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Bike & Pedestrian Plan

Washington County

FEBRUARY 2021

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Washington County

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Bike & Pedestrian Plan

Funded in part by the Statewide Health Improvement Partnership, Minnesota Department of Health

ship statewide health improvement partnership

Prepared by HKGi in partnership with CivicBrand and Bolton & Menk

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HUGO FEED MILL
AND
HARDWARE

01. PLAN & PROCESS

HISTORICAL CONTEXT

Washington County's bicycle culture is rich in history dating back to the 1860's. This history is celebrated and promoted throughout the county. The biking community hosts numerous events on an annual basis that attracts hundreds of riders throughout the region and nation. Notable events include the Tour De Hugo (City of Hugo) and the Hero Gravel Classic (City of Stillwater). Many events are also hosted in the county parks that range from fat-tire bike demos to educational/safety programs.

INTRODUCTION

Washington County is fulfilling one of its strategies from the 2040 Comprehensive Plan by "adopting a bicycle and pedestrian plan to address county recreation and transportation needs."

The purpose of this plan is to:

- Create a future county-wide bicycle and pedestrian network that builds upon the existing network;
- Identify barriers that limit safe and comfortable bicycle and pedestrian routes for all users;
- Incorporate community feedback and desires toward bicycle and pedestrian needs, while being balanced with other county goals and resources;
- Identify best practices and guide the county in future facility and network investments; and,
- Guide policy and programming improvements, such as wayfinding and educational/encouragement activities.

PLAN GOALS

The purpose of this Plan is to also advance Washington County's 2040 Comprehensive Plan's goals, policies, and strategies that pertain to pedestrians and bicyclists. Excerpts from Washington County's 2040 Comprehensive Plan are listed below.

TRANSPORTATION GOAL 1: PLAN, BUILD, AND MAINTAIN AN INTERCONNECTED AND ACCESSIBLE TRANSPORTATION SYSTEM THAT CONSIDERS ALL USERS AND MODES OF TRAVEL.

» Policy: Coordinate transportation mobility and choice to meet a diversity of needs, while considering appropriate system levels of service.
  - *Strategy: Integrate non-motorized accommodations into the design of roadway and transit facilities to increase access to destinations*
  - *Strategy: Adopt a bicycle and pedestrian plan to address county recreation and transportation needs.*

» Policy: Work with partners to identify and coordinate transportation system improvements to accommodate growth and development
  - *Strategy: Identify gaps in the trail network and prioritize investments to improve non-motorized access to destinations.*

» Policy: Support regional planning activities to enhance interagency collaboration and coordination.
  - *Strategy: Coordinate with partners, including the Metropolitan Council and Minnesota Department of Natural Resources, to preserve, maintain, and expand the regional and state trail networks.*

TRANSPORTATION GOAL 3: IMPROVE SAFETY AND EFFICIENCIES FOR ALL USERS.

» Policy: Support ongoing safety review processes that promotes both proactive and reactive treatments to reduce crashes.
  - *Strategy: Coordinate with partners to improve safety and usability of county roadways when developing safe, effective, and implementable strategies in key locations (e.g., schools and at non-motorized crossings).*
  - *Strategy: Develop roadway crossings at trail facilities within county roadway corridors to promote safety for all users.*

TRANSPORTATION GOAL 4: PROMOTE POSITIVE ENVIRONMENTAL AND HEALTH OUTCOMES.

» Policy: Explore opportunities to improve the environment and encourage physical activity.
  - *Strategy: Work with local partners to promote land use patterns that enable alternative modes of travel and reduce reliance on the private automobile*
  - *Strategy: Identify trail connections to provide links to key destinations.*

PLANNING FOR BIKING AND WALKING

Over time, the purposes for biking and walking have changed dramatically. Walking is the original form of transportation. It has always been the cheapest and most environmentally friendly way of getting around. The introduction of the bicycle in the early 1800's carried many of the same benefits and allowed people to travel more efficiently, faster, and longer distances. After the advent of the personal automobile and its increased popularity in the 1920s and 30s, biking and walking for transportation purposes began to decline and was seen mostly for sport, exercise, or recreational purposes.

Today, biking and walking have again become more popular for multiple purposes as many people are recognizing the importance of living an active and healthy lifestyle. The following are some key reasons for planning for the future bicyclists and pedestrians in Washington County.

SAFETY

Evidence suggests that high-bicycling-mode-share communities are not only safer for bicyclists but for all road users. Further, bike facilities themselves act as "calming" mechanisms on traffic, slowing cars and reducing fatalities [1].

LIVABILITY + MOBILITY

Fifty percent of U.S. residents say that walkability is a top priority or high priority when considering where to live [2]. Bicycling has become the country's fastest-growing form of transportation for commuters.

QUALITY OF LIFE

Washington County residents have indicated their "quality of life" as being excellent or good[3], which is attributed in part to the County's park and trail system. Parks and trails provide public health benefits by connecting people to nature, while providing opportunities to recreate and live actively. See pages 1-4 and 1-5 for more information on recent surveys conducted by Washington County regarding public health, parks, trails, and active living.

HOUSEHOLD AND COMMUNITY PROSPERITY

According to AAA, it costs an average of $8,849 to operate the average car for 2018, or about $737 per month [4]. Not all households can afford to own a car and some lower income households who own a car may be sacrificing other basic needs in order to get by.

WHY PLAN FOR BIKING AND WALKING TODAY?

The following are some key reasons for planning for the future bicyclists and pedestrians in Washington County.

- **Safety**
- **Livability + Mobility**
- **Health**
- **Household and Community Prosperity**
- **Air Quality and Greenhouse Gas Reduction**
- **Recreation**
- **Parking and Transportation Networks**

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT SURVEY FINDINGS

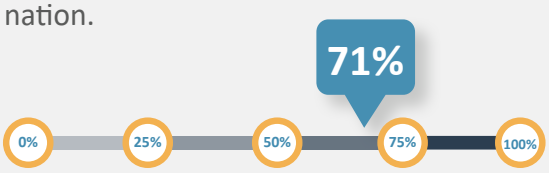
The ***Washington County Residential Survey*** is administered on an annual basis. The most recent survey was mailed to 2,500 randomly selected households in January 2019 and was distributed equally among the five county Commissioner Districts. Of the approximately 2,413 households that received a survey in the mail, 749 surveys were completed, providing a response rate of 31%.

Finding: Washington County residents feel exceptionally safe in the community, but are concerned about road safety.

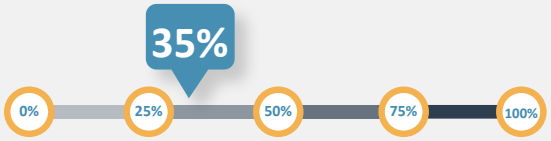
- Residents' rating for overall feeling of safety in the county was much higher than that given in other counties across the nation.
- Respondents felt the least safe from distracted drivers and being injured while biking or walking along roads in the county; both of these reported feelings of safety declined from 2016 to 2019.

Finding: Residents are pleased with the ease of travel in the county, but public transportation continues to be an area of opportunity.

As in 2016, ease of travel by car in Washington County received a rating of 71 on the 100-point scale, which was between "excellent" and "good" and was much higher than ratings given in other counties across the nation.



Residents were less pleased with the availability of public transportation options in the county: this item received a rating of 35 on the 100-point scale (just above "fair") and was lower than the national county average.



"Residents visit parks regularly and would like to see additional amenities offered."

When asked how often they had frequented a regional park or trail in the past year, a majority of respondents ***(6 in 10)*** had visited at least three times during that time period; ***87%*** of the respondents visited a regional park in the past 12 months.

Residents were asked to select from a list of options why they had not visited a regional park or trail, or had not visited more often, and instructed to choose as many as applied. Residents were most likely to indicate lack of time as a factor for not visiting (***52%*** of respondents selected this option).

Residents would like to see the following facilities added or expanded to the county's park system: hiking trails (***48%***), biking trails (***36%***), dog parks (***28%***), a swimming splash pad (***27%***) and picnic/group shelters (***25%***).

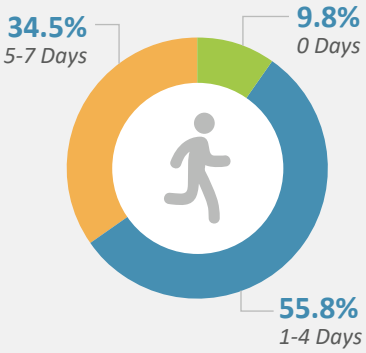
The ***Adult Health and Wellbeing Survey*** is conducted every 4-6 years and was administered by Washington County's Department of Public Health and Environment with SHIP support in the fall of 2019. In 2019, a total of 1,281 residents participated in either a random mail based survey, or a targeted in person survey of low income and minority populations in the county.

TRANSPORTATION

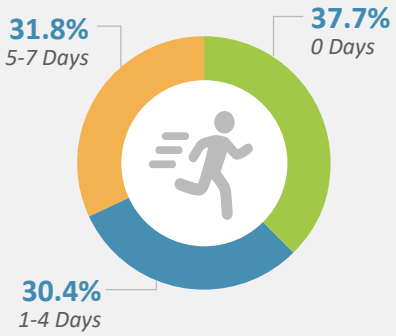
In the year prior to the survey, the lack of personal transportation kept 20% of the respondents in the targeted sample from getting to places where they needed to go, such as jobs, medical appointments, or shopping.

Finding: Most Washington County residents from the targeted sample are getting some form of exercise at least once a week, but is not meeting CDC's recommended physical activity guidelines.

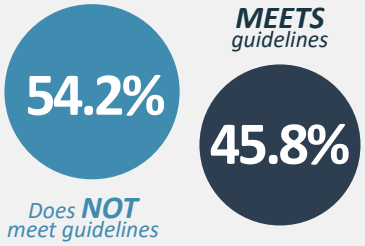
Moderate exercise 5+ days per week



Vigorous exercise 3+ days per week



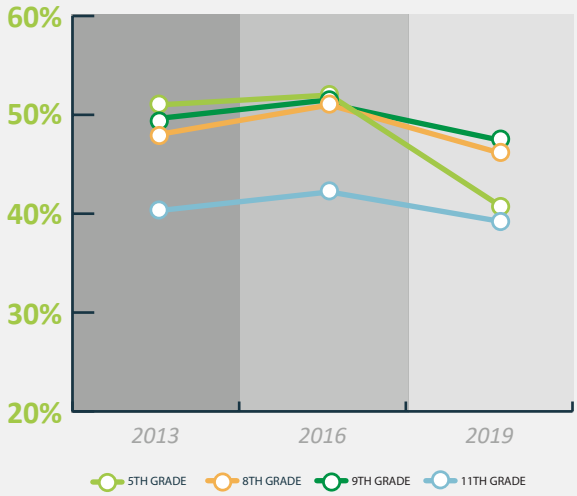
CDC Recommended physical activity guidelines: Moderate activity for 30 minutes / 5+ days or vigorous activity for 20 minutes/3+ days or both

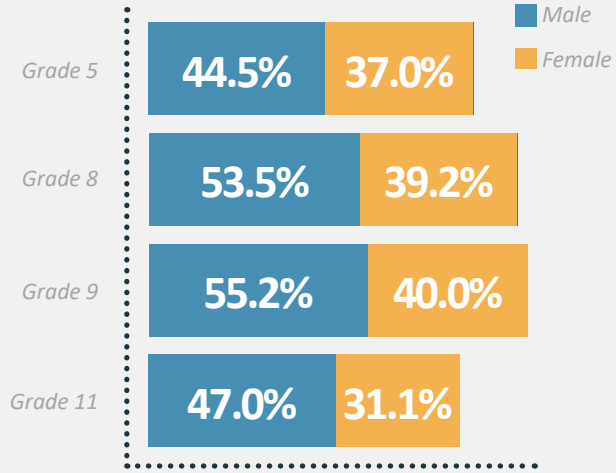


The ***Minnesota Student Survey*** is conducted every three years and is a collaborative effort of local schools and state agencies (Education, Health, Human Services, and Public Safety). This survey was completed in the spring of 2019. In 2019, there were 9,541 survey responses by 5th, 8th, 9th, and 11th graders in the county.

Finding: There has been a steady decline in the amount of time students partake in physical activity during the week.

PHYSICALLY ACTIVE AT LEAST 60 MINUTES F0R 5 OR MORE DAYS IN THE PAST WEEK?





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AIR QUALITY AND GREENHOUSE GAS REDUCTIONS

The transportation sector generates the largest share (28.9%) of greenhouse gas emissions [5]. Walking or cycling could substitute for 41% of short car trips (less than 3 miles), saving nearly 5% of CO2 emissions from car travel [6].

RECREATION & COMMUTING

Trails provide recreational opportunities and commuters options. Trails also serve diverse communities, including those that may otherwise have limited opportunities to access natural areas and jobs due to financial or transportation constraints. Furthermore, bicycling is the fastest growing form of transportation for commuters.

MUTLIMODAL NETWORKS

As more people bike and walk to destinations such as retail, restaurants, entertainment, and work, the demand for vehicle parking decreases, allowing buildings to be closer to each other and become even more walkable. Encouraging transit use, biking and walking brings travel origins and destinations closer together and can help alleviate traffic congestion [7], while supporting public health initiatives.

REGIONAL ECONOMIC COMPETITIVENESS / TOURISM

As bicycling and walking networks have grown, so have active transportation–oriented developments and bike-friendly businesses. Numerous studies have shown that real estate values increase with proximity to bicycle paths and walking trails.

SUSTAINABILITY / RESILIENCE

Because biking and walking do not rely on burning fossil fuels, they are more resilient to swings in fuel prices. From a sustainability perspective, bicycles can be produced for a fraction of the materials, energy, and shipping costs of a car. Biking and walking also saves taxpayers money by reducing road wear. A 20-pound bicycle causes less wear on the pavement than a two-ton vehicle.

THE PLANNING PROCESS

The planning process started in June of 2019 and ended in July of 2020. The draft Plan was available for public review during the fall of 2020 (August 2020 - October 2020). A longer review period was provided to better accommodate people during the pandemic. The Washington County Board of Commissioners adopted the Plan in February 2021.

PROJECT BRAND

A project brand was developed in an effort to create an "identity" for the plan. The project brand and style (as seen below) is based on five brand principles: Balance, Family, Connection, Nature, and Evolution. These principles represent an identity and path for building Washington County's bicycle and pedestrian network. Materials and documents prepared for this plan were required to use the project logo and follow the county's style guide.

PROJECT MANAGEMENT TEAM

The overall planning process was led by Washington County Public Works. The Project Management Team (PMT) was comprised of Public Works, Information Technology, and Public Health staff.

TECHNICAL ADVISORY COMMITTEE

The planning process was guided by a Technical Advisory Committee (TAC) (see Table 1.1). The TAC was comprised of local and regional agencies. Each committee member served as a "champion" of the process by promoting the public engagement activities, reviewing technical information, and providing guidance throughout the planning process.

PROJECT MANAGEMENT TEAM

- **Emily Jorgensen, Planner II, Public Works (Project Lead)**
- **Connor Schaefer, Planner II, Public Works**
- **Kevin Peterson, Engineer II, Public Works**
- **Joe Gustafson, Traffic Engineer, Public Works**
- **Charlie Parent, Engineering Technician II, Public Works**
- **Stephanie Souter, Public Health Program Supervisor, Public Health & Environment**
- **Kim Ball, Public Health Program Coordinator, Public Health & Environment**
- **Alena DeGrado, Planner I, Public Health & Environment**
- **David Brandt, IT Spatial Analyst Developer, IT**
- **HKGi, Bolton & Menk, and CivicBrand project team representatives**

Table 1.1 Technical Advisory Committee Members

NAME	CITY/TOWNSHIP	ROLE/POSITION	COUNTY DISTRICT
Ben Prchal	City of Lake Elmo	Planner	3
Ryan Goodman	Forest Lake, Marine on the St. Croix, Scandia	Consultant Engineer, Bolton & Menk	1
Eric Johnson	City of Oak Park Heights	City Administrator	3
Bill Turnblad/Abbi Wittman	City of Stillwater	Economic Development Director/Planner	3
Bob Streetar	City of Oakdale	Community Development Director	2
John Burbank	City of Cottage Grove	Planner	4
Kathy Laur	Lake St. Croix Beach	City Administrator	3
Merritt Clapp Smith	Stillwater Township, Scandia, Baytown	Consultant Planner, TKDA	1, 3
Kate Eiynck	City of Newport	Consultant Planner, MSA Services	4
Tony Kutzke	City of Woodbury	Engineer	2,5
Shayla Denaway	City of Hugo	Parks Planner	1
Steve Elmer	Met Council	Bike/Ped Planning	NA
Brandon Helm	DNR	Acquisition and Development Specialist	NA

COMMUNITY ENGAGEMENT

Every effort was made to make the planning and public engagement processes accessible to all Washington County residents. This was achieved by targeting public engagement activities in specific parts of the county, while leveraging online tools. A summary of these activities are listed below.

POP-UP EVENTS

Community events were one of the most effective forums for engaging residents in the planning process. Washington county staff attended the following events to share project information and ask questions about walking and biking in the county:

- Spokes & Folks: The Evolution of Bicycles and Trails in Washington County Exhibit (Historic Court House in Stillwater) – June 1, 2019
- Washington County Ice Cream Social (Historic Court House in Stillwater) – July 18, 2019
- Washington County Fair (Lake Elmo) - July 29 - August 4, 2019)
- Washington County Blue Grass Festival (Lake Elmo Park Reserve) – September 7, 2019
- Sustainable Stillwater (Stillwater) - September 6, 2019
- Tour de Hugo (Hugo City Hall) – September 21, 2019
- Park and Trail User Interviews: Field Visit (county-wide) - September 28 – 29, 2019
- Lake Links Association (White Bear Lake and the Town of White Bear) - December, 2019
- Woodbury Bicycle Advisory Committee (Woodbury) - January 14, 2020

Additional events were planned, but canceled as a result of the COVID-19 pandemic. Online engagement efforts were used to help supplement the public engagement process.

VIDEO

A short video was created to highlight the purpose of the study, while showcasing interviews from residents on what walking and biking means to them in the county.

ONLINE TOOLS

Interactive maps and surveys were used to engage people specifically for this planning effort. At any given time during the planning process (June 2019 – July 2020), people were able interact with these tools to provide comments or react to ideas. The county's website was used as a clearinghouse to promote the project and interactive tools. These tools reached over 2,000 unique users.

The public was able to review and comment on the draft Plan in late 2020 (August 2020 - October 2020). The draft document was posted on the project website and paired with a series of videos summarizing each chapter - narrated by county staff.

NOTE TO THE READER

COVID-19 was at the forefront of all of our lives during the last several months of developing this Plan. During this time, Washington County's park and trail system experienced a large increase in the number of users.

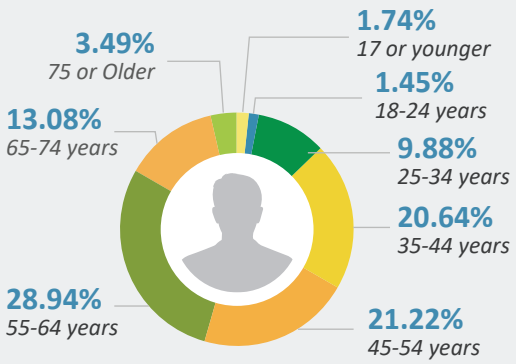
The response to COVID is continually evolving and we will continue to experience impacts in our communities and parks/trail systems as this plan is implemented.

KEY THEMES & FINDINGS

SURVEY RESULTS

Key themes and findings that emerged from the online questionnaire include:

Survey respondents (350 people) fell within the following age groups:



95%

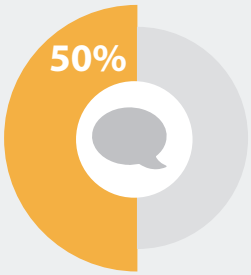
Many respondents indicated they use the existing network on a regular basis for exercise, leisure, or recreational purposes.

Only a small percent of the respondents use the existing bicycle and pedestrian network to travel to work:

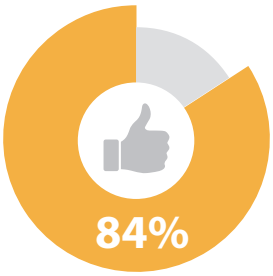
3.5%	4%	3%
Use it everyday	*Use it 2-3 times per week*	*Use it once a week*

Only a small percent of respondents (1.5%) walk or bike to transit options on a regular basis.

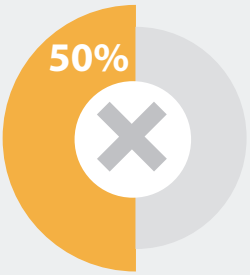
94% of the respondents never walk or bike to school or work.



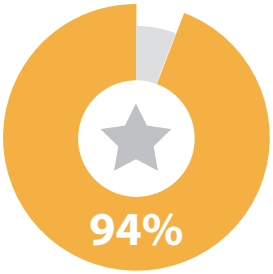
50% of the respondents indicated they are “comfortable” and “confident” in using the existing network, while 28% are “interested” or “concerned” in using the existing network.



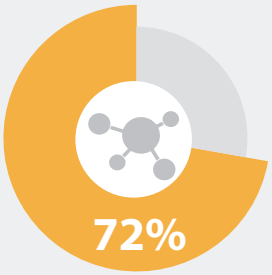
84% of the respondents felt non-motorized access to parks are “important” or “very important.”



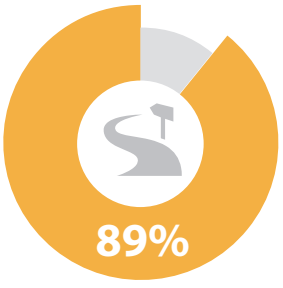
50% of the respondents do not have access to trails or sidewalks for where they want to go.



94% of the respondents felt safety was “important” or “very important” for all users of the roadway.



72% of the respondents felt it was “important” or “somewhat important” to reach their destination by foot or bike as fast as possible.



Creating off-road trails with scenic views and connections to parks and natural features are “very important” or “important” to 89% the respondents.

