CITY OF AMES

BICYCLE AND PEDESTRIAN PLAN

JUNE 2024

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CHAPTER 1

Introduction & Overview

Plan Purpose & Background

Ames has a long-standing commitment to the community to provide active transportation opportunities and corridors throughout the city and has established itself as a great place to walk, bike, and roll. The backbone of the active transportation system in Ames is a network of shared-use paths along streets and greenbelts that connect most of the city. Every day, Ames residents and visitors walk bike, and roll throughout the city to get to work and school, to run errands, for exercise, and just for fun.

Despite this, challenges for walking, biking, and rolling persist, particularly when crossing or traveling along busy streets. People experience high motor vehicle speeds, uncomfortable crossings, and drivers that fail to yield to people on foot or on bikes. Major roadways like US-30, Duff Avenue, and Grand Avenue act as barriers that separate residents from destinations throughout the city. This results in trips taking longer on foot since people have to go out of their way to cross safely. These delays or detours may be enough of a barrier in terms of time, distance, and energy to discourage someone from deciding to make a trip on-foot or by bike.

Walk Bike Roll Ames (WBRA) is an Active Transportation Plan (ATP) that builds on the community's existing path, sidewalk, and bikeway assets and offers recommendations to improve conditions for people walking, biking, and rolling. Through programs, policies, and infrastructure, Ames can encourage more residents to use active transportation. WBRA provides a vision and framework to make Ames more livable for all its residents and visitors. Strategic investments in active transportation will be critical to Ames becoming a safer, healthier, connected, and sustainable community.

Terms Used in this Plan

When WBRA says Active Transportation or Active Modes, it means walking, biking, and rolling.

When WBRA says Rolling, it means using a wheelchair or other mobility device.

When WBRA says Biking, it means using a bicycle, electric bicycle (e-bike), and all forms of Micromobility.

When WBRA says Micromobility, it means scooters and skateboards, electric and non-electric, that operate similarly to bicycles.

When WBRA says Facility, it means paths, bike lanes, sidewalks, crossings, and other spaces designated specifically for the movement of active transportation users.

When WBRA says Active Transportation Network, it means all on- and off-street pedestrian facilities, bicycle facilities, and facilities designated for Micromobility use, combined as a single network.

Plan Overview

Walk Bike Roll Ames contains five chapters, outlined below.

Chapter 1: Introduction & Overview

Chapter 1 defines and explains why active transportation—walking, biking, and rolling—is important and beneficial and outlines a vision statement and foundational goals. The chapter also describes the variety of people that walk, bike, and roll in Ames and establishes a commitment for the City of Ames to plan, design, build, and maintain infrastructure that serves people of all ages, abilities, and identities.

Chapter 2: Opportunities & Needs

Chapter 2 highlights the opportunities and needs for more walking, biking, and rolling in Ames. This includes evaluating travel trends (including impacts of the COVID-19 pandemic) and analyzing the existing sidewalk, path, and bikeway network. An overview of input received from the community is included and how that public input shaped the plan is described. The chapter concludes with a list of key issues identifying what needs to happen to get more people walking, biking, and rolling in Ames.

Chapter 3: Facility Selection & Guidelines

Chapter 3 provides high-level descriptions, considerations, and guidance for the physical infrastructure to create a safe and comfortable active transportation network, with a focus on designing for people of all ages, abilities, and identities. Design toolkits are included for paths and bikeways, crossings, and sidewalks.

Chapter 4: Network Plan & Priorities

Chapter 4 looks at each of the three network elements—bikeways and shared use paths, crossings, and sidewalks—and describes how projects were identified, where those projects are located, and how they are prioritized. The chapter also includes summaries of the scale of projects and potential costs.

Chapter 5: Implementation Strategies & Actions

Chapter 5 identifies key strategies to help move Ames toward the vision described in Chapter 1 and achieving the associated goals. For each of the eight core strategies, specific actions items are identified. In addition, this chapter identifies potential implementation horizons for the infrastructure projects identified in Chapter 4, associated with anticipated funding levels.

What is Active Transportation?

Active transportation includes any human-powered form of transportation, including walking, running, bicycling, skating, and using a wheelchair or other mobility device. Rather than list every possible form of active transportation, this plan refers to people walking, biking, and rolling, which is meant to be inclusive of other active travel. Everyone in Ames participates in active transportation at some point every day, whether biking to work or simply walking from where they parked their car to their final destination.

Why Invest in Active Transportation?

Ames has much to gain by investing in its active transportation network, policies, and programs, and increasing the number of people walking and biking in the city. An improved walking and biking environment has many benefits such as boosting the health, safety, quality of life, environment, economic vitality, and accessibility for residents, students, and visitors.

Health

Making it easy for people to walk and bike as part of their daily routine can help Ames residents be more active and achieve the recommended daily amounts of exercise.[1] Even moderate exercise can help reduce the risk of inactivity-related ailments such as hypertension, obesity, Type II diabetes, heart attack and stroke, and certain types of cancer.

Physical activity, including walking and biking, can help prevent or treat some mental health conditions. Physical activity reduces depression, can improve the quality of sleep, and has been shown to improve cognitive function for older adults.[2] Active transportation can also improve social conditions in communities, which contributes to positive mental well-being among residents. While there may be many reasons people feel socially isolated, land-use and transportation systems designed around the automobile can exacerbate these feelings.

Safety

Nationwide, pedestrian fatalities have continued to climb since the beginning of the COVID-19 pandemic: a 28 percent increase in pedestrian fatalities is reported from 2021 to 2022.[3] By increasing separation from motor vehicle traffic, active transportation infrastructure can decrease the number and severity of crashes, while boosting the number of people walking and biking. Greater numbers of walkers and bikers in turn improves safety even further in a "safety in numbers" situation as drivers learn to watch for and anticipate the needs of other street users.[4]

Quality of Life

Quality of life is influenced by physical and mental health, family and other relationships, education and employment, and built and natural environments. Decreasing dependency on automobiles can lead to improved air quality, less traffic noise, and shorter and more pleasant commutes. Bicycling and walking can also strengthen the sense of community by increasing opportunities for spontaneous interactions between residents.

1 U.S. Department of Health and Human Services, 2008, Retrieved from https://health.gov/paguidelines/2008/summary.aspx
2 U.S. Department of Health and Human Services (2018)
3 Governors Highway Safety Association. Pedestrian Traffic Fatalities by State: 2022 Preliminary Data. 2023. https://www.ghsa.org/sites/default/files/2023-02/GHSA%20Pedestrian%20Traffic%20Fatalities%20by%20State%2C%20January-June%202022%20Preliminary%20Data.pdf
4 Jacobsen, P.L. 2003, Safety in numbers: more walkers and bicyclists, safer walking and bicycling, Retrieved from https://injuryprevention.bmj.com/content/9/3/205

Environment

Increased walking and biking rates improve air quality by reducing emissions. These modes have the greatest capacity to replace shorter trips (over 40% of all trips nationwide are three miles or less in distance).[1] Substituting even a fraction of these short driving trips with walking and biking trips can reduce air pollution as well as carbon dioxide emissions. Preserving natural corridors for shared use paths can benefit air and water quality, mitigate floods, conserve wildlife habitat, and provide carbon sequestration and storage.

Economic Vitality

Making bicycling and walking appealing options for people of all ages can help to attract and retain a robust workforce. Encouraging residents and visitors to travel by foot or by bike can also support economic activity downtown and in neighborhood business districts. More private developers are recognizing the economic benefits of active transportation and are designing their projects to encourage bicycling and walking. A Seattle study found that replacing motor vehicle travel or parking lanes with bike lanes had either neutral or positive economic benefit.[2] Research also has found that people biking to businesses tend to spend more per capita than people arriving by car.[3]

Accessibility and Transportation Choice

Providing a high-quality active transportation network is important for Ames residents who do not have full access to a motor vehicle. This includes people who are under 16 years old, unlicensed adults, suspended drivers, and people who live in households with more drivers than motor vehicles. Whether due to mobility impairments, lack of car ownership, choice, or other reasons, not all Ames residents drive as their primary mode of transportation. For example, 7.9 percent of Ames households lack automobiles, compared to 5.6 percent of households in the state.[4] Furthermore, Ames residents who use mobility devices, such as wheelchairs, benefit greatly from well-designed sidewalks, crosswalks, and curb ramps that are safe, comfortable, and intuitive to use.

Attracting Visitors and Retaining Residents

There is broad consensus across the country that investing in infrastructure for walking, biking, and rolling produces a positive return on investment. This is especially true when it comes to shared use paths, which can serve as attractions for visitors. Path-based tourism can be an economic boost for many small communities, supporting local businesses, creating jobs, and increasing property values.[5]

1 Federal Highway Administration, 2009, National Household Travel Survey, Retrieved from https://nhts.ornl.gov/tables09/fatcat/2009/vt_TRPMILES.html
2 Rowe, K. Bikenomics: Measuring the Impact of Bicycle Facilities on Neighborhood Business Districts. 2013. University of Washington College of Built Environments. https://docs.google.com/file/d/0B0xHj6OM3QVWMUxScjZuMndxVkk/edit?resourcekey=0-c0zVrKvk5iqwUGfo4n3wzg
3 BBC Research and Consulting. Economic and Health Benefits of Bicycling in Northwest Arkansas. March 2018. Prepared for the Walton Foundation and PeopleForBikes. https://headwaterseconomics.org/wp-content/uploads/Trail_Study_136-AR-Bicycle-Benefits.pdf.
4 https://www.census.gov/acs/www/about/why-we-ask-each-question/vehicles/
5 Rails-to-Trails Conservancy. Investing in Trails Cost-Effective Improvements—for Everyone, date unknown. https://www.railstotrails.org/resourcehandler.ashx?name=investing-in-trails-cost-effective-improvements-for-everyone&id=3629&fileName=Economic%20Impacts%20of%20Trails.pdf

WBRA Vision and Goals

The vision and goals define what the community wants Ames to be like in the future and directly inform the recommendations in this plan.

Vision

Ames is a place where walking, biking, and rolling are safe, enjoyable, convenient, and available to everyone.

Goals

Plan recommendations—from identification of new infrastructure to prioritization and implementation strategies—are oriented around these goals:

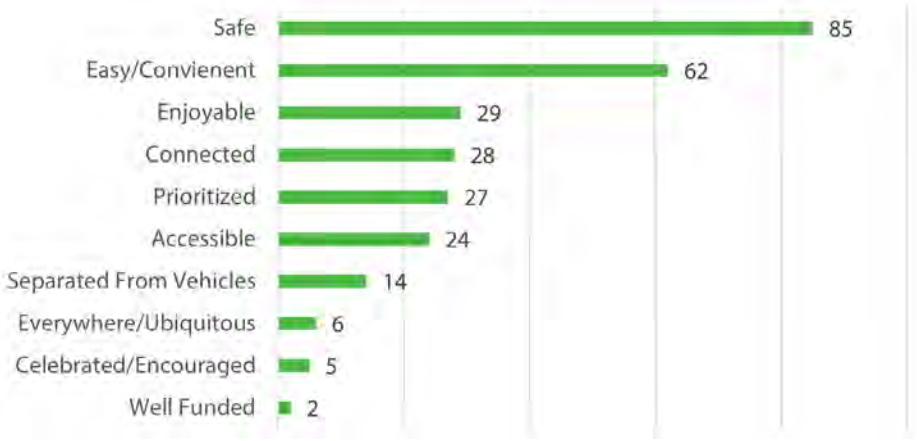
- **Safe and Comfortable.** Plan, design, and operate streets, sidewalks, bikeways, crossings, and paths to prioritize safety with the ultimate goal of eliminating fatalities.
- **Connected and Easy.** Create connections throughout Ames and to surrounding areas that are easy and intuitive to use, encouraging and enabling more people to walk, bike, and roll.
- **Healthy and Sustainable.** Get more people walking, biking, rolling, and using future zero-carbon forms of personal mobility to improve health and to provide easy alternatives to driving.
- **Equitable and Accessible.** Create places where everybody can walk, bike, or roll regardless of age, ability, identity, race, or economic status. Ensure that investments are made equitably and are complemented by programs that encourage and empower everyone to choose active transportation.

Public input that shaped the vision and goals

The WBRA vision and goals were developed based on feedback from residents, stakeholders, and user groups during public outreach events, the Community Advisory Committee, Technical Advisory Committee, and City Council.

"Walking, biking, and rolling in Ames should be…"

An online poll asked residents to complete the sentence above; 181 people responded. The two most prominent themes were **safe** and **easy/convenient**.



Planning Approach

WBRA provides a framework to make Ames more walkable, bikeable, and livable for residents and visitors of **all ages, abilities, and identities.** Walking, biking, and rolling are available to a wide array of people with significant differences in age, vision, hearing, physical strength, balance, reaction time, perception of risk, degree of independence, and personal safety. Enabling everyone to walk, bike, and roll—now and as people age—requires planning, designing, building, and maintaining an active transportation network that meets the needs of people across the spectrum of ages, abilities, and identities.

Taking this approach starts with understanding who walks, bikes, and rolls in Ames and setting forth a vision and goals to create an active transportation system that works for everyone in Ames.

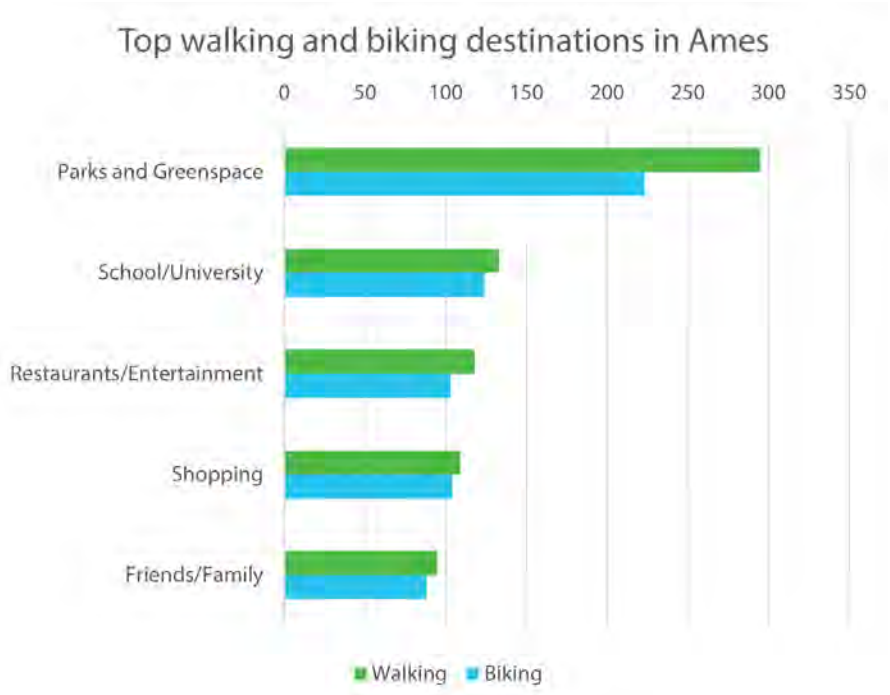
Diversity of Ages, Abilities, and Identities – Walking, Biking, and Rolling

Who Walks, Bikes, and Rolls in Ames?

People of all ages, abilities, and identities walk, bike and roll in Ames. Many people choose active transportation because of the physical and mental health, sustainability, and cost-saving benefits. Ames residents walk regularly; however, it's slightly less common for them to bike, and even less common to use a mobility device, skateboard, or scooter. This is likely because many residents are uncomfortable bicycling or walking around traffic.[1] Reasons for this may include cultural norms in Iowa and concerns about safety. People are more likely to walk or bike if there are high quality and comfortable facilities that take them directly where they need to go.

For those that do use active modes, the top three walking, bicycling, and rolling destinations were parks and greenspace, school/university, and restaurants or entertainment.[2]

That said, walking, rolling, and biking experiences can vary greatly depending on factors such as age, gender identity, race, ethnicity, skin tone, physical ability, trip purpose, and more. There are typically more options for recreational walking, biking, and rolling. Getting to work, school, or important destinations often require routes that are less comfortable, safe, or accessible. People walking, biking, or rolling for transportation purposes have to consider issues like being on time, where to safely lock their bike, and ability to carry things. An adult traveling alone has a different experience than one traveling with children. Children have shorter attention spans and less awareness of their surroundings, meaning the adults accompanying them may choose not to take certain routes, or not to walk or bike at all if there are not safe options to do so. And finally, many people are dependent on active transportation due to age, income, disability, and other factors.



1 These assertions are drawn from the findings of two online surveys conducted for WBRA (described in the Planning Process & Overview section).
2 According to a survey performed during the development of this plan.

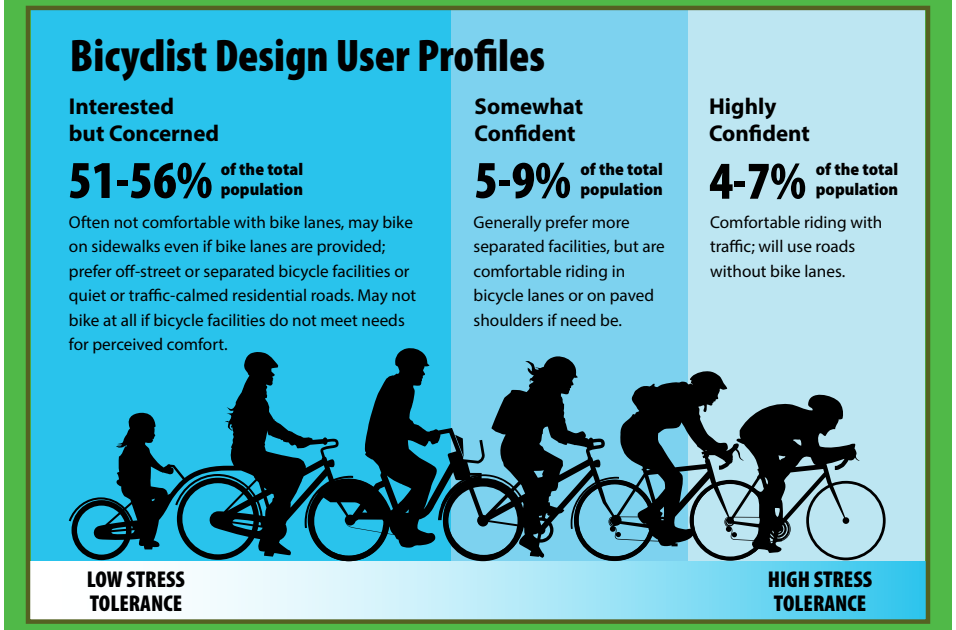
Active Transportation User Profiles

The descriptions of different user profiles below explore how experiences differ for people who walk, bike, and roll in Ames. These categories are not mutually-exclusive—many people in Ames can identify with multiple profiles. WBRA was designed to meet the diverse needs of these users, thereby serving a broad cross section of the population.

- **ISU Students –** This is the largest single user group in Ames, in terms of current walking and biking activity. ISU students have a wide variety of levels of comfort around traffic. Because of parking limitations, they are less likely to have a car.
- **People with Lower Incomes –** This group is more likely to walk, bike, and roll due to lack of access to a car. People in this group may feel less comfortable walking, biking, and rolling around traffic. This group should be able to walk, bike, or roll throughout their community with dignity and comfort.
- **Central Neighborhood Residents –** These residents are more likely to walk, bike, and roll because of their proximity to destinations. They are also more likely to take short trips (less than one mile). Providing safe places to walk, bike, and roll within and between these neighborhoods is a way to convert some driving trips to active modes.
- **Children and Families –** This group ranges widely in how often they walk and bike in Ames today. There are many factors that will influence levels of walking and biking in this group such as distance from home to school, or access from home to shared use paths and other separated facilities for walking and bicycling. Reducing interactions with motor vehicles is the only way this group will feel comfortable walking or bicycling.
- **Older Adults and People with Disabilities –** While some in this group walk, bike or roll daily, this user group is overall less likely to use active modes and likely to feel uncomfortable on existing facilities in Ames. This may be due to distances, lack of accessibility, and concerns about traffic. This population is less likely to drive, so increasing walking, biking, and rolling within this group allows for more mobility and independence later in life.
- **Active Adults (often with higher incomes) –** This population is likely to be more confident in bicycling and walking in their communities. This could be because they have access to higher quality facilities, or simply more free time to walk more or learn how to ride a bicycle in the city.

Confidence While Biking

Researchers and practitioners have categorized people based on their confidence interacting with motor vehicle traffic while biking. While the percentage varies by community, a national survey found that about 5 out of every 10 adults in major urban areas, labeled as Interested but Concerned riders, would like to ride a bicycle but do not currently do so, usually due to concerns about traffic safety.[1] This segment of the population—people that want to bike but aren't currently doing so very often—represents a major opportunity to increase the number of trips taken by bicycle. Planning, designing, and constructing bikeways that are safe and comfortable for the Interested but Concerned bicyclist can encourage more people in Ames to bike.



1 Dill, J, and Nathan McNeil, 2016, Revisiting the Four Types of Cyclists: Findings from a National Survey, Transportation Research Record: Journal of the Transportation Research Board, 2587, Retrieved from https://journals.sagepub.com/doi/10.3141/2587-11

Planning and Policy Context

Existing plans and policies provide a foundation for WBRA and guided the development of this Plan. Key documents include ***Ames Plan 2040*** (the City's comprehensive plan adopted in 2021), ***Forward 2045*** (the regional transportation plan adopted in 2020), ***Complete Streets Plan*** (2018), ***Lincoln Corridor Plan*** (2018), and the ***Lincoln Way Pedestrian Safety Study*** (2018), as well as ongoing bicycle and pedestrian planning efforts by Iowa State University. These documents were reviewed to identify key themes related to active transportation.

Key Themes of Existing Plans and Policies

The following key themes were identified from the plan and policy review. These themes directly shaped the WBRA vision and goals, and the recommendations contained in this Plan.

» **Multimodal Vision –** Mentions of providing a multimodal transportation network is often present in the vision, or in the goals of the previous plans. The aim to make Ames' transportation network accessible and well connected for those walking, biking, or rolling has been reaffirmed in plan after plan.

» **Safety and Comfort of All Users –** From corridor plans to citywide and regional plans improving transportation safety is always at the top of any goals or actions. Many of the plans reference crash history for bicyclists and pedestrian involved crashes. The Forward 2045 plan also includes a facility toolkit that moves Ames to implement more comfortable facilities for users of all ages and abilities.

» **Expanding Transportation Choice –** Expanding choices and encouraging mode shift to get more people walking and biking and less people driving in Ames is a stated initiative in many plans. All relevant plans reviewed aim to increase the feasibility, safety, and comfort for people to walk, bike, or roll.

» **Identifying Priorities for Investment –** Plans typically include some sort of prioritization if specific facilities are being recommended. Along with the prioritization, possible partnerships and funding sources are also identified.

» **Design with Best Practices –** Multiple plans include facility toolkits or recommend specific facility types and how to design them in a way that is accessible for the interested but concerned bicyclist population.

» **Crossing/Intersection Safety –** For many active transportation users, a linear facility such as a sidewalk or bike lane is only as safe and comfortable as the intersections along the route. All of the most recent plans include best practice for implementing high visibility and/or protected intersections for pedestrians and bicyclists.

» **Connectivity –** Connecting the city of Ames across its districts such as the Iowa State University campus is a high priority in many transportation planning efforts the City has conducted. Ensuring that the facilities implemented are connected to each other and important destinations is essential for a successful active transportation network.

Planning Process & Overview

Timeline & Public Engagement Elements

This planning effort spanned from Summer 2022 to Spring 2024. Figure 1 illustrates the project timeline and major milestones. As a part of this plan, multiple engagement opportunities were held between stakeholders, city staff, and the public. The engagement strategies for WBRA emphasized the following:

- Sensitivity to concerns about coronavirus (COVID-19) transmission.
- Interagency coordination and cooperation.
- Guidance and direction from two stakeholder committees.
- Attracting a broad and diverse audience, reaching beyond active bicyclists, to engage people of all ages, abilities, genders, races/ethnicities, and incomes.
- Using City communication methods to promote the project, direct people to online resources, and announce project meetings and commenting opportunities.

There were three unique audiences that were engaged as part of the outreach efforts. 1) The **general public**, including residents of Ames, any bicycle or pedestrian interest groups, the Iowa State community (students and staff), schools and students, and others. 2) The **Technical Advisory Committee**, a group of city staff that advised the project tram as the project progressed. And 3) The **Community Advisory Committee**, a group of Ames residents that provided structured feedback to the project team, outside of outreach activities and efforts designed for the general public.

Virtual and online engagement was conducted with the general public. This included a project website, kick-off email, poll and survey, and social media posts. There were 181 respondents to one of the Walk Bike Roll Ames online polls. This poll was open from October 2022 to April 2023.

There was also an online survey open from November to December of 2022 which received 393 responses.

In-person engagement events were also held for the general public. The project team held a booth at the Iowa State's Sustainability Fair, where around 40 people stopped at the booth to talk to the project team about what walking and biking in Ames should be like, and what they don't like about walking and biking in Ames today. An opportunity to hear from students was held at the ISU campus. From that event the project team heard why students like to walk or bike around Ames, what they don't like about biking and walking in Ames, and what biking and walking in Ames should be like.

