail Corridor	14
		Rocky Mountain Greenway Connection	Existing turn-around to Indiana St.	Trail	Major Trail Corridor	13
9	47	Broomfield Trail	Main to 136 <sup>th</sup> Ave	Trail	Major Trail Corridor	12.5
10	56	SE Community Trail	Midway to Columbine Meadows Park	Trail	Major Trail Corridor	12.5
1	1	Broomfield Trail	SH 128 to Simms	Trail	Major Trail Corridor	11
13	68	SE Community Trail	Broomfield Trail to SE Community Trail	Trail	Major Trail Corridor	11



Table 18. Bicycle Network Projects: Major Trail Network Crossings

Zone	ID	Name	Limits	Project Type	Network	Total Score
4	CIP-D	Hoyt Street RR Overpass	Midway to Industrial	Overpass	Major Trail Corridor	17.5
13	124	Broomfield Trail	Sheridan vicinity of 144th	Crossing Enhancements	Major Trail Corridor	17.5
6	CIP-G	Broomfield Industrial Park RR Underpass	West of Industrial Park Ball fields	Underpass	N/A	17
7	40	Main Street Mid-Block Crossing Improvements	Main Street between 2nd & 3rd	Crossing	Major Trail Corridor	17
9	48	Broomfield Trail	136 <sup>th</sup> Ave underpass	Underpass	Major Trail Corridor	14.5
10	57	SE Community Trail	Midway	Underpass	Major Trail Corridor	14.5
13	123	Zuni	144th	Underpass	Major Trail Corridor	14.5
13	121	Sheridan	Lowell	Crossing Improvement	Major Trail Corridor	14
13	122	Broomfield Trail at Lowell Crossing	Lowell	Underpass	Major Trail Corridor	13
16	80	Broomfield Trail	I-25 north of SH 7	Underpass	Major Trail Corridor	12.5
1	5	Broomfield Trail	At Simms	Underpass	Major Trail Corridor	12
1	6	Broomfield Trail	At SH 128/Eldorado Blvd	Underpass	Major Trail Corridor	12
16	81	Broomfield Trail	I-25 north of WCR 6	Underpass	Major Trail Corridor	12
4	125	Lake Link Trail	BNSF Railroad	Underpass	Major Trail Corridor	12



Table 19. Sidewalk Projects: Arterial & Connector

Zone	ID	Name	Limits	Project Type	Network	Total Score
6,8	101	120 <sup>th</sup> Avenue	120 <sup>th</sup> Extension to Lowell	Construction	Sidewalk	16
4	90	Industrial	Hoyt to Nickel	Sidewalk	Sidewalk	16
7	129	US 287	6th Ave to Midway	Sidewalk	Sidewalk	16
6	98	112 <sup>th</sup> Avenue	US 36 to Main	Construction	Sidewalk	15
6	99	Old Wadsworth/ Colmans Way	112 <sup>th</sup> to 120 <sup>th</sup>	Sidewalk	Sidewalk	15
11	111	Sheridan	Lake Link Trail to Dillon Rd	Sidewalk	Sidewalk	14.5
8	105	Midway	Main to Ash	Sidewalk	Sidewalk	14
13,14	113	Sheridan	Lowell to SH 7	Sidewalk	Sidewalk	14
7	102	1 <sup>st</sup> Avenue	Nickel to Laurel	Reconstruction	Sidewalk	13.5
8	104	Spader Way	Descombes to Community Park Rd	Sidewalk	Sidewalk	13
8	103	1 <sup>st</sup> Avenue	Sheridan to the west	Sidewalk	Sidewalk	12.5
5	95	Uptown Avenue	West of Central Ct	Sidewalk	Sidewalk	12.5
6	100	116 <sup>th</sup> Avenue	US 36 Ped Bridge to Old Wadsworth	Construction	Sidewalk	12
15	118	Huron	150 <sup>th</sup> to SH 7	Sidewalk	Sidewalk	12
16	120	Huron	SH 7 to 169 <sup>th</sup> Ave	Construction	Sidewalk	12
3	130	Interlocken Loop (Storage Tek Drive)	US 36 to Via Varra	Sidewalk	Sidewalk	12
3	89	Midway	Flatiron Crossing to s/o Via Varra	Sidewalk	Sidewalk	12
14	116	Preble Creek Parkway	Sheridan to Indian Peaks	Sidewalk	Sidewalk	12
5	92	Metro Airport Ave	Airport Way to Wadsworth	Sidewalk	Sidewalk	11.5
5	96	Uptown Avenue	North of Parkland St	Sidewalk	Sidewalk	11.5
5	93	Wadsworth	Uptown to southern boundary	Construction	Sidewalk	11.5
2	87	120 <sup>th</sup> Ave	Interlocken Loop to Airport Way	Sidewalk	Sidewalk	11
9	108	East 10th Avenue	Birch to Cottonwood	Reconstruction	Sidewalk	11
2	88	Interlocken Loop	Four open parcel gaps between Network Pkwy and Airport Way	Sidewalk	Sidewalk	11
14	114	Lowell	Sheridan to 160 <sup>th</sup>	Sidewalk	Sidewalk	11



9	106	Main Street	12 <sup>th</sup> Ave to 14 <sup>th</sup> Ave	Sidewalk	Sidewalk	11
3	131	S. 96th Street	Northwest Pkwy to west boundary	Sidewalk	Sidewalk	11
4	91	Miramonte	Alter Way to Lilac St	Reconstruction	Sidewalk	10.5
14	117	Preble Creek Parkway	Gap west of Indian Peaks Pkwy	Sidewalk	Sidewalk	10.5
17	128	E. 168th Avenue	SH 7 to County Road 11	Construction	Sidewalk	10
9	107	Aspen Street	12 <sup>th</sup> Ave to 14 <sup>th</sup> Ave	Sidewalk	Sidewalk	9.5
1	82	SH 128	Indiana to Network Pkwy	Construction	Sidewalk	9.5
14,15	115	160 <sup>th</sup> Avenue	Lowell to I-25	Construction	Sidewalk	9
11	110	Aspen	Aspen Creek Dr to Dillon Rd	Construction	Sidewalk	9
17	127	County Road 11	E. 168th Avenue North to County Boundary	Sidewalk	Sidewalk	9
16	119	CR 7	SH 7 to Lowell Lane	Construction	Sidewalk	9
1	83	Indiana	SH 128 to southern boundary	Construction	Sidewalk	9
1	84	Simms	SH 128 to Countryside Drive	Construction	Sidewalk	9
5	94	Wadsworth	US 36 bridge to Interlocken Loop	Sidewalk	Sidewalk	9
13	112	Zuni	Dillon Rd to 156 <sup>th</sup> Ave	Construction	Sidewalk	9



### Project Implementation

Many of the recommended projects will require detailed scoping, traffic and design analyses along with a public process prior to implementation.

The trail and sidewalk projects will all require construction activities. The on-street bike projects, however, will be implemented in a variety of ways, depending on project context. In general, the on-street projects will be implemented in one of the following ways:

- Addition of signs and pavement markings for signed neighborhood bike routes and shared roadways
- Restriping to add bike lanes, which may require narrowing travel lanes, and can be completed opportunistically as a part of street overlay projects or as dedicated CIP project for key corridors
- Reconstruction to incorporate enhanced bikeway design such as separated bike lanes or multi-use paths
- Construction of new streets to include bike lanes or any new street standard adopted (particularly in the northeastern portion of Broomfield)

#### *Scoping & Capital Improvement Programming*

Some on-street bike facilities are anticipated to evolve over time to become higher-quality (and lower stress) bikeways as demand increases and funds become available.

Notably Main Street and Midway Boulevard which have been identified for future barrier separated bike lanes. Because these projects (#31 and #36 will likely require street reconstruction to accommodate low-street bike facilities, they are considered to be the desired future configuration and further study will be required to evaluate design alternatives.

#### *Widening Existing Bike Lanes*

The arterial street bike lane projects included herein are those that would be required to complete the arterial street bike lane network and to bring sub-

standard bike lanes (as identified on ) up to Broomfield’s current standards.

One opportunity Broomfield has to widen existing bike lanes is to identify opportunities when streets are resurfaced each year, it is recommended that Broomfield staff consider the option of widening the bike lanes (and narrowing the travel lanes) to provide for wider bike lanes or buffered bike lanes to improve the level of comfort afforded to bicyclists.

Resurfacing projects may provide only short segments that allow for an update of the width or perhaps a only a couple blocks in one direction, creating corridor challenges. Broomfield could also consider identifying bike lane corridors of the highest priority and opportunity for widening and program and annual CIP project to use waterblasting to remove striping on long corridor segments and place the stripes according to new standards. Once the new striping is placed appropriately and accurately the street will be maintained by Public Works in this new configuration.

#### *Intersection Treatments*

The bicycle and pedestrian projects recommended in this Plan are primarily linear, segment-based projects (except a few specific intersection projects and the grade separation projects). One of Broomfield’s goals is to create a safe and comfortable place for all types of bicyclists and pedestrians. A low-stress route may become uncomfortable where it crosses high-traffic, high-speed streets. An important aspect of implementing any of the bicycle and pedestrian projects will be to ensure a safe and convenient design at the intersection crossings and to use the best available design guidance to promote safety and comfort, including protected intersections when and where appropriate.

#### *Design Guidance*

The following list of resources should be used for planning and design of bicycle, pedestrian and trail infrastructure; these recourses include best



practices relative to bike lane widths and intersection treatments. Broomfield may wish to review construction standards and specifications and update or add new facility specifications as desired. Facilities should consider the operational design of different device types that may be used by people of all ages and abilities as described in Chapter 5, including the consideration of E-bikes.

- American Association of State Highway Transportation Officials (AASHTO) Guide for the Planning, Design, and Operation of Pedestrian Facilities (July 2004, 1st Edition)
- AASHTO Guide for the Development of Bicycle Facilities (2012, 4th Edition)
- National Association of City Transportation Officials (NACTO) Urban Streets Design Guide (2013, 1st Edition)
- NACTO Urban Bikeway Design Guide (2014, 2nd Edition)
- Federal Highway Administration (FHWA) Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflict (2016)
- FHWA Separated Bike Lane Planning and Design Guide (2015)
- FHWA Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)

Additionally, Broomfield may want to review new development requirements for bicycle parking, rack types and other related end-of-trip amenities to support and encourage everyday bicycling. APBP: Essentials of Bike Parking may be used to assist in developing standards.

## Wayfinding

Wayfinding is a highly visible way to improve bicycling in an area because it helps identify the best routes to destinations, helps people overcome a barrier of not knowing where to ride, and reminds motorists to anticipate the presence of bicyclists.

A wayfinding system typically combines signage and pavement markings to guide bicyclists along

preferred routes to destinations across the community, county, or region. The routes may or may not be numbered, named, or color-coded. Wayfinding signs may also indicate distances or travel time to destinations. Local street signs could also be replaced or enhanced with a sticker that includes a symbol that denotes the street as a bikeway.

A wayfinding system for Broomfield’s walking and bicycling network is important, particularly because many of the low-stress routes use local and connector streets, and riders may be unfamiliar with the routing. Most residents are most familiar with their local transportation network as drivers of vehicles, using the main collectors and arterials. Promoting routing on low-stress, lower volume roads, neighborhood streets and off street trails is an entirely new way to navigate as these are streets typically don’t drive on or through or paths that they experience on a regular basis.

Broomfield may consider developing the branding, typical signage types, including pavement markings, and retrofitting of existing street or wayfinding signs as well as information to be displayed on the signage types. Subsequent to developing the signage a strategic plan to develop construction plans for a phasing of key corridors could be considered.

## Pedestrian Improvements

In addition to the sidewalk projects listed and prioritized in **Table 16** to close gaps in the sidewalk network, additional pedestrian improvements will be needed to create a more walkable community. Not many small gaps exist, many will need to be Capital Improvement Program Projects, some will need to be coordinated with other entities such as Colorado Department of Transportation if it is in CDOT’s right of way. Many segments identified are segments that will likely be completed with developer obligations, those segments should be flagged as such.

Appropriate pedestrian improvements should be identified for neighborhoods, subareas, and corridors using the pedestrian improvement toolbox



in **Chapter 4**. Improvements should be identified based on the surrounding land use typology.

Notably, pedestrian access to bus stops and the accessibility of each bus stop should be evaluated for appropriate improvements including sidewalks, crossing and boarding areas. This assessment did not identify bus stops in Broomfield or propose a prioritization. Improvements could also be incorporated into the scope of corridor, intersection or neighborhood projects.

### Safe Routes to School Improvements

**Chapter 6** identifies deficiencies in the sidewalks and crossings along the priority walking routes for the schools in Broomfield. Improvements to address these deficiencies have not been prioritized; instead, the City and County of Broomfield should use this assessment to make improvements along these priority walking routes as conditions allow and in coordination with the school districts.

### Project Programming

To achieve a reasonable community impact to take action on projects identified in this Assessment and future identified projects, new programs need to be created and budgeted. In addition to increase in programming, appropriate staffing levels should be considered to effectively plan for project development and prioritization.

To create continuous corridors that reduce stress along the route, several different types of treatments may need to be applied, or roadways need to be evaluated for right of way constraints and opportunities for reconstruction as well as intersection design analysis.

These types of projects and facilities will need a higher level of scope refining before budgeting as the project scopes are not as clear as filling sidewalk gaps or simple striping enhancements. In addition to study and planning, some projects may also require various levels of public input from neighboring businesses or neighbors along the route.

A current example is Industrial Lane, this corridor had many comments but along the length of the roadway there are many issues and constraints that needs evaluation and study understand the opportunities we have to improve access for people walking and bicycling. Alternatives from the analysis will help inform the potential to provide continuous access.

Other examples for future project consideration include Main Street and Midway Boulevard which have been identified for future barrier separated bike lanes. Because these projects will likely require street redesign to accommodate low-street bike facilities, they are considered to be the desired future configuration and further study will be required to evaluate design alternatives. These projects also are consistent with public input received and relate to location based comments.