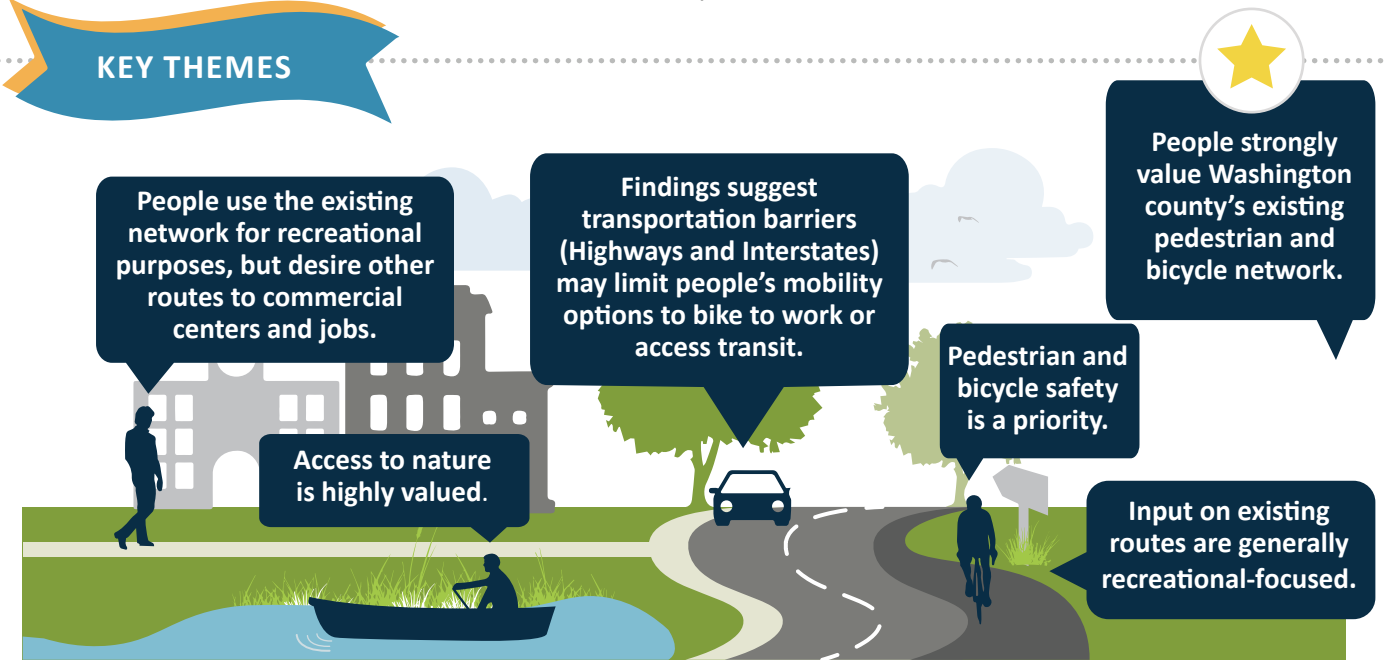
Specific destinations for better pedestrian and bicycle routes identified by the public include:

- Woodbury Village/494 and CR16
- Stillwater Marketplace (Stillwater Blvd and 36)
- Transit stations/park and ride locations
- Gateway Trail
- Indian Head Trail
- Hardwood Creek Trail
- Lake Links Trail
- Browns Creek Trail
- Carpenter Nature Center
- Wargo Nature Center
- Oakdale Nature Center

Key themes and findings that emerged from the Social Pinpoint (an interactive online map) and discussions with people at pop-events include the following:

- Safety concerns are primarily linked to pedestrian and bicycle crossings at trails and intersections.
- Transportation barriers, such as Highway 36, Highway 95, Interstate 94, and Interstate 494 are major obstacles for people traveling by foot or bike.
- There is a strong desire to provide safer connections between neighborhoods, schools, and commercial/retail centers.
- On-road shoulders could be wider to provide more opportunities for bicyclists.
- Desired routes are focused on larger connections between popular destination points (state/regional parks to state/regional trails) or future commuter and school routes/connections
- In general, bike commuters are traveling between Woodbury and Saint Paul.
- There is a growing need for more pedestrian and bicycle amenities (e.g., bike racks, restrooms, bike repair stations, kiosks, and drinking fountains) along regional trail corridors (e.g., Gateway and Browns Creek).
- Some of the most popular pedestrian and bicycle loops are located in and around natural features (lakes and rivers).

KEY THEMES



02. EXISTING ENVIRONMENT

INTRODUCTION

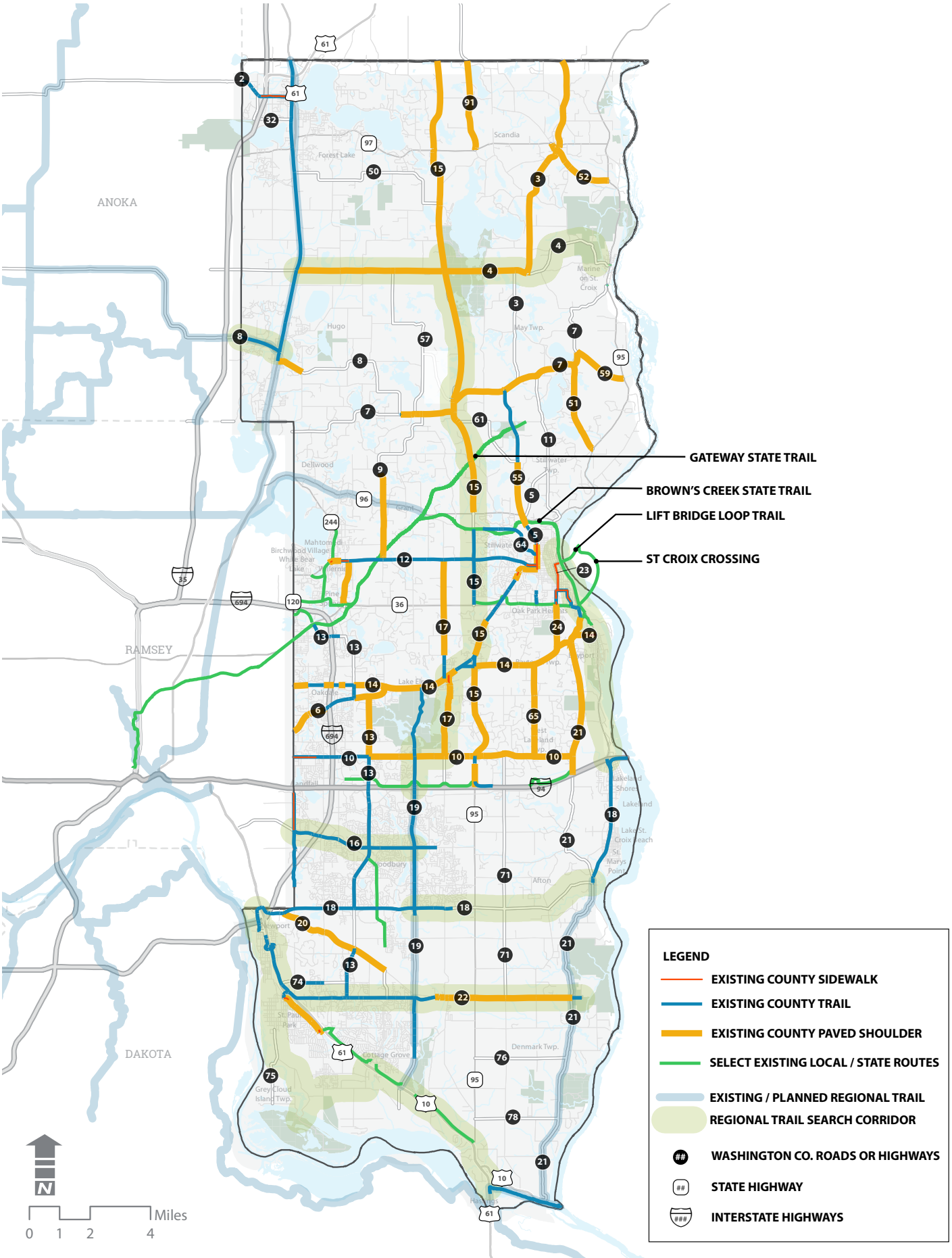
This chapter evaluates the characteristics of the existing transportation and built environment, county demographics and the demand for biking and walking, biking and walking travel behaviors and attitudes, and the safety of those who bike and walk. This analysis was used to help build the Future Network Plan and plan recommendations.

PUBLIC INPUT

During the existing conditions analysis, public input (see Chapter 1) was used to help to 'ground truth' data, as well as inform the factors used in the analysis. Where applicable community feedback is noted in this chapter with grey callout boxes.

WHAT WE'VE HEARD

Figure 2.1 Existing Bike and Pedestrian Facilities in Washington County



POPULATION FORECASTS

Washington County was reported by the State Demographer to be the third fastest growing county between 2010 and 2018. Washington County is expected to continue this type of growth as it looks out to the year 2040 (see Table 2.1). As part of this growth, Washington County and its local partners have been committed to building a multi-modal transportation network. It is also important to recognize Washington County's changing demographics (e.g., an aging population and increased racial/ethnic diversity). Planning for a multi-modal transportation networks will need to take into consideration these changing demographics, which are discussed in the Washington County 2040 Comprehensive Plan.

Table 2.1 Metropolitan Council Forecasts for Washington County

YEAR	POPULATION	HOUSEHOLDS	EMPLOYMENT
2010	238,136	87,859	71,897
2020	269,970	102,590	88,860
2030	305,600	118,620	96,540
2040	336,810	132,500	103,490

STATE DEMOGRAPHER

According to the State Demographer, the fastest growing counties by population between 2010 and 2018 were Carver (16.4% increase), Scott (12.5%), Washington (9.8%), Wright (9.5%) and Hennepin (9.4%). The counties that added the most residents between 2010 and 2018 on net were Hennepin (+108,679), Ramsey (+43,592), Dakota (+30,006), Anoka (+27,007), Washington (+23,376), and Scott (+16,183). Forty-five counties have lost population since 2010.

SYSTEM CHARACTERISTICS

Washington County's multi-modal network is comprised of over 240 miles of bicycle and pedestrian facilities, which complements the county's 35 miles of state and regional trails (see Figure 2.1 and Table 2.2). The county's network consists of paved shoulders, paved trails, and sidewalks along county roads in some urban areas. Paved shoulders less than 5.5' in width are not considered as part of the existing bicycle and pedestrian network. Table 2.2 does not include local (city) bicycle and pedestrian networks. Combined, the local, county, and regional systems play an important role in moving people throughout the county.

Table 2.2 Washington County Bicycle and Pedestrian Network

TRAIL OR SIDEWALK	LENGTH
County Sidewalks	9.3 Miles
County Trails*	65.0 Miles
Shoulders ≥ 5.5' on county Roads	167.2 Miles **
Regional Trails	19.1 Miles
State Trails	16.5 Miles
Total* **	**277.1 Miles**

** Washington county trail total equals miles of road with county trails alongside them.*
*** Center lane miles*
**** Total does not include county Roads without shoulders and with shoulders less than 5.5' on both sides.*

WHAT WE'VE HEARD

One of the most prevalent comments received through community engagement regarding the existing bike and pedestrian system is a concern for narrow and inconsistent shoulder widths along county roads.

TRANSPORTATION TRIPS

Transportation trips can be classified as all trips whose primary purpose isn't for exercise and recreation and are destination focused. Examples of transportation trips include trips to:

- **visit friends/family**
- **shopping/run errands**
- **restaurants, bars, and other entertainment**
- **cultural, religious, or community events**
- **work**
- **school**
- **make connections with transit**

DATA NOTES

The US Census does not account for partial trips; if a resident decides to bike to the nearest transit stop and take the bus to work, that trip will likely be counted as a transit trip if the transit portion of the trip is longer in length.

Every person, regardless of their main travel mode, is a pedestrian at one point in time whether it's walking (or rolling) from their car to their work entrance, walking to the transit stop, or walking to a neighbors house to carpool to work.

EXISTING TRAVEL BEHAVIOR AND HOUSEHOLD CHARACTERISTICS

Data available through the US Census Bureau and the Minnesota Department of Transportation (MnDOT) help paint a picture of how Washington County residents are currently getting around the county and to other destinations. This section provides a summary of this data.

BIKE AND WALK MODE SHARE

A large majority of daily transportation trips occur between the home and work. Analyzing how residents get to work provides a snapshot of typical mode share. Mode share is the percentage of travelers using a particular type of transportation. Figure 2.2 highlights how Washington County residents get to work most days of the year. Findings from this assessment include:

- An estimated 83% of Washington County residents drive to work compared to 76% of all US citizens.
- Approximately 286 people bike to work in Washington County and an estimated 1,340 people walk to work.
- Non-motorized transportation accounts for 1.2% total in Washington County.
- Walking and biking as a means of getting to work has stayed relatively the same since 2000 (see Table 2.33) in Washington County.

Figure 2.2 Means of Transportation to Work in Washington County

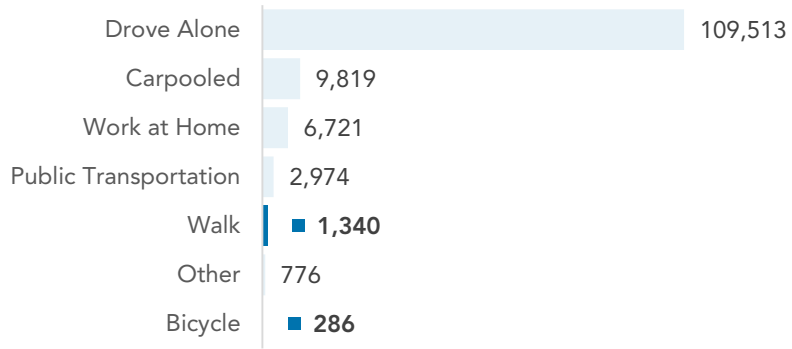
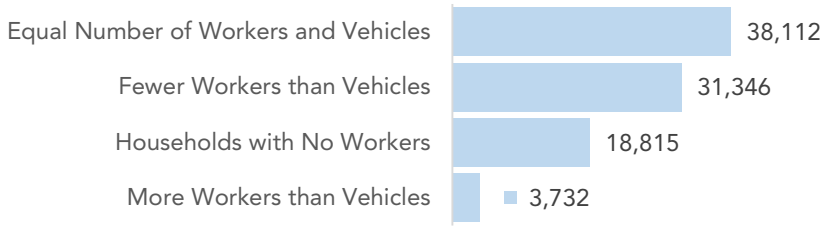


Figure 2.3 Vehicle Competitive Households in Washington County



-2017 American Community Survey 5-Year Estimates

SELECTED HOUSEHOLD CHARACTERISTICS

When a household has more workers than it has vehicles, it is classified as a vehicle-competitive household. People within a vehicle-competitive household are oftentimes faced with the decision of how they are going to get around, because they do not have the option to drive for every trip. Options for these people include alternative work schedules, or choosing other means of transportation, such as carpooling, transit, walking, or biking.

Other vehicle household characteristics include those who do not own a vehicle (zero vehicle households) by choice or for financial or ability reasons. For example, it costs an average of $8,849 to operate the average car for 2018, or about $737 per month[1]. This amount factors in all costs of auto ownership over the life of the vehicle. For those living at or below the poverty level, vehicle ownership can be a significant cost burden. This cost burden may be eliminated or significantly lowered if a safe and convenient non-motorized transportation network exists.

Washington County's vehicle household characteristic are highlighted below:

» **Vehicle-Competitive Households:** Figure 2.3 highlights the number of vehicle-competitive households in Washington County. This data suggests that not every eligible driver in the county needs to own a car, and that some households may be able to supplement some trips by walking or biking to nearby destinations.

» **Zero Vehicle Households:** There are 2,752 zero vehicle households in Washington County (Table 2.44). These homes are primarily located inside the I-494 beltway. The number of zero vehicle households may be relatively small (3%), but still calls attention to the number of Washington County residents who rely on other modes of transportation.

» **Poverty Status:** As seen below (Table 2.55), 12,251 (5.0%) Washington county residents live at or below the poverty level. A disproportionate level of minority populations live below the poverty level in Washington County.

Table 2.3 Bike/Walk Mode Share Over Time in Washington County

MODE	% SHARE		
Year	**2000**	**2010**	**2016**
Bicycle	0.1%	0.2%	0.2%
Walk	1.1%	1.4%	1.0%

Source: U.S. Census Bureau, Multiple Years

Table 2.4 Zero Car Households in Washington County

HOUSEHOLD TYPE	HOUSEHOLDS	PERCENT
Number of Zero Vehicle Households	2,752	3.0%
Total Households	**92,005**	**100.0%**

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

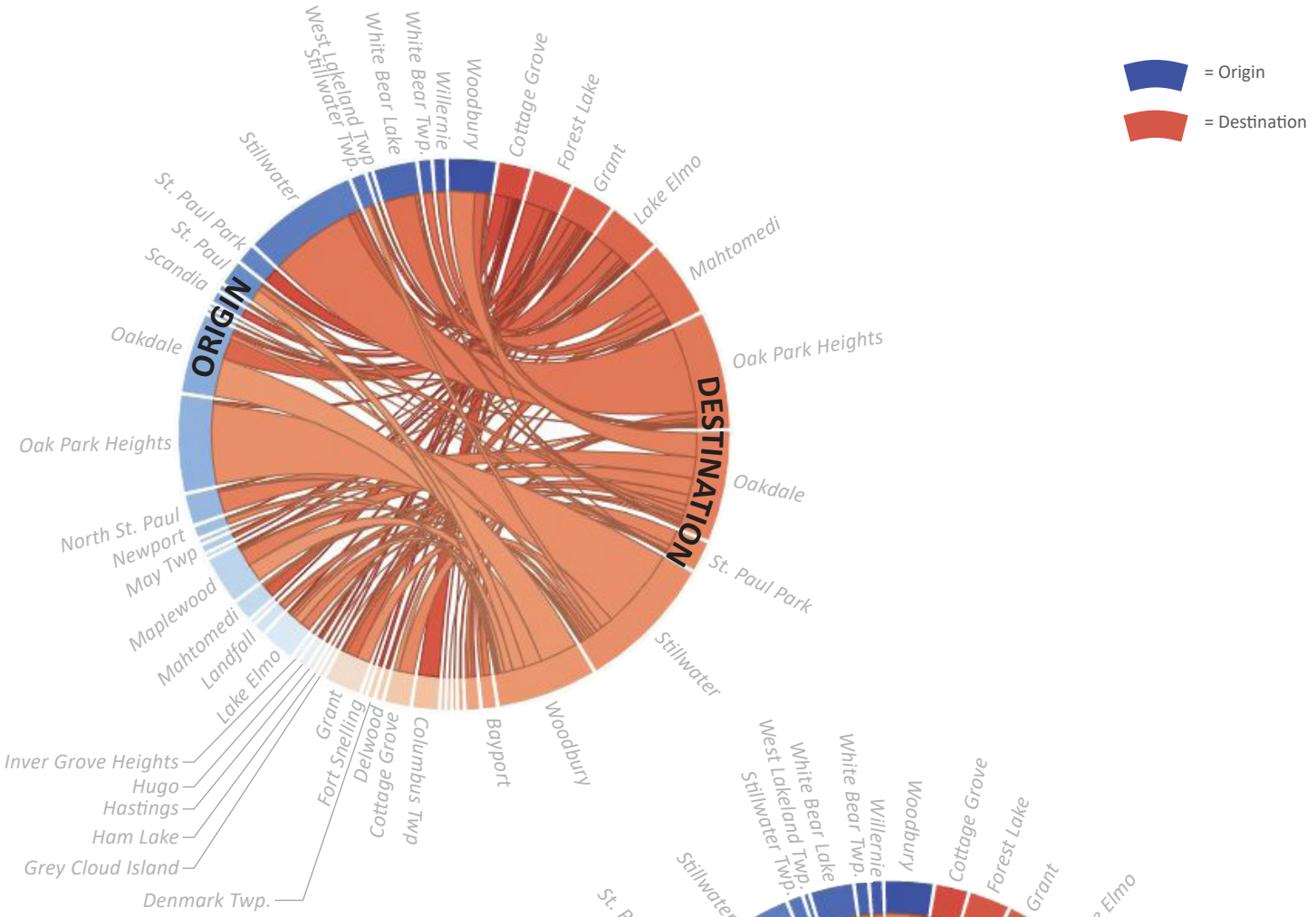
Table 2.5 Poverty Status in Washington County

RACE/ETHNICITY	TOTAL POPULATION	BELOW POVERTY LEVEL	% BELOW POVERTY LEVEL
Population Below Poverty Level	**247,183**	**12,251**	**5.0%**
White	214,363	9,241	4.3%
Black or African American	9,462	1,380	14.6%
American Indian	697	67	9.6%
Asian	13,388	526	3.9%
Hispanic or Latino	9,680	1,415	14.6%
Other	9,273	1,037	11.2%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

1 Your Driving Costs: How Much Are You Really Paying to Drive? [Brochure]. (2018 Edition) Heathrow, FL: AAA Association Communication

Figure 2.4 Non-Motorized Trips Originating in Washington County



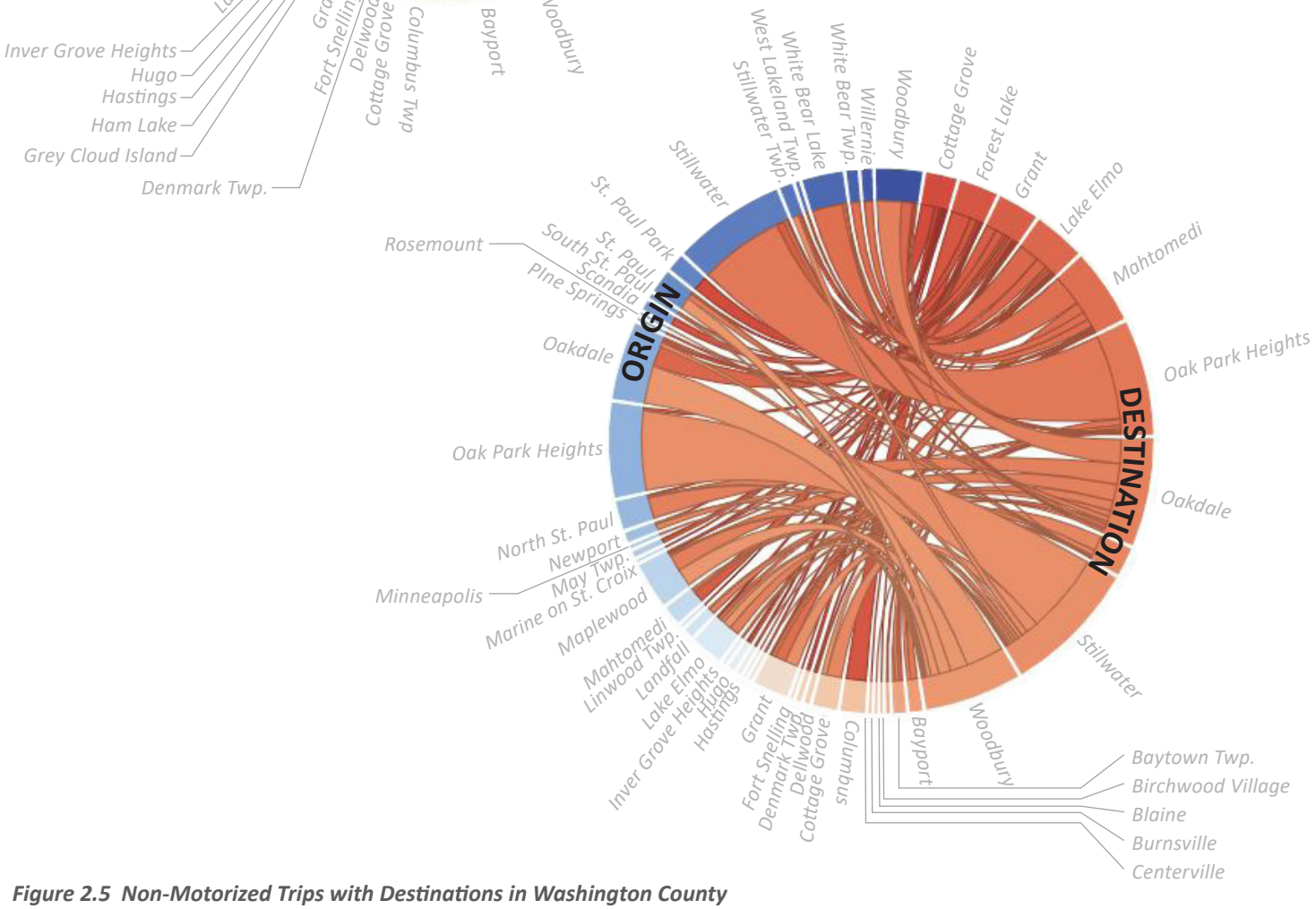
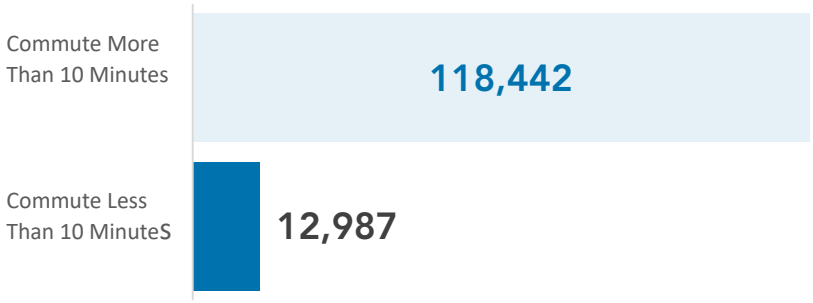


Figure 2.5 Non-Motorized Trips with Destinations in Washington County

TRAVEL DISTANCE AND DESTINATION

For all modes of transportation, the majority of Washington County residents have a commute to work that is longer than 10 minutes (see Figure 2.66). However, there are almost 13,000 residents that have less than a 10-minute commute. Because such a large gap exists between the amount of people who are currently walking and biking to work (1,626 people) and the amount of people who have less than a 10-minute commute (~13,000 people), there is greater potential to increase the non-motorized transportation mode share through education and improved facilities.

