Heartland connections

Bicycle & Pedestrian Plan

Omaha-Council Bluffs Metro Area

Table of Contents

U.S. Department of Transportation
Federal Highway Administration

MAPA

NDOR
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1 Introduction and Background

The Heartland Connections Bicycle and Pedestrian Plan is the first comprehensive bicycle and pedestrian plan for the Omaha metropolitan area. This plan was prepared on the heels of a regional multimodal exercise begun by the Metropolitan Area Planning Agency (MAPA) called Heartland Connections. That effort consisted of two distinct planning projects, a regional transit vision and a regional bicycle and pedestrian plan. The initiative involved a series of workshops with varied stakeholders representing local governments and other key transportation partners.

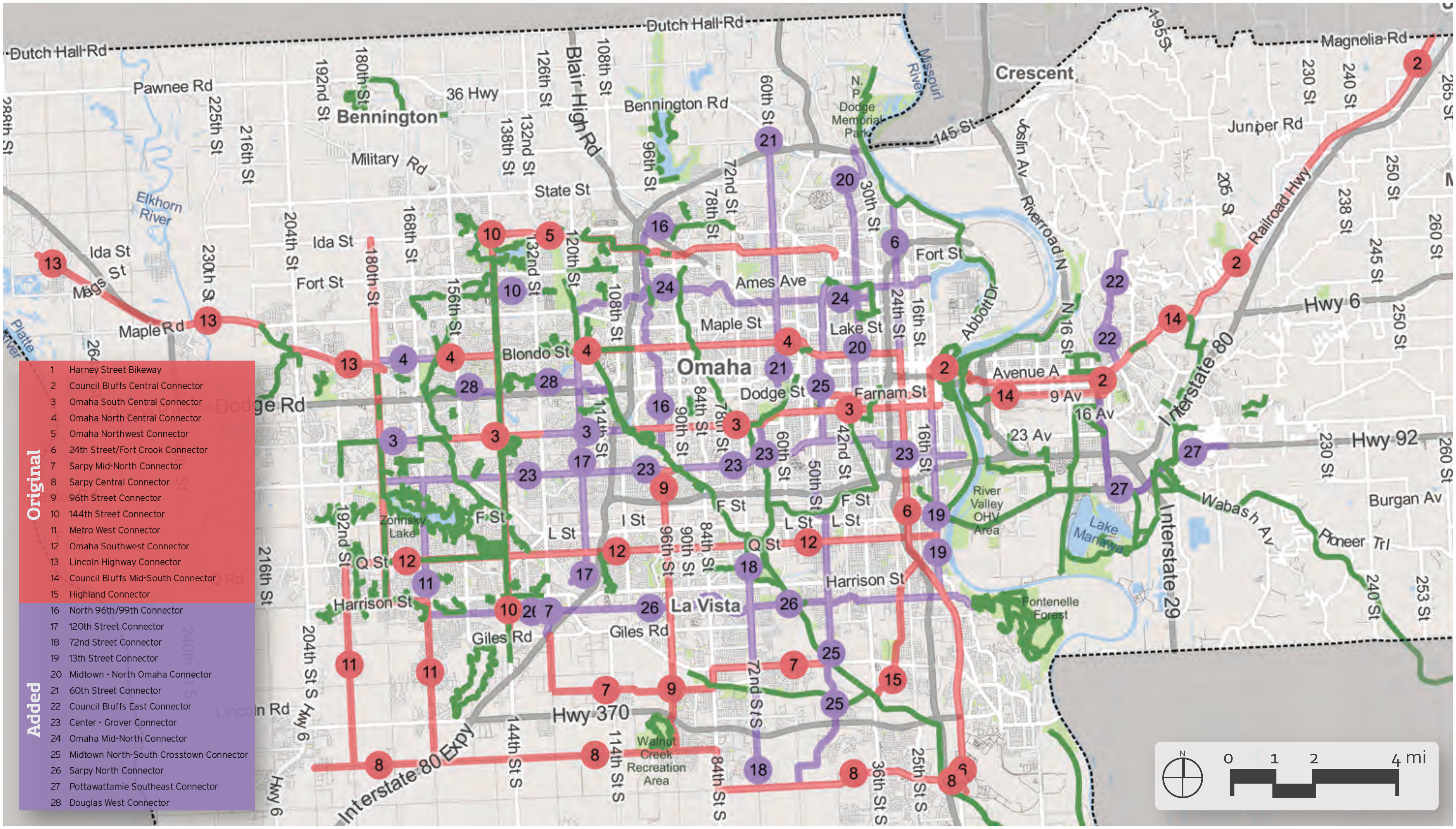
In addition to a major kick-off workshop, meetings in the three counties of Douglas and Sarpy in Nebraska, and Pottawattamie in Iowa were also conducted. The result of the workshops yielded generalized goals and performance objectives. Most importantly for this plan, bicycle corridors were identified on which to direct more intense planning efforts and investments. Even before that effort, MAPA started its Long Range Transportation plan process. Of significance, much of the public comment produced through that effort called for a transportation system with more opportunities for transit, walking and bicycling.

In late 2013, the planning process began for the Heartland Connections Bicycle and Pedestrian Plan.

The objective of this plan is two-fold: establish a series of recommendations for specified corridors that create a system of bikeways and walkways that provide local and regional connectivity, and to develop a set of efforts focused on putting the plan into action. This plan builds on some recent successes in the metro area, but an equal number of challenges persist. The area has an extensive system of trails concentrated almost entirely along creeks which are part of the Papillion Creek watershed, which is administered by the Papio-Missouri River Natural Resources District (NRD). These trails run in a northwest-southeast direction originating from the far southeast corner of the metro area. The trails are well designed with attention given to making connections to streets, yet with effective and safe separation at major highway crossings. Unfortunately, bicycle travel in an east-west orientation in both Douglas and Sarpy Counties is far more limited – especially at a regional scale - and this plan identifies corridors focused on this deficiency. On the Iowa side of the metro area, a trail system has evolved over the past 20 years, but there are very few on-street bikeways.

The Metropolitan Area Planning Agency (MAPA) is the designated metropolitan planning organization (MPO) as well as the council of governments (COG) for the Omaha-Council Bluffs metropolitan region. MAPA conducts regional transportation planning in a Transportation Management Area (TMA) comprising Douglas and Sarpy Counties in Nebraska and part of Pottawattamie County in Iowa. It has the responsibility of conducting bicycling and pedestrian planning for the metropolitan area and to coordinate those efforts with communities in the region.

Map 1 | Study Corridors



Corridor Approach for Bicycling

The analysis and recommendations for improvements in this plan are focused around 28 corridors that span the metro area. Corridors vary in length, but generally follow major streets (arterial streets) as important connections in the region's street network.

MAPA indicated an initial set of 11 high consensus corridors and four moderate consensus corridors that were to be studied during the planning process. In addition to these initial corridors, it was determined that a number of supplementary corridors were needed to fill gaps in the corridor network. In consultation with MAPA and the planning steering committee, additional corridors were added as complements to the initial set of corridors. The corridors are displayed on Map 1.

Corridors were primarily drawn to follow existing major streets since these roads provide continuous long-distance connections across the region. Additionally, given the hilly terrain in the metro area, the major streets are often located in natural corridors with the most forgiving grades. These streets are also engineered to a different standard than neighborhood streets, making them easier to traverse for bicyclists and pedestrians.

Several factors were considered when making the recommendations: bicycle level of service (existing conditions for bicycling), current pavement cross-section of streets, available right-of-way, national bicycle guidelines, and crashes that bicyclists had with motorists.

Pedestrian Element

Once the planning process began for this effort, it was clear that the pedestrian element of the plan would not be focused on corridors like it was for bicycling. It is difficult to conduct a pedestrian plan at a regional level since pedestrians take short trips that are not centered on arterial streets, but are much more destination focused, such as to connect to transit, to schools, or to local businesses. Furthermore, most of the main arterials within corridors already have sidewalks on both sides of the street, making a planning process to identify gaps in the pedestrian system somewhat moot.

Consequently, the pedestrian element of this plan is focused on two general policy areas:

- Urban development patterns
- Pedestrian accommodations and engineering

Two specific themes of special interest to pedestrians are also discussed in greater detail:

- School area safety and connectivity
- Connections to transit

Existing Plans and Their Relationship to This Plan

Several plans strongly influence and inform this plan. Similarly, this plan will in turn impact updates of many of the region's plans. Noted below are the key plans.

- The Metropolitan Area Planning Agency Long Range Transportation Plan is a comprehensive 2011 transportation plan which projects transportation needs for the Omaha-Council Bluffs metro area to the year 2035. Bikeways and trails are featured as an element of the plan. The plan consolidates other metro-area bicycle system plans. It includes key recommendations on how to close gaps in the bikeway and trail system, as well as suggests new segments. Many of the recommendations became the foundation for the bicycle corridors identified for this plan.
- Considerable effort has resulted in a number of community-based bicycle and trail plans. The plan that has gotten the most traction is the 2009 Bike Omaha Pilot Network. It is a 20 mile system of bike lanes, bike boulevards, routes, streets with shared lane markings, and trail extensions. The projects selected for Bike Omaha were intended as pilot projects for a larger citywide system and are well over half completed. The 2012 Omaha Master Plan's Transportation Element calls for balanced options to enhance mobility. It speaks generally about the density of sidewalks in various parts of Omaha, and recognizes that a system of on-road bicycle facilities is lacking. The plan identifies nine key bicycle projects with a few maps showing these project locations and recommendations. The plan's predecessor from the 2000s identified pedestrian-related recommendations such as when sidewalks should be constructed, and features to improve accessibility for people with disabilities.
- More relevant from a pedestrian standpoint, the 2014 Central Omaha Alternatives

Analysis is a plan that evaluated the best transit alternative to serve an east-west corridor in central Omaha from Downtown to 72nd Street and to an area south of 72nd Street to the College of St. Mary. The next phase includes preliminary engineering, environmental documentation, and a full financial plan for Bus Rapid Transit.

- The 2012 Council Bluffs Recreation Trails Master Plan map indicates corridors for trails, bike lanes, and future facilities. It is very comprehensive and offers a balanced combination of short-term and longer term on-street and trail investments. Council Bluffs also has a draft comprehensive plan – Bluffs Tomorrow 2030. Of importance to the corridors examined in this plan are the recommendations for the Broadway Corridor including 1st and 2nd Avenues (bike lanes recommended for 1st and part of 2nd) and the north-south corridor using 13th , 14th, 15th and 16th streets. That plan also has a fairly comprehensive on-road and off-road bikeway element which builds upon the 2012 trails master plan. Both plans recommend a continuous trail along Kanesville Boulevard between East Pierce Street and McKenzie Avenue.
- The City of Bellevue has passed a complete streets policy and has been active in implementing that policy. 2012 Bellevue Complete Streets annual report includes information from the Bellevue Citizen Complete Streets Advisory Panel. This committee supports general outreach and support for complete streets on specific projects.
- There are several county based bicycle and trail plans. The 2004/2005 West Douglas County Trails Plan links the three communities of Elkhorn, Waterloo, and Valley together with a key connection to the western city limits of Omaha. Six secondary destinations were also identified as important connections. The plan includes significant detail and prioritization for the Tri-County Core trail. Many additional recommendations include county and city roads to be reconstructed with bike lanes and paved shoulders.

Public Involvement

In the development of this plan a variety of means were used to engage the public. A group of stakeholders and a steering committee was established. Six steering committee meetings were held during the development of the plan. Two workshops specifically targeted at key stakeholders and the steering committee were conducted. The first workshop included goal setting and prioritization exercises for the identified corridors, mapping exercises, and other information gathering exercises designed to actively engage important decision makers in the planning process. The second workshop was conducted over the course of one day and focused on bicycle and facility design based on the 2012 AASHTO Bike Guide and the PED Safe workshop.

Several meetings were held for the general public. The first public meeting was set up as a workshop targeted at gathering local knowledge and experiences about walking and bicycling in the region. Information was presented on a series of maps and boards. Participants were able to markup maps indicating the destinations they would like to go to via bicycle, the routes they prefer to use for recreation and transportation, and the streets they avoid. A second public meeting was conducted near the end of the planning process to present the major recommendations of the plan.

Plan Organization

This plan is organized into six chapters including this one.

- **Chapter One** acts as the introduction to the plan including how the plan originated and an overview of important planning efforts leading up to the plan's development.
- **Chapter Two** establishes the goals for the plan and includes a discussion how the goals relate to bicycle and pedestrian travel in the metro area.
- **Chapter Three** provides important background information and analysis for the plan. It includes an overview of the different types of bicycle and pedestrian facilities, bicycle and pedestrian heat maps showing overall demand for bicycling and walking, and a bicycle level of service map showing current bicycling conditions in the identified corridors.
- **Chapter Four** represents the pedestrian element of the plan. Themes which impact pedestrian transportation are covered including municipal policy, engineering, safe routes to school, and transit connections.

- **Chapter Five** is the bicycle element. It provides two main sets of bikeway recommendations for major streets within the 28 corridors and for parallel routes. Depending on the corridor, recommendations are generalized or provided as design concepts.
- **Chapter Six** is the implementation element of the plan. Cost estimates are provided for the corridors, projects are sorted by short, medium, and long term; and general strategies are provided for the plan.
- Some key resources are included in the **Appendices**. In many cases, maps and tables too cumbersome to include in the plan are provided in the appendices. Recommended street cross-sections and bicycle facility technical sheets are also provided in the appendices.

2 Goals

A desire for active transportation is reflected in many of the current plans for cities in the region. As travel preferences in Omaha, Council Bluffs, Bellevue, and surrounding communities have shifted toward biking and walking, it has become clear that many areas of the region are lacking in non-motorized options for getting around. This plan represents a comprehensive effort to address gaps in the region's key transportation corridors with regard to bicycle and pedestrian travel.

The recommendations in this plan work toward a vision of a region where non-motorized travel is safe; comfortable; and accessible to a wide range of people, including youth and seniors, people that are confident bicyclists and those that are not, and people with disabilities. This vision is characterized by the following goals:

1. **Improve safe mobility choices**
2. **Connect places**
3. **Value existing places while planning for new ones**
4. **Achieve a high return on investment for community and fiscal health**
5. **Foster collaboration between jurisdictions and levels of government**

Each of these goals is discussed in further detail on the following pages.

1 Improve Safe Mobility Choices

A regional system should be designed not just for avid cyclists, but for everyday use by ordinary citizens and commuters. This reflects MAPA's commitment to increase the active transportation modal split in the region and the overall safety of the transportation system.

Aside from the metro area's trail system, there are few existing opportunities for people to travel throughout the region on infrastructure designed to make cycling and walking safer, easier, and more comfortable for the average person.

Although many local streets are reasonably comfortable for cycling, interruptions in the street grid, steep grades, and difficult road crossings present traffic stress and wayfinding challenges, especially for less experienced or less confident users. Avid cyclists tend to be adept at identifying routes to and from their destination, but an average citizen will likely feel less competent at navigating the system and choosing a comfortable route without some outside assistance.

In order to make the region's bicycle system easy to use by cyclists of all experience levels, it is important to provide a regional system of bikeway corridors with primary bikeways that provide direct routes and access to destinations as well as parallel lower-stress routes that are suitable for less confident or less experienced users.

Providing this system will necessitate constructing infrastructure, such as bicycle lanes and cycle tracks, in some locations and in others providing comprehensible wayfinding aids. In all cases, the intersection of corridors should be seamless and easy to navigate so that all users feel confident they can safely reach their destination.

In terms of walking, the sidewalk network is discontinuous or not present in many areas of the region. Citizens should feel comfortable and safe walking to accomplish daily needs. This is especially important for people with disabilities and people that do not drive (including children and senior citizens). Therefore, it is important for sidewalks to be continuous, convenient, and accessible to ensure that everyone can make use of them.

Complete Streets Process

In recent years, cities in the Omaha metro area, like many areas across the country, have begun to explore and adopt Complete Streets policies. The term "Complete Streets" refers to the notion that street design should accommodate all users of the public right-of-way. The National Complete Streets Coalition defines Complete Streets as follows:

Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users. People of all ages and abilities are able to safely move along and across streets in a community, regardless of how they are traveling. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.

Bellevue had Nebraska's first formal Complete Streets policy, which includes an annual progress report to the city council. The City of Omaha has not adopted an official complete streets policy; however, the adoption of such a policy has been a recommendation of previous plan documents, including the transportation element of the city's master plan and the Omaha Streetscape Handbook.

2 Connect Places

A regional system should connect the region's communities, with priority investment in corridors and routes that minimize complexity and maximize system legibility. This is especially important as local bicycle and pedestrian planning efforts ramp up and risks of a disconnected and illegible system increase.

Individual bikeway, trail, and sidewalk projects provide localized benefits in terms of safety, access, and comfort. However, safe and comfortable regional corridors that connect to each other and to key activity centers are critical for improving regional connectivity and access for bicycling and walking.

The regional bicycle system should provide safe, comfortable, and continuous access to important community and regional destinations like schools, parks, and shopping areas. Furthermore, this system should connect to each community in the region and be accessible to everyone living within the urban area (via local bikeway connections). Although the development of the regional bikeway network will occur in stages, projects should follow an overall vision for creating an interconnected network. Gaps in the system should be avoided and those that exist should be prioritized for improvements.

Enhancing pedestrian connectivity in the region should take a localized approach, focusing on connecting sidewalk networks within activity centers across the region and connecting each activity center with the surrounding areas. In portions of the region that are already developed, opportunities should be sought to improve pedestrian access between disconnected neighborhoods and retrofit aging shopping centers into more walkable destinations. Furthermore, consideration should be given to modifying local and regional policies related to land development and zoning, so that new development is pedestrian friendly.

3 Value Existing Places while Planning for New Ones

A regional system should strengthen existing places and communities by providing mobility options as well as encourage new development that is friendlier to cycling, walking, and transit.

Many areas of the region were developed at a time when building facilities for cycling and walking was not an important priority in the transportation system. As the region has come to recognize the value of having several transportation options to choose from, some areas are in need of retrofitting. Furthermore, this is a growing region. People come here to enjoy the high quality of life and family-friendly atmosphere. New growth with infrastructure that provides transportation choice can reduce traffic congestion and pollution while strengthening community and economy. Active transportation can also be a quality-of-life indicator in its own right.

Municipalities in the region should identify opportunities to build or improve bicycle and pedestrian accommodations and implement changes where appropriate, using the resources provided in this plan to guide decision making.

New and reconstructed roads should be planned and designed following the "Complete Streets" process (see above) so that they include bike accommodations and sidewalks by default. Cities should incorporate such facilities into their standard street cross sections so that active transportation is institutionalized into the development process.

4 Achieve a High Return on Investment for Community and Fiscal Health

A regional system should be sustainable in the broadest sense. Benefits should be measured from the standpoint of investment generated as well as increases in bicycling and walking, and overall improvements in health and economic development.

Cost is an important factor in any public infrastructure project. Although bicycle and pedestrian infrastructure is relatively inexpensive compared to highway and public transit projects, it can vary from low-cost treatments, such as bicycle route signage and shared lane markings, to feature-rich, large scale projects, such as the Bob Kerrey Bridge. In general, the cost and level of permanent infrastructure that is appropriate for a given location is dependent on the local context. New projects should be cost effective and communities in the region should prioritize

Health and Financial Benefits of Active Transportation

Transportation choice has a significant impact on community and public health. Obesity, diabetes, and other diseases have been linked to low levels of physical activity. The growth of these health problems is due in part to a significant decline in active transportation over the course of the 20th Century. These health problems have real economic costs, with families, community organizations, hospitals, and governments paying more and more to treat these preventable diseases.

Active transportation can bring other economic benefits as well. For example, studies have shown that an increase in cycling and walking activity can lead to higher sales for nearby businesses. Ensuring that families have multiple transportation options means that some families may feel comfortable eliminating the additional household expense of owning multiple vehicles, or even paying to maintain a car at all.

investments that offer the greatest potential for serving walking and cycling trips.

The way the Omaha metro area prioritizes transportation investments should include consideration of the positive economic and quality-of-life impacts cycling and walking infrastructure can have on families and municipalities thanks to better public health, increased economic activity, and more options for mobility. Specifically, regional project funding should be used to maximize the return on investment for bicycle and pedestrian infrastructure. The prioritization methods used for grant programs (such as Transportation Alternatives) should consider improvements to regional connectivity and access, safety, and regional equity. Furthermore, regional funding for street and road projects (such as STP Urban) should prioritize Complete Streets projects above projects that do not include bicycle and pedestrian infrastructure.

5 Foster Collaboration between Jurisdictions and Levels of Government

A regional system should be built with the participation and support of all of the region's local units of government, as well as state and Federal government.

Transportation projects are often funded and implemented through a variety of mechanisms. Agencies in different municipalities and at multiple levels of government often collaborate on projects. Following the Complete Streets approach, communities in the region should work with each other and with state and federal agencies to ensure that bicycling and walking are considered as a part of every project.

In many cases, the cost of building cycling and walking infrastructure can be a minor additional expense when included as part of a major roadway reconstruction (i.e., projects that follow the Complete Streets process). In order to ensure that these opportunities are realized, it is necessary that the agencies and jurisdictions involved have a common understanding of where cycling and pedestrian infrastructure should be prioritized.

All agencies that plan, design, and build roads in the Omaha region should be aware of the need to include bicycle and pedestrian accommodations in their projects. Most importantly, protocol should be in place to ensure that cycling and walking accommodations are included in all road resurfacing and reconstruction projects to the extent they are feasible.

3 Bikeway and Pedestrian Facilities

This chapter presents different types of bikeways and pedestrian facilities that are recommended for use in this plan. The chapter also describes a Bicycle Level of Service analysis that was performed for the study area as well as existing and potential bicycle and pedestrian demand.

Bikeway Types

This section provides brief descriptions of different types of bicycle facilities. The Plan recommendations do not include all of the facilities described below; however, it is intended that any of these facilities will be considered where appropriate when specific street segments are more closely examined for bikeway implementation. Appendix E includes technical sheets that provide considerably more information than that provided below in the short descriptions of facilities.

Bikeway

A bikeway is any facility that is open for the use of bicyclists. Bikeways include on-street facilities such as bike lanes and shared lane markings, as well as off-street facilities such as shared use paths. All of the on- and off-street bicycle facilities described in this section are considered bikeways.

On-Street Bikeways and Bicycle Treatments

The following tables provide descriptions of types of on-street bicycle facilities included in this Plan.

Bike Lane

A bike lane is a pavement marking that designates a portion of a street for the preferential or exclusive use of bicycles. Bike lane markings are typically dashed where vehicles are allowed to cross the bike lane, such as for right turns or at bus stops. Bike lanes are best suited for two-way arterial and collector streets where there is enough width to accommodate a bike lane in both directions, and on one-way streets where there is enough width for a single bike lane.

Buffered Bike Lane

Buffered bike lanes are created by striping a buffer zone between a bike lane and the adjacent travel lane. Some buffered bike lanes also offer a painted buffer between the bike lane and an adjacent parking lane. Buffered bike lanes should be considered at locations where there is excess pavement width or where adjacent traffic speeds are at or above 35 mph.

Contraflow Bike Lane

Contraflow bike lanes run in the opposite direction of other traffic on a one-way street. Contraflow bike lanes provide legal bike access on one-way streets where bicyclists may otherwise ride against traffic or on the sidewalk. Contraflow bike lanes may be separated from other traffic by painted lines, a painted buffer, or a physical barrier.

Climbing Bike Lane

A climbing lane is a bikeway design for a two-way street that has a steep slope and insufficient width to permit bike lanes in both directions. A bike lane (the climbing lane) is provided in the uphill direction to accommodate slow moving bicyclists in the uphill direction and a shared lane marking is provided in the downhill direction, where bicyclists can typically travel at speeds close to motor vehicles.

Colored Bike Lane

All of the above bike lanes may have green color applied to them to highlight the presence of the bike lane. Colored lanes are typically used in high-conflict areas such as through complicated intersections, in areas where traffic is merging across the bike lane, or in areas where traffic frequently turns across the bike lane. In 2011, colored bicycle lanes received interim approval from FHWA to be used on streets, thereby making way for their ultimate inclusion in the Manual of Uniform Traffic Control Devices in its next update.

Separated Bike Lane (Cycletrack)

A separated bike lane, sometimes called a cycletrack, is a bicycle facility that is physically separated from both the street and the sidewalk. A separated bike lane may be constructed at street level using street space, or at the sidewalk level using space adjacent to the street. Separated bike lanes isolate bicyclists from motor vehicle traffic using a variety of methods, including curbs, raised concrete medians, bollards, on-street parking, large planting pots/boxes, landscaped buffers (trees and lawn), or other methods. Separated bike lanes designed to be level with the sidewalk should provide a vertical separation between bicyclists and pedestrians, as well as a different surface treatment to delineate the bicycle from the pedestrian space (such as asphalt vs. concrete). Separated bike lanes can be one way for bicycles on each side of a two-way road, or two-way and installed on one or both sides of the road. Separated bike lanes provide cyclists with a higher level of comfort compared to bike lanes, and are typically used on large multi-lane arterials where higher vehicle speeds exist. They may also be appropriate on high-volume but lower-speed streets.

Neighborhood Greenway / Bicycle Boulevard

A neighborhood greenway, sometimes also called a bicycle boulevard, is a street with low motorized traffic volumes and speeds designated to provide priority to bicyclists and neighborhood motor vehicle traffic. Neighborhood greenways may simply have signs and shared lane markings, or may include traffic calming elements consisting of speed humps, traffic circles, chicanes, or traffic diverters. Neighborhood greenways benefit neighborhoods by reducing cut-through traffic and speeding without limiting access by residents.

Shared Lane Marking – Neighborhood Street

Shared lane markings (sharrows) may also be used on residential streets to designate bicycle facilities where there is not sufficient width for bike lanes. Studies have shown that sharrows direct bicyclists away from the "door zone" of parked cars, alert motorists of appropriate bicyclist positioning and encourage safe passing of bicyclists by motorists. The "Bicycles May Use Full Lane" sign (R4-11 in the MUTCD) is commonly used in conjunction with shared lane markings.

Shared Lane Marking – Collector or Arterial Street

Shared lane markings (sharrows) are used on streets where bicyclists and motor vehicles share the same travel lane. The sharrow helps position bicyclists in the most appropriate location to ride. It also provides a visual cue to motorists that bicyclists have a right to use the street. On a four lane street, sharrows should be placed in the outside lane. If the outside travel lane is too narrow for a motorist to comfortably pass a cyclists while staying within the travel lane (generally less than 14 feet) the sharrow marking may be centered in the lane. This encourages cyclists to "take the lane," and encourages motorists to use the left lane to pass. In a 12-14 foot lane, the marking may be offset from the curb by 4 feet. For 10-12 foot lanes, the BIKES MAY USE FULL LANE sign is recommended, because drivers may not be used to sharing the road with cyclists and may not provide comfortable clearance when passing. Sharrows are not appropriate on streets with speed limits greater than 35 mph. The "Bicycles May Use Full Lane" sign (R4-11 in the MUTCD) is commonly used in conjunction with shared lane markings.

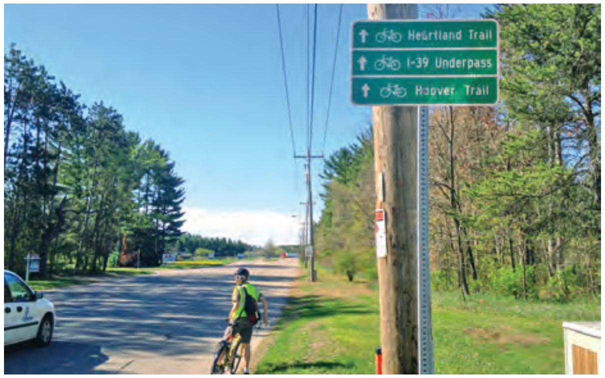
Urban Shoulder (Paved)

An urban shoulder is a paved section of a street between the travel lanes and the curb. Urban shoulders are separated from the travel lanes by a solid white line and may include the street's gutter section. Urban shoulders can serve as a bicycle accommodation if they have at least three feet of pavement, exclusive of the gutter area. Bicycle lanes that are not designated as such with pavement markings and/or signage are technically an urban shoulder.

Rural Shoulder (Paved)

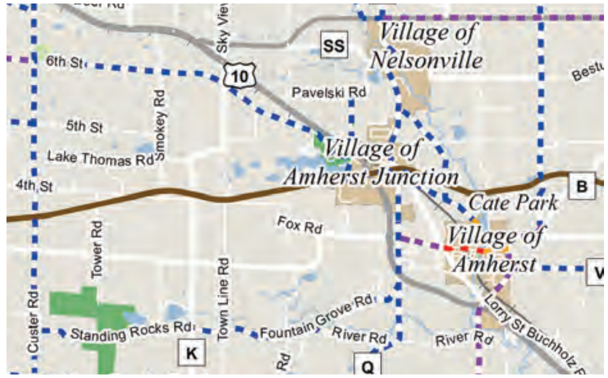
The shoulder is the section of the roadway outside of the travel lanes. When paved and of sufficient width, paved shoulders can serve as a bicycle accommodation. Additionally, paved shoulders provide safety and maintenance benefits. Paved shoulders should typically be 4' or wider to serve as a bicycle accommodation, although 3' may be acceptable on lower volume roads.

Signed Bike Route



Signed bike routes provide distance and directional information as a wayfinding aid for bicyclists. Signed routes may be established on streets, paths, or any combination of facility types that offer a continuous bicycling environment. Signs should offer cyclists information about alternative routes and accessible destinations from their current location. They also can be used to suggest the conditions cyclists can expect on a route by referencing trails or roadways by name. Signed routes provide cyclists with greater confidence when they are exploring new routes or when they are in unfamiliar territory. Signed routes can also prevent cyclists from getting lost in residential areas with curvilinear street layouts and few through streets.

Bike Route (mapped)



A mapped bike route is only designated as a bike route on maps – there are no signs placed along the route to designate the route. Mapped bike routes indicate to users roads that are better for bicycling on and for connecting to specific destinations. Mapped bike routes should be supplemented with signed bike routes or other bicycle facilities to guide users to popular destinations, such as Zorinsky Lake.

Bike Box (Advanced Stop Line)

Bike boxes are street markings at signalized intersections that allow bicyclists to move to the front of a traffic queue during the red signal phase. Allowing bicyclists to move to the front of the queue can increase their visibility to motorists and can reduce "right-hook" crashes with motorists at the beginning of the green signal phase. Bike boxes can also aid cyclists in position for left turns. This Plan does not recommend any specific locations for bike boxes, but they should be considered on streets with bike lanes as the proposed bicycle network is more fully implemented.

Off-Street Bikeways

The tables below provide descriptions of types of off-street bicycle facilities included in this Plan.

Shared-Use Path

A shared use path is an off -street bicycle and pedestrian facility that is physically separated from motor vehicle traffic. Typically, shared use paths are located in an independent right-of-way such as in a park, stream valley greenway, along a utility corridor, or an abandoned railroad corridor. Shared-use paths are utilized by other non-motorized users including pedestrians, skaters, wheelchair users, joggers, and sometimes equestrians

Sidepath

A sidepath is a shared use path located adjacent to a roadway. It is designed for two-way use by bicyclists and pedestrians. Sidepaths are sometimes created by designating a wide sidewalk for shared use, or they may be a segment of a longer trail. Sidepaths sometimes facilitate connections to on- and off-street bicycle facilities. A sidepath is not generally a substitute for on-street bicycle facilities, but may be considered in constrained conditions, or as a supplement to on-street facilities. Sidepaths may not be appropriate in areas of high pedestrian activity unless there is space to successfully manage conflicts. The use of sidepaths should be limited to roadways with limited points of conflict at intersections and driveways

Bicycle Facility Design Guidance

Design details for these facility types are available from the following resources:

- The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 4th Edition (2012) https://bookstore.transportation.org/item_details.aspx?id=1943
- The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (2009) http://mutcd.fhwa.dot.gov/
- The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide (2012) http://nacto.org/cities-for-cycling/design-guide/
- Iowa Statewide Urban Design and Specifications (SUDAS) http://www.iowasudas.org/

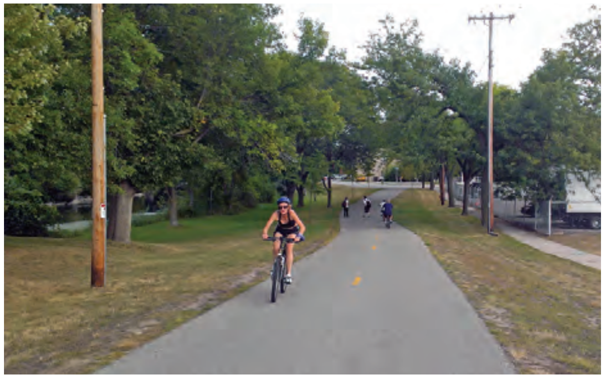
Pedestrian Facility Types

"Pedestrian facilities" is a general term to include a number of accommodations for pedestrians. These include sidewalks, paths, pedestrian signals, crosswalk markings, and median islands.

Sidewalks

Sidewalks are generally constructed of concrete, are typically five feet wide and are located immediately adjacent to streets, preferably on both sides. Sidewalks are used to separate foot traffic from vehicle traffic, to reduce conflicts, and to increase comfort of pedestrians. Recent research has supported sidewalks as being very effective in reducing crashes.

Shared-Use Path



A shared use path is an off -street bicycle and pedestrian facility that is physically separated from motor vehicle traffic. Typically, shared use paths are located in an independent right-of-way such as in a park, stream valley greenway, along a utility corridor, or an abandoned railroad corridor. Shared-use paths are utilized by other non-motorized users including bicyclists, skaters, wheelchair users, and joggers. In areas with high levels of walking and bicycling activity, conflicts between bicycles and pedestrians may occur. Conflicts can be mitigated by providing wider paths (12 to 14 feet wide) and/or designating one portion for walking and one portion for bicycling (via striping or different pavement materials)

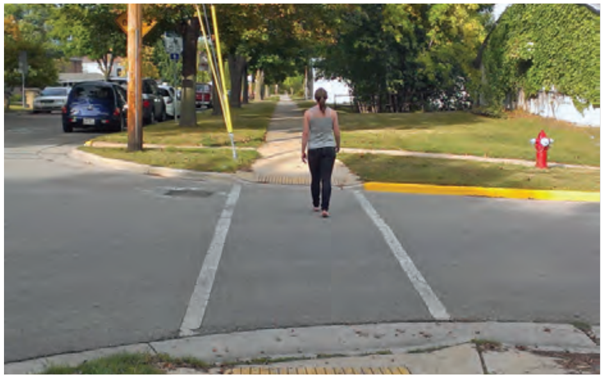
Sidepath

A sidepath is a shared use path located adjacent to a roadway. It is designed for use by bicyclists and pedestrians and each may travel in either direction. Sidepaths are sometimes created by designating a wide sidewalk for shared use, or they may be a segment of a longer trail or network of trails. . Like shared-use paths, conflicts between bicycles and pedestrians can occur and may be mitigated by widening sidepaths and/or designating different portions of the path for bicycling and walking.

Pedestrian Signals

When traffic signals are used at intersections, pedestrian signals are added to provide separate indications for pedestrians. In the absence of pedestrian signals, pedestrians are directed by state law to use the traffic signals intended for motorists. This is rarely desirable except in remote areas. The usefulness of pedestrian signals can be greatly increased by including countdown timers, which indicate how long a pedestrian has to cross the street, and leading pedestrian intervals, which allow pedestrians a head-start across the street before right- and left-turning motor vehicle traffic is allowed to proceed.

Crosswalk



Extensions of sidewalks through intersections are legal crosswalks under state and local laws, regardless of if they are painted on the street. At busier intersections, signalized intersections, and at mid-block crossings, crosswalks are marked for additional visibility for motorists and to direct pedestrians to the appropriate crossing area. Standard crosswalks are comprised of two parallel lines across a street.

Crosswalk – Continental or Ladder

Continental crosswalks provide greater visibility than standard crosswalks. Continental markings consist of 12 inch or wider bars that run in the direction of traffic; if perpendicular edge lines are included (as shown), the crosswalk may be referred to as a "ladder" style. Continental crosswalks should be considered at busier street crossings, at unsignalized crossings, in school zones, and any locations where pedestrian crossings are difficult.

Crosswalk – Colored or Textured

Colored or textured crosswalks are often used to increase the visibility of a crosswalk while establishing a "character" for a neighborhood. For example, red textured crosswalks may evoke older brick streets and may be used in a historic district. In general, colored crosswalks are less visible than continental crosswalks. While colored crosswalks may have appropriate uses, heavily textured crosswalks, such as stamped bricks, should be avoided as they present a rough surface to those most sensitive to it: pedestrians and people using wheelchairs, walkers, or canes.

Median Island

Medians provide space in the middle of intersections or at right-turn locations for pedestrians to stage crossings in multiple steps. These facilities make crossings easier and safer for pedestrians. They should be a minimum of six feet in width and length.

Pedestrian Hybrid Beacon (HAWK Signal)

A pedestrian hybrid beacon, sometimes known as a High-Intensity Activated Crosswalk (HAWK) Signal, is a traffic control device designed to stop motor vehicle traffic to allow pedestrians to cross a street. Pedestrian hybrid beacons are typically triggered by a pedestrian pushing a button which causes the signal to flash yellow and then with alternating red lights (much like at a railroad crossing); when the red lights are flashing, a pedestrian signal indicates to the pedestrian that they may cross the street. Pedestrian hybrid signals are typically used at mid-block street crossings and are only active when triggered by a pedestrian. FHWA provides guidance for situations in which crosswalk safety improvements (such as HAWK signals) are warranted based on traffic volumes and speeds and roadway width.

Rectangular Rapid Flashing Beacon (RRFB)

RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections. When a pedestrian triggers the system, the lights flash rapidly, drawing attention to the warning sign and the presence of a pedestrian. RRFBs are typically used at mid-block street crossings and are only active when triggered by a pedestrian. RRFBs are lower cost than full signals or pedestrian hybrid beacons and have been shown to increase driver yielding behavior. FHWA provides guidance for situations in which crosswalk safety improvements (such as RRFB signs) are warranted based on traffic volumes and speeds and roadway width

Curb Extensions / Bump-outs / Bulb-outs

Curb extensions extend the sidewalk into the parking lane of a street to narrow the roadway, provide additional pedestrian space, and reduce the distance of the street crossing for pedestrians. Curb extensions can be used at intersections or at mid-block crossings. Care should be taken to ensure that curb extensions to not extend into bike lanes. Curb extensions also function as a traffic calming device as the narrowing of the roadway tends to slow traffic speeds.

Pedestrian Facility Design Guidance

Design details for these facility types are available from the following resources:

- The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004) https://bookstore.transportation.org/item_details.aspx?id=119
- The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (2009) http://mutcd.fhwa.dot.gov/
- The National Association of City Transportation Officials (NACTO) Urban Street Design Guide (2013) http://nacto.org/usdg/
- Iowa Statewide Urban Design and Specifications (SUDAS) http://www.iowasudas.org/
- Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines http://www.fhwa.dot.gov/publications/research/safety/04100/index.cfm

Regional Context

Dating back to the mid-19th century, the philosophy of laying out streets and the decision of whether to include sidewalks and other bicycle and pedestrian facilities within new developments has been influenced by a number of outside factors. These included the prevailing modes of transportation, varying municipal planning policies and changing city design theories. The grid street layouts and winding boulevards that run along the ridgelines of the older portions of the region's cities made way for larger block sizes, wider streets, and interstates after World War II when land use and transportation decisions focused on prioritizing motor vehicle travel while the needs of bicycle, pedestrian, and transit modes were marginalized or altogether forgotten. Especially in the 1960s and 1970s, the development of the transportation system included many high-traffic thoroughfares that are too stressful for many bicyclists and that completely lacked sidewalks and crosswalks.

On a natural level, the area's topography and waterways affected the positioning and breadth of land developed. The rolling hills of eastern Douglas and Sarpy Counties, the prominent Loess Hills' bluffline running through Council Bluffs, and the Papio and Indian Creek systems served as barriers to the extension of the historic grid system. Streets were laid out to maximize the number of lots available for construction around these natural features.

When viewed at this macro scale, the impacts of these factors on the composition of the region can be seen. The goal of developing an approach to improve the region's bicycle and pedestrian networks is to create a set of guidelines, standards and proposed initiatives that when applied to the varying portions of the study area are general and universal enough to fit the established framework of each and every context.

The Development Map shown in Figure 1 is a general representation of the development pattern of the Omaha Metro Area over time.

Figure 1: Development Map of Omaha Metro Area

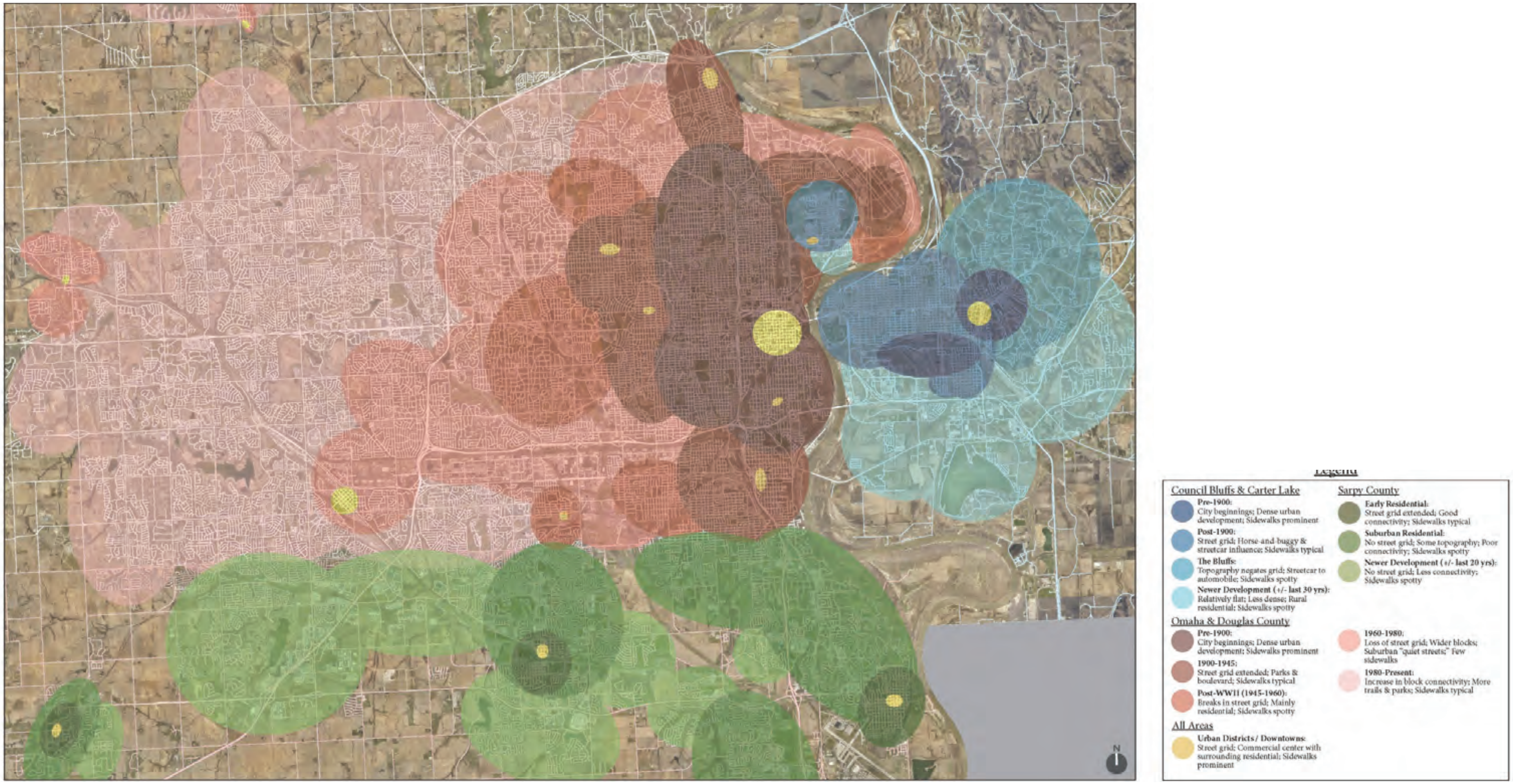


Figure 1: Bicycle Level of Service ratings applied to select streets.