List of potential capital & transportation projects for study and/or scope & budgeting refinement, include but are not limited to:

- 112<sup>th</sup> Ave. /Uptown Avenue. Complete Street
- 120<sup>th</sup> Ave./ US 287 Multimodal Access
- Airport Creek Underpass
- Broomfield Wayfinding & Signage
- First & Final Mile Projects & Programs
- Industrial Lane Ped/Bike Improvements
- Low-Stress Network Refinement & Action Plan
- Main Street Corridor Bikeway and Pedestrian Improvements
- Micromobility Development Program
- Midway Boulevard Active Transportation Corridor Improvement
- Nickel & Commerce to US 36 BRT
- US 36 Bikeway - Frank Varra Park Realignment
- US 36 BRT Bicycle Shelters

Suggested new budgeted annual Capital Improvement and Transportation Programs will need definition of the scope of the program and/or



prioritization list and reasonable budget to create a community impact. Potential new annual programs to consider include, but are not limited to:

- Bus Stop Access & Amenities Improvement Program
- Bicycle Parking & Amenities Program
- Neighborhood Bikeway (or Low Stress Network) Improvement Program
- Pavement Marking Replacement Program (Add new bike lanes or replace existing with enhanced bike lanes)
- Safe Routes to School Program (or increase of budget to existing Traffic Safety Program)
- Safety & Education Programs (for youth and adults)
- Sidewalk Gaps & Access Ramp Program
- Transportation Demand Management Program Support
- Wayfinding Signage Program



## Appendix A. Public Input Summary



**WALK. BIKE. BROOMFIELD**

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**Broomfield Bicycle & Pedestrian Assessment:  
Public Involvement Summary**



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## PUBLIC INVOLVEMENT APPROACH

The public outreach process for the Broomfield Bicycle and Pedestrian Assessment was focused on information gathering and asking residents to comment on existing conditions, gaps and needs, and to inform community values and desired elements of a future network of bicycle and pedestrian facilities. These findings will be used as well as other planning tools to improve Broomfield’s network of sidewalks, crosswalks, bike lanes, trails, and underpasses. Another component was simply to establish awareness throughout the community that the assessment is under development and that interested members of the public are being asked to make their voices heard.

## PUBLIC INVOLVEMENT TOOLS

A variety of tools were used in the public outreach process. They were chosen to maximize the degree of public exposure for the project and give as large and diverse a portion of the public as possible the opportunity to get involved and provide their input.

### *Project Website*

The project website, [Broomfield.org/WalkBikeBroomfield](http://Broomfield.org/WalkBikeBroomfield), is the primary portal of information for members of the public looking to learn more about the project and to stay informed. Information provided includes an overview of the project and opportunities to complete an online survey, add feedback to the public commenting map and sign up for email notifications of project updates.

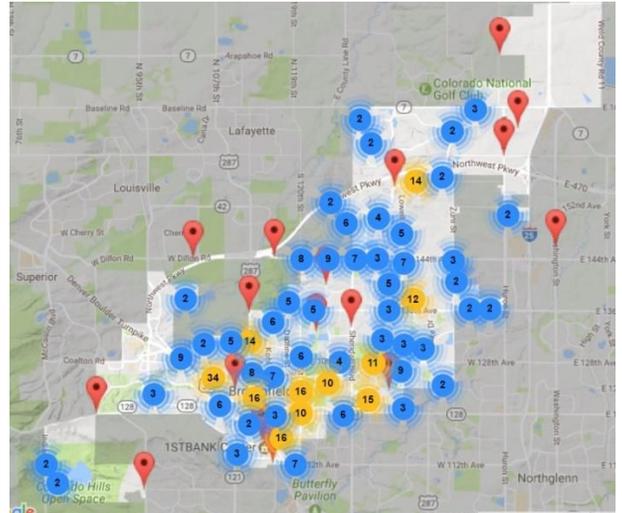




# WALK. BIKE. BROOMFIELD

## Public Commenting Map

The public commenting map is hosted on the project website and provides an opportunity for the public to submit geocoded comments about bicycle and pedestrian improvements. This mapping tool provides an easy way for the public to provide location-specific input and results in a visual representation of hotspots and areas of concern. Once submitted and approved, all comments are visible to everyone that visits the commenting map on the project website.



## Survey

A project survey was developed in order to discern and analyze the major trends and issues related to walking and bicycling in Broomfield, to identify key community values and priorities and provide initial guidance towards recommendations for improvements to the existing bicycle and pedestrian network in Broomfield. The survey included five questions specific to bicycling and walking, as well as a few demographic questions and an open-ended question seeking any additional input. The survey questions focused primarily on users' current bicycling and walking habits and what influences them. A summary of survey results can be found in Section 4 of this document.





# WALK. BIKE. BROOMFIELD

## Traditional Media

An insert was created and sent to all city and county water customers in the monthly bill, an advertisement ran in the local Broomfield newspaper on a Thursday and Sunday, and three large banners were posted along high traffic trails to further develop the project brand (In the Arista RTD Complex, Lake Link Trail trailhead off of Quartz, on the trails around the Library and at Broomfield County Commons, on the south end of the playground at the entrance to the open space and Siena Community Park's trailhead) and to assist with the dissemination of information and to provide additional publicity for other public involvement activities and tools (e.g., online survey and public commenting map).

**BIKE/WALK BROOMFIELD**

"I would walk or ride my bike more if \_\_\_\_\_."

How would you fill in the blank? Take our survey. Your feedback will help identify opportunities and priorities for capital improvement projects.

WHAT DO YOU THINK? **COMPLETE AN ONLINE SURVEY**

SHOW WHERE YOU BIKE & WALK ON THE **PUBLIC COMMENT MAP**

ADD YOUR **EMAIL** TO OUR **CONTACT LIST** & GET PROJECT UPDATES

Give us your feedback at [Broomfield.org/WalkBikeBroomfield](http://Broomfield.org/WalkBikeBroomfield)

## Digital Media

Social media platforms including Facebook, Twitter, Instagram, YouTube and NextDoor were utilized as a means for connecting quickly to large audiences. Through Broomfield's existing social media accounts, information was pushed out organically and through paid social media advertising.

City and County of Broomfield  
Sponsored · Like Page

"I Would Walk or Ride My Bike More If \_\_\_\_\_"

Give us your feedback at [Broomfield.org/WalkBikeBroomfield](http://Broomfield.org/WalkBikeBroomfield)

Use an interactive commenting map to show where you walk/bike now or would like to walk/bike in Broomfield in the future, complete an online survey and sign up for email updates at [Broomfield.org/WalkBikeBroomfield](http://Broomfield.org/WalkBikeBroomfield). ... See More

76 Reactions 27 Comments 19 Shares



## SUMMARY OF FINDINGS

### Online Survey

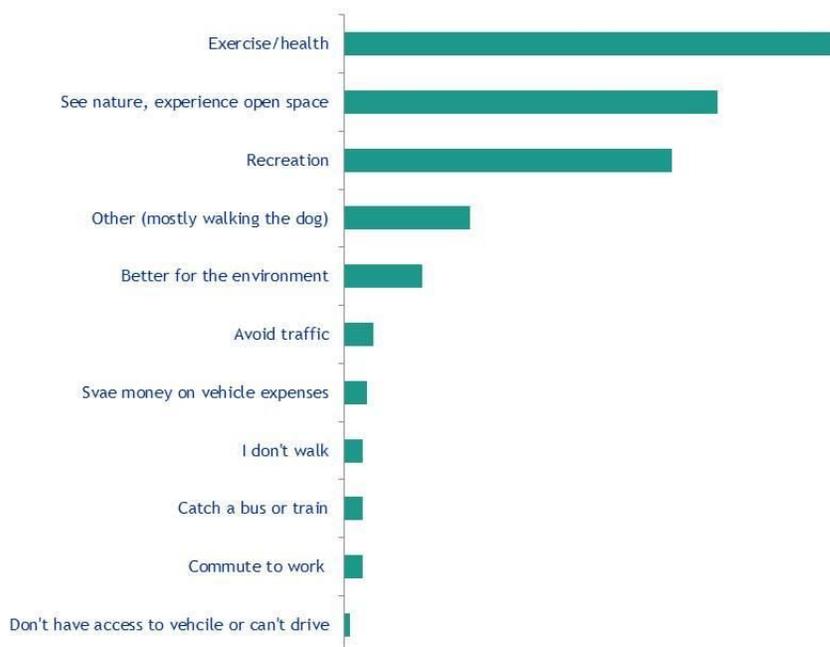
The survey questions focused primarily on users' current bicycling and walking habits and what influences them, asking how often, how long, where and why people walk and bike in Broomfield. Survey respondents were also asked to rank the top five bicycle and pedestrian improvements that would encourage them to walk and bike more. The survey was completed a total of 271 times. The results highlight the current state of active transportation in Broomfield and suggest potential avenues for improvements in the future

### Pedestrian

The first half of the survey addressed the walking habits and preferences of the respondents. From the results, it is clear that walking for exercise/health, recreation and to see nature/experience open space is much more common in Broomfield than walking for utilitarian purposes such as going to work or to catch a bus or train. A majority of respondents, 38%, reported walking a few times a week, 37% reported walking daily, 11% said weekly, 7% monthly, 4% reported that they don't walk and finally, 2% reported walking bi-weekly.

Figure 1: Survey Question Results: Top 3 Reasons You Walk

*What are the top 3 reasons you WALK in Broomfield?*



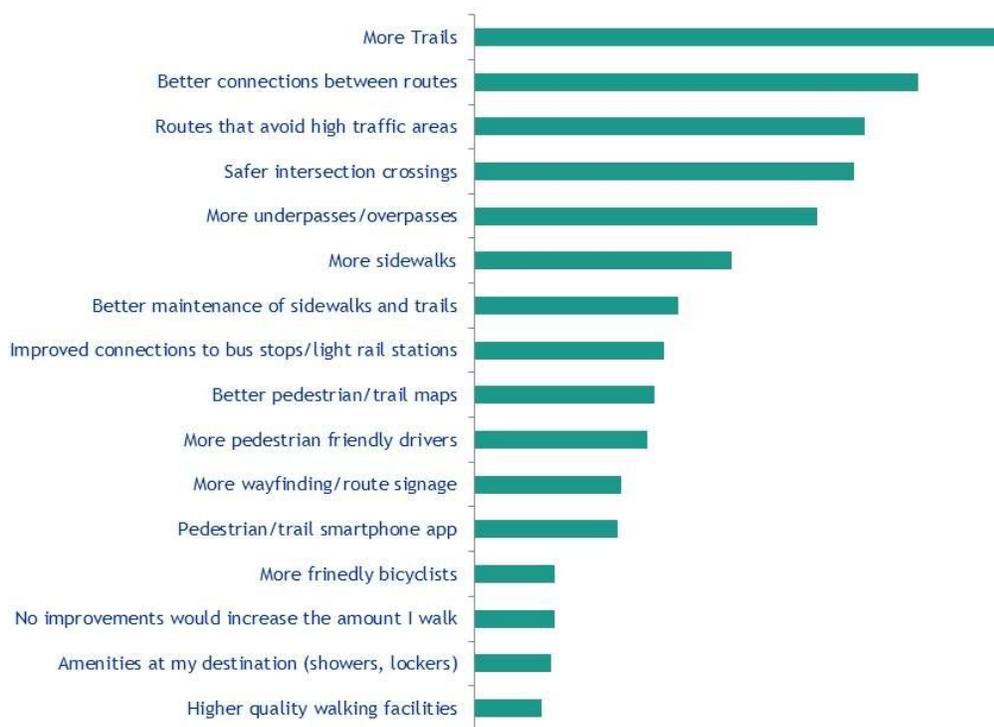


# WALK. BIKE. BROOMFIELD

The third question of the survey asked respondents to identify where they most often walk in Broomfield. Respondents reported the following as the top three places: Open Space/Trails (76%), Around My Neighborhood (75%) and in Parks (41%). When asked to rank the five improvements to the pedestrian network that would most encourage them to walk more. The results of this question provide valuable insight into which components of the network should be prioritized by Broomfield for improvement in order to most effectively and efficiently enhance the pedestrian experience. Figure 2, below, presents the various improvements that could be selected in order from highest to lowest priority among online survey respondents.

**Figure 2: Survey Question: Walking Improvements**

*Which improvements would encourage you to walk more?*



The most highly-prioritized improvement among all respondents was more trails. About 42% of all respondents chose this option as one of their five answers, the highest proportion of any choice. Other highly prioritized improvements to the pedestrian networks were better



## WALK. BIKE. BROOMFIELD

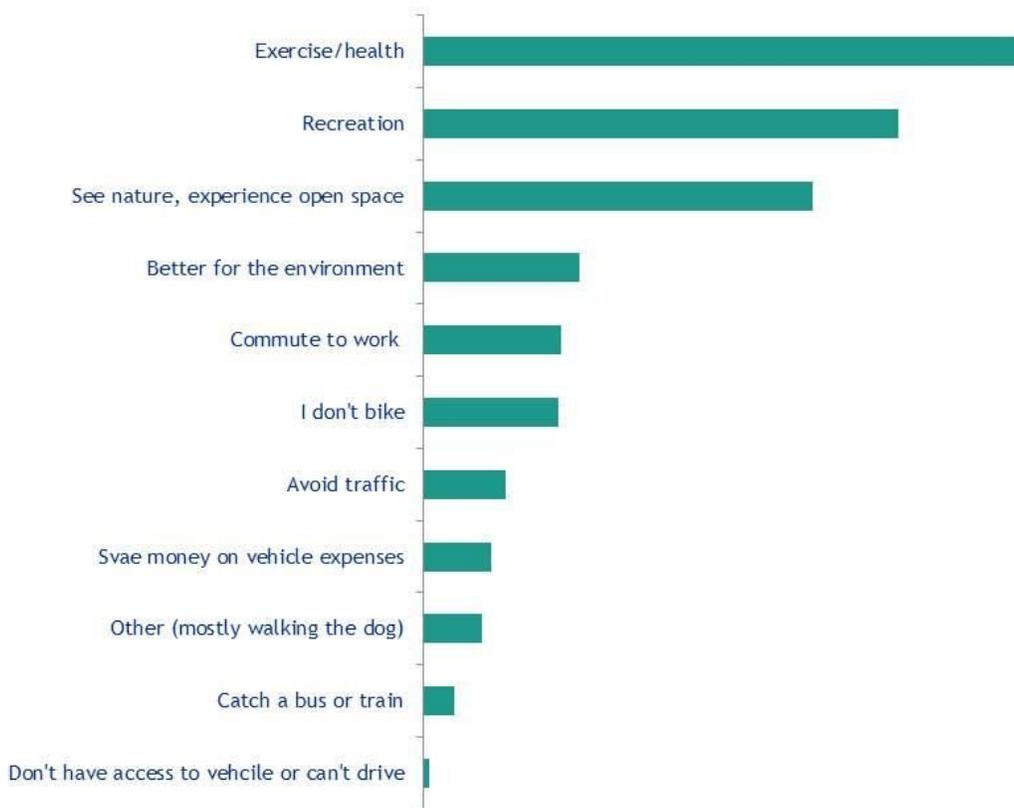
connections between routes, routes that avoid high traffic areas and safer intersection crossings, indicating that connections and safety are of primary concern to a lot of people within Broomfield.