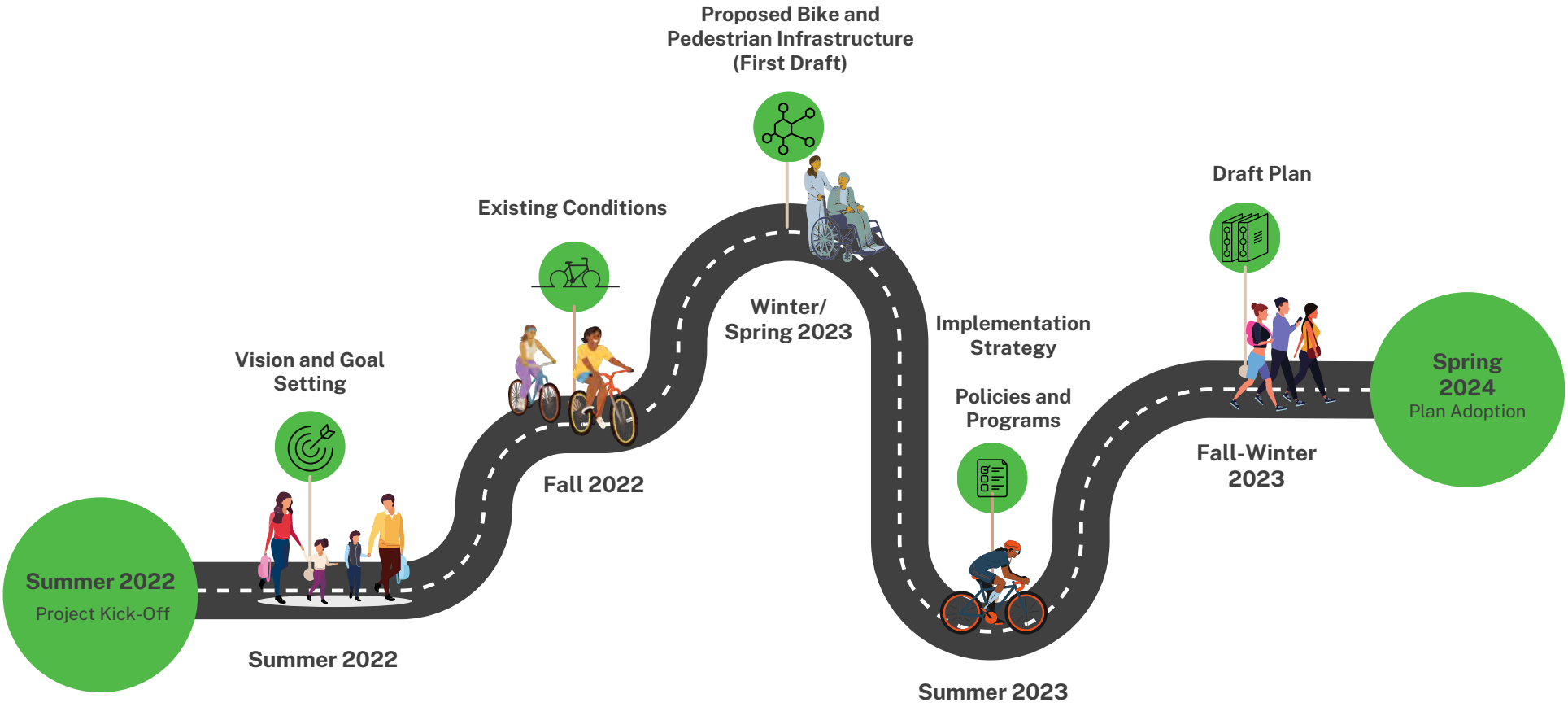


Figure 1 | Overview of the Walk Bike Roll Ames Project Timeline

CHAPTER 2

Opportunities & Needs

Highlighting the Opportunity

Ames is a relatively compact community with many destinations within two or three miles—a 10-to-15-minute bike ride—of most parts of the city. Iowa State University, with its nearly 30,000 students (plus faculty and staff), generates a significant number of trips. While many of these trips are by car and transit, the ISU campus generates a substantial amount of walking, biking, and rolling trips.

Demographic data and various Big Data sources—including StreetLight, Replica, and Strava—were analyzed to identify and illustrate the potential for more active transportation. There is significant opportunity to increase the amount of walking, biking, and rolling in Ames by providing enhanced facilities that accommodate and enhance existing active transportation trips, while also encouraging more people to walk, bike, or roll instead of drive.

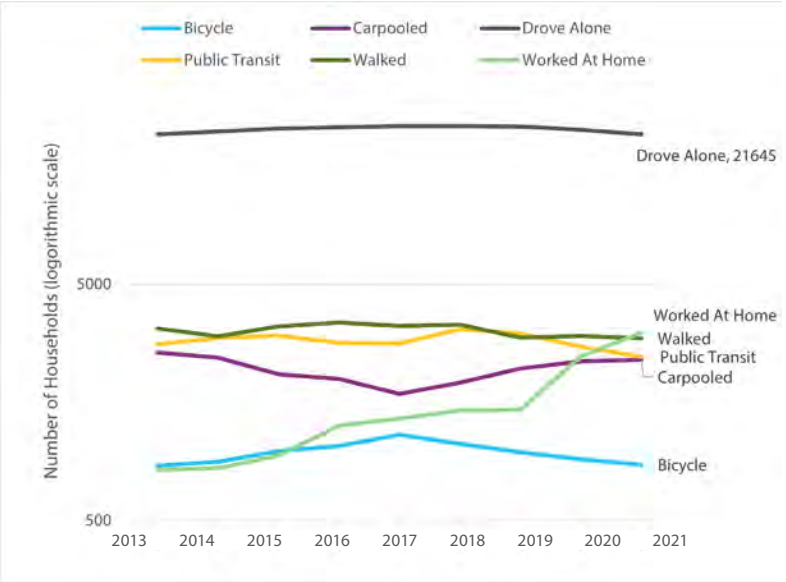


Figure 2 | **Journey to Work by Mode over Time. Source: American Community Survey**

Travel in Ames: Statistics and Trends

According to the American Community Survey (ACS; 2021 5-Year Estimate) journey to work data, about 71% people in Ames drive to work (alone or carpool), 7.4% take transit to work, 2.6% bike to work, and 8.8% walk to work. Looking at historic data, the percentages of those driving and walking to work has not seen much variation over the past several years. However, biking to work peaked at 3.4% in 2017 and has gradually declined since. The share of people working from home has increased significantly as a result of the COVID-19 pandemic (to 9.3% see Figure 2).The remaining 1% of the population ride a motorcycle to work or reported "other" as their mode to work.

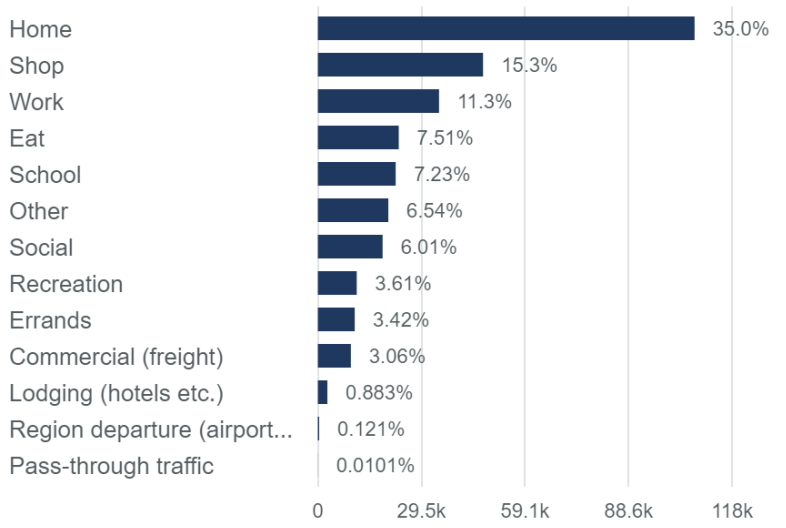


Figure 3 | **Trip Purpose in Ames. Source: Replica.**

While the ACS journey to work data is informative, most trips people take every day are not trips to work (11.3% of all trips). In fact, according to Replica more often trips end at home (35% of all trips) and shopping destinations (15.3%) (see Figure 3). Considering the mode used for these non-work trips, the general pattern is the same as journey to work, with most trips by car. However, Replica shows that 14.1% of all trips (work and non-work) are by walking and 2.2% are by bike.

So where are walking and biking trips happening today? Analyzing StreetLight data shows that more than 60% of the pedestrian trips and more than 50% of the bike trips in Ames originate on Iowa State University's main campus. Of those trips originating on campus, the majority (approximately 85% of walking trips and 70% of biking trips) are entirely within campus, or they are trips to and from the South Duff retail corridor, where Walmart, Target, and other large retail destinations are located (see Figure 4).

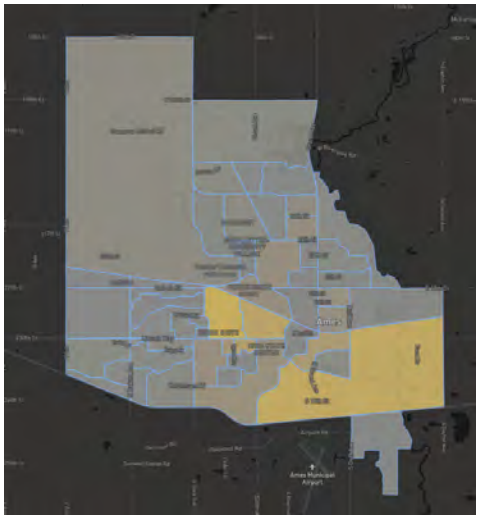


Figure 4 | **Primary starting Census Block Groups of Pedestrian Trips (Patterns for Biking trips are Essentially Identical).**
Source: StreetLight.

Effects of COVID-19

The COVID-19 pandemic affected travel patterns in Ames in several ways. The proportion of people that work from home increased significantly (4.3% in 2019 and 9.3% in 2021) and proportion that take the bus to work decreased (9.1% in 2019 down to 7.4% in 2021). This reflects an overall decline in transit use caused by the pandemic. Prior to 2020, CyRide served approximately 35,000-40,000 passengers daily. In FY2022 the system served about 20,000 passengers daily and is still recovering from the pandemic's impact on decreased ridership.

While the pandemic initially reduced the overall amount of weekday travel in Ames by all modes, Replica data shows that by 2023 the number of trips taken in Ames had risen and surpassed pre-pandemic rates, even though many people continue to work from home or have hybrid work schedules.

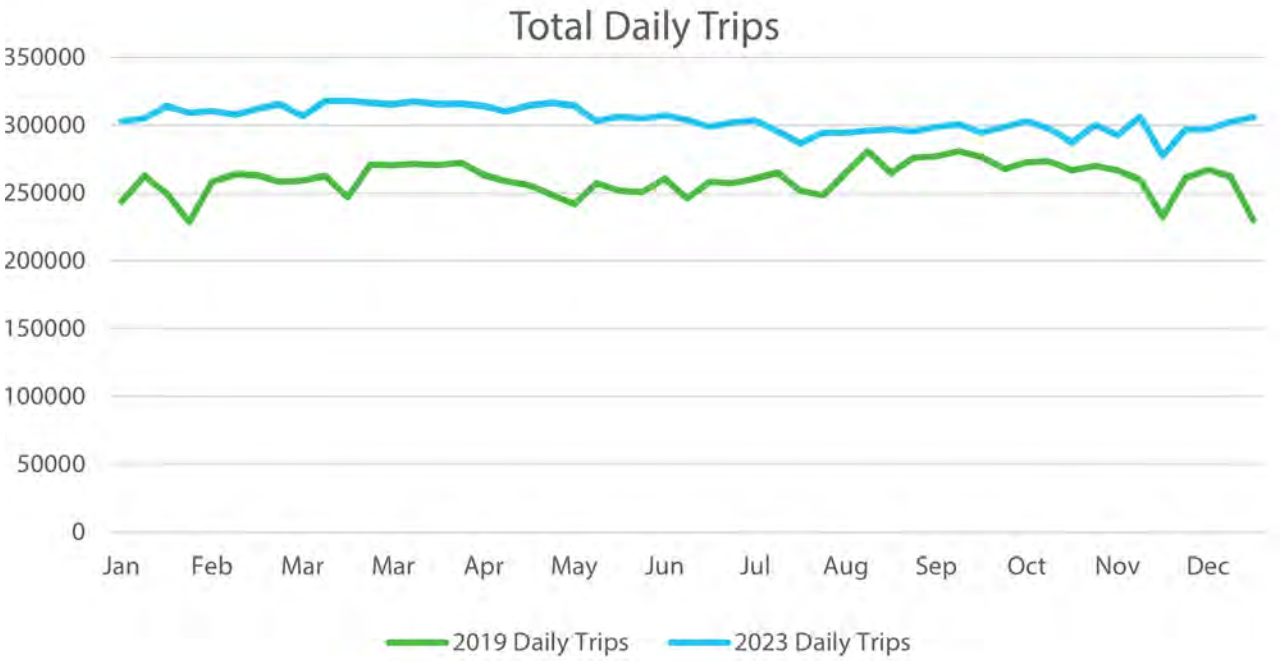


Figure 5 | **Total Daily Trips in Ames in 2019 Versus 2023.**

Converting Short Trips to Active Modes

Replica data was analyzed for a typical Thursday in Spring 2023. Replica estimates there were 218,000 total trips (all modes) that originated in Ames taken by 55,500 people that live in Ames. Approximately 25% of those trips (54,500 trips) were less than a mile. More than 78% of trips were less than 4 miles. In other words, the vast majority of trips were less than four miles long. This indicates a significant opportunity to increase biking and walking and decrease driving by providing people opportunities to walk and bike for shorter trips, especially those under a mile.

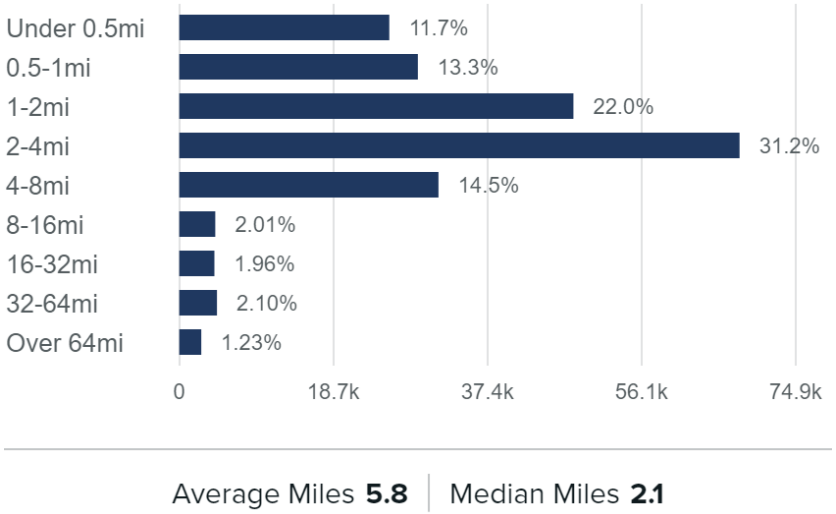


Figure 6 | **Distribution of Trips by All Modes by Length in Miles (Fall 2021)**

Short Trips

When looking only at trips that are less than a mile in length, a little less than half are taken by foot (and 1,600 by bike), but nearly 22,000 trips under 1 mile in Ames are taken by car. When excluding very short trips (under 0.25 miles), an even greater proportion of trips are made by driving than by walking in Ames. See Figure 7.

These short trips of less than one mile were mapped to the street and shared-use path network to understand the routes people take when they make short trips and where key opportunities may lie (see Figure 8). Short trips are concentrated around ISU, Campustown, downtown, South Duff, Somerset, and North Grand Mall. This indicates the areas in Ames with the greatest opportunity to capture more walking and biking trips.

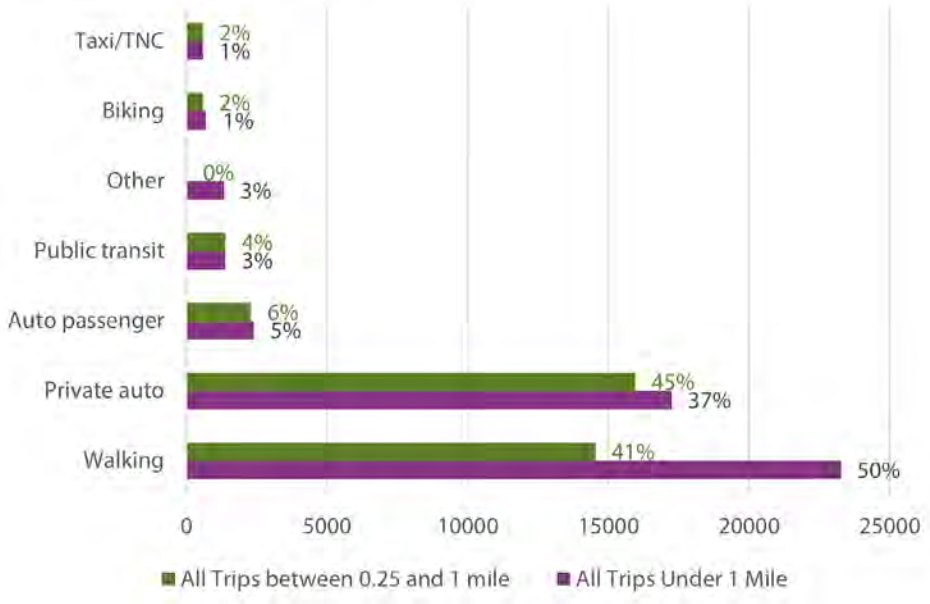
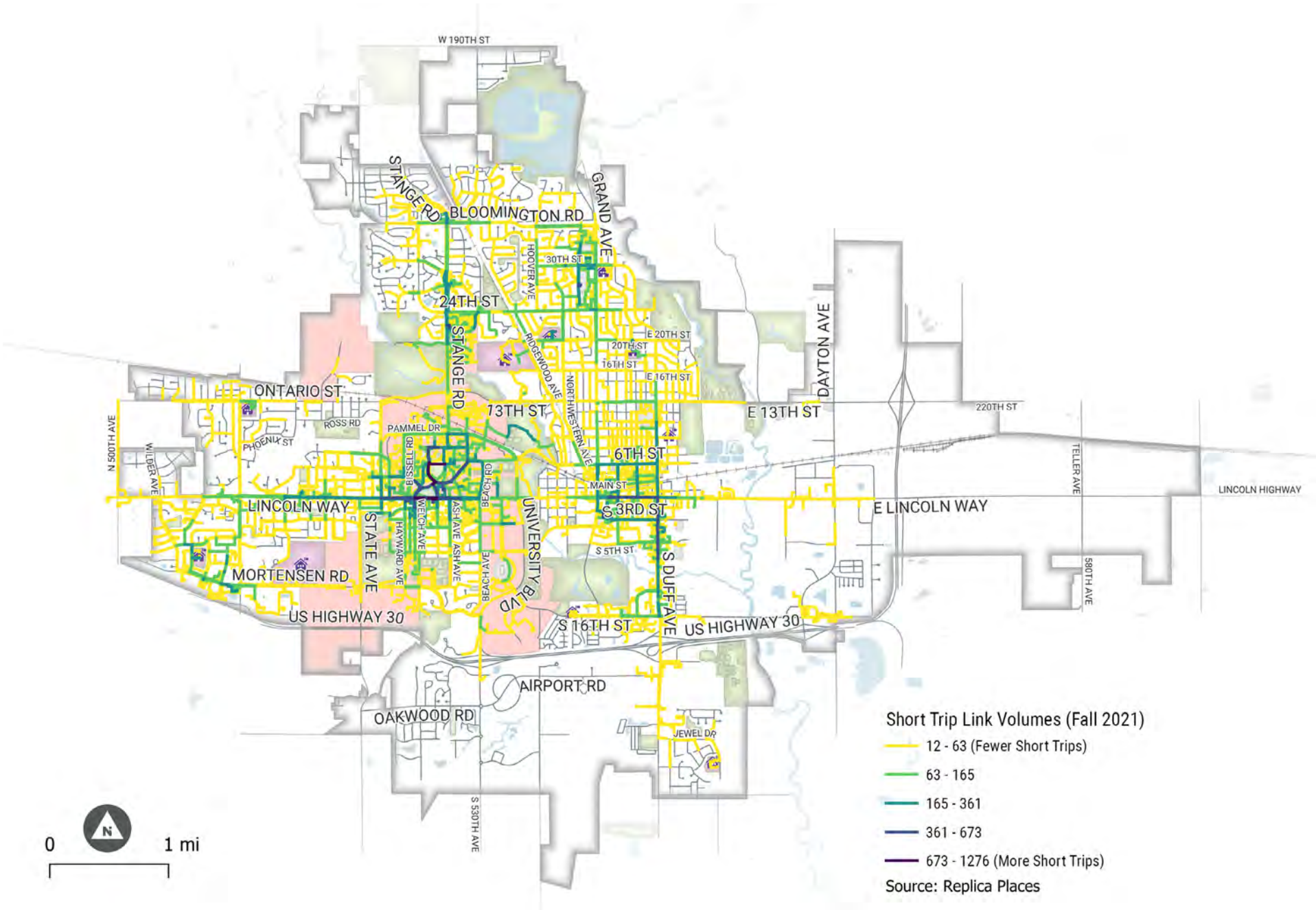


Figure 7 | **Mode of Trips under 1 Mile (Spring 2023) (Left); Mode of Trips between 0.25 Miles and 1 Mile (Spring 2023) (Right)**

Figure 8 | **Network Distribution of Trips under 1 Mile (all modes, Fall 2021)**



Analyzing the Network

Existing Walk, Bike, and Roll Facilities

The City of Ames has built an extensive network of shared-use paths, sidewalks, and on-street bikeways over the years. WBRA builds upon the existing network by recommending new connections and identifying valuable improvements to existing facilities, all with an eye toward building a more accessible and better-connected network.

Existing Paths & Bikeways

Figure 9 displays the many bicycle and shared use path facilities existing in Ames. The city is well connected overall, in large part due to the presence of shared use paths along major streets (paths along roadways are also referred to as “sidepaths”). However, several significant gaps exist, requiring circuitous routes to reach several major destinations. Furthermore, as described later, several existing shared use paths have poor pavement conditions and are narrow.

Existing Sidewalks

Ames currently has extensive sidewalk coverage in most of the residential areas of the city. Figure 10 illustrates the location of sidewalks within Ames by identifying whether each street has sidewalk on both sides, one side, or no sides (sidewalks are missing). The majority of gaps are present along streets in more rural areas in the east and south. However, there are several key sidewalk gaps located more centrally near key destinations.