Bicycle Level of Service Analysis

The Bicycle Level of Service is a nationally-used measure of on-road bicyclist comfort level that is included in the Highway Capacity Manual. The BLOS accounts for roadway geometry and traffic conditions to produce a rating for the segment of roadway being analyzed. It is important to note that the standard vehicle level of service (LOS) and the BLOS measure different things. Level of service measures for motor vehicles indicate vehicle delay and throughput, while the BLOS indicates the perceived level of comfort for bicyclists. For example, a street that carries a significant volume of motor vehicle traffic at higher speeds with little or no delay would likely have a high LOS rating, but may have a low BLOS rating if there is not adequate space for bicyclists on the street, such as a bike lane.

Table 1 displays the specific BLOS levels and a description of each score. The formulas used to calculate BLOS are complex, and will not be displayed here. However, the League of Illinois Bicyclists has an online calculator that provides BLOS ratings based on user input of roadway conditions: http://www.bikelib.org/roads/blos/blosform.htm

The BLOS model is focused on conditions that affect the comfort of bicyclists from a safety standpoint. Unfortunately it does not account for topography. It is important to point out that in most communities this is not an issue since they are relatively flat, but does become more important for the MAPA metro area where significant hills affect the comfort and physical stress of bicyclists.

Table 1: BLOS scores and general descriptions

BLOS	Score	Condition	General Description	Comments
Level A	0.0 - 1.5	Excellent	Good for all	Nearly impossible to achieve this level w/o bike lanes or parking*
B	1.51 - 2.5	Very Good	Good for all with possible exception of inexperienced child	25 mph, 750 ADT or less is 2.48, but with only 10% occupied on-street parking
C	2.51 - 3.5	Average	Acceptable to most average adult cyclists	30 mph, 3,000 ADT is 3.47 which is upper threshold of C
D	3.51 - 4.5	Poor	May be acceptable to experienced cyclists	35 mph, 4-lane, with more than 5,000 ADT is 3.5 or greater
E	4.51 - 5.5	Very poor	Bearable by some experienced adult cyclists	35 mph, 4-lane, ADT 10,000 is 4.5
F	>5.5	Extremely poor	Not suited to any cyclist	

Note: Parking space, even at 40 and 50% occupied has a tremendous impact on BLOS. BLOS changes by a full point with a marked parking lane of 6' in width.

Applying the BLOS to the MAPA Region

A BLOS analysis was performed for many of the streets in the MAPA region. The data needed to score street segments using the BLOS formula was not all available in GIS format and the BLOS calculations were time consuming. Because of this, only the primary streets within the identified corridors were scored for their Bicycle Level of Service. The results of the BLOS scoring are displayed on Map 2.

Approximately 345 miles of streets within the MAPA region were given BLOS ratings. To simplify the rating process, Levels A and B were combined into a single rating (A/B), as were Levels E and F (E/F). Table 2 displays the total miles of streets with each BLOS level in the MAPA region.

Table 2: Miles of street by BLOS rating

BLOS	Miles	Percent
Level A/B	73.19	21.2%
C	83.34	24.2%
D	118.03	34.3%
E/F	69.84	20.3%
Total Miles	344.40	100.0%

In general, the streets that the BLOS was applied to rated poorly, with over half of the total mileage (54.6%) rated D (poor) or worse. There are bright spots that emerged from the BLOS analysis however. Approximately 73 miles of streets rated A (excellent) or B (very good), and many of those street segments are contiguous and could form good corridors for bicycling.

Streets in the northeast section of Omaha did particularly well. Ratings were conducted for the street even if there was a sidepath positioned along the street. The BLOS has not been modified to create ratings for sidepaths.

Pedestrian Crashes

Data for crashes involving a pedestrian was provided for Douglas County for the period of January 2008 through May 2013. During that period, a total of 686 accident reports were filed that included a pedestrian, an average of 10.6 crashes per month, or approximately one crash every three days. A total of 16 pedestrians were killed in these crashes, while another 177 had disabling injuries. Map 3 displays a heat map of pedestrian crash locations – the darker the reddish color, the more pedestrian crashes occurred in that area in the time frame cited above.

As can be seen on the heat map, a high concentration of pedestrian crashes occurred in Omaha's downtown as well as areas immediately to the west of downtown. Approximately one third of the crashes occurred between Hamilton and Center Streets and the Missouri River and 52nd Street. A concentration of pedestrian crashes is to be expected in this area as the greater density of housing, employment, and commercial activities in this area likely leads to greater numbers of pedestrians in the area.

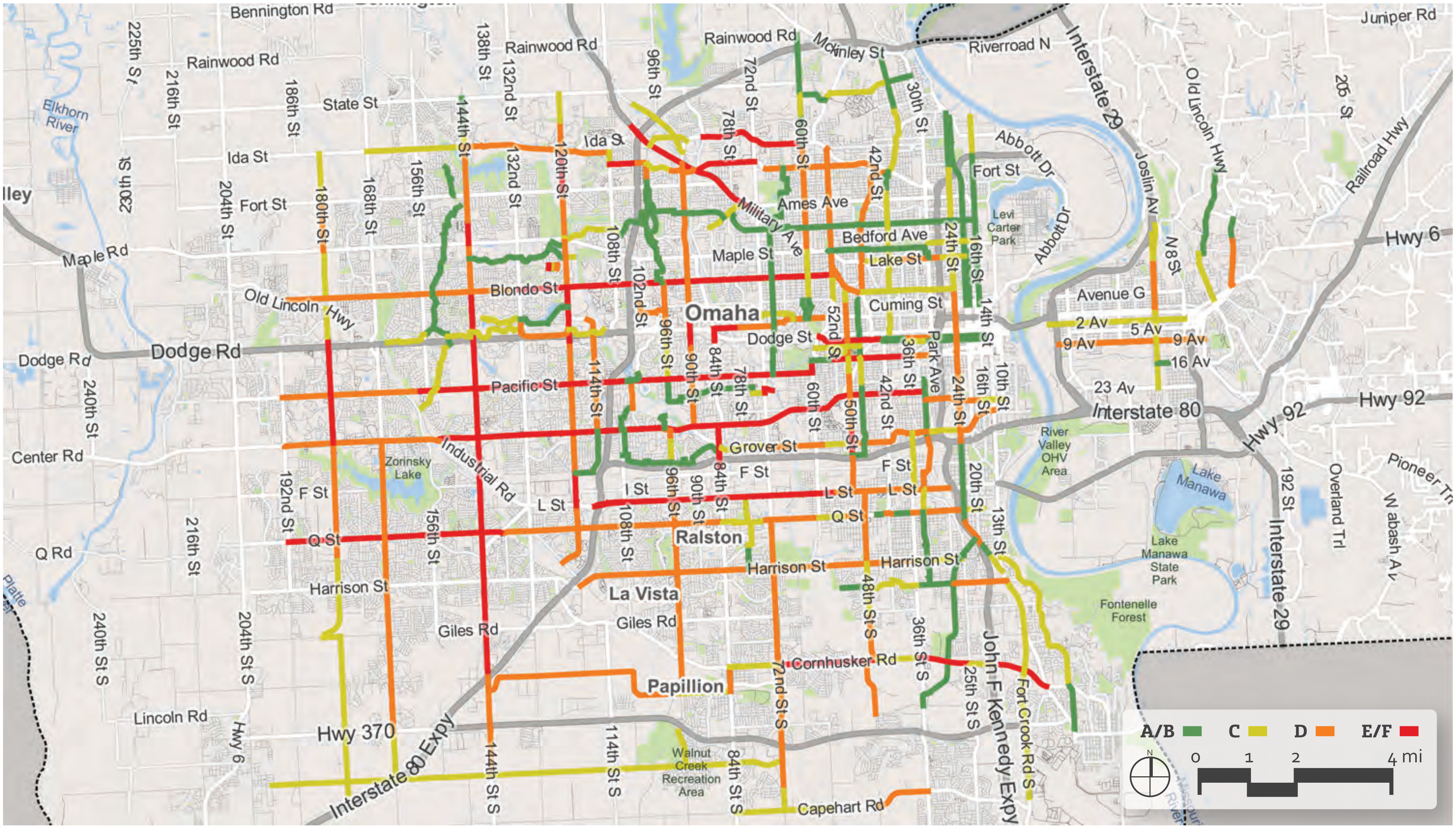
Additional concentrations of crashes occurred in the area of 24th Street between F Street and L Street and the intersection of Ames Avenue and 30th Street.

Bicycle and Pedestrian Demand

Estimating demand for bicycle and pedestrian travel is an important step in determining priority areas for infrastructure improvements. For this analysis, demand (existing and latent) was determined by the concentration and proximity of various trip generators and destinations. Demand within MAPA's Transportation Management Area is illustrated by two heat maps—one for bicyclists and one for pedestrians. A total of 11 trip generators and destination types were factored into the development of the heat maps:

1. High population density (more than 49 people per acre)
2. Medium-high population density (between 29 and 49 people per acre)
3. Schools (K-12)
4. Higher education (colleges and universities)
5. Transit stops (the bike heat map only factors transit centers and park & rides, not regular bus stops)
6. Major employers (sites with 200+ employees, weighted by number of employees)
7. Government centers
8. Libraries
9. Medical offices and hospitals
10. Parks
11. Trails/paths

Map 2 | Bicycle Level of Service



Map 2: Bicycle Level of Service ratings applied to select streets.

Weighted scores were assigned to each factor, based on distance, regardless of whether each individual feature is currently accessed by walking or biking with any regularity. For example, the areas within 1/4 mile of a school get a higher score than areas between 1 and 2 miles of the same school, even if the school is in an area that is currently not walkable or bikeable. This was done intentionally since it indicates the latent or pent-up demand for improved bicycle and pedestrian conditions.

The resulting maps are generalized, but provide good indications for where there is the potential for significant numbers of bicycling and walking trips. The primary differences between the bicycle and pedestrian maps include reduced buffer distances around traffic generators for the pedestrian map and the inclusion of standard bus stops as a factor in the walking map. In general, both maps show the greatest concentrations of demand within Downtown Omaha, along the Dodge Street corridor, along the Keystone Trail North, along the North Freeway (US-75), and along the Broadway corridor heading east from downtown Council Bluffs.

Map 4 displays the bicycle demand heat map while Map 5 displays the pedestrian demand heat map for the metro area. Table 3 following the maps describes the weighting that was used to score each factor used in the heat maps.

Table 3: Demand (Heat Map) analysis weighting for Heartland Connections

Pedestrian

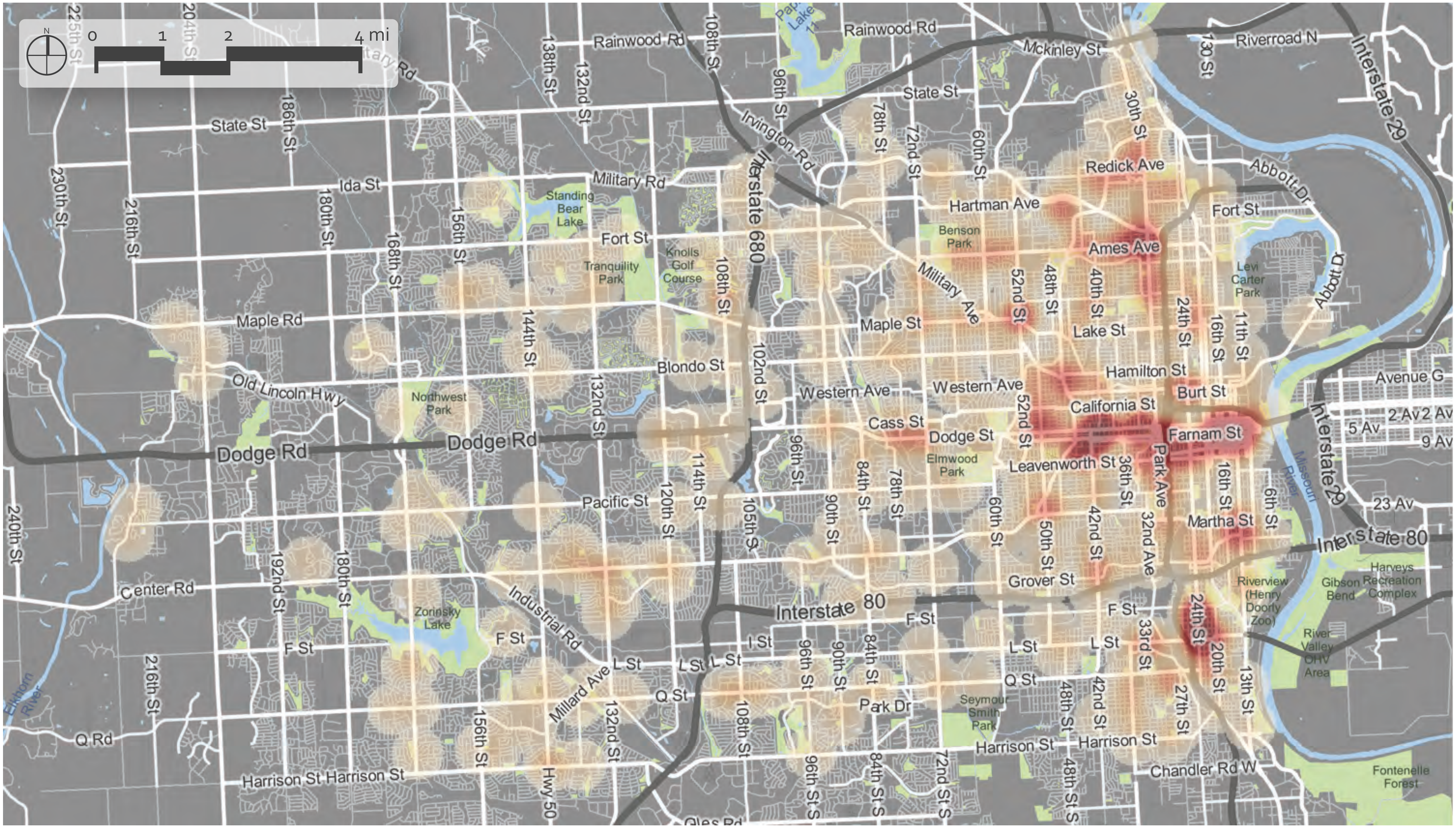
Generators	1/10 mile	1/4 mile	1/2 mile	1 mile	Total	Weight
High Population Density (>=49/acre)*	24	18	10	3	55	10%
Med-High Population Density (>=29/acre)*	12	9	6	3	30	6%
Schools K-12	24	18	12	6	60	11%
Higher Education (UNO & Creighton)	26	20	18	10	74	14%
Transit Stops	24	16	8	4	52	10%
Employer**	30	24	18	12	84	16%
Government Center	10	6	4	1	21	4%
Library	16	12	8	4	40	7%
Medical	12	9	6	3	30	6%
Park	20	16	8	1	45	8%
Trail/path	24	18	5	1	48	9%

Bicyclist

Generators	1/4 mile	1/2 mile	1 mile	2 miles	Total	Weight
High Population Density (>=49/acre)*	24	18	10	4	56	10%
Med-High Population Density (>=29/acre)*	12	9	6	3	30	5%
Schools K-12	24	18	12	4	58	11%
Higher Education (UNO & Creighton)	26	20	18	12	76	14%
Transit Centers and Park & Rides	12	9	6	3	30	5%
Employer**	30	24	18	12	84	15%
Government Center	10	8	6	4	28	5%
Library	24	18	12	6	60	11%
Medical	12	9	6	3	30	5%
Park	24	18	12	3	57	10%
Trail/path	20	15	5	1	41	7%

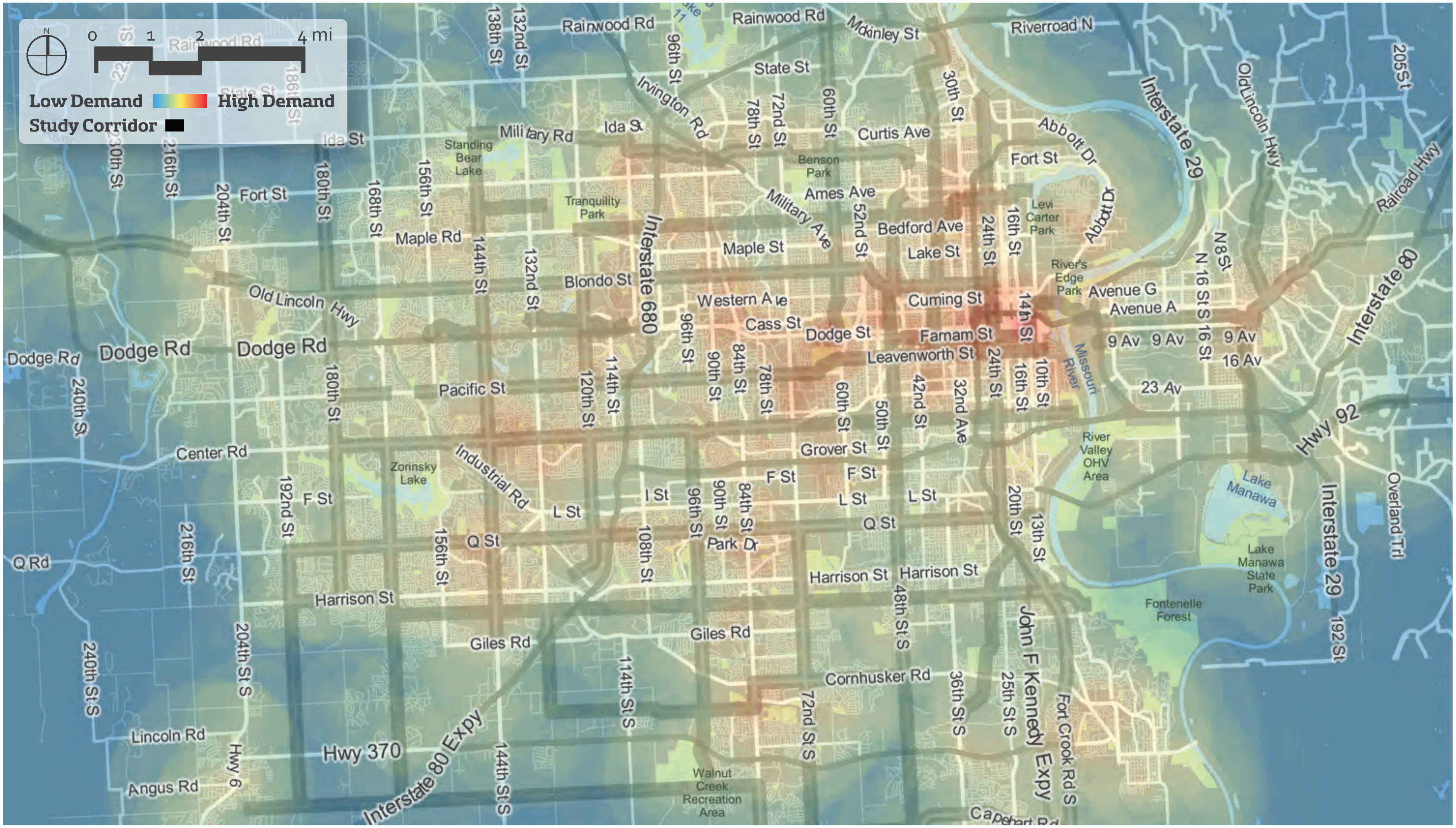
*Only one resulting value from either the High Population Density or Med-High Population Density factors will be calculated into the total score (whichever is higher).
**The Employer factor is weighted based on the number of employees at each site. Sites with 200 to 350 employees receive 60% of the points, sites with 351 to 850 receive 80% of the points, and sites with more than 850 will receive 100% of the points.

Map 3 | Pedestrian Crashes



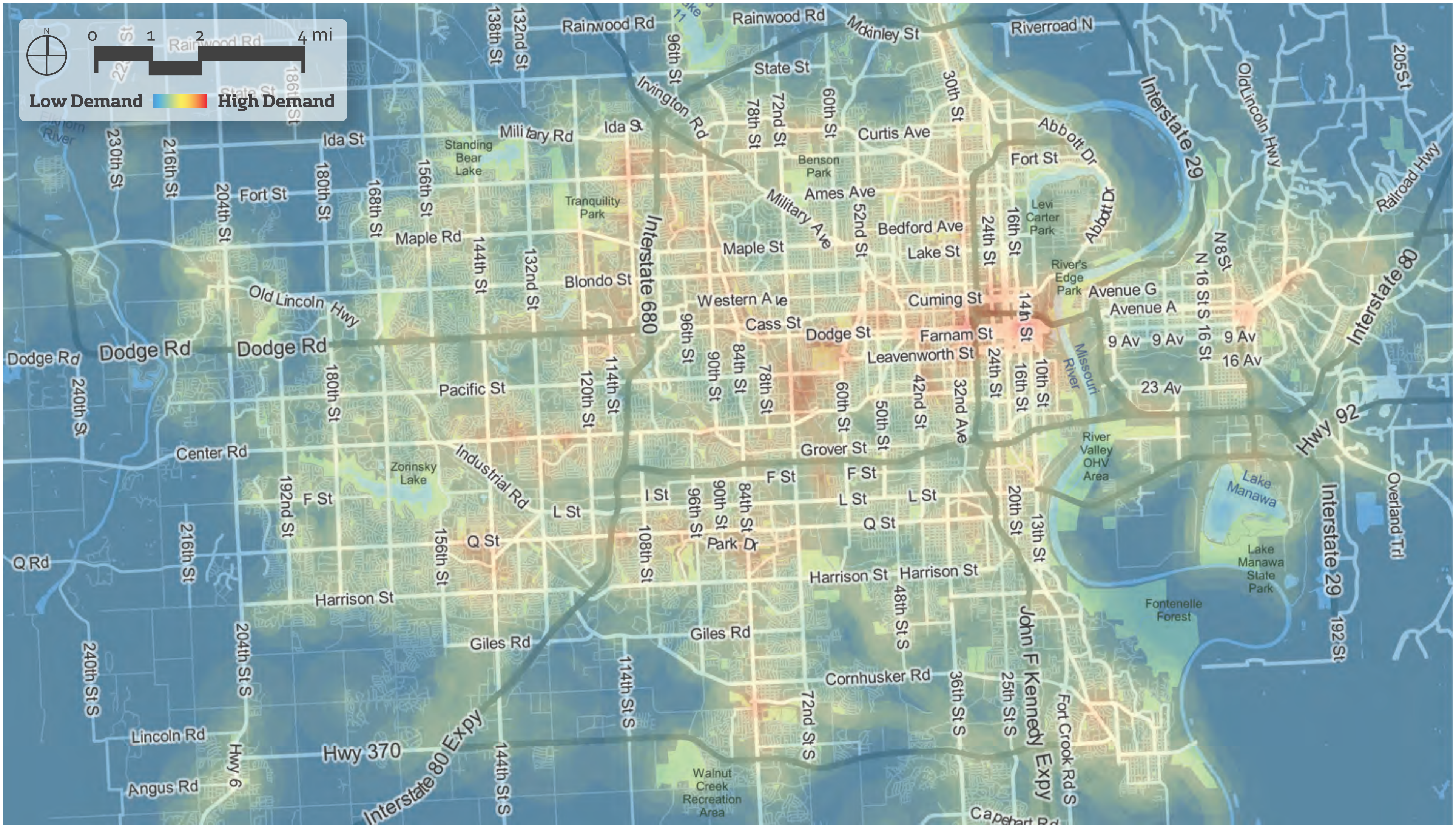
Map 3: Pedestrian crash heat map for crashes occurring in Douglas County, January 2008 - May 2014.

Map 4 | Bicycle Demand



Map 4: Bicycle demand heat map with original bikeway corridors displayed

Map 5 | Pedestrian Demand



Map 5: Pedestrian demand heat map

4 Pedestrian Element

Introduction

Walking is the most universal of all modes of transportation. Individuals of any background, age, and income level can be pedestrians, walking either on foot or using a mobility device. Those who cannot afford to own or do not have access to a personal automobile, including children, many senior citizens, and people with disabilities, rely on walking to accomplish daily tasks. Across the Omaha metro area, walking is an important mode of transportation for all residents to access places of employment, goods and services, community spaces, and recreational facilities. Table 4 lists the top reasons why people walk, as documented in the US Department of Transportation's 2012 National Survey of Pedestrian and Bicyclists Attitudes and Behaviors, Highlights Report.

Table 4: Why are People Walking?

Reasons for Walking	Percentage
Exercise or health	39%
Personal errands	17%
Recreation	15%
Walk the dog	7%
Visit a friend or relative	7%
Commuting to/from work	7%
Commuting to/from school	3%
Required for job	2%

It is important to recognize that everyone is a pedestrian. Walking trips can be made alone or in conjunction with transit, driving, and bicycling. Coordination with these other modes can improve the functionality, as well as expand the scope, of a pedestrian network. Walking then becomes a viable part of all trips, including longer commutes to and from work or school.

Walkable Districts in the Omaha Metro Area

The Omaha metro area has many examples of districts that are or can become highly-walkable. Historic areas like the Old Market in Omaha and the 100 Block in Council Bluffs have been renovated with much of their original character preserved, creating uniquely-detailed pedestrian environments.

The downtowns of the smaller communities of the region, including Ralston, Papillion, and Bellevue also exhibit characteristics of walkable areas. Omaha's Country Club and Council Bluffs' Oakland-Fairview neighborhoods are two examples of the region's older neighborhoods that provide quieter, yet engaging areas for pedestrians.

Omaha has a number of small neighborhood business districts that serve as community centers where residents and visitors alike can work, shop, and play. Included in this group are the Dundee, Benson, South Omaha, 24th & Lake, Florence, and Vinton business districts. Each district centers onto a main street corridor with a pedestrian-scale streetscape. Surrounding these districts are neighborhoods that funnel residents toward the main corridor on low-traffic local streets.

Stakeholder Presentation on Walkable Environments

On August 26, 2014 the project stakeholder group heard a presentation on the principles of walkable environments. The key discussion items from the presentation are summarized as follows:

All inhabited places in the world have pedestrians, but there are a number of factors that make some locations more "walkable" than others.

All walkable places require the following characteristics to be appealing for walking:

Comfortable
The pedestrian has a feeling of personal safety and is at ease with his or her surroundings.

Engaging
The environment provides sustained appeal or interest to the pedestrian.

Accessible
The environment is capable of being used easily by the pedestrian.

Large cities also require that the following additional conditions are achieved for walking as a viable transportation mode:

Convenient
Convenient cities foster efficient social and economic exchange by having what pedestrians routinely need and want nearby through the appropriate mix and density of land uses.

Connected
Connected cities have land uses, open spaces, streets, and people visually and physically linked together with multiple routing options via their street network, paths, trails, parks, intersections, crossings, and other connections to increase the utility of the city for pedestrians.

Appendix D includes a more detailed report on the content of the presentation.

Pedestrian Element Approach

A person's decision to travel on foot is the result of a complex interaction between individual preferences and external forces. Municipal policies cannot dictate individual preferences, but government action can and has shaped the external factors that affect walking as a transportation option.

This chapter examines the Omaha Metro Area in the context of two broad municipal policy areas:

- Urban development patterns
- Pedestrian accommodations and engineering

In addition, two themes of special importance for pedestrians will be discussed:

- School area safety and connectivity
- Access to transit

Urban Development Patterns

The physical form of a city can have a significant effect on the attractiveness of walking. This section identifies two key attributes that have a high impact. The first is the proximity of destinations. The second is the layout of the street network.

Proximity of Destinations

Broadly speaking, areas of higher density and a greater mix of land uses see higher rates of pedestrian activity. The relatively low speed of travel on foot is a barrier in locations where shops, restaurants, housing, and places of employment are spaced far apart.

Figure 2: Traditional grid-based downtown in Council Bluffs (left). Typical suburban commercial center (right). (images accessed from Pictometry Online)

Traditional Land Use Patterns

The elevated building densities near Downtown Omaha and other older districts in the region are an artifact of historic development patterns. Neighborhoods that were built before private automobiles became a significant part of the transportation system were scaled to pedestrian needs because walking was the dominant mode of transportation. This meant, for example, that buildings were spaced close together to shorten walking distances. It also resulted in a greater mixture of land uses, with small commercial hubs and activity centers being located at the heart of each distinct neighborhood.

Suburban Land Use Patterns

As consumer preferences shifted toward the automobile, land use patterns changed to respond to new needs. Space dedicated to parked cars became a necessity for new commercial buildings. Garages became standard features in new residential construction. And pressure for new development pushed farther into rural and agricultural areas because of the reduced travel times into major employment and commercial centers in the city. Many municipal and state policies, such as single-use zoning and minimum parking requirements soon followed suit.

By nature, these changes tended to degrade the pedestrian environment; Parking lots increased the walking distance between buildings, private driveways interrupted the sidewalk network, and the push for development outside of the urban core often resulted in a hollowing out of existing neighborhoods built to a pedestrian scale.

Quantifying Destinations

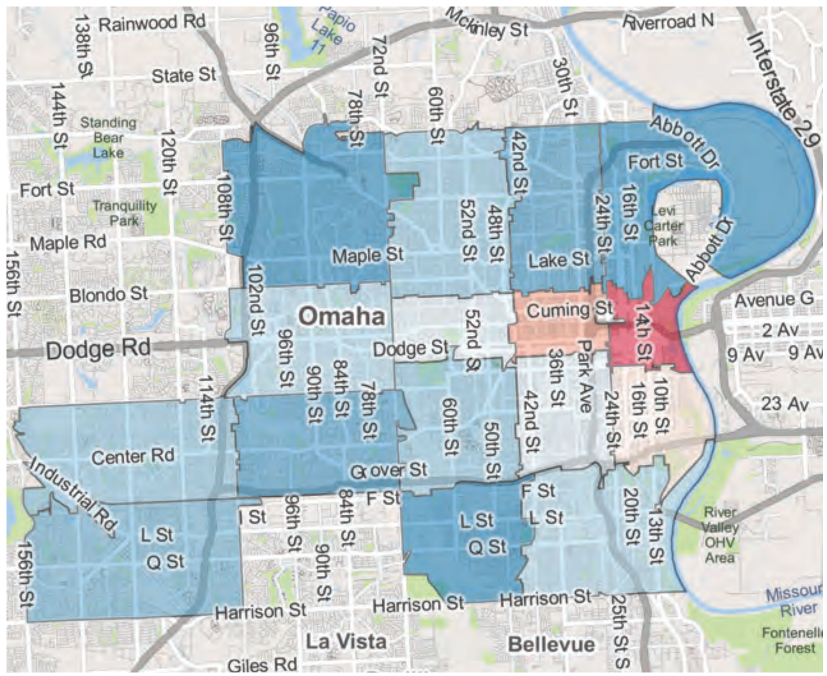
In recent years, Walk Score has become a popular tool for comparing walking environments among different locations. Walk Score is an online tool that reports the number of destinations near a given address or within a city. A score between 0 and 100 is also assigned, with locations having more destinations receiving a higher score:

Walk Score	Description
90-100	Walker's Paradise - Daily Errands errands do not require a car
70-89	Very Walkable - Most errands can be accomplished on foot
50-69	Somewhat Walkable - Some errands can be accomplished on foot
25-49	Car-Dependent - Most errands require a car
0-24	Car-Dependent - Almost all errands require a car

Walk Score's methodology is not without shortcomings. Most notably, Walk Score does not include an assessment of existing pedestrian infrastructure in its scoring algorithm. This could potentially result in a neighborhood with poor pedestrian accommodations receiving a high walk score. Furthermore, Walk Score's categorization of destinations is not perfect; stores that sell groceries are treated equally whether one is a full-service supermarket or a small corner store with limited offerings, for example.

Though imprecise, Walk Score can provide a useful measuring stick for assessing the abundance or lack of key destinations in an area relative to its peers.

As a whole, Walk Score assigns Omaha a score of 41, Council Bluffs 32, and Bellevue 28. However, there are large variations within each community. For example, the Downtown Omaha address of 409 S 16th Street has a Walk Score of 93. The amount of variation is further apparent in a listing of Omaha zip codes:



Zip Code	Walk Score
68102	78
68131	69
68108	60
68132	55
68105	53
68107	48
68114	47
68106	46
68144	44
68104	44
68137	42
68111	40
68124	40
68134	37
68110	36
68117	35

Recommendations to Increase Proximity to Destinations

Municipalities wield powerful tools in determining the form that development takes. Zoning codes are ubiquitous and dictate restrictions on the density of development and types of activities that can occur on any given parcel of land. Zoning originated in the early 20th Century as a response to undesirable industrial operations locating adjacent to residential areas.

Over time zoning codes have evolved from simple restrictions on specific, incompatible uses into complex regulations. Most codes today regulate a building's height, width, form, and function, as well as the amount of off-street parking for virtually every piece of real estate in a city.

In simple terms, cities can increase the number and variety of walking destinations for a typical resident by easing restrictions on the form and allowable uses of development. In recent decades, many cities have heavily modified or completely rewritten zoning codes in pursuit of this goal. The City of Omaha's 2007 zoning code revision is one example of this trend.

It is recommended that municipalities in the Omaha Metro Area address these issues by considering the following strategies where appropriate:

- Relax requirements for off-street parking to reduce the amount of land occupied by parking lots
- Expand the types of uses allowed in compatible zones
- Support the rezoning of parcels to encourage a greater variety of uses in a neighborhood

Street Patterns and Connectivity

The layout and spacing of streets, as well as their connectivity within the larger road network, have a direct impact on walkability.

Traditional Grid Layout

The streets in many older sections of cities within the Omaha Metro Area were built in a traditional grid pattern, with many parallel streets and frequently-spaced perpendicular cross streets. These areas developed around the popular means of transportation at the time of early growth, including the horse-and-buggy, the streetcar, and walking.

The grid pattern was favored during this era because it maximized block frontage and gave pedestrians shorter walking routes to destinations. Figure 3 details the general block size and subsequent walk times of the Old Market area in Omaha, a prime example of a highly-walkable district.

Figure 3: Old Market Block Sizes and Walk Times

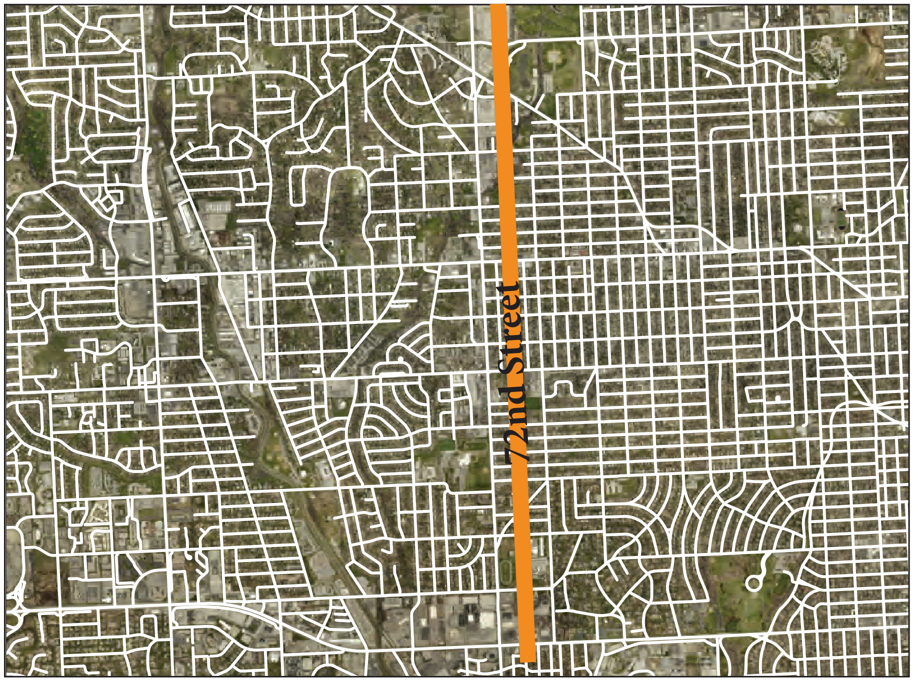


Figure 4: 72nd Street and the Movement Away from the Grid

Figure 5: Lack of Pedestrian Connectivity at the Neighborhood Scale in West Omaha

Disconnected Suburban Pattern

With the popularization of the automobile, the efficiency of the grid pattern fell out of favor while meandering streets and culs-de-sac, often associated with suburban development, became more common. In Omaha, 72nd Street is a clear dividing line between these differing street patterns. As Figure 4 shows, the tight grid pattern of eastern Omaha ends abruptly at 72nd Street with areas to the west developed in the disconnected style associated with the post-war period.

In this shift away from the grid, pedestrian needs began to receive less attention from cities and developers. For example, in Omaha many neighborhoods constructed in the 1960s and 1970s did not include sidewalks; city policy did not require developers to provide them. This policy quickly fell out of favor as, beginning in the 1980s, new developments were required to include sidewalks along all streets.

In spite of this renewed sidewalk requirement, pedestrian movement is still hindered by the breakdown of the street grid. As Figure 5 illustrates, the lack of connectivity between streets within a single neighborhood can force pedestrians to travel distances far longer than simple geography would suggest.

Challenges posed by Disconnected Street Patterns

Even though a highly-connected grid pattern of streets is inherently better for pedestrians, it is possible to provide an adequate level of pedestrian connectivity within a suburban street network. Examples of both good and poor pedestrian connectivity can be found in the more recent developments in the Omaha Metro Area, which still tend to adhere to the low-connectivity patterns that dominated in the last half of the Twentieth Century.

Figure 6 and Figure 7 illustrate examples of the common connectivity issues that are found in these areas. Culs-de-sac create isolated pockets of homes while channelizing travel along a more limited number of major routes through a neighborhood. Many neighborhoods developed in the last 50 years have only two or three streets providing access to nearby thoroughfares. In addition to resulting in a heavy increase in automobile traffic and higher travel speeds on those streets, this greatly limits pedestrian mobility to and through the neighborhood.

Recommendations for Increasing Pedestrian Access in Disconnected Street Patterns

Whether built as the neighborhood is being developed or retrofitted at a later date, pedestrian connections can be made between disconnected streets in order to improve walkability. Figure 8 shows some of the treatments found in newer developments in the Omaha Metro Area that improve pedestrian movement.

Planned gaps between residential lots can be designed to accommodate shared paths that lead to parks and schools. Even if the street and sidewalk systems are not ideal for pedestrian movement, these small connections can create a better functioning pedestrian network. Figure 8 shows an example of a pedestrian connection between residential properties.

Figure 6: Culs-de-sac Prevent Neighborhood Connections and Channelize Traffic to a Single Street (photo base images accessed from Pictometry Online)

Figure 7: Too Few Entry-and-Exit Points Create Congestion Issues because of Limited Routing Options (photo base images accessed from Pictometry Online)

Figure 8: Examples of Neighborhood Pedestrian Facilities (photo base images accessed from Pictometry Online)

Figure 9: Photo of Walkway Between Lots and Reconnecting Streets

Figure 10: A vacated street that has been preserved as a pedestrian connection.

These connections are also possible in more urban parts of the Omaha Metro Area. Even at locations where the street grid remains mostly intact, portions of streets are sometimes vacated to accommodate newer large-scale commercial or institutional developments. In these instances, the old rights-of-way of the vacated streets should be reused as pedestrian corridors in order to maintain the same level of connectivity. Simply incorporating standard sidewalks in place of streets can lead to a successful development that benefits the pedestrian environment. Figure 10 displays a good example of this in the Omaha Metro Area.

Pedestrian Accommodations and Engineering

The design, location, and implementation of dedicated pedestrian infrastructure is another factor which contributes to the appeal of walking. Although sidewalks are not the only form of dedicated pedestrian infrastructure, they are the most extensive and common in the Omaha Metro Area. This section will assess four elements of particular importance to sidewalk facilities:

- Quality and comfort
- Continuity
- Accessibility
- Intersection treatments

Quality and Comfort

The convenience of sidewalks depends on their relationship to adjacent buildings and roads, as well as physical characteristics like their width and the presence of obstacles. Sidewalks should be sized to accommodate the expected amount and type of pedestrian traffic to be served.

In general, areas of more intense land use will attract more pedestrians, necessitating wider sidewalks. The provision of site amenities (such as seating, furnishings, light fixtures, decorative paving and landscaping) should be determined by context, surrounding land uses and adjacent street type. If provided, these amenities should not obstruct the normal flow of pedestrian traffic. Placing such features to the side of the main walkway allows for ease of movement for pedestrians while creating a nice alcove or amenity zone within the streetscape. Figure 11 and Figure 12 highlight four good examples of these relationships.

Figure 11: Consistent walkway through amenity zone (left). Specialty paving outside of walkway (right).

Figure 12: Overhead canopy protection (left). Bollards and speed table at crosswalk (right).

Figure 13: Sidewalk with parkway on local street (left). Side path separated from street by berm and street trees (right).

Figure 14: Sidewalk along open space (left). Widened sidewalk from back-of-curb setback from street (right).

Figure 15: Arterial (left) and local (right) street with no sidewalks

Materials, both hardscape and landscape, located between the street and sidewalk can affect the comfort level of pedestrians and motorists alike. The width of these buffers should be greater along streets with higher motor vehicle traffic volumes and speeds. Larger setbacks for structures from the sidewalk also influence pedestrian comfort levels while additionally delineating levels of access.

State of repair and maintenance is an important part of sidewalk usability. Cracking, crumbling, and heaving present a trip hazard to sidewalk users. Maintenance issues like snow and brush removal can also impact pedestrian travel.

Continuity

In urban areas, sidewalks are one of the most fundamental elements of public space. They are essential for the safety of all pedestrians, including people with disabilities. Gaps within a sidewalk system can severely decrease the effectiveness of a pedestrian network.

Breaks in the system tend to occur at specific locations because sidewalks were not included with original developments, land uses do not encourage pedestrian access, or properties are undeveloped and do not include sidewalk facilities.

Neighborhood Gap Analysis Process

Identifying gaps in the sidewalk network is an important step in improving pedestrian accommodations. The following illustrates a process and example for gap analysis on a neighborhood level. This process is most applicable to a 2-to-3 square mile area that is manageable for analysis and potential improvement recommendations.

The general methodology is as follows:

1	Document sidewalk facilities for any arterial street, major or minor, located within or adjacent to the study area.
2	Document sidewalk facilities for all collector and local streets.
3	Place a 1/4-mile radius around all schools within or less than a 1/4-mile away from the study area. If applicable, the same radius should be applied to all civic buildings, including libraries and community centers, transit stops and public open spaces within the same limits.
4	Place a 1/4-mile radius around all schools within or less than a 1/4-mile away from the study area. If applicable, the same radius should be applied to all civic buildings, including libraries and community centers, transit stops and public open spaces within the same limits.
5	Add any gaps to be filled by proposed sidewalk projects to the map of the existing network. The final gap analysis diagram gives a good picture of the existing pedestrian facilities of the neighborhood and the necessary improvement projects that, when implemented, will serve the greatest good for pedestrians.

Gap Analysis Case Study

The following is an example neighborhood gap analysis study from the City of Omaha. The study area was selected because of the number of internal destinations, its diversity of both street types and land uses, and the general scarcity of sidewalks within its boundaries. The Gap Analysis Diagram (right) that illustrates the existing sidewalk system and recommended improvements for the study area.

The study area is located within the city of Omaha and bounded by West Dodge Road on the north, 84th Street / Ridgewood Avenue on the east, West Center Road on the south and 90th Street on the west. The boundary roadways are all major arterial streets with the exceptions of South 84th Street and Ridgewood Avenue, which are minor arterials. Each of the boundary streets includes sidewalks on both sides along the entire extent of the study area. Pacific Street, which bisects the study area running east-to-west, is also a major arterial and has sidewalks on both sides.

No collector streets are located within or adjacent to the study area. Along the local streets, sidewalk existence is spotty. Sidewalks are concentrated around schools, parks and Countryside Village, a small neighborhood retail center located along Pacific Street. Indian Hills Drive, Shamrock Drive, Arbor Street and South 85th Avenue are local streets with existing sidewalks along the majority of their spans. Few other local streets that connect to these four have existing sidewalks.

Two elementary schools, one middle school and one high school are located within the study area. Two additional elementary schools, as well as a city library, lie just outside its boundaries. Even within the 1/4-mile proximity limits, sidewalk connectivity from these destinations into the surrounding neighborhood is weak. South 85th Avenue is the exception, as it has sidewalks on both sides running between Westside High and Middle Schools.

As Figure 16 shows, the existing sidewalk network has numerous large gaps. The neighborhood lacks connectivity between its major destinations. With that known, the dark blue lines drawn on the diagram illustrate how the network could be improved. North of Pacific Street, South 89th, 87th and 85th Streets are given sidewalks to connect the Swanson Park / School area with Indian Hills Drive. Broadmoor Drive and Brentwood Road are given sidewalks to improve east-west movement through the Christ the King and Countryside areas. The existing sidewalks within Swanson Park would connect the proposed improvement areas.