### *Bicycle*

The second half of the survey addressed the biking habits and preferences of the respondents with a set of six questions identical to those focused on walking. The results from the cycling portion of the survey were similar to those from the walking portion, showing that biking for recreation and exercise is much more common in the county than cycling for utilitarian purposes. When asked how often they bike in Broomfield, respondents reported biking a few times a week 29% of the time, monthly 27% of the time and that they don't bike 20% of the time.

**Figure 3: Survey Question Results: Top 3 Reasons You Bike**

*What are the top 3 reasons you BIKE in Broomfield?*





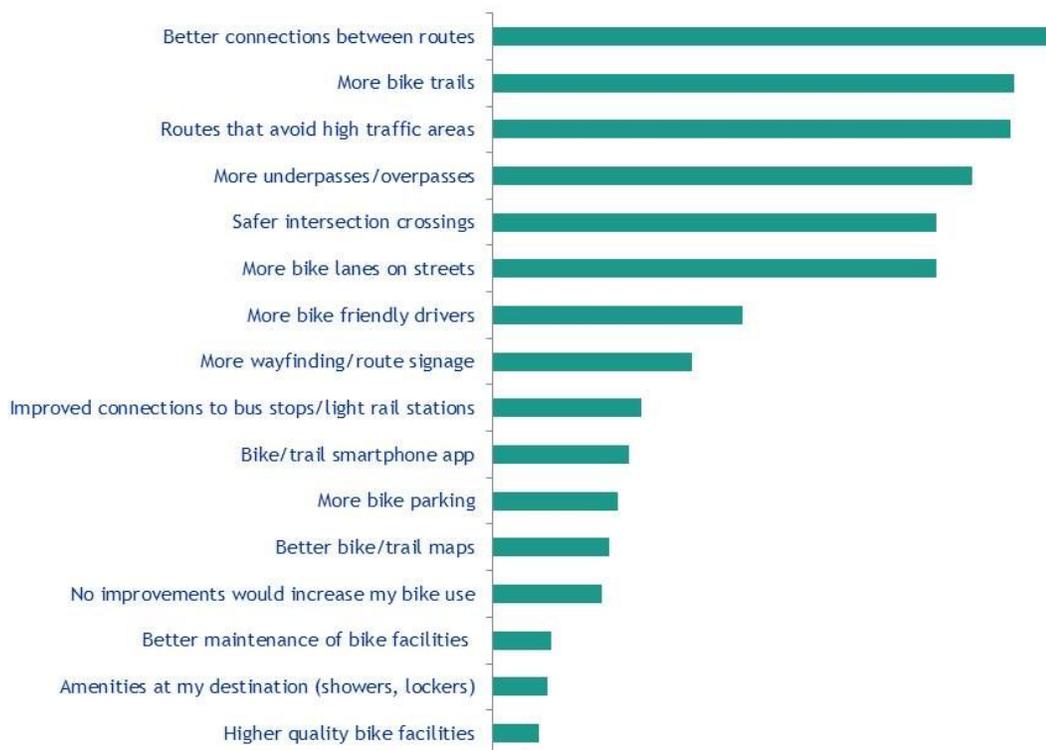
# WALK. BIKE. BROOMFIELD

These responses are identical to the top three reasons shown for walking in Figure 1. The observation that biking, like walking, is still a predominantly recreational mode of transportation in Broomfield, is further enforced by the results from Question 10, “Where do you go most often when you bike in Broomfield?”. Over 60% of respondents selected open space/trails and trails and 40% chose, “Around my neighborhood”, while work was chosen by only about 15% and transit stops by about 5%.

Similar to Question 6, Question 12 asked respondents to rank the five improvements to the bicycle network that would most encourage them to bike more. Figure 4, below, presents the various improvements that could be selected in order from highest to lowest priority among all respondents.

Figure 4: Question Survey Results: Biking Improvements

## *Which improvements would encourage you to bike more?*





## Respondent Demographic Snapshot for Online Survey

Three questions were included at the end of the survey to capture the demographic makeup of the pool of respondents. People who made comments on social media or directly on the commenting map were not asked any demographic questions. On the survey respondents were asked to indicate their age, gender and place of residence. The majority (66.16%) of survey respondents were between 30 and 69. The gender makeup of the group was about 50% female and 49% male.

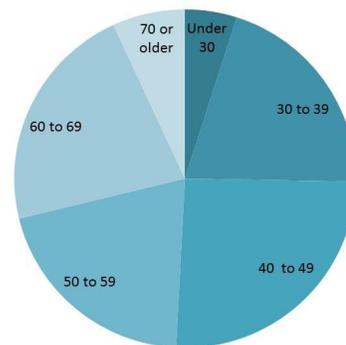


Figure 5: Demographic Snapshot: Age of Online Survey Respondents

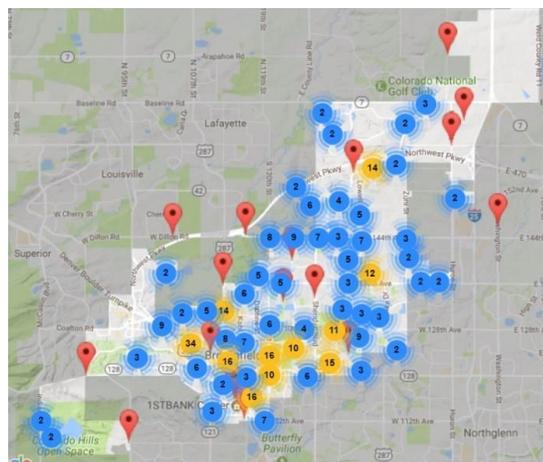
## Public Commenting Map

In addition to the survey, input was gathered during the public outreach process via comments from a number of other platforms, including: the project website’s public commenting map and open-ended comment feature, the survey’s open-ended final question, and Broomfield’s Facebook, Twitter, Instagram and NextDoor accounts. Each of these platforms provided opportunities for members of the public to leave comments related to any aspect of the bicycle and pedestrian network they wished to address. Throughout the outreach campaign, a total of 460 comments were gathered. These comments varied widely in tone and specificity, but after review and analysis, a series of common themes and areas for improvement arose.

Figure 6: Public Commenting Map

Some of the areas mentioned most frequently on the Public Commenting Map were:

- Industrial Lane Corridor and the Hoyt Street Railroad Crossing
- Main St./120th Ave. Intersection
- Nickel/Commerce Vicinity
- Civic Center/Midway Vicinity
- Dillon Road
- Sheridan to Perry St on 120th Ave
- Miramonte/US 287 Intersection and US 287 in the vicinity of Midway





## WALK. BIKE. BROOMFIELD

- Lake Link Trail and Lowell Blvd/136th (Sidewalks, Drainage in Underpass, Bike Lane Improvements)
- Sheridan/Northwest Pkwy to HWY7
- Sheridan/Lowell in the vicinity Sienna Reservoir and the Northwest Parkway

In order to analyze the large body of responses, a list of the 9 most distinct and prevalent themes or categories of comments was developed. Common themes that emerged from the comments were:

Amenities

Bike lanes

Trails planned for completion or identified as future project

New trails or focus areas

Regional trails

Sidewalks

Crossings/crosswalks

New underpass/overpass

Challenging suggestion



**Figure 7: Word Cloud sizing keywords based on number of times it was used in all public comments.**

### *Amenities:*

- Need bike racks at Civic Center, Library, Auditorium and local businesses
- More porta-johns at trailheads and parks
- Beautify and add lighting at the 116th Flatiron Flyer Stop/US 36 Pedestrian Bridge

### *Bike lanes*

- Sheridan Parkway north of Lowell is a problem with just one bike lane on the west side
- Industrial Lane
- Commerce Street East of Recycling Center
- Wadsworth Parkway and Metro Airport Avenue
- Simms north of 108th near Skyestone north to SH 128
- Bike Lane on Main by Broomfield High School is narrow
- Midway: use green bike lane to create a strong east/west connection
- Proposed bike lanes on 120th to Arista are inadequate



## WALK. BIKE. BROOMFIELD

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- From 136 and Kohl southbound to Miramonte; limited bike lanes a problem
- Midway from Sheridan to Lowell only two lanes are needed and the bike lanes could be expanded to result in slower speeds and safer biking so intersections could remain as is.
- Hoyt Street

### *Trails planned for completion or identified as future project*

- NW Parkway Siena Park Anthem Trail (part of the Broomfield Trail)
- Industrial Lane sidewalk and bike lanes
- Trail from Trails Park North to SE Corner of Lowell and 136th (near Lutheran Church)
- Continue Rocky Mtn. Greenway across Indiana
- Connect west end of 116th Street to Old W
- Broomfield Trail from Skyestone north to SH 128 and Improvements to Simms to provide north/south connections up to SH 128
- King Circle and Julian Street connections to Westlake Park (private property)
- Hoyt Street Bridge
- Nickel Lane improvements
- Rock Creek Underpass at RR and Midway from Lac Amora Trail to BRT and parking area
- Minimal traffic route to 1st Bank Center (Old Wadsworth bike lanes and sidewalks; Commerce Street bike lanes and sidewalks and/or connection behind Recycling Center to Commerce from Industrial Lane
- Broomfield Trail east of Lowell Blvd. and the new Wildgrass segment to Spruce Meadows
- Huron bike lanes, trails, sidewalks
- Connections from Anthem to other community trails
- Broomfield County Commons Trail improvement north of Tom Frost
- 96th Street Underpass west of Parkway Circle Neighborhood/Conoco Phillips to Flatiron Crossing west entry
- 6th to Midway 8-foot trail along the east side of US 287 to connect to Blue Star Park
- Trail from Wildgrass to NW Parkway underpass to Coal Creek Trail
- Main Street to west to 112th and north to the new 120th connection along Old Wadsworth -New 120th under construction must include bike trail
- Trail from MacKenzie Court to Lowell in Brandywine
- East side of Wal-mart south end of sidewalk to 120th commercial
- 8-foot sidewalk between Tennyson and Shelley's Garden Store on the north side of 120th to get to the Goddard School
- West side of Lowell from the NE corner of Red Leaf to the 136th and Lowell Intersection needs a sidewalk
- Improve connection between the Field and Broomfield County Commons 10th is inadequate and 7th is also inadequate (in Trails Plan but more work needed)
- Old Wadsworth needs a trail or sidewalk (both are planned with road improvements; see above on comments regarding 112th)
- Sheridan and Lowell Intersection up to SH 7 need trail/sidewalk



## WALK. BIKE. BROOMFIELD

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- SH 7 improvements for bike lanes and pedestrians
- Dillon Road improvements bike lanes and sidewalks
- Dead-End Sidewalk along Spader Way and Community Park Road by ballfields
- Bottleneck by Big Choice Brewing and RR tracks no way to get to Old Wadsworth
- Completion of 120th sidewalks
- Markel Open Space: Complete trail along the ditch (Broomfield Trail)
- Better access from east side of Lowell by Westlake to PDRC
- Sidewalk from north end of Wildgrass along west side of Sheridan up to Lowell
- Sidewalk from Rabbit Mtn. Road in Red Leaf north on the west side of Lowell
- Crossing/Underpass in the area of Wadsworth and Interlocken Loop/SH 128 (future project with next phase of Wadsworth/US 36 Improvements )
- Underpass at The Field and the eastern Field Trail as it crosses Midway (in OSPRT long term project)
- Underpass improved crossing at 120th and Main (In OSPRT long term)
- Connect Wildgrass to Anthem--see above comment about the NW Parkway underpass and improvements at the intersection of Lowell and Sheridan by Siena Reservoir; Siena Park includes the Broomfield Trail along Community Ditch and extends beneath the NW Parkway to 160th Avenue
- Underpass at SH 7 (North Park and Northlands east of Huron on SH 7 and drainage)
- Wottge needs public access at least a trail around the edge which could link to Lake Link South

### *New trails or focus areas:*

- Via Varra Road the Parkway Circle Neighborhood to Louisville along 96th Street
- Broomfield Heights Trails by School
- Connect from Sheridan on the west end and Yates Court on the east end along the north side of Jack's Shopping Center to existing trail on the north side of Wal mart (dependent on redevelopment plans to allow trail)
- Minimal Traffic Route To 1st Bank Center (Old Wadsworth bike lanes and sidewalks) Commerce Street bike lanes and sidewalks and/or Connection behind Recycling Center to Commerce from Industrial Lane
- W corner of Lowell Blvd. and Lina Lane to NW Parkway Bridge (west side of Lowell)
- Create Strong bike/walking connections to Civic Center
- Connect public transit to neighborhoods and local commercial
- SE Community Trail link to the Cimarron Neighborhood across the Drainage at Stuart Court
- Greenway Drive sidewalks and bike lanes
- W. 116th Avenue to the Arista Ped Bridge over US 36 needs streetlights and a bike/ped trail
- Intersection of Lowell and Sheridan north on west side of Lowell to Bridge need 8 foot sidewalk (near Anthem--see comment above about improvements at Lowell and Lina Lane)