Figure 2.6 Travel Time to Work



Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

ORIGIN-DESTINATIONS

Quantifying the number of people biking and walking is a difficult task to achieve at a county level. New data sources are becoming available to quantify the number of users and pinpointing their routes. These data sets are typically being collected through people who have opted into mobile applications that track their movement (e.g., fitness applications). One data source in particular includes StreetLight© data, which is an aggregate of GPS records collected from cellphone providers. This data set was available to Washington County through the Minnesota Department of Transportation (MnDOT) during the development of this study.

The data set was used to provide a snapshot of bicycle trips starting (origin) and ending (destination) in Washington County. The chords (links) in Figure 2.4 and Figure 2.5 demonstrate the bicycle trips occurring between communities. Most trips are starting or ending in Oak Park Heights, Oakdale, Stillwater, and Woodbury. Figure 2.77 - Figure 2.99 also provide a snapshot of common characteristics associated with these bicycle trips. For example, the average bicycle trip is under 20 minutes (85%), under two miles in length (88%), and under ten miles per hour (90%). These figures suggest most trips are occurring at shorter distances.

Figure 2.7 Average Bicycle Speed in MPH

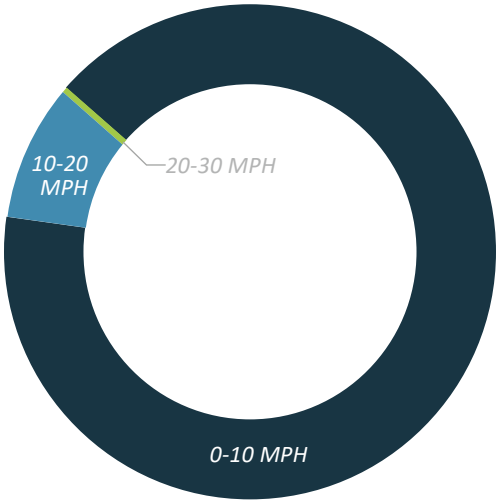


Figure 2.8 Average Bicycle Trip in Miles

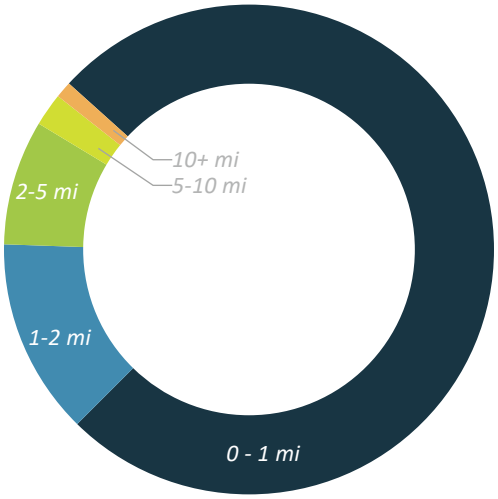
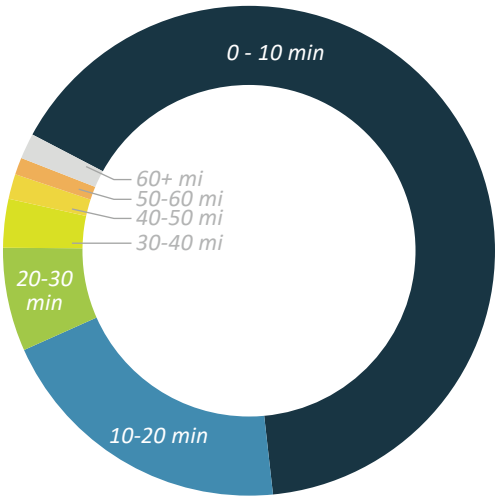


Figure 2.9 Average Bicycle Trip in Minutes



WHAT WE'VE HEARD

The following are top destinations for walking or biking, as identified through community engagement:

- METRO Gold Line / 494 Transit Station Areas
- 3M Campus
- FedEx/Century College
- All elementary, middle, and high schools
- Shopping and commercial areas
- Duluth Junction
- Regional / County / State Parks
- Regional and State Trails
- Lakes and rivers
- Nature Centers
- City centers / downtowns
- Fitness centers
- District / Community Ed locations

DEMAND FOR WALKING AND BIKING

A demand analysis was performed to identify areas in Washington County that are likely to generate high levels of bicycle and walking activity. This analysis reveals areas where there is potentially a need for pedestrian and bicycle facilities, if they do not already exist today. The demand analysis is based on existing conditions and takes into account the following socioeconomic, connectivity, and destination factors:

SOCIOECONOMIC FACTORS

- Population density
- Population density of people younger than 18 years old and older than 65 years old
- Population density of people who bike, walk, and take transit to work
- Population density of people who have a commute that is 10 minutes or less
- Household density of households in poverty
- Household density of households with zero vehicles

CONNECTIVITY FACTORS

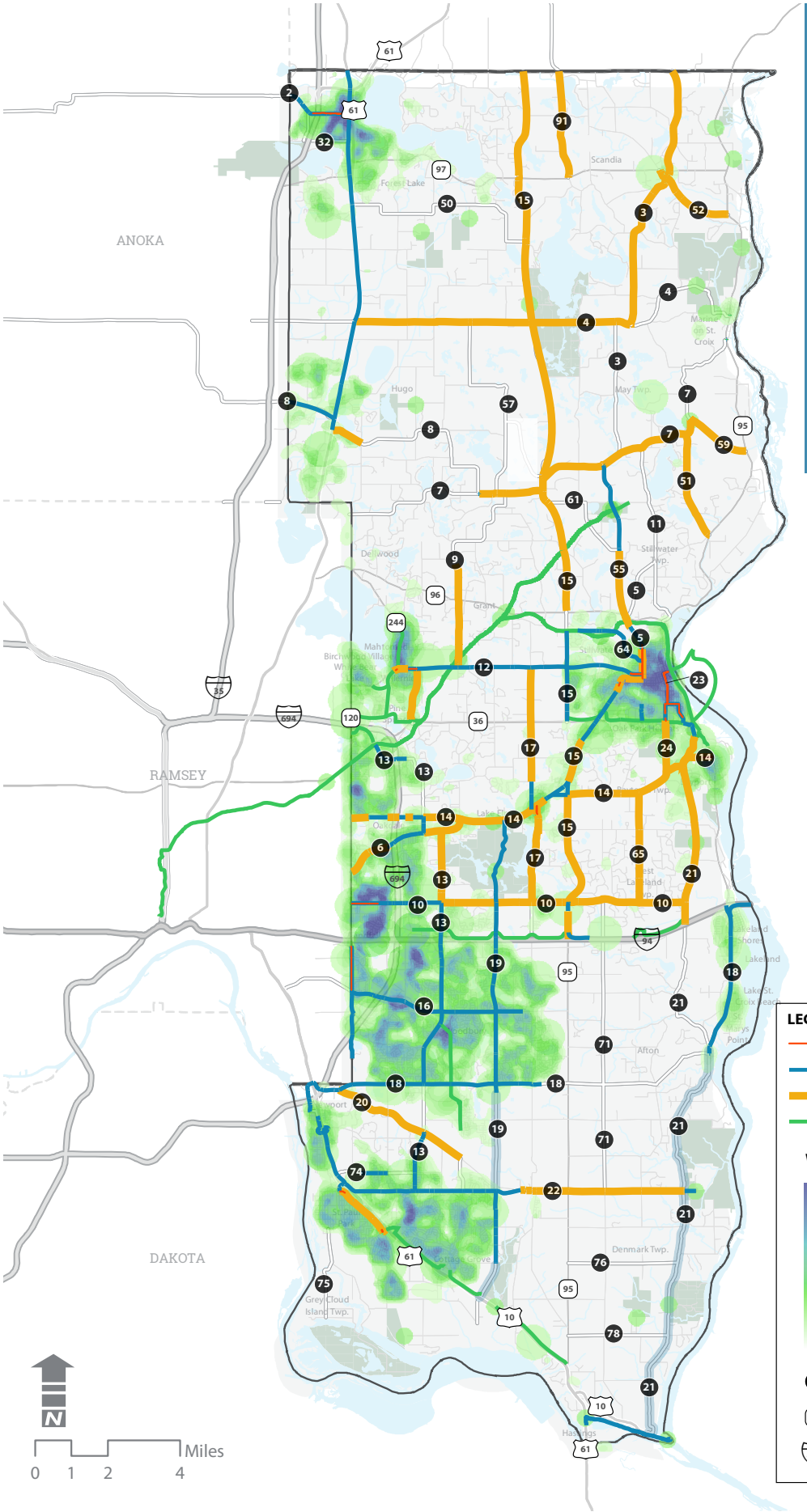
- Intersection density
- Bus Stop Locations
- Future METRO Gold Line BRT Stop Locations

DESTINATION FACTORS

- Retail property density
- Schools (grades K-12)
- Regional Parks, State Parks, and Natural Features
- Trailheads
- Job density

The factors above were layered together to produce a heat map (see Figure 2Figure 2.1010). Areas in darker blue indicate higher demand for biking and walking destinations. In general, these areas contain many of the factors described above when layered together. Areas in green contain only a few of the factors, while no color represents areas that do not contain any of the factors. Areas without color still serve as opportunities for future connections between neighborhoods and higher demand destinations. However, these destinations may change over time as the county's population grows and develops.

Figure 2.10 Washington County Walking and Biking Demand



WALKING AND BIKING DEMAND

This map identifies areas in Washington County that are likely to generate high levels of bicycle and walking activity. This map reveals areas (greens and blue) where there is potentially a need for pedestrian and bicycle facilities.

LEGEND

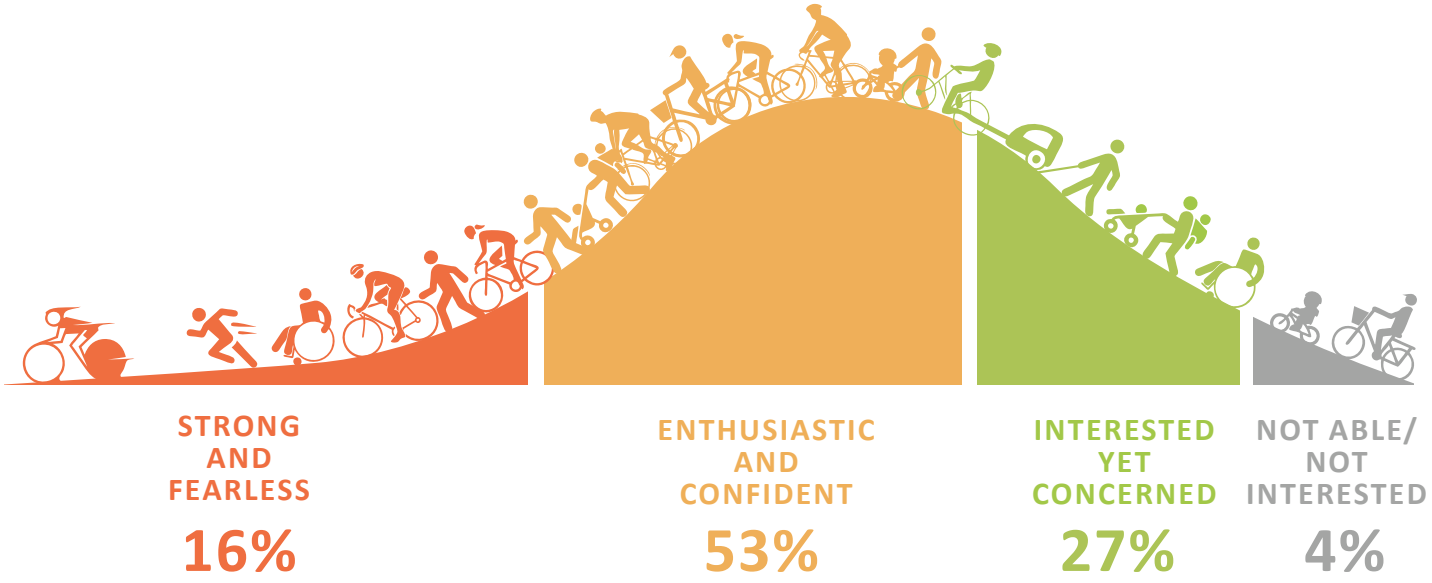
- EXISTING COUNTY SIDEWALK
- EXISTING COUNTY TRAIL
- EXISTING COUNTY PAVED SHOULDER
- SELECT EXISTING LOCAL / STATE ROUTES

WALKING AND BIKING DEMAND

- HIGHEST DEMAND
- LOWEST DEMAND

- ## WASHINGTON CO. ROADS OR HIGHWAYS
- ## STATE HIGHWAY
- ### INTERSTATE HIGHWAYS

Figure 2.11 Identified Levels of Comfort (as reported in the Washington County Biking & Walking Survey)



WHAT WE'VE HEARD

Nearly 400 Washington county residents participated in a web survey during the spring/summer of 2020, which gathered information about community preferences for biking and walking. The results show that over half of participants identify as "Enthusiastic and Confident" in their abilities to get around using non-motorized transportation. Approximately 27% of participants identify as "Interested Yet Concerned". Generally, the filling of gaps in the separated off-road trail network significantly improves the chances that folks in this category will one day consider upgrading their status to "Enthusiastic and Confident" or even to "Strong and Fearless."

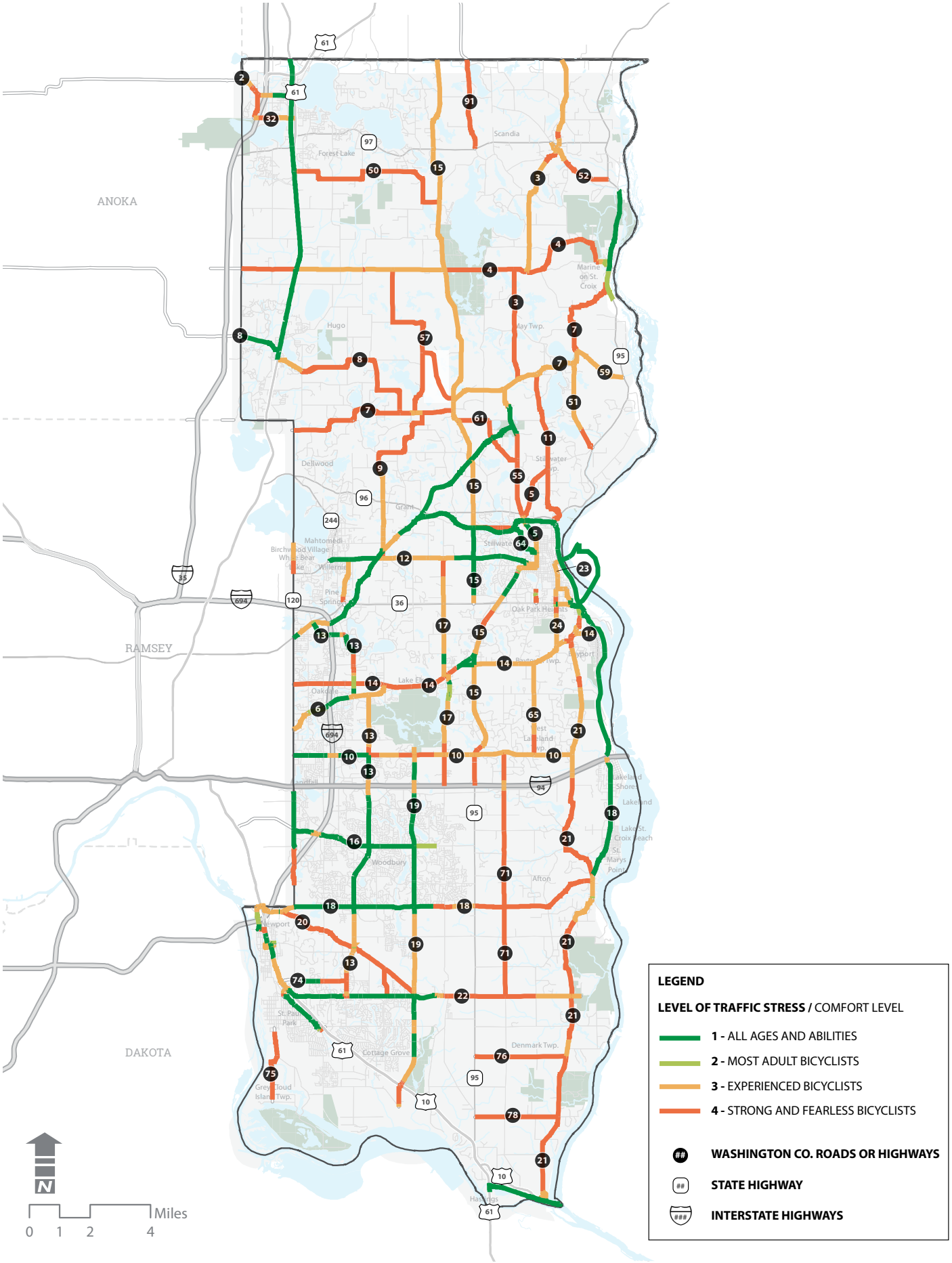
DEFINING COMFORT

Not all people have the same level of comfort when it comes to bicycling. Originally developed by Roger Geller at the City of Portland (OR) the "Four Types of Bicyclists" (see Figure 2.711) are meant to guide efforts in assessing what certain segments of a population require or want in a bikeway facility. Geller suggested that most people can be categorized into the following four groups:

1. Strong and Fearless: People willing to bicycle with limited or no bicycle-specific infrastructure
2. Enthusiastic and Confident: People willing to bicycle if some bicycle-specific infrastructure is in place
3. Interested Yet Concerned: People willing to bicycle if high-quality bicycle infrastructure is in place
4. Not Able or Interested: People unwilling to bicycle even if high-quality bicycle infrastructure is in place

These typologies help us identify which segments of the population need lower stress facilities to try bicycling or to bicycle more often. Most communities find that as they build safer and more comfortable bicycle facilities, the number of people bicycling increases. This is due to the fact that one of the largest groups of bicyclists identify as "Interested Yet Concerned" with biking. When bicycle facilities are built to the needs of the "Interested Ye Concerned", the results of investment yield the highest number of users. Additionally, when more people start bicycling because of a more comfortable network, biking becomes safer due, to the fact that motorists are more aware of the bicyclists presence.

Figure 2.12 Washington County Level of Traffic Stress / Comfort Analysis



WHAT IS COMFORT?

Comfort and perceived safety are strongly tied to bicycling and walking behavior. If people do not feel comfortable or safe bicycling and walking, they are unlikely to walk or bike for transportation or recreation.

LEVEL OF COMFORT FINDINGS

Overall, most of the county system accommodates the "experienced bicyclist" and the "strong and fearless bicyclists." This is depicted in Map 1.3 and summarized in the table below.

These findings should not be perceived as a negative, but merely as a benchmark for moving forward. These findings also serve as an opportunity for helping identify improvements on the existing system and opportunities to expand the multi-modal network that accommodates all age groups and abilities.

LEVEL OF COMFORT ANALYSIS

A Level of Comfort analysis was performed to understand the level of comfort or stress bicyclists face on the existing system. While this analysis traditionally focuses on bicyclists, the outcomes are easily translatable for pedestrian experiences. Level of comfort is influenced by the following:

- **Traffic Volume:** High volume of adjacent traffic is stressful and less desirable for bicyclists, especially when sharing the road with vehicles.
- **Traffic Speed:** High speed of adjacent traffic is stressful and less comfortable for bicyclists, especially when sharing the road with vehicles.
- **Separation:** Adjacent vehicle traffic in close proximity is stressful and less comfortable for most bicyclists. Separating bicyclists from the road (e.g., off-street trails) are the most comfortable routes to experience. Off-street trails also provide safer routes for pedestrians.
- **Crossings:** Unmarked or un-signalized intersections can be stressful and uncomfortable for both pedestrians and bicyclists. Crossing driveways and access roads can also be stressful for pedestrians and bicyclists. Visible and comfortable pedestrian and bicycle crossings require site-specific design elements. Not every crossing is stressful or uncomfortable.

The existing Washington County system, along with state and regional trails, were scored based on these factors to determine a Level of Traffic Stress (LTS). The LTS analysis shows the least and most stressful routes for bicyclists.

The LTS scores for Washington County have been translated to correspond to Level of Comfort (see Figure 2.11 and Table 2.6). For example, the most comfortable facilities (or the least stressful) are referred to as facilities for "all ages and abilities." These facilities are generally comfortable for people of a wide range of abilities, ages and perceptions of safety. The least comfortable facilities (most stressful) are referred to as facilities for "strong and fearless bicyclists." These facilities are adjacent to or intersect with high vehicle speeds and multiple traffic lanes. These facilities are generally uncomfortable for most bicyclists and pedestrians, with the exception of highly experienced road cyclists.

Table 2.6 Overall Level of Comfort (LTS) in Washington County

FACILITY IS COMFORTABLE FOR:	MILES	PERCENT
All Ages and Abilities (LTS 1)	82.2	25.8%
Most Adult Bicyclists (LTS 2)	4.3	1.4%
Experienced Bicyclists (LTS 3)	104.4	32.7%
Strong and Fearless Bicyclists (LTS 4)	128.1	40.1%
Total	**319.0**	**100.0%**

SAFETY OF BICYCLISTS AND PEDESTRIANS

Crash data was reviewed for crashes involving people walking and bicycling from 2013 - March 2018. The locations of these crashes are illustrated in Figure 2.13. However, existing crashes do not provide a full picture of safety issues for people walking and biking. The lack of documented crashes at certain locations may indicate that people are unwilling to bike or walk in these locations because they do not feel safe. The purpose of this assessment is to provide a general overview of reported crashes (see Table 2.7). It is important to recognize the data presented throughout this section is based on reported crashes and an interpretation of crash reports. Not all crashes are reported by people, so it is unclear on the exact number of pedestrian and bicycle crashes occurring on the system. Findings from this analysis provide a general understanding of pedestrian and bicycle crashes.

LOCATION OF CRASHES

Most bicycle crashes occurred at a stop-controlled intersection (52%) with the second most common location being a signalized intersection (30%)(see Table 2.8). The most common locations for pedestrian crashes were listed as occurring in an other/unknown location or not at an intersection (57%)(see Table 2.9).

Table 2.7 Total Pedestrian and Bicycle Crashes

NUMBER OF CRASHES				
2013	2014	2015	2016	2017
37	44	38	49	50

Table 2.8 Location of Crashes Involving Bicyclists

LOCATION OF BIKE CRASHES	FREQUENCY	PERCENT OF TOTAL CRASHES
Signalized Intersection	31	30%
Stop Controlled Intersection	55	52%
Roundabout	3	3%
Interchange (on Ramp)	1	1%
Driveway Access	3	3%
Other/Unknown/Not at Intersection	12	11%

Table 2.9 Location of Crashes Involving Pedestrians

LOCATION OF PEDESTRIAN CRASHES	FREQUENCY	PERCENT OF TOTAL CRASHES
Signalized Intersection	17	14%
Stop Controlled Intersection	28	24%
Roundabout	1	1%
Driveway Access	5	4%
Other/Unknown/Not at Intersection	68	57%

WHAT WE'VE HEARD

The following are some of the most commonly voiced safety concerns raised by residents through community engagement. Note that most are referring to intersection crossings:

- Inconsistent, narrow, or missing segments of paved shoulders along roadways
- Need for pedestrian signals or better signal timing for existing signals at crosswalks
- Low visibility of pedestrians crossing at intersections
- Need for more visible crosswalks near schools
- Vehicle speeds and enforcement of pedestrian crosswalks at roundabouts

TYPE/CAUSE OF CRASHES

Most bicycle crashes were caused by a vehicle turning left or right (45%)(see Table 2.10), where most pedestrian crashes were caused by vehicles or pedestrians failing to follow traffic control or inattention/ distraction (50%)(see Table 11).