South of Pacific Street, South 87th and 84th Streets are given sidewalks to supplement the north-south demand on South 85th Avenue. Hickory Street is given sidewalks and becomes a prominent east-west route between the section's bookend schools. For all improvements throughout the study area, proposed sidewalks would only be recommended on one side of the roadway because of limited rights-of-way and the prevalence of drainage swales along the majority of the local streets.

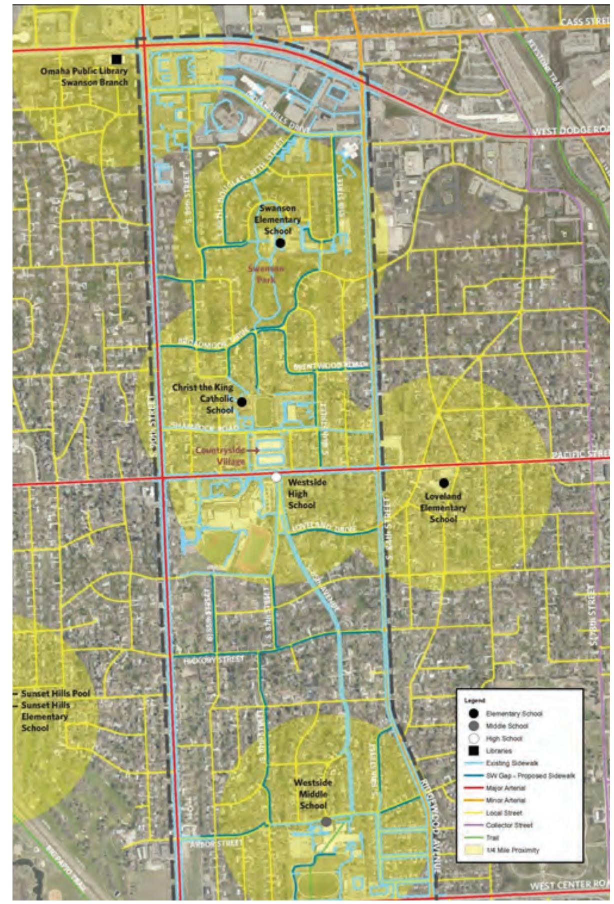


Figure 16: Gap Analysis Diagram

The preceding analysis and diagram are meant to serve as an example for the process and methodology municipalities and planning groups throughout the area can utilize in the future to document the gaps in their pedestrian networks, analyze the impacts to the network's functionality, and develop a plan for new sidewalk construction projects to effectively close the system. This approach can be repeated any number of times for any area with the general purpose of understanding and shaping the pedestrian experience.

Accessibility

A properly functioning pedestrian network must be universally accessible. Accessibility refers to the ability of all people to make use of sidewalks and other pedestrian accommodations. This includes small children, senior citizens, and people with physical disabilities. Standards for accessibility encompass treatments such as curb ramps, detectable warning panels at street crossings, and crossing signals. In addition, the width, grade, and surface material of sidewalks are covered by standards.

In the United States, accessibility standards are universal, eliminating issues of coordination among municipalities and different disability groups. The Americans with Disabilities Act (ADA) and the U.S. Access Board Proposed Guidelines for Public Rights-of-Way are the two governing documents of accessibility.

Because of the ubiquity of accessibility standards, their importance can easily be overlooked. However, every community has accessibility deficiencies in their pedestrian infrastructure, either because of changes in standards or deterioration in existing accommodations.

The maintenance and repair of existing facilities, as well as the construction of new facilities to acceptable standards of durability, falls to both municipalities and private land owners. Impediments to pedestrian movement are generally easy to identify, but can be difficult to resolve. The images in Figure 17 and Figure 20 document examples of the two most general types of obstacles to accessibility within a pedestrian network: path obstructions and crossing impairments.

The Omaha Metro Area's pedestrian network is constantly undergoing improvements and updates. Street construction and reconstruction incorporate accessible pedestrian amenities, as required by federal law. However, the majority of street projects involve widening street sections that shrink the pedestrian realm, which may not negatively affect accessibility but can nonetheless reduce the quality and comfort of the walking environment.

The sidewalks in the older sections of the region's cities are in continual need of minor repair and maintenance associated with deterioration over time. Many parts of the region still lack sidewalks. While current federal and state laws do not require sidewalks along streets, a lack of sidewalks can impair an area's accessibility.

Intersection Design and Safety

Intersections are the building blocks a transportation network. Important buildings, civic spaces, and public art features are all typically located near intersections, as are major commercial establishments and other key destinations. In addition, an intersection is often the most visible and safest place for pedestrians to cross a street.

However, intersections imply a mixture of travelers utilizing various modes of

The following are official resources for more information on accessibility and current standards for pedestrian infrastructure:

Americans with Disabilities Act: http://www.ada.gov/

United States Access Board: http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines

Federal Highway Administration Bicycle & Pedestrian Program – Accessibility Guidance: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/accessibility_guidance/

Figure 17: Path obstructions

The traffic signal pole is aligned to hinder movement along the sidewalk and without proper setback from the curb ramps.

The street light pole is located on the sidewalk and obstructs accessible clearance along the path.

The low planter obstructs the sidewalk.

The street trees' trunks have grown into the sidewalk while their roots have raised a portion of the concrete, creating a tripping hazard for pedestrians.

transportation. This dynamic represents a danger to all road users. Generally, intersections are the most common locations for crashes involving motorists, bicyclists, and pedestrians.

This section explores two design elements that impact the safety and comfort of intersections for pedestrians: intersection crossing width and physical infrastructure cues. Several examples from throughout the region are provided for illustrative purposes.

Crossing Width

The width of an intersection determines the amount of time needed to complete a crossing. A pedestrian crossing a wide thoroughfare, then, spends a longer amount of time exposed to motor vehicle traffic than a pedestrian crossing a narrow street. In some cases signals do not provide adequate time to cross the street, increasing the likelihood a pedestrian is stranded in front of oncoming or turning traffic.

In general, wider streets also require longer signal timings for through traffic. This results in longer wait times for pedestrian signals. This issue is exacerbated at intersections where more than one cycle is completed before a pedestrian crossing signal is issued.

Double left turn and right turn lanes are increasingly common in the newer portions of the Omaha Metro Area. In addition to the additional street width required, these lanes make it more difficult for pedestrians because they reduce pedestrian visibility and encourage faster approach and turn speeds.

Physical Infrastructure Cues

Many of the design tools employed in the engineering of roads rely on visual cues that are often interpreted subconsciously by road users. Elements like the presence or lack of street trees, the width of lanes, turning radii at intersections, and the presence and type of pavement markings all contribute to the "feel" of a road.

These design principles affect the pedestrian realm as well. The lack of a buffered sidewalk or delineated streetscape creates a sense of discomfort in pedestrians. Higher traffic speeds also reduce the comfort level of pedestrians. Intersection curb extensions, or bulb-outs, serve multiple purposes – the narrowing of the street shortens the crossing distance for pedestrians and also tends to slow vehicles.

Marked crosswalks inform motorists and pedestrians about expected locations for crossing the street. If markings are not present or not properly maintained, awareness is reduced. Similarly, a pedestrian walk signal at signalized intersections is critical for helping pedestrians comfortably cross at traffic lights.

Additional pedestrian amenities, such as seating areas, street trees, and decorative paving enhance the pedestrian experience and offer visual cues to drivers that pedestrians are a welcome and expected user of the street.

Figure 18: Intersection with excessively wide streets (left). Long distance required to cross the wide street (right).

Figure 19: Intersection with lack of physical pedestrian cues.

Figure 20: Crossing impairments

While a curb ramp is provided on the near side of the street, the lack of a ramp on the far side prohibits accessible crossing.

The mid-block crossing does not include street markings, signage or signals alerting drivers and pedestrians of a crossing point.

The alignment of the crosswalks is not advantageous as they do not meet the sidewalk at a proper setback from the cross street.

The near sidewalk needs widening, repair, extension and a curb ramp to accommodate crossing.

Figure 21: Ideal Examples

The Omaha Metro Area has a number of exemplary intersections that provide quality pedestrian facilities. The following are three examples of recently renovated walkable intersections that see high levels of pedestrian traffic.

The intersection of 50th Street and Underwood Avenue lies at the heart of Omaha's Dundee neighborhood and business district. It incorporates sidewalk furniture including benches, trash receptacles, decorative light poles, and landscaping. Both streets have two travel lanes and include on-street parking stalls pushed back from the intersection, minimizing the crossing distance for pedestrians.

The intersection of 33rd and Farnam Streets is a prominent location within the Midtown Crossing development. The development is a mixed use, live-work-play district in central Omaha. This particular intersection sees heavy pedestrian traffic moving amongst the various buildings and uses. The intersection provides automated push-button and crosswalk signals that optimize accessibility. Crosswalks incorporate decorative pavers to call attention to the crossing areas for pedestrians and motorists alike.

Intersection of 50th Street & Underwood Avenue

Intersections of N & O Streets with South 24th Street

Intersection of 33rd & Farnam Streets

Intersection Audit Example

Galvin Road and Harvell Drive, Bellevue

The existing intersection is an example of a large suburban intersection with wide street sections and few pedestrian facilities. The recommendation includes mid-block pedestrian crossings, with painted street markings, signage and refuges located on all medians, incorporated on all four legs of the intersection. These crossings would be set back a distance from the intersection to accommodate high vehicle speeds and to allow for good visibility to both motorists and pedestrians.

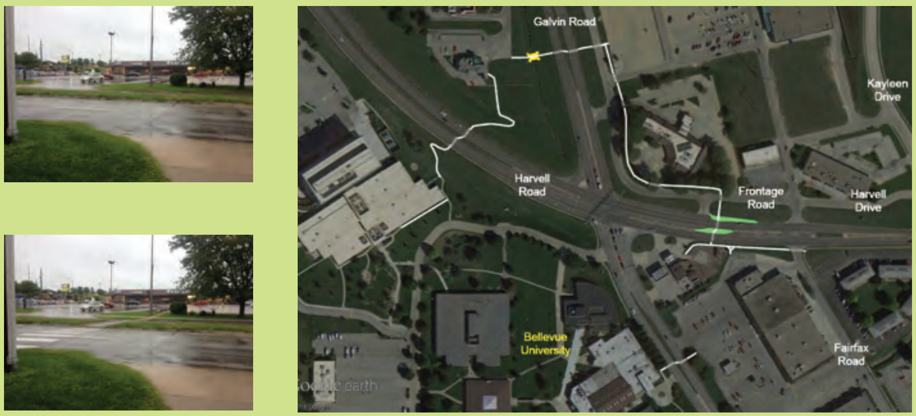


Figure 22: Proposed pedestrian facility improvements, Galvin Rd & Harvell Dr, Bellevue.
(aerial photo image accessed from Google Earth)

Field Audits

The Planning Team conducted a series of intersection field audits around the Omaha Metro Area on August 25, 26, and 27, 2014. Members of the Planning Team and Steering Committee knowledgeable of the city street network were tasked to select intersections that would warrant analysis and could provide appropriate locations for improvements to be made. From this group, the intersections that were eventually audited were selected for the positive and/or negative aspects each portrayed as representations of larger, more widespread issues for the region's street network.

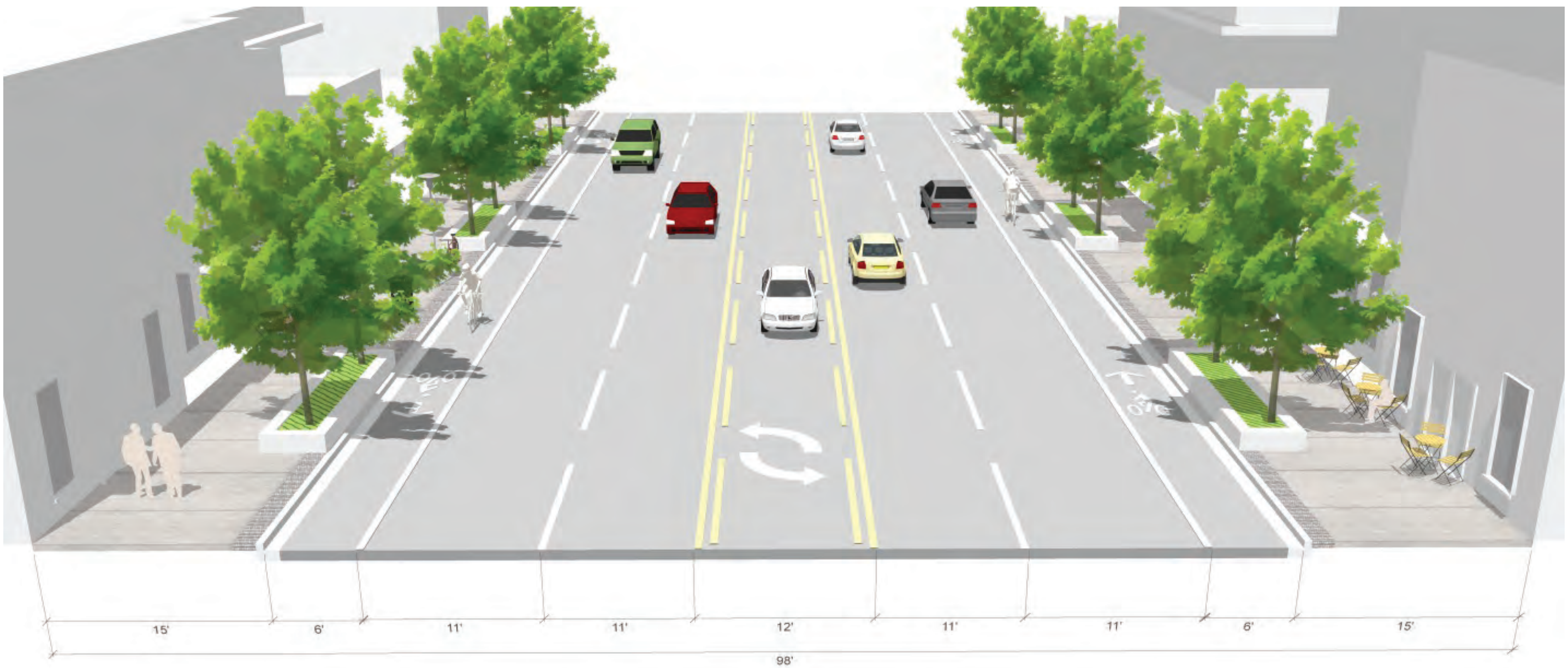
During the field audits, Planning Team members assessed the individual intersections, noting layout dimensions, timing crossing signals, and judging the degree of visibility. Members noted issues and successful treatments and then opened dialogue on possible improvements. The type and number of pedestrians, bicyclists, and vehicles moving through the intersections were noted as well.

All of the information gathered painted a reasonable picture of what the intersection was and what it could be with improvements. The collection of this inventory data will allow feasibility analyses to be made for multiple facility improvement projects in the future. Projects deemed possible could then be recommended to the governmental body with jurisdiction over the particular intersection.

The following are the intersections audited by the Planning Team. Appendix F includes a summary of the findings and recommendations for each of the intersections.

- 67th & Center Streets – Omaha (Aksarben Village / UNO Arena)
- 72nd Street & Interstate 80 – Omaha (typical interstate crossing)
- 132nd & L Streets – Omaha (large suburban intersection)
- 24th & Cuming / Burt / California Streets – Omaha (North Downtown / Creighton)
- Saddle Creek Road & Leavenworth Street – Omaha (Midtown / development opportunities)
- 37th to 40th Streets & Dodge Streets – Omaha (high pedestrian-to-vehicle crash incidence)
- 69th to 74th Streets & Dodge Streets – Omaha (high number midblock pedestrian crossings)
- L to P Streets & South 24th Street – Omaha (South Omaha Business District)
- Galvin Road & Harvell Drive – Bellevue (large suburban intersection / university adjacency)
- Park Avenue to 1st Street & West Broadway Avenue – Council Bluffs

In addition to the intersections, the team also visited a section of Leavenworth Street near the Medical Center. This is a transforming area and redevelopment opportunities are likely to occur, allowing the consideration of bicycle and pedestrian accommodations. Featured below is a concept drawing of a more bicycle- and pedestrian-friendly Leavenworth.



School Area Safety and Connectivity

Schools are major destinations and high-activity areas. They can serve as community spaces as well as iconic places for residents. Accordingly, schools are good locations to begin improving the pedestrian network. Walking routes leading to schools should be direct, well-marked and comfortable for people of all ages, especially children. Both older and more recent developments tend to be laid out around schools, with primary streets running to school properties. It is important that pedestrian facilities are provided to, along, and across these primary streets.

Another reason why significant consideration should be given to schools in the pedestrian network is the age of the typical user. Children make the majority of trips to and from schools. They are generally inexperienced in interacting with motorists and street systems. The pedestrian facilities, including wayfinding signage, crossing signals and markings, and sidewalks, should be sized and oriented to minimize the number and difficulty of decisions children must face when navigating school routes. All design choices must be made with safety being the top priority.

Consideration given to schools should expand to include pedestrian connections to the transit and bike systems of a given area. Both avenues expand the reach of a school system while increasing the population it serves.

Beyond physical infrastructure, a number of initiatives or programs can be implemented to make school travel safer for children. Walking school buses are groups of children led by adults that walk to and from a school. Remote drop-offs are designated points within a half- or quarter-mile of a school where parents, or school buses, can drop kids off and have them walk the rest of the way along safe routes. Observance of International Walk-to-School month, week or day can raise awareness among both parents and administrators to what programs are viable for their schools.

Finally, almost every school in the Omaha metro area would benefit from the development of a school-specific or districtwide Safe Routes to School plan.

School Area Planning and Design Resources

A number of resources exist for planners, developers and municipalities to utilize when planning a new school site and pedestrian routing project. The resources provide descriptive philosophies, conceptual frameworks, guidelines and case studies to drive design and planning. The same resources can be applied when considering a retrofit to an existing school and neighborhood. Below is a list of organizations and programs, both on a national and regional level, that provide information on the treatment of safe school routes.

National

National Center for Safe Routes to School, http://www.saferoutesinfo.org/

Safe Routes to School National Partnership, http://saferoutespartnership.org/

Federal Highway Administration, Transportation Alternatives Program (TAP), http://www.fhwa.dot.gov/environment/transportation_alternatives/

Manual on Uniform Traffic Control Devices, Traffic Control for School Areas, http://mutcd.fhwa.dot.gov/pdfs/2009/part7.pdf

Regional

Iowa Department of Transportation, Safe Routes to School Iowa, http://www.iowadot.gov/saferoutes/

Nebraska Department of Roads, Safe Routes Nebraska, http://www.saferoutes.nebraska.gov/

Live Well Omaha, http://livewellomaha.org/physical-activity/safe-routes-to-school/

Figure 23: Gateway Elementary School, Omaha (photo image accessed from Pictometry Online)

Model School Example

Within the Omaha metro area, there are numerous examples of school-oriented routing design features for pedestrians. Gateway Elementary School is one of the most extensive new projects that incorporates a number of beneficial walkability principles and features into its plan. The project can serve as a standard for future new construction sites as well as a reference for smaller retrofit projects around existing schools and neighborhoods.

Gateway Elementary School, located in south Omaha at 42nd & V Streets, opened for classes in the fall of 2013. The school combines three previous schools that serviced three diverse communities. The school structure and site have a focus on sustainability, with the new construction aiming to reduce environmental impact.

School pedestrian planning involves both the school site and routes leading to the school. On-site paths guide pedestrians and bicyclists from property entrances to the school building doors. Sidewalks and queuing areas on the school property should be sized to handle peak student demand and be comfortably separated from vehicular traffic. Neighborhood routes leading to the school include sidewalks which are accessible for parents with strollers and children with disabilities, wayfinding signage, crosswalk markings and traffic signals.

Site Elements


Figure 24: Large sidewalk plaza at street corner (left). Sidewalk separated from street by wide landscaped area (right)


Figure 25: Sidewalks provided along parking medians (left). Bike racks and benches located at a secondary entrance (right).


Figure 26: Wide paved area at drop-off zone (left). Pop-up bollards at entrance to pedestrian-only path (right).

Neighborhood Routing Elements

Figure 27: Pedestrian crossing sign (left) and speed limit and school signage (right)

Figure 28: Traffic lights and signals provided with access-prohibited signage for vehicles (left). Landscaped medians, street trees and crosswalk markings (right)

Figure 29: Pedestrian crossing light and signal provided with pedestrian refuge in median (left). Wide sidewalk extends from school into surrounding neighborhoods (right).

Transit Access

Modern transit systems, such as bus rapid transit (BRT) and streetcars, are being considered and implemented across the country, including in the Omaha metro area. Since all transit users are pedestrians at some point during their travels, it is essential that transit stations, stops, and other facilities are accessible to pedestrians and are designed to facilitate pedestrian flow within the area. Extending beyond these areas, all pedestrian facilities, from sidewalks to intersection crossings, must be accessible and designed to accommodate safe walking for transit users once they step off a bus.

A number of factors affect an individual's desire to use transit services. Among them are facility and vehicle cleanliness, boarding times, overcrowding on vehicles, service frequency and coverage, passenger facilities, sidewalk connections to transit routes, and lighting and security. The final four in that list have particular relevance to the larger pedestrian network.

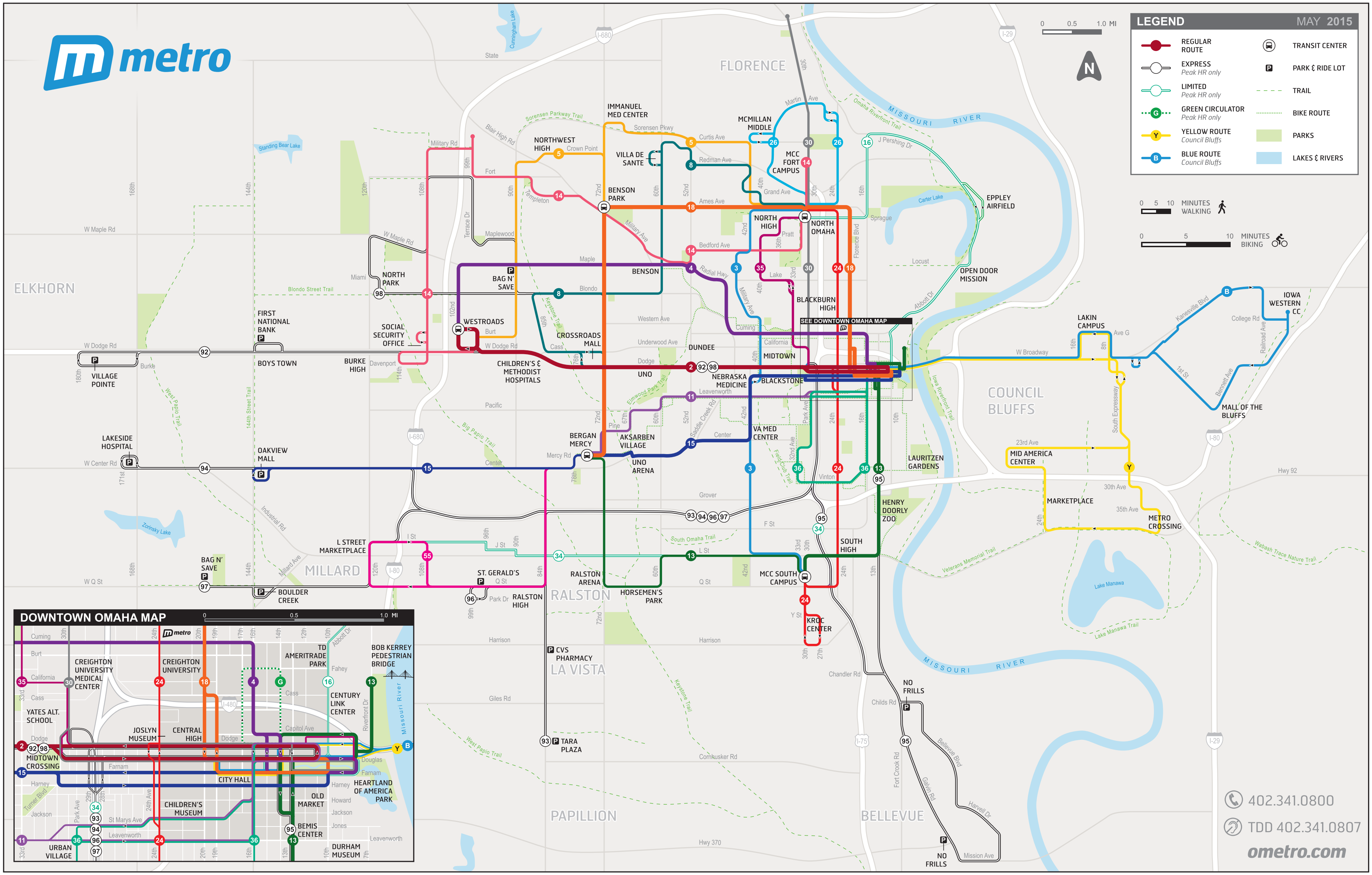
The Current and Planned Transit System

Currently, mass transit is provided to the Omaha Metro Area by the Metro Bus (Metro) system. The system covers the majority of Omaha and Council Bluffs and the communities of Bellevue, La Vista and Papillion in Sarpy County. Figure 30 shows the current Metro system map.

The City of Omaha and MAPA have recently completed the first phase of the Central Corridor Alternatives Analysis, a feasibility and planning study for a transit improvement project running east-west along Dodge, Farnam and Harney Streets. BRT service will run from Westroads Mall on the west to downtown Omaha on the east. Figure 31 shows the preferred route identified in the alternatives analysis.

To maximize pedestrian access to transit stations, sidewalks should exist along all street sections within a one-mile radius. Wayfinding signage guiding pedestrians should also be utilized to guide pedestrians to the transit facility and to community destinations near the station.

Figure 30: Metro Bus System Map



(image accessed from www.ometro.com)

Figure 31: Preferred Transit Alternative Route

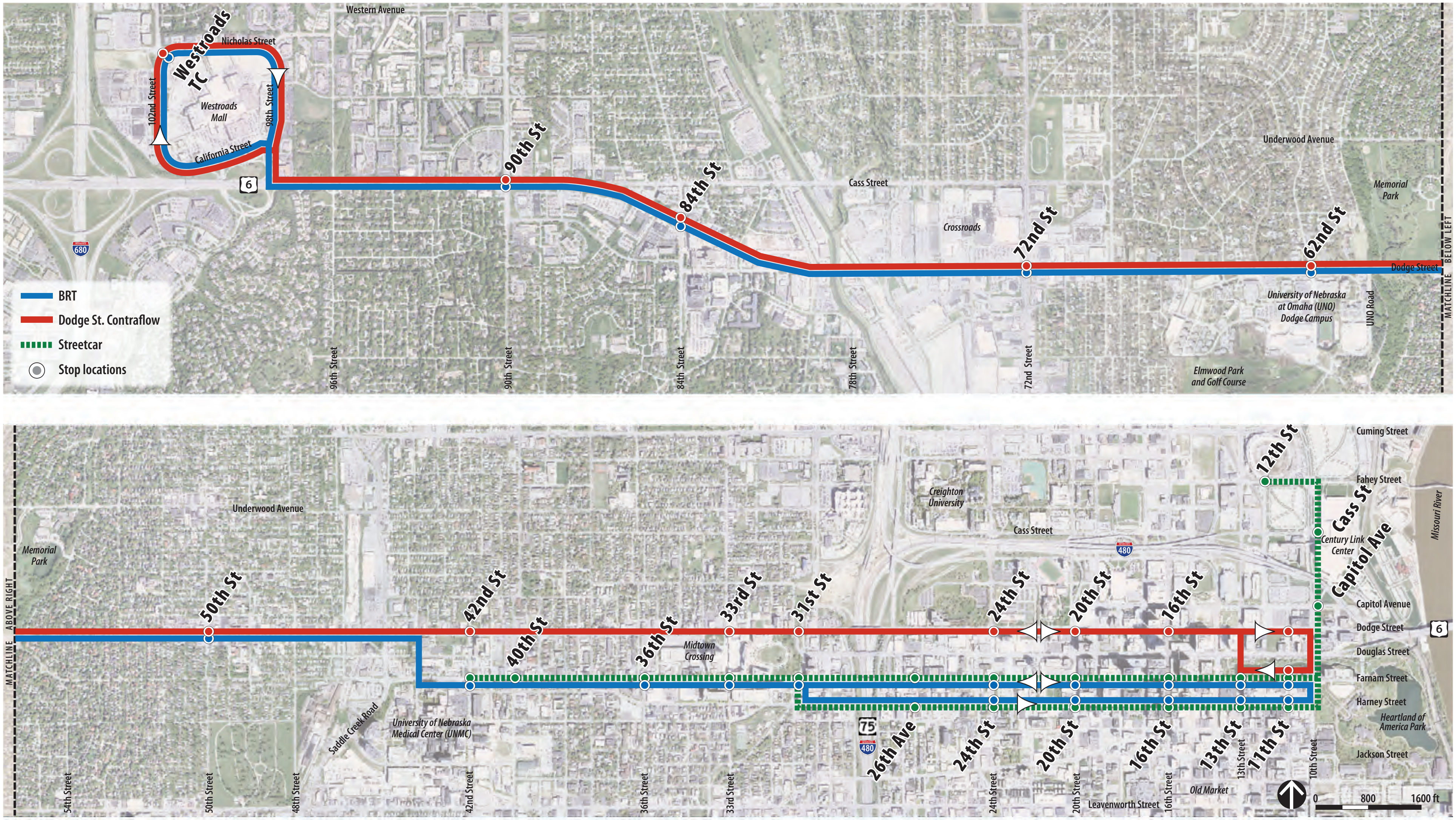


Figure 31: Preferred Transit Alternative Route from Central Corridor Alternatives Analysis (image accessed from www.omahaalternativesanalysis.org)

Pedestrian-Friendly Facility Design

Beyond spatial requirements, transit facility design is important from a perceptual standpoint. The facilities themselves become symbols of the transit system and representations of how well it works on the whole. Facilities must be accommodating, yet economical. They must be clean and well-maintained. Stations need to be laid out simply for ease of use. Stops should be suitably located in high-traffic areas. Riders must feel safe at all stations and stops. Users should be comfortable and confident in the system. The perception begins with the physical facilities.

Both the current and forecasted increase in demand will require that all transit facilities be designed to accommodate larger numbers of travelers with growing standards in amenities. These changes in amenities can be seen in some of the newer installations within the Metro system. The North Omaha, Benson Park, and Westroads Transit Centers have undergone recent renovations that create more comfortable hubs for system riders. Transit stops near newer developments, like Midtown Crossing in Omaha, also show an improved design.

The transit centers, as hubs for pedestrian entry and exit into the system, should be laid out to be highly visible along primary streets and paths. The platforms should be wide, with seating and appropriate setbacks and barriers from the bus stalls provided. The platform should have an overhead canopy to offer protection from

Figure 32: Photos of the recently-renovated North Omaha Transit Center

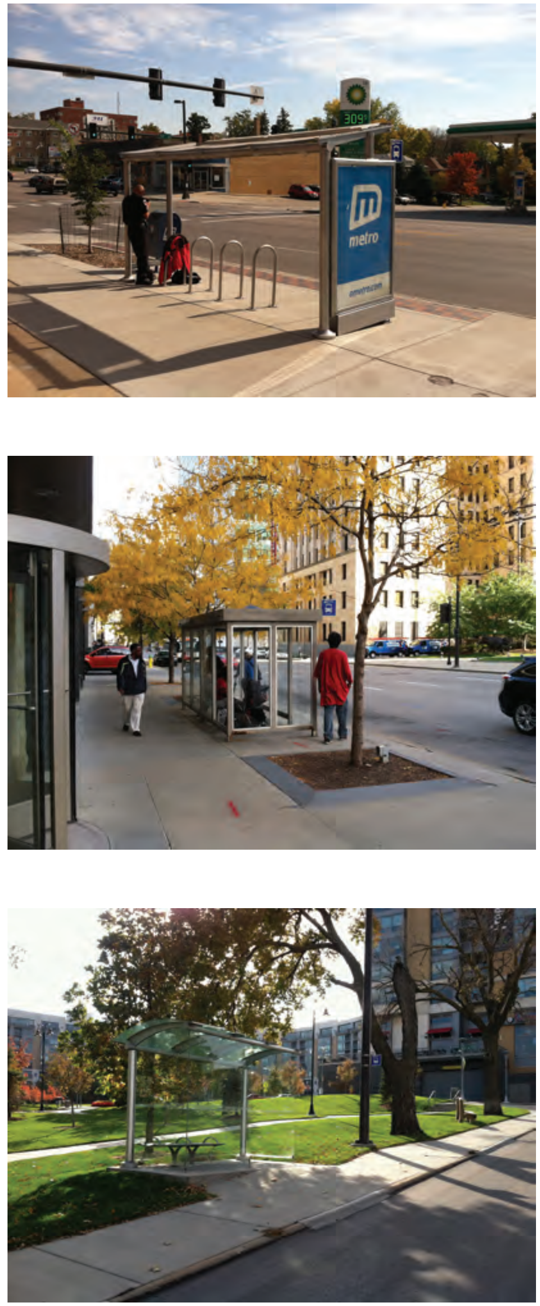


Figure 33- (from left) Transit Stops at 50th & Dodge, 16th & Dodge, and 31st & Dodge Streets

weather. An enclosed structure should be built with heating and air conditioning capabilities to accommodate riders during inclement weather. System and route maps should be prominently displayed and easily accessible.

The transit center site should also be nicely landscaped. Each center should have adequate bicycle parking, including enclosed bike lockers, which provide enhanced security for protecting helmets, wheels, lights, and other accessories. Figure 33 shows images of some of the amenities at the recently renovated North Omaha Transit Center near 30th and Ames Streets.

Individual transit stops, like the system stations, need to be designed for more riders and higher frequency of service. All stops should provide seating and overhead protection with the majority having additional side standards to protect riders from heavy winds. Bus line identification and route maps should be large and easily readable. The structure should be set back from the roadway at a comfortable distance, with bollards or other barrier elements included where the setback is limited.

Bike racks can be incorporated to encourage multi-modal usage of the system, while landscape elements, like planters or street trees, can help the transit stop fit into the surrounding streetscape. Figure 34 shows photos of successful transit stops in the area.

Conclusion

Overall, there are a number of positive elements upon which the Omaha Metro Area can build. The region currently has a number of walkable districts. While the region has some elements of a strong pedestrian system, there are significant challenges that need to be addressed.

The following are avenues that should be considered by municipalities and other regulatory agencies to improve pedestrian travel within the Omaha metro area.

Urban Development Patterns

1. Increase Proximity to Destinations.
   a. Ease restrictions on the form and allowable uses of development.
   b. Modify or re-write existing zoning codes.
      i. Relax requirements for off-street parking to reduce the amount of land occupied by parking lots
      ii. Expand the types of uses allowed in compatible zones
      iii. Support the rezoning of parcels where appropriate to encourage a greater variety of uses in a neighborhood.
2. Increase Pedestrian Access in Disconnected Street Patterns.
   a. Introduce requirements for non-motorized connectivity within and between new developments that facilitate access to schools, parks, or other high-activity areas.
   b. Reuse the rights-of-way of vacated streets in urban areas as pedestrian corridors.

Pedestrian Accommodations and Engineering

1. Improve Quality and Comfort of Pedestrian Travel.
   a. Designate wider sidewalks at more intense land uses. Keep these sidewalks clear of site amenities.
   b. Provide wide buffers between sidewalks and roadways with high traffic volumes and speeds. These buffers should include landscape features characteristic of the surrounding neighborhood.
   c. Enforce regulations governing sidewalk clearance and repair by both public and private entities.
2. Expand the Continuity of the Sidewalk System.
   a. Eliminate gaps between sidewalks along arterial and collector streets.
   b. Provide sidewalks along the local streets that connect pedestrian destinations.
   c. Provide sidewalks along primary streets within a quarter-mile radius of civic buildings, schools, transit stops and public open spaces.
3. Implement Universal Accessibility Standards throughout the Metro Area.
   a. Inventory obstacles and impairments within existing pedestrian system and develop a phased schedule to eliminate the conflicts.
4. Improve the Design and Safety Accommodations of Street Intersections.
   a. Limit the width of streets at intersections allowable by traffic standards. Eliminate unnecessary turn lanes and provide pedestrian-zone bulb-outs where appropriate.
   b. Provide appropriate physical infrastructure cues, such as delineated streetscapes, marked crosswalks, crossing signals and site amenity areas, to help guide pedestrian movement through an intersection.

School Area Safety and Connectivity

1. Include ample areas on school sites to accommodate large numbers of students.
2. Separate vehicle drop-off areas from secondary school entrances to be used only by pedestrians and bicyclists.
3. Extend designated sidewalk routes, with standard signage, street markings and signalization, into the neighborhoods surrounding a school site.
4. Encourage school administrations to participate in safety programs, like Safe Routes to School, and implement walking initiatives.

Access to Transit

1. Increase signage into surrounding neighborhoods from a transit center or stop to help guide pedestrians toward the destinations.
2. Retrofit transit centers and individual stops to include seating, cover and protection from the elements, adequate lighting, comfortable offset from roadways and system maps.
3. Provide bicycle storage and parking amenities at appropriate centers and stops.

5 Bicycle Element

This chapter identifies existing cycling facilities in the region and sets forth recommendations for improvements to bicycling infrastructure in the corridors.

Existing Facilities

The Omaha region has an extensive network of paths. These paths offer a quality cycling experience – near total separation from vehicular traffic, scenic surroundings, and relatively little topography thanks to their position adjacent to rivers and streams. However, because of their orientation to the region's water features, their use for serving everyday travel needs is limited by their distance from important activity centers and a lack of lateral connections.

The paths, like the water features they parallel, tend to serve north-south movements well but do not make connections from east to west through neighborhoods.

Some on-street facilities exist in cities throughout the region, but they are sparse and do not yet form an interconnected network. Additionally, the City of Omaha has begun to designate some signed bike routes. These routes utilize some existing facilities such as bike lanes or shared lane markings in specific locations, but also make use of streets without dedicated cycling accommodations when necessary.

Map 6 illustrates the paths, bike lanes, and signed bike routes that exist currently in the region.

Map 6 | Existing Bicycle Facilities

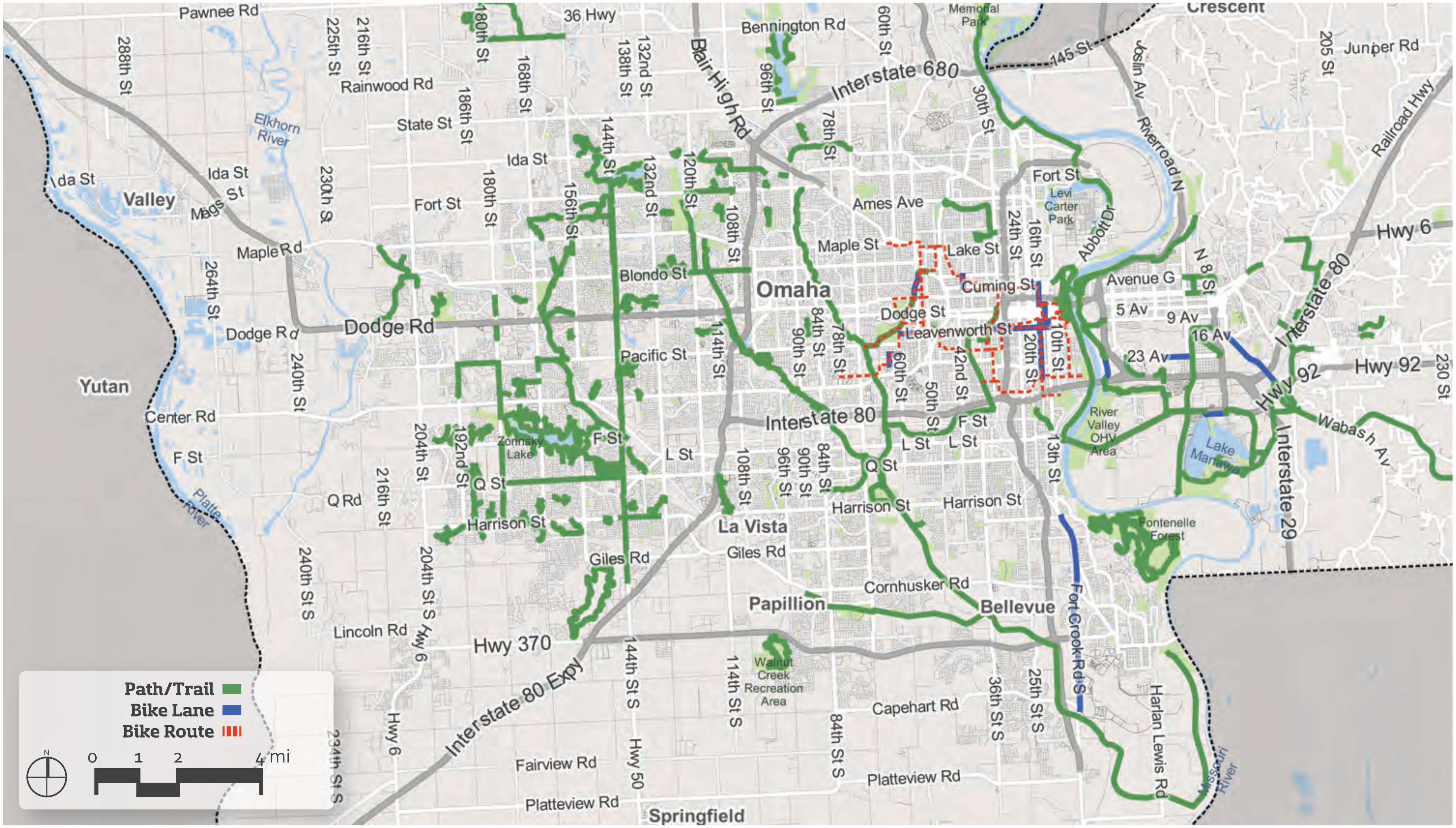


Figure 34 - Existing Cycling Facilities

Recommendations

Recommendations in each corridor were developed based on existing conditions, national guidelines from Table 2-3 (Bikeway Considerations) of the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities AASHTO, and MAPA staff and public comments.

A rough time frame was also assigned to each recommendation. Short-term recommendations are those which are relatively inexpensive and require little planning and design work. These projects can generally be achieved within the next five years. Medium-term recommendations may necessitate additional planning or design and typically involve a higher level of investment than short-term recommendations. These are expected to involve 5-15 years of additional preparation to complete. Long-term recommendations are generally the most expensive and dramatic investments and may require more than 15 years to fully implement.

In many instances, adding bicycle facilities to an existing major road (i.e. through restriping, removing parking, etc.) is not feasible. As a result, opportunities for adding bikeways on these streets will not present themselves until major work is done on the street such as large-scale reconstruction. In the recommendations that follow, these areas are categorized as "reconstruction," meaning that bicycle facilities should be strongly considered and included when made possible by construction work on the street. A major street is often reconstructed every 30 to 40 years and is necessitated by a significant deterioration in the pavement that cannot be repaired. This presents the best opportunity to incorporate bicycle accommodations since the pavement is removed often with the curbs. Secondly, this also presents the best prospects to rearrange space at the edge of the street (between the curbs and property lines) or to acquire property for bikeways and sidewalks.

Making the best of these major street improvement projects represents a major recommendation of this plan and an incremental way of improving conditions for bicycling and walking on the major streets identified within this plan. However, there are different degrees of feasibility of incorporating bicycle and pedestrian facilities in streets in the metro area. Much of this feasibility depends on how constrained the street and street right-of-way is. Generally, feasibility improves when there is ample space between the curb (or shoulder) and the property lines and the acquisition of property can be limited. The "reconstruction recommendations" made in this plan for main streets were not placed into different feasibility categories, but it may be helpful to consider these three broad categories:

- **High Potential** – these are major streets that have ample room between the curb (or shoulder) and the property lines. This space is available for expanding the footprint of the street for bikeways and adding sidewalks if necessary. Alternatively, space between the curb lines can be repurposed by reducing the number of travel lanes or travel lane width to include bicycle lanes. Many of the major streets on the far west and south sides of the metro area have considerable potential for adding bikeways and sidewalks since they are currently two lane roadways with little adjacent development.
- **Moderate Potential** – these are streets where a number of limited opportunities may exist for including bikeways, but may be outweighed by constraints. There may be some usable space (more than four feet) between the curb and sidewalk or space between the sidewalk and property line. There is potential for some property to be acquired especially where little development exists along the street or if property is already being acquired for other purposes (i.e. adding turning lanes). In some circumstances, space between the curb lines can be repurposed to create space for bikeways.
- **Limited Potential** – these are major streets within highly constrained street corridors. These commonly exist where homes and businesses closely abut sidewalks and there is no or little space between the curbs and sidewalks. Secondly, no potential exists to reduce the number of travel lanes or travel lane widths.