## WALK. BIKE. BROOMFIELD

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- Improve flow of sidewalks and bike lanes through the Civic Center, particularly the library at Spader and also ideally connect to Bus Rapid Transit (BRT) on US 36 and Bikeway; Improve crossing from east side of Spader into the Library
- Aspen Lane needs better ped and bike access up to Dillon Road
- Yates Court to existing Walmart Trail (short neighborhood connection easy--part of the larger improvements mentioned above at Jax and Wal-mart)
- Main Street to 112th by Jefferson Academy no shoulders for bikes or peds
- Widen Trails in Broomfield County Commons to accommodate bikes and peds
- Nickel at US 287 needs bike/ped improvements
- Arista Hospital connection at 120th into Arista is a key destination and should be a focal point for bike and ped improvements as it connects to transit, work, commercial and housing
- Intersection of Eldorado and Interlocken Loop
- Intersection of Nickel, Industrial and Commerce
- Want more bike and ped improvements to get to shopping and dining; update existing areas so they are more accessible by walking and biking
- Better Crossing at Bradburn and 120th need sidewalk on CCOB or north side of intersection
- Crossing at Silver Feather Circle and Sheridan Blvd. (this would likely require a traffic light)
- Crossing at Simms and 108th by Skyestone
- Better Crossing at Vrain and 128 Place as these streets cross Midway or build a sidewalk on north side of Midway along the Broomfield County Open Space from 128th to Perry where there is a light
- Uptown Avenue/Old Wadsworth/112th Dangerous for bikes and peds
- Improve Indiana and Simms they are both dangerous to ride on; suggest at least improving the connection here to St. Francis trail or add map/signage.
- Crossing at US 287 and Midway
- Better Crossing at US 287 and Miramonte
- Nickel Street/Commerce St./Industrial Lane bike lanes, sidewalks needed
- Main St. and 120th intersection (esp. SE corner) "sketchy"
- Main St. to Park and Ride needs better access
- SH 128 W 120th Ave. and McCaslin area off Indiana and Simms. "Currently this is a 'dead end' for trails - 128/120th, Indiana and Simms are all dangerous to ride on - suggest at least improving the connection here to St. Francis trail or add map/signage."
- Burbank and connections to Broomfield better signage in this area around The Broomfield Trail
- Shannon St. in Broadlands leads to the Lake Link Trail, but to get North or West from here is difficult. Needs sidewalks, crossings, bike lane

### *Regional trails outside of Broomfield*

- Indiana Street
- US 287 north of Broomfield



## WALK. BIKE. BROOMFIELD

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- Broomfield to Lafayette that avoids SH 7, Dillon and US 287
- Wildgrass trails to the west through Boulder County
- Wadsworth South of Arista to 104th needs a trail (crosses last privately owned parcel in Arista and airport land)
- Convert Big Dry Creek to Concrete (This trail is owned by Westminster and this change to concrete is being phase in over time)

### *Sidewalks*

- Sidewalk from intersection of Brainerd Drive/E. Flatiron Circle/Midway make connection to the Park and Ride
- Sidewalk from 144th and Lowell west to existing sidewalk along the north side of 144th
- Complete missing sidewalks on 144th
- Wider sidewalks needed in general
- Wider sidewalks in 1st and 2nd Filings
- Sidewalks by and along Jefferson Academy needed along 112th
- Better lighting on sidewalks
- Sidewalk along Broomfield County Commons Drive just east of the eastern athletic field has a drainage problem
- Missing sidewalk south of 6th to 5th approximately on both sides of Alter
- Sidewalk on north side of Chase Chase and 120th intersection to Wonderland Brewing
- Sidewalk on east side of Commerce just north of 120th up to north of Park Street is needed s US 287 by Garden Center Apts. needs a sidewalk on the east side to connect to sidewalks to the north and south by Blue Star Park
- Midway and Main Intersection: A Sidewalk is needed from the crusher trail adjacent to Brunner Farmhouse west to the intersection on the north side of Midway; crossing indicator on NE corner of intersection also needed
- Trail east of Willow Run Parkway at Midway crossing is “problematic needs map and better crossing at Willow Run Parkway”

### *Crosswalks/Crossings:*

- Crosswalk at Spader and Trail from Brunner Reservoir heading to the Broomfield Courts/Police Building in between the Broomfield Community Center and Bay (requested flashing lights instead of just the painted crosswalk).
- Crossing Stripes on Oak Cir South and Miramonte Blvd intersection
- Narrow width of roadway to cross or upgrade crossing at the intersection of Midway/Wolff St
- Scary to cross US 287 here on bike or on foot (SE corner of Miramonte Blvd and US 287)
- Pedestrian crosswalk signal at Light at US 36 off ramp and Wadsworth heading north on US 287 near Recycle Center needs improvements to alert drivers to peds/bikers. "There is NOTHING to help warn a driver coming off 36 that someone needs to cross here from the east



## WALK. BIKE. BROOMFIELD

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side. Drivers only look left (west) for oncoming traffic. Looking for pedestrians or cyclists on the path do not come to mind. Close encounters have forced me to take other routes.”

- Crosswalk between Spader and Ash on Midway by the Field is a hazard
- Need crosswalk striping at Kohl and Midway; difficult for bikes here
- Create a safer crossing at Vrain and Midway
- US 287 and Miramonte is a difficult intersection for Peds and Bikers
- US 287 and Midway a difficult crossing for Peds and Bikers

### *New underpass/overpass*

- Underpass on 120th between Lowell and Sheridan by Bradburn (plus complete sidewalks along north side of 120th)
- Underpass at 120th and Sheridan
- Underpass at 120th and Vann Street
- Underpass at Midway Blvd. and Brainerd Drive
- Underpass where Broomfield County Commons Trail south of Le Gault Reservoir Meets Sheridan Blvd.

### *Challenging trails to accomplish*

- Trail from the Lake Link Trail Underpass going south to the Big Dry Creek Trail without going on any streets (this connection is in Westminster and there appears to be an existing connection that goes through greenbelts and wider trail/sidewalks).
- Sidewalk on south side of 144th between Zuni and Huron so we can get to Orchard (this is in Westminster)
- Crossing at Molly Lane and 136th to get to the Safeway Store on the west side of Lowell
- Trail connection from 104th in Boulder County to NW Parkway by Terracina (challenging given the agreement with the RR not allowing access across the tracks; the Rock Creek Underpass may address some of this concern and new trail to 96th Street through the Audi Project)
- Single Track on NW corner of Miramonte and Quartz (this is a previous landfill site that is under a management plan from Colorado Department of Public Health and Environment and the land is protected through the remediation plan)
- Connect Coyote Ridge School to Lowell Underpass (challenging given golf course and safety hazard of errant golf balls, can try to address with signage to direct to Lowell Blvd. Underpass)
- Trail on north side of Plaster (challenging because of concerns about golfers and errant balls)

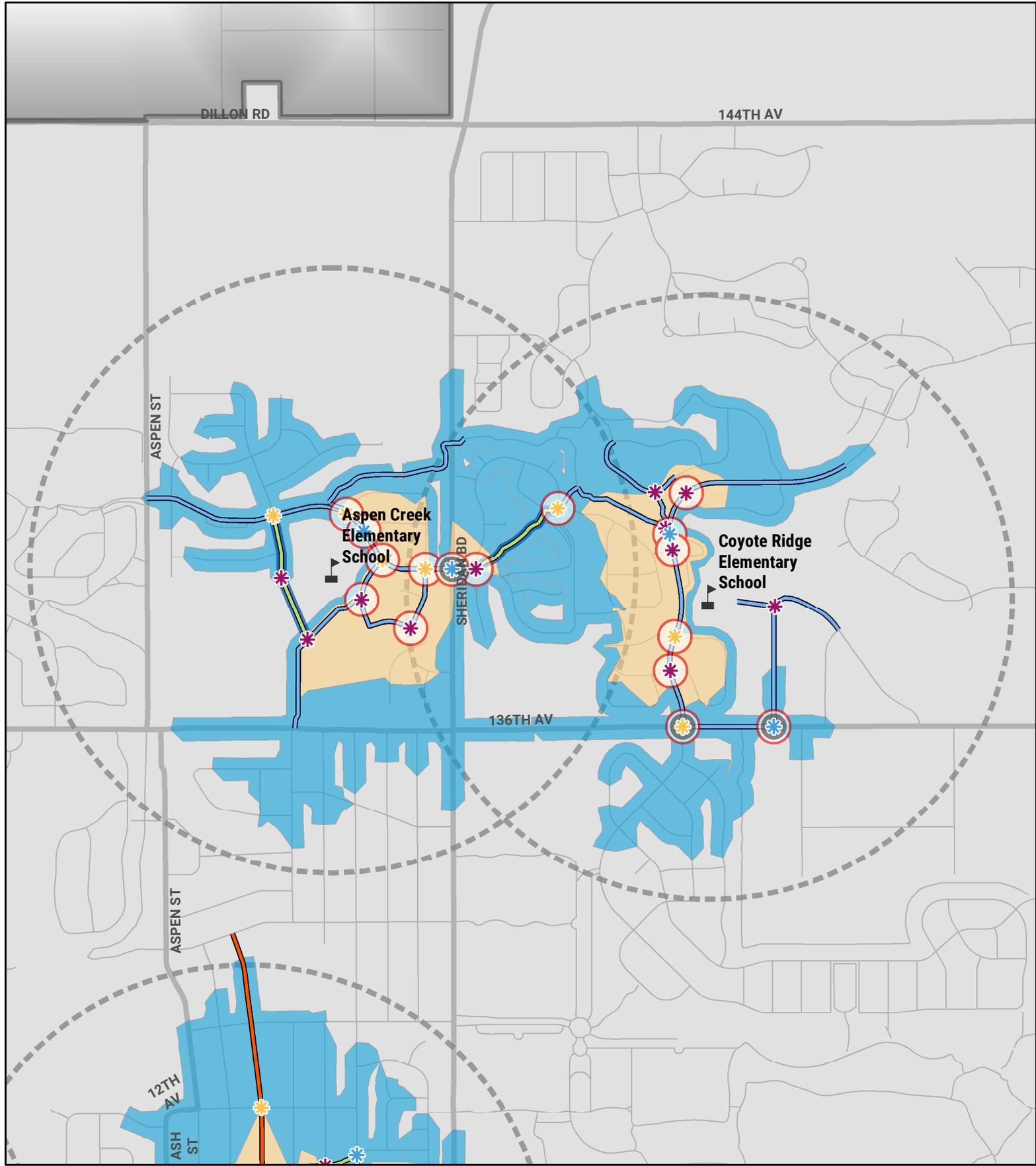


## *Reference:*

- [All Comments Spreadsheet](#)
- [All Comments Word Cloud](#)
- [Online Survey Results](#)
- [Commenting Map](#)
- [Project Website](#)



## Appendix B. Safe Routes to Schools Maps



# City of Broomfield

## School Access Routes and Issues Identification



School	<b>Priority Route Sidewalk Condition</b>	<b>Network Distance</b>
Crosswalks	Standard	1/4 Mile
None	Trail	1/2 Mile
Partial	Substandard	1/2 Mile Direct Distance
All	Proposed Connection	Broomfield City Limit
Major Street Intersection	Substandard ADA Ramp(s)	