CRASH SEVERITY

The number to fatal and serious injury (incapacitating) crashes has remained about the same from 2013-2017 for bicycle crashes; however, these types of pedestrian crashes shows an increase every year from 2014-2017 (see Tables 2.12 - 2.13).

Table 2.10 Cause of Bicycle Crash

CAUSE OF BICYCLE CRASH	FREQUENCY	PERCENT OF TOTAL CRASHES
Vehicle Turning Left	22	21%
Vehicle Turning Right	25	24%
Vehicle Failure to follow Traffic Control or Inattention/ Distraction	16	15%
Bicycle Failure to follow Traffic Control or Inattention/ Distraction	25	24%
Other/Unknown	17	16%

Table 2.11 Cause of Pedestrian Crash

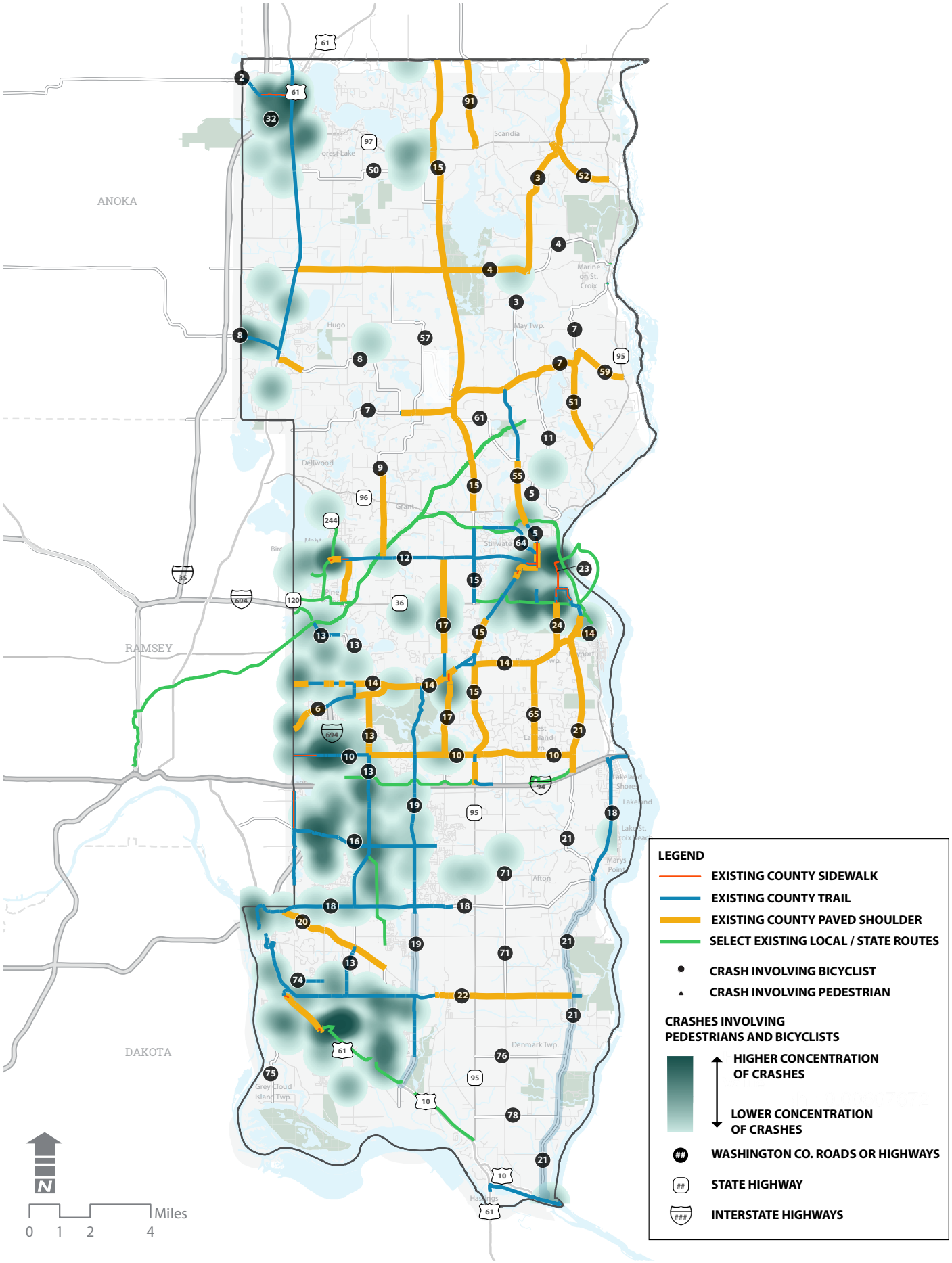
CAUSE OF PEDESTRIAN CRASH	FREQUENCY	PERCENT OF TOTAL CRASHES
Vehicle Turning Left	16	13%
Vehicle Turning Right	6	5%
Vehicle Failure to follow Traffic Control or Inattention/ Distraction	32	27%
Pedestrian Failure to follow Traffic Control or Inattention/ Distraction	27	23%
Other/Unknown	38	32%

WHAT WE'VE HEARD

"We need to be able to get to practical places without fearing the traffic."

Social Pinpoint Comment

Figure 2.13 Washington County Crashes Involving Bicyclists and Pedestrians (2013 - March 2018)



SYSTEMATIC SAFETY ANALYSIS

Opportunity for further safety analysis may include identifying patterns and crash risk associated with different infrastructure conditions and environments. This analysis would help support a proactive approach to improving bicycle and pedestrian safety.

Tools such as pedbikesafe.org also provide practitioners with the latest information available for improving the safety and mobility of those who walk and bike. These tools and others should be considered when exploring safety improvements for various infrastructure conditions.

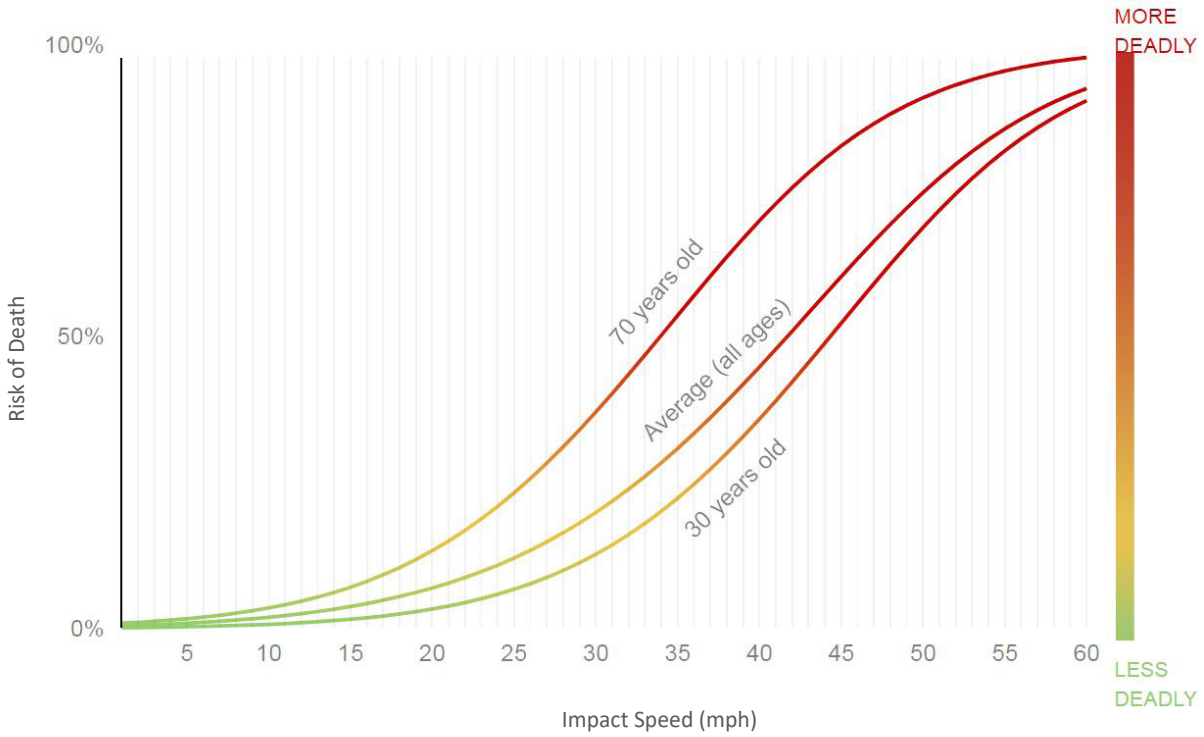
Table 2.12 Severity of Bicycle Crashes

CRASH SEVERITY	2013	2014	2015	2016	2017	2018 (ONLY THRU MARCH)
Fatal	1	1	1	0	1	0
Incapacitating Injury	2	2	0	2	1	0
Non-Incapacitating Injury	7	11	7	11	9	1
Possible Injury	6	11	15	4	8	1
Property Damage Only	0	1	0	0	2	0
Total	16	26	23	17	21	2

Table 2.13 Severity of Pedestrian Crashes

CRASH SEVERITY	2013	2014	2015	2016	2017	2018 (ONLY THRU MARCH)
Fatal	3	0	0	1	2	0
Incapacitating	2	4	5	6	7	1
Non-Incapacitating	11	5	2	17	12	1
Possible Injury	5	9	8	5	3	2
Property Damage Only	0	0	0	3	5	0
Total	21	18	15	32	29	4

Figure 2.14 Impact Speed and Risk of Pedestrian Death



Source: "Unsafe at Many Speeds". Lena Groeger. https://www.propublica.org/article/unsafe-at-many-speeds

ISSUES AND CHALLENGES

Pedestrian and bicycle facilities should be designed for use by people of all ages and abilities. There are a variety of issues and challenges in the county that can make bicycling and walking difficult for even the most confident bicyclists and pedestrians.

Man-made and environmental physical barriers within the county that may hinder biking and walking include:

- **Rivers, Streams, and Lakes**
  Washington County is home to many water features for its residents to enjoy. Unfortunately, crossing over these features can be challenging without structures (e.g., bridges and boardwalks), which can be costly.
- **Highways and Freeways**
  Roadways with limited access and high speeds of traffic are difficult to cross and in some cases, illegal to cross as a pedestrian and bicyclist.
- **Railroad Corridors**
  Rail corridors throughout the county can be hazardous to cross at improper locations. Rail crossings require careful coordination with railway companies.

The top locations for crashes involving pedestrians and bicyclists are highlighted in Figure 2.13. Most of these locations occur where there is high demand for walking and biking and major transportation barriers are both present. Most of these locations are destination-rich and come with the challenge of balancing automobile mobility and access with the safety of pedestrians and bicyclists.

While the county may be connected through trails (state, county, regional, and local), county roads, and local roads, only 25% of the county's existing bicycle and walking network is identified as comfortable for all ages and abilities. Vulnerable populations that do not or cannot drive are more affected by missing gaps in the network of comfortable biking and walking facilities. Even places along existing trails, such as the Gateway and Brown's Creek trails, can be uncomfortable for bicyclists and pedestrians because the trails cross high speed highways at grade. Grade separated infrastructure (tunnels or bridges) is often an expensive solution, and may not always be the best solution to address safety. Traffic slowing or calming, increasing visibility and/or providing adequate signals may be just as effective to improving user comfort at crossings and throughout the overall ped/bike network.

Policy and education based issues and challenges such as trail winter maintenance, awareness of trail locations, trail etiquette and driving laws, as well as vehicle speeds also affect the comfort and accessibility for biking and walking in Washington county.

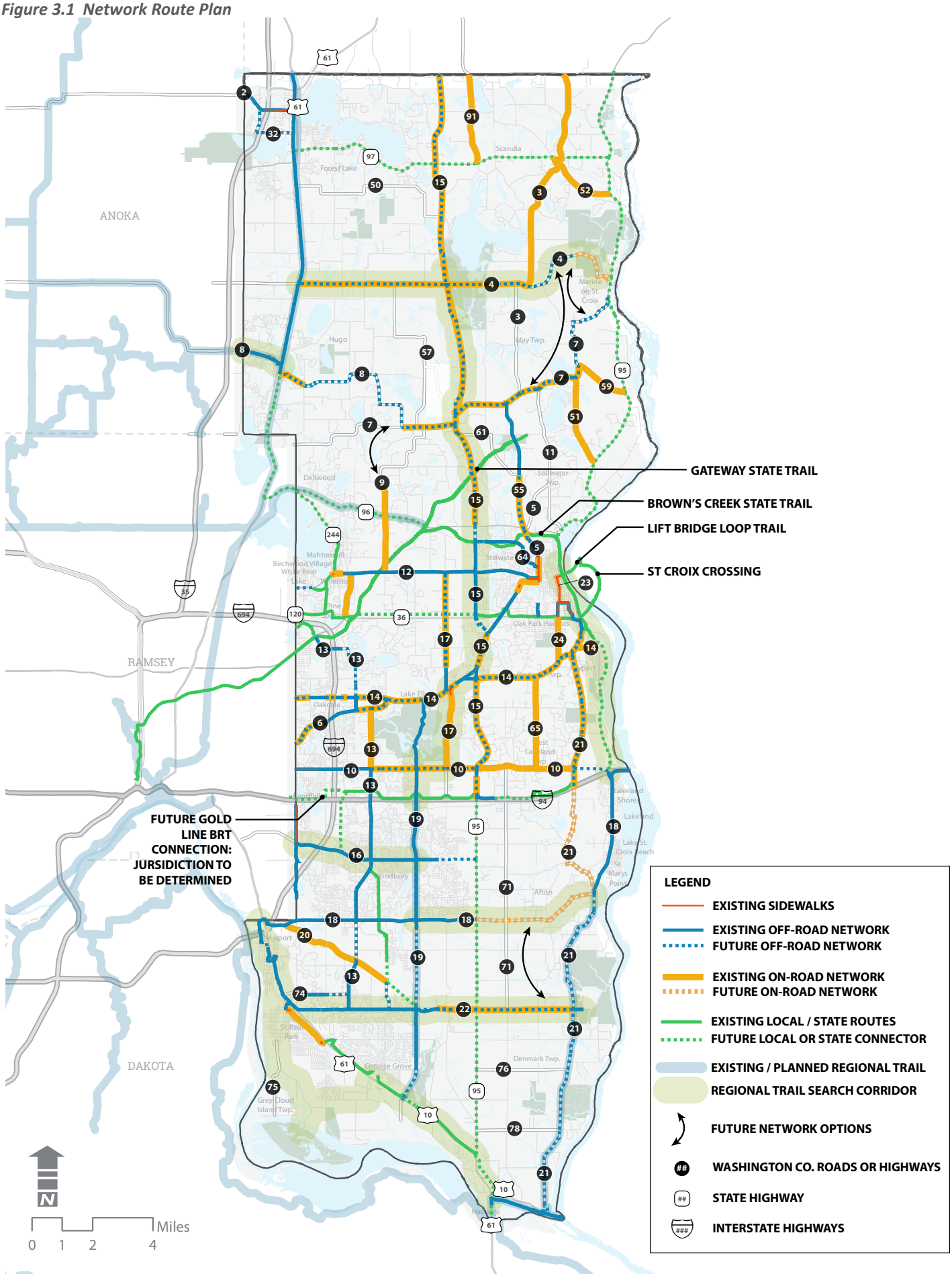
03. NETWORK PLAN

GOALS FOR THE NETWORK

A successful network for pedestrians and bicyclists consists of clearly defined routes that connect users to relevant destinations with a consistent experience throughout the start and end of their trip. Today, the network of pedestrian and bicycle facilities throughout Washington County's system is primarily built as trails or sidepaths (trails aligned with existing roadways) and paved shoulders that are actively used by pedestrians and bicyclists as their comfort level allows.

In the development of a plan for the future county-wide network, the following goals were established through collaboration with county staff and influenced by feedback gathered through community engagement. These goals will continue to serve as guidance for future alignment, identification, and implementation of the network and supporting pedestrian and bicycle facilities.

Figure 3.1 Network Route Plan



NETWORK GOALS

1

Goal 1: The Washington County network for pedestrian and bicyclists will primarily focus on creating and maintaining longer segment connections between cities, regional and state parks, and other destinations throughout the county, providing pedestrian and bicycle connections at a range of intervals of every 2 miles (in urban or suburban areas) up to every 4 miles (rural areas).

2

Goal 2: The planned Washington County system will connect to existing local and state trail networks, and future segments within the county's system will avoid duplication of similar routes owned by other agencies.

The Washington County network will continue to serve an existing and enthusiastic community of recreational bicyclists, as well as support a growing population of people interested in integrating biking and walking into daily commutes to work or school.

3

Goal 3: The Washington County network will continue to consist primarily of two types of facilities: off-road trails and paved shoulders. New network segments and improvements to existing segments will be constructed and planned with consistency and with accepted state and national standards and guidance applicable to the appropriate rural, suburban, or urban transects of Washington County.

4

Goal 4: The Washington County Network Plan will build off of previous comprehensive planning efforts. The Network Plan will support the ongoing planning and construction of the Regional Bicycle Transportation Network (RBTN). Search corridors and alignments previously identified will remain part of the future county-wide network, with additionally planned segments that will augment and support these routes.

5

Goal 5: The county road and public right-of-way network will connect various public realm amenities for a range of modes and activities (walking, biking, driving, roller-blading, etc.), and will support how residents travel to and from destinations such as schools, parks/open space, restaurants and other businesses.

NETWORK PLAN

The Network Plan was developed to guide the next 10 years of bicycle and pedestrian routes within Washington County, and is intended to clearly build off of recent and concurrent multi-modal planning efforts throughout the county. The Network Plan is compatible with the County's 2040 Comprehensive Plan, as well as future corridor search areas for regional trails. These routes have been determined through analysis and synthesis of the existing conditions (as outlined in Chapter 2), as well as combined input from county staff and residents of Washington County through community engagement.

The primary focus of the Network Plan in Figure 3.1 identifies:

- Existing and future off-road network segments as trails or sidepaths as shown in blue.
- Existing and future on-road network segments as paved shoulders as shown in orange.
- Existing local or state connector routes that support the county-wide system today, or will potentially support in the future as shown in green.

ROUTE TYPES

OFF-ROAD NETWORK

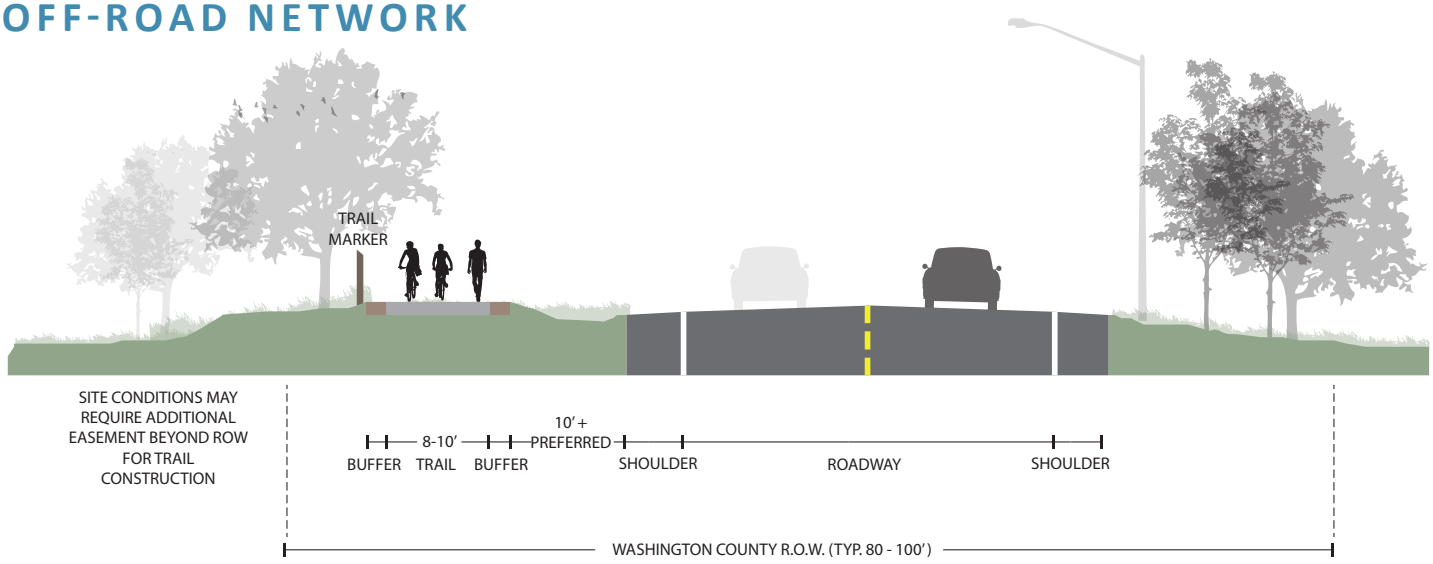


Figure 3.2 Typical Off-Road Network Route Section

The existing off-road network consists of paved shared-use trails that are aligned with county roadways and are built almost exclusively within the county right-of-way. The proposed off-road network builds off of the existing built segments to fill gaps, creating connections for longer distance travelling throughout the county for recreational and transportation purposes. This route type is intended to provide a continuous trail experience, separated from the roadway, that is comfortable for use by all ages and skill levels. This route type is intended to be used by pedestrians and bicyclists, as well as in-line skaters and other non-motorized transportation users. Whether a trail is located on one or both sides of the roadway will be determined at the time of implementation, and will be driven by projected use and connection to nearby destinations. Roadways with trails along one side of the roadway should have extra attention paid at roadway crossings, to ensure that trail users can connect safely and comfortably to other trail connections and to community destinations.

An effort should be made to provide continuous connection to nearby existing local, state, and county trails and sidewalks where possible, and may require spurs or additional connections that are not in alignment with the adjacent roadway.

OFF-ROAD NETWORK RECOMMENDED DESIGN FEATURES

Existing trails throughout the county vary in width and design. As new trail segments are built, or as trails are improved or upgraded, the following recommendations should be considered for design:

- 8-10’ in width with a preferred minimum 10’ vegetated buffer between the trail and adjacent roadway
- 2’ gravel or vegetated buffer on either side of the trail
- Continuous bituminous (asphalt) surface
- ADA curb ramps installed at all roadway crossings, along with high visibility crosswalk markings as necessary
- Maximum of 5% running slope wherever possible, with a 1-2% cross slope
- Intermittent trail markers or directional signage to nearby landmarks or intersections
- Communication of on-road network to be done through a county-wide map, available through the county website and posted at county parks

See page 3-18 for further specific guidance on trail / sidepath design.