Methodology

The following factors informed the development of recommendations in each corridor:

- Bicycle Level of Service
- Pavement Cross-Section
- Available Right of Way
- National Guidelines
- Crash Analysis

Recognizing that new cycling infrastructure may not be an immediate possibility on some major roads, parallel bikeway facilities, most often identified as low-volume local streets, were considered in conjunction with each corridor's primary arterial.

The intended result of this approach is twofold: First, the identification of routes that offer immediate connections through the corridor focused mostly on low-speed, low-traffic streets adjacent to major thoroughfares.

Secondly, recommendations for more comprehensive corridor routing that include some improvements to physical infrastructure will be made. These recommendations tend to focus on longer-term improvements to streets or trails and generally offer more direct routing through the corridor.

Corridor Profiles

The following pages consist of profiles of each corridor, describing the overall context of each and the recommended improvements.

The size and scope of the corridors, especially with the inclusion of 13 additional corridors, presents some difficulty in examining each corridor at the level of detail needed to provide specific recommendations. MAPA and the project team developed a tiered approach to the corridors which provides for progressive levels of specificity in important areas of the region.

All corridors in the study were examined at a basic level, with recommendations made throughout each.

Corridors with Priority Areas

- Omaha North Central Connector
- Omaha South Central Connector
- 24th/Fort Crook Connector
- Sarpy North Connector
- Council Bluffs Central Connector

In select corridors, a section of the corridor was targeted for more detailed analysis. In the plan these areas are referred to as Priority Areas. Where applicable, corridor profiles include a schematic diagram of recommendations in the Priority Area, as well as photographic documentation of existing conditions. The Priority Areas were identified based on the bicycle facility demand analysis discussed in Chapter 3 and verified by the steering committee.

A final level of detail was reserved for a specific intersection or block within a few select corridors. These locations, referred to in the plan as Design Locations, are presented in the corridor profiles under the appropriate corridor.

The Design Locations were chosen to provide examples for how bicycle accommodations could be incorporated into the existing curb-to-curb areas at specific locations in the corridors. Each Design Location includes conceptual drawings of existing and proposed conditions. In the case of on-street facilities, it was assumed that the width between curbs would not change to add these bicycle facilities. However, if a total reconstruction project does occur, there would likely be more flexibility.

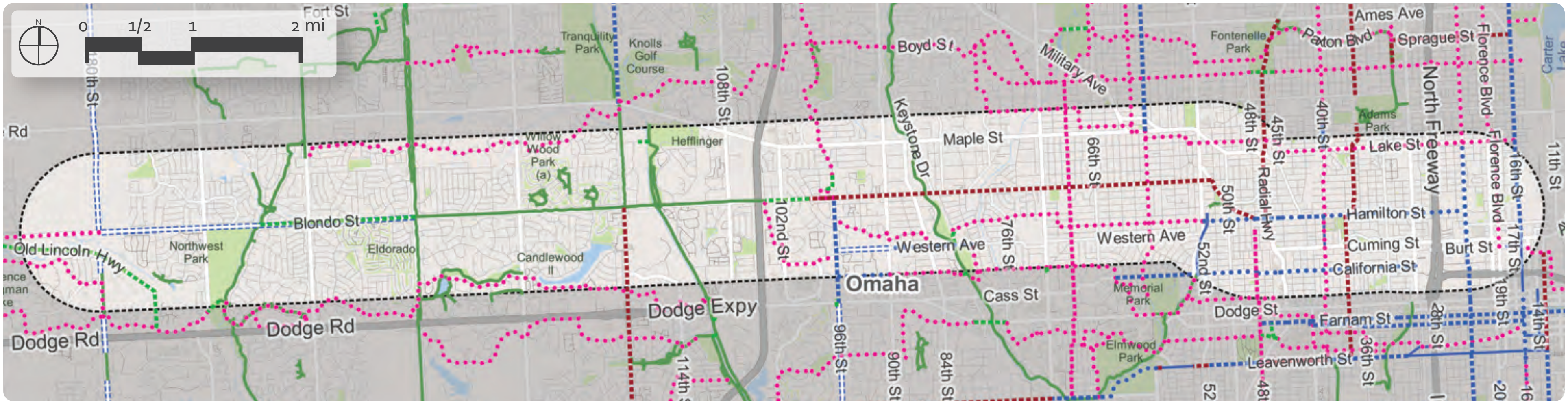
Design Locations

Corridor	Location
Omaha North Central Connector	Underwood Ave at 62nd St
	Hamilton St at 42nd St
Omaha South Central Connector	Emile St at Saddle Creek Rd
24th St – Fort Crook Connector	24th St at Patrick Ave
	24th St at Castelar St

Conceptual drawings are one of the first steps in designing bike facilities. Each project would involve changing how the street is used by the public and maintained by local transportation crews. Changes require public input, intersection-to-intersection examination, and analysis of how traffic will flow. They also require a detailed plan for how existing pavement marking and signs will be altered. The year leading up to a street resurfacing or reconstruction project can be an ideal opportunity to plan for these changes.

Although the Design Locations refer to specific places, it is intended that the types of changes reflected in the conceptual drawings will be considered where appropriate anywhere in the region.

Omaha North Central



Existing	
Bike lane	
Path/Trail	

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The Omaha North Central Connector traverses a range of development patterns from east to west. The corridor follows Hamilton Street just north of Creighton University, turning northwestward along Saddle Creek Road, and then continuing westward following Blondo Street to its terminus at 180th Street.

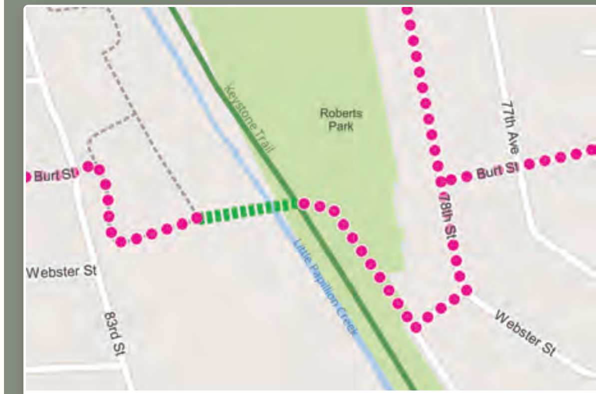
Traffic levels rise on primary arterials as the corridor proceeds outward from downtown, starting near 10,000 ADT on Hamilton Street and then reaching over 25,000 on some of the westernmost stretches of Blondo Street. From 64th Street to 72nd Street there is a short section of Blondo composed of 3-lanes with 11,000 to 14,000 vehicles per day.

Right-of-way is significantly limited along the more urban stretches of the corridor. Hamilton Street is mostly a narrow two-lane street with a speed limit of 30 mph for most of its length. Blondo Street becomes a divided highway west of Interstate 680 with a speed limit of 45 mph. Extra space is more abundant in the far western parts of the corridor where the ultimate street cross-section has not been built yet.

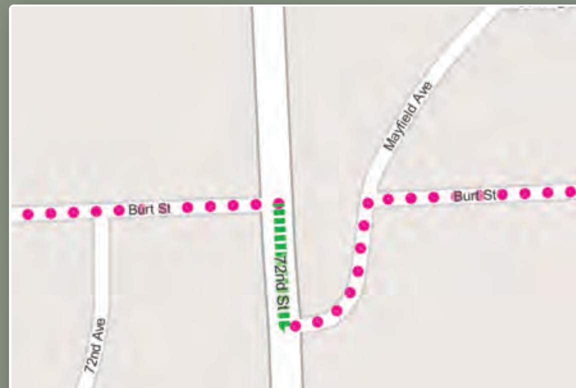
Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Paved Shoulder
- Shared Use Path

Omaha North Central | Priority Area



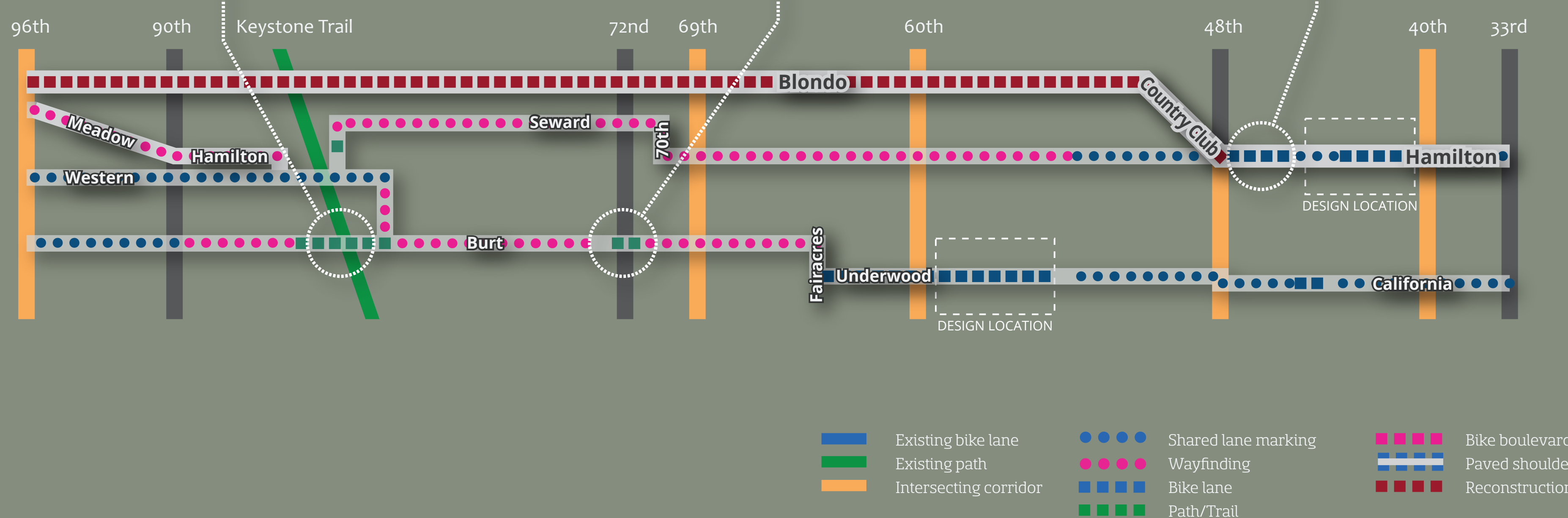
Low-stress routes along Burt Street on either side of the Keystone Trail are broken up by the Little Papillion Creek. A bridge across the creek will carry users through the corridor and make a connection to the trail for users west of the creek.



Burt Street offers a continuous, low-stress route through this part of the corridor. However, this jog in the street network presents difficulty for users needing to cross 72nd Street with the light at Mayfield Avenue.

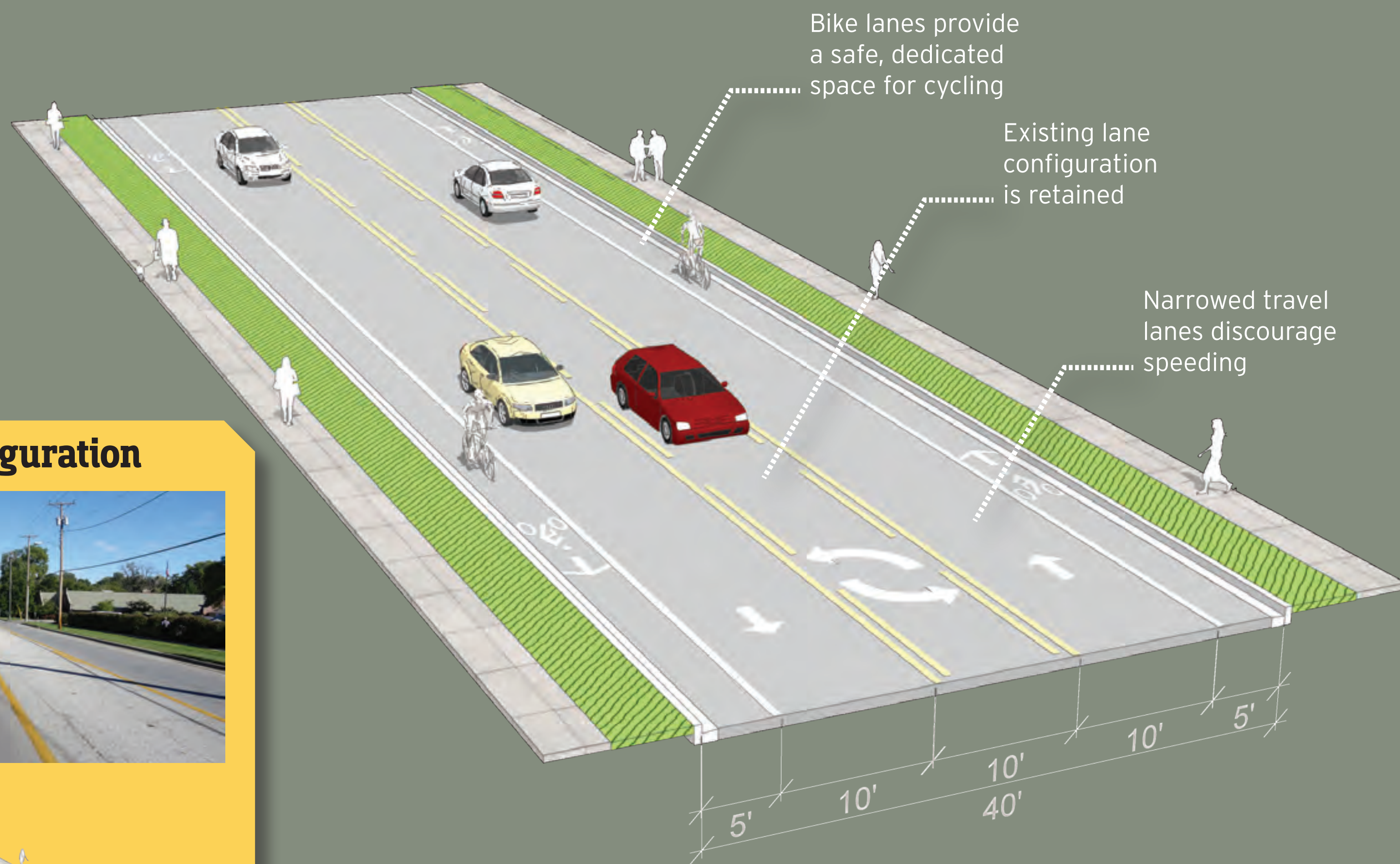
A side path adjacent to 72nd Street will complete the connection back to Burt from the signalized crossing.

A bike lane in the uphill direction east of NW Radial Highway will provide a separated space for slow-moving cyclists climbing the hill in the eastbound direction.



Omaha North Central | Design Location

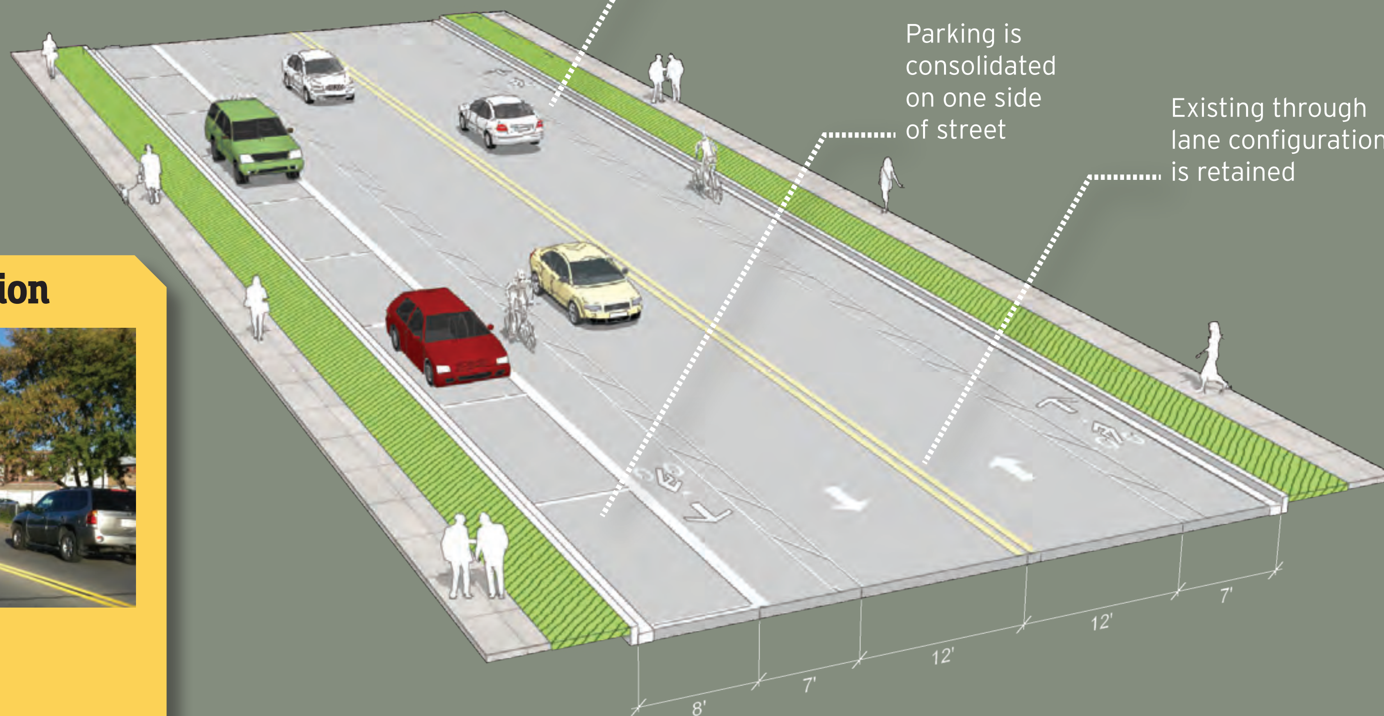
Underwood Avenue at 56th Street



Existing Configuration

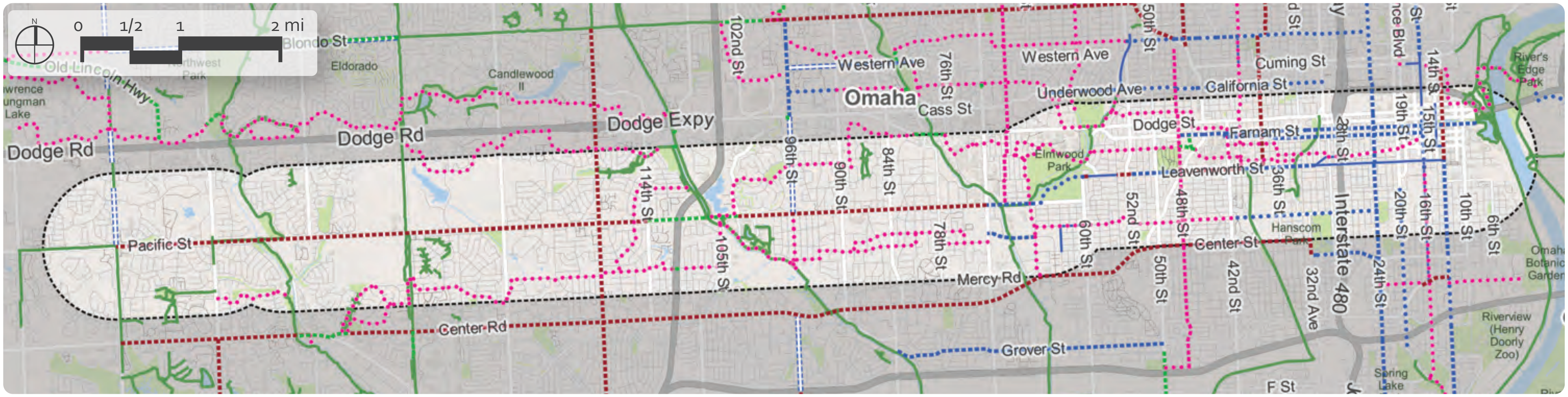
Omaha North Central | Design Location

Hamilton Street at 42nd Street



Existing Configuration

Omaha South Central



The Omaha South Central Connector plots an east-west course from just south of downtown Omaha through the westernmost parts of the City of Omaha. The corridor follows Leavenworth Street from downtown to Elmwood Park, eventually shifting slightly to the south and then continuing its course along Pacific Street to 180th Street.

Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The corridor spans a variety of development contexts, starting at Omaha's urban core, with multiple travel lanes. Traffic volumes on Leavenworth and Pacific are generally similar throughout, with between 15,000 and 20,000 ADT downtown, rising slightly to around 25,000 near Interstate 680.

The segments of Leavenworth without bicycle lanes as well as Pacific Street both have a bicycle LOS rating of E/F.

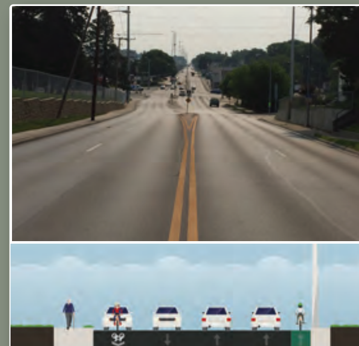
Access in the urban core is irregular with many drive ways and frequent intersections. As the corridor takes a more suburban form beyond 72nd Street, access is less frequent, with fewer intersections and fewer driveways, becoming almost highway-like in some stretches. Right-of-way is constrained throughout much of the corridor, particularly in the older sections of Omaha.

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Shared Use Path

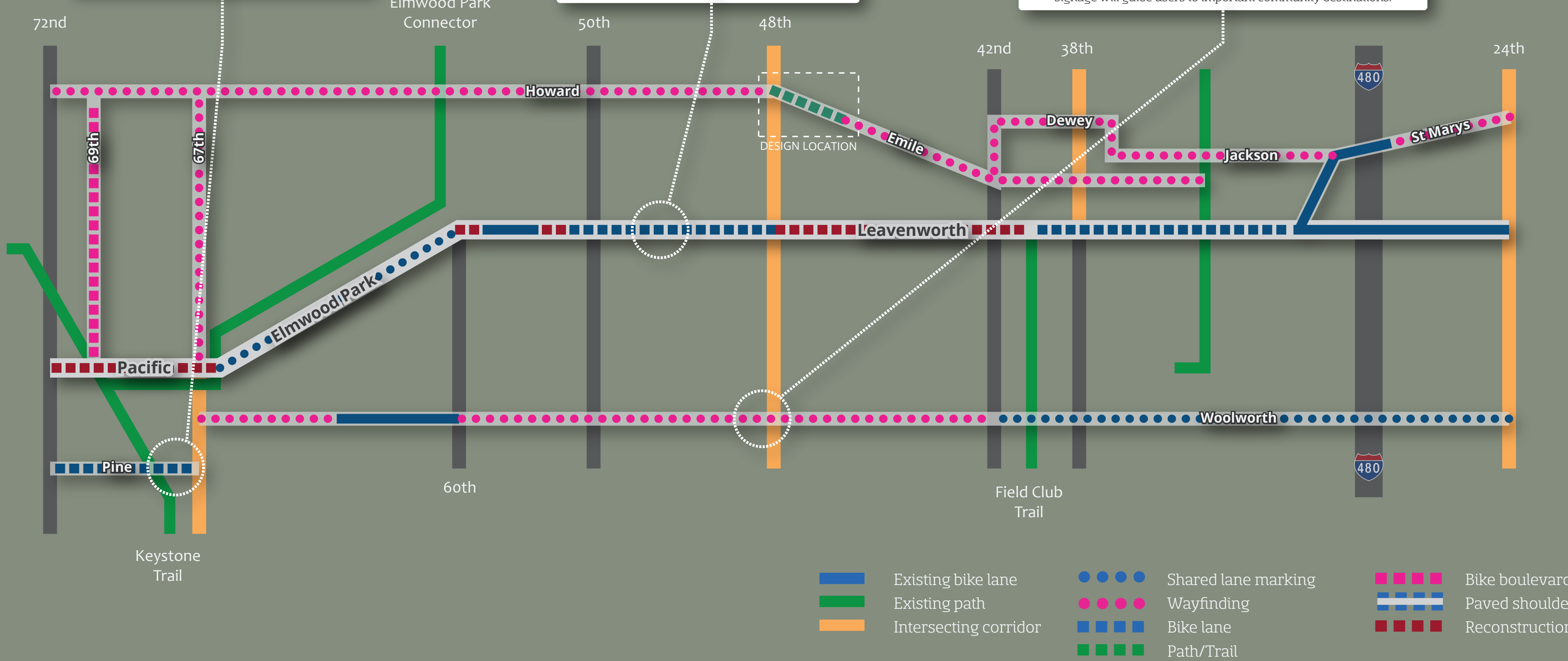
Omaha South Central | Priority Area

Pine Street is an important connection through both the UNO and College of St Mary campuses. Repurposing underutilized travel lanes will allow for buffered bike lanes.



The hill on Leavenworth Street between 48th Street and 50th Street is a challenge for cyclists in the uphill direction. Right-of-way is highly constrained, but there may be room for a climbing bike lane to aid uphill riders.

Local streets to the south of Leavenworth make a continuous route primarily on Woolworth Avenue through the corridor. Wayfinding signage will guide users to important community destinations.



Omaha South Central | Design Location

Emile Street at Saddle Creek Road

Existing Configuration

24th Street / Fort Crook

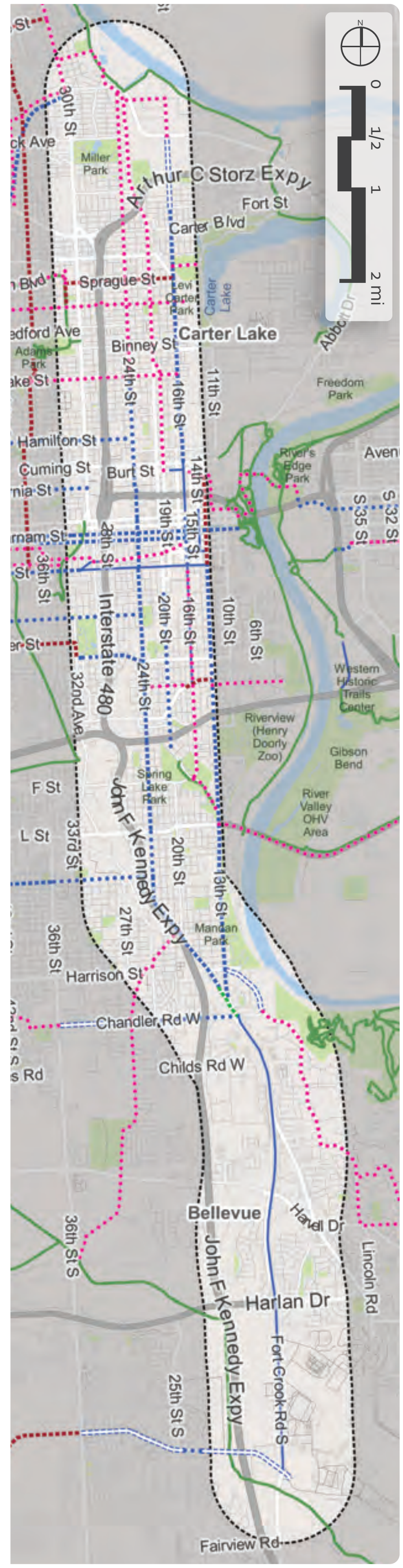
The 24th Street/Fort Crook Connector runs north to south through downtown, extending south into Sarpy County. North of downtown, 24th Street is relatively wide and mostly residential, with underutilized parking on both sides of the street. Volumes are comfortable, around 2,000 ADT. The speed limit is 30 mph.

Approaching downtown, 24th Street widens to four lanes and sees higher levels of traffic. Volumes remain high through much of South Omaha, falling slightly through the retail node between L and Q Streets.

South of Q Street, the corridor meets up with Fort Crook Road, which functions as a higher-speed four lane divided highway. Bike lanes have recently been added to this stretch of highway.

There are numerous parallel streets that also have been identified within this corridor that rate well for bicycle LOS. 24th Street itself ranges from an A/B rating to a stretch of LOS D.

16th Street was also considered as part of this corridor. This street runs north from Cuming Street near downtown to the northern edge of Omaha through residential and industrial neighborhoods. 16th Street sees low to moderate levels of traffic, ranging from below 5,000 to 8,000 ADT. It is a two-lane road for the length of the corridor with ample width to accommodate travel lanes and parking in most locations. The available parking is not heavily utilized.



Existing

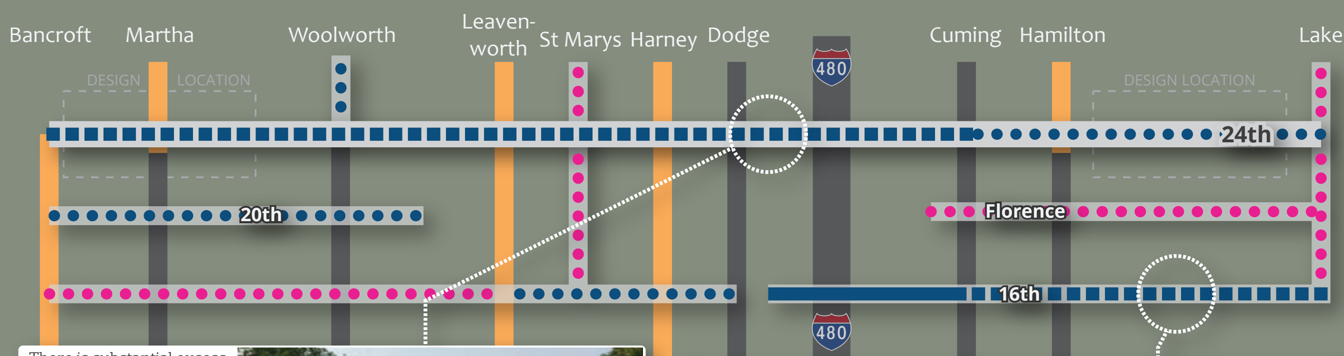
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Paved Shoulder
- Shared Use Path

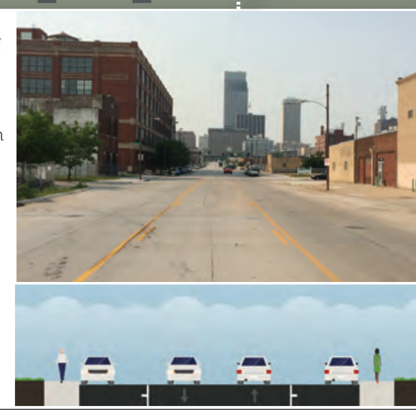
24th Street/Fort Crook | Priority Area



There is substantial excess capacity on 24th Street through downtown. Repurposing travel lanes for bike lanes or buffered bike lanes where appropriate will create a safe, dedicated space for cyclists.

This area serves Creighton University and downtown offices, prime markets for increased bicycle travel.

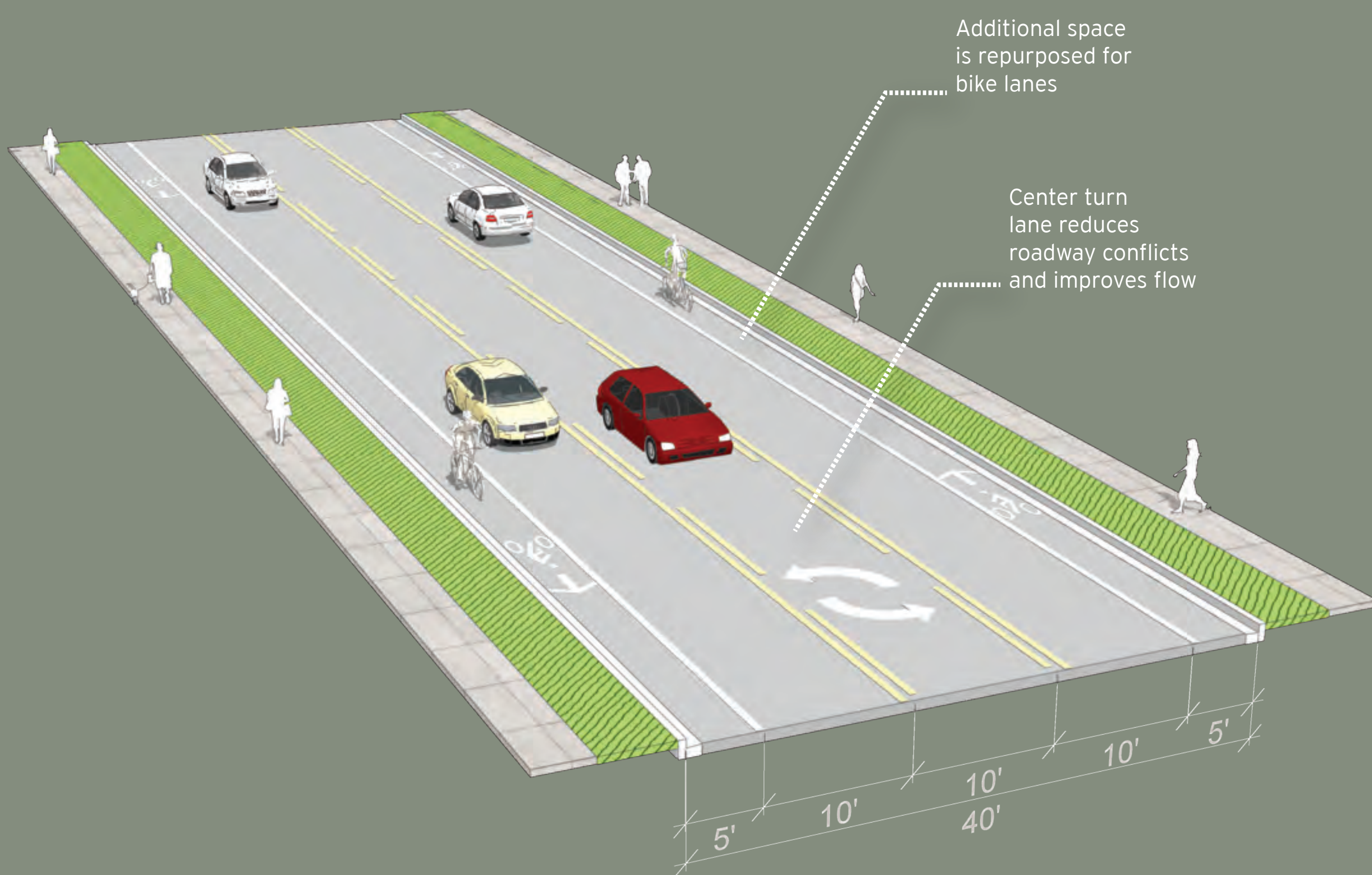
It is likely there is room to stripe bike lanes on 16th Street north of Cuming. As an alternative, wide parking lanes can be striped. Given the low utilization of parking, these lanes can function as de facto bike lanes and leave room for cyclists to manuever around parked cars when necessary.



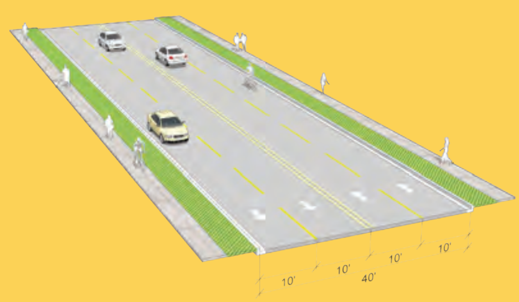
Existing bike lane
Existing path
Intersecting corridor
Shared lane marking
Wayfinding
Bike lane
Path/Trail
Bike boulevard
Paved shoulder
Reconstruction

24th Street / Fort Crook | Design Location

24th Street at Castelar Street

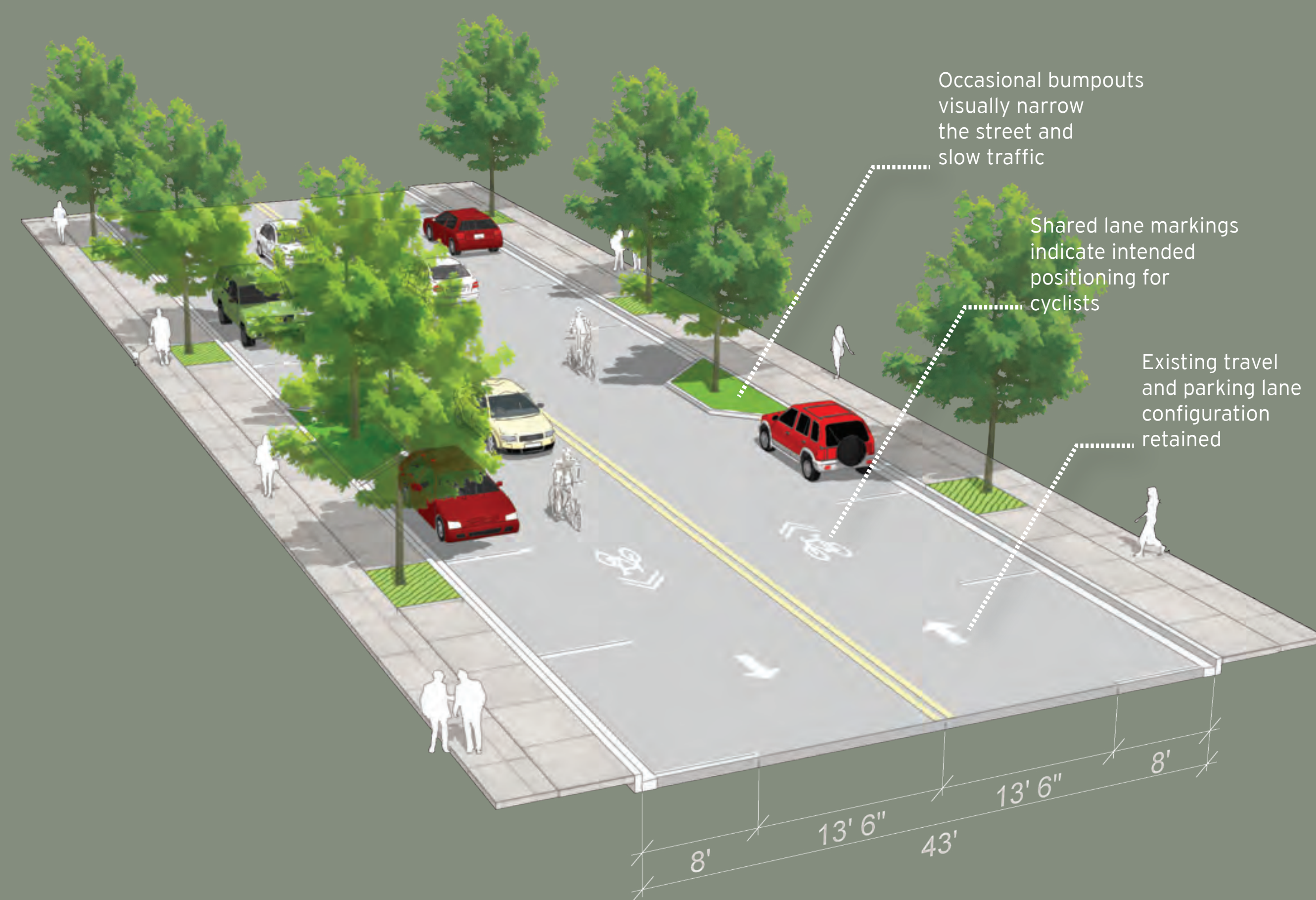


Existing Configuration



24th Street / Fort Crook | Design Location

24th Street at Patrick Avenue



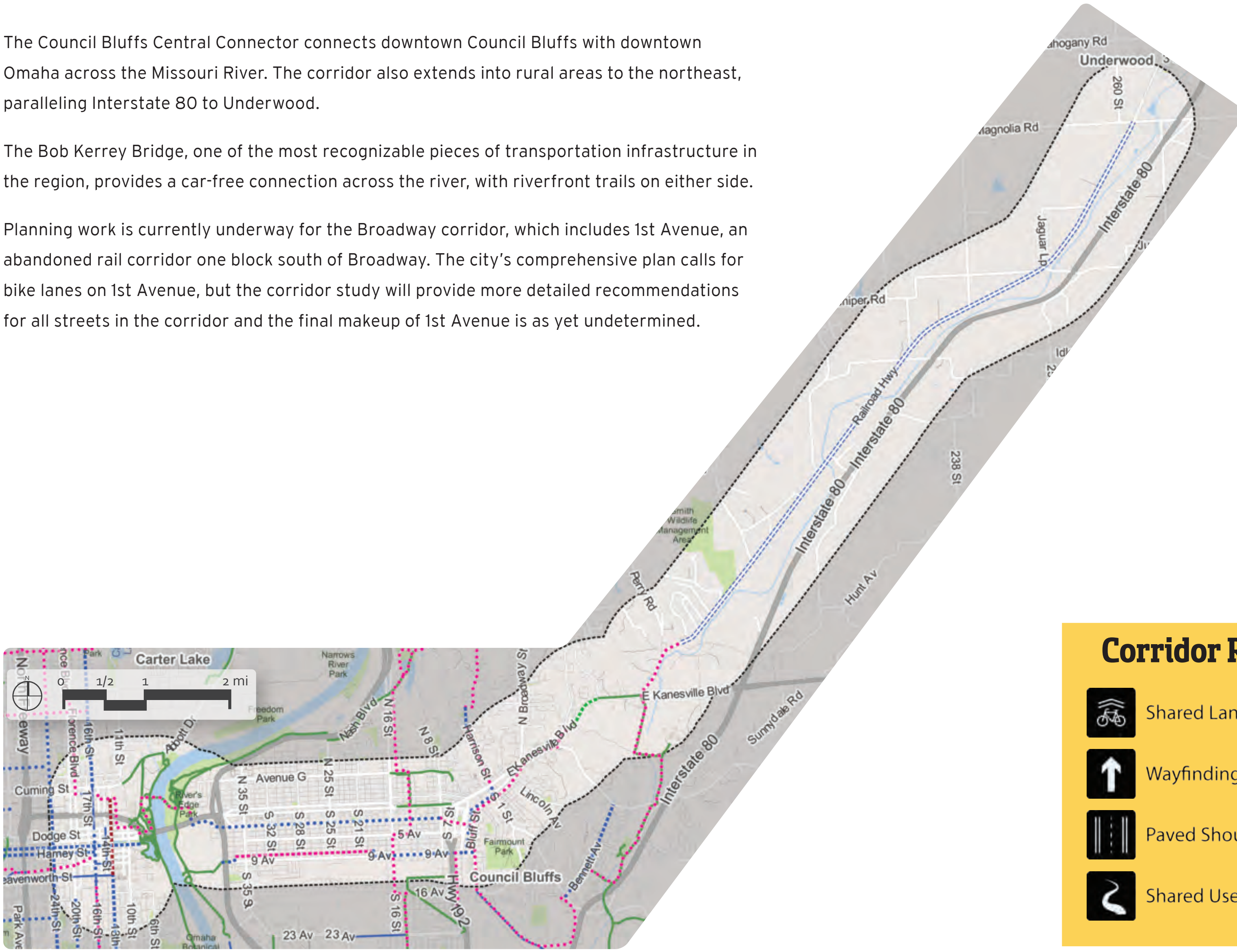
Existing Configuration

Council Bluffs Central

The Council Bluffs Central Connector connects downtown Council Bluffs with downtown Omaha across the Missouri River. The corridor also extends into rural areas to the northeast, paralleling Interstate 80 to Underwood.

The Bob Kerrey Bridge, one of the most recognizable pieces of transportation infrastructure in the region, provides a car-free connection across the river, with riverfront trails on either side.

Planning work is currently underway for the Broadway corridor, which includes 1st Avenue, an abandoned rail corridor one block south of Broadway. The city's comprehensive plan calls for bike lanes on 1st Avenue, but the corridor study will provide more detailed recommendations for all streets in the corridor and the final makeup of 1st Avenue is as yet undetermined.



Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

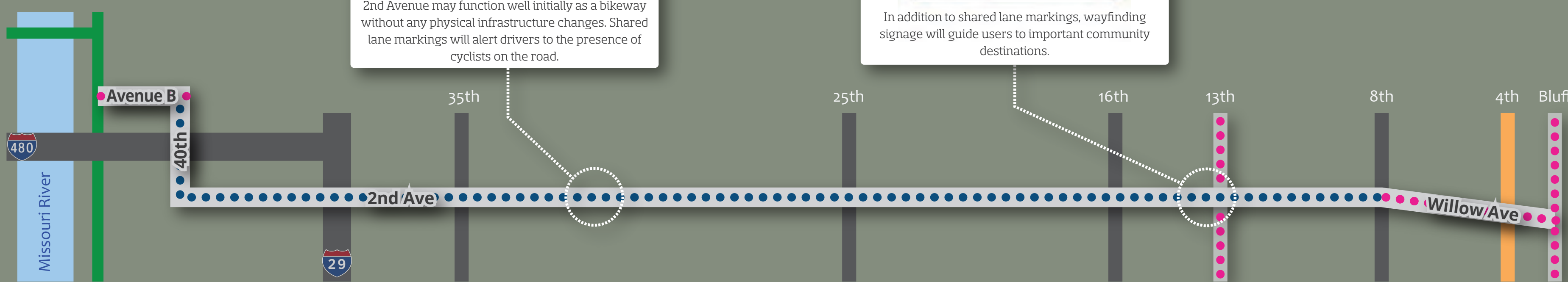
Corridor Recommendations

- Shared Lane Marking
- Wayfinding Signage
- Paved Shoulder
- Shared Use Path

Council Bluffs Central | Priority Area

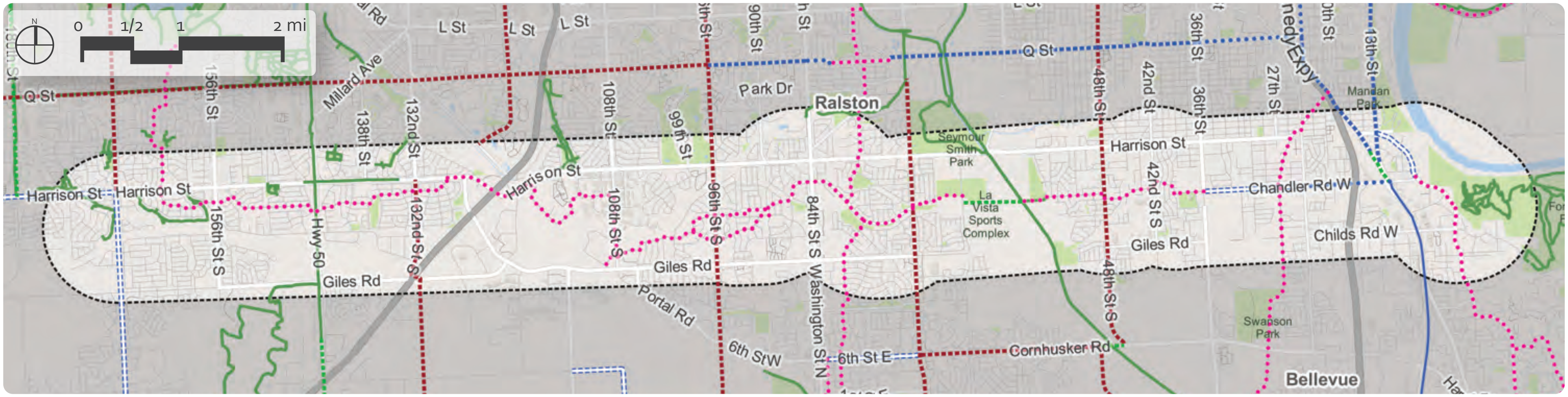
2nd Avenue may function well initially as a bikeway without any physical infrastructure changes. Shared lane markings will alert drivers to the presence of cyclists on the road.

In addition to shared lane markings, wayfinding signage will guide users to important community destinations.



- Existing bike lane
- Existing path
- Intersecting corridor
- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Sarpy North



Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The Sarpy North Connector runs from east to west through the northern portion of Sarpy County. On the east it follows Chandler Road West, a five lane arterial that carries about 10,000 vehicles per day. West of 39th Avenue the corridor winds through the residential neighborhoods on local streets, eventually emerging at Sun Valley Park at the Big Papillion Creek. Crossing the creek presents a challenge; the nearest existing crossings are at Harrison Street to the north and Cornhusker Road to the south.

The corridor continues west of 72nd Street on Park View Boulevard, a local residential street. From 96th Street to the west there are connectivity issues that will pose a challenge for a continuous east-west corridor. Some of these connectivity issues are due to the presence of a rail corridor, the location of Papillion Creek, and to prevailing development patterns that do not favor connectivity.

Corridor Recommendations

- Paved Shoulder
- Shared Lane Marking
- Wayfinding Signage
- Shared Use Path

Sarpy North | Priority Area

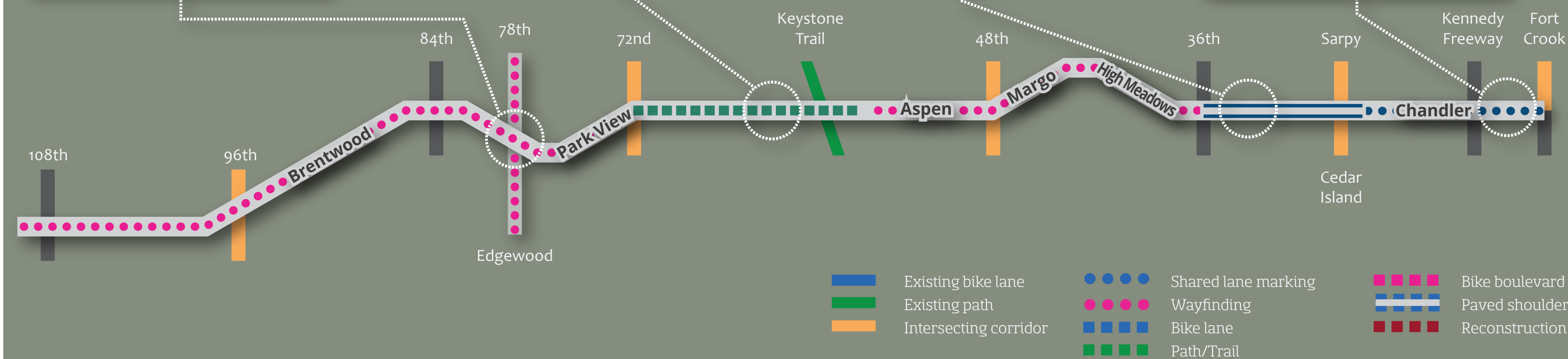
Most of the corridor follows local streets that may not require physical changes to create a safe and low-stress cycling experience. Wayfinding is emphasized in these sections and will guide users to important community destinations.

The Big Papillion Creek creates a gap in connectivity through the corridor. The low-stress routes on either side of the creek will be connected to each other and the Keystone Trail via a bicycle and pedestrian bridge next to Sun Valley Park.

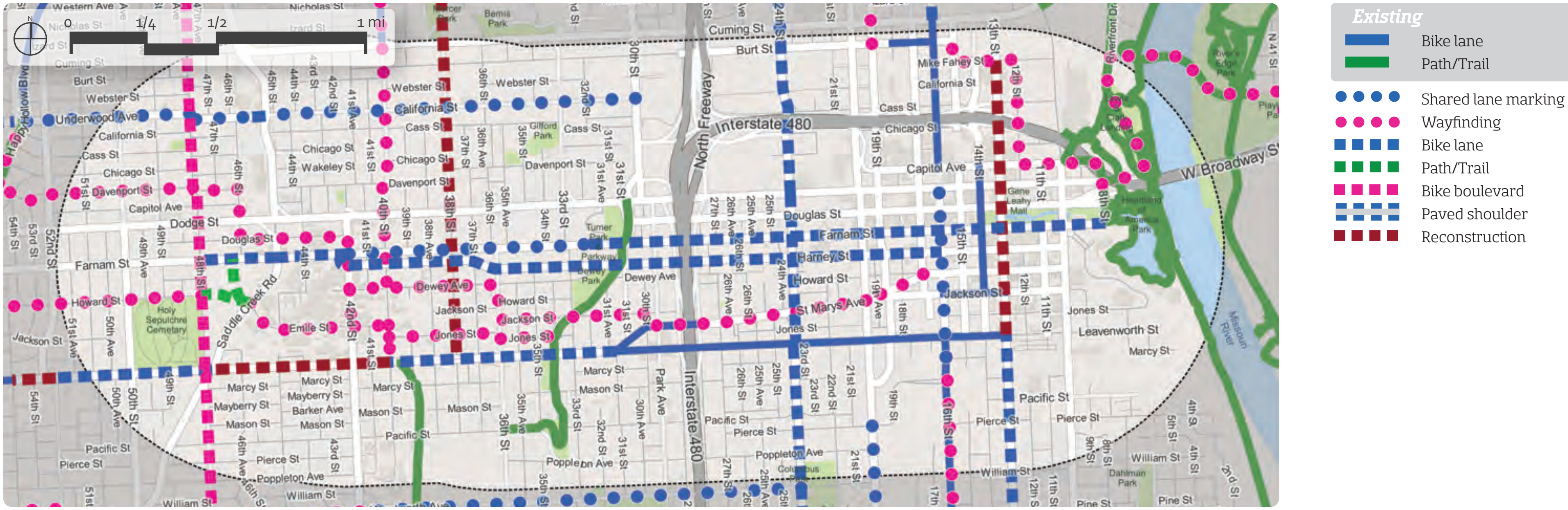
This section of Chandler Road is a rural cross section with no curb or gutter. Paved shoulders are recommended here to provide a safe space for cyclists. Paved shoulders also provide important maintenance and safety benefits for vehicular travelers

Traffic volumes on this section of Chandler Road are low enough to allow for a road diet. However, the existing raised concrete median may mean that a significant reorganization of the roadway must wait until the road is reconstructed.

In the meantime, shared lane markings will call greater attention to the presence of cyclists.



Harney Street Bikeway



Harney Street combined with Farnam Street make up a one-way east-west couplet for much of their length between downtown Omaha and the Medical Center campus. The corridor is urban in nature and is lined with taller buildings and shallow setbacks (or none at all). Parking is restricted in some areas while it is heavily utilized where allowed.

In general, both streets carry three or four lanes of traffic at a speed limit of 25 to 30 mph. Both streets are also served by relatively frequent bus service with dedicated stop locations at the curb. Average daily traffic (ADT) counts range from around 6,000 on each street through downtown up to over 10,000 through Midtown.

Harney Street is the subject of an ongoing study for bikeway improvements whose recommendations are forthcoming. Farnam Street is in the design phase to be converted to a major transit corridor, thanks in part to a recently-awarded federal grant.

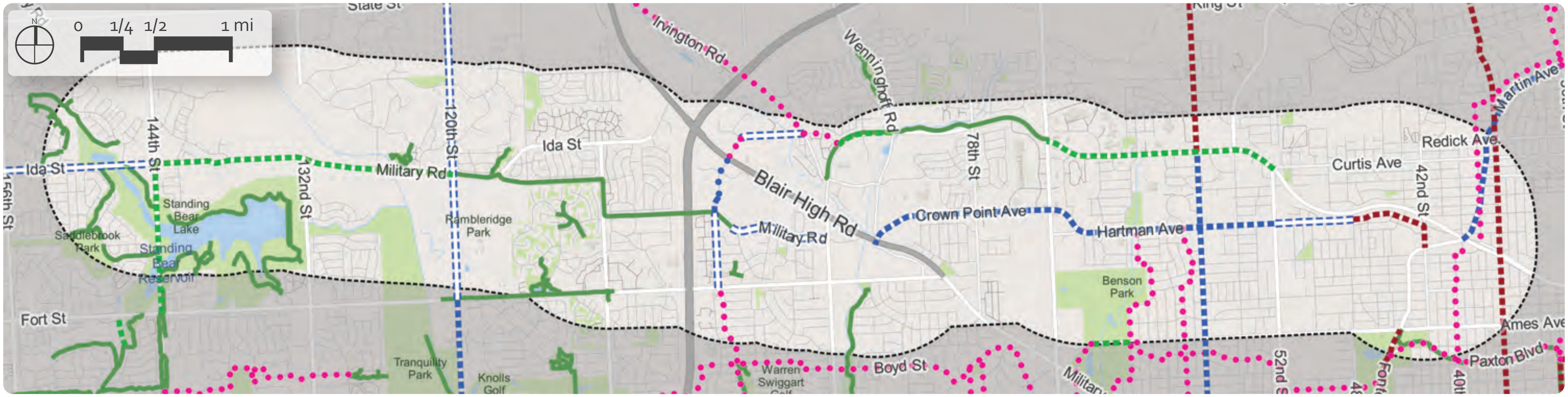
The developing changes in transit infrastructure on Farnam Street may warrant modifications to expected cycling improvements in the corridor. The corridor recommendations identified here specific to Farnam Street are predicated upon their viability in the context of the service and design elements of the BRT.

Corridor recommendations on Harney Street are likewise subject to the outcome of more detailed studies and planning processes currently underway.

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage

Omaha Northwest



Existing

Bike lane

Path/Trail

Shared lane marking

Wayfinding

Bike lane

Path/Trail

Bike boulevard

Paved shoulder

Reconstruction

Connecting North Omaha to areas west, the Omaha Northwest Connector meanders along several key streets. East of 72nd Street, the corridor follows Hartman Avenue which is a narrow, almost suburban, mostly two-lane road, with volumes of roughly 2,000 – 4,000 ADT and a speed limit of 30 mph.

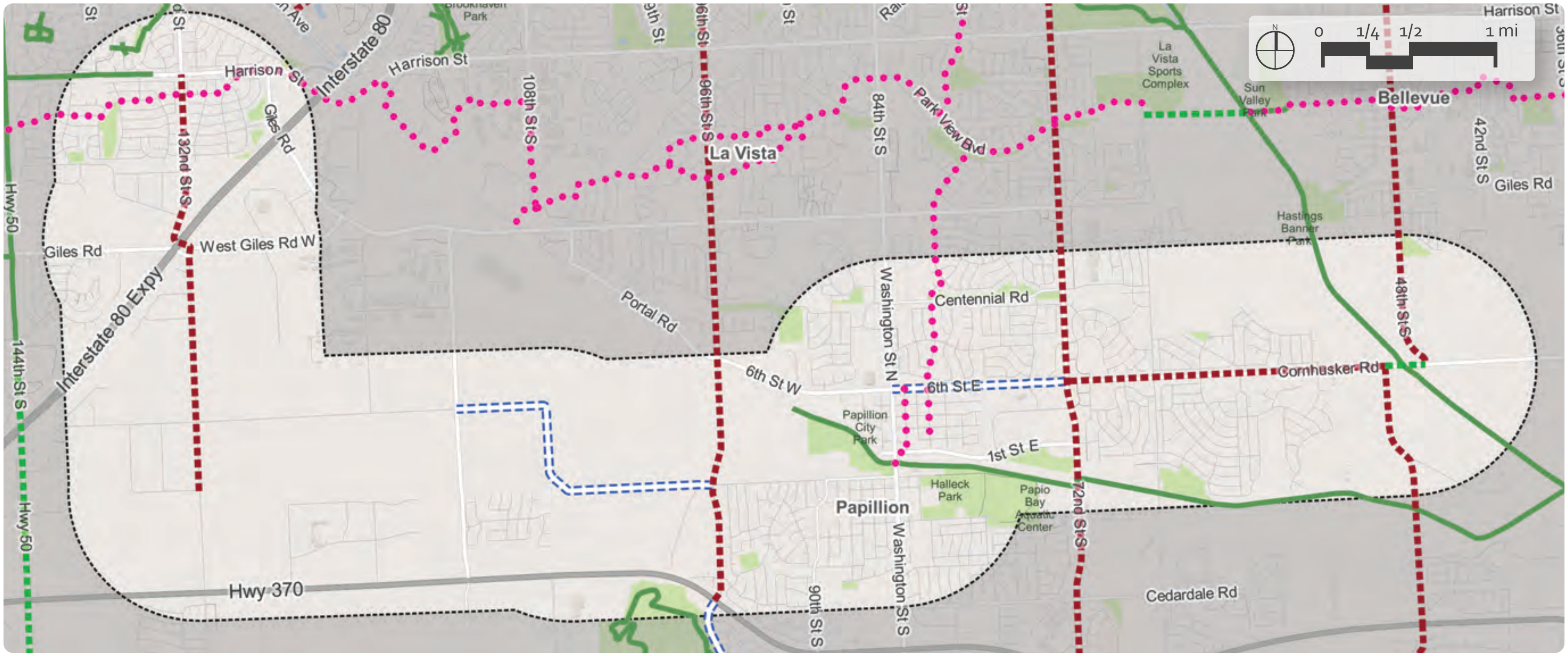
Hartman Avenue becomes Crown Point Avenue near 72nd Street, widening to four lanes. Traffic volumes increase to above 4,000 and the speed limit rises to 35 mph. The corridor continues westward along Military Road, which provides a widened sidewalk/sidepath for bicyclists along a portion of its length and paved shoulders in other sections. The road itself is 2-3 lanes with a posted speed of 35 mph and traffic volumes near 10,000 in some stretches.

Military Road eventually takes on a rural character with two narrow lanes and no shoulders. The corridor terminates at 144th Street. The major roads in the corridor are generally rated at bicycle LOS D or E/F.

Corridor Recommendations

- Bike Lane
- Shared Use Path
- Paved Shoulder

Sarpy Mid-North



The Sarpy Mid-North Connector stitches together Bellevue, Papillion, and Millard. The corridor follows Cornhusker Road from the Big Papillion Creek Trail, eventually dipping south to Lincoln Street through Papillion, and then turning northward on 132nd Street to meet up with the Sarpy North Connector at the edge of Millard. The corridor also connects the Big Papillion Creek Trail with the West Papillion Creek Trail.

Because of its location in a mostly suburban setting, the corridor's main arterials are large, higher-speed roads and thread together a relatively disconnected local street network. Most of the arterials are rated from bicycle LOS C to E/F.

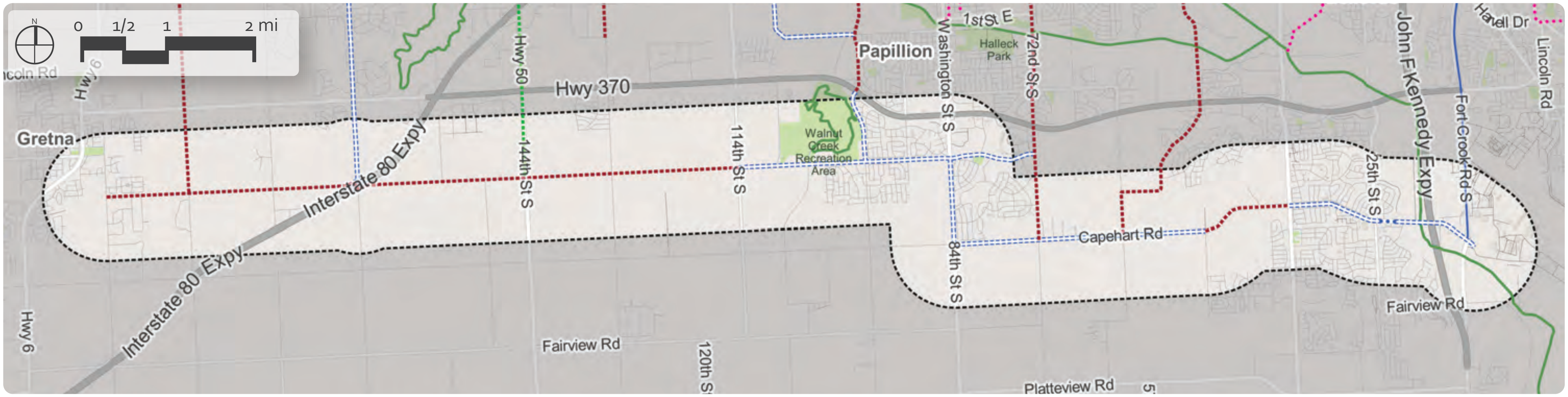
Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

- Shared Use Path
- Paved Shoulder

Sarpy Central



Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Capehart Road and Schram Road form the backbone of the Sarpy Central Connector, which runs from the southern edge of Bellevue through La Vista and into rural parts of the county near Gretna.

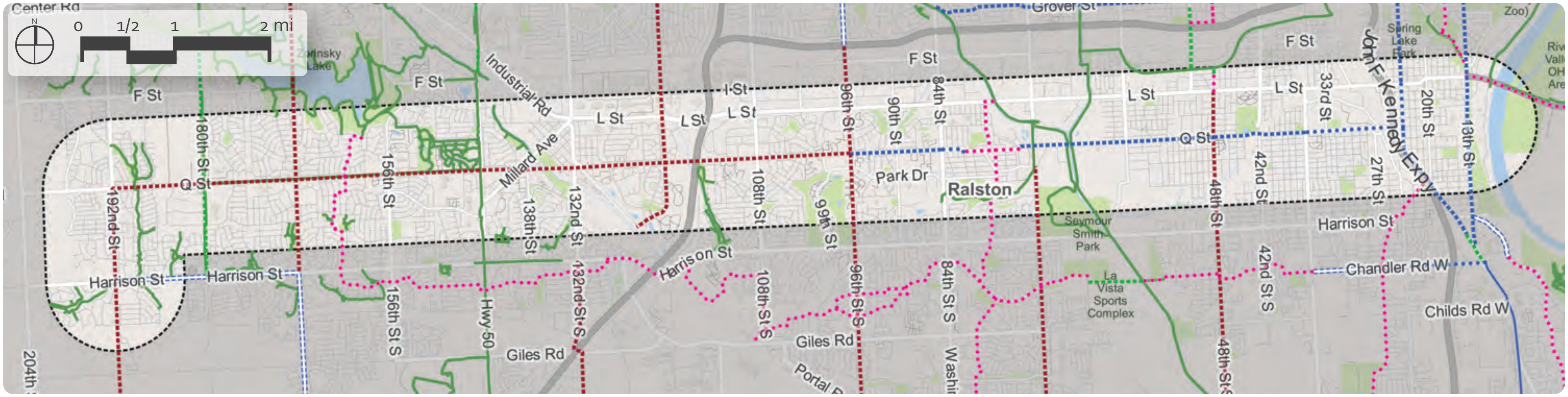
At its eastern end, the corridor connects a freeway exit with Fort Crook Road and carries around 25,000 ADT. Proceeding westward, the corridor becomes much quieter, with volumes dropping to a few thousand cars past 38th Street and the character turning more rural. This section from 38th Street to 96th Street is comprised mostly of two lanes with no shoulder.

The western parts of the corridor along Schram Road are very rural in nature, with gravel road and very little traffic.

Corridor Recommendations

- Shared Lane Marking
- Paved Shoulder

Omaha Southwest



Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The Omaha Southwest Connector follows Q Street from South Omaha to Millard at 192nd Street. Through much of the City of Omaha, Q Street is an urban two or three lane collector, traversing established neighborhoods and industrial corridors. Traffic is moderate with around 10,000 vehicles per day. Road widths and right-of-way are constrained. Intersections are frequent and parking is underutilized and intermittent on both sides of the street due to frequent curb cuts.

Through Ralston, the road widens to four or five lanes and becomes a suburban arterial with a speed limit of 40 mph. This pattern continues through Millard, although the corridor picks up a widened sidewalk/sidepath east of Millard Avenue. At 185th Street, the roadway narrows to three lanes with no shoulder and loses the sidepath.

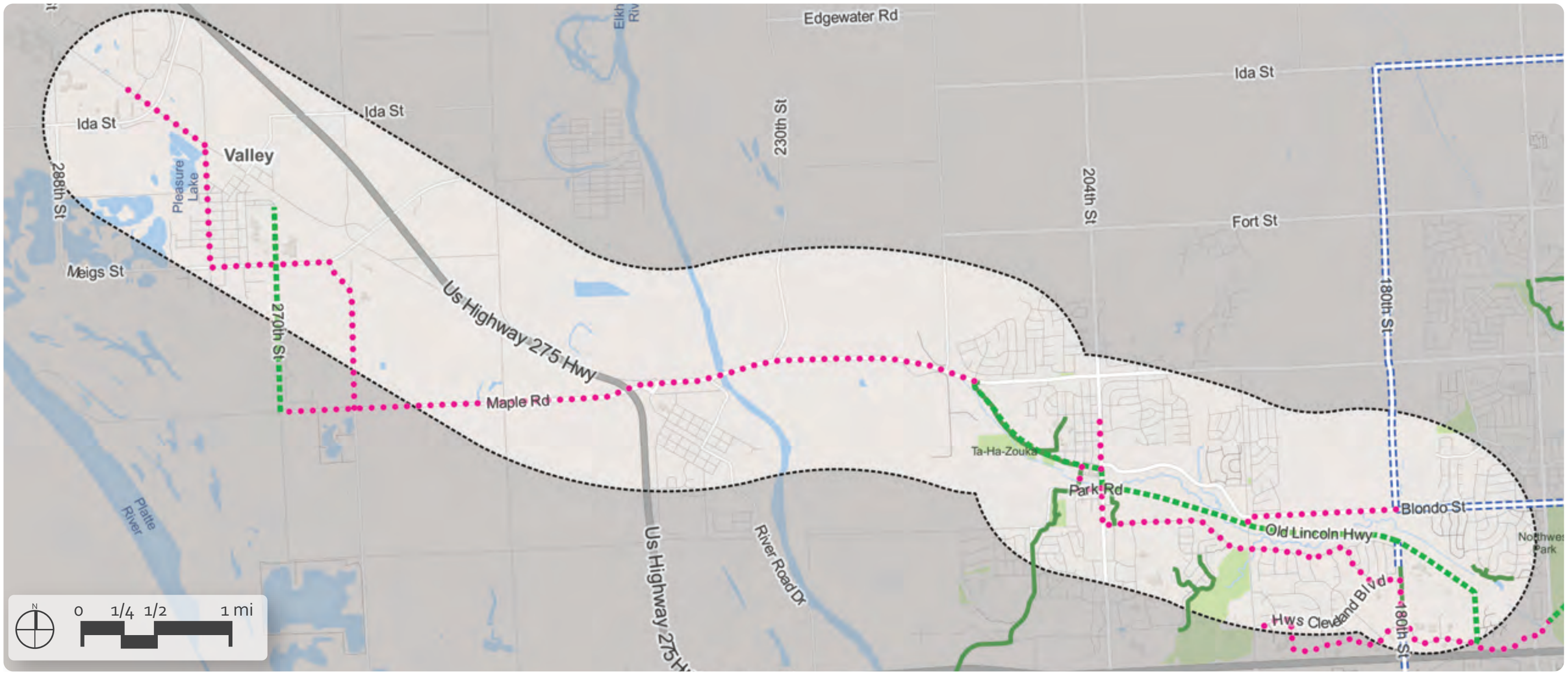
At 192nd Street, the corridor turns south to meet up with the Metro West Connector at Harrison Street and 192nd Street.

Most of Q Street is rated as LOS D. From 144th to the west the rating drops to E/F.

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage

Lincoln Highway



Existing
Bike lane
Path/Trail

Shared lane marking
Wayfinding
Bike lane
Path/Trail

Bike boulevard
Paved shoulder
Reconstruction

The Lincoln Highway Connector stretches to the northwest of Omaha from the western edges of the urban area to Elkhorn, Waterloo and Valley. It follows the Old Lincoln Highway from 180th Street to 204th Street, and then continues through Elkhorn on Elkhorn Drive to Maple Road through Waterloo. It continues, paralleling US 275 to the City of Valley.

The Old Lincoln Highway is a rural two-lane road with roadbrick in some sections. The current roadway is very narrow with no shoulders but traffic is very light at only about 500 ADT. The highway parallels a rail right-of-way that is currently being used.

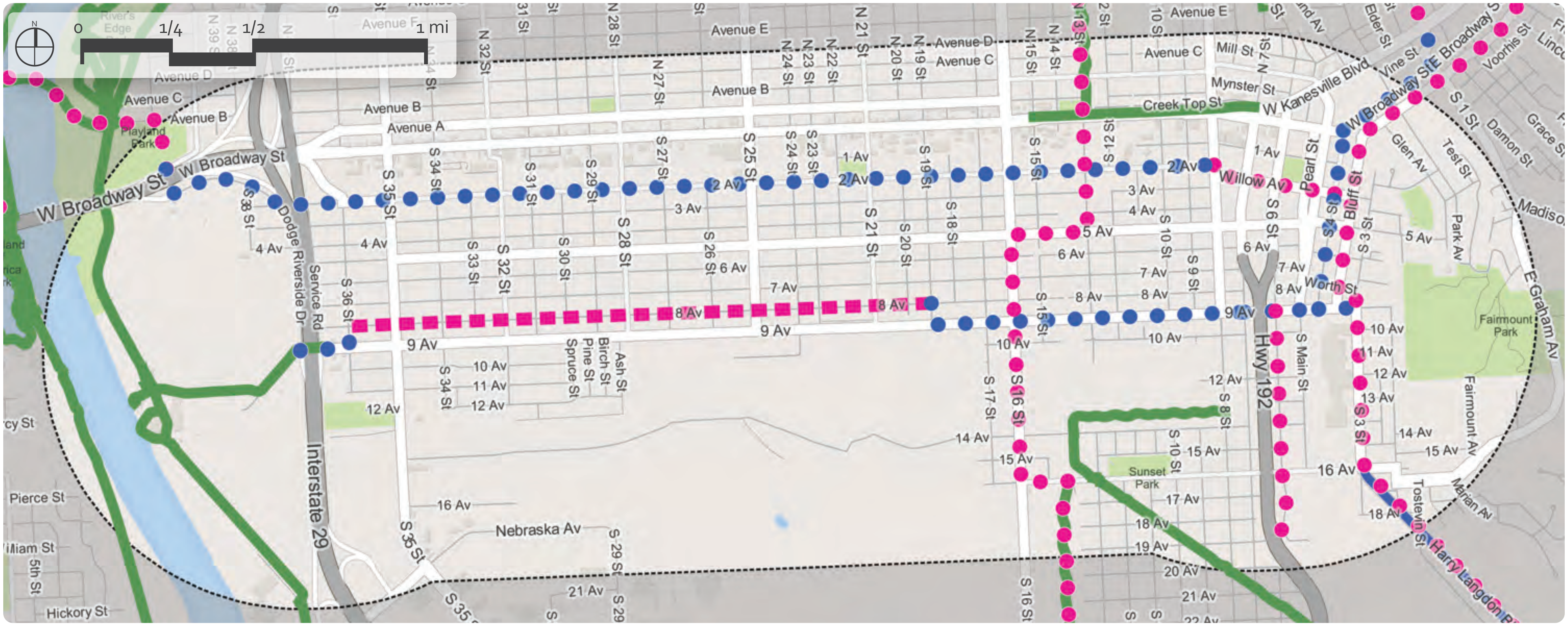
Through Elkhorn, the corridor turns north to meet up with West Maple Road (Highway 64), which is a divided highway with paved shoulders leading to the west and Waterloo.

Corridor Recommendations

Shared Use Path

Wayfinding Signage

Council Bluffs Mid-South



Existing	
Bike lane	Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

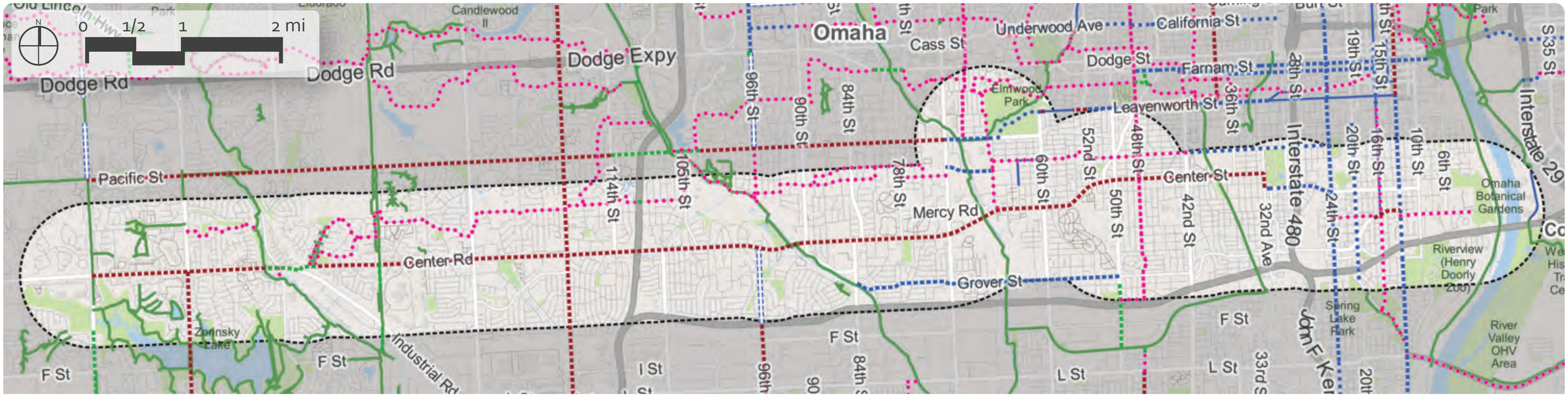
Primarily following 8th and 9th Avenues from west to east, the Council Bluffs Mid-South Connector connects residential areas in the southern half of Council Bluffs. 9th Avenue runs unimpeded from Interstate 29 at the western end of Council Bluffs to the South Expressway and meets up with the Council Bluffs East Connector. 8th Avenue has several breaks in continuity.

The prospect of adding bike lanes to 9th Avenue is very low even if the street were reconstructed. Traffic volumes are also relatively high especially on the western end of the street. 8th Avenue has some potential, but sections of 9th Avenue would still need to be used where 8th Avenue does not connect across barriers.

Corridor Recommendations

- Bike Boulevard
- Shared Lane Marking

Center - Grover



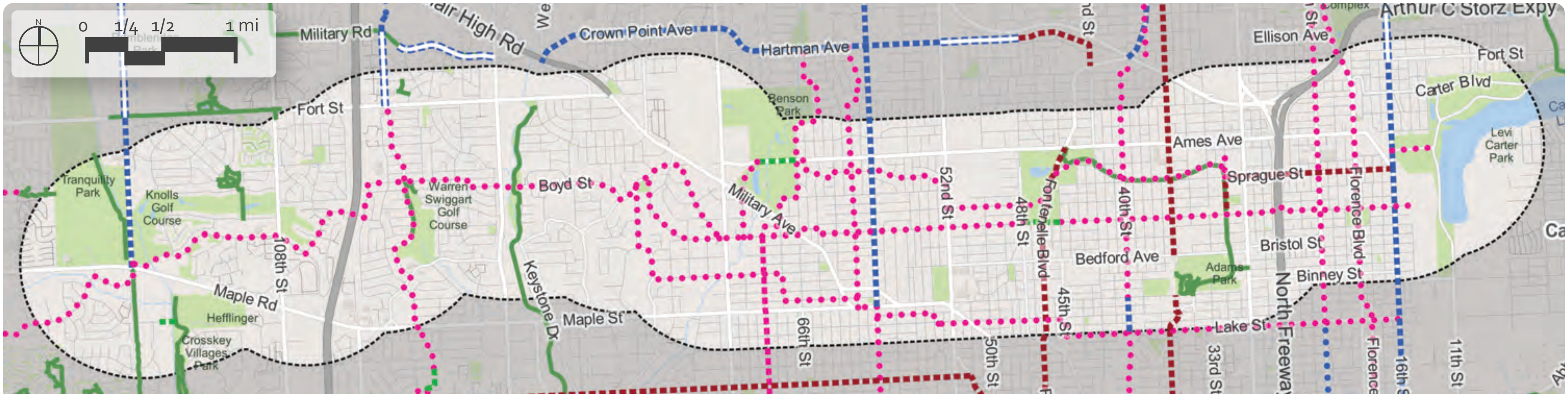
This corridor was added to the original 15 corridors to fill a broad expanse between the Omaha Southwest Connector to the south and the Omaha South-Central Connector to the north.

The corridor runs from the Missouri River on the east to 180th on the west. The majority of the corridor follows Center Road, a major thoroughfare with heavy traffic (between 25,000 and 30,000 ADT) and a speed limit of 40 mph. Portions of Center Road operate as a divided highway.

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Shared Use Path

Omaha Mid-North



Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The Omaha Mid-North Connector runs east to west through residential neighborhoods north of downtown and areas to the west. This was an added corridor to the original 15. The corridor starts near Carter Lake and follows Sprague Street, a local residential street that spans the North Freeway with a pedestrian overpass.

The corridor eventually turns northwest on Clifton Drive, then follows Keystone Drive and then Boyd Street, a two lane collector road with no shoulder.

All of these streets were rated in the A/B category of bicycle LOS.

At 90th Street, the corridor shifts slightly north to Ames Avenue, a local residential street, and then dips south to Sprague Street in order to cross Interstate 680. Beyond the interstate, it continues its course on Old Maple Road, a two lane rural road with no shoulder, until 120th Street.

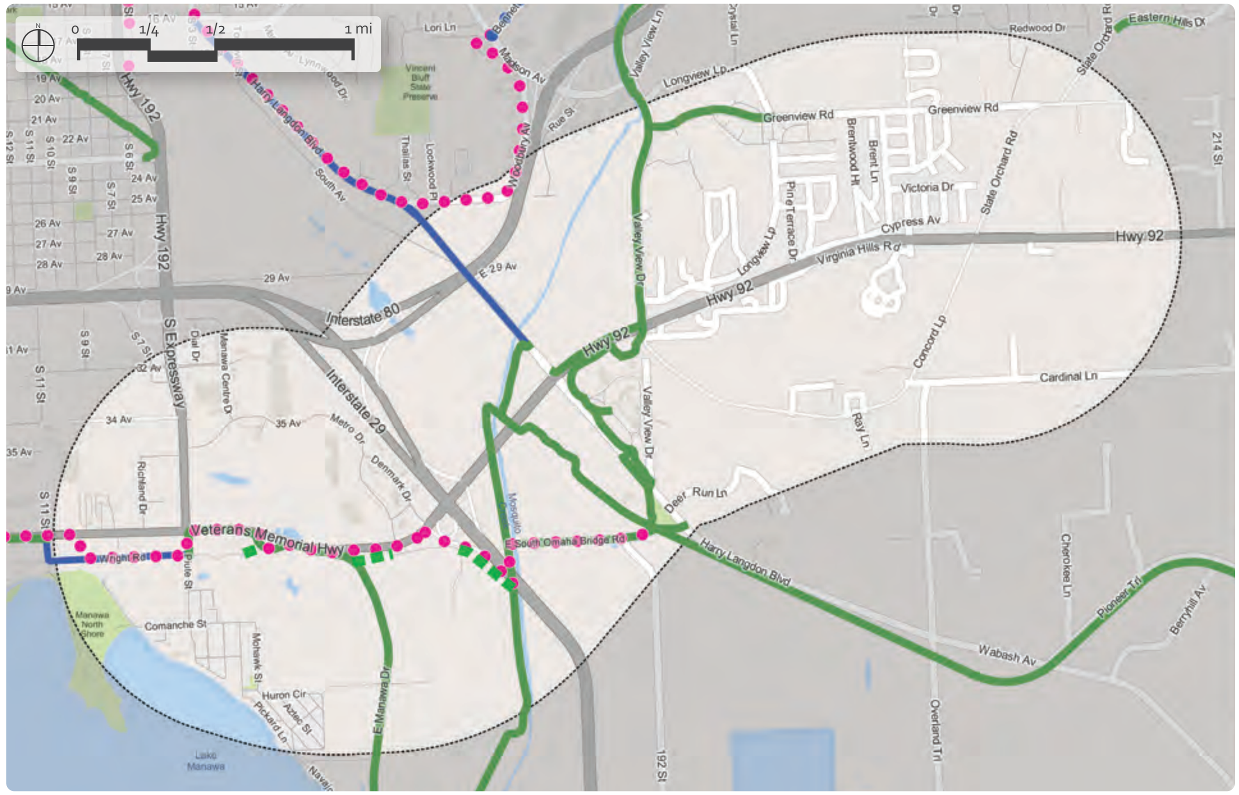
Corridor Recommendations

- Shared Use Path
- Wayfinding Signage

Pottawattamie Southeast

The Pottawattamie Southeast Connector follows Veterans Memorial Highway Across Interstate 29. The highway is high speed and carries large volumes of traffic, including a high level of heavy truck traffic accessing industrial areas near the rail yards.

The area is served by existing paths that connect to Lake Manawa and to the Wabash Trace Nature Trail. Bike lanes on Harry Langdon Boulevard also connect north into the city of Council Bluffs.



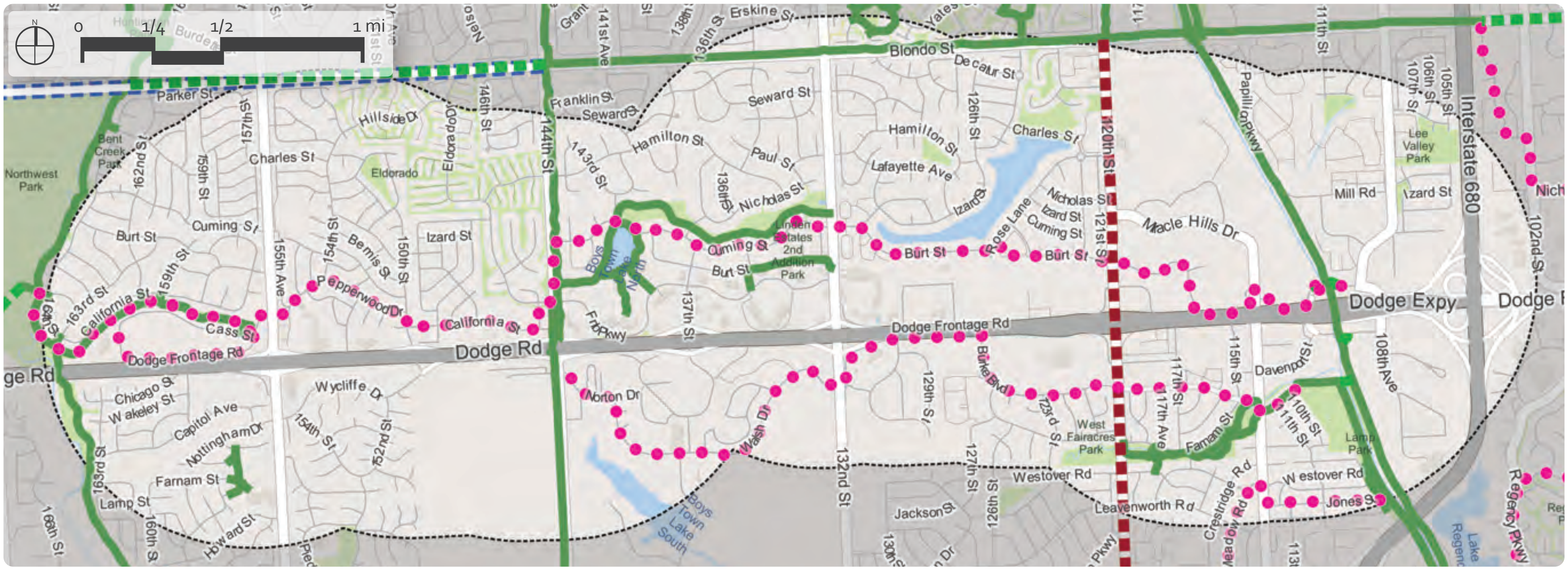
Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

- Shared Use Path
- Wayfinding Signage

Douglas West



Existing	
	Bike lane
	Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

The Douglas West Connecter serves areas at the far west of the metropolitan area. The corridor parallels Dodge Street starting at 108th Street, running on adjacent local residential streets to 192nd Street. This was not one of the original 15 corridors and materialized while working on the Omaha North Central Connector (Blondo Street). Starting at the frontage road at Dodge and the Big Papio Trail the route follows the frontage road to 116th Street to Burt Street, to Cuming Street, to a path along 144th Street, to Eldorado Drive, to California Street, to a path parallel to Cass Street to the Big Papio Trail, to 168th Street (via pedestrian bridge), to Burt Street, to California Street, to 189th Street, to Cleveland Street, and to 192nd Street.

Crossing the Big Papillion creek poses the most significant challenge, but an existing bridge exists about a ✣ mile to the north of Dodge Road. A path does not exist to connect this bridge to 168th Street.