Figure 9 | **Existing Paths and Bikeways**

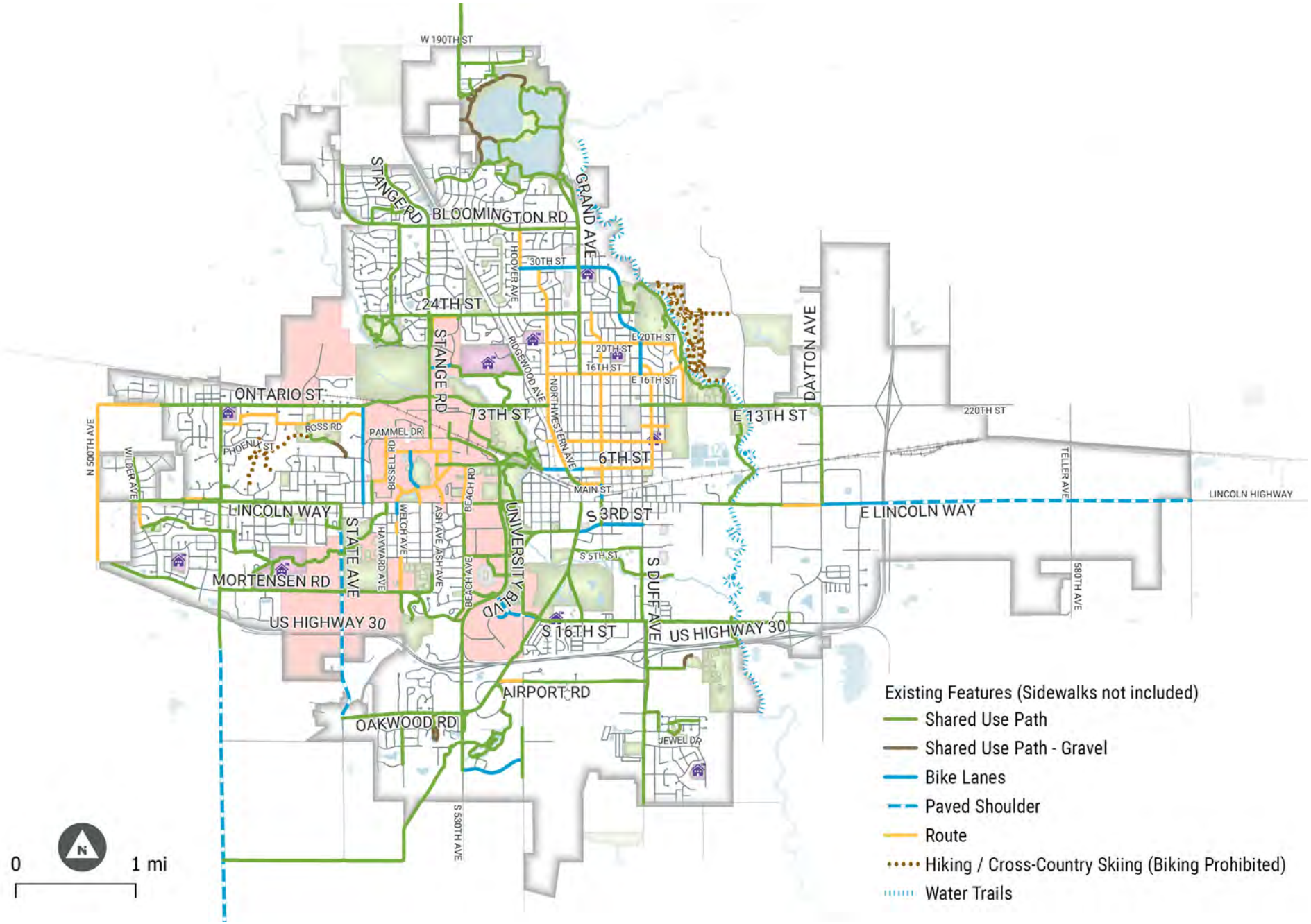
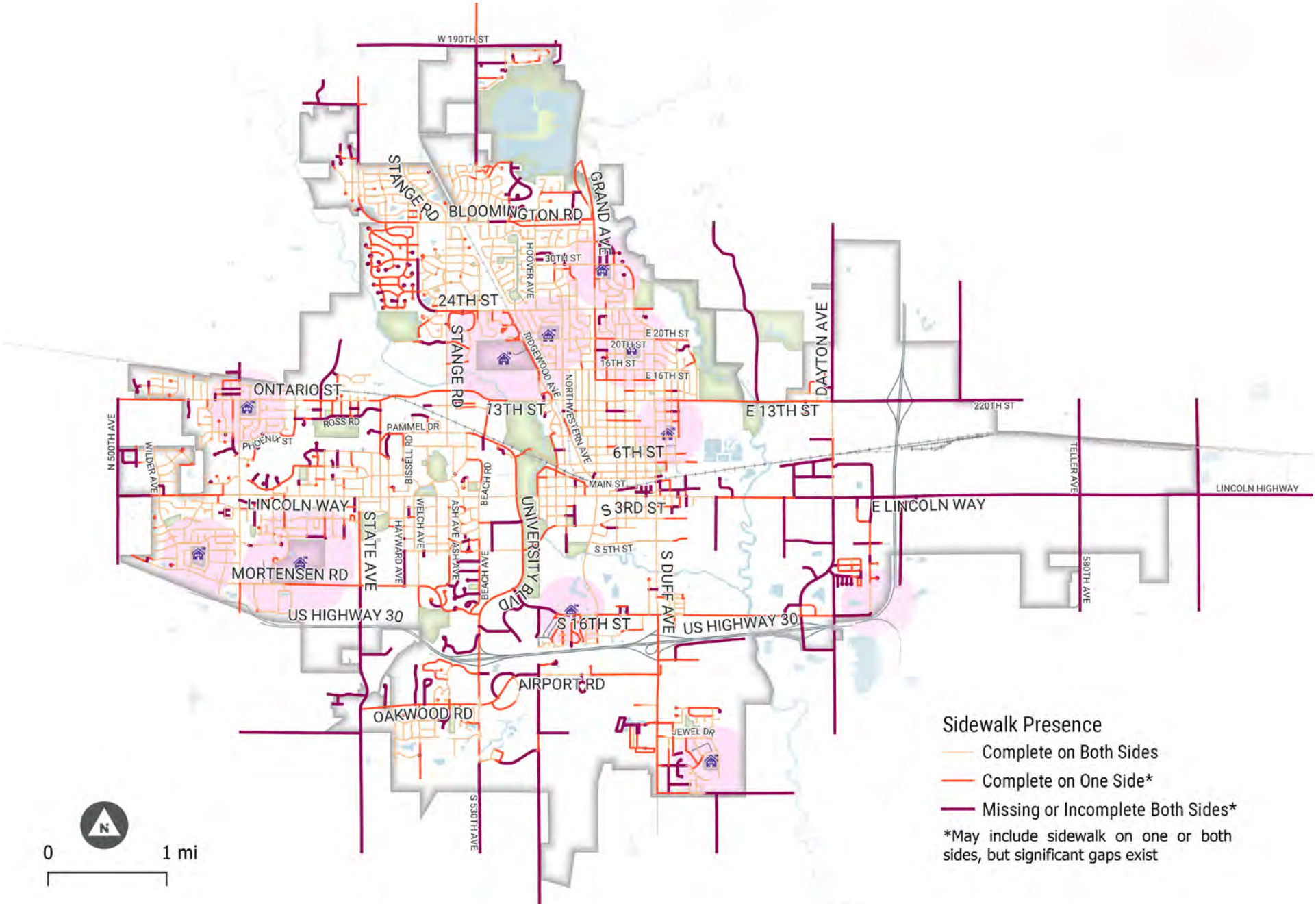


Figure 10 | **Existing Sidewalk Presence and Gaps**



Safety Analysis

Making streets safer for people walking and bicycling is a key goal of WBRA. Evaluating crash patterns helps identify locations where additional sidewalk, crossing, path, or bikeway infrastructure may have the greatest likelihood of improving safety for active transportation users. Bicycle and pedestrian crash data from 2013 to 2022 was downloaded from the Iowa Department of Transportation's Iowa Crash Analysis Tool (ICAT) and reviewed. Only records of crashes that were reported to the police are available and may not include all crashes, especially minor crashes.

Trends

From 2013 to 2022 there were approximately 9,800 crashes of all types in Ames. Of those, 137 reported crashes involved people walking (1.4% of all crashes), and 170 reported crashes involved people biking (1.7% of all crashes) reported in Ames. As shown in Figure 11, crashes have generally declined over the past decade, but with a recent uptick in bicycle crashes.

Severity

Figure 12 displays a breakdown of crash severity for people walking and biking. Most reported crashes involving people walking resulted in injuries. **There were 7 total crash fatalities during the 10-year period and 3 of those were pedestrians (43% of fatal crashes).** Most bicycling-related crashes also led to injuries but comparatively fewer led to serious injuries and no fatalities were reported during the 10-year period.

Figure 11 | **Pedestrian and Bicyclist Crashes by Year**

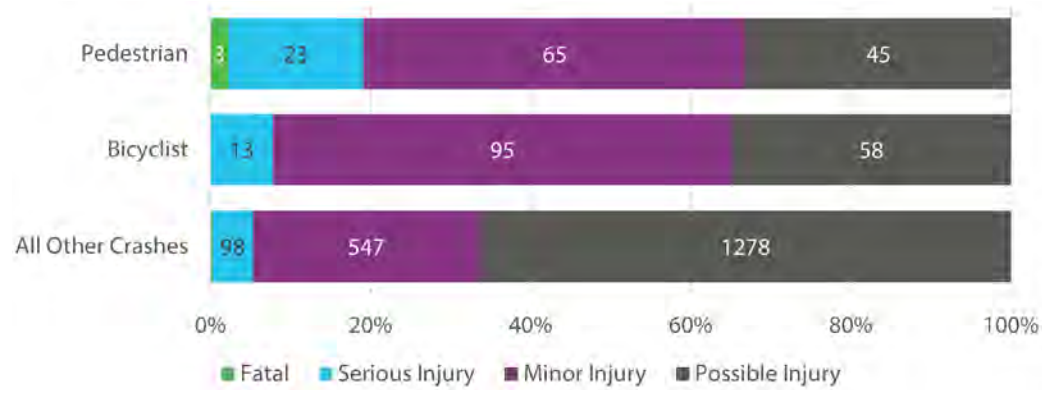


Figure 12 | **Pedestrian and Bicyclist Crashes Severity**

Location

Rather than simply map crash locations, the planning team performed a Crash Density Analysis using a subset of crash data (years 2017 through 2021) to reflect recent conditions. This approach offers several advantages in highlighting corridors with greater crash impacts. The Crash Density Analysis utilizes a "sliding window" approach, which identifies segments with the highest crash density, weighted by crash severity. A 0.5 mile length of roadway section (the "window" segment) is moved along the roadway alignment in increments of smaller steps (0.1 mi). Crashes occurring within 50 feet of these window segments are then counted and summarized by mode and severity.

Figure 14 shows the results of the analysis. Segments with higher crash densities (represented by darker lines) represent portions of the roadway network that have a higher concentration of overall crashes and a higher proportion of fatal/severe crashes. The results show that the corridors with the highest crash densities for people walking and biking are concentrated near the ISU campus / Campustown and downtown Ames, particularly along Lincoln Way, Grand Avenue, and Duff Avenue.

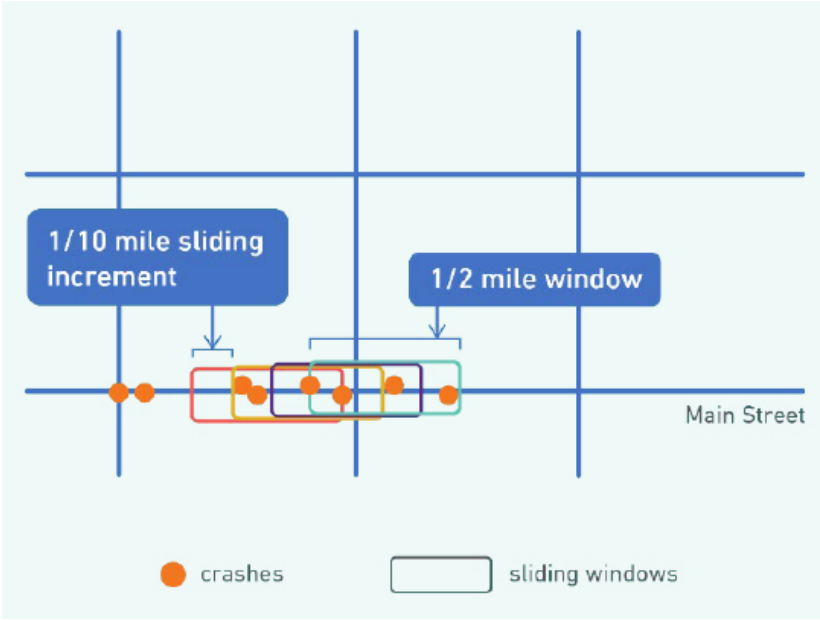
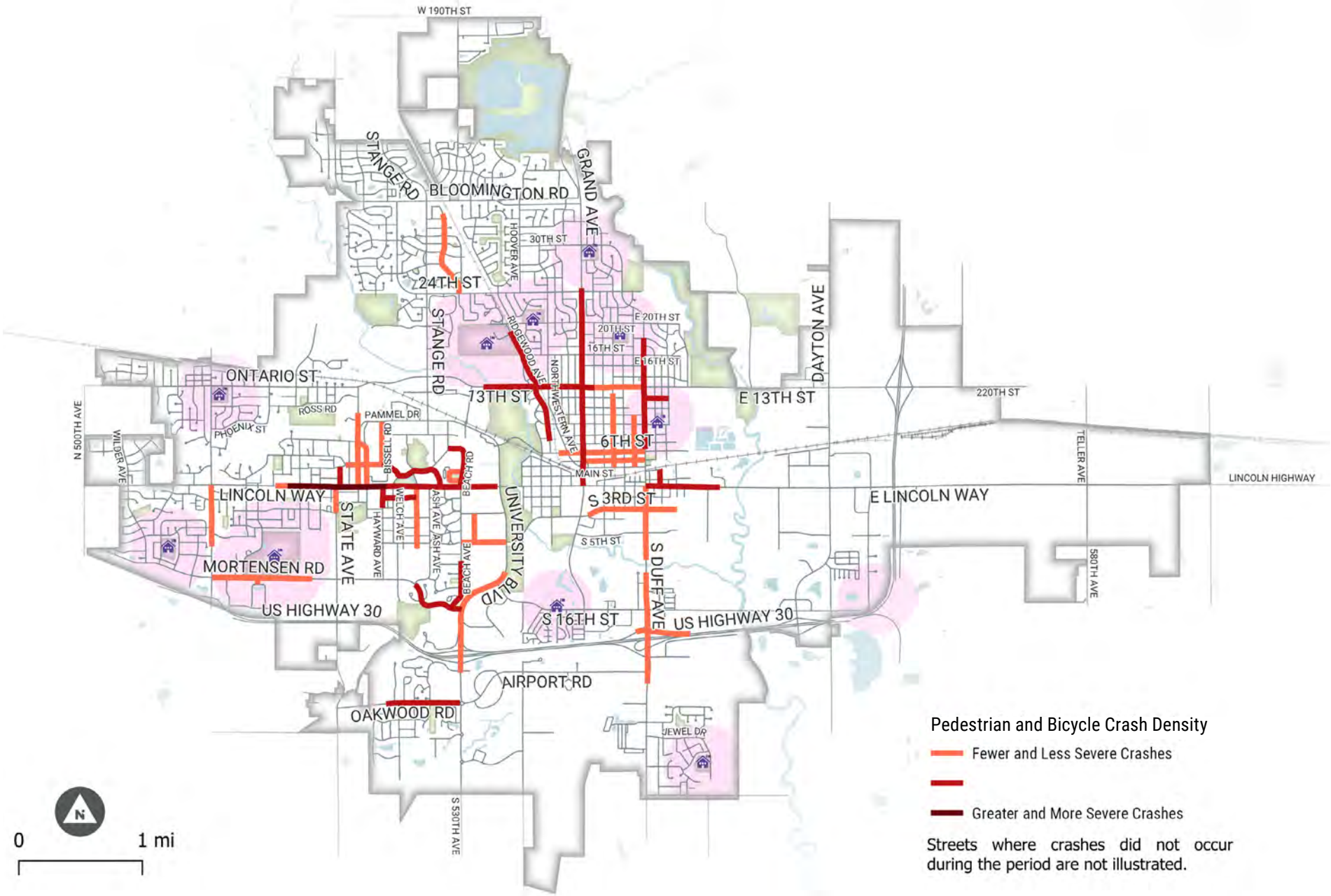


Figure 13 | **Illustration of the 1/2 Mile "Sliding Window" Analysis to Identify Segments with the Highest Crash Density**

Figure 14 | **Roadway Segments with High Density of Crashes Involving Pedestrians and Bicyclists.**



Level of Traffic Stress Analyses

Comfort is a key factor in whether individuals choose to walk or ride a bike, whether it's for commuting, everyday needs, recreation, or multimodal transportation connections. Comfort is measured as the level of stress a person experiences when walking or biking. Creating good low-stress connectivity increases the likelihood that people will walk or ride a bicycle. Several factors—such as the number of motor vehicle travel lanes, traffic volumes and speeds, and walking and biking infrastructure—can help discern the expected comfort at intersections and along streets. Using these data, the comfort level of streets and crossings for all of Ames were analyzed and stress ratings of one through four were assigned. The detailed methodologies for the Pedestrian Crossing Level of Traffic Stress (PLTS) and Bicycle Level of Traffic Stress (BLTS) analyses are explained in the ***Walk Bike Roll Ames State of Active Transportation Report***, available separately on the City of Ames' website.

Pedestrian Crossing Level of Traffic Stress

Ames's roadway network consists of collector and arterial roadways that have relatively high vehicle volumes and high posted speed limits that contribute to stressful pedestrian crossing experiences. The collector and arterial roadways provide direct north-south and east-west connectivity for motor vehicle travel through the city but act as both real and perceived barriers to connectivity for many people who are uncomfortable crossing these high-stress streets on foot. Figure 15 displays low-stress crossings as green (PLTS 1) or blue (PLTS 2) dots, high-stress crossings as orange (PLTS 3) or red (PLTS 4) dots. Figure 16 shows how streets currently act as barriers to walking, by showing only high-stress crossings (PLTS 3 and 4) and identifying segments of street where the distance to the nearest low-stress crossing exceeds 1/8 mile.

Both maps clearly show a similar pattern of high-stress pedestrian crossing along major streets. This is most notable along Lincoln Way, Duff Avenue, Stange Road, Oakwood Road/Airport Road, East 13th Street, Ontario Street, and North and South Dakota Avenues. These corridors are generally wide and have both high vehicle speeds and volumes. Many of these high-stress crossings along major streets are at CyRide stops. It is also important to note that limited access roadways such as US-30 are clear barriers to active transportation use in the City.

In addition, the analysis shows the roadway network to have long distances between low-stress crossings on multiple corridors. To put it in perspective, to use a low-stress crossing more than 1/8 of a mile away to get to a destination directly across the street would require a person to walk 1/4 mile, or roughly 5 minutes out of their way. These delays or detours may be enough of a barrier in terms of time, distance, and energy to discourage someone from deciding to make a trip on-foot or may lead to pedestrians crossing at potentially risky locations.

Measuring Traffic Stress

Stress Rating	Stress Level	Simplified Stress Level
1	Lowest	Low Stress
2	Medium-Low	
3	Medium-High	High Stress
4	Highest	

Figure 15 | **Results of PLTS Analysis**

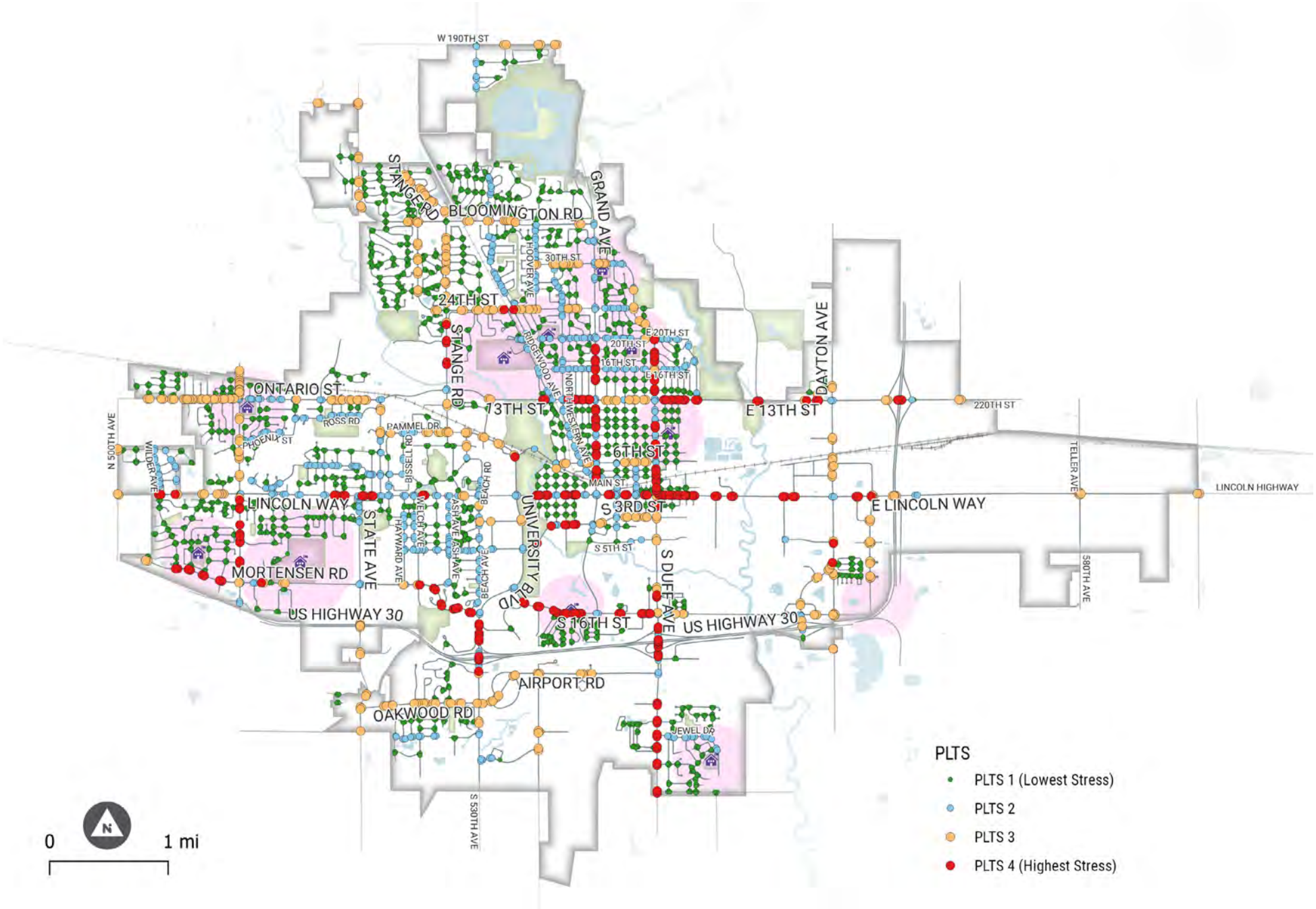
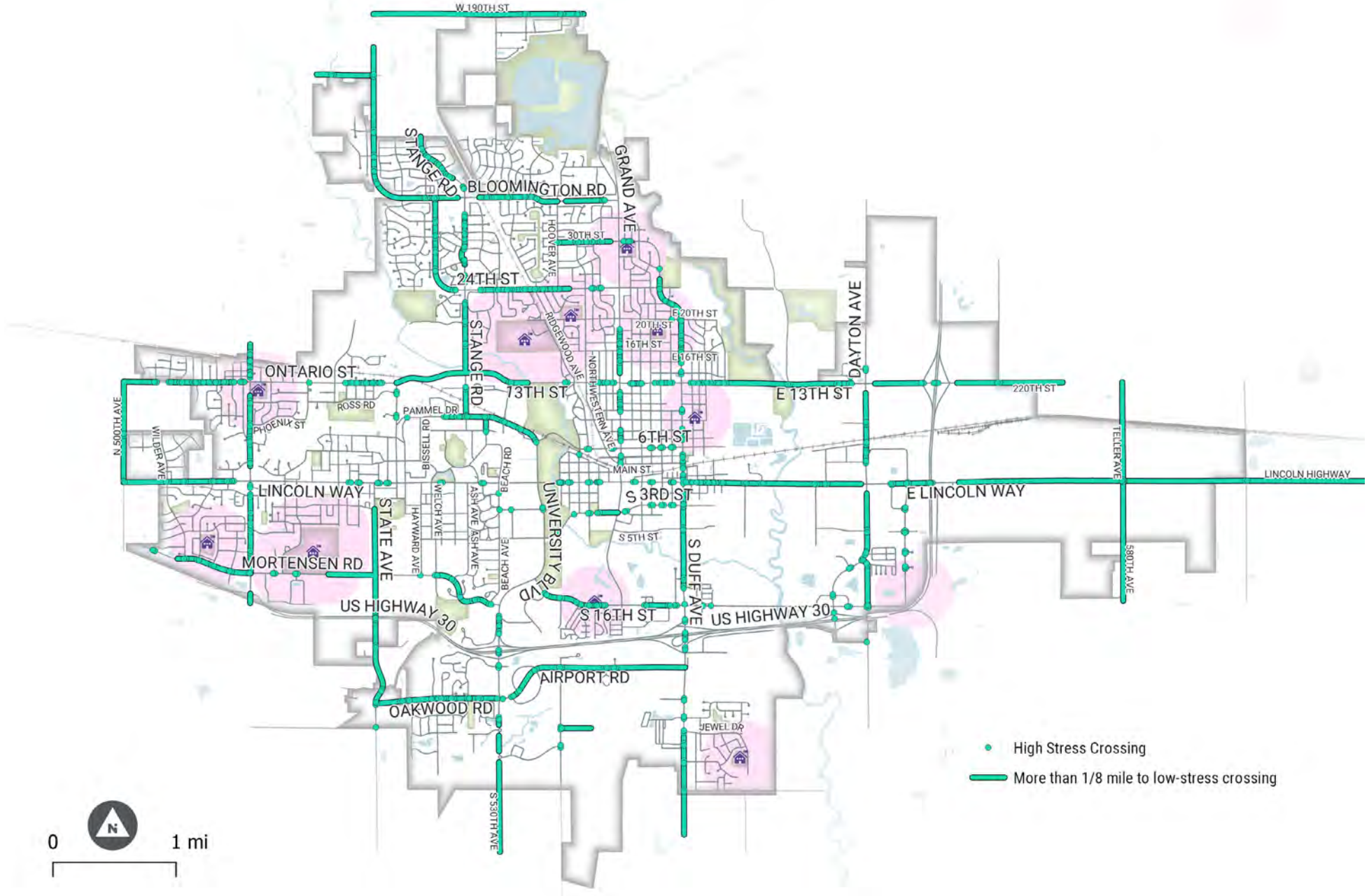


Figure 16 | **High-Stress Crossings and Excessive Distance to Nearest Low-Stress Crossing as Determined by PLTS Analysis Results**



Bicycle Level of Traffic Stress

Bicycle Level of Traffic Stress (BLTS) depends on traffic conditions as well as the configuration and type of bicycle accommodation. Generalized examples of what various levels of traffic stress look like for biking are shown in Figure 17. Only paths (including trails, shared-use paths, and sidepaths, which are shared use paths along streets) are considered BLTS 1. Sidepaths can be low stress; however, if they are very narrow and immediately adjacent to the curb and roadway (as are many of the older sidepaths in Ames), they receive higher stress ratings.