OFF-ROAD NETWORK: REGIONAL TRAIL

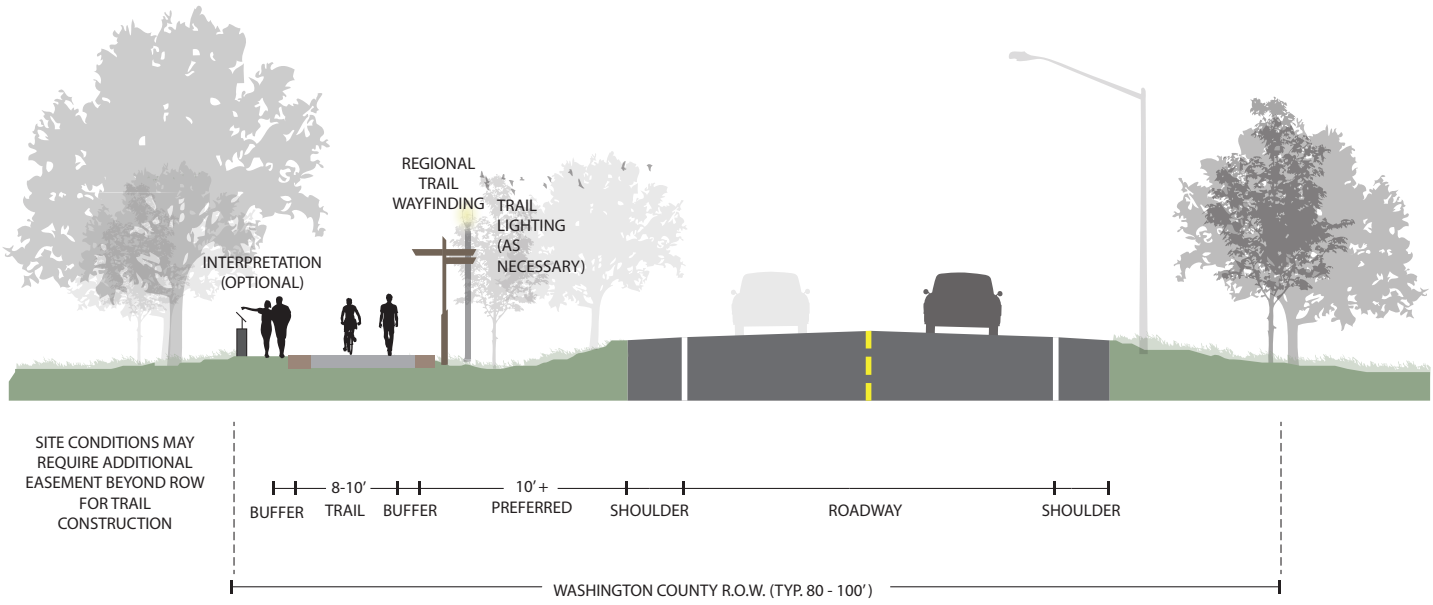


Figure 3.3 Typical On-Road Network Route Section for a

The off-road network includes segments that have been previously planned as a future regional trail, or fall within a regional trail search corridor. Regional trails are intended to serve as high-quality recreational routes for non-motorized use. Most often, the regional trail networks connect to natural and scenic areas, as well as connect to and through regional and local park systems. Wayfinding and interpretive elements are often integrated into the trail experience to provide interest and information about regional destinations, history, and/or ecology.

Trailhead along Hardwood Creek Regional Trail with seating, information kiosk, and trash/ recycling receptacles (Photo: Star Tribune)

OFF-ROAD NETWORK: REGIONAL TRAIL RECOMMENDED DESIGN FEATURES

In addition to the recommended design features outlined for the off-road network routes (as shown on page 3-4), off-road network segments within the Washington County bicycle and pedestrian network should be considered for the following design elements:

- Regional trail name and placemaking elements such as wayfinding signage, trailheads, and interpretive elements
- Trail lighting (either pedestrian-scale lighting with dark sky features or trail bollards with lighting) where appropriate
- Observation platforms or scenic viewing locations at places of interest
- Other possible trail amenities such as drinking fountains, bike fix-it stations, trash/recycling receptacles
- Trail markers or directional signage directing users to nearby landmarks or intersections
- Communication of on-road network to be done through a county-wide map, available through the county website and posted at county parks

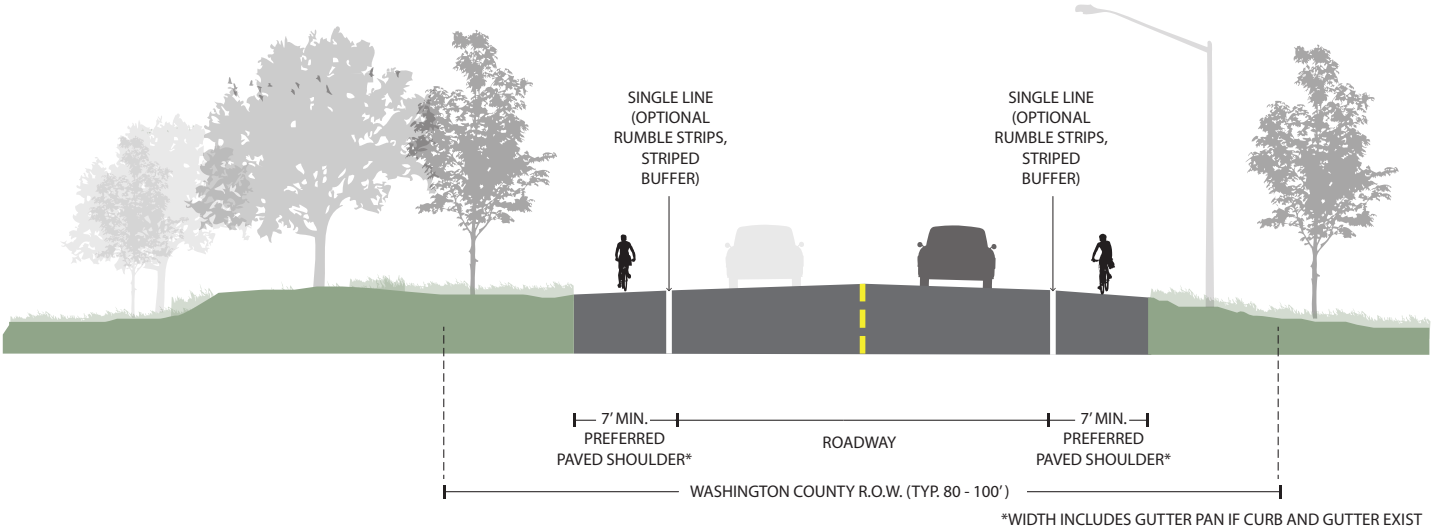


Figure 3.4 Typical On-Road Network Route Section

The on-road network consists of paved shoulders that are wide enough for bicyclists or pedestrians to use. These paved shoulders exist today, throughout county, and vary in width and comfort for use. The Network Plan identifies existing paved shoulder segments that are at least 5.5' in clear width as part of the existing network. A handful of new segments for the on-road network are proposed in the Network Plan.

The planned on-road network:

- Supports connections to the off-road network
- Acknowledges the existing on-road bicycle routes used today by cyclists who are comfortable travelling alongside vehicle traffic, and
- Fills gaps in the overall county-wide network where a separated trail is likely not feasible due to land constraints (topography, tree cover, private land ownership, etc.), high costs, and low projected use.

Today, the county does not have any bike lanes and shared-use lanes have been constructed sparingly. This plan does not include specific recommendations to include these types of on-road facilities in the near future within the county system, as there has been a general preference voiced for focus on separated trails that are comfortable for a wider range of abilities and comfort levels. The on-road network comprised of paved shoulders will take advantage primarily of existing roadways and routes that are in-use today by cyclists.

ON-ROAD NETWORK RECOMMENDED DESIGN FEATURES

On-road network segments within the Washington County bicycle and pedestrian network should be considered with the following design elements:

- 7' clear width for paved shoulders is preferable for these routes and future roadway upgrades
- Optional rumble strips or striped buffer
- Optional wayfinding or directional signage
- Communication of on-road network to be done through a county-wide map, available through the county website and posted at county parks

See page 3-19 for further specific guidance on paved shoulder design

STATE AND LOCAL CONNECTORS

It is not possible to provide an evenly distributed route network across the entire county by relying solely on Washington County roadways and landholdings. Each municipality within the county has an existing trail and sidewalk network, and there are state trails (Gateway and Browns Creek Trails) that provide significant connection to destinations today. The Washington County Network Route Plan identifies some of the existing state and local trails and facilities that are already in-place today to support the county-wide network. Often these are longer route segments that connect trail users across longer distances.

Future state and local connector routes are also identified on the Network Route Plan. These are segments that could serve to support the county-wide network in the future. However, these areas are not within Washington County jurisdiction. They have been identified in this plan as potential projects that, if initiated by the local or state jurisdictions, could also serve to supplement the county bike and pedestrian network.

Browns Creek State Trail in Stillwater

INTERSECTION CASE STUDIES

County-wide crash data from 2013 to 2018, along with information gathered through the public engagement process, guided the identification of areas throughout the county that warranted further study to address safety at intersections. Efforts were made to understand how future facility improvements (e.g., crossing aids, crosswalk markings, signage, trail or pavement design) could potentially address safety issues for pedestrians and bicyclists as they use or connect to the Washington County pedestrian and bicycle network.

A number of common intersection types were identified as safety and comfort concerns for pedestrian and bicyclists:

- Roundabout intersections
- Trail crossings at side streets
- Crossings at wide roadways due to trail gaps
- Signalized intersections near commercial / community destinations

The following case studies examine these example intersection conditions found throughout the county to better understand the public's safety concerns. The case studies also provide potential improvement considerations and resources for further exploration.

There are many intersections throughout the county roadway system where pedestrians and bicyclists will potentially cross at some point, either with or without adjacent trails or paved shoulders. Enhanced crossing treatments, signals, and signage do not necessarily make intersections safer for pedestrians, reduce speeds of drivers, or improve behaviors. All options should be explored, including dissuading pedestrians from crossing at unsafe locations.

1 CASE STUDY: ROUNDABOUT INTERSECTION

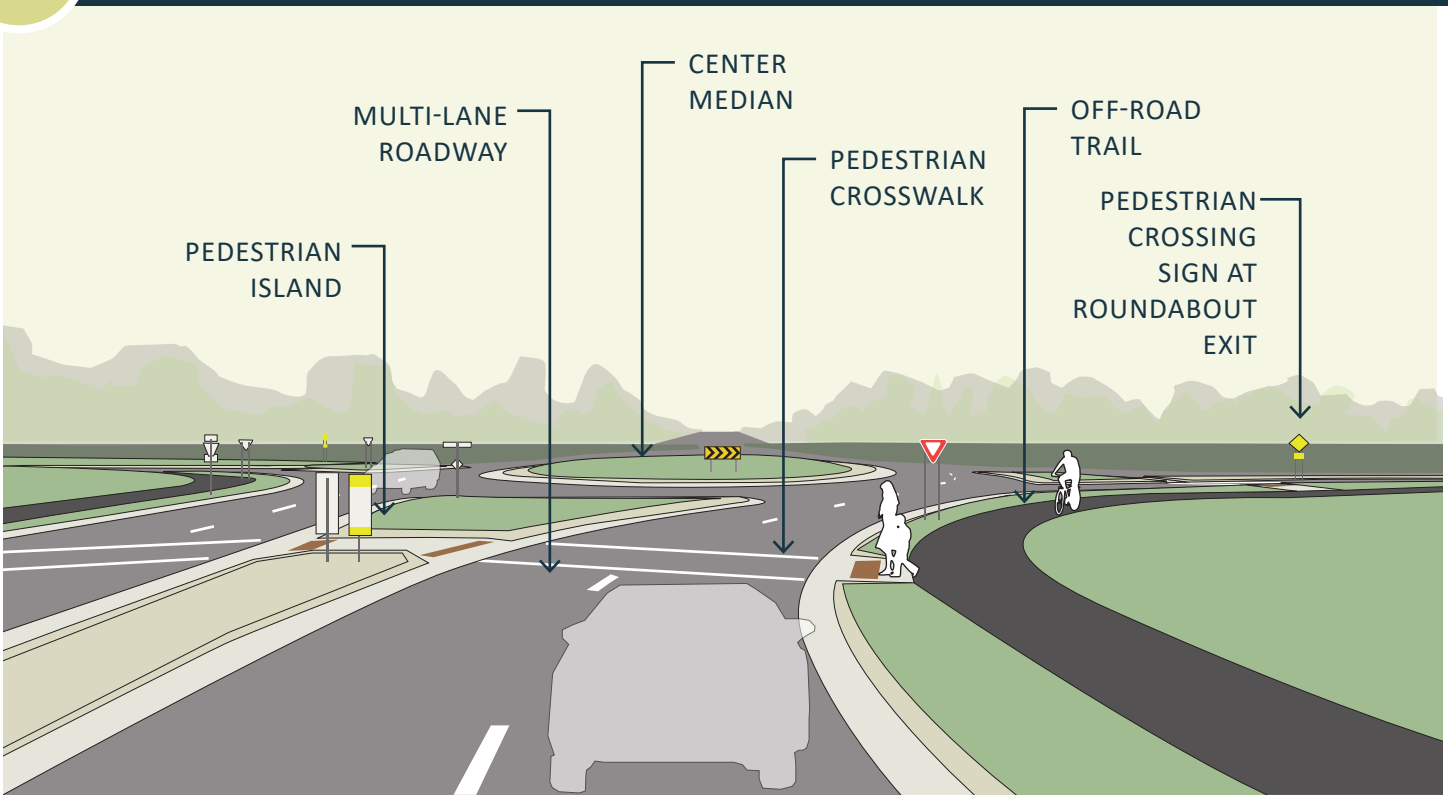


Figure 3.5 Illustration of an example roundabout

ROUNDABOUT:

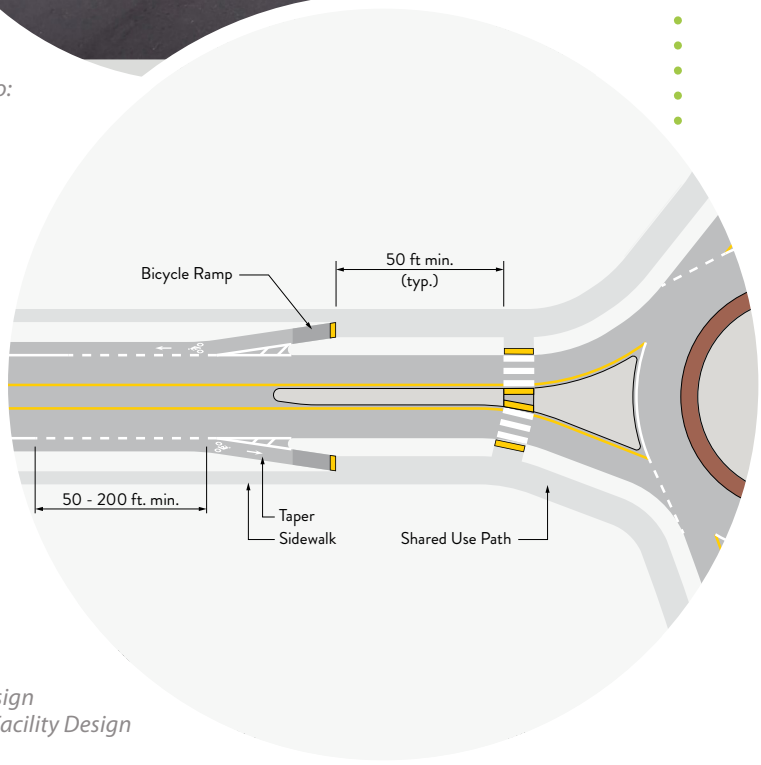
- **Intersections designed as an alternative to signal-controlled or stop-controlled intersections.**
- **Generally, vehicles enter the intersection at lower speeds (compared to typical intersections).**
- **Vehicles are required to yield to vehicles from the left, as well as yield to pedestrians and bicyclists.**
- **Crossing distances for pedestrians and bicyclists at roundabouts are generally shorter, with pedestrian islands.**
- Single-lane roundabouts typically offer shorter crossing distances and lower speeds than multi-lane roundabouts.

SAFETY CONCERNS:

- Drivers entering the roundabout intersection are generally looking ahead and to the left for conflicting vehicles, and can fail to see pedestrians and bicyclists crossing the intersection from the right side of the roadway. This situation is not exclusive to roundabouts and occurs at standard intersections as well.
- Drivers exiting the roundabout may fail to see a pedestrian in a crosswalk.
- Roundabouts can be complex for drivers that aren't familiar with them.
- Crosswalks with multiple lanes of approach, at roundabouts or elsewhere, can cause crosswalk users to become hidden from view behind stopped traffic creating a potential hazard.
- Bicyclists using the roadway may be uncomfortable mixing with traffic as they move through the roundabout.

Roundabout design with separated pedestrian and bicycle crossing, entry pedestrian crossing signs, high visibility crosswalks and low vegetation in medians. Note that this example includes on-road bike lanes. Also note that diamond signs are not included in Minnesota State guidelines. (Image: MassDOT Separated Bike Lane Planning and Design Guide)

Example of crosswalk design (Photo: Carmanah Traffic)



Slip ramp design (MN Bicycle Facility Design Manual)

BICYCLE AND PEDESTRIAN CONSIDERATIONS AT ROUNDABOUTS:

- **Consider signs at roundabout, including pedestrian crossing signs at vehicle approach of the roundabout intersection.**
- **Continue to provide protected pedestrian islands at crosswalks.**
- **Continue to provide continental-style crosswalk markings and other high-visibility crosswalk treatments.**
- **Consider Rectangular Rapid Flashing Beacons (RRFB) or other user-activated pedestrian signal at roundabout crossing where applicable, such as high-volume locations.**
- **Continue to integrate protected shoulders or shared-use paths at roundabouts. Consider installing a slip ramps, with considerations for maintenance and ADA standards.**
- **Continue to opt for a single-lane roundabout design if traffic volumes permit.**
- **Continue to design roundabouts to allow for proper deflection angles to promote slower speeds throughout.**

RESOURCES:

- **MN Bicycle Facility Manual (2020), page 7-13**
- **MnDOT Road Design Manual, Chapter 12**
- **NCHRP Report 672 - Roundabouts: An informal Guide**

2 CASE STUDY: TRAIL CROSSING AT SIDE STREET

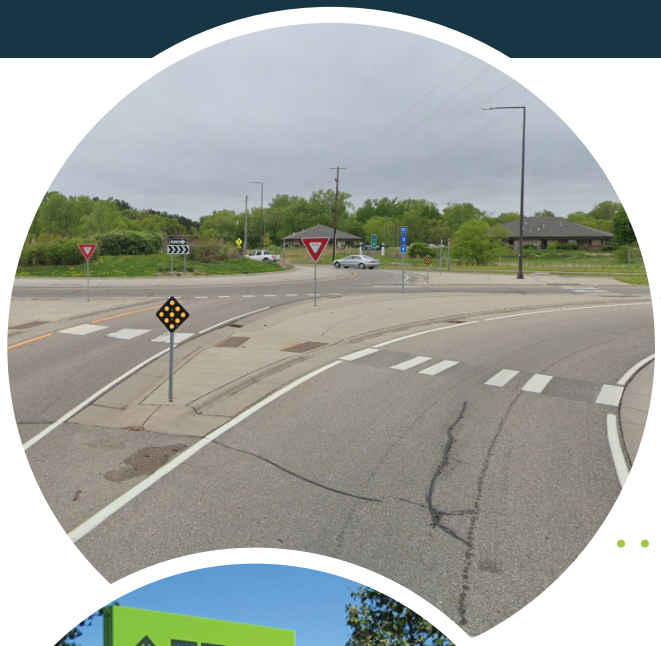
Figure 3.6 Illustration of an example trail crossing at a side street

SIDE STREET TRAIL CROSSING:

- **The Washington County bicycle and pedestrian network primarily exists in alignment with the county roadway network.**
- **Separated trails (also known as sidepaths) are generally located parallel to major roadways.**
- **Local (municipal) streets intersect the trail network with variations in crossing treatments.**
- **Roadway width, lighting, topography, continuity and connection with other trail networks, and signage contribute to the visibility of trail users to vehicles, as well as contribute to the overall comfort of trail users.**

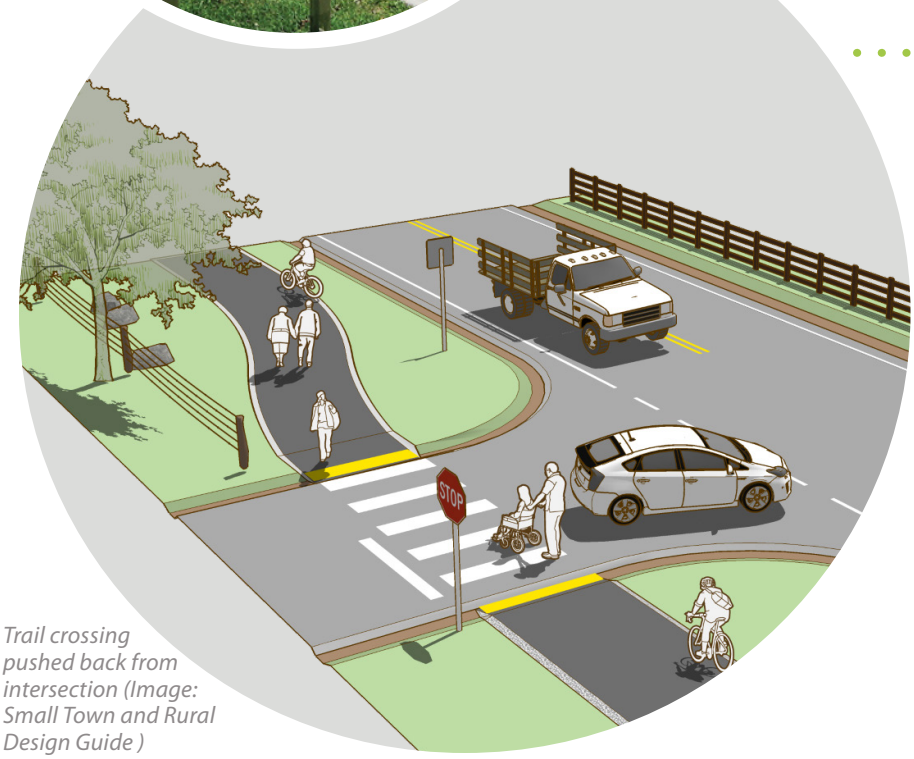
SAFETY CONCERNS:

- Drivers approaching from sidestreets may not anticipate a trail crossing at the intersection.
- Inconsistencies in design of signage, crosswalk markings, or pedestrian curb ramps between local and county jurisdictions could pose confusion for trail or roadway users.
- Wide distances between the roadway and the trail provide a more comfortable trail experience between intersections. However, the crossing might be set back from drivers' desired stopping location.
- Drivers approaching the intersection from a side street may be looking in one direction for a gap in traffic and do not see a cyclist on the trail coming from the other direction.
- Cyclists from the side street might be in the driver's blind spot as they approach the intersection.