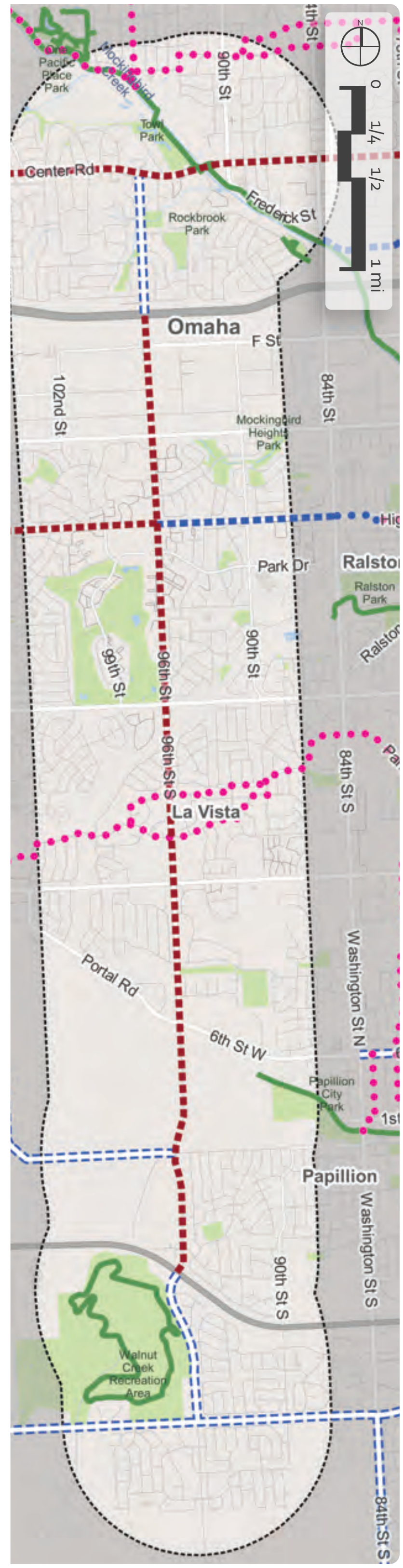
Corridor Recommendations

- Shared Use Path
- Wayfinding Signage

96th Street

The 96th Street Connector follows 96th Street in Sarpy County and parts of Omaha south of Interstate 80. The corridor originates on the north at Center Road near the Big Papio Trail. As 96th Street crosses Interstate 80 the roadway widens to four or five lanes and volumes increase to above 15,000.

The corridor proceeds through La Vista, occasionally as a divided highway, and connects with Highway 370.



Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

Paved Shoulder

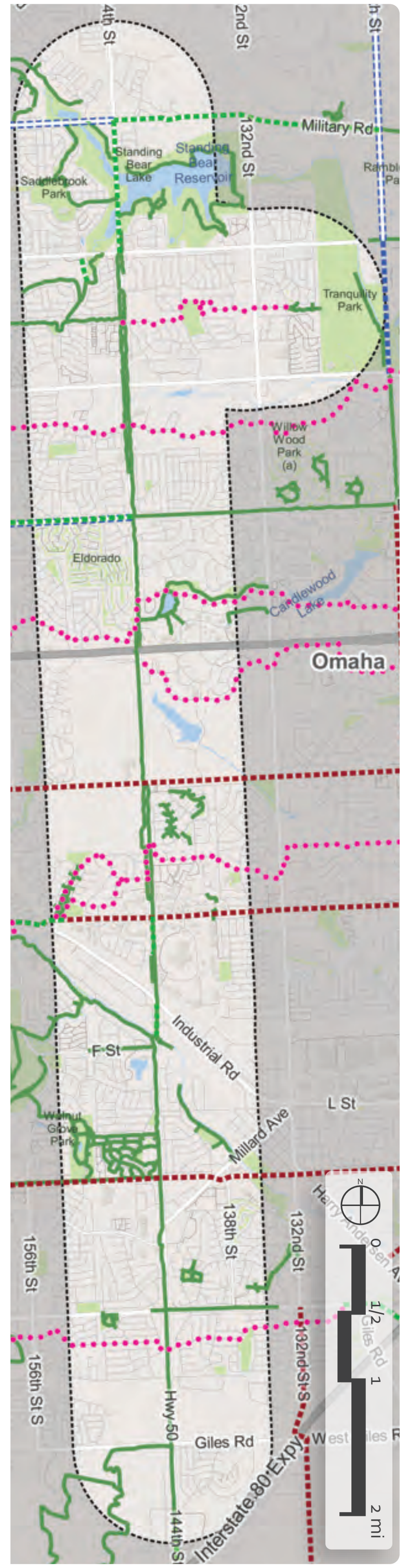
144th Street

From Standing Bear Lake Park on the north to Chalco Hills Recreation Area on the south, the 144th Street Connector runs directly along 144th Street with a small branch at the north end connecting Tranquility Park.

The corridor offers bicycle sidepaths on one or both sides through almost the entire length. The roadway itself changes character substantially from north to south. On the north, it is a suburban three lane thoroughfare with ample right-of-way and moderate-to-heavy levels of traffic (above 15,000 ADT in some parts).

The southern half is a divided highway with a speed limit of 45 and traffic levels near 35,000 ADT for most of the corridor.

On street bicycle riding conditions falls almost entirely into LOS E/F, but the sidepath provides a comfortable alternative and most cyclists use it where available.



Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

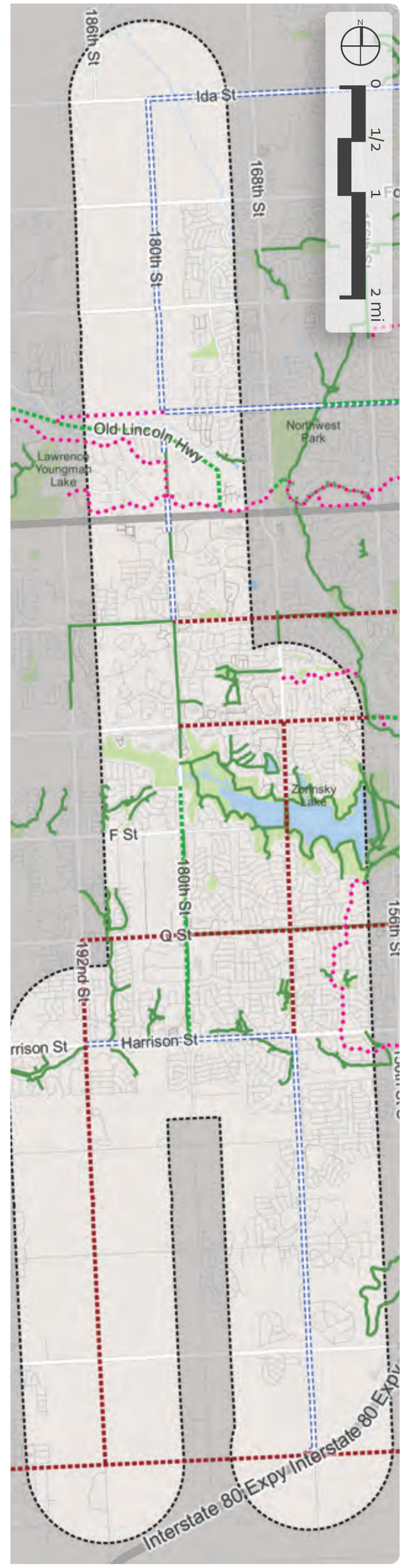
- Shared Use Path
- Wayfinding Signage

Metro West

The Metro West Connector is the furthest west of all the north-south running corridors in the plan. It spans the fringe of the urbanized area from north to south, mostly along 180th Street. The corridor branches at its southern end, with a section following 168th Street from Zorinsky Lake to Schram Road, and the other section following 192nd Street.

North of Blondo Street, 180th Street is a largely rural, two lane road with no paved shoulder and fewer than a thousand ADT. As the corridor approaches Dodge Road it widens into a four lane divided highway. Further south, the road alternates between five and three lanes, but a sidepath is present sporadically to Q Street.

The 168th Street branch runs through residential areas of Millard along a five lane arterial up to Zorinsky Lake. Traffic is moderate with about 10,000 ADT and a speed limit of 45. The 192nd Street segment is presently a rural three lane roadway up to Giles Road, where it becomes a gravel road.



Corridor Recommendations

- Paved Shoulder
- Shared Use Path
- Wayfinding Signage

Existing
- Bike lane
- Path/Trail

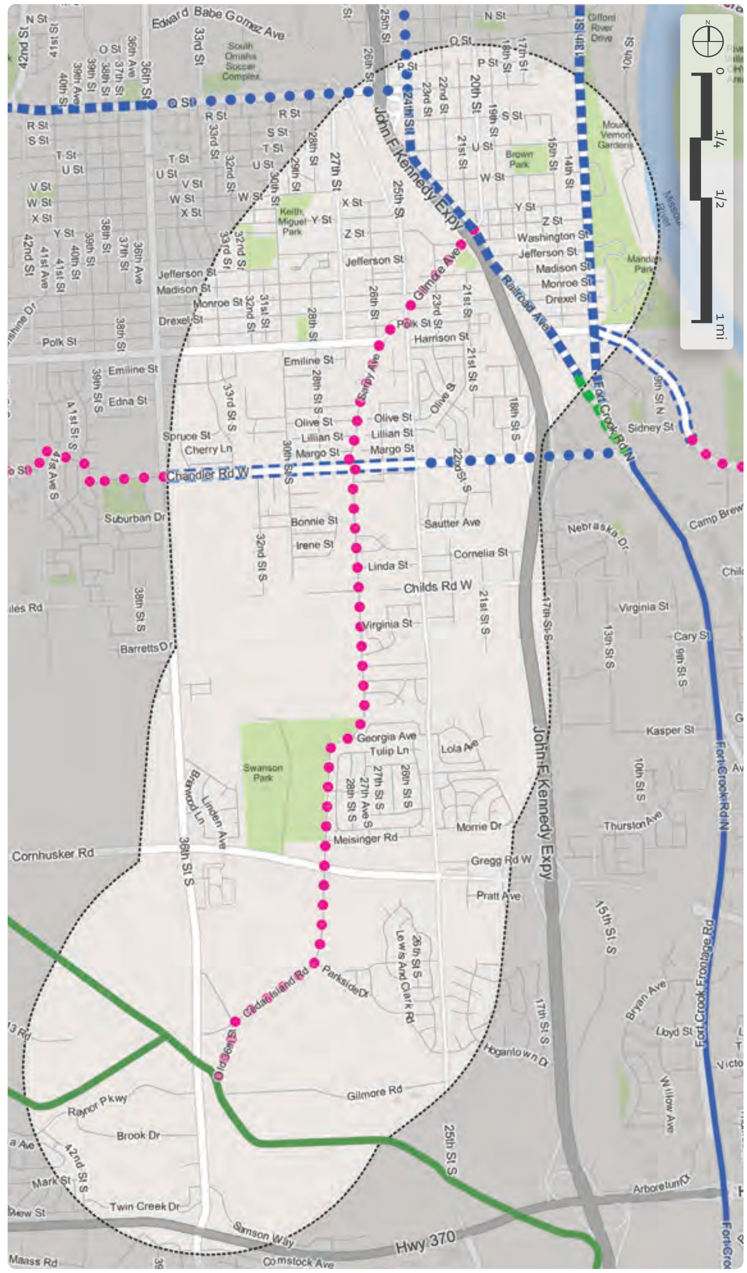
- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Highland

The Highland Connector links South Omaha and the western parts of Bellevue with the Keystone Trail to the southwest. The corridor follows Gilmore Avenue, Sarpy Avenue, and Cedar Island Road.

Gilmore Avenue is a local residential street that crosses the Kennedy Freeway and connects with the 24th Street/Fort Crook Connector at Railroad Avenue. At Polk Street the corridor proceeds on Sarpy Avenue through light industrial and residential areas, eventually meeting up with Cedar Island Road at Chandler Road.

Cedar Island Road is a narrow two lane road with no shoulders serving mostly rural and suburban residential neighborhoods. At its southern end it becomes a gravel road and meets the Keystone Trail. All of these streets are rated as A/B for bicycle LOS.



Corridor Recommendations

- Shared Use Path
- Wayfinding Signage

Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

96th Street North/99th Street

The 96th Street North/99th Street Connector follows 99th and 96th Streets from Sorensen Parkway on the north through suburban Sarpy County on the south. Through the north side, several intermediate roads are used to connect with the northern terminus of the continuous portion of 96th Street, most notably Maplewood Boulevard and Parkview Drive. Parkview Drive is a local residential street while Maplewood Boulevard is a residential collector road with a landscaped median.

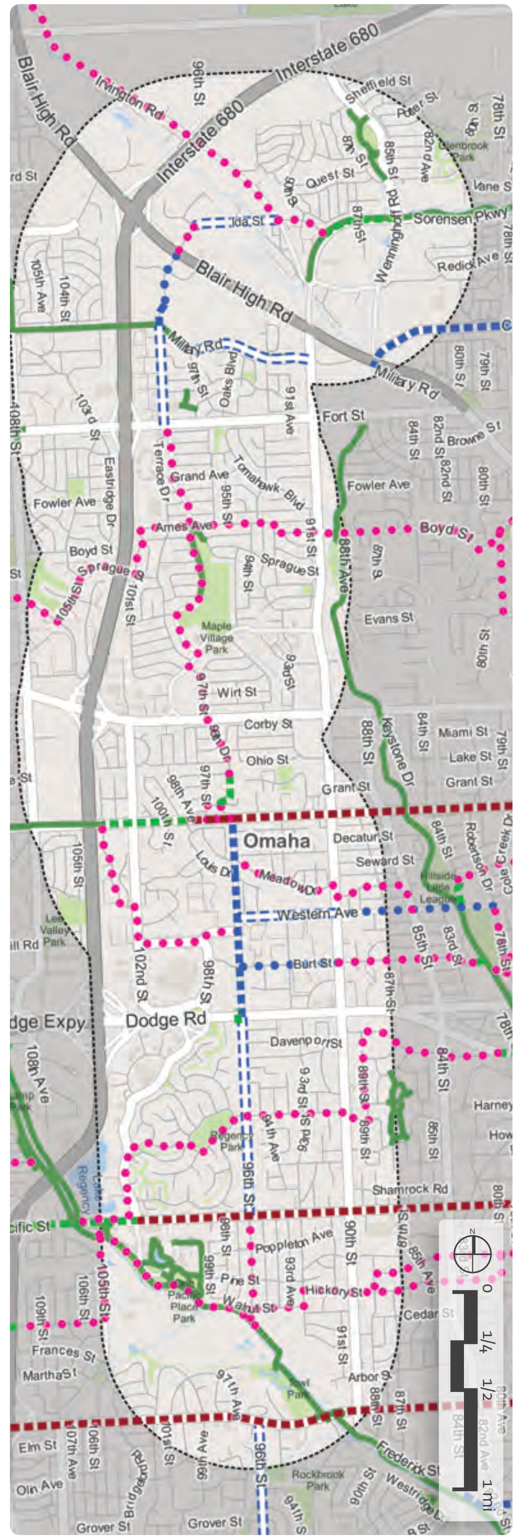
The middle section of 96th Street near Westroads Mall is a four lane thoroughfare with moderate levels of traffic (about 4,000 vehicles daily). South of Dodge Road, the road narrows to two lanes and serves mostly residential properties, although it has a striped centerline and currently would not accommodate cycling outside of the travel lanes.

Proceeding south of Pacific Street, the road becomes a local residential street again with fewer than a thousand ADT.

At the Big Papio Trail the corridor follows the trail, picking back up at the intersection of 96th Street with Center Road. The road again becomes a collector with a striped center lane and no room for cyclists outside of the travel lanes.

90th Street was also examined from Center Road to Blair High as part of this corridor.

Bicycle LOS for most of 96th Street north of Interstate 80 is fair to good.



Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Paved Shoulder
- Shared Use Path

Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

120th Street

The 120th Street Connector originates at Blondo Street and follows 120th Street south to the Papillion Creek south of Q Street. Virtually the entire length of 120th Street through the corridor consists of four or five lane roadway with traffic levels fluctuating between 20,000 and 30,000 ADT. The speed limit is 35 to 40 mph depending on the location. The bicycle LOS for this street was consistently rated at D or worse.

In the short term, on-road bikeway improvements would be exceedingly difficult given the character of the roadway and right-of-way constraints. The best prospects for shorter term accommodations exist north of Maple Road beyond the northern terminus of this corridor.

Several parallel options were considered including 114th Street, however, current bicycling conditions and the prospects for shorter term measures were no better than 120th Street. A combination of neighborhood streets between 126th and 121st and between Dodge and Center were also considered, but given its relatively short run as a bikeway and the circuitous nature of the route, it was considered not viable.

Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

Wayfinding Signage

72nd Street

The 72nd Street Connector runs north to south from Q Street at the southern edge of the City of Omaha into Sarpy County, serving Omaha, Ralston, La Vista, and Papillion.

72nd Street is a major regional north-south arterial, operating primarily as a divided highway throughout the corridor. Speed limits are high (45 mph) and the corridor carries high traffic loads in excess of 30,000 ADT in some spots. There appear to be some segments where right-of-way for widening or other improvements in the corridor area might be available. In the short term, bikeway improvements will be difficult at best.

Combinations of parallel streets offer relatively comfortable travel adjacent to 72nd Street, although the street network breaks down at key locations.

Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Corridor Recommendations

Wayfinding Signage

13th Street

The 13th Street Connector was added as a parallel alternative to 24th Street. 13th Street runs north to south through the heart of downtown Omaha. The 13th Street Connector follows 13th Street from downtown through South Omaha and connects with the 24th Street/Fort Crook Connector at the northern edge of Bellevue.

The northern portion of the corridor at Leavenworth Street is a very urban, wide thoroughfare with moderate traffic volumes that are lower than 15,000 ADT. The land use intensity is high with frequent intersections.

Proceeding south, the street retains its urban character, albeit with increasing traffic volumes, reaching 23,000 ADT near the Interstate 80 interchange. Volumes drop significantly, falling below 15,000 south of the interchange where the corridor becomes less urban in character.

At Missouri Avenue, the corridor branches to include the bridge across the river. Continuing along the main corridor, the road passes through residential areas until its end at Railroad Avenue. Traffic here is lighter, near 10,000 ADT. Despite the lower traffic volumes, four lanes of travel are present.

Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage
- Paved Shoulder
- Shared Use Path

Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Midtown - North Omaha

The Midtown – North Omaha Connector was added as an additional corridor to be studied. Several streets were considered, but the following streets had the most potential. The main corridor runs from Florence on the north into Midtown and Leavenworth Street on the south. The corridor route follows 30th Street south from Interstate 680, to Martin Street, to Fontenelle Boulevard, across Sorensen Parkway, and then continues south on 40th Street until its end at Leavenworth Street.

40th Street is the main local residential street in this corridor with fairly light traffic and low speeds that make it comfortable for biking. However, its continuity is broken by the Sorensen Parkway, for which the nearest crossing would be Fontenelle Boulevard.

Bicycle LOS is either A/B or C through the entire corridor.

Corridor Recommendations

Bike Lane

Wayfinding Signage

Existing

Bike lane

Path/Trail

Shared lane marking

Wayfinding

Bike lane

Path/Trail

Bike boulevard

Paved shoulder

Reconstruction

60th Street

The 60th Street Connector was added as an additional corridor. It stretches north to south from Rainwood Road just north of Interstate 680 to Dodge Street on the south. The northernmost portion is a rural area with a two lane road, no shoulders, and volumes below 4,000 ADT. At Sorensen Parkway, the road widens to four lanes and volumes increase to above 5,000 ADT. The surrounding land use continues to be predominantly residential.

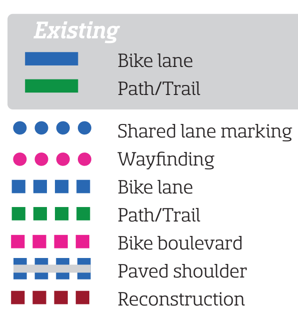
South of Maple Street, 60th Street becomes a local residential street, with volumes dropping back to under 3,000 ADT. The corridor transitions briefly to Dillon Drive, another local residential street, and eventually terminates at Memorial Park and the University of Nebraska-Omaha campus.

Bicycle LOS for this corridor ranges from LOS D to LOS A/B north of Sorensen and LOS C south of Benson commercial area.

Corridor Recommendations

Bike Lane

Wayfinding Signage

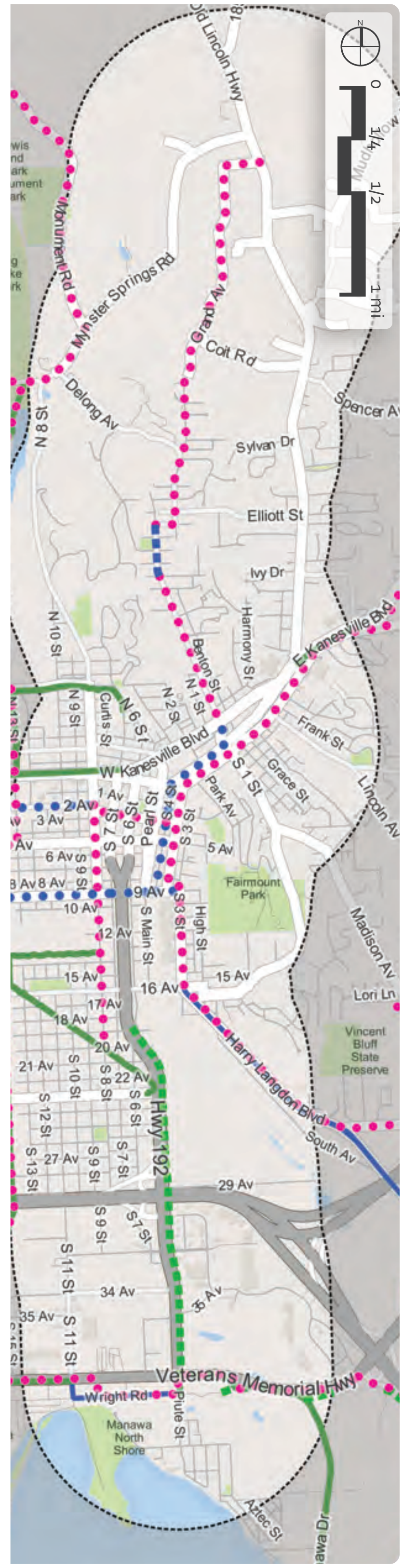


Council Bluffs East

The Council Bluffs East Connector is a north-south corridor that spans rural areas to the northeast of Council Bluffs, skirts downtown Council Bluffs on the east side, and continues southward beyond the edge of the urban area.

On the north, the corridor follows Grand Avenue, a two lane rural road. Grand Avenue terminates at Morgan Street, at which point the corridor shifts to Harrison Street. The character of Harrison Street is less rural, but still residential and low traffic. Parking is provided on one side of the road, leaving just enough room for the two travel lanes. The road continues in this manner and crosses Kanesville Boulevard. The corridor then follows Broadway, eventually turning south on 4th Street.

4th Street is a collector street with a more urban character and roughly 4,000 ADT. At 9th Avenue, the corridor shifts to 6th Street and then continues southward. 6th Street flanks the South Expressway and runs through primarily industrial land. Eventually, the corridor meets up with the South Expressway, a limited access divided highway with paved shoulders and heavy traffic (50,000 ADT). It follows the South Expressway to the corridor's end at Veteran's Memorial Highway near Lake Manawa.



Corridor Recommendations

- Bike Lane
- Shared Lane Marking
- Wayfinding Signage

Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Midtown North-South Crosstown

The Midtown North-South Crosstown Connector was added to the original 15. Both 50th and 48th Streets were considered. At its north end, the corridor begins at Maple Street. Both streets are largely residential but 50th Street carries considerably more traffic.

Bicycle LOS ratings for 48th Street were consistently A/B, while 50th was LOS D.

Corridor Recommendations

- Shared Use Path
- Bike Boulevard
- Wayfinding Signage

Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Parallel Network

Many areas throughout the region need bikeways that can be implemented immediately while more substantial infrastructure is being planned, designed, and constructed on major roads. Special attention was given in each corridor to low-traffic neighborhood streets that can fill this need with only minor investments, such as shared lane markings, wayfinding, and route signage. Some of the recommendations in each corridor are made expressly for this purpose. The recommendations that comprise such routes will be referred to in the plan as the "Parallel Network".

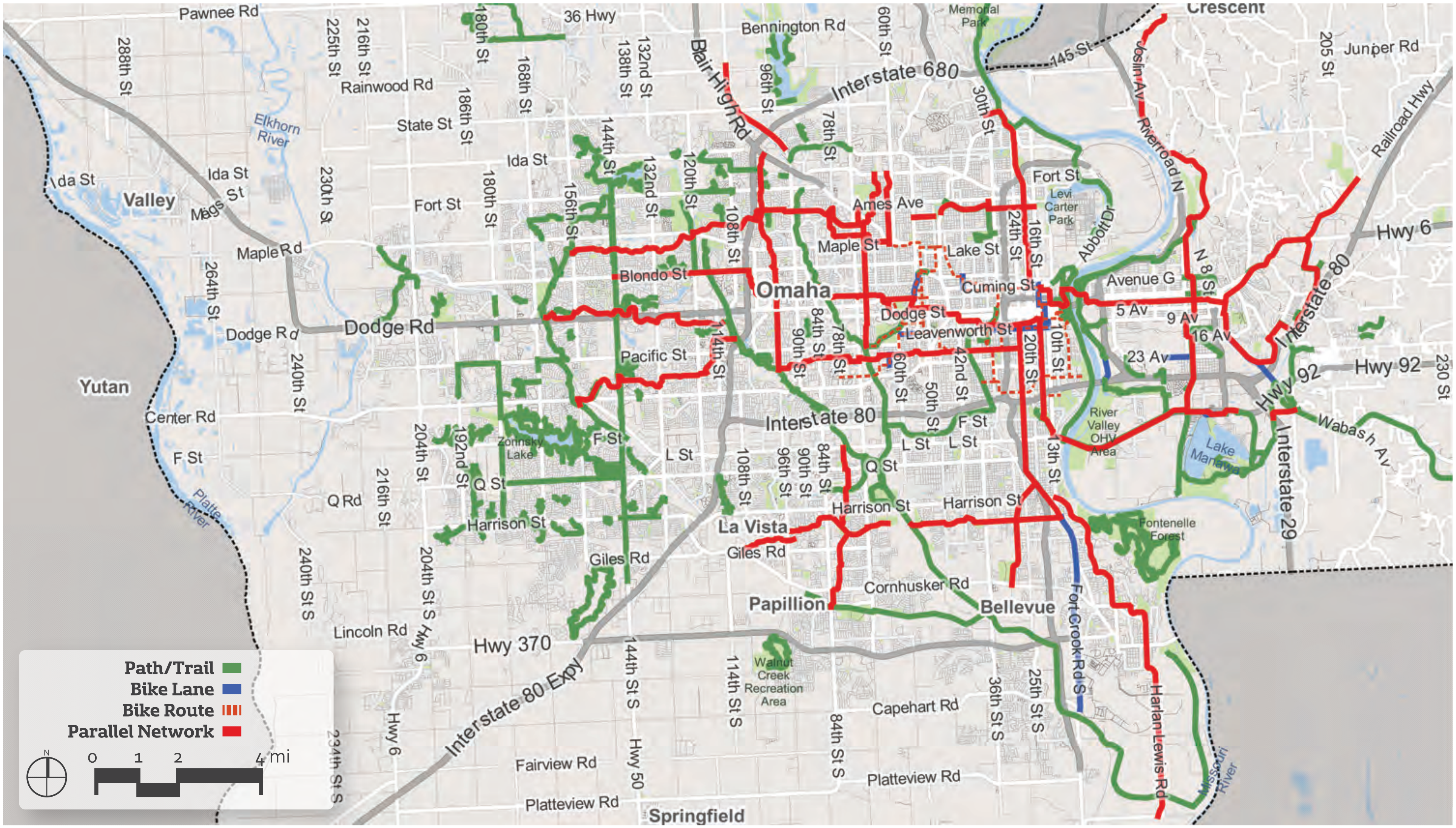
Many of the recommended neighborhood streets for this network are hilly and are not engineered using the more modest grades of nearby major streets. Although topography was a consideration for the routes, more examination at the time of implementation may lead to small changes in the orientation of individual routes. In some cases, a shift of just a block or two will help minimize the steepest climbs for bicyclists.

Recommendations in the Parallel Network are sorted into short- and medium-term recommendations. Short-term recommendations are the most basic and simple improvements. Medium-term recommendations may involve more complicating factors, such as minor reconfigurations of roadways, or small sections of heavier infrastructure treatments at isolated locations such as bridges or major intersections.

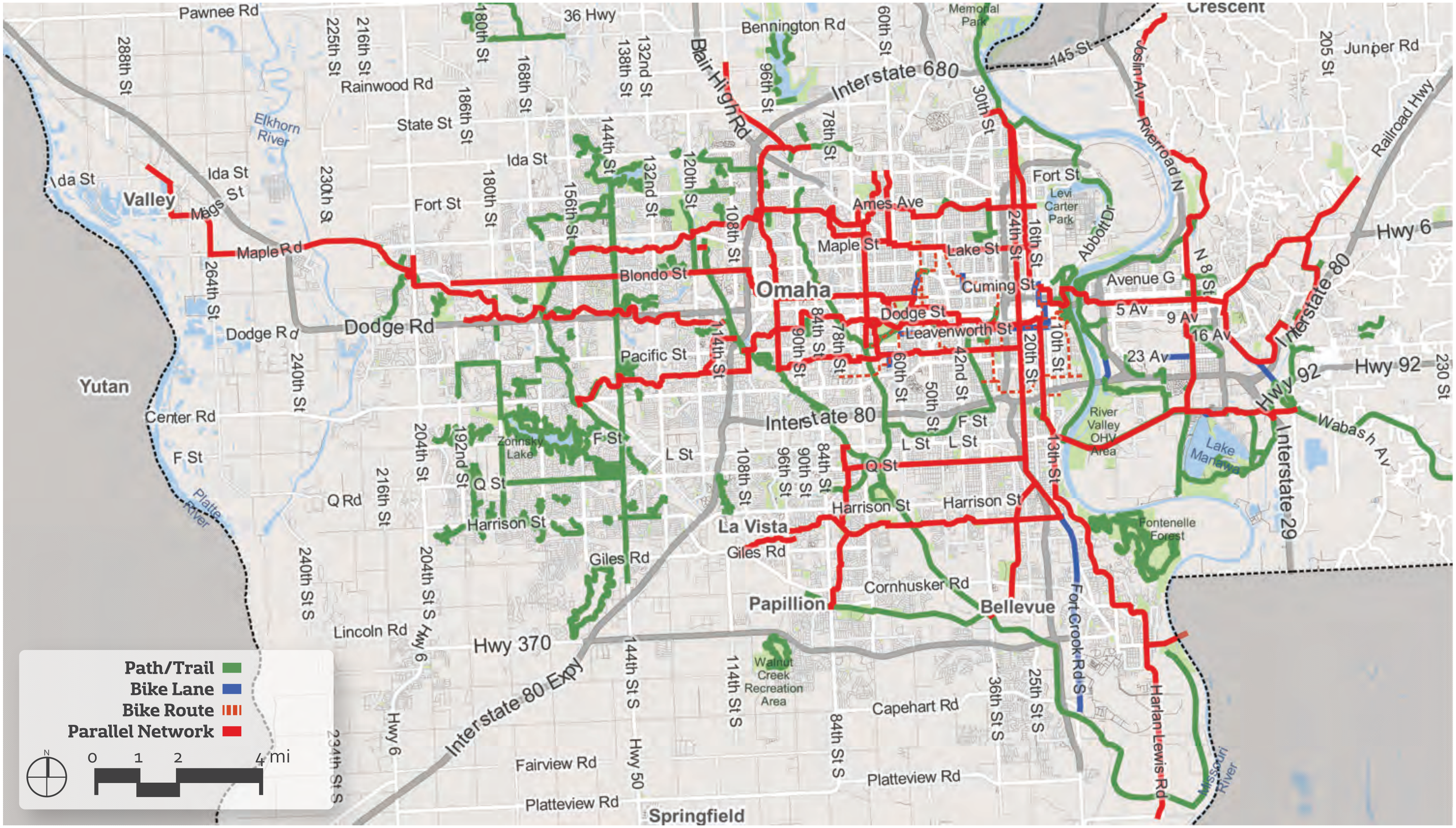
The Parallel Network promises immediate, cycling-ready connections through corridors but cannot be considered a complete bike network. The following are some issues that are not adequately addressed by the Parallel Network alone:

- Because they tend to follow lightly traveled residential streets, they may fail to make connections to major destinations on busier roads.
- Connections often have to be made in areas with steep hills or other natural obstacles. Flatter passages through neighborhoods tend to be used by major roads.
- The discontinuous street grid often necessitates out-of-direction travel and many turns in order to connect through an area. This adds to the length of a trip and decreases the legibility of a route.

Map 7 | Short-Term Parallel Network



Map 8 | Medium-Term Parallel Network

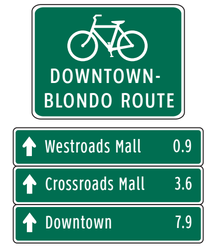


Wayfinding Example

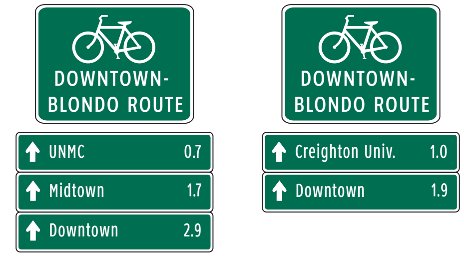
Wayfinding

The Parallel Network relies primarily on wayfinding to assist users in navigating through the city. Because the low-stress neighborhood streets used for these recommendations do not always connect straight through neighborhoods, each route typically includes many turns. Proper wayfinding will be critical to ensure that riders are not confused. An example from the Omaha North Central Connector is provided here to illustrate several key principles of good wayfinding.

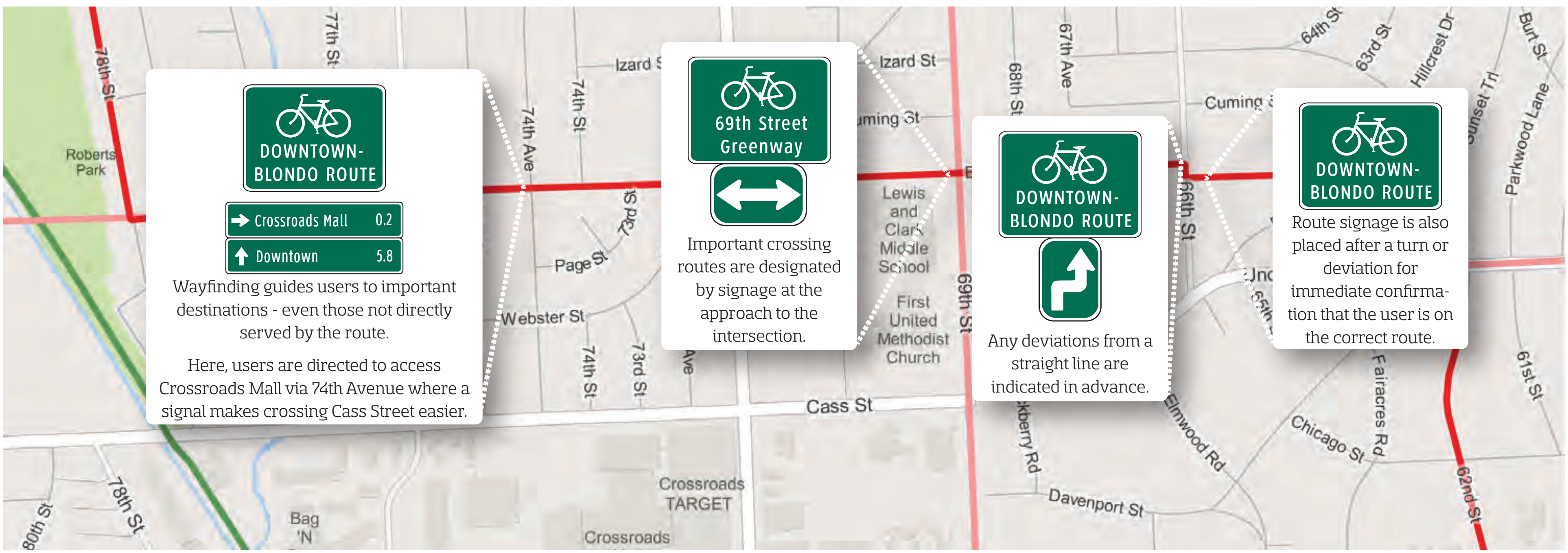
To identify the route, a modified MUTCD D11-1 sign that uses the route name can be used. Where appropriate, this plaque would be accompanied by directional arrows or other indicators to guide users along the route.



Route plaques are often accompanied by "fingerboards" that indicate destinations, directions, and distances.



Destinations on the fingerboards change through the course of the route. Generally, the ultimate destination is retained at the bottom for the entire course of the route.



Standard Cross Sections

Streets have different characteristics based upon the goals of the community. Some streets are built to accommodate large flows of auto traffic, while others have lighter amounts. On-street parking is allowed on some streets, but not on others. No matter whether a street is being built for the first time, totally reconstructed for the first time in 60 years, or resurfaced on a 20-year cycle, road work is an ideal opportunity to incorporate bicycle facilities. More significant projects (such as street reconstructions) tend to have more flexibility because the width of the street and sidewalks can be altered. Resurfacing projects tend to have less flexibility because curb lines do not change.

No matter the type, it is possible to incorporate bike lanes in all forms of road work because the surface of the street (and potentially sidewalks or paths) is new. The cross sections included in this plan cover different types of streets, ranging from 5 lanes to 2 lanes. Sometimes bike lanes are on the street and other times there may be an opportunity to plan for a separated side path.

Standard cross sections are intended to provide consistency across a community, so that travelers become accustomed to how to interact with one another on different types of streets. Sometimes however, greater flexibility is required, and these cross sections can serve as a starting point for a discussion about the goals of a project.

All standard cross sections are provided in Appendix A.

Transit Connections

Cycling and public transportation are both associated with vibrant urban communities. The two modes of transportation can often work together to facilitate trips that would otherwise happen in a private vehicle. Comfortable cycling routes that connect to important transit stops can broaden the reach of the transit system and provide additional transportation options to cyclists, particularly for longer trips.

Metro Transit (Metro) is the primary provider of public transportation in the region. Metro operates six major transit centers in various parts of the City of Omaha. Two transit centers are directly served by a study corridor's central arterial. These are:

- Midtown Transit Center (Harney Street Bikeway)
- Metro Community College South Campus (Omaha Southwest Connector)

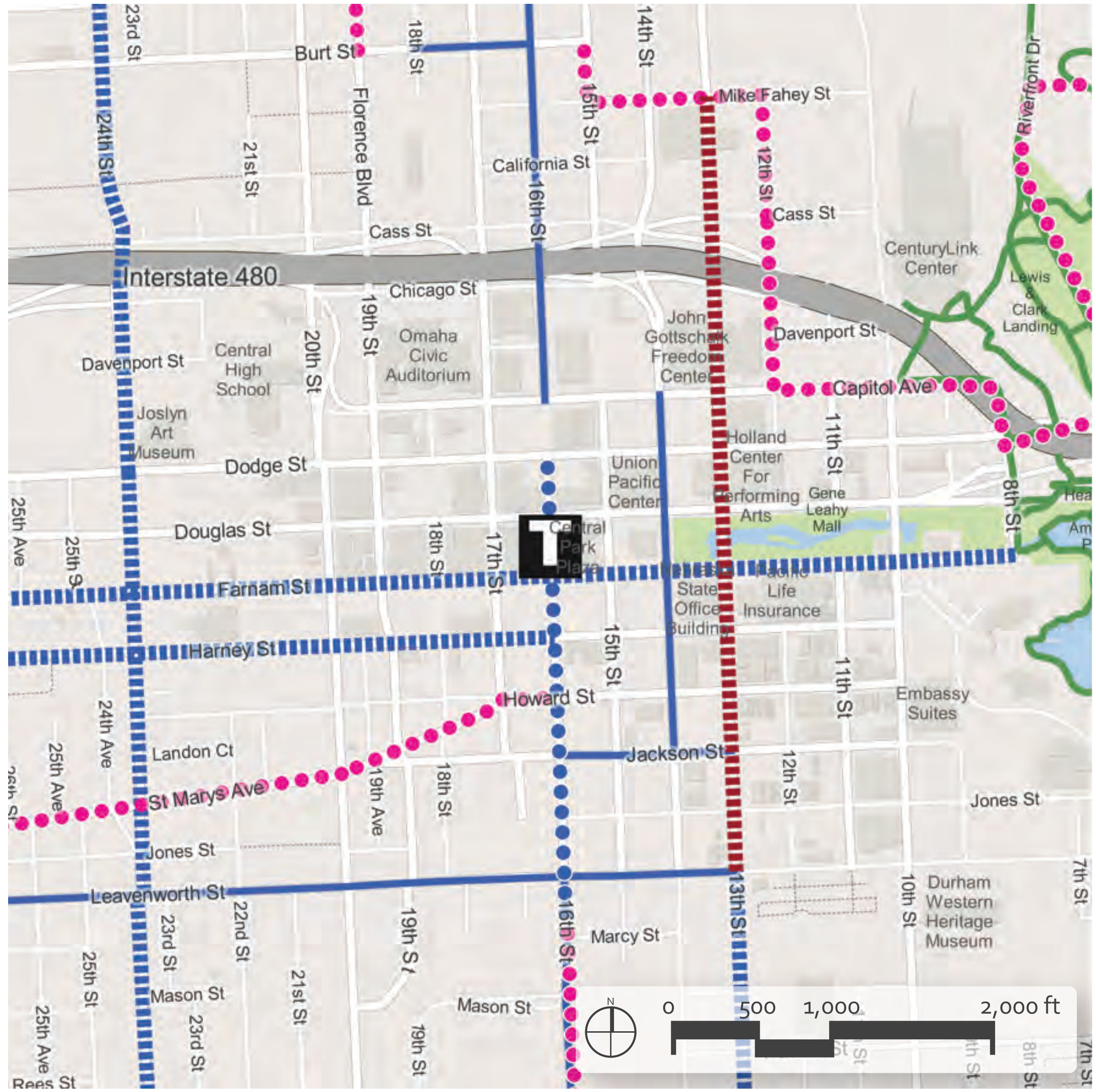
The other transit centers are all near at least one study corridor but not directly served by its central arterial. To ensure that the bike network facilitates connections to the transit centers, the recommendations include transit connections that bridge the gap between a corridor and a nearby transit center.

The following maps illustrate the relationship between each transit center and nearby corridor recommendations.

16th Street Transit Center

The 16th Street Transit Center is the main transit hub serving downtown Omaha. As such, it is an important destination for transit users and provides access to major attractions, employment, cultural centers, and government facilities. The area is served by existing north-south bike lanes on 14th Street and 16th Street, as well as east-west bike lanes on Jackson Street and Leavenworth Street.

This area marks the convergence of a number of study corridors. Recommendations near the transit center include shared lane markings, wayfinding, and bike lanes.