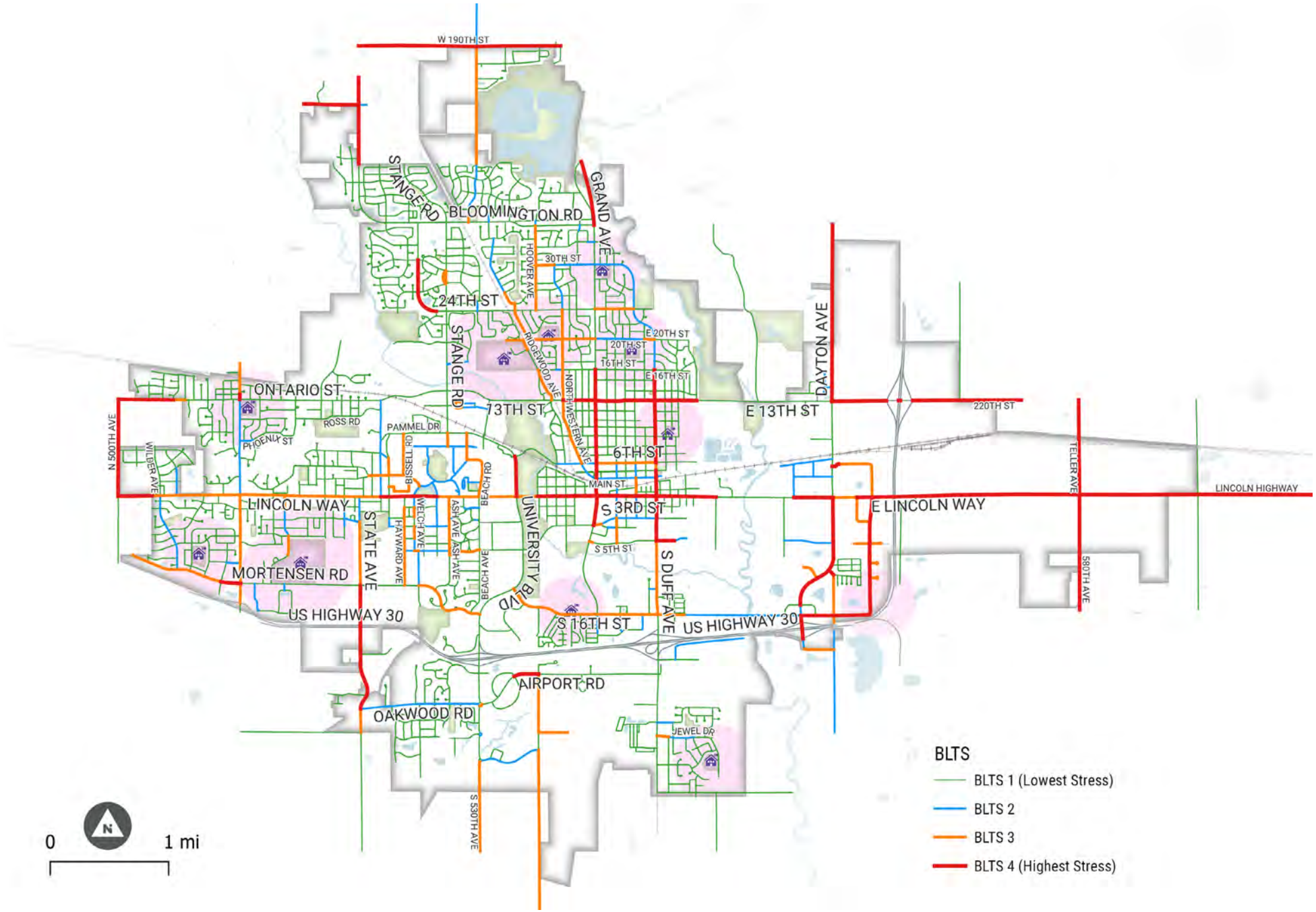
The results of the BLTS analysis are shown in Figure 18. This map displays low-stress streets and paths as green (BLTS 1) or blue (BLTS 2) lines, and high-stress streets as orange (BLTS 3) or red (BLTS 4) lines. Note that several high-traffic streets (such as portions of Stange Road, 13th Street, etc.) are identified as low-stress because they have a sidepath alongside the roadway. Biking in the roadway along these streets would be high stress.

The City of Ames has built sidepaths along many of its higher-traffic streets; however, several arterial streets (such as those surrounding downtown) still create barriers and prevent the pockets of low-stress trails and lower-stress streets found in neighborhoods from forming a connected network. While many, if not most, residents have access to facilities that score at a BLTS 2 level within their neighborhoods, many are not able to access adjacent neighborhoods or further away destinations using low-stress routes because of the barriers that the larger streets present.

*Presence of on-street parking increases traffic stress

Figure 17 | **Generalized Examples of BLTS Ratings of Various Bicycle Facilities**

Figure 18 | **Bicycle LTS Results**



Hearing from the Community

Community Values

Various surveys and public engagement activities allowed the WBRA planning team to understand why walking, biking, and rolling are important for Ames residents. From the beginning, engagement focused on articulating the underlying community-identified values that should be that drive the vision and goals for this plan. Safety, enjoyment, health, and environment or sustainability were all important values for Ames. Nearly 80 percent of survey respondents wanted to walk or bike more than they currently do, but safety concerns about traffic and lack of sidewalks, bike lanes, and paths are concerns that make residents reluctant to do so.

"What's to not like about walking, biking, and rolling in Ames?"

Figure 19 | Word cloud of things people do not like about walking, biking, and rolling in Ames.

"What's to love about walking, biking, and rolling in Ames?"

Figure 20 | Word cloud of things people like about walking, biking, and rolling in Ames.

Needs

Input from residents also helped identify what types of changes WBRA should focus on. When asked what the most important thing to improve/expand in Ames was, most people wanted more places to bike and safer places to cross the street (Figure 21). The infrastructure recommendations in Chapter 3 reflect these needs, with more than 100 recommended street crossing improvements and over 77 miles of bikeway recommendations.

Specific concerns about bikeways, crossings, gaps, and safety issues were also addressed at multiple points through online interactive maps and discussions with a Community Advisory Committee (CAC).

Non-infrastructure recommendations in Chapter 5 also reflect discussions with the CAC and other public input on the need to improve safety and increase street sweeping of bikeways.

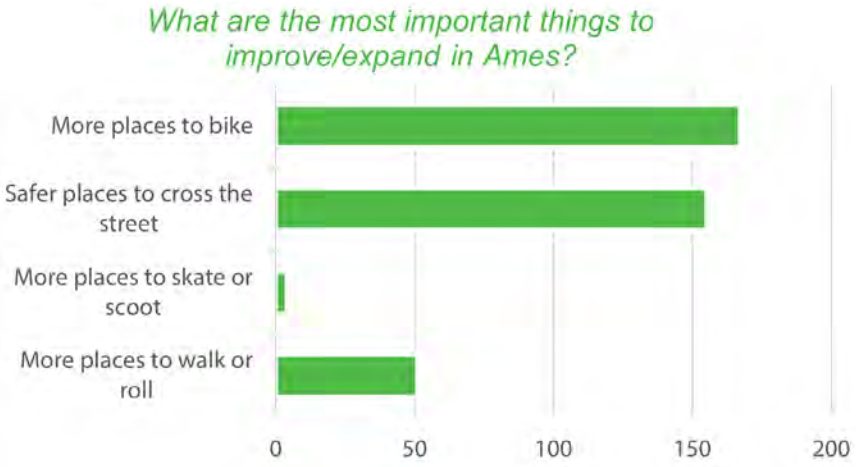


Figure 21 | **Public Feedback on Ames' Active Transportation Needs**

Opportunities

A Technical Advisory Committee (TAC) made up of City, agency, and ISU staff met at multiple points during WBRA planning process and provided input on the feasibility of various potential infrastructure changes, including specific wants and concerns on Lincoln Way, Main Street, and South Duff Avenue. They also helped shape the strategies and program actions in **Chapter 5** by identifying current or previous programs and initiatives that WBRA recommendations could build upon.

Priorities

For the most part, WBRA priorities in **Chapter 4** were shaped by the four goals (Safe and Comfortable, Connected and Easy, Healthy and Sustainable, Equitable and Accessible) which were developed after early public input. However, some targeted discussions with the CAC also helped guide the development of the recommendations. For example, the CAC helped point out that shared-use paths are in poor condition and are too narrow for comfort and use by people both walking and biking. The CAC members said that widening existing shared use paths should be as important as adding new bikeways.

Public & Stakeholder Input

Vision and Goal

Safe and Comfortable

Connected and Easy

Healthy and Sustainable

Equitable and Accessible

What to do (first draft)

Proposed programs

Public & Stakeholder Input

What to do (second draft)

Proposed programs

Public & Stakeholder Input

How to prioritize

Scores and weights for projects

Public & Stakeholder Input

Which projects should be done first

- Priority sidewalks and pedestrian crossings
- Priority bikeways and bike crossings

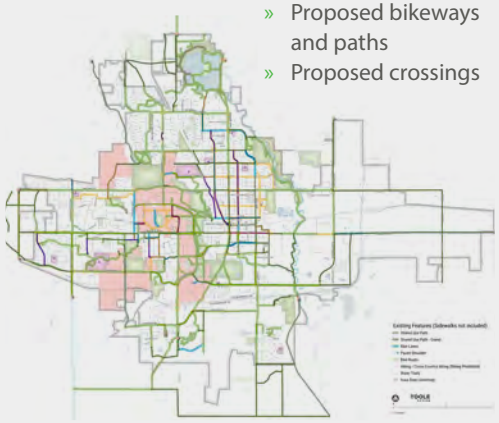
Public & Stakeholder Input

Who is the design user?

- Types of bikeways & crossings considered appropriate for Ames
- Need for widening existing paths, etc.

What to build (first draft)

- Proposed sidewalks
- Proposed bikeways and paths
- Proposed crossings



Public & Stakeholder Input

What to build (second draft)

Figure 22 | How Public Input Shaped WBRA

Summary of Key Issues

What's needed for more people to walk, bike, and roll in Ames?

Synthesizing community input with evaluation of existing conditions and mobility trends, the following needs were identified as key issues that will influence whether more people in Ames choose to walk, bike, and roll.

Walking & Rolling

Primary Needs

Intersection / Crossing Treatments

» Safer, more comfortable crossings of major streets, including enhancements at existing signalized intersections to provide refuge for people outside of cars, and treatments to encourage driver yielding and slow turning vehicles.
» Closer spacing between comfortable crossings, especially in areas with higher levels of pedestrian activity.

Secondary Needs

Fill Sidewalk and Path Gaps

» While there are some critical sidewalk gaps that need to be completed, most streets in Ames have sidewalks or paths on both sides.
» Focus should be placed on filling gaps along busier streets and in areas with higher levels of walking and rolling activity. This means filling gaps on low-traffic neighborhood streets that already have complete sidewalk on one side is a priority.

Biking & Micromobility

Primary Needs

Improved Sidepaths (Shared Use Paths along Streets)

» Wider sidepaths that provide adequate space for sharing with people walking and rolling (at least 10 feet wide).
» Sidepaths set back from the curb by at least 3 feet to provide a buffer from moving car traffic.
» Better pavement surfaces to address potholes and cracks.
» Reduced conflicts with bus stops.

Fully Separated Bikeways

» Separated bike lanes (also known as protected bike lanes) are for the exclusive use of people biking and using micromobility, and provide vertical separation from car traffic.
» Separated bike lanes are potential solutions when right-of-way does not exist for a sidepath (or when pedestrian traffic is very high in the area), but adequate roadway space exists.

Traffic-Calmed Bike Boulevards

» Bike boulevards can be established along quiet neighborhood streets, which is where many people prefer to bike already (compared to busier streets). Traffic calming features can be incorporated to manage traffic speeds. Traffic diversion features can be incorporated to reduce the amount of car traffic on the street.
» This treatment is preferred by many in Ames over conventional bike lanes on busier streets. Bike boulevards can also improve the pedestrian experience.

Intersection / Crossing Treatments

» Infrastructure to improve street crossings for people biking is an important step toward increasing the amount of bicycle activity in Ames. Some kinds of crossing treatments (such as median islands) are more suited to improve safety for bicyclists than crossing treatments aimed at pedestrians (such as curb extensions).

Secondary Needs

Bike Lanes, Bike Routes, Etc.

» People prefer biking on sidepaths, separated bike lanes, and bike boulevards. However, there remains a need for bike lanes, bike routes, and other types of treatments where the more desirable bikeway types are not feasible or appropriate.

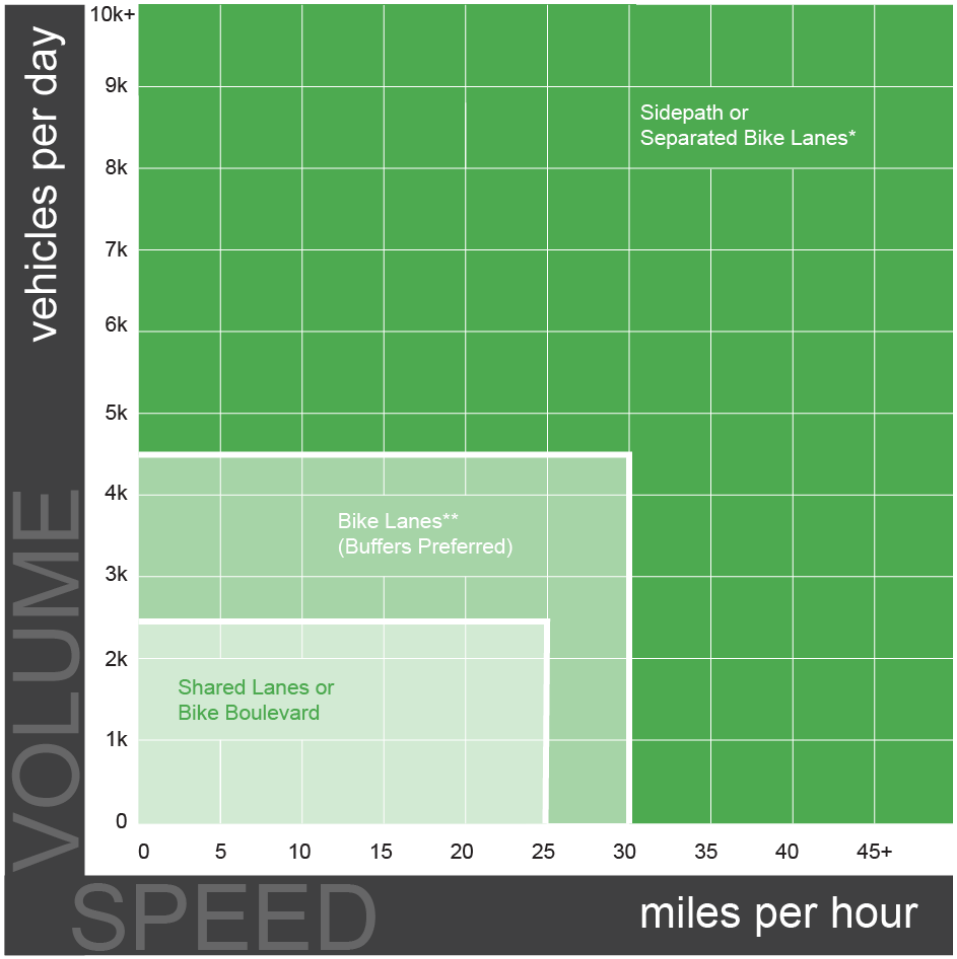
CHAPTER 3

Facility Selection & Guidelines

Best Practice Design

This chapter provides high-level descriptions, considerations, and guidance for the physical infrastructure to create a safe and comfortable active transportation network, with a focus on designing for people of all ages, abilities, and identities, as described in Chapter 1. The guidance in this chapter was used to select facilities for the recommended bikeway and path network for Ames. The toolkit is also meant to be a resource for the City to use during implementation of the Plan. The toolkit is not meant to replace engineering studies, feasibility evaluation, or design—those will always be subject to engineering judgment, context, and community engagement.

As an overarching principle: walking and biking infrastructure in Ames will be designed for people of all ages and abilities. This emphasizes separation from motor vehicle traffic and designing intersections to prioritize people on foot. Sometimes people walking and biking will share the same space, but in some situations, it is preferable to separate them.



*To determine whether to provide a sidepath or separated bike lane, consider pedestrian and bicycle volumes or, in the absence of volume, consider land use. Where greater levels of pedestrian activity are expected, provide separate spaces for walking and biking.
**Sidepaths may be desirable below 4,500 ADT in various cases, such as when creating shared use path connections, near schools, etc.

Figure 23 | City of Ames Bicycle Facility Selection Matrix

Paths & Bikeways

Low-stress connected bicycle networks improve bicyclist safety and encourage bicycling for a broad range of user types. Creating such a network requires selecting appropriate bicycle facilities for the context and ensuring appropriate design of said facilities. Bicycle networks should be continuous and provide convenient access to destinations. Anywhere a person would want to drive to for utilitarian purposes, such as commuting or running errands, is a potential destination for bicycling. As such, creating a low-stress bicycle network is not achieved by simply avoiding motor vehicle traffic. Rather, bikeways should be provided along many higher traffic streets and planners and engineers must therefore identify ways to lower stress along higher traffic corridors so that bicycling can be a viable option for the majority of the population.

Appropriate bicycle facilities are selected based on roadway width, traffic volumes, speeds, and other considerations. Figure 23 identifies thresholds that guide the selection of bicycle facility types in Ames. These thresholds were informed by the FHWA ***Bikeway Selection Guide*** and originally published in the ***Ames Complete Streets Plan***. They have been further refined for WBRA. The FHWA guide provides additional guidance on the selection of appropriate bicycle facilities.

Path & Bikeway Toolkit

The toolkit below presents high-level guidance for path and bikeway implementation tailored for the City of Ames. Design considerations, guidance, and context information are provided for each treatment type. Compatible Place Types are identified for each facility type. These place types are defined on page 15 of the ***Ames Complete Streets Plan*** (CSP) and include Activity Center, Urban Mix, Residential, Large Scale Commercial, and Industrial. For the purposes of this toolkit, a sixth place type (Park/Rural) was identified.

Facility Type	*Description + Design Considerations*	*Guidance*
Shared Use Paths  Construction Cost per Mile: **$1,100,000**[1]	Shared use paths, also known as **trails**, include paved and unpaved paths that can be used by pedestrians and bicyclists. Shared use paths can follow streets for short distances but are typically located away from streets in natural and unsettled environments. Trail intersections should provide clear wayfinding to direct trail users. Where heavily utilized or around curves, a centerline can encourage users to stay to the right. Crossings at major streets should draw motorists' attention and encourage yielding. **CSP Place Types:** Any **Motor Vehicle Traffic Volume** N/A – See Sidepaths section below for shared use paths along streets. **Posted Speed Limit** N/A – See Sidepaths section below for shared use paths along streets.	Shared use paths (and sidepaths, below) should be designed according to state and national standards. This process includes establishing a design speed (typically 18 mph) and designing path geometries accordingly. 10 ft should be used as a minimum width for paths and sidepaths. Greater widths (or separate facilities for bicyclists and pedestrians) are necessary where higher bicycle and pedestrian traffic is expected in order to minimize conflicts between users. Vertical objects close to the path edge can endanger users and reduce the comfortable usable width of the path. Shoulders also provide space for users who step off the path to rest or allow users to pass one another. Setback width guidance for shoulders and vertical objects: » 2 ft minimum » 3 ft typical » 5 ft preferred All shared-use paths should be designed to meet standards in the US Access Board's Public Rights-of-Way Accessibility Guidelines (PROWAG). Trail lighting is an important amenity, as it ensures that trails can be used year-round (during winter months) and for transportation.

1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Facility Type	*Description + Design Considerations*	*Guidance*
Sidepaths  Construction Cost per Mile: **$1,100,000**[1]	**Sidepaths** are paved shared use paths, used by both pedestrians and bicyclists, which are located adjacent to streets. This distinction is made because sidepaths present far more interactions with motor vehicle traffic. Crossings at intersections and driveways should draw motorists' attention and encourage yielding. There are various design solutions that can improve interactions between bicyclists and motorists, including shifting the sidepath further away from the side of the road at driveways. **CSP Place Types:** Urban Mix, Residential, Large Scale Commercial, Industrial, Park/Rural. **Motor Vehicle Traffic Volume** Any volume (typically 4,500 ADT or greater) **Posted Speed Limit** Any speed (typically 30 mph or higher)	Sidepaths should be at least 10 ft wide, and wider where higher bicycle and pedestrian traffic is expected (e.g. activity centers and mixed-use areas). Vertical objects close to the path edge can endanger users and reduce the comfortable usable width of the path. Shoulders also provide space for users who step off the path to rest or allow users to pass one another. Setback width guidance for shoulders and vertical objects: » 2 ft minimum » 3 ft typical » 5 ft preferred Sidepaths should not be located immediately next to the curb unless they are at least 12 ft wide in total. Special consideration must be given to the design of roadway crossings to increase visibility, clearly indicate right-of-way, and reduce crashes. Alternative accommodations should be sought when there are many intersections and commercial driveway crossings per mile. All sidepaths should be designed to meet standards in the US Access Board's Public Right-of-Way Accessibility Guidelines (PROWAG).

1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Facility Type	*Description + Design Considerations*	*Guidance*
Separated Bike Lanes  Construction Cost per Mile: **$500,000-$1,000,000** (depending on type of separation), including intersection treatments[1]	**Separated bike lanes** dedicate spaces to people on bicycles that are physically separated from both motorists and pedestrians. Common vertical separators include planters, curbs, plastic delineators, and on-street parking. Separated bike lanes can be designed to accommodate one- or two-way travel. Bicycle signals, lateral offsets, signs, and markings can improve safety at intersections and driveways. Transitions to trails and other bicycle facilities should be clear, comfortable, and intuitive. **CSP Place Types: Activity Center,** Urban Mix, Residential. **Motor Vehicle Traffic Volume** Any volume (typically 4,500 ADT or greater) **Posted Speed Limit** Any speed (typically 30 mph or higher), though higher speeds necessitate more durable/solid separators, such as concrete barriers.	Separated bike lanes can generally be considered on any road with one or more of the following characteristics: » 3 or more total traffic lanes » Frequent turnover for on-street parking » Frequent bike lane obstructions » Streets that are designated as truck or bus routes » Critical connections to key destinations/routes The minimum width of a one-way protected bike lane is 5.5 ft if sidewalk level or between sloped curbs and less than 150 bikes per hour. A desirable width is 8 ft which includes a 3 ft buffer separation. Separated bike lanes are preferred over multi-use paths in higher density areas, commercial and mixed-use development, and near major transit stations or locations where pedestrian volumes are anticipated to exceed 200 people per hour on a multi-use path. Parking removal may be required to construct separated bike lanes.

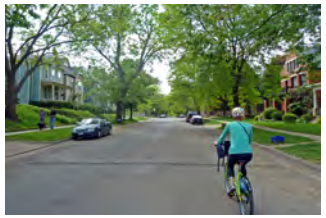
1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Facility Type	*Description + Design Considerations*	*Guidance*
Bike Boulevards  Construction Cost per Mile: **$150,000-$450,000**[1]	Bike boulevards optimize local streets for bicycle travel by reducing traffic volumes and speeds. Some measures can be implemented with roadway resurfacing and signage, while others require construction. Beyond signs and markings, bike boulevards generally include traffic calming features – such as speed humps, curb extensions, traffic circles, and traffic diversion treatments – and should be placed on local streets to discourage speeding and cut-through traffic. **CSP Place Types: Activity Center,** Urban Mix, Residential. **Motor Vehicle Traffic Volume** » Up to 1,000 (preferred) » 2,500 ADT (maximum) **Posted Speed Limit** » 20 mph or lower (preferred) » 25 mph (maximum)	Wayfinding signage may be required to direct bicyclists. Additional traffic control at minor intersections may be considered to prioritize pedestrian and bicycle through travel. Treatments like curb extensions increase the visibility of children at crossings, due to their short stature. The shared roadway design may be an opportunity for plantings, rain gardens, and green infrastructure.

1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Facility Type	*Description + Design Considerations*	*Guidance*
Bike Lanes  Construction Cost per Mile: **$80,000-$190,000**[1]	Conventional bike lanes provide space within the street for exclusive bicycle travel. Signs and markings remind motorists that the bike lane is intended solely for bicyclist travel. Bike lanes should be striped all the way to the intersection (and not disappear at turn lanes) and through intersections if the need for clarity exists. Bike lanes should meet minimum width requirements exclusive of the gutter pan. If space allows, a striped buffer area can be provided in addition to the bike lane, typically positioned between the bike lane and adjacent travel lane. In some cases, the buffer may be placed next to on-street parking to mitigate collisions with opening doors. **CSP Place Types: Activity Center,** Urban Mix, Residential, Large Scale Commercial, Industrial. Motor Vehicle Traffic Volume 4,500 ADT or lower Posted Speed Limit 30 mph or lower	The minimum width of a bike lane adjacent to a curb is 5 ft exclusive of a gutter; a desirable width is 6 ft. The minimum width of a bike lane adjacent to parking is 5 ft, with a preferred width of 6 ft. Parking T's or hatch marks can highlight the door zone on constrained corridors with high parking turnover to guide bicyclists away from doors. When a buffer is provided, the minimum buffer width is 18 inches. Diagonal cross hatching should be used for buffers <3 ft in width. Chevron cross hatching should be used for buffers >3 ft in width. There is no maximum width for a bike lane or buffered bike lane. However, when the total width of bike lane and any buffer(s) exceeds 8 feet, there is an increasing chance that people will drive and/or park in these spaces. In these cases, separated bike lanes should be considered. On hills where inadequate space exists for bike lanes in both directions, a climbing lane can be provided in the uphill direction and paired with a shared lane in the downhill direction.

1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Facility Type	*Description + Design Considerations*	*Guidance*
Bike Routes  Construction Cost per Mile: **$50,000**[1]	Bike routes are designated routes typically identified by signage and shared lane markings (or "sharrows"). They do not provide any dedicated space for biking or any dedicated forms of traffic calming. Bike routes typically include "Bikes May Use Full Lane" and/or "Bike Route" signs, along with wayfinding signs guiding people to destinations. Bike routes identified in this plan are along streets with very low traffic speeds and volumes that are important connections to destinations, but where any additional bikeway treatment has been deemed infeasible or unwarranted based on the traffic conditions and surrounding context. **CSP Place Types:** Residential, Park/Rural. Motor Vehicle Traffic Volume 1,000 ADT or less (preferred, to serve all ages, abilities, and identities) 2,500 ADT (maximum) Motor Vehicle Operating Speed 20 mph or lower (preferred) 25 mph or lower (maximum)	Shared lane marking centerline must be at least 4 ft from the curb or edge of pavement where parking is prohibited to direct bicyclists away from gutters, seams, and other obstacles. Shared lane marking centerline must be at least 11 ft from the curb where parking is permitted so that it is outside the door zone of parked vehicles. The preferred shared lane marking placement is in the center of the travel lane to minimize wear from motor vehicles and encourage bicyclists to use the full travel lane. Shared lane markings should be paired with "Bikes May Use Full Lane" signs (MUTCD R4-11) to clearly inform road users that bicyclists may choose to fully occupy travel lanes, discourage passing by motor vehicles, and also inform bicyclists that they can or may operate towards the center of the travel lane for safest operation.