Continental style crosswalk markings (left) and Seattle-style markings (right) at CR 14 and Stillwater Boulevard in Lake Elmo. Washington County has had success with the Seattle-style markings, as they reduce degradation from repeated tire crossing. (Photo: Google Streetview)

Highly visible and consistent trail wayfinding can assist with navigating trail network and provide a visual cue to drivers (photo: SEGD)



Trail crossing pushed back from intersection (Image: Small Town and Rural Design Guide)

BICYCLE AND PEDESTRIAN CONSIDERATIONS AT SIDE STREET TRAIL CROSSINGS:

- **Continue to install continental-style or Seattle-style crosswalk markings at trail crossings. This may require collaboration with local municipalities. Consider forward stop bars (see lower image), where necessary, to reinforce safety at crosswalk for pedestrians and bicyclists.**
- **Provide consistent and highly visible wayfinding signage at key trail intersections.**
- **Consider trail lighting along the trail, as well as along the side street leading to the intersection.**
- **Consider providing clear cone of vision for vehicles approaching the intersection from the side streets, minimizing obstructions, unnecessary objects and tall vegetation.**
- **Consider alternative trail designs at intersections. One strategy that has been used with varying degrees of success has involved pushing the trail crossing back from the intersection to allow approaching vehicles the ability to stop prior to the crosswalk, and then move forward to check for oncoming traffic. This, and other types of alternative designs will require further site-specific study to determine applicability.**

RESOURCES:

- **Small Town and Rural Design Guide**
- **MN Bicycle Facility Manual (2020), page 5-27**
- **MnDOT Best Practices and Guidance in At-Grade Trail Crossing Treatments**

3 CASE STUDY: WIDE ROADWAY / TRAIL GAP

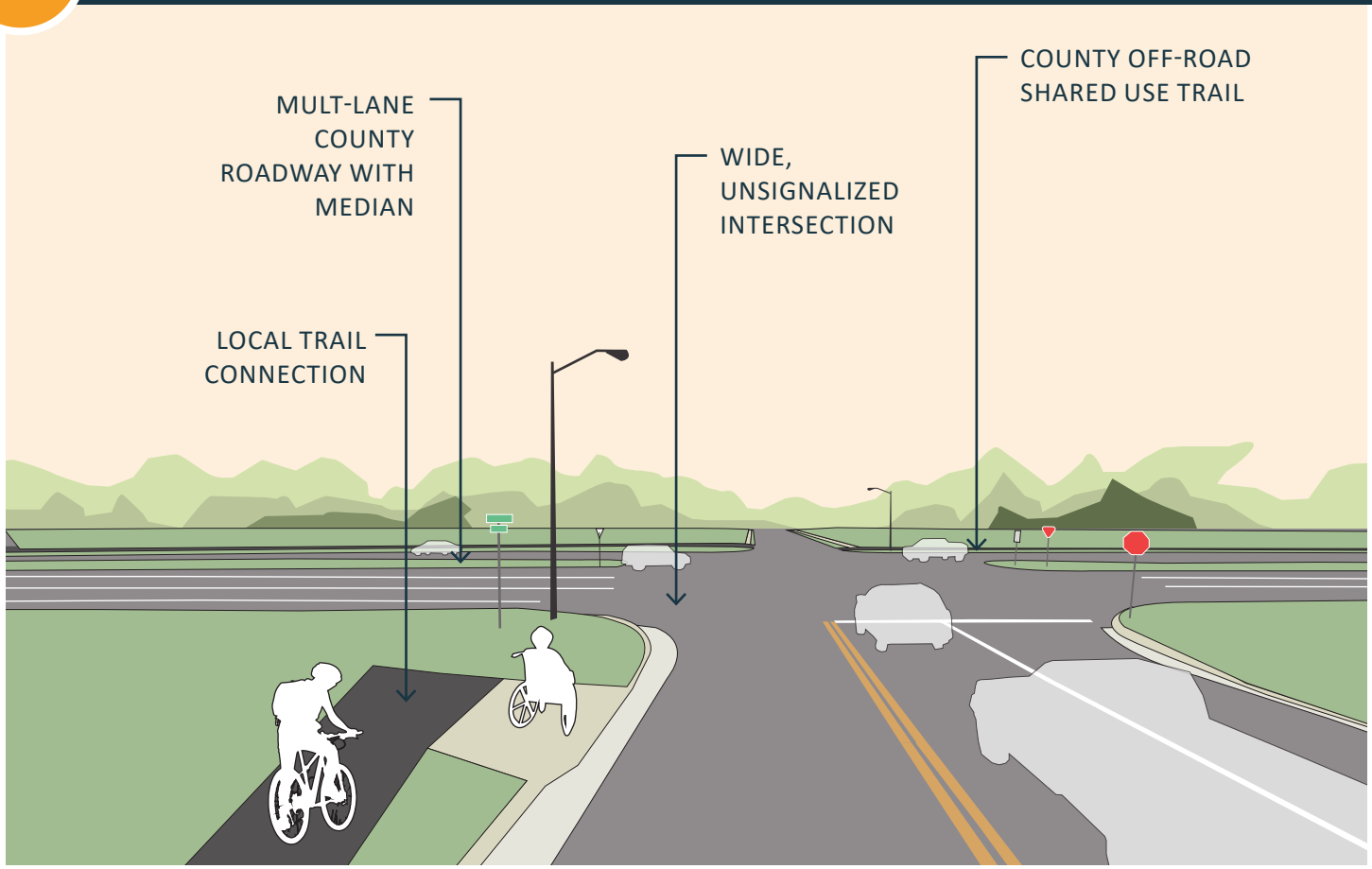


Figure 3.7 Illustration of an example wide roadway with a gap in trail connection

WIDE ROADWAY / TRAIL GAP:

- **The Washington County bicycle and pedestrian network primarily exists in alignment with the county roadway network.**
- **Separated trails (also known as sidepaths) are generally located parallel to major roadways.**
- **Local (municipal) streets intersect the trail network with variations in crossing treatments, pedestrian curb ramps, lighting, crosswalk markings, and signage.**
- Local and county trail segments may exist only on one side of the roadway.
- Gaps in the local and county trail network, even on just one of four legs of an intersection, can create a significant barrier for continuous pedestrian or bicycle travel.

SAFETY CONCERNS:

- Crossing at an unsignalized intersection is difficult for people of all abilities with higher speed vehicular traffic, but especially for people with disabilities, seniors, children, and people using mobility aids.
- Pedestrian ramps sometimes do not allow people to enter into an intersection in the direction of their travel (as in the example above), which makes it more difficult to cross.
- Wide, multi-lane roadways provide longer distances for travel in order to cross, increasing the vulnerability of pedestrians.
- Travel speeds of vehicles and lack of gaps in traffic pose as barriers for pedestrians looking to cross roadways such as this.

Example of improved pedestrian curb ramp installed in both directions of pedestrian travel at an intersection (image: City of San Francisco)

Protected pedestrian refuge island shortens the distance that pedestrians are exposed to vehicles while crossing an intersection (Photo: AARP)

HAWK Signal (High Intensity Activated Crosswalk) shown in combination with continental -style crosswalk markings (image: Mary Carpenter Transportation)

Example of a grade-separated crossing in Woodbury MN (image: HKGI)

BICYCLE AND PEDESTRIAN CONSIDERATIONS AT WIDE ROADWAY CROSSINGS OR ADDRESSING TRAIL GAPS:

- Consider working with local municipality to install wider pedestrian ramps at key trail connections.
- Continue to install pedestrian refuge islands at key trail connections.
- Consider installing curb extensions where space permits. Note that curb extensions aren't recommended if they impede roadway travel lanes or shoulder widths.
- Consider installation of a HAWK signal (High-Intensity Activated Crosswalk) at a mid-block location in combination with other enhanced pedestrian facilities. Pedestrians are not likely to travel farther than 1/4 mile out of their way to reach a safer crossing location, which should be taken into consideration.
- Consider installation of trail along both sides of roadway, with connection to a safer crossing point.
- Consider a partnership with the adjacent municipality to install a grade separated crossing, such as a bike/ped tunnel or a pedestrian bridge. Note that both tunnels and bridges have significant funding and space requirements.

RESOURCES:

- AASHTO Guide for the Development of Bicycle Facilities
- MnDOT Best Practices and Guidance in At-Grade Trail Crossing Treatments
- MnDOT Bicycle Facility Design Manual

4 CASE STUDY: SIGNALIZED INTERSECTION

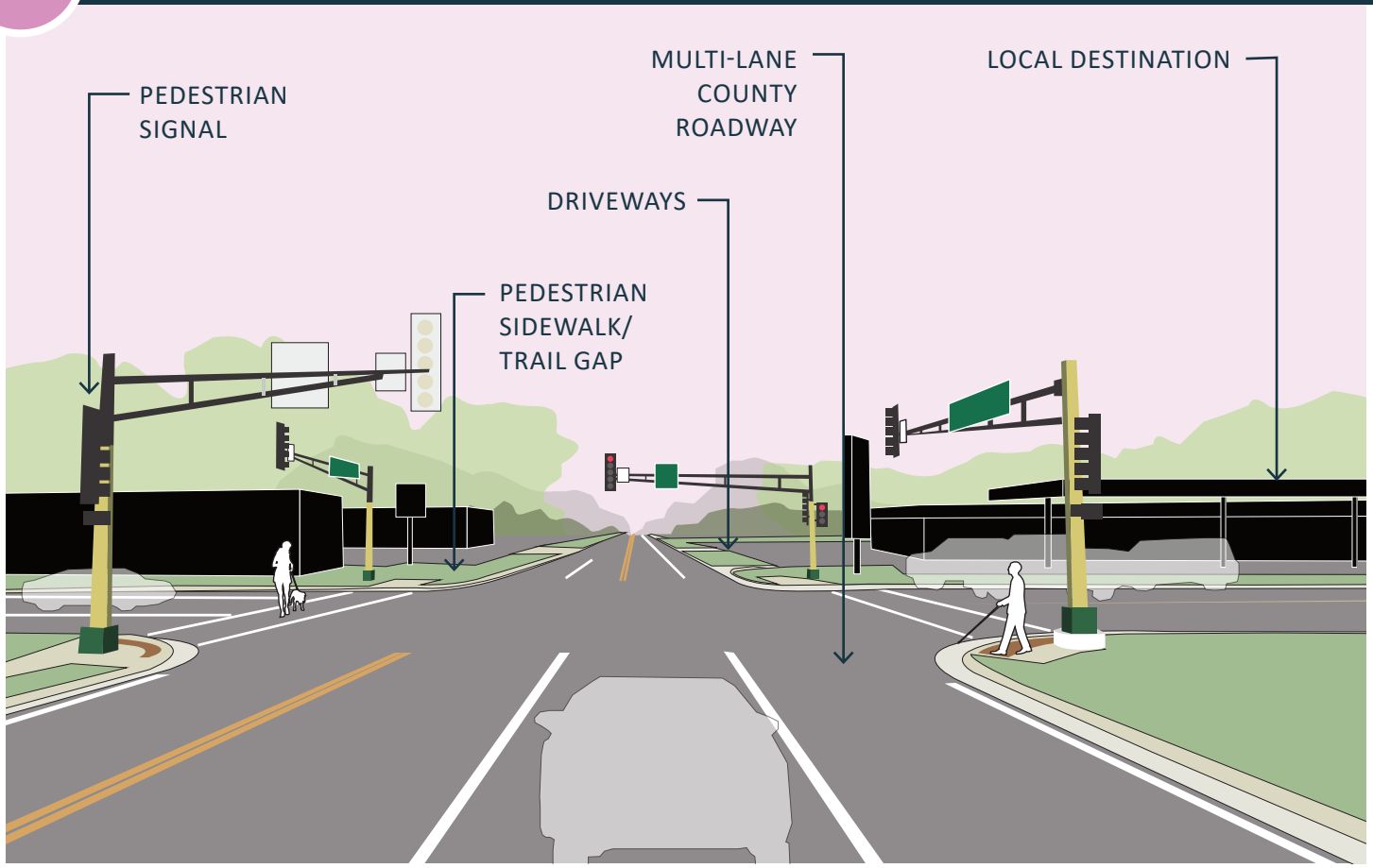


Figure 3.8 Illustration of an example signalized intersection

SIGNALIZED INTERSECTION:

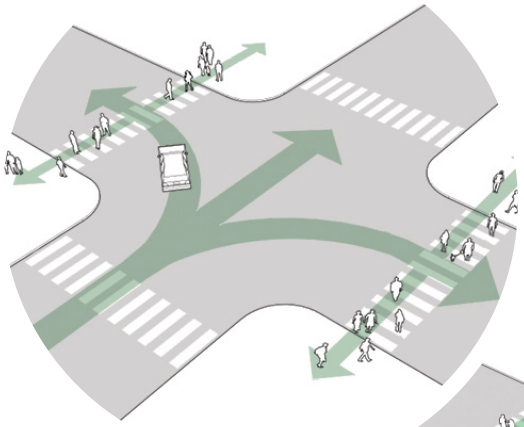
- **The Washington County bicycle and pedestrian network primarily exists in alignment with the county roadway network.**
- **Sidewalk connections exist in a few locations throughout the county, primarily in commercial areas.**
- **Pedestrian curb ramps, lighting, crosswalk markings, signage, and pedestrian crossing signals are all types of facilities found at signalized intersections that influence the perception of safety and comfort.**
- Gaps in the local and county trail network, even on just one of four legs of an intersection, can create a significant barrier for continuous pedestrian or bicycle travel.

SAFETY CONCERNS:

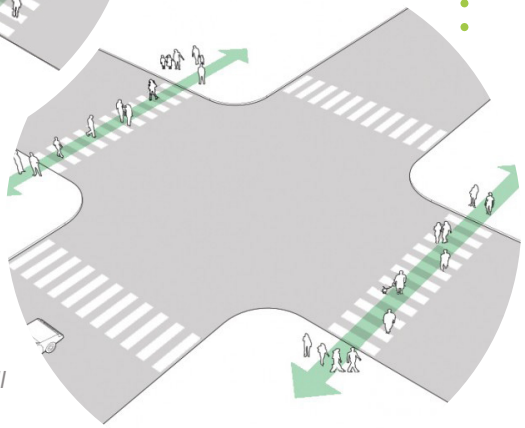
- Crosswalk markings are sometimes degraded beyond visibility for both drivers and pedestrians.
- Gaps in the trail and sidewalk network create barriers to people with disabilities, seniors, children, and people who use mobility aids.
- Pedestrian ramps and landing areas are sometimes installed around roadway signals and other vertical elements, leaving narrow widths for pedestrians to navigate around.
- Vehicles making both right and left turns are potential threats to pedestrians and bicyclists using crosswalks.
- Pedestrians will likely use boulevard areas to access commercial and community destinations, crossing driveways and parking lots where their presence may not be visible or anticipated by drivers.

No Turn on Red sign (Photo: The Hawk)

Curb extension with integrated stormwater feature (Photo: NACTO)



Typical signal timing exposes pedestrians in crosswalks to vehicles making right and left-hand turns (Image: NACTO)



Leading pedestrian interval is signal timing that gives pedestrians a head start on crossing without vehicles entering the intersection. All-way stop timing allows pedestrians to cross in all directions for a longer period of time, with vehicles stopped in all directions (Image: NACTO)

BICYCLE AND PEDESTRIAN CONSIDERATIONS AT SIGNALIZED INTERSECTIONS:

- Continue to work with local municipalities to perform ADA retrofits and/or signal replacement with improved pedestrian ramps.
- Continue to install continental or Seattle-style crosswalk markings at all trail and sidewalk crossings, as well as forward stop bar markings.
- Consider implementing NO TURN ON RED at intersections where warranted.
- Continue to consider installation of pedestrian refuge islands where warranted.
- Curb extensions have been considered, if space permits (without obstructing a bikeable shoulder).
- Consider filling gaps in sidewalk and trail connections throughout corridor.
- Consider leading pedestrian intervals or all-way stop timing at signalized intersections to allow pedestrians more time to cross the roadways, where applicable. Note that pedestrian wait times can be longer with variations in signal timing.

RESOURCES:

- NACTO Urban Bikeway Design Guide
- Washington County ADA Transition Plan
- MnDOT Best Practices and Guidance in At-Grade Trail Crossing Treatments
- MnDOT Bicycle Facility Design Manual

PEDESTRIAN AND BICYCLE FACILITY DESIGN

GENERAL DESIGN GUIDANCE

The following statements are intended to provide guidance on general design of bicycle and pedestrian improvements throughout the county:

» The design and implementation of county pedestrian and bicycle facilities should continue to recognize the community character (e.g. rural, suburban or urban) and design features will respond to local features such as natural resources, aesthetics, and gateways.

» Elements will be incorporated into planning and design efforts to encourage:
- *Comfortable corridors and places to walk and bike to,*
- *Safe and well-landscaped routes that inter-connect the community, and*
- *Healthy and active lifestyles.*

» Continental-style crosswalk markings should continue to be installed and maintained at county roadway intersections. The county has explored other style crosswalk markings, such as the "Seattle-style" marking, which reduces marking degradation and allows for better visibility with the same amount of material. This style and others will continue to be installed on a case-by-case basis to best suit the context.

» The county road and public right-of-way network should connect various public realm amenities for a range of modes (walking, biking, driving, etc.) to support travel to and from destinations such as schools, parks/open space, restaurants and other businesses.

» Per the 2015 ADA Transition Plan approved by the county, new facilities for pedestrians will meet accessibility standards. The county will also continue to actively upgrade existing pedestrian facilities to meet these standards as well.

» When determining which bicycle and pedestrian facilities to potentially install along roadways and at intersections, the comfort and safety of all roadway users should be taken into account. Pedestrian and bicycle facilities often provide a necessary physical separation between motorized and non-motorized roadway users, which benefits both.

DESIGN GUIDANCE ON SPECIFIC FACILITIES

The following resources provide specific guidance on paved trails and paved shoulders. This guidance has combined standards as listed in the following:

- *2020 MnDOT Bicycle Facility Manual*
- National Association for City Transportation Officials (NACTO) guides, such as the *Urban Street Design Guide* and the *Urban Bikeway Design Guide*
- *Small Town and Rural Multimodal Networks (2016, US DOT)*
- *Minnesota's Best Practices for Pedestrian/Bicycle Safety (2013)*
- *State Aid Manual (2015, MnDOT)*
- *MnDOT Facility Design Manual*

Guidance for County State Aid Highways (CSAH) is generally provided through the most current *MnDOT Bicycle Facility Manual*.

TRAIL (OR SIDEPATH) DESIGN

In Washington County, nearly all constructed trails could also be referred to as sidepaths, as they typically align with existing roadways. For simplicity, the term trail is used throughout this plan to mean a paved, separated shared-use facility to be used by non-motorized vehicles and pedestrians. This facility type is intended to serve a wide variety of comfort levels for both biking and walking.

Typical design features of trails in Washington County include:

- Bituminous (asphalt) surfacing
- Aggregate base
- 10’ width preferred, with 8’ width at areas of site constraint and 12’+ in areas of heavy use
- 2-5’ fall zone (turf or gravel) on both sides of the paved trail with no vertical obstructions within 2’ of either side of the trail.
- 2-5% running slope wherever possible, with a 1-2% cross slope
- Pavement markings to separate bicyclists from pedestrians or designate direction of travel to be implemented only where trail use is heavy and warranted
- Generally, more separation width between the edge of the roadway and the trail is preferred, with 10’ minimum buffer as a guide where feasible. In practice, the county generally matches the boulevard width to the trail width (e.g. construction of a 10’ boulevard adjacent to a 10’ trail). Trail and boulevard widths are determined to fit within site constraints.
- Future trail layout and determination of roadway side placement should consider County ROW width, drainage ditches, utilities, existing trees, topography, driveway conflicts, bridge crossings, and other site-specific environmental constraints that impact pedestrian and bicyclist safety and comfort and project costs.

PAVED SHOULDER DESIGN

Paved shoulders alongside Washington County roadways have been considered as part of the bicycle and pedestrian network if they are at least 6 feet in width and are continuously paved with either bituminous (asphalt) or concrete surface to the edge of the roadway. Bicyclists who are comfortable riding alongside and in the same direction as adjacent vehicle traffic are generally the users of these facilities, although pedestrians do use paved shoulders for walking (typically moving in the opposite direction of adjacent vehicle traffic). All Washington County roadways will continue to remain available for pedestrian and bicycle use, with the following design guidelines for future facility construction and improvement:

» Bituminous (asphalt) paved surface, continuous in width

» A single, continuous stripe separates vehicle traffic from shoulder use. Rumble strips or striped buffers are also potential treatments to further separate drivers and bicyclists or pedestrians.

» Although 6' is considered a minimum today for this type of facility, future roadways to be used as part of the County's paved shoulder network should strive for a 8' width (minimum)in urban areas and a 10' width in rural areas to accommodate for future changes in roadway volumes or speeds. These widths are guided by State Aid Standards. In most cases, paved shoulders will widened to meet county and state standards as part of roadway reconstruction projects.

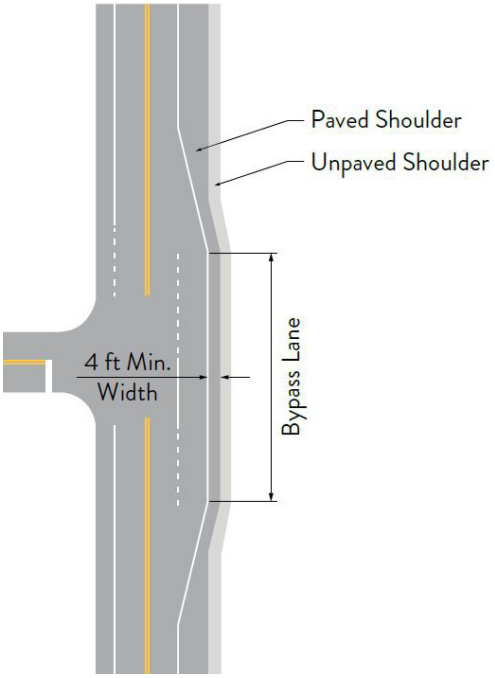
» It is expected that shoulders along the County's paved shoulder network will meet minimum width and design guidelines for both sides of the roadway.

» Potential warning and regulatory signs that may be applicable to Washington County paved shoulder network include:

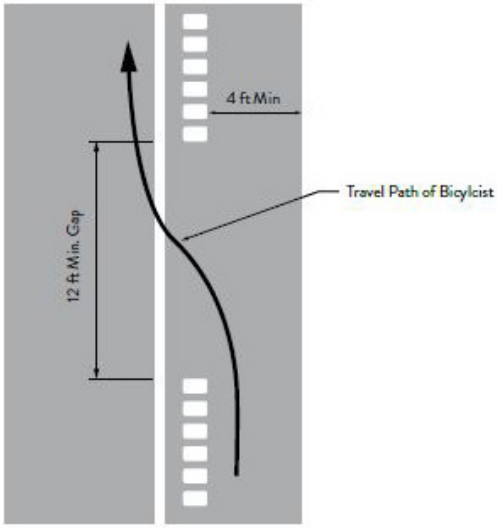
- *W11-1 Bicycle Warning Sign with SHARE THE ROAD plaque (W16-1P)*
- *W8-25 SHOULDER ENDS*
- *R4-4 RIGHT TURN LANE YIELD TO BIKES*

» Where a right turn lane terminates the paved shoulder, consider installation of shared lane markings where bicyclists and vehicles share the roadway.

» At bypass lanes, consider a 4' minimum (6'+ preferred) paved shoulder for bicyclists to continue.



Paved shoulder with bypass lane guidance, as shown in the MnDOT Bicycle Facilities Design Manual (2020)



Rumble strip design guidance, as shown in the MnDOT Bicycle Facilities Design Manual (2020)

CHOOSING FUTURE FACILITIES

This plan is intended to serve as a tool for future decision-making regarding improvements to the bicycle and pedestrian network in Washington County. The following table provides guidance to understand specific facility types that are recommended to be used in combination with common intersection types found in Washington County.

Table 3.1 lists facilities for safety strategies that are potential considerations for intersection types commonly found in Washington County. The table also cites state and national references for locating guidance on specific design for facility and intersection combinations. The table is intended to be used as reference for exploring multiple options for future comparison of language and design. The guides listed are current as of 2020; it should be noted that this list is not exhaustive, but intended to serve as a starting point.

The references are keyed below (click on text to link directly to reference documents):

1 - FHWA Safe Transportation for Every Pedestrian (STEP)
2 - FHWA Proven Safety Countermeasures
3 - AASHTO Guide for the Development of Bicycle Facilities
4 - NACTO Urban Street Design Guide
5 - NACTO Urban Bikeway Design Guide
6 - MnDOT Best Practices and Guidance in At-Grade Trail Crossing Treatments
7 - MnDOT Best Practices for Pedestrian/Bicycle Safety
8 - MnDOT Bicycle Facility Design Manual

It should be noted that guidance for County State Aid Highways (CSAH) is generally provided through the most current *MnDOT Bicycle Facility Manual* (2020) for pedestrian and bicycle facilities, through the State Aid Manual (2015), and through the MnDOT Facility Design Guide.

Guides are updated periodically; the list above and included in the table reflect guidance current as of 2020.