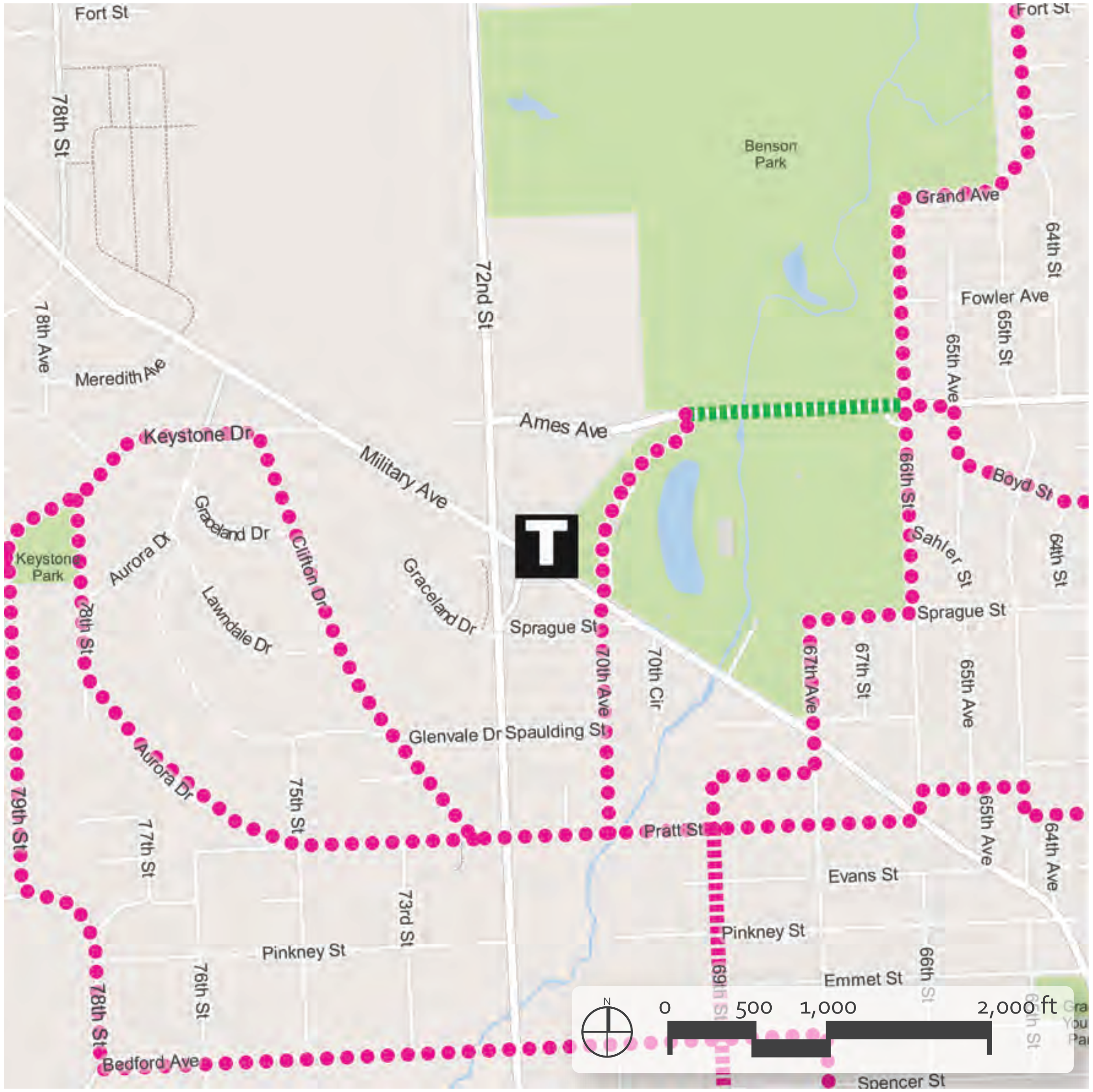


Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Benson Park Transit Center



The Benson Park Transit Center is located at the junction of three thoroughfares: 72nd Street, Military Avenue, and Ames Avenue. It also lies near three study corridors. The Omaha Mid-North Connector passes to the south along Pratt Street. The Omaha Northwest Connector follows Ames Avenue to the north, and the 60th Street Connector is located to the east.

Connections from the transit center to each corridor are recommended mostly via wayfinding on neighborhood streets, although there is also a path recommendation along Ames Avenue to ease connections from the transit center to points east.

Existing

- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Metro Community College South Campus Transit Center

The Metro Community College (MCC) South Campus Transit Center is located in the heart of the college's 40-acre campus in South Omaha, which is near the intersection of I-680 and Q Street. This is the busiest campus of MCC.

The Omaha Southwest Connector follows Q Street through the area and shared lane markings are recommended here. The center itself is not immediately adjacent to the roadway. Bicycle access is assumed to occur from Q Street through the small parking lot serving the South Omaha Library.

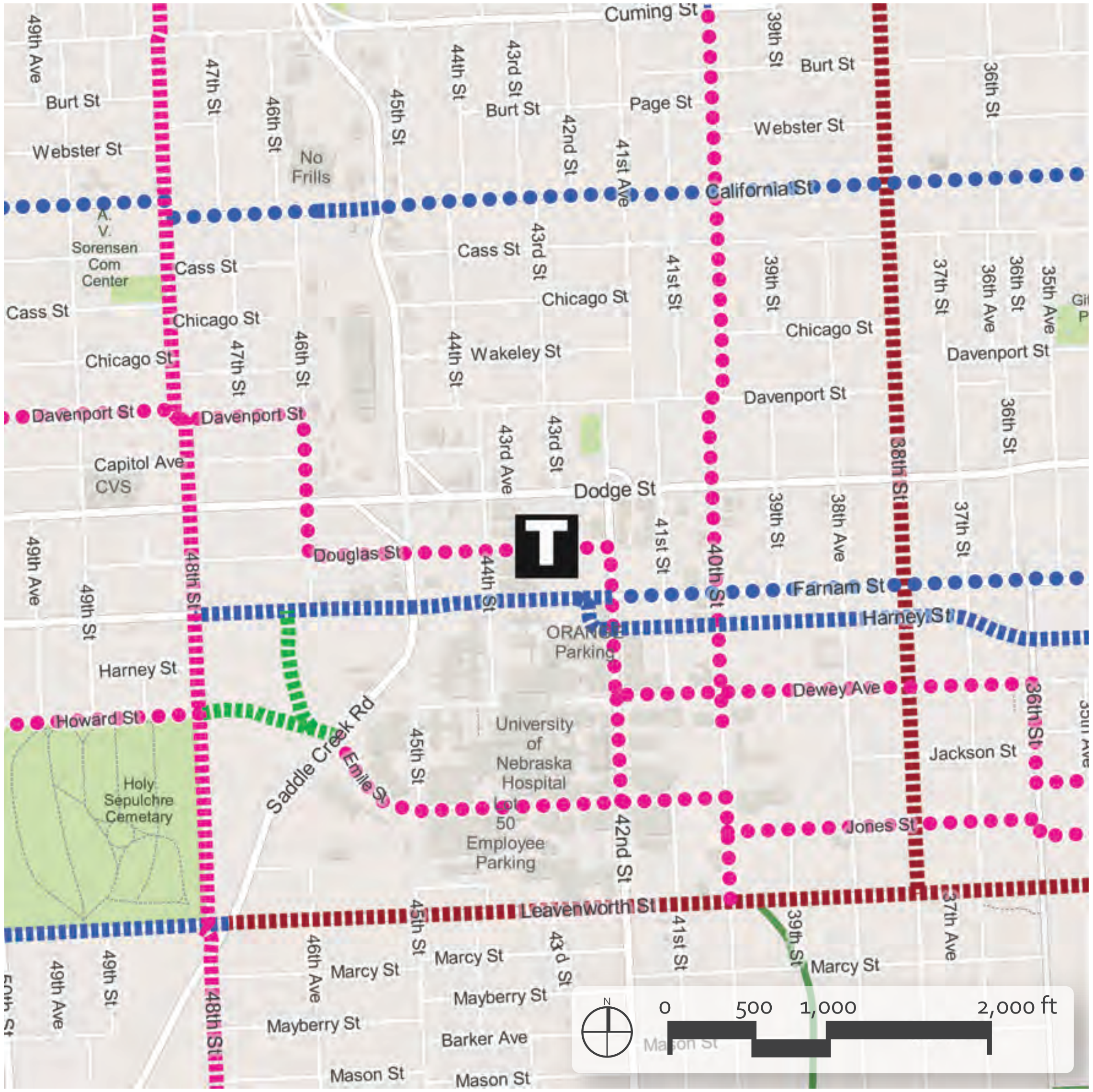
Existing

- Bike lane
- Path/Trail

Legend:

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

Mid Town Transit Center



The Midtown Transit Center is nestled to the north of the Medical Center campus. Served by the Harney Street Bikeway, the recommendation for direct access to the center involves wayfinding from Harney and Farnam Streets to Douglas Street, one block north. Recommendations in the vicinity include bike lanes, shared lane markings, and wayfinding. There is also a path recommendation to facilitate east-west movements from the transit center to neighborhoods to the west.

It is important to note that transit service in this area is likely to change significantly with the forthcoming BRT corridor planned for Farnam Street. Changes to the transit system in this neighborhood, including the introduction of new BRT stations, should include consideration of bicycle access.

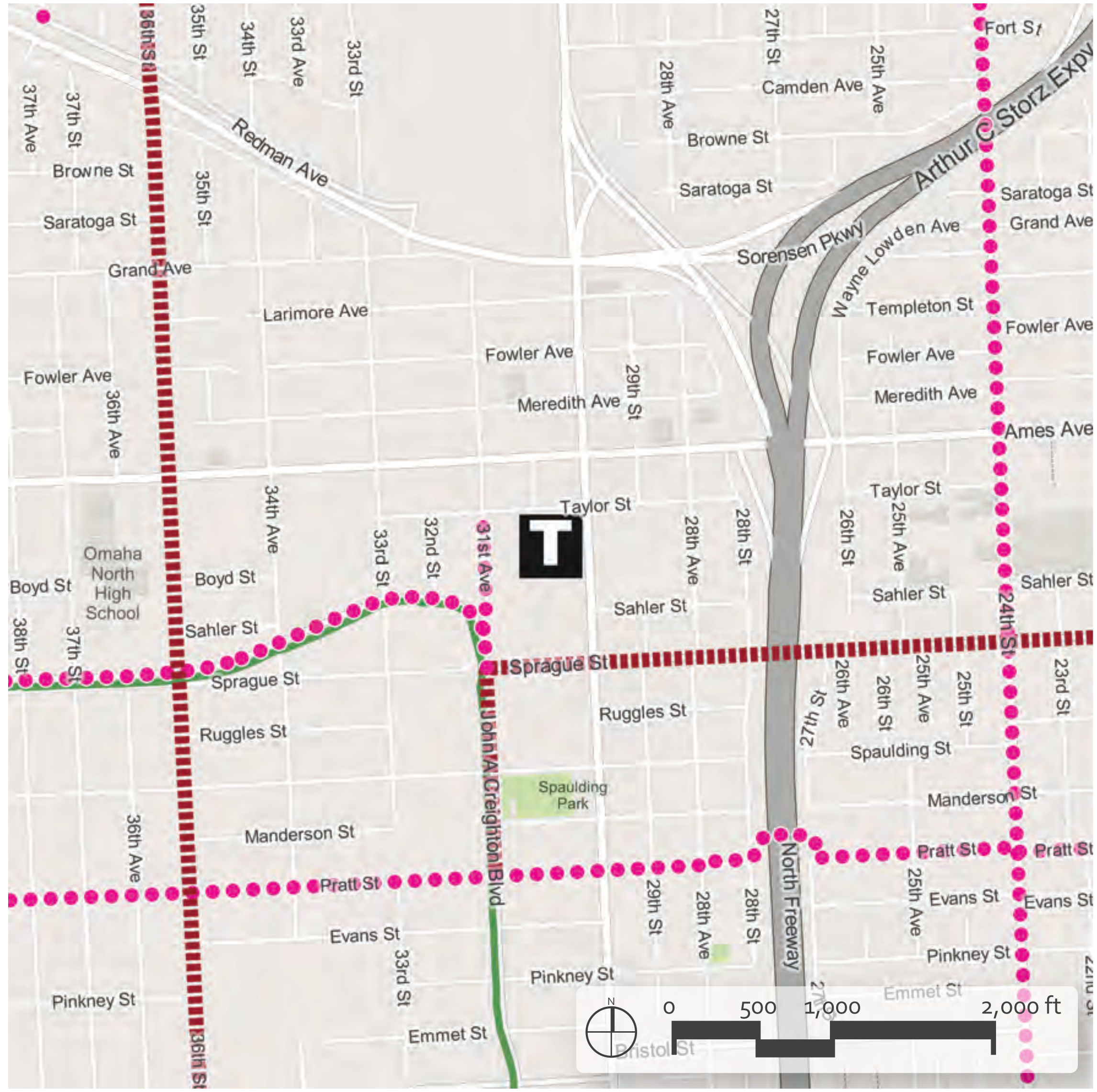
Existing
- Bike lane
- Path/Trail

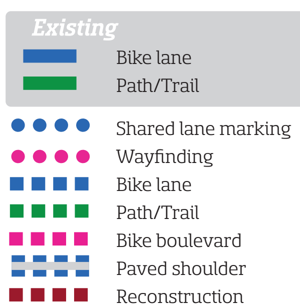
- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

North Omaha Transit Center

The North Omaha Transit Center is located just south of Ames Avenue and between N 30th Street and N 31st Avenue. The transit is almost directly served by a side path along John A Creighton Boulevard, although the path itself is not constructed to current standards and may have some maintenance issues.

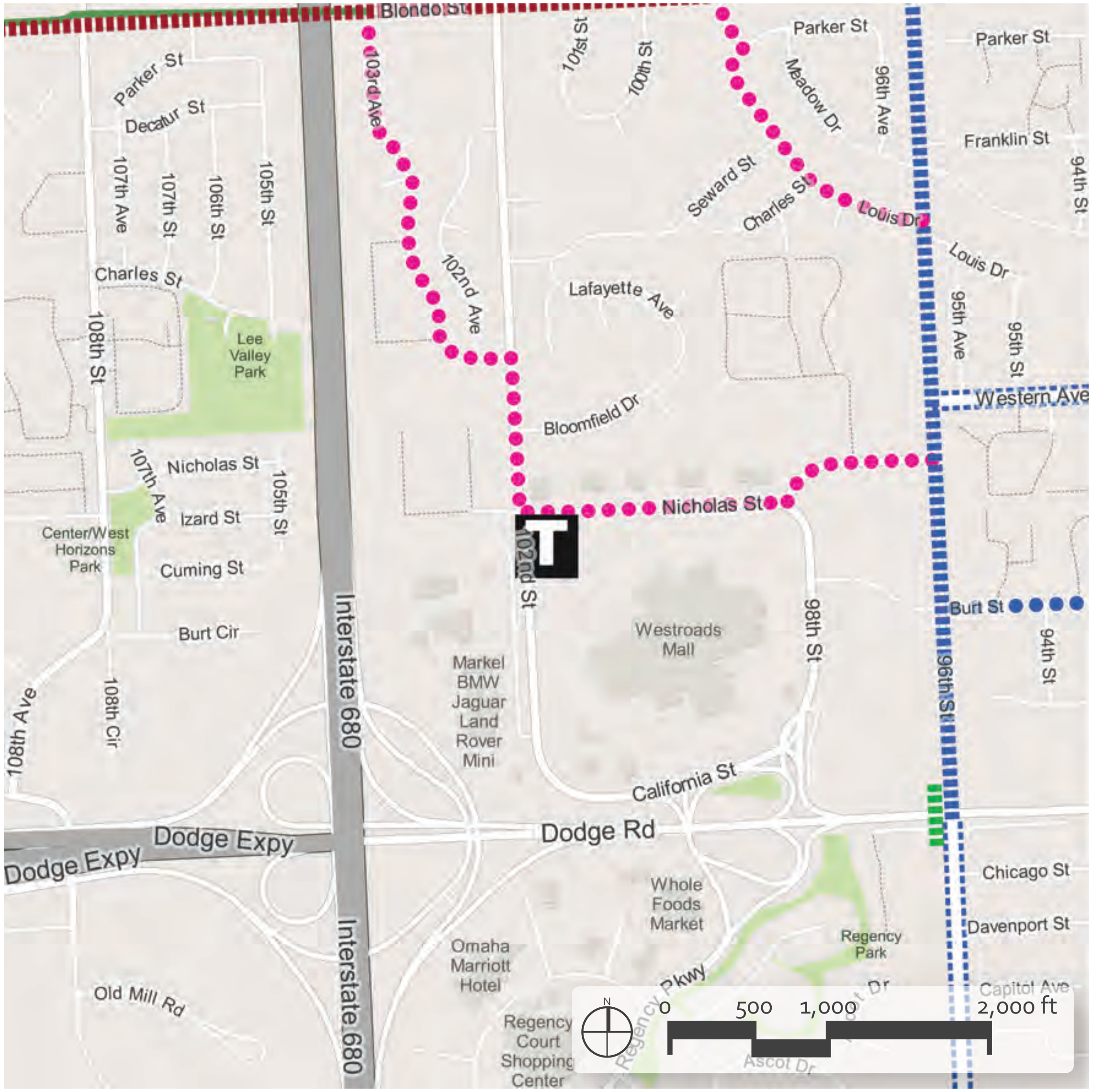
Wayfinding is recommended to direct users north on 31st Avenue to Taylor Street where the bus platforms are located.





Westroads Transit Center

The Westroads Transit Center is located in the northeast corner of the Westroads Mall parking lot. The North 96th Street/99th Street Connector passes nearby, as does the Omaha North Central Connector. Connections to both corridors are recommended via wayfinding that directs cyclists on Nicholas Street, 102nd Street, and 103rd Avenue.



Existing
- Bike lane
- Path/Trail

- Shared lane marking
- Wayfinding
- Bike lane
- Path/Trail
- Bike boulevard
- Paved shoulder
- Reconstruction

6 Implementation

Introduction

The bicycle and pedestrian facility recommendations described in this plan will make the Omaha metro area a much improved area for bicycling and walking. While improving bicycling and walking is a clear priority, implementation of these recommendations will necessarily occur over time commensurate with available resources. The purpose of this chapter is threefold:

- Provide direction on the phasing and priority setting of projects;
- Establish general project costs and identify funding strategies; and
- Provide other implementation strategies that have had success elsewhere and appear to be viable for Omaha metro area communities.

The recommended approach to expanding the region's bicycle network considered what was realistic given historic and anticipated funding, while also providing the jurisdictions with flexibility to respond to changing conditions and opportunities that may arise.

Corridors and Parallel Routes

The bicycle facility recommendations made in this plan are intended to be implemented over the next 20 to 30 years by taking advantage of street reconstruction and resurfacing projects whenever possible. A unique aspect of this plan was the identification of a series of specific corridors to consider accommodations in a more intense manner. However, it became clear during the development of this plan that more immediate short term efforts were critical to setting the plan in action.

This called for two modifications: additional corridors were added and parallel streets – most often low volume and low speed neighborhood streets – were considered as options. An extensive series of parallel streets were studied and field visited. A subset of these streets is recommended as a bicycle parallel network. Most of the arterial streets in the identified corridors were deemed too difficult to effectuate short term bicycle improvements. Almost all of the recommendations for those arterials became long term recommendations to be acted upon when the streets are reconstructed, resurfaced, or newly surfaced. In a similar fashion, pedestrian facilities, including sidewalks, should be included on streets that are built new or reconstructed.

This section provides an overview of steps to implement the corridor and the parallel bikeways as well as an overview of costs and funding opportunities. During this period of implementation some bikeways and walkways will be built that do not directly connect to other facilities or obvious destinations – this is a necessary effect of incremental implementation. This is especially true when including bikeways on major arterial streets where providing space for bikeways is pursued in an entirely opportunistic fashion – when the major streets are reconstructed.

It is important not to judge the performance and utility of these isolated bikeways until they are connected to the larger system. As more and more bikeways are installed, the network will gradually fill out, and a complete, well-connected bikeway system will form. This is also the way the performance of the entire metro bikeway system should be judged – it will take time before system connections are made and bicyclists are able to make more frequent and longer trips on a well-connected bikeway network.

Two Parts to Project Implementation

There are two main ways that bicycle and pedestrian projects are developed. This plan advocates for a combination of these two approaches.

First, bicycle and pedestrian facilities should be folded into larger street projects. There is no better or more economical way to build bicycle and pedestrian facilities than to capitalize on including them on major street projects.

Cost advantages for the bicycle and pedestrian facilities as part of larger projects are realized since fixed costs for the entire project stay the same while the overall project grows in relatively small ways due to the inclusion of bicycle and pedestrian facilities. Also, direct costs associated with the project construction are often lessened since economies of scale are at work as projects are expanded to include bicycle and pedestrian facilities. Project types falling within this category include sidewalks, bicycle lanes, paved shoulders, and even paths when they are integrated with larger street projects.

The other major means of building bicycle and pedestrian projects is through the construction of facilities built as independent projects. These projects are often referred to as "free standing" since they are not tied to other larger street projects. When this happens, implementation can occur independent of street or other public works projects. These projects often include path projects built within their own corridor or bicycle/pedestrian bridge projects. They also include restriping projects when bicycle lanes are added to existing streets without any construction. Bicycle route wayfinding is a major recommendation of this plan and is also considered a free standing project type.

This two pronged approach applies to the implementation of this plan in the following way. Major arterials identified within the corridors that do not adequately accommodate bicyclists currently are recommended to include bikeways and walkways when they are staged for reconstruction or resurfacing. These bicycle and pedestrian accommodations should be included and funded with the same source of funding as the major street project.

Independent bikeways (and some walkways included as trails) are identified for the purposes of this plan as short and medium term projects for consideration of funding.

Street Design

All new streets constructed in the metro area should include appropriate pedestrian and bicycle facilities. This does not mean that every street will have bicycle lanes or a path. The vast majority of the street network is made up of local streets that can accommodate bicyclists and pedestrians without any change to the current design. However, busier streets, including most collectors and all arterials, will require changes to their design to allow for the inclusion of bicycle facilities.

Chapter 5 provides a general discussion on using appropriate street cross sections for major streets in the Omaha Metro Area; all of these cross sections include bicycle lanes or paved shoulders, and in some cases, a path. The reconstruction of streets offers an excellent opportunity to incorporate bicycle and pedestrian facilities, but there may be limitations due to how constrained the street and right-of-way are. Those are discussed in more detail below.

Timeframe for Implementation

The implementation of the metro area bicycle and pedestrian plan will occur over an extended period of time. Many of the plan's recommendations are intended for quick action such as the bicycle wayfinding routes, while implementation of other parts of the plan will extend over a longer period. This is especially true for recommendations related to arterial streets in many of the plan's identified corridors.

There are many reasons for this incremental approach, including:

- **Constrained Right of Way and Street Opportunities:** Many streets, particularly the main arterials within each identified corridor of this plan have narrow or standard width lanes. Very few of these streets have wide outside lanes or paved shoulders that would make adding bike lanes feasible. Furthermore, most arterials have very narrow widths beyond the curb lines (toward the sidewalks) making the potential to add bicycle facilities such as bike lanes difficult even if street widening is considered. To further complicate the prospects for inclusion of bikeways, many existing streets in the Omaha Metro Area have highly constrained right-of-way conditions that will make the expansion of the street's footprint extremely difficult without the purchase of real estate, even with a full street reconstruction.
- **Arterials in Newly Developing Areas:** Sections of many of the key corridors, especially the arterial streets in western Omaha/Douglas County and southern Sarpy County, will ultimately be reconstructed to a completely different cross-section than exists today. Most of these are two or three lane streets which will be rebuilt in the next several decades. Also, many of these streets are unpaved today. Bikeways should be included when the streets are reconstructed, which may

not occur for a considerable time, perhaps not even within the timeframe of this plan. Interim measures can be taken, but to significantly improve bicycle conditions will likely be prohibitively expensive for some projects when considering what might be a relatively short lifespan of the facilities.

- **Funding:** One of the main implementation strategies of this plan is to develop and fund projects in an incremental manner to take advantage of opportunities. Costs for bicycle and pedestrian facilities are relatively minor if they incorporated into a larger street reconstruction or paving projects.
- **Advisory Plan:** The recommendations made in this plan, although sound, are not required of municipalities within the metro area. Communities will be asked to approve the plan, but compliance with the plan may take some time.

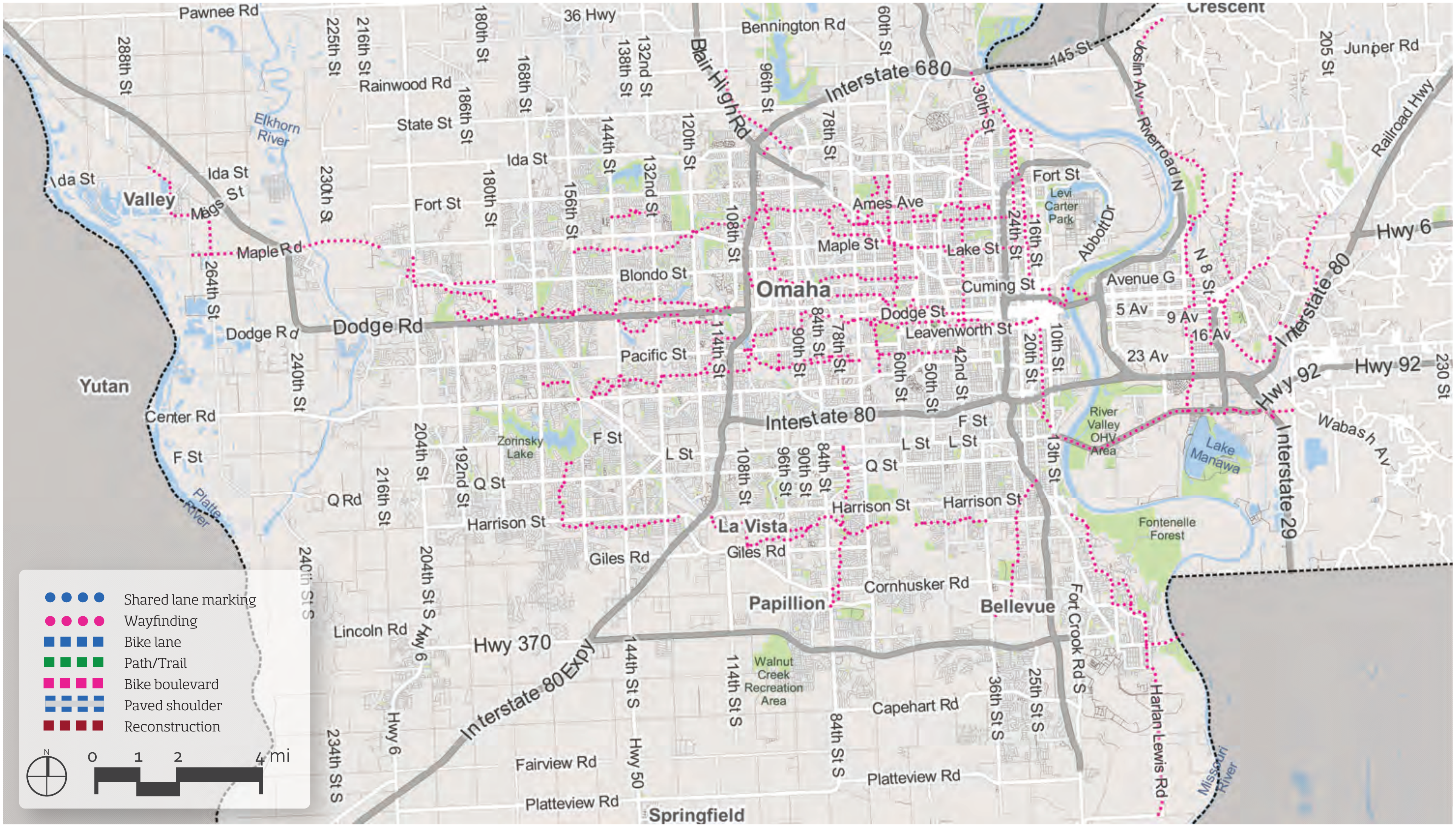
Given these constraints, this section describes approaches to implementing the corridor plan in a coordinated and incremental manner. While some bicycle and pedestrian facilities may not be developed for years, or even decades, the approaches below are structured in way that a bicycle network in the near term can be provided.

Cost Estimates

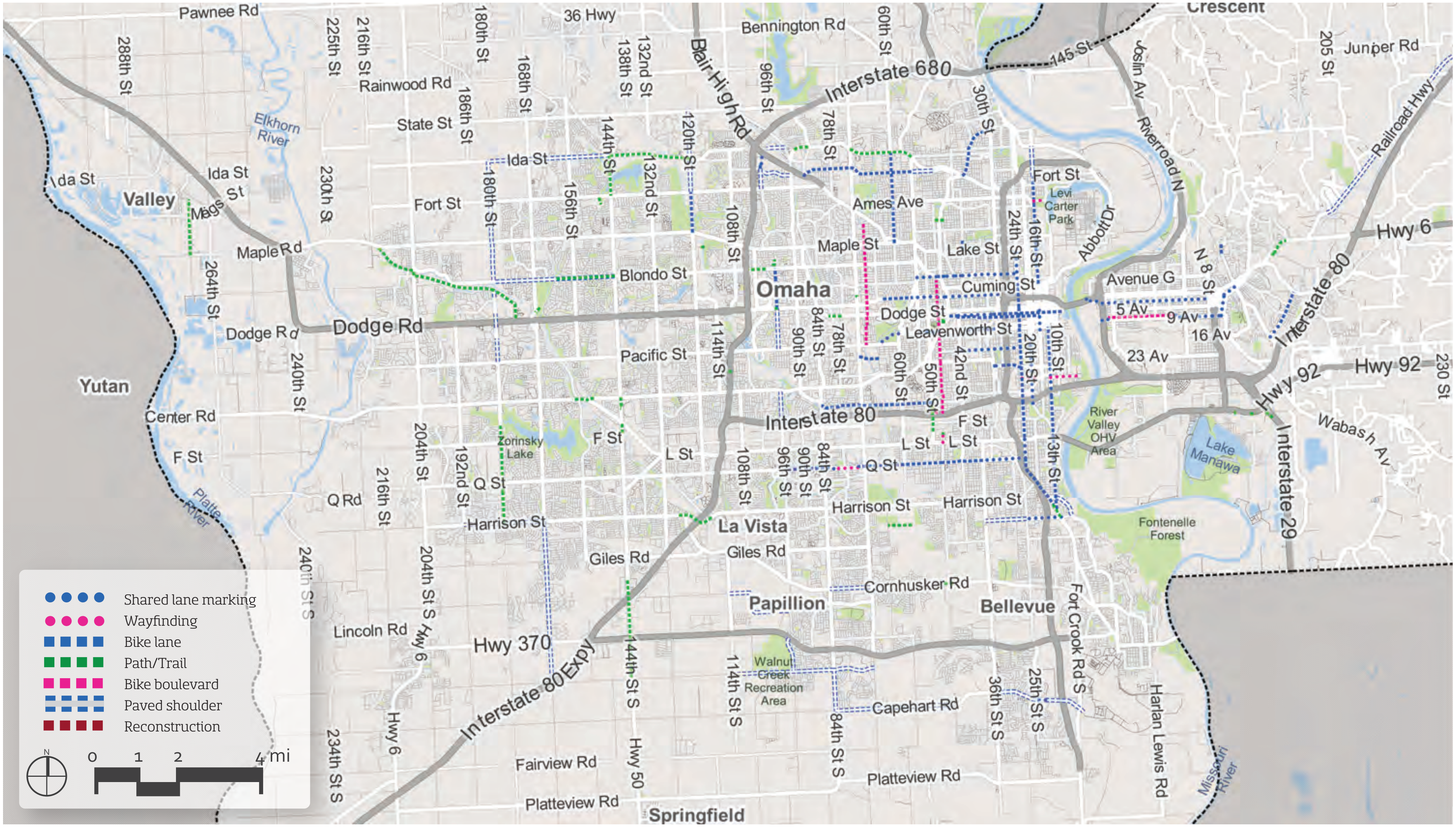
Estimating costs for projects is one of the most difficult tasks involved in developing a plan. Providing cost estimates is considered more important for a municipal bicycle and pedestrian plan where firm budgets can be established for projects. However, general cost estimates are still considered valuable for a metro area plan with multiple jurisdictions to permit comparisons and to aid in project prioritization. There are several significant challenges in estimating costs for this plan:

- **Comprehensive cost estimating is difficult at this stage.** Although some project cost data is available through local and state sources, gathering and assessing all of the factors that might impact the cost of the pedestrian facilities and bikeways as part of projects is still difficult. In many cases, the actual conditions affecting the cost of projects are often not known until preliminary engineering work is done.
- **Determining the true marginal cost of adding bicycle facilities**. In some cases, determining the marginal cost of bicycle facilities is straight forward, like adding in costs for marking bicycle lanes. In other cases, it becomes much more complex. For instance, the costs for adding paved shoulders or bike lanes to many streets in the newly developing parts of the metro area (a recommendation for many corridors on the west and south sides of the metro area) where adequate shoulder width already exists or would otherwise be added as part of the larger project would have a very low marginal cost attributable to bikeways. Conversely, adding bikeways to a project that does not already have sufficient roadway width for adequate accommodations is considerably more expensive.
- **Multiple benefits.** Accurately attributing costs and benefits to the bicycle or pedestrian parts of a project when bicycle accommodations benefit other users is nearly impossible. Cost/benefit studies have conclusively shown that motorist, transit users, and pedestrians benefit when bicycle lanes or paved shoulders are added to a project, but there is no formula available to help parse the costs and benefits and attribute them to each mode of travel.
- **Project staging uncertainty.** Many of the arterial streets in the newly developing areas of the Heartland metro area are in need of bicycle lanes or paved shoulders. Most of these streets are rural cross-sections (do not have curb and gutter) and have shoulder sections where paving over them might be feasible and cost effective if that was the next stage in the street's development cycle. However, in many cases the street will not see a major street reconstruction until the ultimate cross-section with curb and gutter is built, resulting in far different bicycle and pedestrian facility costs. Not knowing the project type or timing for the next stage of many of the developing arterials makes it difficult to estimate costs or to place costs in an accurate timeframe.

Map 9 | Short-Term Recommendations



Map 10 | Medium-Term Recommendations



Map 11 | Long-Term Recommendations

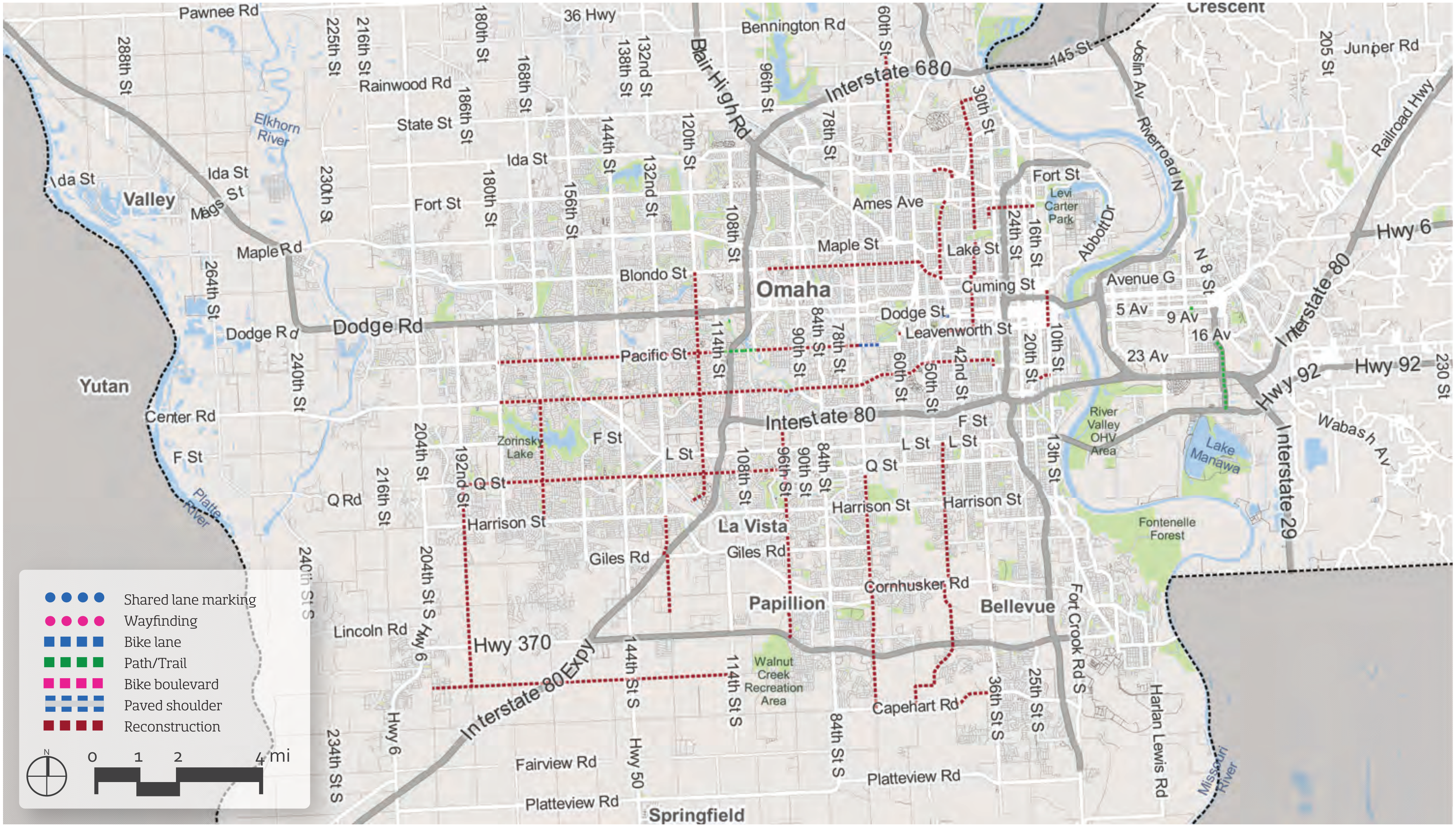


Table 5 provides a general range of estimated costs for bicycle facility implementation in the Omaha metro area. In order to provide broad cost estimates for each corridor, a cost point within the range was selected for estimating purposes. These cost estimates are based on national averages, but were adjusted where necessary using the Nebraska Department of Roads average unit price summaries. These are considered "planning-level" estimates since they are not based on actual project-by-project conditions.

Table 5: Planning level costs by facility type

Project Type	Cost Estimate per Mile
Signed Routes	
1. Signed Route	$4,000 - $10,000
2. Priority Shared Lane	$10,000 - $30,000
Bike Lanes	
3. Bike Lane without lane restriping (paint to thermoplastic)	$12,000 - $35,000
4. Bike Lane with travel lane restriping	$20,000 - $35,000
5. Bike Lane with lane travel restriping and new center turn lane	$50,000 - $70,000
6. Bike Lane or paved shoulder over existing shoulder (asphalt)	$90,000 - $120,000
7. Bike Lane with roadway widening needed (as part of street reconstruction project)	$250,000 - $400,000
Buffered Bike Lanes	
8. Buffered Bike Lane without lane restriping	$45,000 - $90,000
Neighborhood Greenway	
9. Low End (Striping & Signing)	$23,000
10. High End (Includes Traffic Calming Measures)	$300,000
Trail/Path	
11. New Trail/Path Segment	$200,000 - $400,000

Toole Design Group costs adjusted based on Nebraska Department of Roads 2013 Average Unit Price Summaries

Table 6 applies the per mile costs to the bikeway recommendations made for the 28 corridors. The costs are focused almost entirely on the main arterial within the corridor, however, in a few cases the cost of parallel facilities were also included if the recommendation was considered important to the function of the corridor for bicycling. There were numerous segments of arterials where the opportunity to include bikeways is unlikely to arise because of constrained environments. In these cases, bikeways will not be provided at the time of reconstruction or the existing street space will be divided up differently to incorporate bikeways. When space can be found to add bikeways within the existing street, the costs for the bicycle accommodations will be very small. This explains why certain streets within each corridor have such a low cost associated with them largely related to restriping.

Table 6: Planning level costs by corridor

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
1. Harney	• 3 miles of Cycle Track @ $300,000 • Emile Street Connection $1,000,000	$1,900,000	Cycle track and Emile connection
2. Council Bluffs Connector	• 7.5 miles of route signage @ $4,700 • 5 miles of shared lane markings @ $17,400 • 1.3 mile of path @ $223,000 • 2 miles of paved shoulder @ $109,000 • 0.5 of marked bike lane @ $12,000	$636,150	Kanesville Path and 2nd Avenue bikeway
3. Omaha South Central Connector	• 1 mile of paved shoulder @ $300,000 • 0.5 mile of bicycle climbing lane estimated @ $400,000 total • 0.5 mile of SLM @ $17,500 • 6.5 miles of resurfacing/reconstruction @ $58,000 • 1 mile of sidepath @ $223,000 • Shirley overpass @ $2.5 million	$3,608,750	Raised bicycle climbing lane, Pine Street bike lanes

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
4. Omaha North Central Connector	• 3 miles of paved shoulder @ $300,000 • 1.3 mile of bike lane @ 300,000 • 2.7 mile of resurfacing/reconstruction @ 58,000 • 1.8 mile of bike lane marking or shared lane markings @ $22,500 • Burt Street Overpass of the Keystone @ $1.5 million	$2,987,100	Burt Overpass, Path connection at Burt and 72nd, Underwood bike lanes
5. Omaha Northwest Connector	• 2 miles of paved shoulder @ $300,000 • 2.3 miles of path @ $223,000 (120th to 144th) • 1 mile of paved shoulder for one side of street @ $97,000 (or $48,500) • 1.7 mile of buffered bike lane @ $43,200 • 0.25 mile of raised bike lane/sidewalk on Blair @ $110,000	$1,982,340	
6. 24th/Fort Crook Connector	• South of Dodge: • 0.8 mile of bike lane markings @ 43,000 • 0.5 mile of two-way cycle track @ 200,000 • 3 mile of bike lane through road diet @at 58,000 • 1.5 mile of buffered bike lanes @ 43,000 • North of Dodge: • 6 miles of parking lane markings and shared lane markings, some signs @ $11,900	$444,300	Bike lanes from Lake to Chandler

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
7. Sarpy Mid-North Connector	• 1.5 mile of paved shoulder @ $300,000 • 1 mile of bike lane marking @ $11,900	$461,900	
8. Sarpy Central Connector	• 8 miles of paved shoulder @ $300,000 • 1 mile of signs • 6 miles of paved shoulder to be added beyond the timeframe of the plan	$2,404,700	
9. 96th Street Connector South	• 0.5 mile of paved shoulder @ $300,000 • 3.5 miles of reconstruction or resurfacing (lane diet cost of 58,000) • 0.75 mile of paved shoulder @ $300,000	$578,000	
10. 144th Street Connector	• 4 miles of path @ $223,000	$892,000	
11. Metro West Connector	• 9.5 miles of paved shoulders @ $300,000 • 3 miles of path @ $223,000 • 2 miles of path widening @ $112,00 • 5 miles of paved shoulder expected to be added beyond timeframe of plan	$3,743,000	
12. Omaha Southwest Connector	• 8 miles of road reconstruction @ $58,000 • 1 mile of paved shoulder @ $300,000	$764,000	
13. Lincoln Highway Connector	• 11.5 miles of bicycle route @ $4,700	$54,050	
14. Council Bluffs Mid-South Connector	• 4 miles of bike route and shared lane markings @ $22,100	$88,400	
15. Highland Connector	• 3 miles of bike route @ $4,700	$14,100	

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
16. 96th Street Connector (north)	• 6 miles of bicycle route signing @ $4,700 • 0.5 mile of paved shoulder @ $300,000 • 1 mile of reconstruction/resurfacing @ $58,000 • Overpass of Dodge @ $2,000,000	$2,236,200	Overpass
17. 120th Street Connector	• 5.5 reconstruction/resurfacing @ $58,000	$319,000	
18. 72nd Street Connector	• 1 mile of paved shoulder @ $300,000 • 4 miles of reconstruction/resurfacing @ $58,000	$532,000	
19. 13th Street Connector	• 3 miles of remarking on 13th south of 275 @ $58,000	$174,000	
20. Midtown-North Omaha Connector	• 7.5 miles of wayfinding signs	$35,250	
21. 60th Street Connector	• 2.5 mile 4 to 3 lane conversion @ $58,000 • 1.75 miles of route signage @ $4,700 • 2 miles of paved shoulder to be added beyond timeframe of plan	$153,225	
22. Council Bluffs East Connector	• 11 miles of wayfinding signs	$51,700	

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
23. Center-Grover Connector	• 2,000 feet of paved shoulder – one side • 10.5 miles of reconstruction/resurfacing @ $58,000 • 1 mile of road diet parking consolidation • Climbing lane (Creighton – Martha) @ $25,000 • 0.25 mile of bike lane – Creighton Underpass @ $22,100	$696,343	
24. Omaha Mid-North Connector	• 12 miles of route @ $4,700		
25. Midtown North-South Crosstown Connector (48th)	• North of I-80 • 6 miles of wayfinding/bike boulevard @ $4,700 • 0.4 mile of bike lanes under I-80 @ $300,000 • South of I-80 • 1 mile of paved shoulder @ $300,000 • 2.5 miles @ $300,000 • 2 miles of reconstruction/resurfacing @ $58,000	$56,400	
26. Sarpy North Connector	• 5 miles of bike route @ $4,700 • Bridge @ $1,750,000 • 0.25 mile path @ $232,000 • 0.5 mile reconstruct/resurfacing @ $58,000	$1,314,200	

Corridor	Recommended Bikeway Treatment and Cost/Mile	Planning Level Cost	Short/Moderate Term Project
27. Pottawattamie Southeast Connector	• Path on bridge deck over tracks @ $1,750,000 • 0.6 mile path along 92 and along r/w of I-29 on-ramp to path @ $464,000	$1,860,500	Bridge
28. Douglas West Connector	• 5.5 miles of bicycle route wayfinding • 0.2 mile of path @ $223,000	$2,028,000	
Parallel Network of Routes	• Wayfinding bicycle routes signs • 57 miles @ $4,700	$70,450	
TOTAL		$30,353,958	

Prioritization Process

A key part of this plan and implementation chapter is a prioritized list of projects in key corridors. The prioritization methodology used for the plan is based on the 10-Step Method for Prioritizing Pedestrian and Bicycle Improvement Locations Along Existing Roads developed through Project 07-17 of the National Cooperative Highway Research Program (NCHRP) of the Transportation Research Board (TRB). The 10-Step Method is the result of findings from a national survey, literature review, and agency interviews. Final approval from NCHRP is still pending, but no changes are expected.