1 Refer to Summary of Costs – Paths & Bikeways, p. 47

Summary of Costs – Paths & Bikeways

The opinions of probable costs for paths and bikeways were developed by identifying major pay items and establishing rough quantities to determine a rough order of magnitude cost. Additional pay items have been assigned approximate lump sum prices based on a percentage of the anticipated construction cost. Planning-level cost opinions include a 25% contingency to cover items that are undefined or are typically unknown early in the planning phase of a project. Unit costs are based on 2023 dollars and were assigned based on historical cost data from City of Ames, Wisconsin DOT, City of Madison, WI, and City of Austin, TX. Cost opinions do not include easement and right-of-way acquisition; permitting, inspection, or construction management; engineering, surveying, geotechnical investigation, environmental documentation, special site remediation, escalation, or the cost for ongoing maintenance. A cost range has been assigned to certain general categories such as utility relocations; however, these costs can vary widely depending on the exact details and nature of the work. The overall cost opinions are intended to be general and used only for planning purposes. Toole Design Group, LLC makes no guarantees or warranties regarding the cost estimate herein. Construction costs will vary based on the ultimate project scope, actual site conditions and constraints, schedule, and economic conditions at the time of construction.

Facility	*Action/Description*	*Typical Cost per Mile (FY 2023 Dollars)*[1]
New Shared Use Path[2]	Construct new concrete shared use path (10’ width, 6” depth)	$1,100,000
Widen Existing Shared Use Path	Remove and repave shared use path at 10’ width (with concrete)	$1,160,000
Separated Bike Lanes	Delineator-Separated, Add Striping/Marking	$180,000
	Construct New, Curb-Separated	$970,000
	Protected Intersection (cost per intersection)	$150,000
Bike Boulevards	Construct traffic calming infrastructure such as curb extensions, pedestrian islands, and other measures to reduce speeds and traffic volumes.	$150,000 to $450,000
Bike Lanes	Add Striping/Marking (no existing markings)	$110,000
	Road Diet (4 to 3 conversion)	$190,000
	Lane Diet (narrow travel lanes)	$130,000
	Climbing Lane (bike lane on one side, marked/signed bike route on the other)	$80,000
Bike Routes	Install bike route signs and shared lane markings	$50,000

1 Assumptions for all facility costs: The existing ROW is clear and free of obstructions (trees, structures, etc.) except for shared use paths. Costs do not include installation of curb and gutter (unless noted).

2 Shared use paths costs exclude the costs of structural concrete, steel, and fencing

Crossing Treatments

The selection and application of crossing treatments is highly dependent on the context of the location. Motor vehicle traffic volumes and speeds, roadway width, the presence of existing infrastructure (such as medians), surrounding land use, and amount of foot and bike traffic all factor in.

The FHWA published its Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations in 2018, which includes guidance for pedestrian crash countermeasures that can be used at crossings based on roadway configurations, speed limits, and average daily traffic volumes. Figure 24 is a key resource in that guide, providing facility selection methodology for crossings.

As illustrated in the matrix, crossing treatments are typically used in combination. Selecting those combinations is often a case-by-case decision. However, there are common combinations used that align with common crossing situations. Examples are provided on "Typical Treatment Combinations" on page 54.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

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

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

*Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.
**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

Figure 24 | Crossing Treatment Selection Matrix (Source: FHWA)

Crossing Toolkit

The toolkit below presents high-level guidance for common crossing elements tailored for the City of Ames. Design considerations, guidance, and context information are provided for each treatment type. Compatible Place Types are identified for each treatment type. These place types are defined in the ***Ames Complete Streets Plan (CSP; Page 15)*** and include Activity Center, Urban Mix, Residential, Large Scale Commercial, and Industrial. For the purposes of this toolkit, a sixth place type (Park/Rural) was identified.

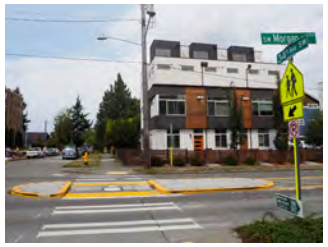
Facility Type	*Description + Design Considerations*	*Guidance*
Marked Crosswalks  Construction Cost per Location: **$2,000-$8,000**[1]	Crosswalks facilitate pedestrian crossings at intersections and mid-block locations. Per Iowa State laws and regulations, motorists are legally required to yield to pedestrians in any unsignalized crosswalk. **CSP Place Types: All** **Location Characteristics** Not all crosswalks need to be marked. The City of Ames will default to providing marked crosswalks in the following locations: » On all legs of signalized intersections » On all legs of intersections in school zones » Where a shared use path or sidepath crosses a roadway » At all midblock crossings » At locations where motor vehicle traffic might block pedestrian traffic when stopping for a stop sign or red signal The City of Ames will also consider providing marked crosswalks at pedestrian crossing locations within 100 feet of bus stops and parks.	High visibility crosswalks are recommended at all locations, but are prioritized in school zones, near parks, at midblock crossings, and where shared use paths/sidepaths cross roadways. Where applied, the bars in high-visibility crosswalks should be spaced 2-3 ft apart to increase the visibility. Crosswalks should be at least 6 ft wide (10 ft preferred) or the width of the approaching sidewalk if it is greater. In areas of heavy pedestrian volumes (such as near the ISU campus and downtown) crosswalks can be up to 25ft wide. Stop lines at stop-controlled and signalized intersection approaches should be striped no less than 4 ft and no more than 30 ft from the edge of crosswalks. Crosswalks should be oriented perpendicular to streets, minimizing crossing distances and therefore limiting the time that pedestrians are exposed. On higher-volume, higher-speed, multi-lane streets, marked crosswalks should be accompanied by treatments to encourage motorist yielding and improve pedestrian safety, such as parking restrictions, nighttime lighting, yield signs and markings, median refuge islands, and pedestrian hybrid beacons.

1 Refer to Summary of Costs – Crossing Treatments, p. 56

Facility Type	*Description + Design Considerations*	*Guidance*
Curb Ramps  Construction Cost per Location: **TO BE DETERMINED**	Curb ramps provide smooth transitions from sidewalks to streets at intersections and crossings which serve pedestrians with mobility devices. Curb ramps can also serve people with strollers or people on bicycles. Curb ramp design and construction must comply with ADA requirements to ensure that they can be used by people with disabilities. ADA-compliant curb ramps typically include detectable surfaces to warn Blind and visually-impaired people of the bottom of the ramp. **CSP Place Types: All** **Location Characteristics** At any legal crossing	The Public Right of Way Accessibility guidelines set forth detailed standards that address the design of curb ramps.[1]
Crosswalk Visibility Enhancements  **Construction Cost per Location:** **$4,500-$21,500**[2]	Crosswalk visibility enhancements such as nighttime lighting, parking restrictions, and pedestrian warning signs are used to identify optimal or preferred locations for people to cross and help reinforce the driver requirement to yield the right-of-way to pedestrians. These countermeasures are a minimum first line of defense where safety at intersections is in question. **CSP Place Types: All** **Location Characteristics** Lighting and parking restrictions are recommended at any marked crosswalk Warning signs are recommended at all midblock crosswalks and intersection crossings with challenging configurations or visibility	Marking crosswalks and increasing crosswalk visibility should almost always occur in conjunction with other pedestrian safety countermeasures on streets with over 9,000 ADT. Install pedestrian warning signs (MUTCD W11-1, W11-2, W11-15, or S1-1). On streets with more than 3 lanes, use Yield Here for Pedestrians MUTCD R1-5 and shark teeth markings). Restrict parking within 20-50 ft of the crosswalk to improve visibility. Ensure adequate nighttime lighting levels. Crosswalks with high pedestrian activity across collectors and arterials should have high illuminance.

1 Public Right-of-Way Accessibility Guidelines (PROWAG). (2023). Retrieved from: https://www.access-board.gov/prowag/

2 Refer to Summary of Costs – Crossing Treatments, p. 56

Facility Type	*Description + Design Considerations*	*Guidance*
Curb Extensions  Construction Cost per Location (One Pair): **$10,000-$50,000**[1]	**Curb extensions** involve extending the curb beyond the sidewalk or buffer edge to shorten crosswalk length and increase visibility of people entering the crosswalk, particularly when there is on-street parking. Curb extensions are also effective tools for narrowing streets or tightening intersections to reduce motor vehicle turning speeds. Near schools and parks, they can help increase the visibility of children waiting to step into the intersection. **CSP Place Types: Activity Center,** Urban Mix, Residential, Park/ Rural. **Location Characteristics** » Where on-street parking is provided » Near schools, parks, or other areas where children may be present » Often used on bike boulevards	Curb extensions are especially effective on streets where drivers habitually encroach on crosswalks or park too close to crosswalks. Corner radii should be kept as small as possible while still accommodating the design vehicle at a crawl speed. Larger design vehicles can be accommodated with mountable curbs or aprons. Curb extensions that extend less than 6 ft into the street are compatible with bike lanes next to on-street parking. Stormwater drainage concerns can pose a challenge. If needed, preserve 1-2 ft between the sidewalk and curb extension to provide space for drainage structures or install additional drainage inlets to prevent ponding water. Curb extensions can be an opportunity to incorporate green infrastructure, street furniture, bike parking, wayfinding, public art, or other public space elements into the street design.
Median Island / Pedestrian Refuge Island  Construction Cost per Location: **$25,000-$50,000**[1]	**Median islands** provide a protected refuge space in the center of two-way streets to allow pedestrians to cross the street in two steps, negotiating only one direction of traffic at a time. Islands also provide traffic calming by narrowing the roadway and creating edge friction. **CSP Place Types: All** **Location Characteristics** » Where the roadway width is 30 ft or greater » Any traffic volume (always consider on any street with 9,000 ADT or greater) » Often used on bike boulevards	Median islands should be a minimum of 6 ft wide. An island width of 8-10 ft is preferred, especially at shared use path crossings or other locations where people bicycling may also be crossing to accommodate strollers and bicycles with trailers. Follow the Manual on Uniform Traffic Control Devices (MUTCD) guidance for warning signage, signalization, pavement markings, and painted curb on the island approach. Consider flush accessible paths through the pedestrian island to minimize the need for ramps. Can be paired with curb extensions to further reduce crossing distances, where space allows.

1 Refer to Summary of Costs – Crossing Treatments, p. 56

Facility Type	*Description + Design Considerations*	*Guidance*
Raised Crossing  Construction Cost per Location: **$15,000-$30,000**[1]	**Raised crossings** are used for traffic calming and to improve motorist yielding to people walking and biking at intersections and midblock crossings. Crosswalks are elevated to reduce or eliminate the transition from the sidewalk to the street crossing. Transition aprons on each approach to the raised intersection are marked to alert drivers of the grade change. **CSP Place Types:** Activity Center, Urban Mix, Residential, Park/ Rural **Location Characteristics** » Typically, 2-lane or 3-lane streets » Generally, not on truck routes, emergency roues, and arterial streets » Less than 9,000 ADT » Speeds of 30 mph or less » Often used on bike boulevards	Raised crosswalks are typically flush with the height of the sidewalk. The crosswalk table is typically at least 10 ft wide. Detectable warnings should be provided at sidewalk edges to indicate to pedestrians that they are exiting the sidewalk and entering the street. On-street parking should be stopped at least 20 ft before the marked crosswalk to provide adequate sight distances and visibility between people crossing and people driving. Consider supplementing parking restrictions with signage, pavement markings, and vertical elements such as curb extensions. Warning signs and pavement markings on transition aprons should be included to alert drivers. Provide transition apron slopes between 5 and 8%. Where vehicles with low height wheelbases are likely (e.g., lowboy trailers), the raised crosswalk height should be limited to 3 inches. Stormwater drainage concerns can be an issue and additional drainage inlets may need to be installed to prevent ponding water.
Raised Intersection  Construction Cost per Location: **$50,000-$75,000**[1]	**Raised intersections** are effective traffic calming measures where there are high volumes of people. The entire intersection area is elevated to create a level transition from sidewalk to street crossing. Transition aprons on all sides of the raised area are marked with pavement markings to alert drivers of the grade change. **CSP Place Types:** Activity Center, Urban Mix, Residential, Park/ Rural **Location Characteristics** » At crossings of 2-lane or 3-lane streets » Less than 9,000 ADT » Speeds of 30 mph or less	Vehicle stop bars should be located 20 ft back from transition aprons. The raised intersection should be designed to ensure that stormwater drainage is properly accommodated. Special paving material, color, and/or pattern can be used to delineate and accentuate raised intersections. Stormwater drainage concerns can be an issue and drainage inlets may need to be moved; however, raised intersections can also be used to address stormwater concerns depending on the location.

1 Refer to Summary of Costs – Crossing Treatments, p. 56

Facility Type	*Description + Design Considerations*	*Guidance*
Rectangular Rapid Flashing Beacons  Construction Cost per Location: **$10,000-$30,000**[1]	**Rectangular rapid flashing beacons (RRFBs)** alert drivers to yield when pedestrians or bicyclists are crossing the street. Crosswalk users activate the beacon with a pushbutton. Other types of activation (e.g., infrared detection) can be used. RRFBs are an effective treatment option at many types of uncontrolled crosswalks. Their bright, irregularly flashing LEDs are aimed directly in motorists' range of vision. RRFBs increase driver yielding at mid-block crossings **CSP Place Types: All** **Location Characteristics** » Any street configuration, but more common on multilane and wider streets » Under 15,000 ADT » Speeds less than 40 mph	The design of RRFBs should be in accordance with FHWA's Interim Approval 21 for Operational Use of Pedestrian-Actuated Rectangular Rapid-Flashing Beacons at Uncontrolled Marked Crosswalks. On streets with more than one lane in each direction, RRFBs should always be accompanied by with advance yield markings (shark teeth) and Yield Here to Pedestrian signs. RRFBs are installed on both sides of the roadway at the edge of the crosswalk. If there is a pedestrian refuge or other type of median on roadways with multi-lane approaches, an additional beacon should be installed in the median. High-visibility crosswalk markings may accompany RRFBs
Pedestrian Hybrid Beacon  Construction Cost per Location: **$190,000-$210,000**[1]	**Pedestrian Hybrid Beacons (PHBs)** are appropriate at crosswalks on streets with higher speeds and traffic volumes. PHBs signal for vehicles to come to a complete stop for pedestrians and bicyclists in the crosswalk. Crosswalk users activate PHBs with a pushbutton. **CSP Place Types: All** **Location Characteristics** » Multilane crossings » Any volume (typically 9,000 ADT or greater) » Typically speeds 30 mph or higher	PHBs must comply with MUTCD traffic control device warrants. Accessible pedestrian actuation features should be used on all PHBs.

1 Refer to Summary of Costs – Crossing Treatments, p. 56

Typical Treatment Combinations

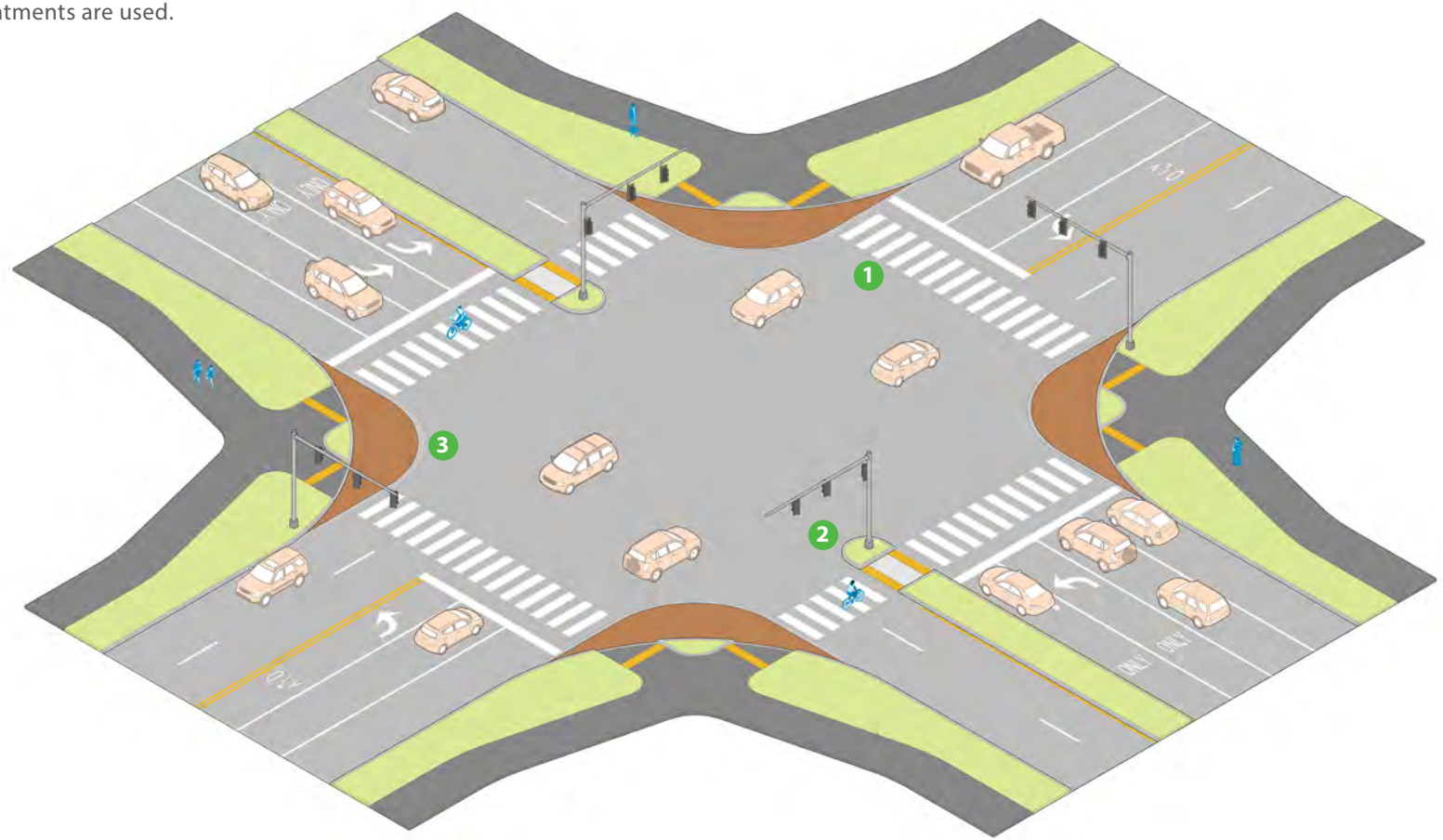
The crossing treatments shown on the previous pages are typically used in combination. While treatments are selected and combined based on the unique conditions and constraints of each project location, there are common combinations used that align with common crossing situations. Examples of common situations and common treatment combinations are shown on this and the following page. These images represent how the City will typically approach crossing design in these situations—however, actual conditions at each project location will guide how the City evaluates needs and makes decisions about which treatments are used.

Major Signalized Intersection

Intersections where major arterials (such as Grand Avenue, Lincoln Way, University Boulevard, and South Duff Avenue) cross each other often have traffic signals and high amounts of car traffic. Crossing treatments are selected to achieve the goals of shortening crossing distances, providing refuge for pedestrians, and slowing the speed of turning motor vehicles.

These locations can be enhanced for people walking, biking, and rolling by retrofitting treatments such as:

1. High Visibility Marked Crosswalks
2. Median Islands
3. Curb Extensions (the graphic shows mountable curb extensions that encourage lower turning speeds while allowing semi trailers to roll over the surface)
4. Leading Pedestrian Intervals (signal phasing that gives a WALK signal before parallel car traffic receives a green light)

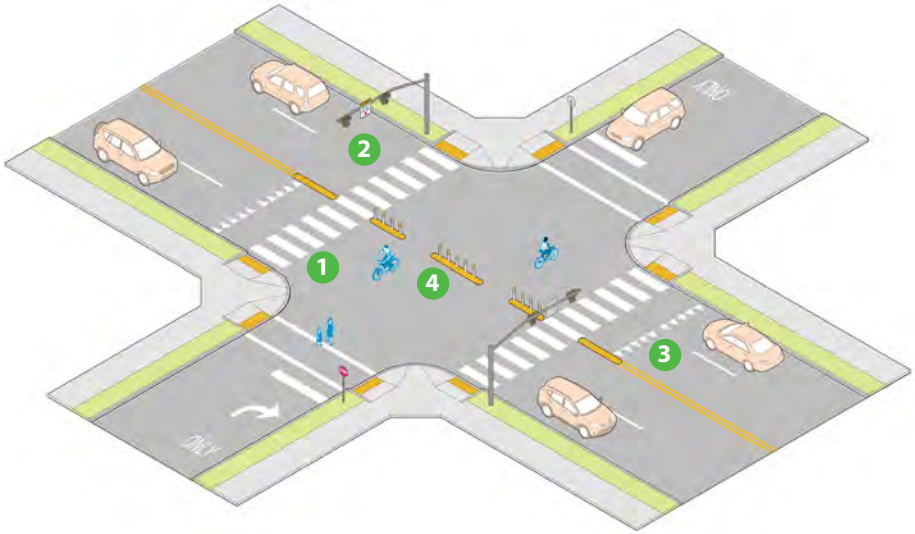


Arterial Street Crossing

There are numerous locations in Ames where neighborhood streets cross four-lane arterial streets. These crossings are also often located along Bike Boulevards (see page 44). These locations typically do not have space to add median islands without reducing the number of travel lanes (and therefore roadway capacity). Crossing treatments are selected to achieve the goals of increasing visibility of people walking, biking, and rolling, raising driver awareness, and controlling traffic. When the cross street is a Bike Boulevard, an additional goal is to reduce car traffic on the Bike Boulevard.

These locations can be enhanced for people walking, biking, and rolling by retrofitting treatments such as:

1. High Visibility Marked Crosswalks
2. Pedestrian Hybrid Beacons or Rectangular Rapid Flashing Beacons
3. Advance Yield Lines
4. Hardened Centerlines (Optional; typically used on Bike Boulevards)

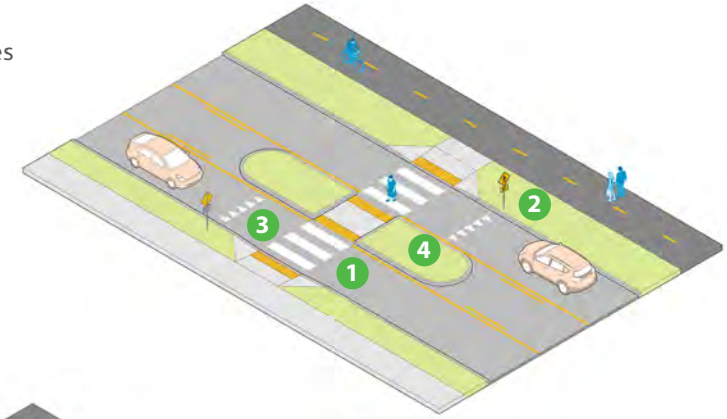


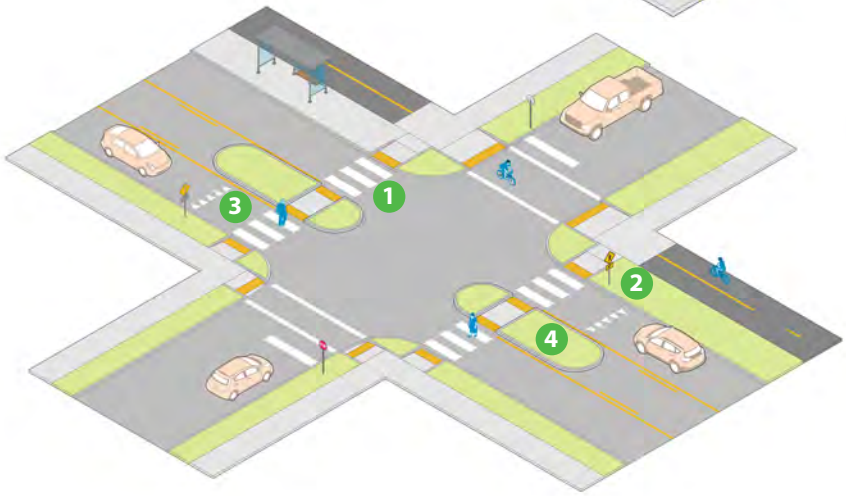
Collector Street Crossing

There are numerous locations in Ames where people walking, biking, and rolling need to cross two-lane collector streets (with or without a center turn lane). These include locations where neighborhood streets cross, as well as mid-block crossings. Both types of locations are shown below. Crossing treatments are selected to achieve the goals of increasing visibility of people walking, biking, and rolling, raising driver awareness, and providing pedestrian refuge.

These locations can be enhanced for people walking, biking, and rolling by retrofitting treatments such as:

1. High Visibility Marked Crosswalks
2. Crosswalk Warning Signs (or Rectangular Rapid Flashing Beacons at higher-traffic locations)
3. Advance Yield Lines
4. Median Islands





Summary of Costs – Crossing Treatments

The opinions of probable costs for crossing treatments assume that a variety of crossing treatments will be used for each crossing or intersection. Costs were developed by identifying major pay items and establishing rough quantities to determine a rough order of magnitude cost. Additional pay items have been assigned approximate lump sum prices based on a percentage of the anticipated construction cost. Planning-level cost opinions include a 25% contingency to cover items that are undefined or are typically unknown early in the planning phase of a project. Unit costs are based on 2023 dollars and were assigned based on historical cost data from City of Ames, City of Madison, WI, and City of Austin, TX. Cost opinions do not include easement and right-of-way acquisition; permitting, inspection, or construction management; engineering, surveying, geotechnical investigation, environmental documentation, special site remediation, escalation, or the cost for ongoing maintenance. The overall cost opinions are intended to be general and used only for planning purposes. Toole Design Group, LLC makes no guarantees or warranties regarding the cost estimate herein. Construction costs will vary based on the ultimate project scope, actual site conditions and constraints, schedule, and economic conditions at the time of construction.