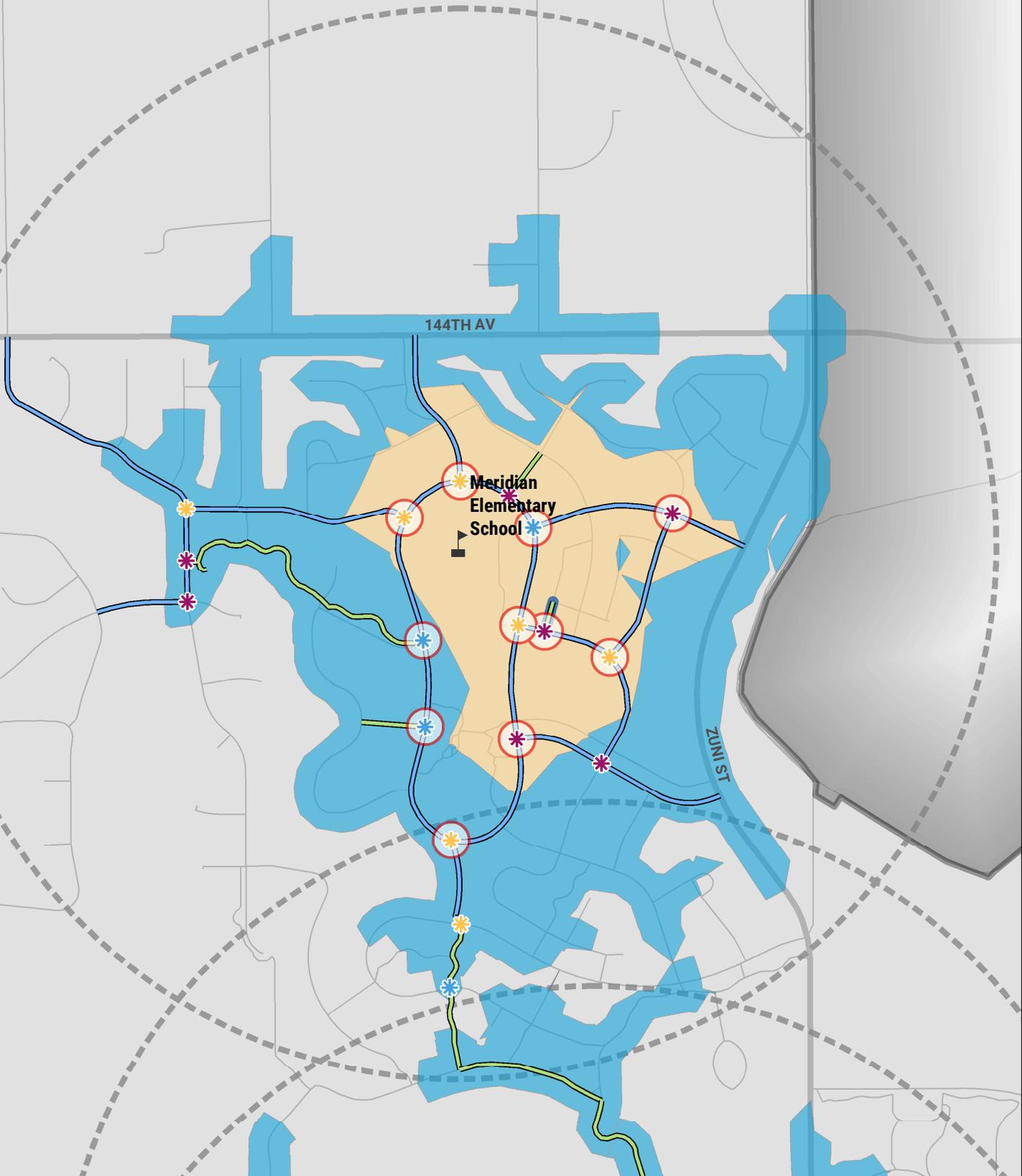
# City of Broomfield

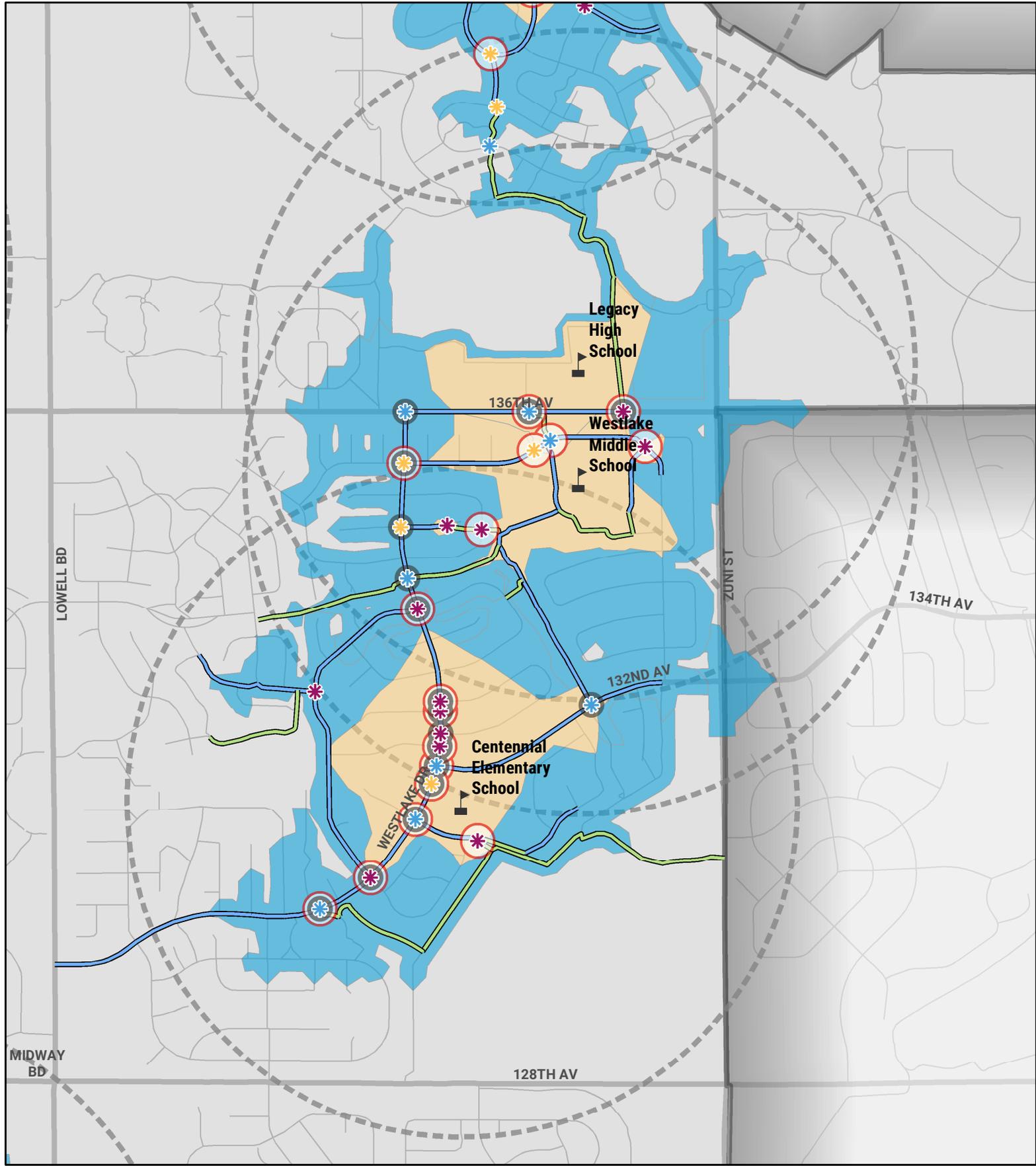
## School Access Routes and Issues Identification



- |                           |  |                          |
|---------------------------|--|--------------------------|
| School                    | <b>Priority Route Sidewalk Condition</b> | <b>Network Distance</b>  |
| Crosswalks                | Standard                                 | 1/4 Mile                 |
| None                      | Trail                                    | 1/2 Mile                 |
| Partial                   | Substandard                              | 1/2 Mile Direct Distance |
| All                       | Proposed Connection                      | Broomfield City Limit    |
| Major Street Intersection | Substandard ADA Ramp(s)                  |                          |

0 0.1 0.2 0.4 Miles Date: 2/15/2017





# City of Broomfield

## School Access Routes and Issues Identification



- School
- Crosswalks
  - None
  - Partial
  - All
- Priority Route
- Standard
- Trail
- Substandard
- Proposed Connection
- Major Street Intersection
- Network Distance
  - 1/4 Mile
  - 1/2 Mile
- 1/2 Mile Direct Distance
- Broomfield City Limit
- Substandard ADA Ramp(s)

# City of Broomfield

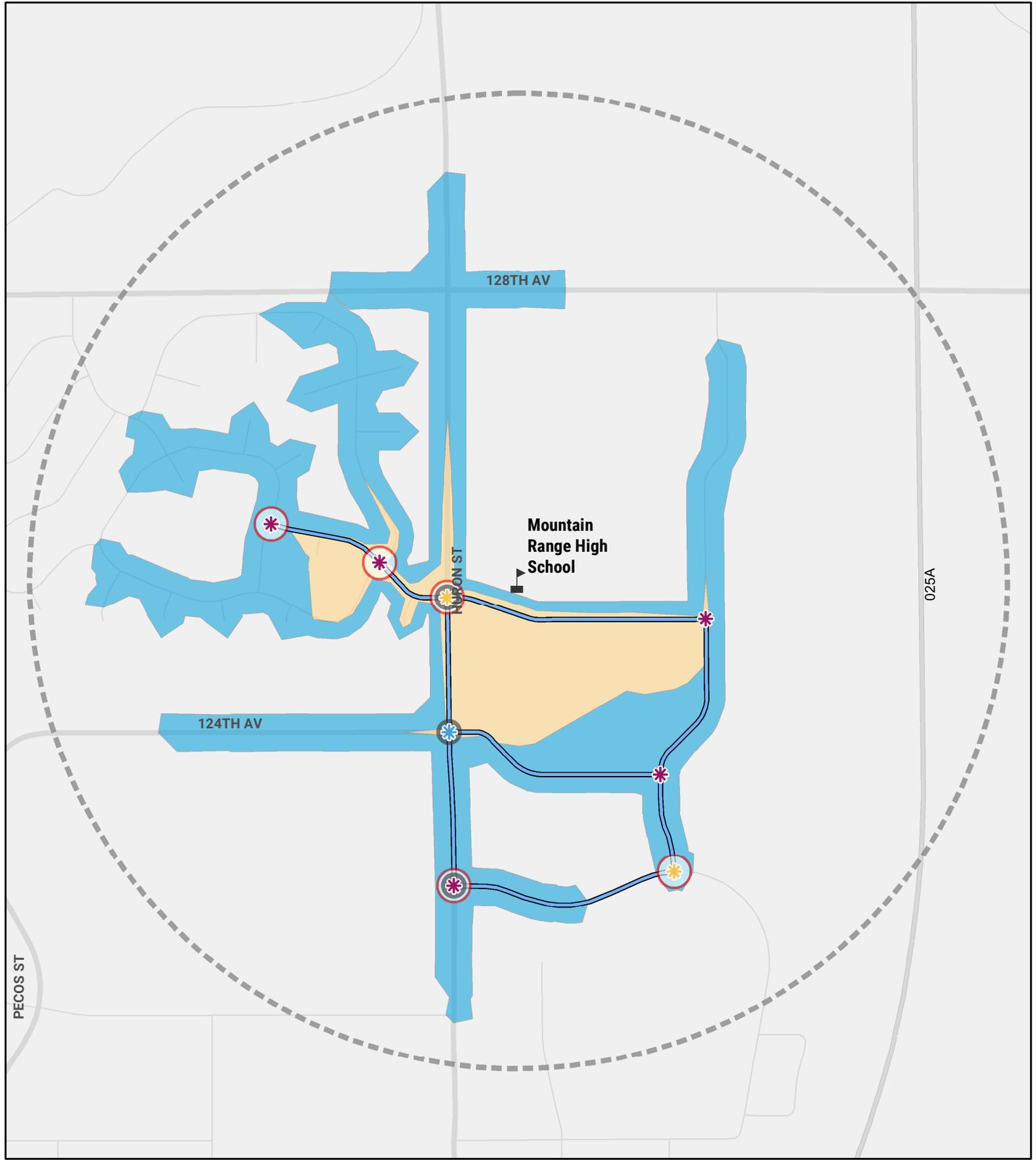
## School Access Routes and Issues Identification

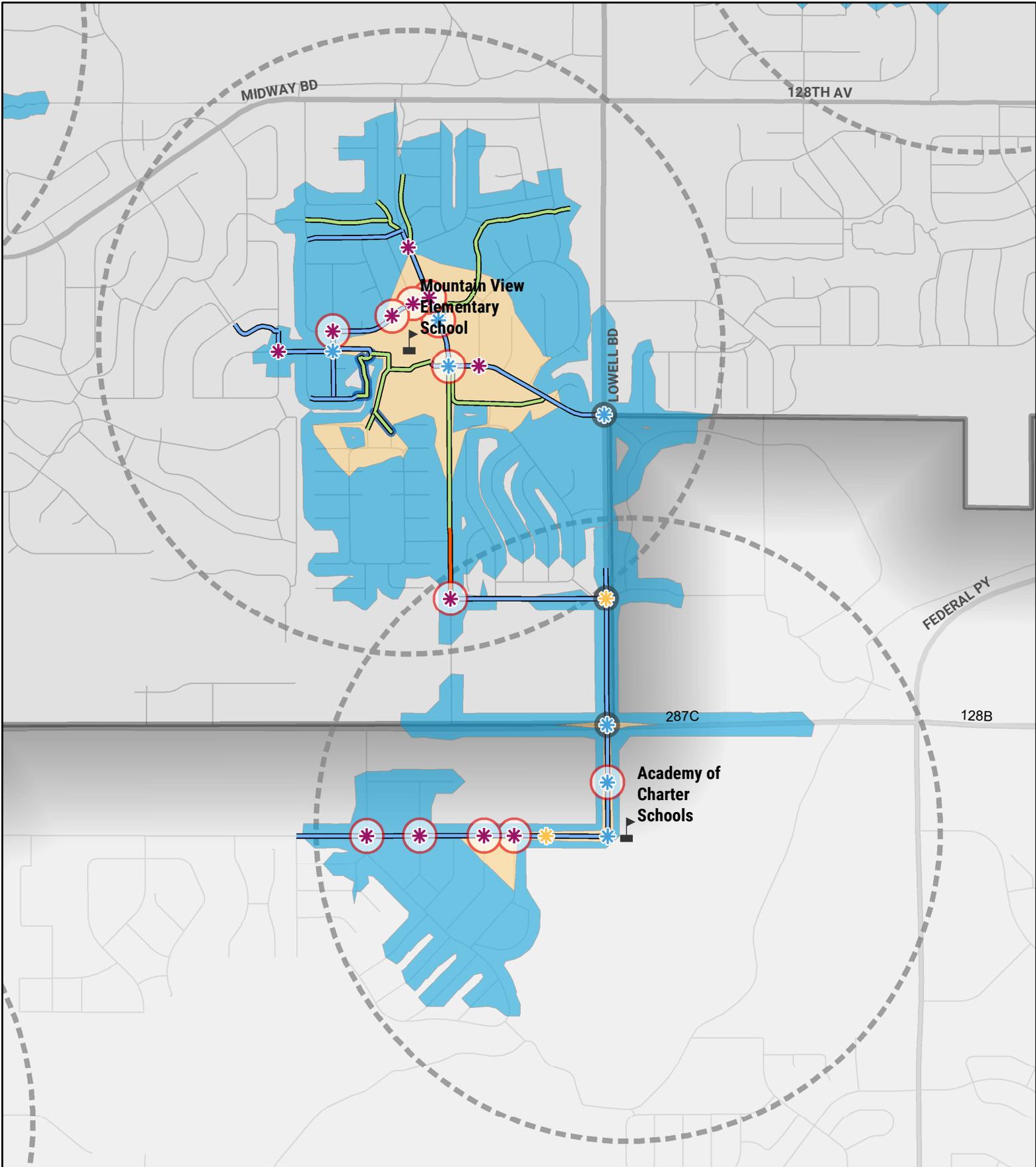


- |                           |  |                          |
|---------------------------|--|--------------------------|
| School                    | <b>Priority Route Sidewalk Condition</b> | <b>Network Distance</b>  |
| Crosswalks                | Standard                                 | 1/4 Mile                 |
| None                      | Trail                                    | 1/2 Mile                 |
| Partial                   | Substandard                              | 1/2 Mile Direct Distance |
| All                       | Proposed Connection                      | Broomfield City Limit    |
| Major Street Intersection | Substandard ADA Ramp(s)                  |                          |



Date: 2/15/2017





# City of Broomfield

## School Access Routes and Issues Identification



School	<b>Priority Route Sidewalk Condition</b>	<b>Network Distance</b>
Crosswalks	Standard	1/4 Mile
None	Trail	1/2 Mile
Partial	Substandard	1/2 Mile Direct Distance
All	Proposed Connection	Broomfield City Limit
Major Street Intersection	Substandard ADA Ramp(s)	