Table 3.1 Reference Guide to Pedestrian and Bicycle Crossing Facilities at Intersection Types

SAFETY STRATEGIES		INTERSECTION TYPE					
		Roundabouts	Signalized Intersections	Four-way Stop Control	Two-way Stop Control	Trail Crossing at Mid-block	Highway Crossing
SIGNING / STRIPING	High Visibility Crosswalk Markings	1	1,4,6,7,8	1,4,6,7,8	1,4,6,7,8	1,34,6,8	1,4,6,7,8
	Crosswalk Warning Signs	1	1,6,8	1,4,6,8	1,6,8	1,3,6,8	1,6,8
	Advance Stop Bar Marking					1,3,4,5,6,7,8	1,6,7,8
	Stop or Yield Signs for Bicycles					3,5,6,8	
CROSSING AID	Rectangular Rapid Flashing Beacon (RRFB)	1,5			1,5,6,7,8	1,4,5,6,7,8	
	Overhead Pedestrian Hybrid Beacon (PHB/HAWK)				2,5,6,7,8	1,2,3,5,6,8	1,2,4,6,7,8
GEOMETRY	Slip Ramp	3,8					
	Curb Extensions (Bump Outs)		1,4,6,7	1,4,6,7	1,4,6,7	1,4,6,7	
	Pedestrian Refuge Island		5,6,8	5,6,8	5,6,8	1,2,3,5,6,8	1,2,6,8
	Trail Crossing Pushed Back from Intersection	6			6, 8		
	Road Diet					1,2,3,7	
SIGNALIZED INTERSECTION	Protected Only Left and Right Turn Phases		4,8				
	Signal Timing Adjustments		3,8				
	Bicycle Actuated Signals		3,5,8				
	Leading Pedestrian Interval		2,3,4,5,8				
	No Right Turn on Red		4,8				
GRADE SEPARATION	Trail Overpass or Underpass					3,7,8	3,7,8

ACTIVE LIVING RECOMMENDATIONS

Today, the benefits of increasing physical activity and promoting healthy lifestyle choices for people of all ages in our communities is an identified priority. Access to a safe, convenient, and enjoyable network for walking and biking plays a significant role in providing opportunities for people to engage in healthy lifestyles.

Active living is a method to prioritize the integration of physical activity and healthy eating into daily routines. Age, physical ability and proximity to parks and trails influence opportunities for making active living a reality for residents.

In addition to creating a plan for investing in the future bicycle and pedestrian network, primarily in the form of trails and paved shoulders, this plan identifies other non-infrastructural recommendations for promoting and achieving an environment conducive to active living for all Washington County residents.

Example of trail wayfinding (Photo: E3)

RECOMMENDATIONS

1. DEVELOP A COHESIVE AND CONSISTENT WAYFINDING AND SIGNAGE PLAN

This wayfinding plan should coordinate or be integrated with Washington County Parks. Providing clear and consistent communication throughout the county-wide network will promote use of trails and can also build identity and pride for the network. The wayfinding and signage plan process can also integrate a community engagement initiative to develop trail names, and to identify potential landmarks, loop routes, connections with other regional/state/local trail networks, or other points of interest to be noted in directional signage.

2. DEVELOP AND MAINTAIN AN UPDATED NETWORK ROUTE MAP

A county-wide route map, with popular county destinations, landmarks, and existing segments of the bicycle and pedestrian network is an essential way to promote active living. This map should be kept up-to-date and posted visibly through county communications such as the county website, as well as posted at county parks and at regional trailheads. The map should consider accessibility by readers who have visual impairments, and may need to be provided in other languages.

3. DEVELOP SAFETY AND EDUCATION PROGRAMS FOR PEDESTRIANS AND BICYCLISTS

Providing pedestrian and bicyclist safety and education programs can help potential bicyclists and pedestrians understand how to engage in active living safely and comfortably. This is especially true for residents in more rural areas, who may think that biking and walking are activities reserved for urbanites. These programs can be initiated through Washington County SHIP (Statewide Health Improvement Partnership) or through Washington County Public Safety, Sheriff's Office or Parks. Education or information can also be extended to include programs for drivers, to better understand how to share the roadway with bicyclists and pedestrians. Group bicycle rides or hikes, lead by professionals trained through Bicycle Alliance of Minnesota are one way of providing education in a group setting.

The Minnesota Bicycling Handbook is an excellent resource for understanding the rules of the road and becoming familiar with safe riding techniques. Link to resource:

https://www.bikemn.org/education/minnesota-bicycling-handbook

MnDOT's Walk! Bike! Fun! curriculum is a toolkit for creating walking and biking education for children, adults, and seniors. Link to resource: https://www.bikemn.org/education/walk-bike-fun

4. BECOME DESIGNATED AS A BICYCLE FRIENDLY COMMUNITY

The Bicycle Friendly Community Program is administered through The League of American Bicyclists. This is an incentive program where communities apply to and become designated at different levels of achievement for accomplishing community goals related to providing high quality bicycle facilities and access to educational and encouragement activities. Becoming designated and working actively with the League of American Bicyclists opens the door to sharing best practices and connecting to technical resources for building and improving the county-wide system. Link to resource: https://www.bikeleague.org/

5. EVALUATE PLAN PROGRESS

This plan, once approved by the county, should be revisited periodically to take inventory of progress made towards filling network gaps, addressing safety improvements, and increasing biking and walking activity in the county. Evaluation could include the following:

- Taking inventory of completed projects and updating map files
- Completing trail counts or intercept surveys along routes
- Convening across county departments to evaluate progress

MNDOT PORTABLE COUNTER BORROWING PROGRAM

MnDOT provides freely available and easy to install portable counters that can be used to collect bicycle and pedestrian count data without concern for weather, climate or daylight. Equipment and instructive toolkits are available to cities, counties, and active transportation advocacy organizations for short-term lending. Counts can be used as a tool for understanding use of current trail networks, and lay the groundwork for future planning and prioritization efforts.

» **To learn about this program, visit** *www.dot.state.mn.us/bike-ped-counting/borrow.html*

04. IMPLEMENTATION

INTRODUCTION

The Implementation Chapter helps articulate the Future Network Plan and the implementation steps that should follow. This chapter provides the county a framework for identifying priorities and demonstrating visible project needs that reach long term goals in providing a county-wide pedestrian and bicycle network.

PROJECT PRIORITIZATION

A well-defined project prioritization process can help rank project needs (on-road facilities and off-road trails) in a manner that is consistent with county pedestrian and bicycle goals. Ranking projects helps determine where investments should occur first. In this case, the future network has been broken into logical projects for prioritization (see Figure 4.1).

The prioritization process is based on a scoring system that assigns point values to a trail segment based on their contribution to specific measures (see page 4-3). The end result is a cumulative score for each trail segment; the higher the score, the higher the project.

» ***High*** **- These projects are projected to have the biggest impact for improving the safety and comfort level for pedestrian and bicycle movement, while linking to key destinations. High projects are intended to be completed or have substantial progress towards completion in the near-term.**

» ***Medium*** **– These projects are projected to have substantial impact in meeting specific measures. Medium projects should be viewed as opportunities for completion in the mid-term.**

» ***Low*** **– These projects are projected to meet a few of the measures. Regardless of their score, they are still viewed as a need in completing the county's pedestrian and bicycle network. These project should be monitored for opportunities for completion and how they may coincide with future roadway projects.**

PROJECT PRIORITIZATION RESULTS

The project prioritization tool developed for this study allows the county to run alternative scenarios to determine a project's benefit to the overall network. This tool also provides the county flexibility to adjust measures accordingly as priorities may shift over time. For example, opportunities may present themselves to advance a project sooner than originally planned. This may include opportunities to secure new funding, responding to a safety need, or aligning a trail project that coincides with a roadway improvement.

The project prioritization tool ranks 48 projects that total over 100 miles of new off-road bike/pedestrian routes and on-road bike facilities (see Tables 4.1 & 4.2 and Figure 4.1). This list helps communicate project needs to elected leaders, residents, and stakeholders.

PROJECT PRIORITIZATION MEASURES

The following measures were used to evaluate the Future Network Plan and to inform the project priorities list (see Tables 4.1 and 4.2). The measures were selected based on community input and direction from the Technical Advisory Committee (TAC).

FILLS A GAP

The project fills a gap in the existing network, which are typically missing links less than one mile in length

CONNECTOR TO PARKS

The project provides a logical connection to a county or State park

RBTN CONTRIBUTION

The project is part of the Regional Bicycle Transportation Network (RBTN)

CONNECTOR TO SCHOOLS

The project provides a logical connection to a school (K-12)

CONNECTOR TO REGIONAL & STATE TRAILS

The project will help complement the existing regional and state trail network by connecting county trails to this network

CONNECTOR TO A RBTN

The project will complement the Regional Bicycle Transportation Network (RBTN) by connecting county trails to this network

CONNECTOR TO HOMES

The project will help link households in poverty to the county or regional trail network

COMFORT LEVEL

The project will help enhance the user's experience, which is measured by Levels of Traffic Stress (LTS). A LTS score represents the level of stress or comfort one experiences on the route (see Chapter 2). For example, the most comfortable facilities (or the least stressful) are referred to as facilities for "all ages and abilities." These facilities are generally comfortable for people of a wide range of abilities, ages and perceptions of safety. The least comfortable facilities (most stressful) are referred to as facilities for "strong and fearless bicyclists." These facilities are adjacent to or intersect with high vehicle speeds and multiple traffic lanes. These facilities are generally uncomfortable for most bicyclists and pedestrians, with the exception of highly experienced road cyclists

CONNECTOR TO DEMAND CENTERS

The project provides a logical connection to a demand center (see Chapter 2). Demand centers are areas where there is a high need for pedestrian and bicycle facilities. These areas are based on existing conditions that take into account socioeconomic factors (e.g., population density), connectivity factors (e.g., bus stops), and destination factors (e.g., job centers)

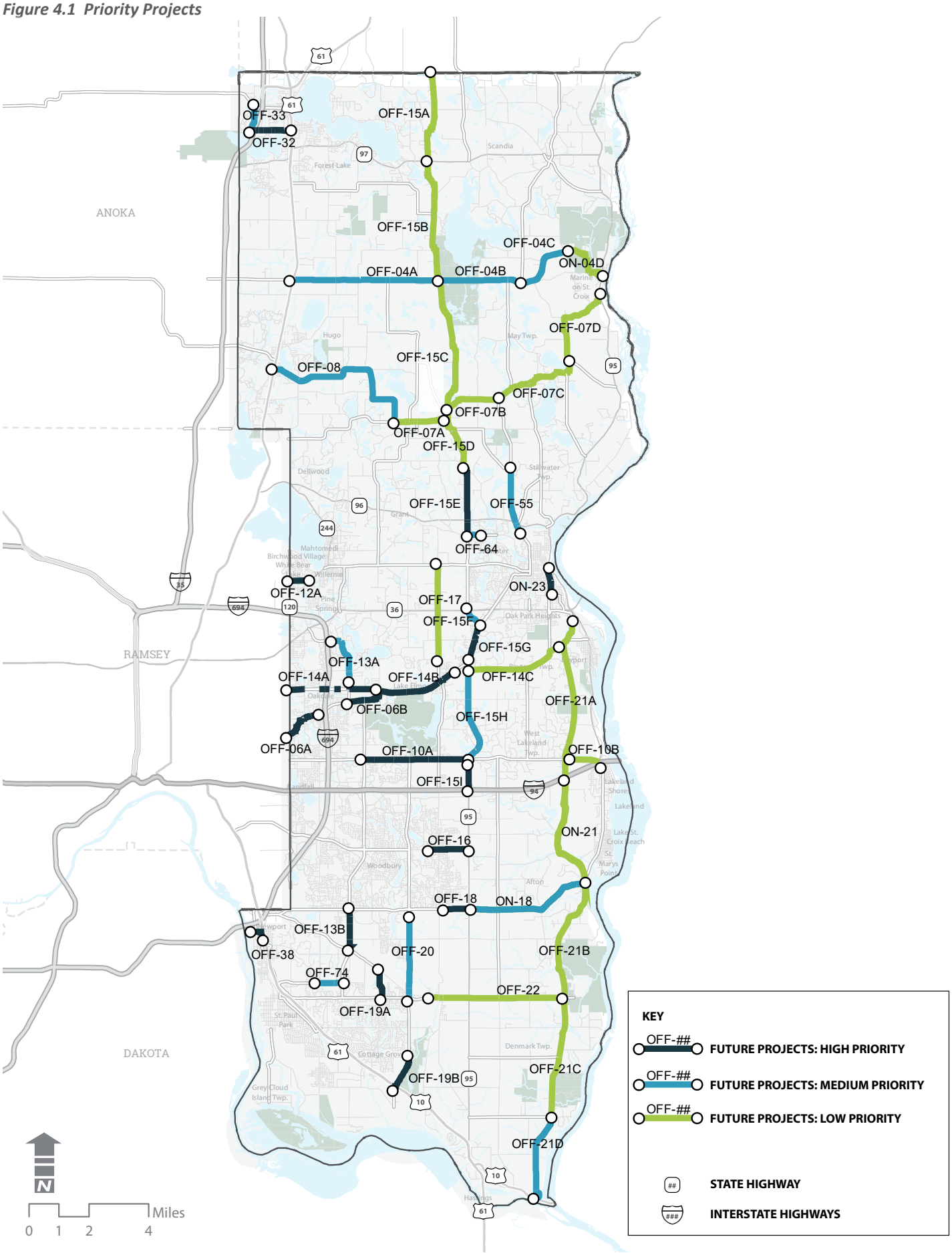
Table 4.1 New Off-Road Facilities

PROJECT (SEE FIGURE 4.1)	MILES	PRIORITY	CR ROAD #
OFF-04a	4.91	Medium	CR 4
OFF-04b	2.73	Medium	CR 4
OFF-04c	2.14	Medium	CR 4
OFF-06a	1.29	High	CR 6
OFF-06b	1.20	High	CR 6
OFF-07a	1.74	Low	CR 7
OFF-07b	1.83	Low	CR 7
OFF-07c	3.04	Low	CR 7
OFF-07d	3.09	Low	CR 7
OFF-08	0.90	Medium	CR 8
OFF-10a	3.53	High	CR 10
OFF-10b	1.16	Low	CR 10
OFF-12a	0.55	High	CR 12
OFF-13a	1.86	Medium	CR 13
OFF-13b	1.34	High	CR 13
OFF-14a	2.03	High	CR 14
OFF-14b	2.54	High	CR 14
OFF-14c	3.50	Low	CR 14
OFF-15a	3.09	Low	CR 15
OFF-15b	4.12	Low	CR 15
OFF-15c	4.75	Low	CR 15
OFF-15d	1.82	Low	CR 15
OFF-15e	2.25	High	CR 15
OFF-15f	0.70	Medium	CR 15
OFF-15g	1.21	High	CR 15
OFF-15h	3.17	Medium	CR 15
OFF-15i	0.76	High	CR 15
OFF-16	1.25	High	CR 16
OFF-17	3.16	Low	CR 17
OFF-18	0.73	High	CR 18
OFF-19a	2.72	High	CR 19
OFF-19b	1.12	High	CR 19
OFF-20	0.93	Medium	CR 20
OFF-21a	5.35	Low	CR 21
OFF-21b	4.26	Low	CR 21
OFF-21c	4.04	Low	CR 21
OFF-21d	3.06	Medium	CR 21
OFF-22	4.53	Low	CR 22
OFF-32	1.39	High	CR 32
OFF-33	0.81	Medium	CR 33
OFF-38	0.30	High	CR 38
OFF-55	2.15	Medium	CR 55
OFF-64	0.29	Medium	CR 64
OFF-74	0.72	Medium	CR 74
Total	98.11		

Table 4.2 New On-Road Facilities

PROJECT (SEE FIGURE 4.1 MAP ID)	MILES	PRIORITY	COUNTY ROAD #
ON-04d	1.78	Low	CR 4
ON-18	4.24	Medium	CR 18
ON-21	4.02	Low	CR 21
ON-23	1.00	High	CR 23
Total	11.05		

Figure 4.1 Priority Projects



USING THE 6E'S: Implementation of the Future Network Plan should embrace the 6 E's[1] from Safe Routes to School (SRTS) initiatives. The 6 E's have been translated to a broader definition that applies at a county-wide level.

EVALUATION

Evaluation strategies help monitor trends over time and identify specific safety issues. Evaluating and monitoring crash data can help identify areas of concern that may warrant safety improvements (see Page 2-14 for this Plan's safety analysis).

EDUCATION

Education programs aim to teach residents safe walking and biking behaviors. Education programs may also include driver safety campaigns. There are often opportunities to partner with police, community groups or others on education programs.

ENGAGEMENT

Every project should begin by listening to the community, youth, families, community organizations, and build intentional, ongoing engagement opportunities into the planning and design process.

EQUITY

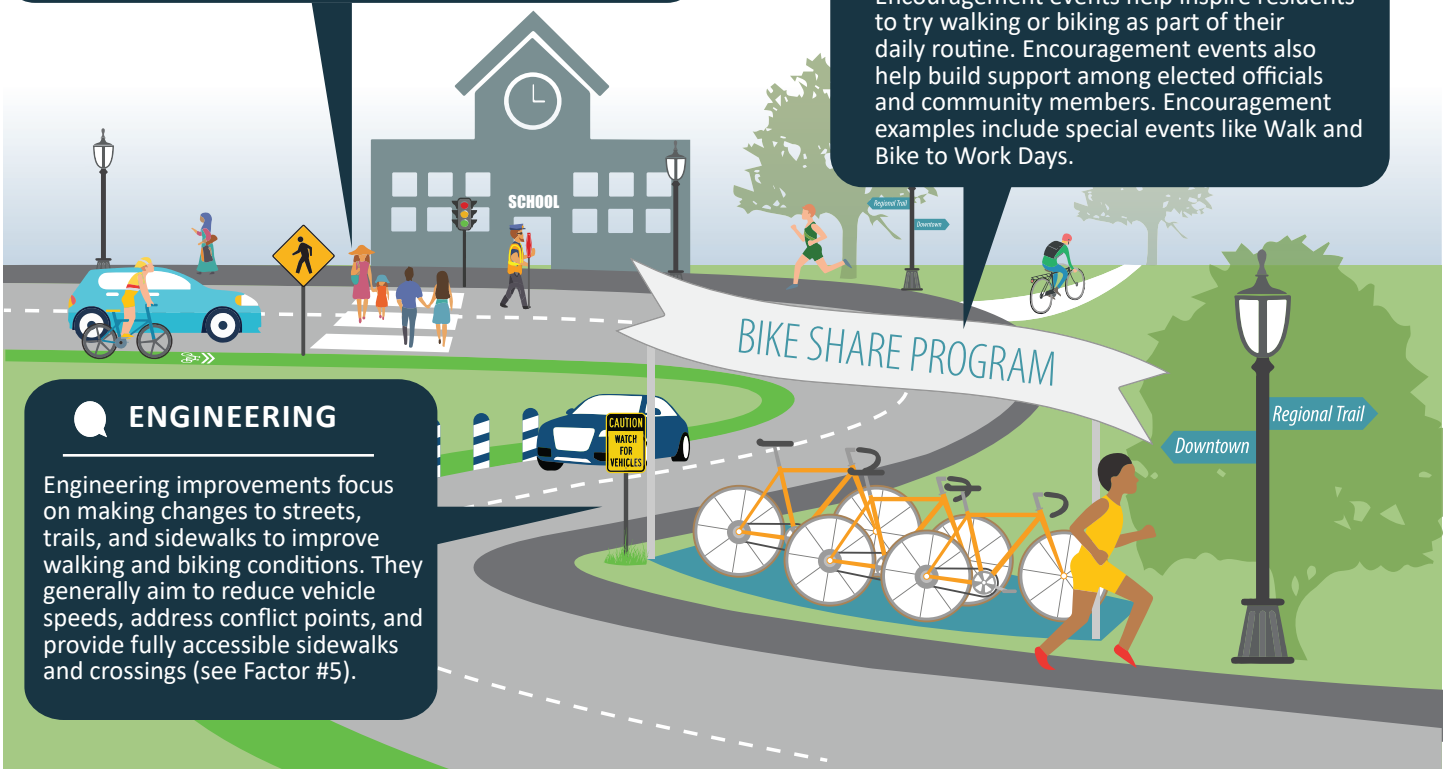
Equity recognizes that different people have different barriers to living healthy, fulfilled lives (see Factor #6). In order to allow people to get to the same outcome, we need to understand the different barriers and opportunities that affect different groups, and craft our policies, programs, and overall approaches with those various challenges and needs in mind.

Equality assumes that all needs are the same. The result is that every community gets the exact same resources without regard to individual differences. Equality works only in circumstances where everyone starts from the same place and needs the same things.

Equity allows resources to be provided on the basis of need. Communities disproportionately impacted by safety, health or transportation access inequities are provided appropriate resources to address their individual needs. Therefore, resource allocation may differ between communities. While often used interchangeably with equality, equity involves a variety of strategies aimed at the fair – but not necessarily equal - provision of resources.

ENCOURAGEMENT

Encouragement events help inspire residents to try walking or biking as part of their daily routine. Encouragement events also help build support among elected officials and community members. Encouragement examples include special events like Walk and Bike to Work Days.



ENGINEERING

Engineering improvements focus on making changes to streets, trails, and sidewalks to improve walking and biking conditions. They generally aim to reduce vehicle speeds, address conflict points, and provide fully accessible sidewalks and crossings (see Factor #5).

[1] *Minnesota Department of Transportation "Minnesota Safe Routes to Schools" https://www.dot.state.mn.us/mnsaferoutes/ and Safe Routes Partnership: https://www.saferoutespartnership.org/safe-routes-school*

CONSIDERATION FACTORS

There are many factors to consider when prioritizing a project for implementation. In order to shift a project, the county should consider a series of "Consideration Factors." The factors maintain a degree of flexibility when prioritizing projects over time. The factors help address larger policy decisions that need to be considered when programming projects for implementation.

The factors are provided to help further refine the implementation of the projects listed in Tables 4.1 and 4.2. The factors may further influence the timeline or importance of a project, in addition to their priority measure ranking.

CONSIDERATION FACTOR #1: DOES THE PROJECT ADDRESS PEDESTRIAN AND BICYCLE SAFETY NEEDS?

Pedestrian and bicycle safety is an important contributor in making Washington County a great place to live, work, and play. There are many examples of great places to walk and bike in Washington County. However, there is still much work to be done. High vehicle speeds lead to risky crossing conditions and connectivity gaps at high traffic locations, resulting in uncomfortable pedestrian and bicycle experiences.

Bicycle and pedestrian safety goals are included in Washington County's 2040 Comprehensive Plan. Working towards this goal requires a comprehensive approach that mirrors the 6 E's for Safe Routes to School (SRTS). The 6 E's (see page 4-6) have been translated to a broader definition that applies at a county-wide level. The 6E's should be used as a source of inspiration in creating safer environments for pedestrians and bicyclists.

The county should focus on "Evaluation" and "Engineering" for the purpose of this factor. Shifting project priorities (see Tables 4.1 and 4.2) should be "Evaluated" to address safety needs first. Safety improvements should also be "Engineered" to address problem areas, while using design strategies that are proactive in helping mitigate conflicts between vehicles and pedestrians and bicyclists.

CONSIDERATION FACTOR #2: DOES THE PROJECT OVERCOME A TRANSPORTATION BARRIER?

There are physical barriers that limit pedestrian and bicycle movement throughout the county. The Future Network Plan will need to overcome these barriers. Therefore, stronger consideration should be given to projects that help move people safely over these barriers. Some of the more major barriers (e.g., Highway 36 and Interstate 94) in the county are discussed in the sidebar.

REGIONAL BARRIERS

Some of the major barriers in that limit pedestrian and bicycle movement in Washington county have been recognized by the Metropolitan Council's Regional Bicycle Barriers Study (2019). These barriers primarily consist of connections over major transportation corridors. Major barriers identified during this Plan's public engagement process include Highway 36, Highway 95, Interstate 494, and Interstate 94.