Facility	*Description*	*Typical Cost per Mile (FY 2023 Dollars)*
Crossings	Crossing - 2- or 3-lane roadway[1]	$50,000
	Crossing - 4-lane roadway (midblock or unsignalized)[2]	$250,000
	Signalized Intersection Enhancements[3]	$290,000

1 Cost opinion assumes installation of high visibility crosswalk markings, curb extensions, and/or median island and RRFBs

2 Cost opinion assumes installation of high visibility crosswalk markings, curb extensions and/or larger median island, crosswalk warning signs, RRFBs, enhanced lighting, advance Stop Here for Pedestrian sign, and stop line.

3 Cost opinion assumes installation of the following, for all four legs of the intersection: high visibility crosswalk markings, curb extensions to reduce corner radii, pedestrian refuge islands or centerline hardening, enhanced lighting.

Sidewalks

Sidewalks are paved pedestrian routes located parallel to the roadway. Sidewalks are typically vertically separated from the roadway by a curb and horizontally separated by a vegetated buffer. While designed for use by people walking and rolling, sidewalks are often also used for skating and biking, especially by children. If a sidewalk is regularly used for biking by adults, that is a clear indication that a sidepath or dedicated bikeway is needed on that street.

The Ames Complete Streets Plan provides detailed guidance on the selection of sidewalk width, setback from the roadway, and other parameters based on context and street type. The considerations and guidance provided here align with and support the guidance of the Complete Streets Plan.

Guidance

- Sidewalks should generally be present on both sides of all streets. All new streets should have sidewalk on both sides, and sidewalks should be provided (or replaced) when adjacent development or redevelopment occurs or when the street is reconstructed.
- The minimum width of sidewalks is 5 ft to meet ADA requirements, however there are instances where sidewalks should be wider. Wider sidewalks are appropriate when greater volumes of people are anticipated, such as in downtown areas, mixed use zones, around schools, or where sidewalks run immediately adjacent to roadways or building faces.
- The ***Ames Complete Streets Plan*** specifies minimum and preferred sidewalk width (referred to as the "Clear Zone" in the plan) in the Pedestrian Zone Design Criteria section.
- In most areas, sidewalks should be at least 8 ft from the curb of the street for pedestrian comfort and to allow street trees to thrive. In some downtown and urban contexts, it is acceptable to have sidewalks against the curb, especially if the sidewalk is wider and/or on-street parking or bikeway provides a buffer between the sidewalk and moving car traffic.
- Maintenance of sidewalks, such as snow removal, is often the responsibility of the adjacent property owners who may need to be informed of this responsibility. Major repairs or replacement are the responsibility of the City.
- All sidewalks and shared-use paths should be designed to meet standards in the US Access Board's ***Public Right-of-Way Accessibility Guidelines*** (PROWAG). Shared use paths and sidepaths take the place of sidewalks in many situations; see guidance on Page 42 regarding these facilities.

Summary of Costs – Sidewalks

The opinions of probable costs for sidewalks were developed by identifying major pay items and establishing rough quantities to determine a rough order of magnitude cost. Planning-level cost opinions include a 25% contingency to cover items that are undefined or are typically unknown early in the planning phase of a project. Unit costs are based on 2023 dollars and were assigned based on historical cost data from City of Ames and Wisconsin DOT. Cost opinions do not include easement and right-of-way acquisition; permitting, inspection, or construction management; engineering, surveying, geotechnical investigation, environmental documentation, special site remediation, escalation, or the cost for ongoing maintenance. The overall cost opinions are intended to be general and used only for planning purposes. Toole Design Group, LLC makes no guarantees or warranties regarding the cost estimate herein. Construction costs will vary based on the ultimate project scope, actual site conditions and constraints, schedule, and economic conditions at the time of construction.

Facility	*Description*	*Typical Cost per Mile (FY 2023 Dollars)*
Sidewalk	Construct new concrete sidewalk (5' width, 5" depth) on one side of the street	$320,000

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CHAPTER 4

Network Plan & Priorities

Building the Future

This chapter organizes planned active transportation infrastructure into three elements, each designed to move the community toward achieving the vision of Walk Bike Roll Ames—making Ames a place where walking, biking, and rolling are safe, enjoyable, convenient, and available to everyone. The three elements are:

1. **Paths and Bikeways –** Planned changes to streets to better accommodate biking as well as planned off-street shared-use paths, which are also used by people walking and rolling.
2. **Crossings –** Locations for making it safer and more comfortable to cross streets, both for people walking/rolling and for people biking.
3. **Sidewalks –** Priority gaps in the sidewalk network that, once built, will increase connectivity and accessibility for people walking and rolling.

For each of these elements, this chapter includes:

» An overview of how the planned projects were identified
» A map of planned projects
» A data-driven prioritization approach
» A map of projects, prioritized
» Identification of potential costs for implementing the plan

Paths & Bikeways

On-street bikeways and shared use paths form a network of routes along select corridors that provide connectivity and access for people biking and using Micromobility. Designated bikeways and paths are supplemented by low traffic neighborhood streets, which are inherently conducive to biking and connect many peoples' residences with the bike and path network. Shared use paths also serve walking and rolling but are combined with bikeways in this element because they form critical parts of the network upon which on-street bikeways are dependent.

This plan includes new bikeways and paths and identifies upgrades to existing routes, including converting standard bike lanes to separated bike lanes and widening and repaving paths and sidepaths. Needs and opportunities for these changes were identified by the series of analyses described in Chapter 2. The network development process included the following steps:

- Review and inclusion of previously-planned shared-use paths and other bikeways.
- Identification of apparent gaps in the existing network and opportunities to create connections.
- Review of the Bicycle Level of Traffic Stress (BLTS) to find isolated areas of the community. Any route currently on the network with BLTS of 3 or 4 was identified for upgrade.
- Selection of preferred facility type for new connections and upgraded routes. This was determined based on the bikeway selection matrix, shown on **Page 40**, as well as high-level evaluation of probable feasibility and compatibility with the surrounding context.
- Identification of narrow sidepaths (less than 10 feet wide and/or immediately against the curb), which are recommended for widening to 10 or more feet.

The initial draft bikeway and shared-use path network was presented to the Community Advisory Committee and the public. The following changes were made to the network based on their input:

- Added connections to the rear of businesses along South Duff Avenue (e.g., Target and Walmart).
- Increased physical separation between biking and car traffic by upgrading several segments (wider paths, separated bike lanes, etc.).
- Improvements to key corridors, including Clark Avenue, Lincoln Way, Grand Avenue, and Duff Avenue.
- Rerouted the planned bike boulevard along Ridgewood Avenue to instead follow Brookridge Avenue on the southern end.
- Added planned shared use path connections between downtown and the Skunk River and a path/sidepath connecting the cemetery to the Skunk River.
- Provided additional connections apart from busier roadways.

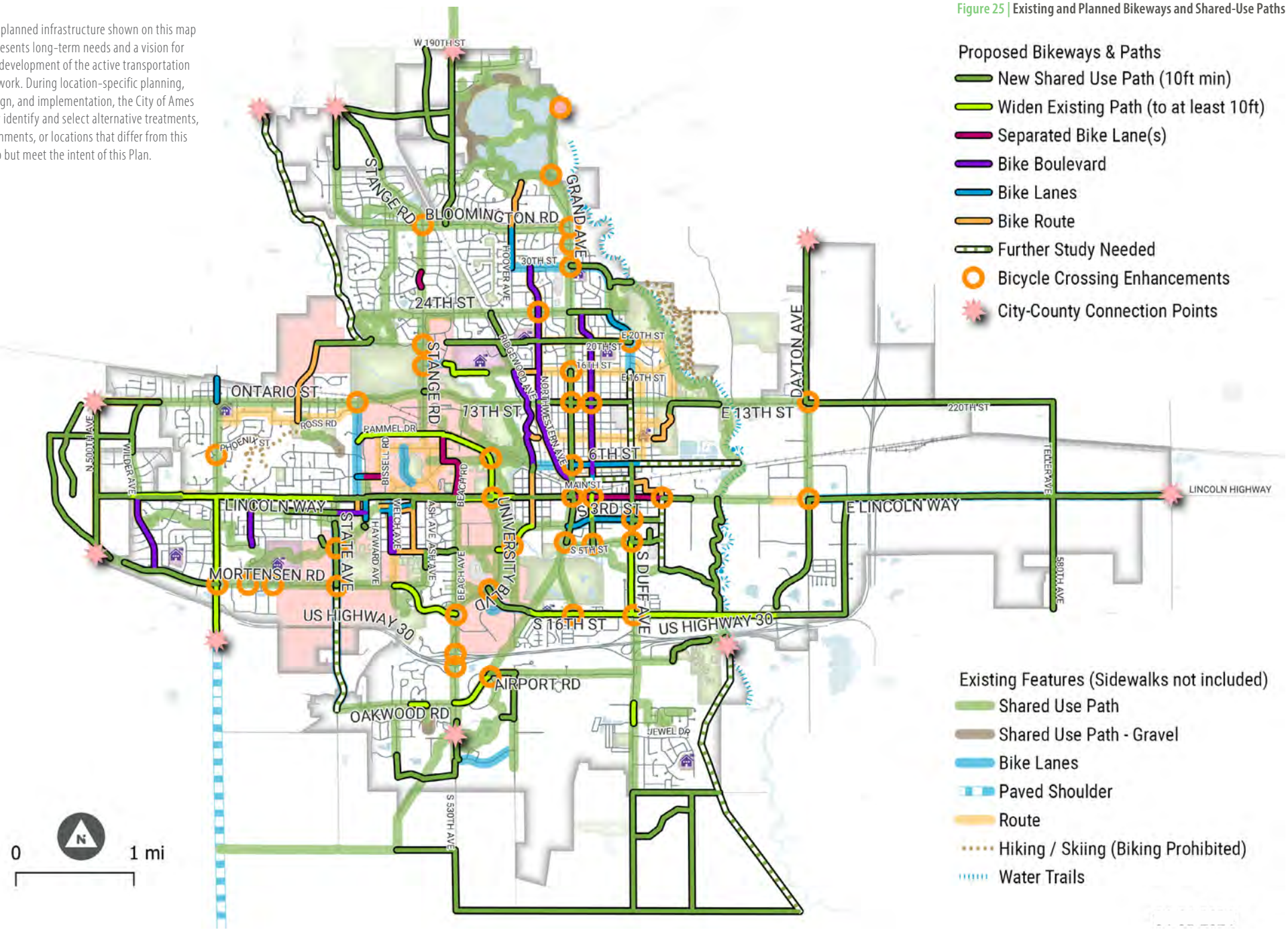
The planned bikeway and shared-use path network is illustrated in Figure 25.

Future Opportunities and Needs

The City of Ames may identify needs and opportunities to construct bikeways and paths that are not identified in this Plan. When doing so, and when reconstructing streets with existing bikeways, the City will use judgement when selecting an appropriate bicycle facility type, including consulting current standards and the Facility Selection Matrix on page 40.

The planned infrastructure shown on this map represents long-term needs and a vision for the development of the active transportation network. During location-specific planning, design, and implementation, the City of Ames may identify and select alternative treatments, alignments, or locations that differ from this map but meet the intent of this Plan.

Figure 25 | **Existing and Planned Bikeways and Shared-Use Paths**



Path & Bikeway Project Prioritization

The City of Ames has a limited amount of funding with which to build new infrastructure, and limited staff time to pursue grant funding. Because of this, it is important to decide which projects should be prioritized for implementation. A data-driven prioritization process—shaped around the WBRA Plan goals—used GIS data to score and rank projects based on objective criteria. The criteria and scoring process for bikeway and shared-use path projects are described in the table on this page. The results of the prioritization, with the darkest projects being the highest-priority projects is shown in the map in Figure 26.

Project prioritization is one tool used to determine which projects to build first. Feasibility, funding availability, and the potential to "piggyback" on larger capital projects all factor in. Timelines for planning, funding applications, and engineering and design also influence order of implementation. This prioritization informs the City's Capital Improvement Plan (CIP), pursuit of grant funding, and dedication of staff time to coordination and planning. ISU also has its own priorities and ultimately has final determination of what and when infrastructure is built within its jurisdiction.

Path and Bikeway Project Prioritization Logic

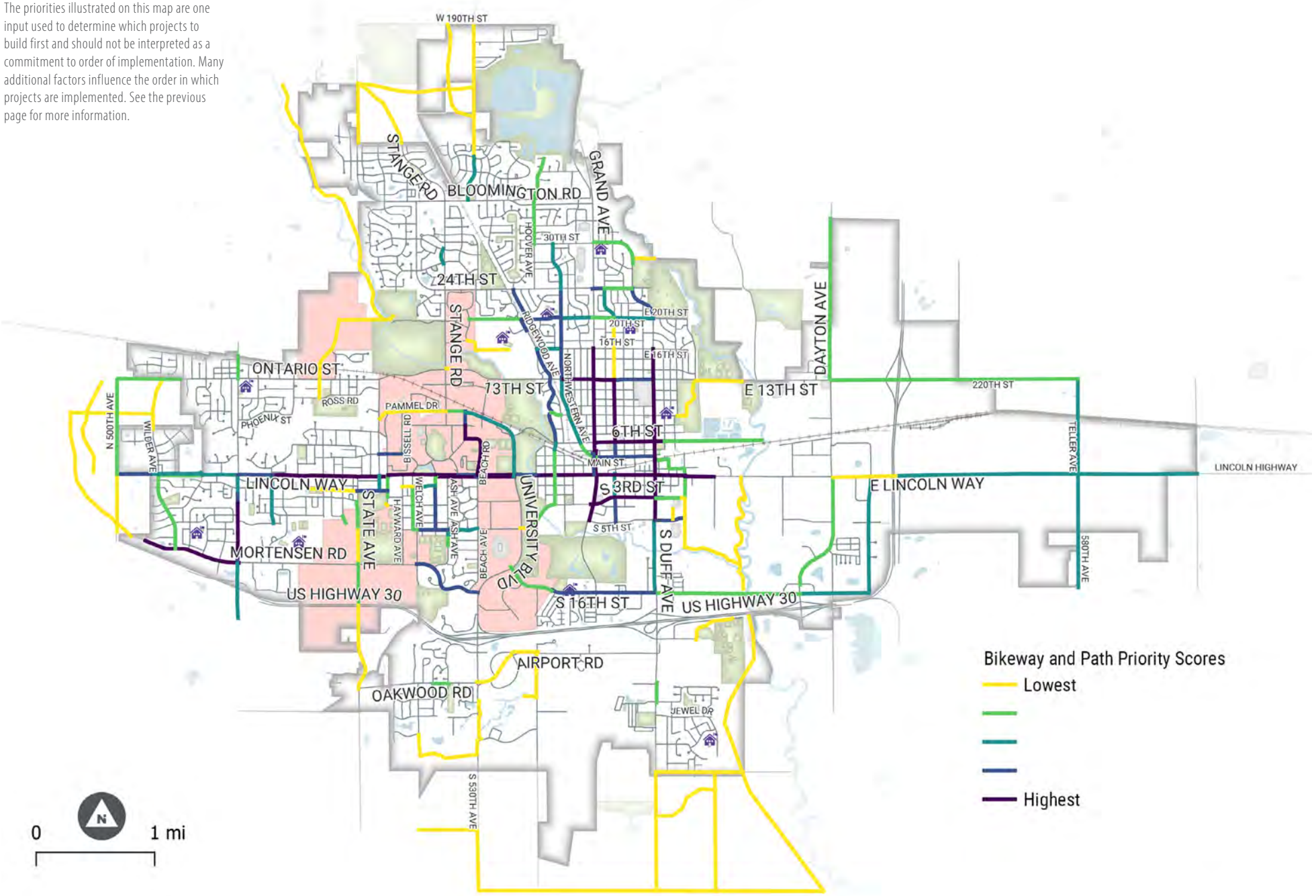
Variable	*Associated Plan Goal(s)*	*Input Data*	*Criteria*	*Weight*
Safety	Safe and Comfortable	Historic Crash Density*	Whether the project is along a corridor with historic crash density.	20%
Use / Demand	Healthy and Sustainable	Trip Potential	Volume of trips 1 mile or less occurring along the corridor, representing high walking and biking trip potential.	20%
Equity	Equitable and Accessible	Locations of Housing, Social Services, and Groceries**	Whether the project is in an area where people receiving social services live, and whether it helps to connect communities to important resources.	20%
Comfort / Lowering Stress	Safe and Comfortable Connected and Easy	Bicycle Level of Traffic Stress (BLTS)	Whether the project is along a roadway that is stressful for biking (LTS 3 or 4)	20%
Connecting Destinations	Connected and Easy	K-12 schools, parks, and grocery stores (including Target and Walmart)	Whether the project is near important destinations. Proximity to multiple destinations increases score.	20%
		Wayfinding Priority Routes	Whether the project is along priority wayfinding route.	

* Historic bike crash density and pedestrian crash density are merged for the purposes of prioritization. Enhancements for either mode will benefit the other. This also helps to account for the relatively small dataset.

** This dataset includes address of Section 8 households throughout the community, low-income housing complexes/units, food pantries, medical clinics/facilities, human service agencies, churches that provide services, grocery stores, financial counseling services, thrift stores, senior centers, Walmart, and Target.

Figure 26 | **Prioritized Bikeway and Shared-Use Path Projects**

The priorities illustrated on this map are one input used to determine which projects to build first and should not be interpreted as a commitment to order of implementation. Many additional factors influence the order in which projects are implemented. See the previous page for more information.



Potential Cost of Implementation of Path & Bikeway Recommendations

The table on this page illustrates the potential cost, in 2023 dollars, of implementing all of the paths and bikeways recommended in this Plan. However, it should be noted that many of the new shared use paths and bikeways on the edges of the City, including some labeled as "Further Study Needed" may not require the City to shoulder the full financial burden:

- As private property is subdivided or redeveloped, City ordinances will trigger shared use path construction.
- Some of shared-use path connections could be the responsibility of Story County. Figure 25 includes markers identifying where the City's responsibility would end, and the County's responsibility would begin.
- Projects under ISU jurisdiction would be the university's responsibility.
- Projects along state or federal highways would be the Iowa DOT's responsibility.
- Other opportunities may arise to reduce the financial burden, such as using federal or state grants.

Nevertheless, the cost of implementing the recommendations illustrates the necessity of prioritizing projects as shown in Figure 26. The Implementation Horizon section in Chapter 5 provides more detail on what portion of these path and bikeway recommendations may be reasonably implemented in the next 25 years.

Facility Type	*Potential Cost/Mile*	*Miles Proposed*	*Approximate Total Cost (FY 2023 Dollars)*
New Shared Use Path	$1,100,000	45.1	$49,600,000
Widen Existing Shared Use Path		10.3	$11,400,000
Bike Lanes	$180,000	3.6	$500,000
Separated Bike Lanes	$1,100,000	1.7	$1,800,000
Bicycle Boulevard	$300,000	5.0	$1,500,000
Bike Routes	$70,000	3.4	$200,000
Further Study Needed	$1,100,000	8.7	$9,600,000
Total		77.7	$74,600,000

Crossings

Safe, comfortable, and convenient street crossings are essential for walkability and bike-friendliness. In Ames, uncomfortable street crossings are a primary barrier to walking, biking, and rolling for many people. This plan recommends projects to enhance crossings for people walking and rolling, crossings for people biking, and crossings that serve both.

Achieving a comfortable crossing is very context-dependent—the design treatments, amount and speed of motor vehicle traffic, presence of traffic controls, street lighting, sight lines, and crossing distance all influence the comfort of a crossing. This plan identifies locations for crossing projects but does not specify designs. Rather, City staff should use the guidance provided in **Chapter 3** and engineering judgment to select appropriate treatments for each location during the implementation process.

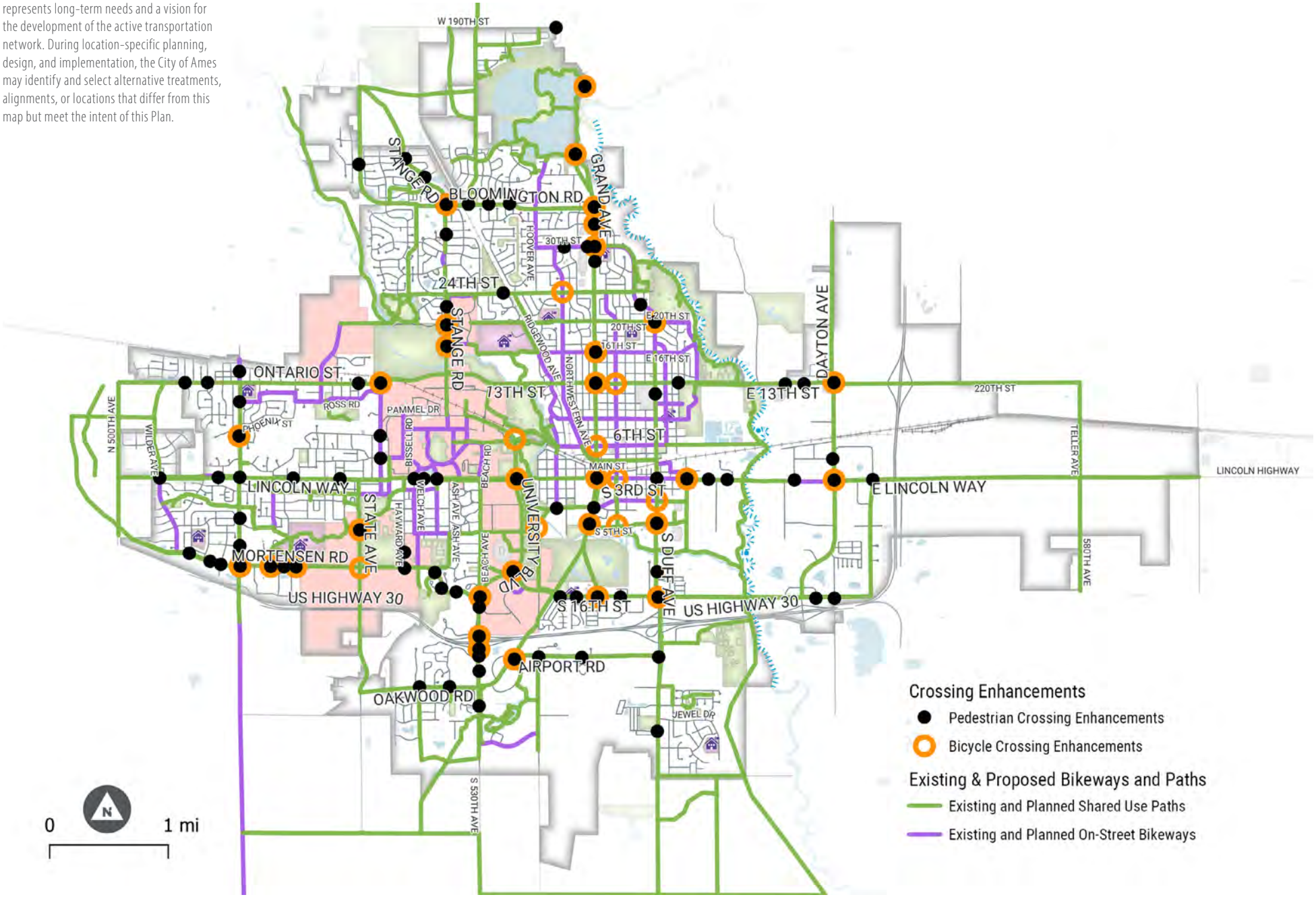
Needs and opportunities for crossing enhancement projects were identified by the series of analyses described in. This process involved evaluating the currently-high-stress crossings and large gaps between low stress crossings, and identifying locations for projects that meet one or more of the following criteria:

» Where bikeways intersect major streets, taking into consideration the intersection geometry, Bicycle Level of Traffic Stress of the cross-street, and presence of traffic control.
» In areas where more than 1/8 mile between low-stress crossings, selected intersections roughly midway between currently-low-stress crossings, or approximately every 1/8 mile or less. This focused on intersections close to bus stops and longer cross-streets. Crossing projects were not recommend if little to no development exists on one or both sides of the street.
» Intersections near schools (within 1/4 mile). Not every intersection was selected—especially those not directly leading to the school and if there are other locations with adequate crossings nearby.
» Where existing or proposed shared-use paths intersect streets and adequate crossing treatments do not already exist.

During public review of recommended crossing projects identified using the above logic, approximately 60 additional crossing needs were identified. These were reviewed, and where feasible were added to the plan. This resulted in a total of 108 crossing projects in WBRA, which are displayed in Figure 27.

Figure 27 | **Planned Crossing Projects**

The planned infrastructure shown on this map represents long-term needs and a vision for the development of the active transportation network. During location-specific planning, design, and implementation, the City of Ames may identify and select alternative treatments, alignments, or locations that differ from this map but meet the intent of this Plan.



Crossing Project Prioritization

The City of Ames has a limited amount of funding with which to build new infrastructure, and limited staff time to pursue grant funding. Because of this, it is important to decide which projects should be prioritized for implementation. A data-driven prioritization process—shaped around the WBRA Plan goals—used GIS data to score and rank projects based on objective criteria. The criteria and scoring process for crossing projects are described in the table on this page. The results of the prioritization, with the darkest projects being the highest-priority projects is shown in the map in Figure 28.