# City of Broomfield

## School Access Routes and Issues Identification



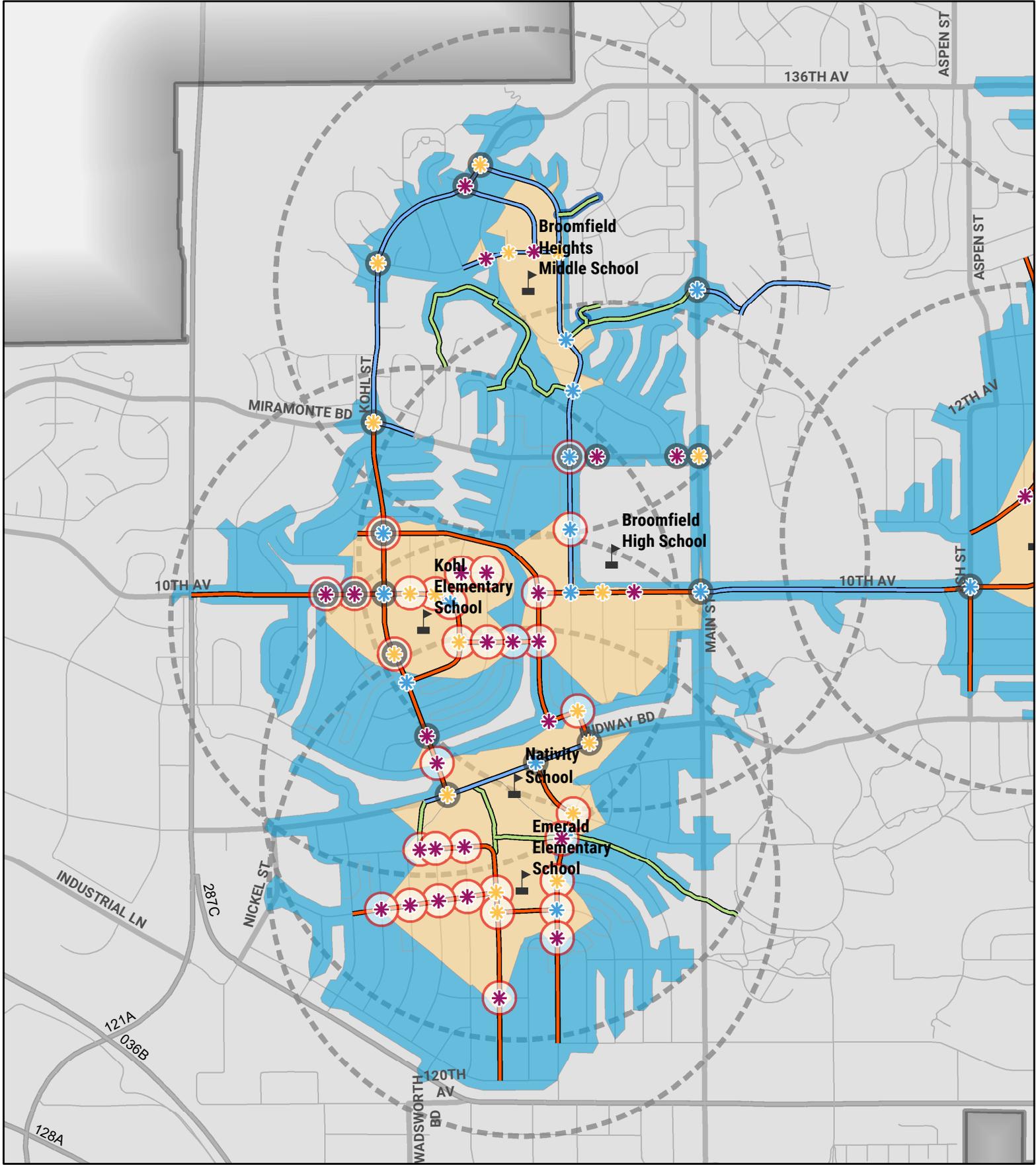
- School
- Crosswalks
- None
- Partial
- All

- Priority Route Sidewalk Condition**
- Standard
- Trail
- Substandard
- Proposed Connection
- Major Street Intersection

- Network Distance**
- 1/4 Mile
- 1/2 Mile
- 1/2 Mile Direct Distance
- Broomfield City Limit
- Substandard ADA Ramp(s)



Date: 2/15/2017



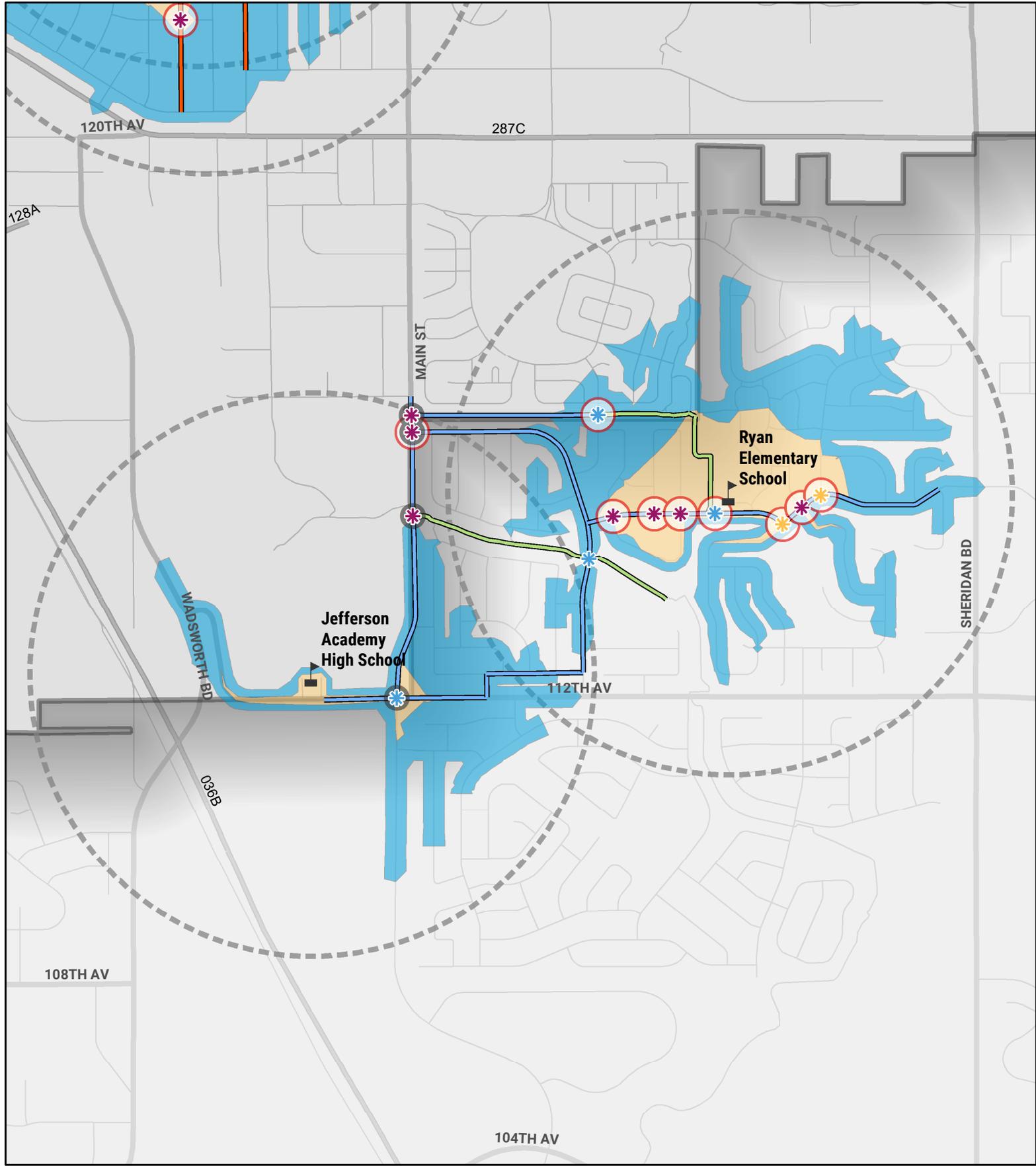
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School	<b>Priority Route Sidewalk Condition</b>	<b>Network Distance</b>
Crosswalks	Standard	1/4 Mile
None	Trail	1/2 Mile
Partial	Substandard	1/2 Mile Direct Distance
All	Proposed Connection	Broomfield City Limit
Major Street Intersection	Substandard ADA Ramp(s)	



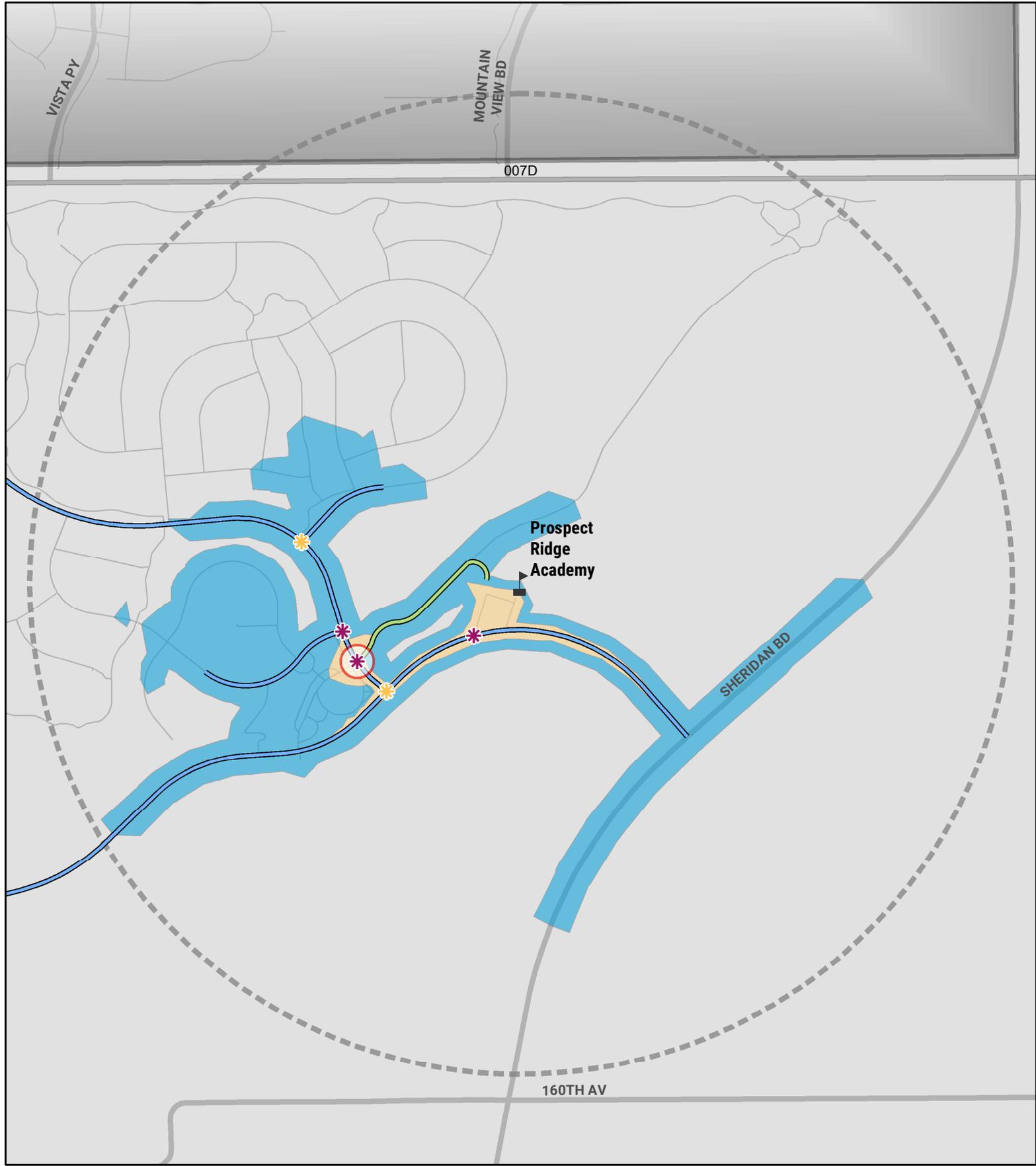


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- |                           |  |                          |
|---------------------------|--|--------------------------|
| School                    | <b>Priority Route Sidewalk Condition</b> | <b>Network Distance</b>  |
| Crosswalks                | Standard                                 | 1/4 Mile                 |
| None                      | Trail                                    | 1/2 Mile                 |
| Partial                   | Substandard                              | 1/2 Mile Direct Distance |
| All                       | Proposed Connection                      | Broomfield City Limit    |
| Major Street Intersection | Substandard ADA Ramp(s)                  |                          |