Overcoming freeway barriers is slowly becoming part of the design process for larger roadway projects. Future interchanges and overpasses (planned or programmed) recognized in Washington county's 2040 Comprehensive Plan include:

- **Highway 36/county Road 15 (Manning Avenue) Interchange**
- **Highway 36/county Road 17 (Lake Elmo Avenue) Interchange**
- **Interstate 35E/County Road 4 (170th Street) Interchange**
- **Highway 36/Highway 120 Interchange**
- **Interstate 94 (west of County Road 13) Overpass**

These projects are primarily being driven by growth and traffic projections. While the timing of these

Under some circumstances, the Future Network Plan may require a grade separated crossing (e.g., overpasses or tunnels) to reduce pedestrian and bicycle crashes. Grade separated crossings can help reduce serious and fatal injuries, while improving traffic flow. However, they also have some disadvantages. They can be costly and may never be fully utilized by pedestrians and bicyclists if they do not provide a safe and convenient connection.

The actual use of a grade separated crossing will depend on the time in takes to use the crossing compared to crossing a roadway at-grade. For example, Table 4.3 demonstrates that if travel times are the same to cross a roadway at-grade and grade separated, most people will choose to use a tunnel and many people will choose use a pedestrian bridge. In general, people will avoid using a grade-separated crossing when it inconvenient and takes too long. Pedestrians are more apt to use a pedestrian tunnel if it does not pose any personal security risks. These considerations needs to be weighed when evaluating cost/ benefit of a grade separated crossing.

Project priorities(see Tables 4.1 and 4.2) may shift over time as further evaluation and consideration is given to a project's ability to overcome a barrier, while providing safer crossings. Higher priority should be given to projects that overcome regional barriers (see sidebar on page 4-7).

Table 4.3 Percent of Pedestrians Using the Grade Separated Route vs. the At-Grade Crossing

TRAVEL TIMES	BRIDGE	TUNNEL
EQUALS	**15% TO 60%**	**95%**
30% Longer on Grade Separated Route	0%	25% to 70%
50% Longer on Grade Separated Route	0%	0%

Note: If grade separated crossings are an alternative at a crossing location, the use of the grade separated crossing depends on the time to use each alternative route.

CONSIDERATION FACTOR #3: DOES THE PROJECT HAVE COMMUNITY SUPPORT?

The usefulness and longevity of this Plan needs to have community buy-in from the outset. To achieve this objective, the implementation of the Future Network Plan will require a meaningful and transparent planning process. The planning process should focus on building consensus around local priorities and realistic implementation measures. The Plan should be referenced, celebrated, and promoted both within the county and at the local level.

The projects and ideas represented in this Plan will require coordinated efforts by many different county, local and state agencies. The various county roles and responsibilities include Public Works, the county Board of Commissioners, Washington County State Health Improvement Partnership (SHIP), and the Parks Commission to name

just a few. Shifting a project (see Tables 4.1 and 4.2) should be vetted through a public process.

COST PARTICIPATION POLICY

Community support for a project is also built through cooperative agreements between the county and city. Trails are sometimes constructed as part of larger roadway projects, which at times may be funded as part of Washington County's Cost Participation Policy (#8001). This policy determines the appropriate division of cost in funding cooperative highway projects, traffic signals, and bridge construction projects with MnDOT, municipalities, and other agencies. For highway and bridge projects, the cost splits differ for cities with populations greater than 5,000 and for those with populations less than 5,000. The primary purpose for this difference is the absence of direct State Aid funding to municipalities with less than 5,000 residents. The policy also guides the county's cost participation when communities use Tax Increment Financing (TIF) and for jurisdictional changes or turnbacks.

CONSIDERATION FACTOR #4: DOES THE PROJECT CONTRIBUTE TO THE RBTN?

Implementation of the Future Network Plan should correspond closely to the corridors identified in the Regional Bicycle Transportation Network (RBTN) in order to provide seamless connections to neighboring communities and the broader regional transportation network. According to the Metropolitan Council, the RBTN corridors and alignments make up the "trunk arterials" of the overall system of bikeways that connect to regional employment and activity centers. Washington County's RBTN alignments and corridors are shown in Figure 4.2.

The goal of the RBTN is to establish an integrated seamless network of on-street bikeways and off-road trails that complement each other to most effectively improve conditions for bicycle transportation at the regional level. These routes are further classified into two tiers of corridors and alignments:

» ***Tier 1 & 2 Corridors*** have been identified as the highest for regional transportation planning and investment. The corridors are planned in locations where they can attract the most riders and where they can most effectively enhance mode choice in favor of biking, walking, and transit over driving alone. Tier 2 Corridors are the remaining corridors in the overall RBTN. A total of 10 RBTN corridors are identified within the county.

» ***Tier 1 & Tier 2 Alignments*** are based on local bicycle plans and in many cases (particularly in the core cities) already exist in some form and may need little or no improvement for the regional network. The RBTN alignment network identified in Washington County provides connections between the cities of White Bear Lake and Forest Lake (via the Hardwood Creek Regional Trail), Pine Springs to the Pine Point Regional Park (via the Gateway State Trail), with a spur connecting to Stillwater (Brown's Creek Trail).

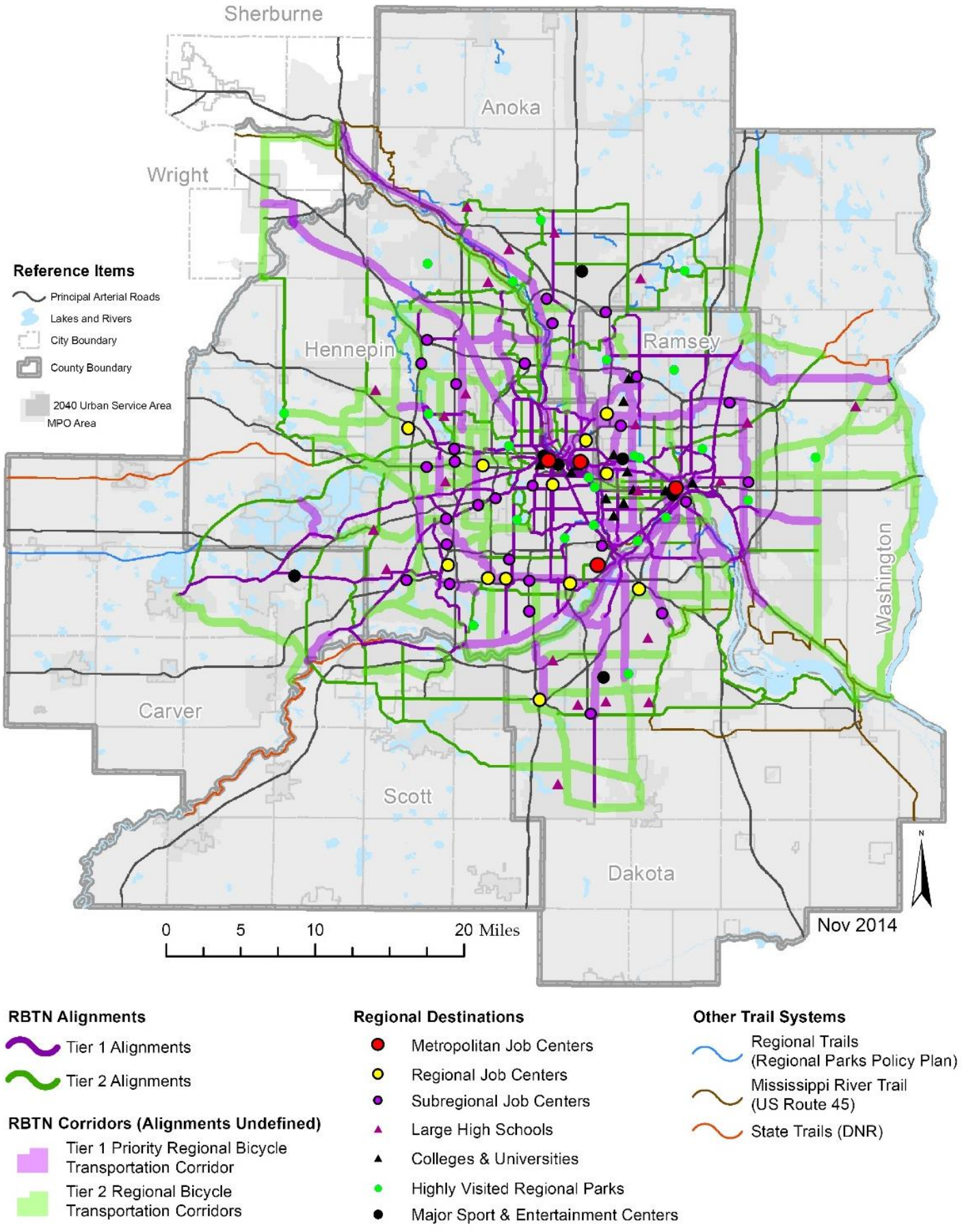
Shifting a project (see Tables 4.1 and 4.2) should consider it's contribution to the RBTN. Projects that contribute to the RBTN may score more favorably as part of the Metropolitan Council's Regional Solicitation program.

CONSIDERATION FACTOR #5: DOES THE PROJECT EMBRACE INNOVATIVE DESIGN SOLUTIONS?

Designing and planning for pedestrian and bicycle projects requires a balance of interpreting and translating experiential or qualitative data and community feedback, alongside current county and statewide standards for roadways, intersections, and trail facilities. While one design standard may be a perfect solution to an issue in one community, the same solution may be completely inappropriate in another context (e.g., rural, suburban, or urban). Design solutions should also embrace some degree of flexibility when finding solutions that address barriers (e.g., topography, environmental features, and right-of-way constraints) and align with community priorities.

Planners and engineers have a wide range of design solutions at their disposal that provide a safer, more comfortable experience, and accessible street for people walking and biking. These design solutions (see Chapter 3) should be explored to their fullest potential when implementing the Future Network Plan. The county should be willing to explore new options and design solutions as they become available, while understanding that investments need to accommodate the movement of people comfortably and safely.

Figure 4.2 Metropolitan Council Regional Bicycle Transportation Network (RBTN)



GRANT FUNDING: The county should continue to pursue grant funds from various programs to help offset capital costs when implementing the Future Network Plan.

MN DNR NATURAL AND SCENIC AREA GRANTS

The MN DNR Natural and Scenic Area Grants are intended to protect and provide public access to high quality natural and scenic areas. Example projects include trails, overlooks interpretive displays, benches, wayfinding and trailhead parking. All projects must align with the State Outdoor Recreation Plan (SCORP). This grant is typically available annually, with an application deadline in early spring.

MN DNR OUTDOOR RECREATION GRANTS

The MN DNR Outdoor Recreation Grant is intended to fund projects that increase and enhance outdoor recreation facilities in local and community parks throughout the state. All projects must align with the State Outdoor Recreation Plan (SCORP). Example projects include internal park trails and trail amenities. This grant is typically available annually, with an application deadline in early spring.

MN DNR LOCAL TRAIL CONNECTIONS (LTC)

Local Trail Connections grants are administered through MN DNR. These grants fund relatively short trail connections between where people live and desired community destinations, and are not intended for funding significant new trails. Funding prioritizes projects with significant connectivity, high expected use, and attractive integration of cultural and natural resources.

MN DNR FEDERAL RECREATIONAL TRAIL PROGRAM

The Recreational Trails program provides financial assistance for the development and maintenance of recreational trails and trail-related projects and provides funding from the Federal Highway Trust Fund in acknowledgment of off-road recreational fuel use. This current federal highway bill is set to expire on September 30, 2020, however a replacement bill (America's Transportation Infrastructure Act (ATIA) has been proposed.

MNDOT SAFE ROUTES TO SCHOOL

MnDOT administers grant funding to support Safe Routes to School (SRTS) Planning Assistance and plan development to support schools' effort to promote safe biking and walking for students on a daily basis. Small micro-grants are occasionally available to fund educational or encouragement programs such as bike fleets and bike rodeos. SRTS Plans are generally used as a foundation for cities and school districts to apply for SRTS Infrastructure grants. Infrastructure grants support capital funding for projects that promote and encourage biking and walking to school, such as trails, sidewalks, and other bike/ped facilities near schools. Other example projects include traffic calming, crosswalk signals, bicycle parking and ADA improvements. SRTS Planning Assistance and Infrastructure Grants are generally available on an annual basis.

METROPOLITAN COUNCIL REGIONAL SOLICITATION

The Metropolitan Council allocates federal funds through Regional Solicitation Grants. Funding priorities include multi-use trails, bicycle facilities, grade-separated crossings, filling network gaps, intersection/crossing treatments, sidewalks, streetscaping, ADA improvements, and Safe Routes to School infrastructure projects. These grants are available on 2-year funding cycle, with the next solicitation for grant applications anticipated in early 2020.

PEOPLE FOR BIKES (NON-PROFIT 501C3)

The PeopleForBikes Community Grant Program provides funding for important projects that build momentum for bicycling in communities across the U.S. These projects include bike paths and rail trails, as well as mountain bike trails, bike parks, BMX facilities, and large-scale bicycle advocacy initiatives.

CONSIDERATION FACTOR #6: DOES THE PROJECT PROVIDE BENEFITS FROM AN EQUITY PERSPECTIVE?

In many communities, including Washington County, there are barriers that prevent all residents from having the same opportunities to thrive. For instance, race, ethnicity, and age continue to be predictors of health, education, income, housing, and recreation. The Washington County Bicycle and Pedestrian Plan is committed to advancing equitable opportunities for all to move throughout the county.

In order to allow people to achieve their greatest outcome, we need to understand the different barriers and opportunities that affect different groups, and prioritize projects with those various challenges and needs in mind. A fundamental approach to multimodal planning is a process that embraces Context Sensitive Solutions (CSS). CSS is a collaborative, interdisciplinary approach that involves all stakeholders in developing a transportation facility that fits its context and environment (e.g., physical, built, social, and environmental), while maintaining safety and mobility. Implementation of the Future Network Plan should be viewed through a CSS lens that helps advance social equity goals. Shifting a project (see Tables 4.1 and 4.2) should carefully weigh the outcomes from this perspective. However, it is important to note that a focus on equity does not mean providing equal access to the same amount of resources. Equity is focused on making sure everyone has the resources they need to lead a healthy, productive life.

CONSIDERATION FACTOR #7: DOES THE PROJECT ALIGN WITH FUNDING OPPORTUNITIES?

Implementation of the Future Network Plan will occur as opportunities present themselves and as resources allow. Therefore, funding to acquire and build a pedestrian or bicycle improvement will come from a variety of sources. Those sources may include Washington County general funds, bonding, city partnerships, and other grant funding. Since Washington County does not have all the funding needed today to build out the Future Network Plan, it will need to actively monitor and plan for various funding sources. The type of funding (e.g., grants) may influence when a project is built - shifting it's priority (see Tables 4.1 and 4.2).

- ***General Funds:*** General funds are used as a primary source for on-going maintenance, operations, and amenities for the bike and pedestrian system. Capital improvements can also be funded through general funds. Many projects coincide with roadway reconstruction or expansion projects, which make it more cost effective to integrate trail construction when working in the existing rights-of-way.
- ***Grants:*** Grant funding throughout Washington County has had a positive impact on the implementation of local and regional bicycle and pedestrian network. Grant funding generally requires a match by the county or City, likely through general funds. Grant funding also typically favors larger, capital projects over maintenance and operations funding. Grant funding might also require evidence of partnerships and community engagement and support for specific requests. Examples of grant funds are listed on page 4-11.
- ***Bonding:*** General Obligation Bonds and Revenue Bonds provide another source of implementation funding for new facilities, and in some cases, can provide funding for repairs and upgrades of existing facilities. Residents can decide to raise revenue through a permanent or temporary tax increase dedicated for specific purposes such as park, trail, and bikeway improvements and maintenance. These funds are usually provided through bonds approved as part of a voter referendum.
- ***County State Aid Funds:*** State aid funds are available for pedestrian and bicycle improvements on state aid roadways. This funding source is particularly useful at the time of street construction or re-construction.

» ***Partnerships:*** Public and private partnerships have the potential to provide a wide array of funding opportunities beyond the traditional municipal models. Partnerships with local and state agencies have proven to be successful in building the existing trail network. Further partnerships with the School Districts and local businesses will be important for implementation of events and programming, and can support future grant writing efforts as well. Organizations with partner funding can also provide assistance with design, outreach, or maintenance/stewardship of facilities.

» ***Donations:*** Private donations are a potential funding source; these may be from individuals or area corporations, or donations of labor from recreation clubs or use agreements. "Adopt-a-Trail" programs, memorial bench donations, and incentives for local businesses to provide bike racks are all examples of how organizations, businesses, and individuals could help with maintenance and funding, while raising awareness and enthusiasm of the bicycle and pedestrian system.

CONSIDERATION FACTOR #8: DOES THE PROJECT CONSIDER FUTURE OPERATIONS AND MAINTENANCE NEEDS?

Implementation of the Future Network Plan should consider ongoing operations and maintenance needs. General maintenance activities may include trail edge mowing, surface maintenance, snow removal, refuse removal, annual inspections, and general administration. General estimates for these types of activities associated with a regional trail corridor (15 to 30 miles in length) are provided in Table 4.4. Table 4.5 provides general cost estimates for other activities associated with capital costs.

Replacement schedules are also an important factor to consider in developing annual work plans and Capital Improvement Programs (CIP). Regular maintenance schedules should be followed for on- and off-road trails to extend their lifespan, while maximizing investments. (see Tables 4.6 and 4.7). Implementation of the Future Network should consider long-term funding needs to ensure investments (projects) can be maintained over time.

Table 4.4 Annual Operations & Maintenance Activities - 2020 Cost Estimates

ITEM	ANNUAL COST *
General Administration	$6,000
Annual Sign Inventory and Replacements	$2,500
Security – Patrol	$1,500
Natural Resource Management Along Corridor	$2,000
Mowing, Trail Sweeping	$4,500
Trail Amenity Maintenance – Benches, Trash Cans, Refuse Removal	$5,000
Landscape Maintenance at Trailheads	$5,500
Shoulder and Striping Maintenance	$6,000
Equipment Maintenance	$6,500
Trailhead facility repair and maintenance	$5,000
Snow Removal	$2,000
Tree trimming	$2,000
Vegetation maintenance (sediment removal from rain gardens and stormwater management systems, prairie management including burns)	$2,500

** General estimates are based on a regional trail corridor that is 15 to 30 miles in length.*

Table 4.5 Capital Activities - 2020 Cost Estimates

FACILITY TYPE	ANNUAL O+M COST	CAPITAL COST	ESTIMATED LIFE
Asphalt Trail (8' wide or less)	$1,200 to $2,000 / Mile	$200,000 to $250,000 / Mile	25+ years
Asphalt Trail (10' wide)	$1,500 to $2,500 / Mile	$250,000 to $350,000 / Mile	25+ years
On-Street Bikeways (8' wide)	$1,500 to $2,500 / Mile	$500,000 to 700,000 / Mile	20 years
Sidewalks (6' wide concrete)	Minimal	$45 / LF	25 to 40 years
New Boardwalk (wood)	$15 - $20 / LF	$600 - $800 / LF	15 to 20 years
SIGNAGE TYPE	**ANNUAL O+M COST**	**CAPITAL COST**	**ESTIMATED LIFE**
Kiosk-Style Signs	Minimal	$5,000 - $25,000	20 years
Wayfinding Sign	Minimal	$1,000 - $1,500	20 years
CROSSING TYPE	**ANNUAL O+M COST**	**CAPITAL COST**	**ESTIMATED LIFE**
Pedestrian/Bicycle Tunnel	$2,000 - $5,000 / yr	$600,000 - $1,200,000	50 years
Pedestrian/Bicycle Overpass	$10,000 - $20,000 / yr	$1,200,000 - $2,500,000	50 years
HAWK (Pedestrian Hybrid Beacon Signal)	$4,000 - $6,000 / yr	$100,000 - $160,000	20 years
RRFB (Rectangular Rapid Flashing Beacons)	Minimal	$15,000 - $20,000	20 years
Signalized Intersection	$6,000 - $10,000 / yr	$200,000 - $350,000	20 years
Flashing Warning Sign	Minimal	$4,000 - $8,000	10 to 15 years
ADA Curb Ramp Retrofit	Minimal	$1,000 - $2,000 / Ramp	25 to 40 years
High Visibility Crosswalks	Minimal	$800 - $2,000	2 to 5 years
Median/Refuge Island (4' to 8' wide)	Minimal	$20,000 - $30,000 / 100 LF	25 to 40 years
Crossing Signs	Minimal	$300 - $1,200	10 to 15 years
AMENITY TYPE	**ANNUAL O+M COST**	**CAPITAL COST**	**ESTIMATED LIFE**
Bike Repair Station	$50 - $100	$500 - $1,500	5 years
Bench	Minimal	$750 - $2,000	10 years
Trash/Recycling Cans	Minimal	$500 - $1,500	10 years
Bike Parking Rack	Minimal	$500 - $1,000	20 years

Table 4.6 Off-Road Trail - Maintenance Schedule

ASPHALT TRAIL YEAR	MAINTENANCE ACTIVITY
0	Original construction of the paved trail
every 5 years	Routine maintenance: crack filling, minor patching, minor curb repairs
15 - 20	Overlay or Mill & Overlay
35	Reclaim and Pave

Table 4.7 On-Road Bike Facility - Maintenance Schedule

ASPHALT TRAIL YEAR	MAINTENANCE ACTIVITY
0	Original construction of the paved trail
every 5 years	Crack Seal
20	Overlay
35	Mill & Overlay
50	Total Reconstruction

** It is assumed maintenance activities will coincide with maintenance schedules used to maintain a typical roadway.*

CONSIDERATION FACTOR #9: DOES THE PROJECT HAVE ANY CHALLENGES TO OVERCOME?

Reaching a consensus on a pedestrian or bicycle project typically requires a quantitative and qualitative approach to evaluate various alternatives, alignments, or routes. This approach needs to consider technical data, public input, engineering design standards, and direction from county staff. To achieve this objective, the county can conduct sensitivity tests to determine a project's feasibility.

A sensitivity test will help determine a project's benefits or fatal flaws from a social, economic, and environmental perspective (SEE Scan). Typical screening criteria that is consistent with federal environmental documents include, but is not limited to the following:

- Impacts to adjacent property (e.g., full or partial acquisition)
- Benefits to surrounding businesses
- Benefits to the physical and natural environment (e.g., noise and air quality)
- Impacts to threatened and endangered species, wetlands, waterbodies, soils, and hazardous materials
- Community and Political Support
- Return on Investment (e.g., low-cost/high benefit vs. high cost/ marginal benefit)
- Project Readiness (right-of-acquisition, design, and permitting)
- Social Equity Measures (ability to connect to underserved populations)

Shifting a project's priority (see Tables 4.1 and 4.2) may be influenced by further analysis. Projects should be fully screened for their benefits and fatal flaws, if any, prior to implementation.

CONSIDERATION FACTOR CHECKLIST

The "Consideration Factors" help introduce larger policy decisions to consider when shifting a project (see Tables 4.1 and 4.2). The factors should be weighed and considered heavily when implementing the Future Network Plan. Using the factors will also help create greater transparency in the decision making process. In that respect, Table 4.8 can be used as a checklist to help determine if and when project should be adjusted.

Table 4.8 Consideration Factor Checklist

YES OR NO	CONSIDERATION FACTORS
	Factor #1: Does the project address pedestrian and bicycle safety needs?
	Factor #2: Does the project overcome a transportation barrier?
	Factor #3: Does the project have community support?
	Factor #4: Does the project contribute to the RBTN?
	Factor #5: Does the project embrace innovative design solutions?
	Factor #6: Does the project provide benefits from an equity perspective?
	Factor #7: Does the project align with funding opportunities?
	Factor #8: Does the project consider future operations and maintenance needs?
	Factor #9: Does the project have any challenges to overcome?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