Project prioritization is one tool used to determine which projects to build first. Feasibility, funding availability, and the potential to "piggyback" on larger capital projects all factor in. Timelines for planning, funding applications, and engineering and design also influence order of implementation. This prioritization informs the City's Capital Improvement Plan (CIP), pursuit of grant funding, and dedication of staff time to coordination and planning. ISU also has its own priorities and ultimately has final determination of what and when infrastructure is built within its jurisdiction.

Crossing Project Prioritization Logic

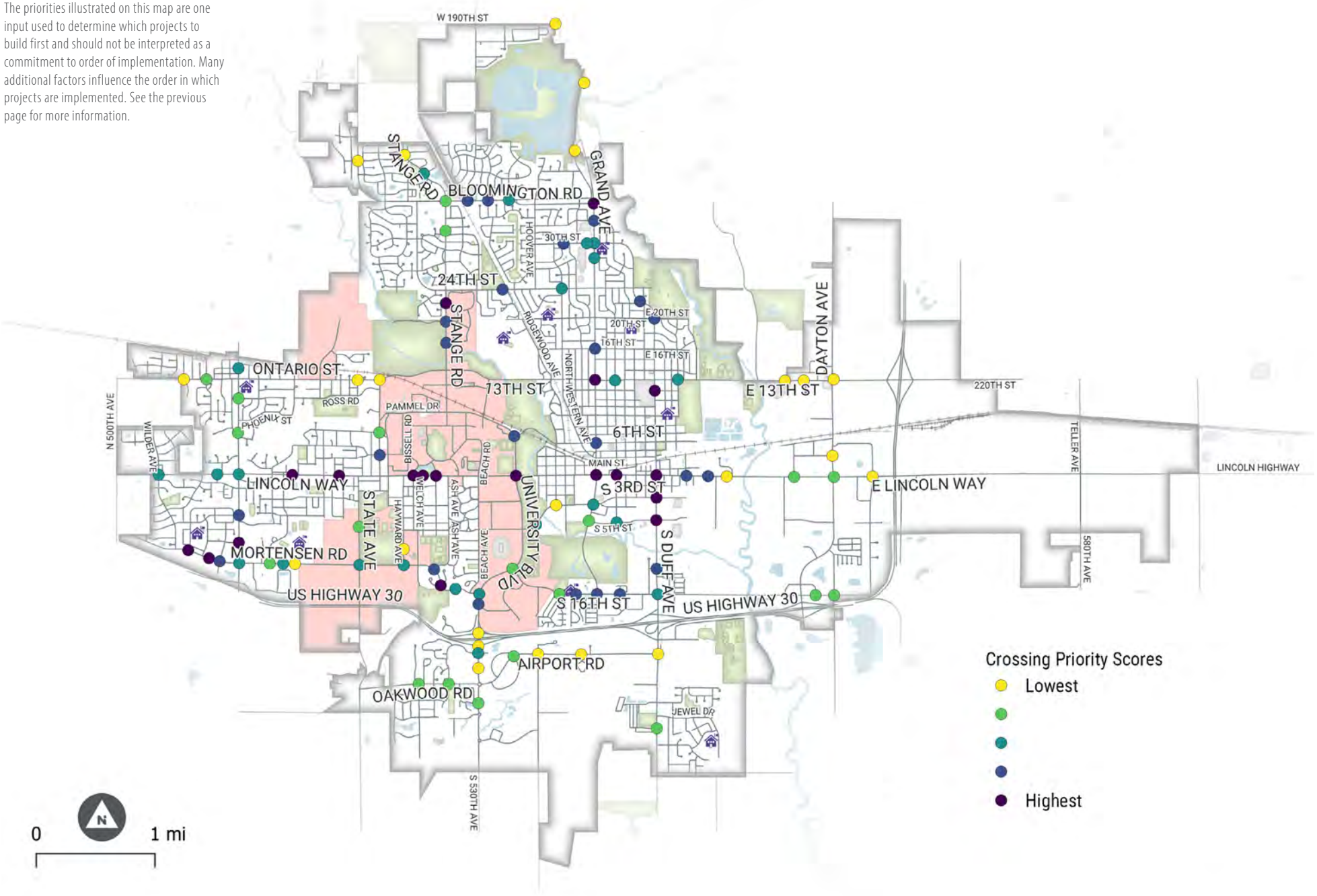
Variable	*Associated Plan Goal(s)*	*Input Data*	*Criteria*	*Weight*
Safety	Safe and Comfortable	Historic Crash Density*	Whether the project is along a corridor with historic crash density.	20%
Use / Demand	Healthy and Sustainable	Trip Potential	Volume of trips 1 mile or less occurring along the corridor, representing high walking and biking trip potential.	20%
Equity	Equitable and Accessible	Locations of Housing, Social Services, and Groceries**	Whether the project is in an area where people receiving social services live, and whether it helps to connect communities to important resources.	20%
Comfort / Lowering Stress	Safe and Comfortable Connected and Easy	Bicycle LTS; Pedestrian Crossing LTS	Whether the crossing is currently high-stress OR the street being crossed is stressful (BLTS).	15%
Connecting Destinations	Connected and Easy	K-12 schools, parks, and grocery stores (including Target and Walmart) Wayfinding Priority Routes	Whether the project is near important destinations. Proximity to multiple destinations increases score. Whether the project is along priority wayfinding route.	15%
Network Completion / Filling Gaps	Equitable and Accessible	Crossing Gaps	Whether the project is more than 1/8 mile from the nearest low-stress crossing, and whether the project is near bus stops.	10%

* Historic bike crash density and pedestrian crash density are merged for the purposes of prioritization. Enhancements for either mode will benefit the other. This also helps to account for the relatively small dataset.

** This dataset includes address of Section 8 households throughout the community, low-income housing complexes/units, food pantries, medical clinics/facilities, human service agencies, churches that provide services, grocery stores, financial counseling services, thrift stores, senior centers, Walmart, and Target.

Figure 28 | **Prioritized Crossing Projects**

The priorities illustrated on this map are one input used to determine which projects to build first and should not be interpreted as a commitment to order of implementation. Many additional factors influence the order in which projects are implemented. See the previous page for more information.



Potential Cost of Implementation of Crossing Recommendations

The table on this page illustrates the potential cost, in 2023 dollars, of implementing all crossing recommendations in this Plan. However, it should be noted that some of the crossing enhancements may not require the City to shoulder the full financial burden:

- Projects under ISU jurisdiction would be the university's responsibility.
- Projects along state or federal highways would be the Iowa DOT's responsibility.
- Other opportunities may arise to reduce the financial burden, such as using federal or state grants.

Nevertheless, the cost of implementing the recommendations illustrates the necessity of prioritizing projects as shown in Figure 28. The Implementation Horizon section in Chapter 5 provides more detail on what portion of these crossing recommendations may be reasonably implemented in the next 25 years.

Facility Type	*Potential Cost per Crossing Location (FY 2023 Dollars)*	*Approximate Number of Locations*	*Approximate Total Cost (FY 2023 Dollars)*
Crossing - 2- or 3-lane roadway	$50,000	29	$1,500,000
Crossing - 4-lane roadway (midblock or unsignalized)	$250,000	48	$12,000,000
Signalized Intersection Enhancements	$290,000	31	$9,000,000
Total		108	$22,500,000

Sidewalks

Sidewalks are fundamental to walking and rolling. While they do not take the place of sidepaths and on-street bikeways, sidewalks can also support biking—especially for younger children and along higher-speed streets with very low walking, biking, and rolling activity. Ames fortunately has sidewalks along both sides of most streets, so this plan focuses on projects that fill key sidewalk gaps.

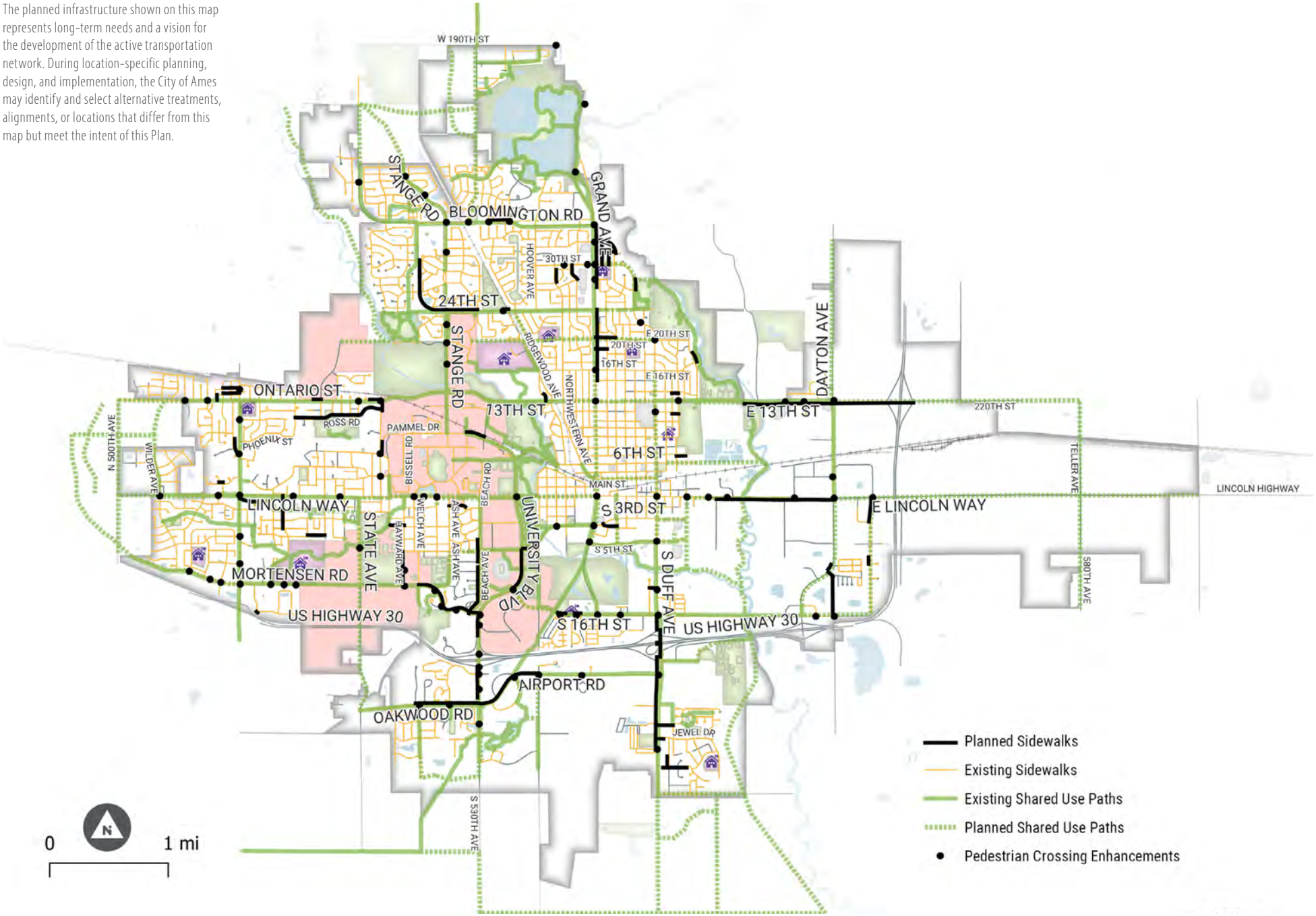
Needs and opportunities for sidewalk projects were identified by the series of analyses described in Chapter 2. This process involved determining whether each street segment in the city has sidewalk on one or both sides and then identifying where there are gaps. Not all gaps are identified as sidewalk projects. Rather, locations for projects were identified based on the following criteria:

- For busier streets (classified as arterial or collector streets, as well as any local street with more than 1,000 cars per day), any sidewalk gap is identified as a project, unless:
  - Significant physical constraints exist (such as retaining walls, etc.), and nearby pedestrian activity is likely low (such as industrial areas, neighborhood settings, etc.).
  - The gap is along a lengthy street corridor through undeveloped areas and park land. While this plan does not identify such locations for sidewalk projects, the City will still require sidewalks on both sides of such streets if and when development occurs in these areas.
- For all other streets that are within 0.25 mile of a K-12 school, sidewalk projects are recommended where there are gaps on both sides of the street so that complete sidewalk is provided on at least one side of the street.

In total, WBRA recommends 15 miles of sidewalk projects to fill the key sidewalk gaps shown on Figure 29.

Figure 29 | **Planned Sidewalk Projects**

The planned infrastructure shown on this map represents long-term needs and a vision for the development of the active transportation network. During location-specific planning, design, and implementation, the City of Ames may identify and select alternative treatments, alignments, or locations that differ from this map but meet the intent of this Plan.



Sidewalk Project Prioritization

The City of Ames has a limited amount of funding with which to build new infrastructure, and limited staff time to pursue grant funding. Because of this, it is important to decide which projects should be prioritized for implementation. A data-driven prioritization process—shaped around the WBRA Plan goals—used GIS data to score and rank projects based on objective criteria. The criteria and scoring process for sidewalk projects are described in the table on this page. The results of the prioritization, with the darkest projects being the highest-priority projects is shown in the map in Figure 30.

Project prioritization is one tool used to determine which projects to build first. Feasibility, funding availability, and the potential to "piggyback" on larger capital projects all factor in. Timelines for planning, funding applications, and engineering and design also influence order of implementation. This prioritization informs the City's Capital Improvement Plan (CIP), pursuit of grant funding, and dedication of staff time to coordination and planning. ISU also has its own priorities and ultimately has final determination of what and when infrastructure is built within its jurisdiction.

Sidewalk Project Prioritization Logic

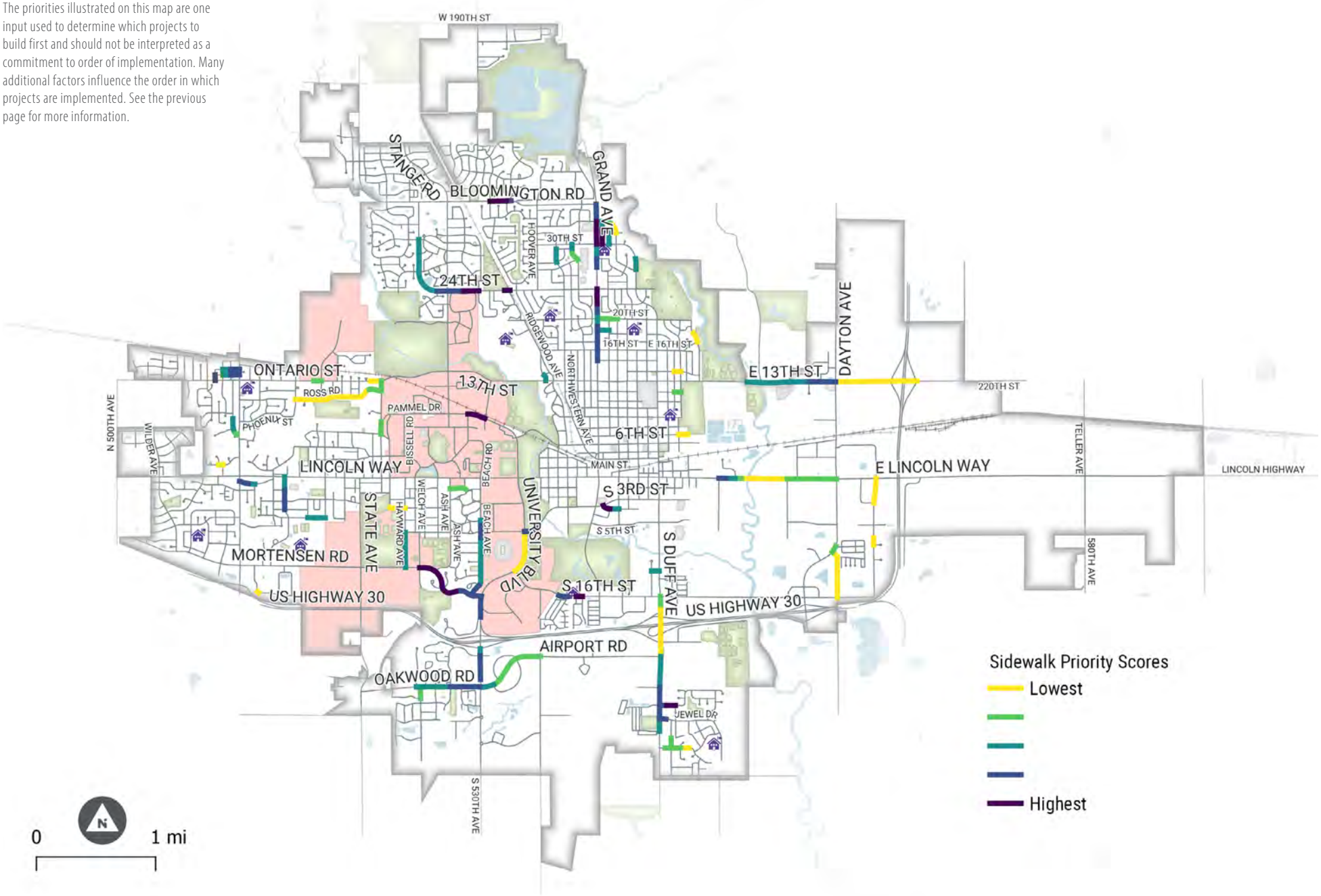
Variable	*Associated Plan Goal(s)*	*Input Data*	*Criteria*	*Weight*
Safety	Safe and Comfortable	Historic Crash Density*	Whether the project is along a corridor with historic crash density.	20%
Use / Demand	Healthy and Sustainable	Trip Potential	Volume of trips 1 mile or less occurring along the corridor, representing high walking and biking trip potential.	20%
Equity	Equitable and Accessible	Locations of Housing, Social Services, and Groceries**	Whether the project is in an area where people receiving social services live, and whether it helps to connect communities to important resources.	20%
Comfort / Lowering Stress	Safe and Comfortable Connected and Easy	Pedestrian Crossing LTS	Whether the project is near a stressful pedestrian crossing.	15%
Connecting Destinations	Connected and Easy	K-12 schools, parks, and grocery stores (including Target and Walmart) Wayfinding Priority Routes	Whether the project is near important destinations. Proximity to multiple destinations increases score. Whether the project is along priority wayfinding route.	15%
Network Completion / Filling Gaps	Equitable and Accessible	Sidewalk Gaps	Whether the project fills a gap in the existing system, with locations where sidewalk is missing on both sides and locations within 100 feet of a bus stop scoring higher.	10%

* Historic bike crash density and pedestrian crash density are merged for the purposes of prioritization. Enhancements for either mode will benefit the other. This also helps to account for the relatively small dataset.

** This dataset includes address of Section 8 households throughout the community, low-income housing complexes/units, food pantries, medical clinics/facilities, human service agencies, churches that provide services, grocery stores, financial counseling services, thrift stores, senior centers, Walmart, and Target.

Figure 30 | **Prioritized Sidewalk Projects**

The priorities illustrated on this map are one input used to determine which projects to build first and should not be interpreted as a commitment to order of implementation. Many additional factors influence the order in which projects are implemented. See the previous page for more information.



Potential Cost of Implementation of Sidewalk Recommendations

The table on this page illustrates the potential cost, in 2023 dollars, of implementing all the sidewalks recommended in this Plan. However, it should be noted that some of the new sidewalks may not require the City to shoulder the full financial burden:

- As private property is subdivided or redeveloped, City ordinances will trigger sidewalk construction.
- Projects under ISU jurisdiction would be the university's responsibility.
- Projects along state or federal highways would be the Iowa DOT's responsibility.
- Other opportunities may arise to reduce the financial burden, such as using federal or state grants.

Nevertheless, the cost of implementing the recommendations illustrates the necessity of prioritizing projects as shown in Figure 30. The Implementation Horizon section in Chapter 5 provides more detail on what portion of these sidewalk recommendations may be reasonably implemented in the next 25 years.

Facility Type	*Potential Cost/ Mile*	*Miles Proposed*	*Approximate Total Cost (FY 2023 Dollars)*
Sidewalk	$320,000	15	$4,800,000
Total		**15**	**$4,800,000**

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CHAPTER 5

Implementation Strategies & Action

Strategies & Actions

Achieving the goals of Walk Bike Roll Ames requires more than infrastructure. In addition to building sidewalks, pedestrian crossings, bikeways, and trails, the City and partners need to amend policies and invest in community programs—key ingredients to creating a place where walking, bicycling, and rolling are connected, safe, and convenient. Community programs can be led by the City, Iowa State University, various community groups, and advocacy organizations. Proposed policy actions are at the discretion of City Council.

This chapter sets forth eight high-level strategies, information about past and ongoing work that supports the strategy, and the specific actions to develop policies and programs that can be implemented over the next 10 years.

The icons below are used throughout this section to illustrate how each strategy aligns which the four goals of Walk Bike Roll Ames.

Safe and Comfortable

Connected and Easy

Healthy and Sustainable

Equitable and Accessible

The strategies—expanded on the following pages—include:

- **Strategy 1:** Increase maintenance and repair of sidewalks, bike lanes, and paths
- **Strategy 2:** Lower motor vehicle speeds
- **Strategy 3:** Standardize decisions about street, bikeway, and walkway design
- **Strategy 4:** Improve pedestrian crossings, especially near bus stops
- **Strategy 5:** Encourage mode shift from driving to walking, biking, and rolling
- **Strategy 6:** Develop a Safe Routes to School plan and program for elementary, middle, and high schools
- **Strategy 7:** Improve bike parking throughout Ames
- **Strategy 8:** Update and accelerate implementation of the Ames ADA Transition Plan

Strategy 1

Increase maintenance and repair of sidewalks, bike lanes, and paths

Having well maintained walking, biking, and rolling infrastructure was a major theme in community conversations on walking and biking. Concerns included gravel and debris in bike lanes and on paths, and issues with leaves and snow. Paths throughout Ames have a variety of owners: a maintenance program would include a plan to keep active transportation infrastructure clear of debris and snow with priority routes, responsible parties, and consistent schedule. In addition to regularly-scheduled maintenance, the City should consider developing a systemic approach to repairing and repaving paths. The City has already allocated increasing levels of funding for path repair in the next five years in the Capital Improvement Plan. Having a more systemic and clearly defined program for inventorying the quality of the active transportation network and keeping it in good condition would have clear comfort and safety impacts for all users.

Additional Implementation Partners:

» Ames Parks & Recreation, ISU

Specific Actions	*Action Lead*
Continue use of the Ames On the Go app to address debris concerns such as leaves and snow and encourage residents to use the app to report concerns.	Ames Public Works
Adopt a maintenance plan that details what entities are responsible for maintenance and repair of walking, biking, and rolling infrastructure throughout the City and campus, and existing maintenance plans, programs, and methods. Use a tiered priority system of routes and/or trails that connect facilities that are critical to Ames' walkability and bikeability.	Ames Public Works
Leverage the City's GIS system to incorporate infrastructure construction and maintenance history and continue to leverage construction and maintenance best practices to provide increased pavement surface conditions.	Ames Public Works
Continue to allocate dedicated funding in the CIP to path pavement resurfacing and repair.	Ames City Council
Educate property owners about their responsibilities for snow clearing and other sidewalk maintenance. Enforce maintenance requirements for negligent property owners.	Ames Public Works

It should be noted that these actions were prepared with recognition of the existing staffing and equipment availability. The impacts to available resources should be evaluated before increasing the maintenance aspects beyond current recommendations.

Active Transportation Maintenance Recommendations

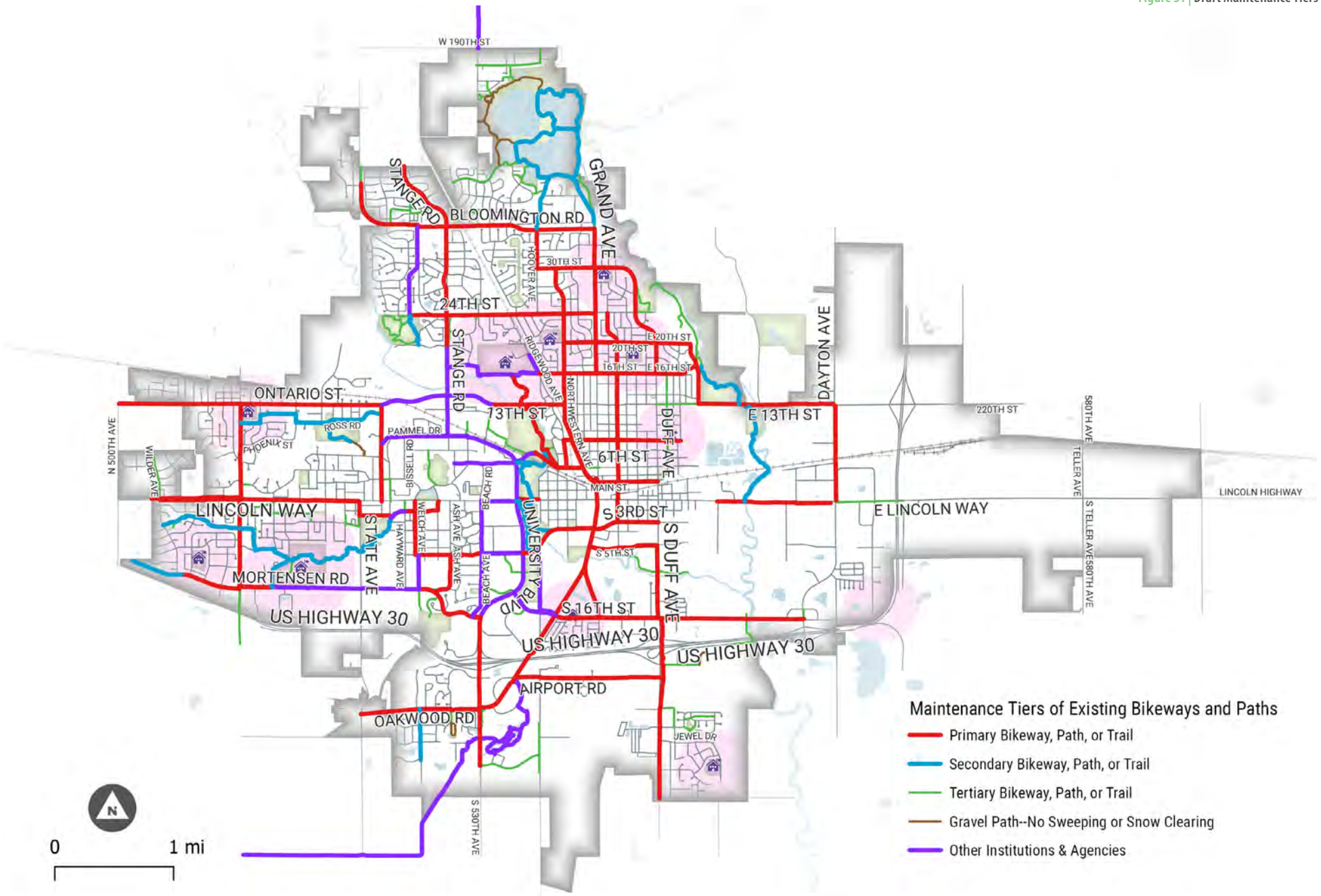
This plan recommends a system of primary, secondary, and tertiary routes to guide the City in maintaining the active transportation network. Implementing these maintenance recommendations will require additional operating funding. The primary, secondary, and tertiary corridors are shown in Figure 31. The table below proposes frequency and standards for maintenance of different corridors.