## Appendix C. Detailed Project Scoring Results

**Broomfield Bicycle and Pedestrian Projects**

Zone	ID	Name	Limits	Project Type	Description	Network	Crash History		Bike & Ped Demand			School Zone		Transit				Network		Relative Cost		Barrier Elimination		Public Input		Total Score	RANK
							Number	Score	Ped Demand	Short Trip	Score	Access	Score	Bus Stop	Micro-Hub	Hub	Score	Score	Cost	Score	Type	Score	Comments	Score			
6	27	Main Street	112th to 136th	Restripe Bike Lanes	Corridor bike & ped evaluation, Bike Lanes; widen existing bike lanes	Arterial Bike Lane Network	10	3	HIGH	HIGH	3	INDIRECT	2	Yes	Yes	Yes	3	2	LOW	3	IMP	2	18	3	21	1	
6,8	32	120th Avenue (US 287)	120 <sup>th</sup> Extension to Dry Creek Trail	Stripe New Bike Lanes	Bike Lanes	Arterial Bike Lane Network	7	3	HIGH	HIGH	3	NONE	1	Yes	Yes	Yes	3	1	LOW	3	MAJOR	3	38	3	20	2	
7	35	Kohl	Midway to 136 <sup>th</sup>	Signing & Striping	Bike Lanes or Signed Bike Route	Low Stress Network	3	3	HIGH	LOW	2	DIRECT	3	Yes	No	No	2	2	LOW	3	IMP	2	20	3	20	2	
7,8,10	36	Midway	Hoyt to US 287 to Zuni	Reconstruction	Enhanced Bikeway / protected bikeway)	Low Stress Network	16	3	HIGH	HIGH	3	DIRECT	3	Yes	Yes	Yes	3	2	HIGH	1	IMP	2	56	3	20	2	
4	15	Miramonte/Oak/W 10th/Hoyt	Lake Link Trail to Hoyt	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	4	3	MED	LOW	1.5	INDIRECT	2	Yes	No	YES	3	2	LOW	3	IMP	2	32	3	19.5	5	
4,5,6,7	17	US 287/SH 121	South Boundary to North Boundary	Restripe Bike Lanes	Bike Lanes	Arterial Bike Lane Network	4	3	HIGH	MED	2.5	NONE	1	Yes	No	Yes	3	1	LOW	3	MAJOR	3	44	3	19.5	5	
		Westlake Drive Bikeway	Lowell to 136th Ave	Signing & Striping	Neighborhood Bikeway	Low Stress Network	3	3	HIGH	LOW	2	DIRECT	3	Yes	No	Yes	3	2	LOW	3	IMP	2	0	1	19	7	
6	29	120th Local/Teller/119th/Greenway Drive	Commerce to Greenway Park	Reconstruction & Striping	Bike Lanes & Sidewalks	Low Stress Network	1	2	MED	HIGH	2.5	NONE	1	Yes	No	Yes	3	2	MOD	2	MAJOR	3	19	3	18.5	8	
8,9	43	Ash Street/Aspen Street	Midway to 136th to Aspen Creek Drive	Signing & Striping	Bike lanes or Neighborhood Bikeway?	Low Stress Network	2	2	MED	LOW	1.5	DIRECT	3	Yes	No	No	2	2	LOW	3	IMP	2	14	3	18.5	8	
		Miramonte	US 287 to Main Street	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	6	3	HIGH	MED	2.5	DIRECT	3	Yes	No	No	2	2	LOW	3	IMP	2	3	1	18.5	8	
6	30	Old US 287	Nickel to 120th Extension	Reconstruction	Bikeway and Pedestrian Improvements (Repurpose Street)	Low Stress Network	1	2	HIGH	MED	2.5	INDIRECT	2	Yes	No	Yes	3	2	HIGH	1	MAJOR	3	17	3	18.5	8	
8	CIP-K	Perry Street	122 <sup>nd</sup> to 124 <sup>th</sup>	Trail & Bike lanes	Trail Connection	Low Stress Network	0	1	HIGH	MED	2.5	DIRECT	3	YES	NO	NO	2	2	MED	2	IMP	2	1	2	18.5	8	
7	CIP-I	Nickel	Midway to Industrial	Stripe Bike Lanes & Sidewalk	Sidewalks and bike lanes	Low Stress Network	1	2	HIGH	HIGH	3	INDIRECT	2	YES	NO	YES	2	2	MED	2	IMP	2	12	3	18	13	
8	46	SE Community Trail	Tennyson to Lowell	Trail	Trail	Major Trail Corridor	0	1	MED	MED	2	INDIRECT	2	Yes	Yes	No	2	3	MOD	2	MAJOR	3	14	3	18	13	
8	41	Spader/Lamar	3 <sup>rd</sup> Avenue to Greenway Dr	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	2	2	HIGH	HIGH	3	NONE	1	Yes	Yes	No	2	2	LOW	3	IMP	2	23	3	18	13	
13	124	Broomfield Trail	Sheridan vicinity of 144th	Crossing Enhancements	Underpass/Overpass/Crossing	Major Trail Corridor	1	2	MED	LOW	1.5	DIRECT	3	No	Yes	No	2	3	HIGH	1	MAJOR	3	7	2	17.5	16	
4	CIP-D	Hoyt Street RR Overpass	Midway to Industrial	Overpass	Overpass	Major Trail Corridor	0	1	HIGH	MED	2.5	NONE	1	NO	NO	YES	3	3	HIGH	1	Major / GS	3	21	3	17.5	16	
8	44	Midway Crossing Improvements to The Field	Between Ash & Spader	Crossing Enhancements	Underpass	Low Stress Network	1	2	HIGH	MED	2.5	INDIRECT	2	Yes	No	No	2	2	LOW	3	IMP	2	9	2	17.5	16	
4	16	West Midway	Hoyt to US 287	Stripe New Bike Lanes	Bike Lanes	Arterial Bike Lane Network	1	2	HIGH	MED	2.5	NONE	1	Yes	No	Yes	3	1	LOW	3	IMP	2	42	3	17.5	16	
11,12	CIP-N	Dillon Rd	US 287 to Zuni	Construction	Bike Lanes, Sidewalks, Multi Use Path	Arterial Bike Lane Network	5	3	LOW/MOD	LOW	1.25	INDIRECT	2	NO	YES	NO	2	2	HIGH	1	MAJOR	3	23	3	17.25	20	
6	CIP-G	Broomfield Industrial Park RR Underpass	West of Industrial Park Ball fields	Underpass	RR Underpass	N/A	0	1	MED	MED	2	DIRECT	3	YES	NO	YES	3	2	HIGH	1	Major / GS	3	3	2	17	21	
6	24	Commerce	116 <sup>th</sup> Avenue to Nickel	Restripe Bike Lanes	Bike Lanes	Low Stress Network	0	1	MED	MED	2	NONE	1	Yes	Yes	Yes	3	2	LOW	3	IMP	2	25	3	17	21	
		Commerce & Nickel Connection	Midway to US 36 Broomfield Station	Construction	Construct low stress connection using a variety of tool	Low Stress Network	1	2	MED	MED	2	NONE	1	Yes	No	Yes	3	2	HIGH	1	MAJOR	3	19	3	17	21	
3,4	CIP-C	Industrial	Flatiron Crossing To Commerce	Reconstruction	Bike facilities and sidewalk	Low Stress Network/ MCT?	1	2	MED	MED	2	NONE	1	NO	NO	YES	3	2	HIGH	1	Major	3	25	3	17	21	
		Kirkwall/Birch	King Soopers to 136th	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	DIRECT	3	Yes	No	No	2	2	LOW	3	NONE	1	0	1	17	21	
7	40	Main Street Mid-Block Crossing Improvements	Mid block Crossing at Main Street between 2nd & 3rd	Crossing	Mid-block Crossing enhancements	Major Trail Corridor	0	1	HIGH	HIGH	3	INDIRECT	2	Yes	Yes	No	2	3	LOW	3	IMP	2	1	1	17	21	
		10th Ave/ Eagle Way	Sheridan to US 287	Signing & Striping		Low Stress Network	1	2	HIGH	MED	2.5	DIRECT	3	Yes	No	No	2	2	LOW	3	NONE	1	0	1	16.5	27	
		10th Ave/ Miramonte	west of US 287	Signing & Striping		Low Stress Network	2	2	HIGH	MED	2.5	DIRECT	3	Yes	No	No	2	2	LOW	3	NONE	1	4	1	16.5	27	
		Country Vista Connection	Trail behind Wal mart to across Sheridan via Yates	Trail		Low Stress Network	0	1	HIGH	HIGH	3	NONE	1	Yes	yes	No	2	2	MOD	2	MAJOR	3	6	2	16	29	
		Daphne	Midway to Kohl	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	DIRECT	3	Yes	No	No	2	2	LOW	3	NONE	1	0	1	16	29	
		Emerald/ W 3rd	US 287 to Midway Blvd	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	DIRECT	3	Yes	No	No	2	2	LOW	3	NONE	1	0	1	16	29	
4	11	Industrial	Hoyt to Nickel	construction	Bike Lanes	Low Stress Network	0	1	MED	MED	2	NONE	1	Yes	No	YES	3	2	HIGH	1	MAJOR	3	48	3	16	29	
		Laurel	Midway to US 287	Signing & Striping		Low Stress Network	1	2	HIGH	HIGH	3	INDIRECT	2	Yes	No	No	2	2	LOW	3	NONE	1	0	1	16	29	
7	39	Midway	At Kohl	Intersection Improvements	Intersection Improvements, ped crossing, enhanced bicycle intersection treatments	Low Stress Network	2	2	HIGH	LOW	2	DIRECT	3	Yes	No	No	2	2	MOD	2	IMP	2	2	1	16	29	
3,13,15	9	NW Parkway Trail	US 36 Bikeway to I-25	Construction	Trail	Major Trail Corridor	0	1	LOW	LOW	1	NONE	1	Yes	Yes	Yes	3	3	HIGH	1	MAJOR	3	21	3	16	29	
7	38	SE Community Trail	10 <sup>th</sup> Avenue to US 287	Trail	Trail	Major Trail Corridor	0	1	HIGH	LOW	2	INDIRECT	2	Yes	No	No	2	3	MOD	2	IMP	2	8	2	16	29	

14,15	69	SH 7 Regional Trail	Through Broomfield	Construction	Bike Lanes, Multi use Trail and Sidewalks	Major Trail Corridor	2	2	LOW	HIGH	2	NONE	1	No	Yes	Yes	3	3	HIGH	1	MAJOR	3	5	1	16	29
2	7	US 36 Bikeway	Interlocken Loop west boundary	Trail	Widen Trail (12')	Major Trail Corridor	2	2	HIGH	LOW	2	NONE	1	Yes	No	Yes	3	3	MOD	2	IMP	2	0	1	16	29
9	54	136 <sup>th</sup> Avenue	Kohl to Lowell	Restripe Bike Lanes	Restripe to widen bike lanes	Arterial Bike Lane Network	4	3	MED	LOW	1.5	INDIRECT	2	No	No	No	1	1	LOW	3	IMP	2	8	2	15.5	39
5	22	Arista Place	Uptown to US 36 Ped Bridge	Signing & Striping	Bike Lane or Signed Bike Route	Low Stress Network	0	1	HIGH	MED	2.5	NONE	1	Yes	No	Yes	3	2	LOW	3	NONE	1	11	2	15.5	39
4	132	Burbank Street	W. Midway Blvd to W. 10th Ave	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	1	2	HIGH	MED	2.5	NONE	1	Yes	No	No	2	2	LOW	3	NONE	1	10	2	15.5	39
3	10	Industrial	Industrial/Flatiron Crossing	Intersection	IntersectionEnhancements	Low Stress Network	0	1	MED	HIGH	2.5	NONE	1	Yes	Yes	Yes	3	2	MOD	2	IMP	2	6	2	15.5	39
12	61	Irving/Shannon Drive	144 <sup>th</sup>	Intersection	IntersectionEnhancements	Low Stress Network	2	2	MED	LOW	1.5	INDIRECT	2	No	Yes	No	2	2	LOW	3	IMP	2	3	1	15.5	39
7	34	Midway	US 287	Intersection	IntersectionEnhancements	Arterial Bike Lane Network	1	2	HIGH	MED	2.5	NONE	1	Yes	No	No	2	1	LOW	3	IMP	2	9	2	15.5	39
12	62	Shannon Drive	144 <sup>th</sup> to Star Creek	Signing & Striping	Signed Bike Route	Low Stress Network	1	2	MED	LOW	1.5	INDIRECT	2	No	Yes	No	2	2	LOW	3	NONE	1	6	2	15.5	39
5		US 36 Bikeway Connections	SH 128, Interlocken Filing 24 Lot 3 or 4, Edgeview Drive	Trail	Trail	Major Trail Corridor	0	1	MED	HIGH	2.5	NONE	1	No	No	Yes	3	3	MOD	2	IMP	2	0	1	15.5	39
4	133	W. 6th Avenue	Burbank St to US 287	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	0	1	HIGH	MED	2.5	NONE	1	Yes	No	No	2	2	LOW	3	IMP	2	7	2	15.5	39
6	26	116 <sup>th</sup> Avenue	US 36 Ped Bridge to Old Wadsworth	Construction	Bike Lanes	Low Stress Network	0	1	MED	MED	2	NONE	1	Yes	Yes	Yes	3	2	HIGH	1	IMP	2	15	3	15	48
		1st Ave.	Nickel Street to Main Street	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	INDIRECT	2	Yes	No	No	2	2	LOW	3	NONE	1	0	1	15	48
		1st Ave.	Main Street to Sheridan	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	NONE	1	Yes	Yes	No	2	2	LOW	3	IMP	2	1	1	15	48
		6th Ave	Main to Burbank	Signing & Striping		Low Stress Network	0	1	HIGH	HIGH	3	INDIRECT	2	Yes	No	No	2	2	LOW	3	NONE	1	2	1	15	48
14	70	Broomfield Trail	NW Parkway to Indian Peaks	Trail	Trail	Major Trail Corridor	0	1	LOW	LOW	1	INDIRECT	2	No	No	No	1	3	MOD	2	GS	3	6	2	15	48
3	CIP-A	Rock Creek Trail	NW Parkway to US 36	Trail	Trail	Major Trail Corridor	0	1	LOW	LOW	1	NONE	1	NO	NO	YES	3	3	MED	2	Major	3	0	1	15	48
3	CIP-B	Rock Creek Trail	Brainard Drive to Midway	Trail	Trail + Crossing	Major Trail Corridor	0	1	LOW	LOW	1	NONE	1	NO	NO	YES	3	3	MED	2	IMP	2	3	2	15	48
1,2,5	2	SH 128	Indiana to US 287	Restripe Bike Lanes	Bike Lanes	Arterial Bike Lane Network	2	2	MED	MED	2	NONE	1	Yes	No	No	2	1	LOW	3	IMP	2	7	2	15	48
5	23	US 36 Trail Connection at 120th	WB 120 <sup>th</sup> to US 36 Bikeway	Trail	Trail Connection	Low Stress Network	0	1	MED	MED	2	NONE	1	Yes	No	Yes	3	2	MOD	2	MAJOR	3	2	1	15	48
10	55	132 <sup>nd</sup> Avenue Alignment	Lowell to Westlake Dr	Trail	Trail	Low Stress Network	1	2	MED	LOW	1.5	DIRECT	3	Yes	No	No	2	2	MOD	2	NONE	1	3	1	14.5	57
9	51	Broomfield County Commons	Sheridan to Lowell	Signing & Striping	add sharrows and signage to share the road	Low Stress Network	1	2	MED	LOW	1.5	NONE	1	No	No	No	1	2	LOW	3	IMP	2	7	2	14.5	57
11	CIP-M	Broomfield Trail	Aspen to Sheridan	Trail	Trail	Major Trail Corridor	0	1	MED	LOW	1.5	DIRECT	3	NO	NO	NO	1	3	MED	2	IMP	2	0	1	14.5	57
9	48	Broomfield Trail	136 <sup>th</sup> Ave underpass	Underpass	Underpass	Major Trail Corridor	1	2	MED	LOW	1.5	INDIRECT	2	No	No	No	1	3	HIGH	1	GS	3	2	1	14.5	57
		Broomfield Trail	Markel Trails	Trail	Trail	Major Trail Corridor	0	1	MED	LOW	1.5	DIRECT	3	No	No	No	1	3	MOD	2	IMP	2	0	1	14.5	57
6		Greenway Drive	Greenway Drive Neighborhood	Signing & Striping	Sidewalk	Low Stress Network	1	2	MED	HIGH	2.5	NONE	1	Yes	No	No	2	2	LOW	3	NONE	1	1	1	14.5	57
8	42	Perry Street	122 <sup>nd</sup> Ave to 120th	Stripe New Bike Lanes	Bike Lanes	Low Stress Network	0	1	MED	LOW	1.5	INDIRECT	2	Yes	No	No	2	2	LOW	3	NONE	1	9	2	14.5	57
10	57	SE Community Trail	Midway	Underpass	Underpass	Major Trail Corridor	1	2	MED	LOW	1.5	INDIRECT	2	No	No	No	1	3	HIGH	1	GS	3	2	1	14.5	57
5	19	SH 121	120th Connection Underpass under SH 121 Wadsworth	Underpass	Underpass	Low Stress Network	0	1	MED	HIGH	2.5	NONE	1	Yes	No	YES	3	2	HIGH	1	GS	3	3	1	14.5	57
13,14	67	Sheridan	Lowell to SH 7	Restripe Bike Lanes	Bike Lane (NB)	Arterial Bike Lane Network	2	2	LOW	MED	1.5	NONE	1	No	No	No	1	1	LOW	3	IMP	2	20	3	14.5	57
5	21	Uptown Avenue	West of Central Ct to US 36	Construction	Bike Lane (eastbound)	Low Stress Network	0	1	HIGH	MED	2.5	NONE	1	Yes	No	Yes	3	2	HIGH	1	IMP	2	7	2	14.5	57
		US 36 Bikeway Connection	From TWELVE THOUSAND WADSWORTH FILING NO 1 Lot: 1 to US 36 Bikeway	Trail		Low Stress Network	0	1	MED	HIGH	2.5	NONE	1	No	No	Yes	3	2	MOD	2	IMP	2	0	1	14.5	57
13	123	Zuni	144th	Underpass	Underpass/Overpass	Major Trail Corridor	1	2	MED	LOW	1.5	INDIRECT	2	No	No	No	1	3	HIGH	1	GS	3	3	1	14.5	57
		14th Ave Neighborhood Bikeway	Main to Sheridan	Signing & Striping		Low Stress Network	0	1	HIGH	LOW	2	DIRECT	3	No	No	No	1	2	LOW	3	NONE	1	2	1	14	70
13	CIP-R	Broomfield Trail	Lowell to Federal	Trail	Trail	Major Trail Corridor	0	1	LOW	LOW	1	NONE	1	NO	NO	NO	1	3	MED	2	MAJOR	3	3	2	14	70
4	12	Broomfield Trail	Midway N/ Community Ditch, cross Compton, to Broomfield Trail east of Richard Steele Park	Trail	Trail	Major Trail Corridor	0	1	HIGH	LOW	2	NONE	1	No	No	No	1	3	MOD	2	NONE	1	34	3	14	70
16,17	75	Broomfield Trail	SH 7 to I-25 (including loop on east side of I-25)	Trail	Trail	Major Trail Corridor	0	1	LOW	HIGH	2	NONE	1	No	No	Yes	3	3	MOD	2	NONE	1	0	1	14	70
13	64	Lowell	144 <sup>th</sup> to n/o Sheridan Parkway	Construction	Bike Lanes	Arterial Bike Lane Network	2	2	LOW	LOW	1	NONE	1	No	Yes	No	2	1	HIGH	1	MAJOR	3	20	3	14	70
13	121	Sheridan	Lowell	Crossing Improvement	Crossing Enhancements	Major Trail Corridor	1	2	LOW	LOW	1	NONE	1	No	No	No	1	3	MOD	2	IMP	2	9	2	14	70
7	CIP-H	US 287	North of Midway to 6th Avenue	Sidewalk	Sidewalk (east side)	N/A	0	1	HIGH	HIGH	3	NONE	1	YES	NO	NO	2	N/A	MED	2	MAJOR	3	1	2	14	70
12	134	W. 138th Avenue	Zuni St to Huron St	Signing & Striping	Signed Bike Route	Low Stress Network	0	1	MED	MED	2	DIRECT	3	No	No	No	1	2	LOW	3	NONE	1	5	1	14	70
12	63	136 <sup>th</sup> Ave	Lowell to Huron - westbound only	Restripe Bike Lanes	Bike Lane (eastbound) and Bike Lanes through Huron intersection	Arterial Bike Lane Network	1	2	LOW	MED	1.5	NONE	1	Yes	Yes	No	2	1	LOW	3	IMP	2	4	1	13.5	78
9	50	13 <sup>th</sup> /Broomfield County Commons	Sheridan	Intersection	IntersectionEnhancements and bike detection	Low Stress Network	1	2	MED	LOW	1.5	NONE	1	No	No	No	1	2	LOW	3	IMP	2	1	1	13.5	78
		Aspen Creek Drive & Durango Neighborhood Bikeway	Lake Link Trail to Broadlands	Signing & Striping		Low Stress Network	0	1	MED	LOW	1.5	DIRECT	3	No	No	No	1	2	LOW	3	NONE	1	0	1	13.5	78