The responsibility of each segment will need to be agreed upon through further negotiations and discussions between Ames Public Works, Ames Parks and Recreation, ISU, business districts, Story County, and Iowa DOT; the City of Ames may also need to amend its Ice and Snow Management Policy.

Frequency of Maintenance for Active Transportation Corridor Tiers

MAINTENANCE ACTIVITIES	PRIMARY CORRIDORS	SECONDARY CORRIDORS	TERTIARY (ALL OTHER) CORRIDORS
Ice and Snow Management			
On-Street Bicycle Facilities	» Maintain in accordance with current City Ice and Snow Management Policy		
Shared-Use Paths and Trails	» Maintain in accordance with current City Ice and Snow Management Policy		
Ongoing Maintenance			
On-Street Bicycle Facility street sweepings	» Every month between April and November (8x per year)	» Spring and Fall (twice a year)	» Once yearly
Shared Use Path sweepings	» Spring and fall (twice a year)	» Spring and fall (twice a year)	» Once yearly
Shared Use Path vegetation maintenance	» Mow bi-weekly during the growing season. A minimum 4′ shoulder on either side of the path should be mowed for sight distance and vision triangles.	» Mow a minimum of once a month during the growing season. A minimum a 3′ shoulder on either side of the path should be mowed.	» Mow at discretion of path or trail management agency.
Pavement Management			
Pavement ratings	» Evaluate condition of pavement for all streets every two years using accepted Pavement Condition Index (PCI). For paths, implement a pavement condition assessment tool using a combination of visual and pavement condition evaluation methods appropriate for trails every 5 years.		
On-Street Bicycle Facilities	» Joint seal and seal coat in accordance with current City pavement management practices » Repair potholes and patch in accordance with current City pavement management practices » Resurface in accordance with current City pavement management practices		
Shared-Use Paths and Trails	» Joint seal and seal coat every 5 years or as needed » Phase out asphalt paths; all new paths should be concrete » Resurface asphalt paths every 20 years or as funding allows		» Joint seal and seal coat at discretion of path or trail management agency » Resurface and replace at discretion of path or trail management agency.

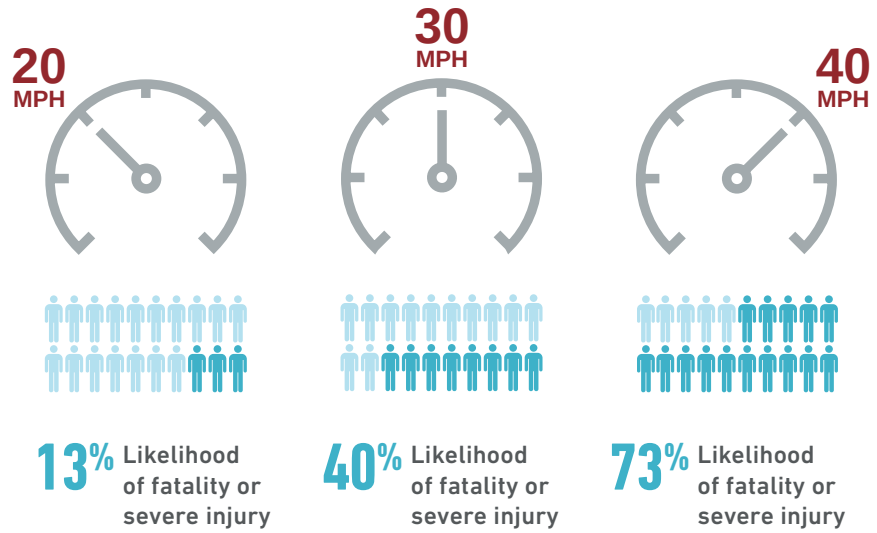
Figure 31 | **Draft Maintenance Tiers**



Strategy 2

Lower motor vehicle speeds

Research has shown that motor vehicle speed is the main indicator of how severe a crash will be, especially when people walking and biking are involved. Having slower speeds, especially on streets where there are high levels of pedestrian and bicycle use along or across the roadway, is essential to improve safety outcomes. In addition, high motor vehicle speeds are a key indicator of how comfortable people of all ages and abilities feel walking or biking along a roadway. Lowering motor vehicle speeds improves the sense of comfort and security for people walking, biking, and rolling.



Data Citation: Tefft, B.C. (2011). *Impact Speed and a Pedestrian's Risk of Severe Injury or Death* (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.

Specific Actions	*Action Lead*
Periodically identify a set of streets and/or corridors where speed reduction is needed to increase safety for people walking, biking, and rolling using citywide speed data, traffic data, multimodal data, safety/crash data, and roadway/land use classifications. Use appropriate engineering, education, and, potentially, enforcement, strategies to reduce speed limits on these streets.	Ames Public Works
In accordance with recommended practices, conduct a reduced speed limit pilot program for residential streets. Identify key streets to test the program. Streets should include residential streets used frequently by people walking, biking, and rolling and/or be near important destinations such as schools and parks. Streets in other key corridors, such as Downtown and Campustown, or identified in the *Ames Complete Streets Plan* should also be considered.	Ames Public Works
Evaluate whether actual speeds are reduced and measure changes in crash rates and severity. Use findings from these evaluations to plan, design, and implement strategies for reducing speeds throughout Ames. Based on the results of the pilot, consider systemic implementation of strategies or changes in tactics.	Ames Public Works

Additional Implementation Partners:

» Ames Police, City Attorney, Neighborhood & Business Associations, ISU

Strategy 3

Standardize decisions about street, bikeway, and walkway design

Right-of-way (ROW) design and space allocation can be one indication of how a city prioritizes the comfort and safety of people walking, biking, and rolling. Ames' subdivision and zoning ordinances could be updated to directly influence active transportation users' safety and comfort on new and reconstructed streets. For example, the Ames Complete Streets Plan recommends consolidation and narrowing of commercial driveways on throughput-oriented streets, wider sidepaths in areas where pedestrians will be present, wider buffer from the curb, and separate spaces for walking and biking where feasible. In the older part of the city, process guidelines can standardize the way the City makes decisions to allocate street space when difficult trade-offs need to be made. For example, if a street is identified as being part of the bicycling network in this Plan, then staff should place a higher priority on building the bicycle facility to the proper standard, and allocate the remaining right-of-way by applying design flexibility for the other street users or placing a lower priority on other uses, such as narrowing or reducing vehicle lanes, removing on street parking, or narrowing buffers.

Additional Implementation Partners:

» Ames Planning, Neighborhood & Business Associations, Development Community, ISU

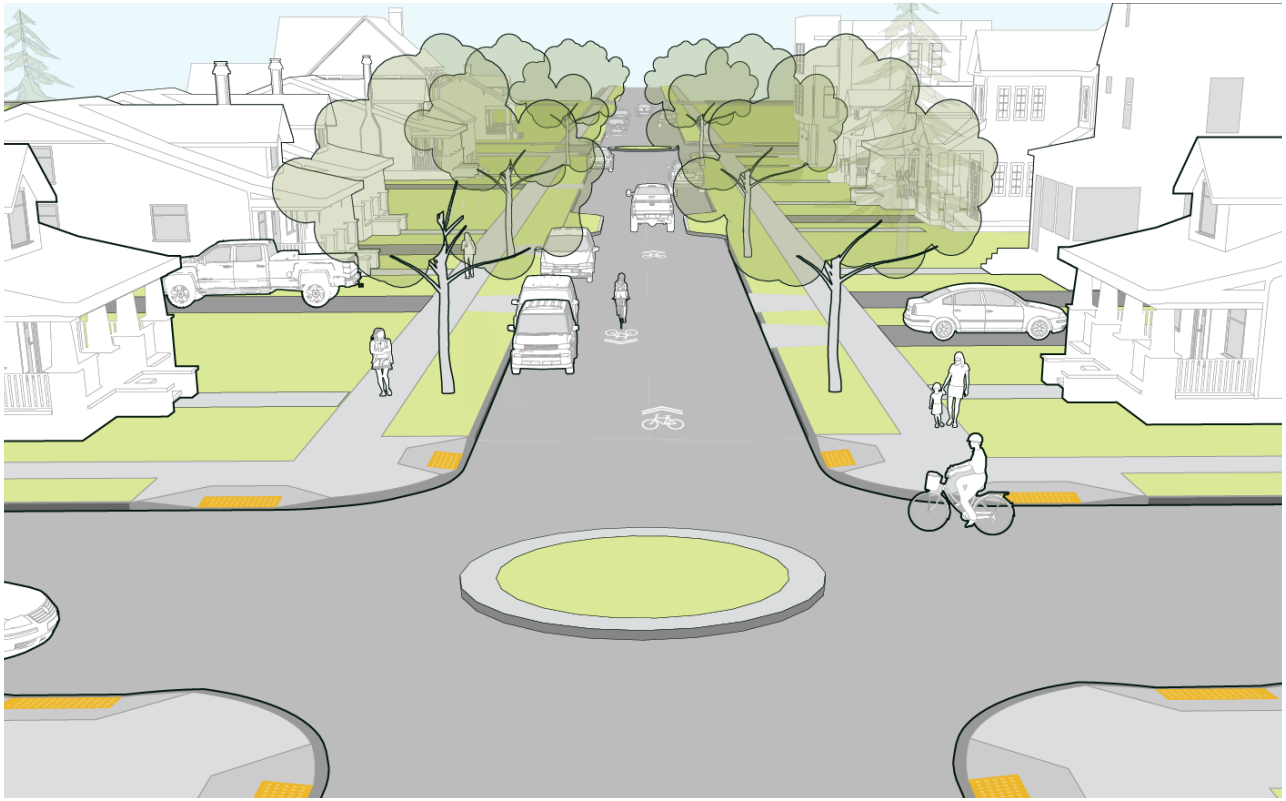


Figure 32 | A Drawing of a Bike Boulevard (variant of the Neighborhood Street type) from the Ames Complete Street Plan.

Specific Actions	*Action Lead*
Incorporate the *Complete Streets Plan* street types and design standards into city development ordinances for both new subdivisions and infill development to better accommodate and encourage walking, biking, and rolling. Make requirements consistent with the design criteria parameters and guidelines in the *Complete Streets Plan*.	Ames Planning
Utilize street reconstruction or redevelopment opportunities to widen sidepaths, sidewalks, and bike lanes to desired widths when feasible.	Ames Public Works
Continue to utilize internal process guidelines or checklists to help the City make decisions about allocating space in the public right-of-way (especially in older neighborhoods) that is consistent with the *Complete Streets Plan*.	Ames Public Works
Coordinate with ISU to create a more cohesive walking and biking network.	Ames Public Works

Strategy 4

Improve pedestrian crossings, especially near bus stops

Safe and convenient street crossings are an instrumental part of creating a complete transportation network. People walking will cross the street to get to their destinations and are only likely to use formalized pedestrian crossings if they are nearby and provide an enhanced feeling of safety and comfort. Ames has installed a number of Rapid Rectangular Flashing Beacons (RRFBs) and high-visibility crosswalks at certain intersections and mid-block crossings with high pedestrian volumes. The City has also historically funded enhanced pedestrian crossings on a case-by-case basis. This Plan includes recommendations to improve safety at more than 100 crossing locations through a variety of measures, such as removing turn lanes, tightening corner radii, or installing curb extensions (see the Crossing Toolkit in Chapter 3).

Additional Implementation Partners:

» CyRide, ISU, Ames Planning

Specific Actions	*Action Lead*
Apply best practice pedestrian crossing standards that account for vehicle speeds and volumes, projected pedestrian use, number of lanes/length or crossing, and destination types, such as the FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*. Incorporate these standards into the City's development ordinances and street design standards.	Ames Public Works
Collaborate with CyRide to study existing bus stop spacing and placement and develop recommendations for co-locating bus stops with crossings based on ridership, crossing visibility, and bus frequency, among other characteristics.	Ames Public Works
Pursue grant funding to build the pedestrian crossing infrastructure for the priority crossings in the Plan.	Ames Public Works
Continue to allocate funding in the CIP for the priority crossings in the Plan.	Ames City Council
Evaluate and selectively prohibit right turns on red to reduce conflicts with pedestrian and bicycle traffic. Prioritize prohibiting right turns on red downtown, near ISU, and along corridors with high levels of walking and biking activity.	Ames Public Works

Strategy 5

Encourage mode shift from driving to walking, biking, and rolling

Ames has set a greenhouse gas emission reduction target, with the goal of reducing emissions and reaching net-zero emissions by 2030. It is currently developing a Climate Action Plan to identify the specific strategies it will use to achieve this goal. The plan will likely include strategies to increase active transportation and transit use in the city. To achieve those goals, the safety and convenience of active transportation and transit needs to be increased. Changing land use and development patterns to make walking and biking easy and convenient is one way of encouraging mode shift. Bike share programs and e-bike incentives that make biking easier and more convenient could be explored, especially if they can be tailored to support people with low incomes.

In future phases, the City and the MPO should evaluate programs that work with major employers or specific neighborhoods to encourage transit use, biking, and walking. For example, ISU students use of CyRide is included in their student fees, while ISU offers bus passes to faculty and staff at discounted rates.

Additional Implementation Partners:

» Ames Planning, ISU, Ames Area MPO, Ames Electric, Neighborhood & Business Associations

Specific Actions	*Action Lead*
Explore opportunities to further reduce or eliminate the amount of car parking required in development standards, and potentially eliminate parking minimums in more areas of the city.	Ames Planning
Evaluate minimum bike parking requirements for new development	Ames Planning
Regularly update this Plan to include planned bike and pedestrian facilities in growth areas to coordinate recommendations for the growth areas in the Comprehensive Plan.	Ames Public Works and Planning
Work with partners to evaluate the potential for a bikeshare program. Bikeshare can encourage people to try biking again by removing barriers to biking such as maintenance, bike locks, and bike storage. Most North American bikeshare programs offer e-bikes which make biking more attractive. Bikeshare also provides an opportunity to collect data on travel patterns to help inform infrastructure projects and prioritization.	Ames Public Works
As bikeshare is established and expanded, explore strategies for a Transportation Demand Management (TDM) program to encourage mode shift from vehicles to walking, biking, rolling, and transit. TDM can include a variety of methods and target individual residents, campuses, specific neighborhoods, or major employers (ISU, USDA) using programs and/or incentives such as transit passes, pay-as-you-go parking passes (instead of annual or monthly passes), or guaranteed ride programs.	Ames City Council
Consider an e-bike rebate program (such as examples in Raleigh, NC or Denver, CO) to subsidize e-bikes, prioritizing low-income residents. E-bikes have the potential to significantly increase the number of bike trips, but people who may benefit most from e-bikes cannot afford them.	Ames City Council
Regularly collect, evaluate, and report data on walking, biking, and rolling volumes / rates in Ames, mode shift, and crashes involving people walking, biking, or rolling. Evaluate the use of data sources and physical data sensors to create data where none is currently available.	Ames Area MPO

Strategy 6

Develop a Safe Routes to School plan and program for elementary, middle, and high schools

Safe Routes to School (SRTS) is a national movement to increase the numbers of students walking, biking, and rolling to school using a holistic approach that incorporates encouragement, education, evaluation, and engineering. The Ames Area MPO has developed "SRTS maps" identifying routes to schools for the five elementary schools and the middle school in the Ames Community School District (ACSD). However, a full-fledged SRTS plan would identify specific infrastructure investments to improve the safety of children walking and biking to school, as well as other programs such as encouragement and education. The Iowa DOT administers SRTS funding as part of the Transportation Alternatives Program (TAP). A SRTS plan would help the City, ACSD, or the Gilbert School District (GSD) apply for funding to provide educational resources to students and their families, apply for funding to improve walking and biking infrastructure near schools, and/or promote walking and biking to school.

Additional Implementation Partners:

» Ames Area MPO, Ames Community School District, Gilbert School District, Ames Public Works, Ames Parks & Recreation, Ames Police, Story County Public Health, Mary Greeley Medical Center

Specific Actions	*Action Lead*
Develop a SRTS Plan update that identifies infrastructure projects near all elementary, middle, and high schools in Ames, as well as programs such as encouragement and education.	Ames Area MPO
Support bicycle safety education programming provided through ACSD, GSD, Ames Parks and Recreation, or local youth program providers such as YSS. The SRTS Plan should include evaluation and recommendations of appropriate agencies and organizations to lead bicycle education programming in Ames, and the appropriate ages or grades for such programs.	TO BE DETERMINED
Support programs to encourage and promote children walking and biking to school and other activities. The SRTS Plan should include evaluation and recommendations of appropriate agencies and organizations to lead encouragement programs in Ames.	TO BE DETERMINED

Strategy 7

Improve bike parking throughout Ames

One of the most common obstacles for traveling by bike is the lack of bicycle parking. People who live in multifamily housing without dedicated sheltered long-term parking for bikes will find it inconvenient to bring their bicycles in and out of the building every time. When people arrive at destinations and cannot find a convenient place to lock their bike, they are discouraged from traveling by bike in future trips. Currently, there is a variety of bike rack styles used throughout Ames, many of which do not meet best practices. New bicycle parking in Ames should align with national best practices and include guidance on rack design; sizing for cargo bikes, e-bikes, and bikes with trailers; and placement relative to building entrances.

Additional Implementation Partners:

» Ames Area MPO, Ames Planning, Ames Parks & Recreation, Ames Fleet Services

Specific Actions	*Action Lead*
Review and update existing parking requirements in development standards to require new commercial, office, and multifamily to provide publicly-accessible bike racks (minimum spaces based on square feet, units, etc.). Bike parking standards should also accommodate cargo bikes, bikes with trailers, and e-bikes (which are heavier and have larger tubing which make locking with a U-lock more difficult). The City of Cambridge Bicycle Parking Guide can serve as a best practice resource for the amount and type of bicycle parking for different types of land uses.	Ames Planning
Install high-quality bike parking in public spaces. There will first need to be an inventory of existing bike parking in downtown, Campustown, at CyRide stops, and parks to determine where bike parking is missing or needing replacement. Bicycle parking should be selected and installed following the Association of Pedestrian & Bicycle Professionals Bicycle Parking Guidelines.	Ames Public Works
Updating development standards will only apply to new developments. Evaluate a program that subsidizes bike parking near businesses. To accelerate the installation of bike racks throughout the city—especially on large privately-owned commercial parcels—Ames could establish a program to incentivize additional bike parking or offer to install it for free when a business or property owner asks for it. Madison, Wisconsin offers a program that can serve as a model.	Ames City Council

Strategy 8

Regularly Update the Ames ADA Transition Plan

Poor pavement on paths and sidewalks and curb ramps that do not meet current standards limit accessibility for people with disabilities. These and other accessibility issues should be addressed through an Americans with Disabilities Act (ADA) Transition Plan, a document required by the ADA for agencies over 50 employees that lists the changes necessary to achieve equitable access to City programs, facilities, and services. The Ames ADA Transition Plan was last updated in 2023 to include an audit of all parks and recreation facilities in Ames. This plan should be reviewed and updated to ensure that walking, biking, and rolling infrastructure along streets (i.e., curb ramps, sidewalks, and traffic signals) are accessible to all ages and abilities.

Additional Implementation Partners:

» Ames Planning

Specific Actions	*Action Lead*
Update the ADA Transition Plan with an inventory of all sidewalk obstructions, maintenance issues, pedestrian push-button access at traffic signals, and missing sidewalk ramps.	Ames Public Works
Review the process for allowing permitted uses of public sidewalks and paths to ensure that compliant accessible routes are maintained.	Ames City Manager's Office
Continue to allocate funding in the CIP for addressing the obstructions and concerns identified in the ADA Transition Plan.	Ames City Council

Implementation Horizon

This plan includes recommendations for 77.7 miles of paths and bikeways, 108 crossing projects, and 15.0 miles of new sidewalks. The total cost of these infrastructure recommendations is nearly $102 million, which far exceeds the current funding sources for active transportation infrastructure in the City of Ames. The table on this page illustrates the quantity and cost of projects in each of the three plan elements, categorized by priority level (see Chapter 4 for explanation of the prioritization methods used for each type of project).

The information shown on this page constitutes a cost impact assessment and is based on historical funding levels. The implementation of this Plan is expected to follow current City of Ames funding policies.

How Will the City Decide What Gets Built?

The City of Ames will focus on implementing the high priority sidewalks, bikeways and crossings identified in the table on this page and in Chapter 4. But the City will also need to consider other factors when deciding what to build each year, such as the feasibility and constructibility of each project; unforeseen opportunities to build other projects; and time needed to plan, apply for funding, and conduct engineering and design. ISU also has its own priorities and ultimately has final determination of what and when infrastructure is built within its jurisdiction.

Funding Strategy

The path, bikeway, crossing, and sidewalk projects identified in this plan will be funded through various means. Some of these sources are more predictable than others.

Dedicated Funding

The City of Ames dedicates funding to active transportation infrastructure projects each year. In the past few years, the funding amount has been $1.2 million per year. Starting in fiscal year 2025, this level is anticipated to increase to $1.3 million per year—and then further increase by $100,000 per year every 5 years (e.g., $1,400,000 per year for 2030-2034, $1,500,000 per year for 2035-2039, etc.).

At its current and anticipated funding levels, the City's dedicated funding can fully cover the costs of the high priority projects identified in this plan over the course of 15 to 20 years. Because of inflation, increases in the real costs of implementation will outpace planned increases in dedicated funding.

Said simply, the City's current and anticipated funding levels cannot alone bear the entire weight of this plan. Implementing this plan in its entirety—as well as implementing the high priority projects more rapidly—will require a change in revenue, whether that means increasing the City's dedicated funding or better capitalizing on some of the other funding options outlined on the following page.

Priority Level	Paths & Bikeways		Crossings		Sidewalks		Total Costs (FY 2023 Dollars)
	Miles	Approximate Cost (FY 2023 Dollars)	Locations	Approximate Cost (FY 2023 Dollars)	Miles	Approximate Cost (FY 2023 Dollars)	
High	11.4	$ 10,900,000	33	$ 6,900,000	3.1	$ 1,000,000	$ 18,800,000
Med-High	19.6	$ 18,800,000	18	$ 3,700,000	1.5	$ 500,000	$ 23,000,000
Medium	7.4	$ 7,100,000	14	$ 2,900,000	4.2	$ 1,300,000	$ 11,300,000
Med-Low	20.5	$ 9,700,000	23	$ 4,800,000	4.9	$ 1,600,000	$ 26,100,000
Low	18.8	$ 8,100,000	20	$ 4,200,000	1.3	$ 400,000	$ 22,700,000
Totals	**77.7**	**$ 74,600,000**	**108**	**$ 22,500,000**	**15.0**	**$ 4,800,000**	**$ 101,900,000**

The City's current dedicated funding for Active Transportation can pay for this plan's high priority projects in 15 to 20 years.

Roadway and Other Capital Projects

Some portion of the recommendations of this plan (including some of the high priority projects) can be implemented as part of larger street reconstruction projects, major utility projects, or other large capital projects that impact the right-of-way. In many cases, implementing this plan's recommendations as part of these larger capital projects will not add any cost to those projects and will therefore reduce the total implementation costs of this plan.

New Development

Regulations in Ames require developers to provide various elements of the infrastructure when developing and redeveloping land. Most of the plan recommendations in the new growth areas of Ames will likely be implemented in this way. These projects have lower priority scores because they are in areas without many existing destinations; however, they will become important as those parts of the community grow.

Grants

Numerous competitive grant programs are available to fund the implementation of paths, bikeways, crossings, and sidewalks. Some of the larger and more notable programs include the Transportation Alternatives Program (TAP; the Ames Area MPO is appropriated funding and allocates it annually) and the more recent Safe Streets and Roads for All (SS4A) program, a federal program with $5 billion in appropriated funds between 2022 and 2026. While these programs can be valuable sources of funding, preparing applications takes staff time and long-term funding levels cannot be predicted.

Conclusion

Walk Bike Roll Ames establishes a vision and set of goals for active transportation in Ames, recommends specific infrastructure investments, identifies priorities for implementation, and provides strategies and action items to help meet the plan's goals. However, the degree to which this plan is implemented depends entirely on the level of commitment and investment that will be chosen by the community and its leaders.

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