8	105	Midway	Main to Ash	Sidewalk	Sidewalk (north side)	Sidewalk	2	2	MED	MED	2	INDIRECT	2	Yes	No	No	2	0	MOD	2	NONE	1	14	3	14	7
13,14	113	Sheridan	Lowell to SH 7	Sidewalk	Sidewalk (both sides, south side only Lowell to Broomfield Trail)	Sidewalk	2	2	LOW	LOW	1	INDIRECT	2	No	No	No	1	0	MOD	2	MAJOR	3	21	3	14	7
7	102	1 <sup>st</sup> Avenue	Nickel to Laurel	Reconstruction	Sidewalk (south side)	Sidewalk	0	1	HIGH	MED	2.5	INDIRECT	2	Yes	No	No	2	0	HIGH	1	IMP	2	14	3	13.5	9
8	104	Spader Way	Descombes to Community Park Rd	Sidewalk	Sidewalk (west side)	Sidewalk	0	1	HIGH	HIGH	3	NONE	1	Yes	Yes	No	2	0	MOD	2	NONE	1	18	3	13	10
8	103	1 <sup>st</sup> Avenue	Sheridan to the west	Sidewalk	Sidewalk (north side)	Sidewalk	1	2	HIGH	MED	2.5	NONE	1	Yes	Yes	No	2	0	MOD	2	NONE	1	8	2	12.5	11
5	95	Uptown Avenue	West of Central Ct	Sidewalk	Sidewalk (south side)	Sidewalk	0	1	HIGH	MED	2.5	NONE	1	yes	No	Yes	3	0	MOD	2	NONE	1	6	2	12.5	11
6	100	116 <sup>th</sup> Avenue	US 36 Ped Bridge to Old Wadsworth	Construction	Sidewalk (both sides)	Sidewalk	0	1	MED	MED	2	NONE	1	Yes	Yes	Yes	3	0	HIGH	1	NONE	1	15	3	12	13
15	118	Huron	150 <sup>th</sup> to SH 7	Sidewalk	Sidewalk (both sides)	Sidewalk	0	1	LOW	HIGH	2	NONE	1	No	Yes	No	2	0	MOD	2	MAJOR	3	3	1	12	13
16	120	Huron	SH 7 to 169 <sup>th</sup> Ave	Construction	Sidewalk (both sides)	Sidewalk	0	1	LOW	HIGH	2	NONE	1	No	No	Yes	3	0	HIGH	1	Major	3	0	1	12	13
3	130	Interlocken Loop (Storage)	US 36 to Via Varra	Sidewalk	Sidewalk (East Side)	Sidewalk	0	1	LOW	LOW	1	NONE	1	Yes	No	Yes	3	0	MOD	2	MAJOR	3	0	1	12	13
3	89	Midway	Flatiron Crossing to s/o Via Varra	Sidewalk	Sidewalks (both sides)	Sidewalk	0	1	LOW	LOW	1	NONE	1	Yes	Yes	Yes	3	0	MOD	2	IMP	2	6	2	12	13
14	116	Preble Creek Parkway	Sheridan to Indian Peaks	Sidewalk	Sidewalk (both sides, south side only Indian Peaks to Alcott)	Sidewalk	1	2	LOW	LOW	1	DIRECT	3	No	No	No	1	0	MOD	2	IMP	2	2	1	12	13
5	92	Metro Airport Ave	Airport Way to Wadsworth	Sidewalk	Sidewalk (both sides)	Sidewalk	0	1	MED	LOW	1.5	NONE	1	Yes	No	No	2	0	MOD	2	MAJOR	3	1	1	11.5	19
5	96	Uptown Avenue	North of Parkland St	Sidewalk	Sidewalk (east side)	Sidewalk	0	1	HIGH	MED	2.5	NONE	1	No	No	Yes	3	0	MOD	2	NONE	1	1	1	11.5	19
5	93	Wadsworth	Uptown to southern boundary	Construction	Sidewalk (both sides, west side only Rocky Mtn Airport/ Uptown to boundary)	Sidewalk	0	1	MED	LOW	1.5	NONE	1	Yes	No	Yes	3	0	HIGH	1	MAJOR	3	3	1	11.5	19
2	87	120 <sup>th</sup> Ave	Interlocken Loop to Airport Way	Sidewalk	Sidewalk (both sides, south side only on west end)	Sidewalk	0	1	MED	MED	2	NONE	1	Yes	No	No	2	0	MOD	2	IMP	2	3	1	11	22
9	108	East 10th Avenue	Birch to Cottonwood	Reconstruction	Sidewalk (south side)	Sidewalk	0	1	HIGH	LOW	2	DIRECT	3	No	No	No	1	0	HIGH	1	IMP	2	2	1	11	22
2	88	Interlocken Loop	Four open parcel gaps between Network Pkwy and Airport Way	Sidewalk	Sidewalk (south side)	Sidewalk	0	1	MED	MED	2	NONE	1	Yes	No	No	2	0	MOD	2	IMP	2	0	1	11	22
14	114	Lowell	Sheridan to 160 <sup>th</sup>	Sidewalk	Sidewalk (west side)	Sidewalk	1	2	LOW	LOW	1	NONE	1	No	No	No	1	0	MOD	2	IMP	2	10	2	11	22
9	106	Main Street	12 <sup>th</sup> Ave to 14 <sup>th</sup> Ave	Sidewalk	Sidewalk (east side)	Sidewalk	0	1	MED	MED	2	INDIRECT	2	No	No	No	1	0	MOD	2	IMP	2	0	1	11	22
3	131	S. 96th Street	Northwest Pkwy to west boundary	Sidewalk	Sidewalk (both sides)/ bike lane	Sidewalk	0	1	LOW	LOW	1	NONE	1	Yes	No	No	2	0	MOD	2	MAJOR	3	1	1	11	22
4	91	Miramonte	Alter Way to Lilac St	Reconstruction	Sidewalk (north/west side)	Sidewalk	0	1	MED	LOW	1.5	NONE	1	Yes	No	No	2	0	HIGH	1	NONE	1	13	3	10.5	28
14	117	Preble Creek Parkway	Gap west of Indian Peaks Pkwy	Sidewalk	Sidewalk (north side)	Sidewalk	0	1	MED	LOW	1.5	DIRECT	3	No	No	No	1	0	MOD	2	NONE	1	1	1	10.5	28
17	128	E. 168th Avenue	SH 7 to County Road 11	Construction	Sidewalk (both sides) and bike lane	Sidewalk	0	1	LOW	HIGH	2	NONE	1	No	No	Yes	3	0	HIGH	1	NONE	1	0	1	10	30
9	107	Aspen Street	12 <sup>th</sup> Ave to 14 <sup>th</sup> Ave	Sidewalk	Sidewalk (west side)	Sidewalk	0	1	MED	LOW	1.5	INDIRECT	2	No	No	No	1	0	MOD	2	NONE	1	3	1	9.5	31
1	82	SH 128	Indiana to Network Pkwy	Construction	Sidewalk (south side full length, north side Indiana to Eldorado)	Sidewalk	0	1	LOW	MED	1.5	NONE	1	No	No	No	1	0	HIGH	1	MAJOR	3	0	1	9.5	31
14,15	115	160 <sup>th</sup> Avenue	Lowell to I-25	Construction	Sidewalk (both sides, south side only Lowell to Broomfield Trail)	Sidewalk	1	2	LOW	LOW	1	NONE	1	No	No	No	1	0	HIGH	1	NONE	1	10	2	9	33
11	110	Aspen	Aspen Creek Dr to Dillon Rd	Construction	Sidewalk (both sides)	Sidewalk	0	1	LOW	LOW	1	INDIRECT	2	No	No	No	1	0	HIGH	1	NONE	1	11	2	9	33
17	127	County Road 11	E. 168th Avenue North to County B	Sidewalk	Sidewalk (both sides)/ bike lane	Sidewalk	0	1	LOW	HIGH	2	NONE	1	No	No	No	1	0	MOD	2	NONE	1	0	1	9	33
16	119	CR 7	SH 7 to Lowell Lane	Construction	Sidewalk (both sides)	Sidewalk	0	1	LOW	HIGH	2	NONE	1	No	Yes	No	2	0	HIGH	1	NONE	1	0	1	9	33
1	83	Indiana	SH 128 to southern boundary	Construction	Sidewalk (both sides)	Sidewalk	0	1	LOW	LOW	1	NONE	1	No	No	No	1	0	HIGH	1	MAJOR	3	3	1	9	33
1	84	Simms	SH 128 to Countryside Drive	Construction	Sidewalk (both sides)	Sidewalk	0	1	LOW	LOW	1	NONE	1	No	No	No	1	0	HIGH	1	MAJOR	3	1	1	9	33
5	94	Wadsworth	US 36 bridge to Interlocken Loop	Sidewalk	Sidewalk (west side)	Sidewalk	0	1	MED	MED	2	NONE	1	No	No	No	1	0	MOD	2	NONE	1	5	1	9	33
13	112	Zuni	Dillon Rd to 156 <sup>th</sup> Ave	Construction	Sidewalk (west side; east side is Adams County)	Sidewalk	1	2	LOW	LOW	1	NONE	1	No	No	No	1	0	HIGH	1	IMP	2	4	1	9	33