The adopted methodology from the study is designed to reflect the needs established by an advisory committee or a group of some standing. Each project is scored based on criteria and weighting to be determined by the committee, in accordance with the vision and goals established for the plan. The scoring uses a combination of selected factors and variables. Factors are categories used in the prioritization process to express community/agency values and group variables with similar characteristics. Variables are characteristics of roadways, households, neighborhood areas, and other features that can be measured. For this plan, the plan steering committee and group of stakeholders provided input on the factors and the weight given to each factor.

The list of projects included in the prioritization model was developed after extensive field work which identified opportunities and needs based on existing conditions. These projects are listed in Table 7 along with their scores. In addition to the projects listed here, the plan has dozens of additional recommendations that are either more general in nature or represent longer-range priorities. This includes facilities that are expected to be included in street projects when the street is completely reconstructed.

The project ranking is based on four factors: Constraints, Demand, Connectivity, and Equity.

- **Constraints** represents potential limiting factors related to a project and includes information about available right-of-way and costs.
- **Demand** indicates how likely a facility is to be used by bicyclists. This includes information about population and employment near the project, as well as specific trip attractors like bike share stations, parks, and schools.
- **Connectivity** captures the degree to which improvements along a given corridor might enhance Omaha's bicycle network by connecting to existing bicycle facilities or planned projects.
- **Equity** considers whether an improvement addresses the needs of any disadvantaged population. This is represented by a project's location relative to areas of low-income population, neighborhoods where car ownership is relatively low, or areas with above-average numbers of persons over the age of 65.

The final project ranking is influenced by the weights assigned to each factor by the steering committee and project team. Weights are numbers used to indicate the relative importance of factors. A complete list of factors, factor weights, variables, and data sources used is provided in Appendix C. Table 7 identifies the overall prioritization score assigned to each project in ranked order.

Table 7: Project prioritization scores

Project Information	Estimated Cost*	Score	Rank
Harney Street – two-way cycle track for 20 blocks	$1,000,000	239.2	1
24th Street –Bike lanes from Leavenworth to South Omaha and South Omaha to Chandler	$1,000,000	228.6	2
Underwood – from Happy Hollow to Fair Acres – Bike lanes and shared lane markings	$200,000	201.8	3
69th – from Manderson to Pacific – neighborhood greenway including traffic calming and 150' of oversizing of sidewalk on Dodge, countdown signals at Dodge	$800,000	201.8	4
Leavenworth – raised bicycle lane in uphill direction from 300' west of Saddle Creek to 55th and shared lane markings	$400,000	197.4	5
2nd Avenue neighborhood greenway – 2 miles of assorted traffic calming devices	$1,500,000	197.1	6
Emily Street Extension – 1,000 to 2,000' of path from Saddle Creek to 48th and Howard	$500,000	195.6	7
24th Street – Bike lanes and shared lane marking from Dodge to Lake	$150,000	193.2	8
Path - south side of Dodge between 81st and 76th	$100,000	186.2	9
Bike lane markings on Pine	$100,000	175.2	109
Oversize sidewalk from Dodge overpass at Memorial park overpass to 62nd Street	$100,000	175.0	1110
60th Street bike lanes	$150,000	173.1	1211
Side path connection from Big Papio Trail to Regency Pkwy on north side of Pacific	$100,000	166.2	13
Harrison - Side path from Brookridge to 118th	$150,000	159.7	14
Big Papio connections to Dodge Frontage Roads	$100,000	157.3	15
Aspen Park Overpass and 2,000' of path	$1,750,000	149.0	16
96th Street Overpass	$2,000,000	133.3	17
Center interchange Crossing – 108th to 114th	$0	120.0	18
Parkview and Brentwood wayfinding and shared lane markings	$175,000	119.9	19
Burt Overpass	$1,500,000	119.3	20
Path connection – at 72nd and Burt	$100,000	116.3	21

*N.B. Costs are included as part of the prioritization scoring. They are shown here for reference, but their relative impact on prioritization is already accounted for in the prioritization score.

Funding

Federal Funding Administered by State Agencies

Using federal funds for the implementation of bicycle and pedestrian projects is quite common in the Omaha metro area. MAPA is involved in the selection and administration process for several of the federal programs. The primary Federal Transportation funding programs for bicycling and walking were consolidated under the MAP-21 legislation of 2012. The Transportation Enhancements, Safe Routes to School and National Recreational Trails programs were combined into the Transportation Alternatives Program (TAP). Funding levels were reduced over previous years, and some changes were made in project eligibility. Greater authority was given to Metropolitan Planning Organizations such as MAPA regarding project selection. Table 8 provides a summary of the types of bikeway projects that would be eligible for a wide range of Federal Transportation funding programs.

Programs that remain unchanged by MAP-21 are also included below. Most of these programs are under a larger Surface Transportation Program known as STP with allocations to sub-programs.

- The **Surface Transportation Urban Program** provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. These funds may be used for either the construction of bicycle transportation facilities, or non-construction projects such as maps, brochures, and public service announcements related to safe bicycle use. These funds can be used in two ways. The most common way is for including bicycle and pedestrian facilities when larger street projects are funded. MPOs who have been at the forefront of supporting bicycling and walking make it nearly impossible to fund street projects through this program without including bicycle and pedestrian facilities. Although STP Urban funds are seldom used for standalone or independent bicycle projects, this is still an excellent source of funding for hard-to-finance bikeway projects. Up to 80% of project costs can be covered by STP Urban funds. MAPA administers these funds for the Omaha Metro Area.
- The **Transportation Alternatives (TAP)** program will provide the best opportunity for federal funding of independent bicycle and pedestrian projects in the Omaha metro area. Projects that exceed a significant minimum amount are the best fit for this program since a considerable amount of administrative work is involved. As indicated above, this is a new program which combines former programs. New for MAPA is the selection of projects since they are a federally designated Transportation Management Agency. The first round of TAP funding was completed without any bicycle and pedestrian projects selected. MAPA will consider projects identified through this plan for potential funding (projects still need to be sponsored by area communities). MAPA receives roughly $1,000,000 annually of the state's $6 million allocation of CMAQ funds. The next round of funding for statewide funds is anticipated for spring 2015.
- Ten percent of each State's annual Surface Transportation Program funds is set aside for the **Highway Safety Improvement Program and Railway-Highway Crossing Program**, which addresses bicycle and pedestrian safety at hazardous locations. These funds can be used for bicycle safety projects, but are rarely used for that purpose in Nebraska. The exception is the use of the funds for several projects involving pedestrian count-down signals.
- Funds from the **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** may be used to construct bicycle facilities, pedestrian walkways, or non-construction projects such as maps, brochures, and public service announcements related to safe bicycle use. Funds in Nebraska have not been used for bicycle and pedestrian projects, but that is likely to change. In general, State departments of transportation are not required to sub-allocate funds to Transportation Management Areas run by MPOs (MAPA), but they are encouraged to consult affected TMAs to determine regional priorities. MAPA has discussed with NDOR the possible allocation of funding and it is likely that MAPA will secure approximately

$1,000,000 of annual funding for regionally significant projects. Awarded projects can include bicycle and pedestrian facilities.

- Funds from the **Recreational Trails Program (RTP)** may be used for all kinds of trail projects. This is the only federal transportation funding source that can be used for maintenance activities and motorized trail use. The Recreational Trails Program (RTP) grant fund is administered by the Nebraska Game and Parks Commission and a few smaller trail projects have been funded in the Omaha metro area.
- The **Highway Safety Grant Program (Section 402)** is administered by NDOR. Federal 402 funds can be used for pedestrian and bicycle public information and education programs. Funds are distributed to states annually from the National Highway Traffic Safety Administration (NHTSA) according to a formula based on population and road mileage. Although government agencies or government-sponsored entities are eligible to apply for 402 funds, this has not been a priority for funding in Nebraska. Section 402 priorities for Nebraska include safety initiatives aimed at alcohol impaired driving, seat belt usage, and vehicle speeds.

Table 8 provides a list of Federal funding sources that may be available for bicycle and pedestrian projects in the Heartland Region. Additionally, Advocacy Advance provides an online Bicycle and Pedestrian Federal Funding Resources List with frequently undated links to each program:

http://www.advocacyadvance.org/site_images/content/Navigating_MAP-21_Workshop_Funding_Profile_NDOR2013.pdf

Table 8: Potential Federal funding sources for bicycle projects

Activity	FTA	ATI	CMAQ	HSIP	NHPP/NHS	STP	TAP/TE	RTP	SRTS*	PLAN	402	FLH	BYW**	TCSP**
Access enhancements to public transportation	•	•	•			•	•					•		•
Bicycle and/or pedestrian plans	•					•				•		•		•
Bicycle lanes on road	•	•	•	•	•	•	•		•			•	•	•
Bicycle parking	•	•	•			•	•		•			•	•	•
Bike racks on transit	•	•	•			•	•					•		•
Bicycle share (capital/equipment; not operations)	•	•	•		•	•	•					•		•
Bicycle storage or service centers	•	•	•			•	•							•
Bridges / overcrossings	•	•	•	•	•	•	•	•	•			•	•	•
Bus shelters	•	•				•	•					•		•
Coordinator positions (State or local)			•			•	^		•					
Crosswalks (new or retrofit)	•	•	•	•	•	•	•	•	•			•	•	•
Curb cuts and ramps	•	•	•	•	•	•	•	•	•			•	•	•
Helmet promotion						•	^		•		•			
Historic preservation (bike, ped, transit facilities)	•	•				•	•					•		•
Land/streetscaping (bike/ped route; transit access)	•	•				•	•					•		•
Maps (for bicyclists and/or pedestrians)	•	•	•			•	^		•		•		•	•
Paved shoulders			•	•	•	•	•		•			•	•	•
Police patrols						^	^		•		•			
Recreational trails						•	•	•				•		•
Safety brochures, books						^	^		•		•			
Safety education positions						^	^		•		•			
Shared use paths / transportation trails	•	•	•	•	•	•	•	•	•			•	•	•
Sidewalks (new or retrofit)	•	•	•	•	•	•	•	•	•			•	•	•
Signs / signals / signal improvements	•	•	•	•	•	•	•		•			•		•

Activity	FTA	ATI	CMAQ	HSIP	NHPP/NHS	STP	TAP/TE	RTP	SRTS*	PLAN	402	FLH	BYW**	TCSP**
Signed bicycle or pedestrian routes	•	•	•		•	•	•		•			•	•	•
Spot improvement programs	•		•	•		•	•	•	•					•
Traffic calming	•			•	•	•	•		•					•
Trail bridges			•	•	•	•	•	•	•			•	•	•
Trail/highway intersections			•	•	•	•	•	•	•			•	•	•
Training			•			•	•	•	•		•			•
Tunnels / undercrossings	•	•	•	•	•	•	•	•	•			•	•	•

• Until Expended ** Until Not Available ^As Safe Routes To School

Table 8 Key

FTA: Federal Transit Administration Capital Funds

ATI: Associated Transit Improvement

CMAQ: Congestion Mitigation and Air Quality Improvement Program

HSIP: Highway Safety Improvement Program

NHPP/NHS: National Highway Performance Program (National Highway System)

STP: Surface Transportation Program

TAP/TE: Transportation Alternatives Program / Transportation Enhancement Activities

RTP: Recreational Trails Program

SRTS: Safe Routes to School Program

PLAN: Statewide or Metropolitan Planning

402: State and Community Traffic Safety Program

FLH: Federal Lands Highway Program (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program)

BYW: National Scenic Byways Program

TCSP: Transportation, Community, and System Preservation Program

State Funding Sources

Currently, there are no state programs that fund bicycle projects, however, the state Department of Roads administers the federally funded programs cited above.

Local Funding Sources

Local funds will be needed to implement the recommendations of this report. One effective approach is to ensure that bicycle facilities be included as part of resurfacing, reconstruction, and construction projects. However, to set the plan in motion, higher priority projects need to be funded as independent projects. In order to do that, local funds will need to be used either on their own and/or as a match for federal funding.

Generally, the majority of the bikeway recommendations that are implemented as stand-alone projects will need to be funded through the general funds of the metro area's communities. This is particularly true of any simple and relatively inexpensive projects such as on-street markings. Projects that have a longer life than street markings (i.e. paths) may be able to be financed through general obligation debt in the same manner that many street or other infrastructure projects are financed.

There is one major and important source of trail funding at the regional level: the Papio-Missouri River Natural Resources District (NRD) provides funding for trails. Papio-Missouri River NRD is responsible for stormwater management in the district, but also has a recreation focus which does include trails at District facilities, as well as the connections to the District's facilities. Just 20% of their budget comes from local property taxes and another 25% from state and federal (with the remainder of their budget coming from bonds and income from Improvement Project Areas). A relatively minor amount of their budget is used for trail development, but it is still a major source of funding for the Heartland Region. For instance, over $3 million of the South Omaha Trail is funded through the District and the District maintains a moderate size Trails Assistance Program budgeted at $530,000 for 2015.

Toolbox

The list below is a short list of the most important tools for the implementation of this plan. Some of these tools are already in place in the metro area, but can be enhanced and supported in the future.

Street Cross Sections

When a new street is built or one is reconstructed, an ideal opportunity exists to incorporate bicycle and pedestrian accommodations. Only arterial and collector streets are likely to need additional space for bicyclists, but almost every street should have sidewalks on both sides. Adopting and following standard street cross sections intended to serve bicyclists and pedestrians will help ensure that facilities will be appropriately built for the long term for these modes of travel. When the only street designs engineers are consulting and using include bicycle and pedestrian accommodations, a community has reached a high level of "institutionalization" of these modes. When this approach is expanded to include accommodations across the board for all users – including transit users and people with disabilities, it is known as complete streets. Several communities in the MPO area have adopted complete streets policies. Just as important as considering and including accommodations for all users of a street, a complete streets approach will provide documentation on the reason(s) why accommodations have justifiably been left out of a project.

Road and Lane Diets

Another strategy consists of incorporating bicycle lanes within existing sections of streets through repurposing the space between the two curbs. In some cases this could involve a road diet where a travel lane is converted into two bicycle lanes most commonly by converting a 4-lane street to a 3-lane configuration with a center turn lane. In other situations, the number of lanes stays the same, but the lane widths are reduced enough to produce bicycle lanes. This lane diet approach has the greatest feasibility where wider lanes exist in the first place or enough space exists in the parking and the travel lanes to repurpose space to mark bicycle lanes. This strategy most often employs the use of 10 and 11 foot travel lanes and requires other considerations such as the presence of truck routes.

Mapping

The Omaha metro area has an excellent bicycle map which has been updated in November, 2014. The new map features topography, a welcome addition for an area that is very hilly. A bicycle map can provide much needed guidance for bicyclists and can be mated with a bicycle wayfinding scheme so information is on a map and signs are matching those same routes. This is currently done for several of the Bike Omaha routes with the Benson route being the longest. Bicyclists will want to know what conditions exist for them from a traffic comfort standpoint.

Tech Sheets

Similar to providing important information on street cross sections is the provision of bicycle and pedestrian facility technical sheets. Communities within the Omaha metro area should not have to wade through national sources for guidance. Appendix E includes 11 technical sheets covering everything from bicycle route wayfinding to bicycle lanes, to paving shoulders, to path design. MAPA can play a role in being the repository for technical information or provide guidance on where to find specific resources.

Workshops

Workshops are critical in getting the word out on the plan and the tools available to area communities for implementing the plan. Additionally, meetings, workshops, and conferences can be conducted that focus on special topics such as the design of facilities or new planning tools to be used in the region. It is important that bicycle and pedestrian topics stay fresh and at the forefront of transportation planning.

Approval of the Plan

MAPA has the responsibility of developing a bicycle and pedestrian element as part of their long range transportation plan. The agency has taken that a step further by developing a free standing bicycle and pedestrian plan. The plan gains traction by having communities and counties in the metro area approve the plan. As communities consider adoption, they learn of the recommendations and have a chance to consider incorporating recommended projects in their own plans and capital improvement programs.

Appendix A | Standard Cross Sections

The Omaha region encompasses a number of municipalities, each with responsibility for the construction and maintenance of streets within their jurisdiction. The cross sections provided in this appendix are intended to be a reference for the accommodation of pedestrian and bicycle facilities within common contexts throughout the region.

Figure 1: Five lanes with bike lanes and sidewalks, no parking

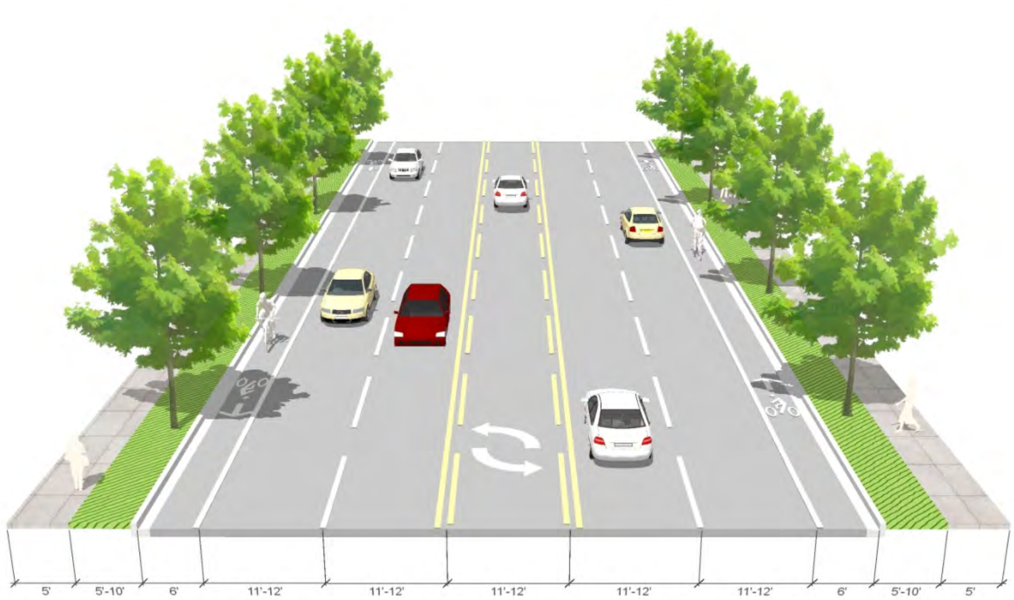


Figure 2: Four lanes with bike lanes and sidewalks, no parking

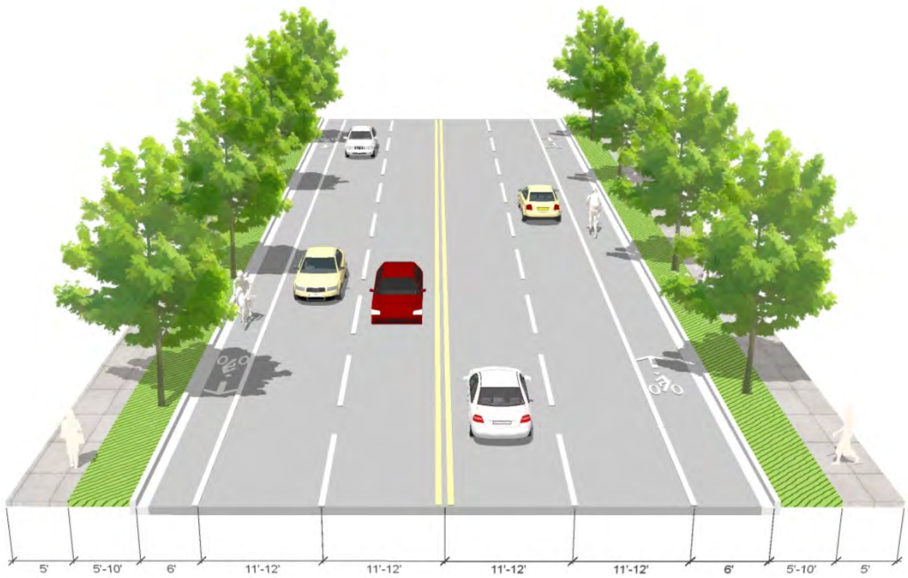


Figure 3: Three lanes with bike lanes and sidewalks, no parking

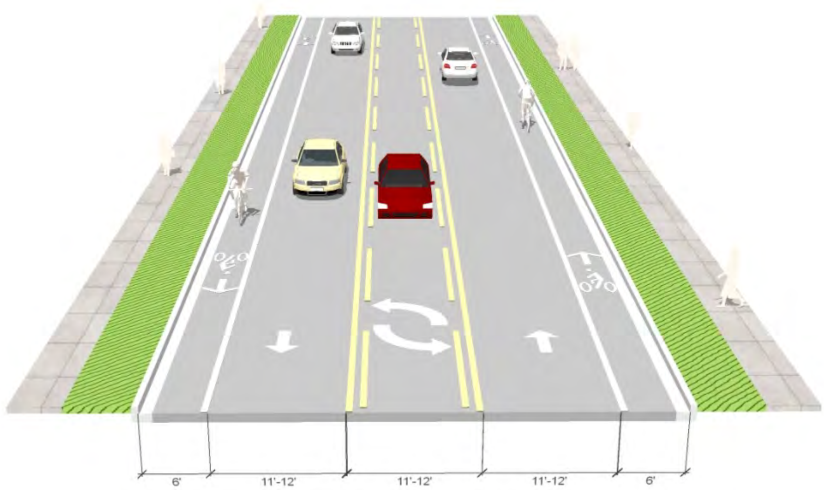


Figure 4: Three lanes with paved shoulders

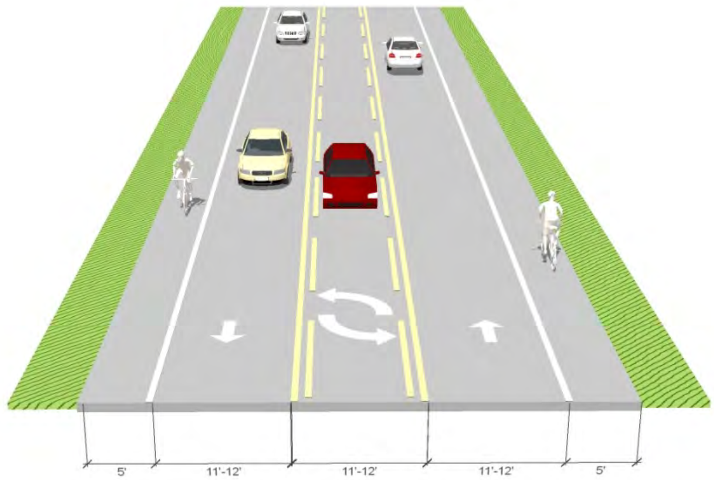


Figure 5: Two lanes with bike lanes and sidewalks, no parking

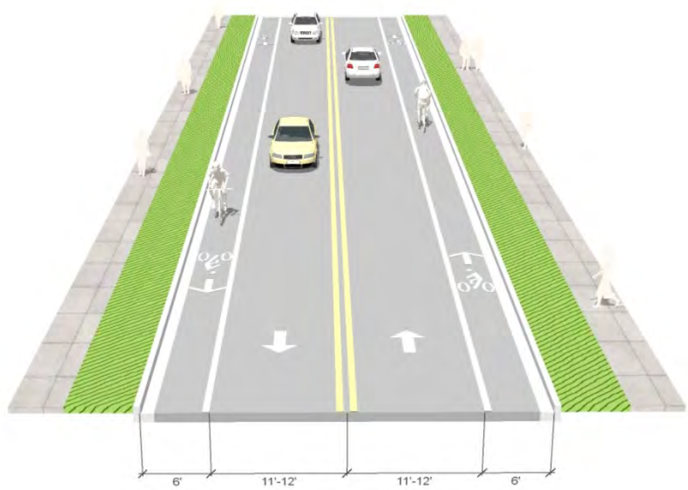


Figure 6: Two lanes with paved shoulders

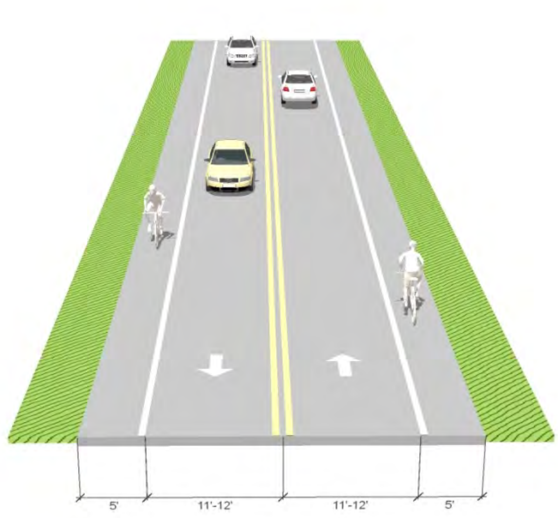


Figure 7: Two lanes with buffered bike lanes and sidewalks, no parking

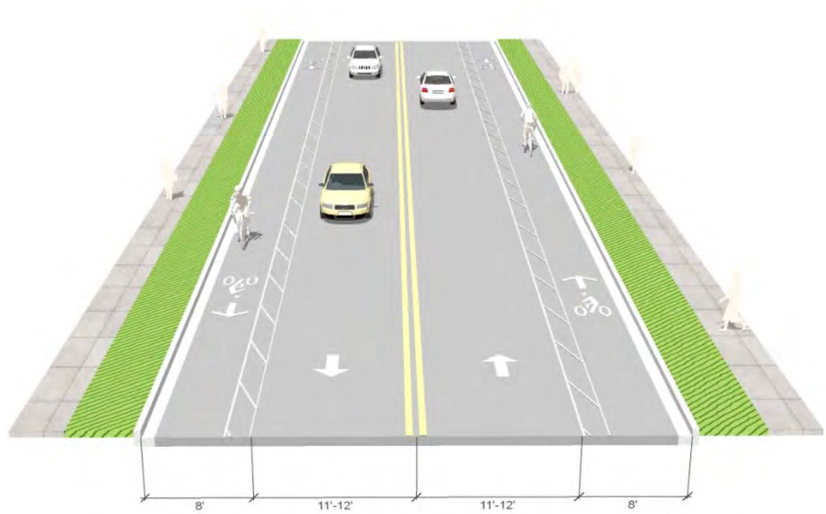


Figure 8Two lanes with bike lanes, sidewalks, and parking

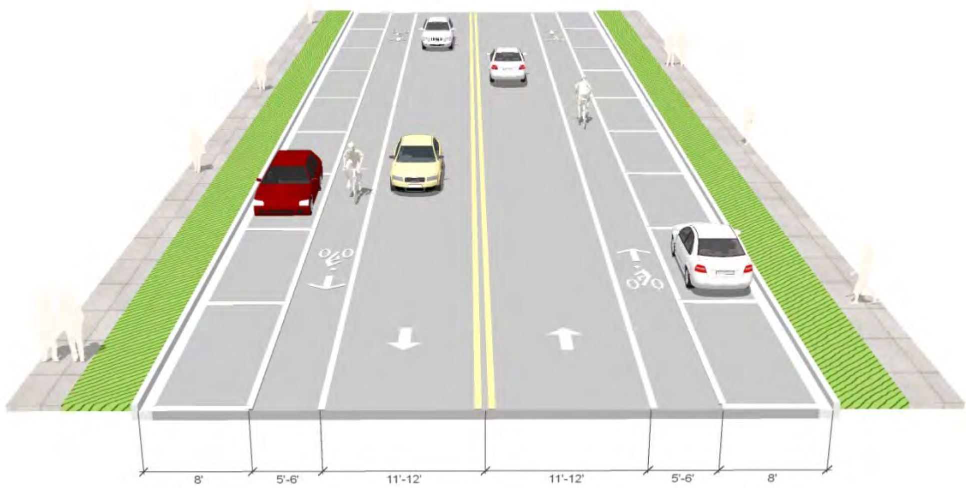


Figure 9: Two lanes with buffered bike lanes, sidewalks, and parking

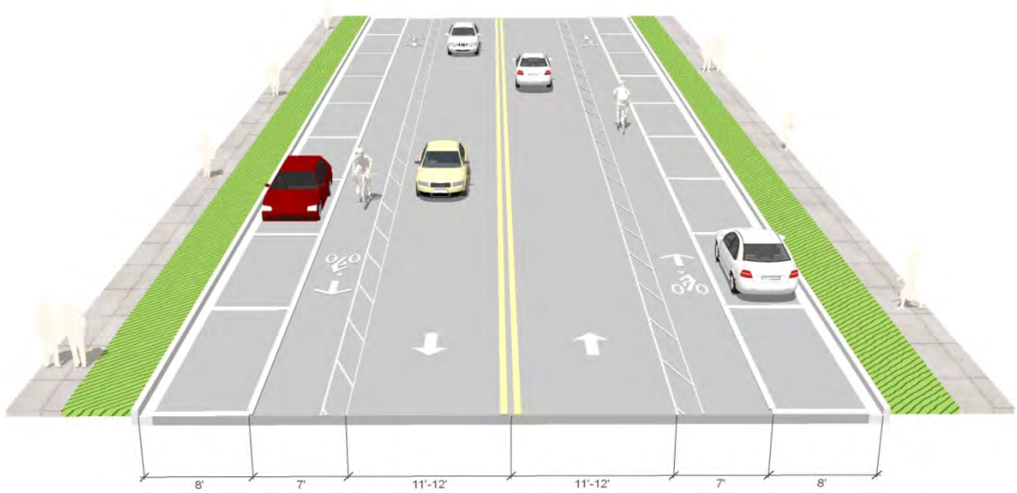


Figure 10: Five lanes with bike lanes and widened side path, no parking

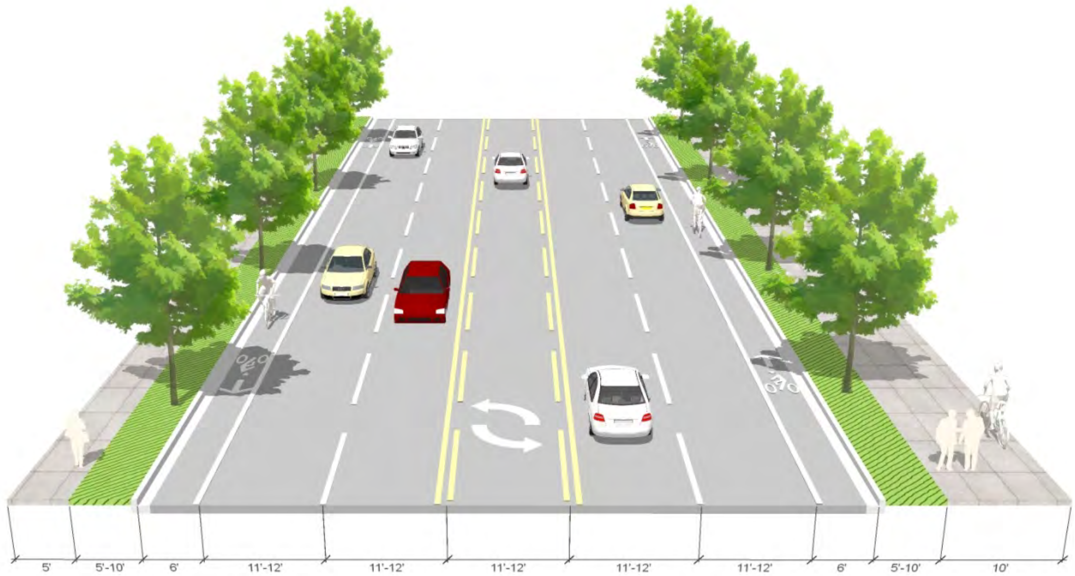


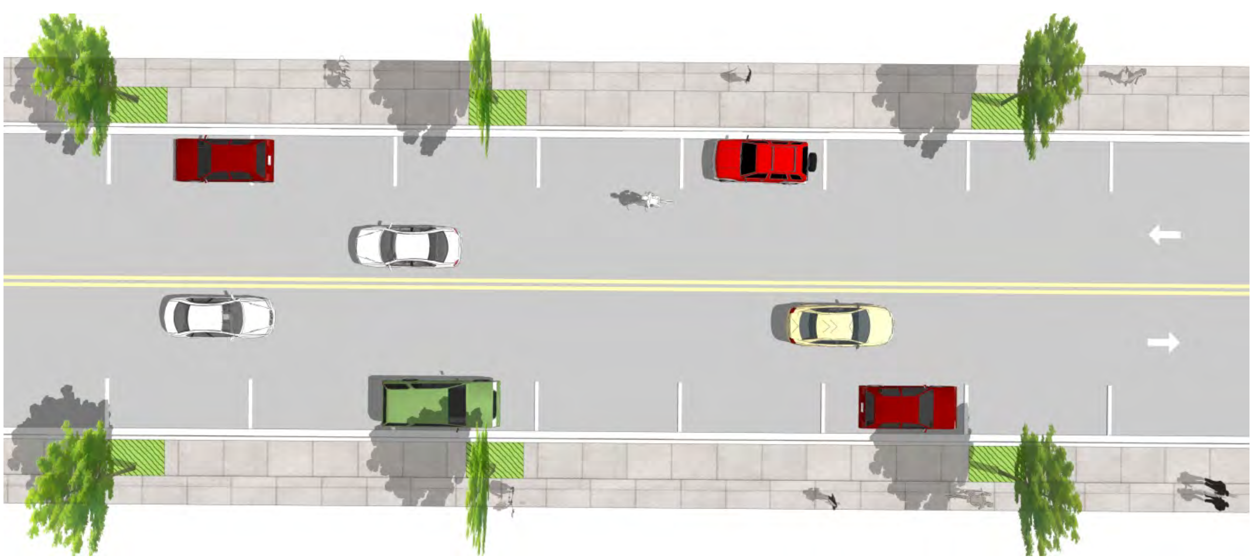
Figure 11: Four lanes with bike lanes and widened side path, no parking

Appendix B | Design Location Concepts

The Design Locations identified in the plan were evaluated for potential opportunities to introduce new bicycle and pedestrian facilities. The concepts contained in this appendix are based on actual measurements at the specific locations. Cross sections in most areas, especially older, more established neighborhoods in the Omaha region, are not always consistent and therefore these cross sections may not carry through the entire recommended area. These are conceptual in nature and further study would be required before designs can be finalized.

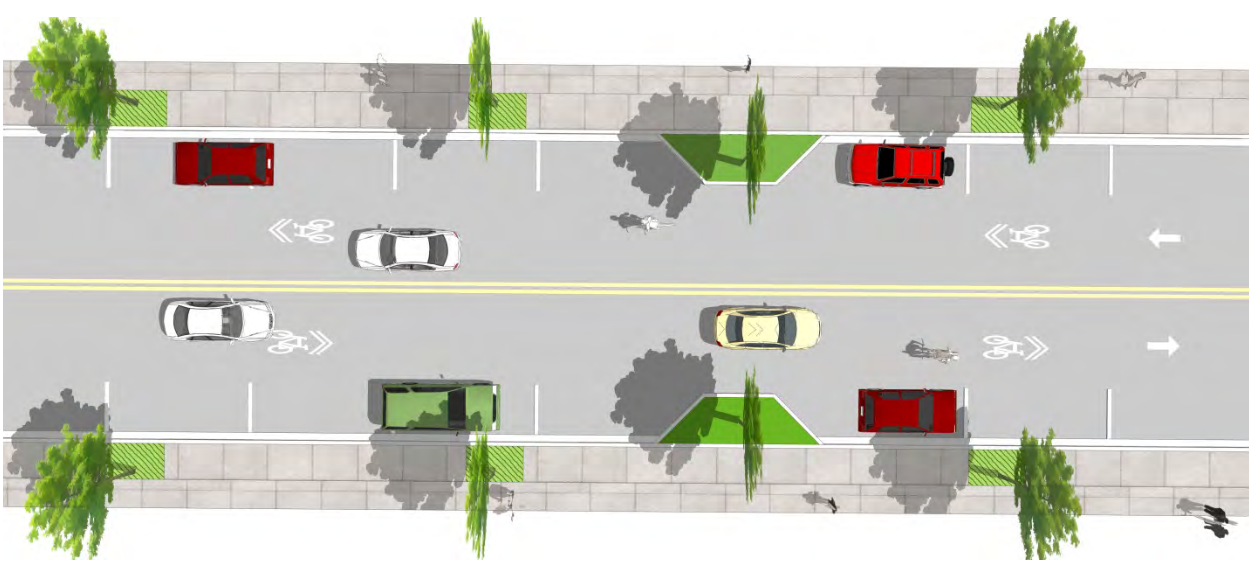
24th Street at Patrick Avenue

Existing



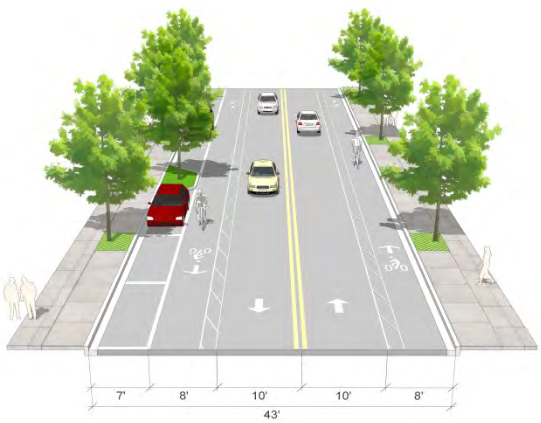
24th Street at Patrick Avenue

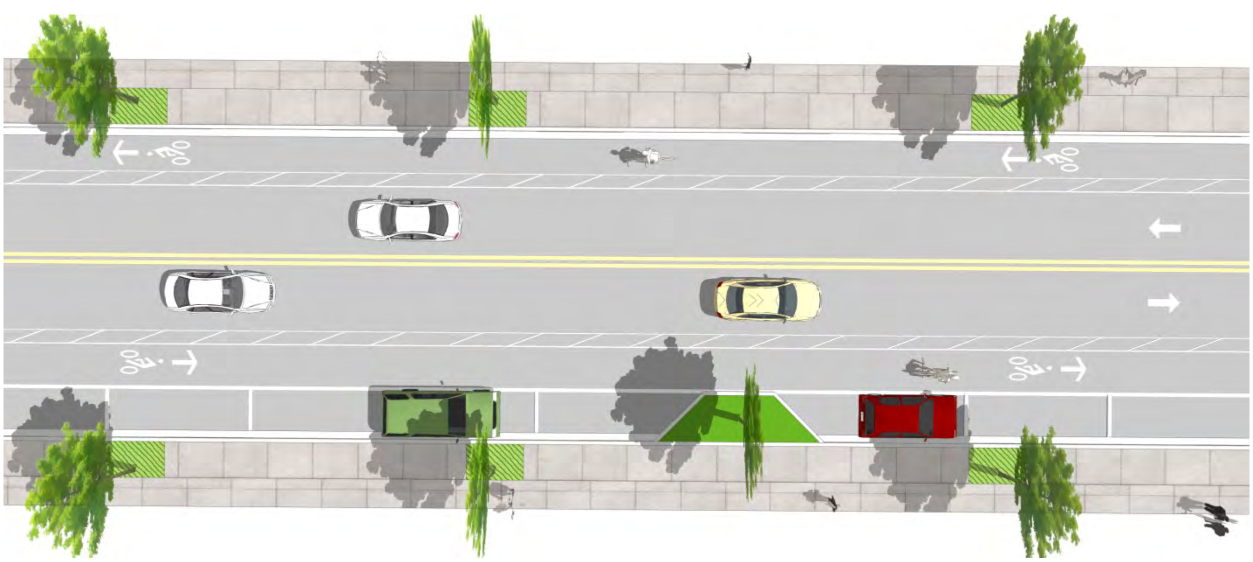
Shared lane markings and traffic calming



24th Street at Patrick Avenue

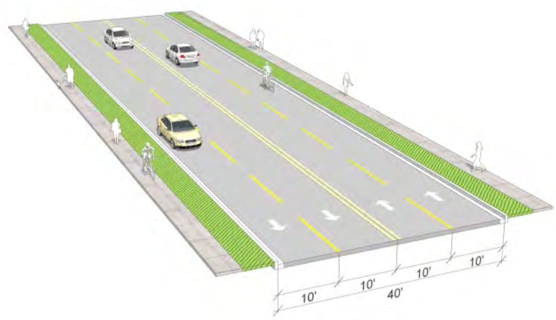
Bike lanes

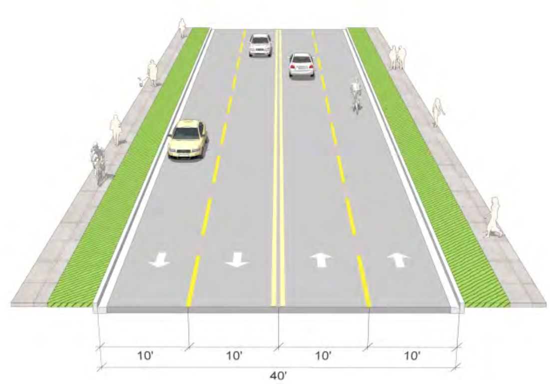




24th Street at Castelar Street

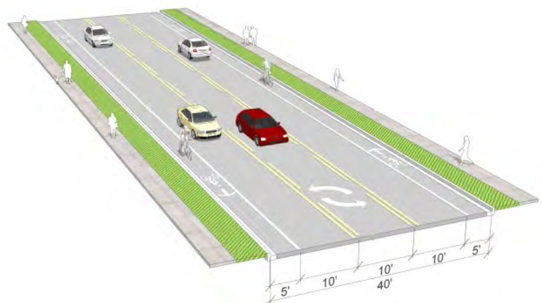
Existing

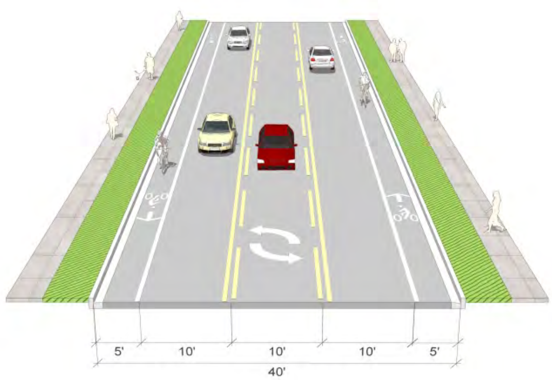




24th Street at Castelar Street

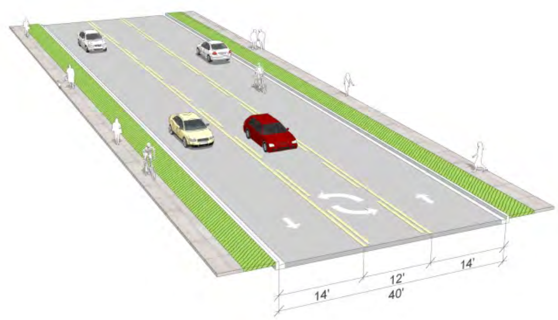
Road diet and bike lanes

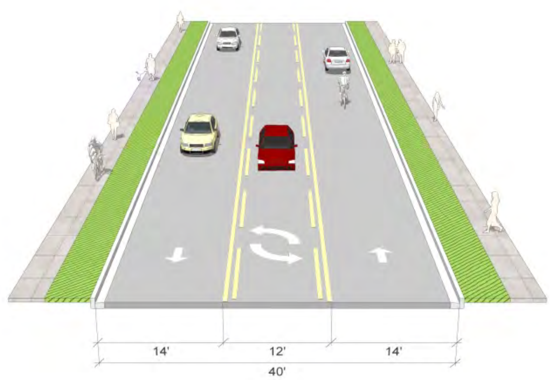


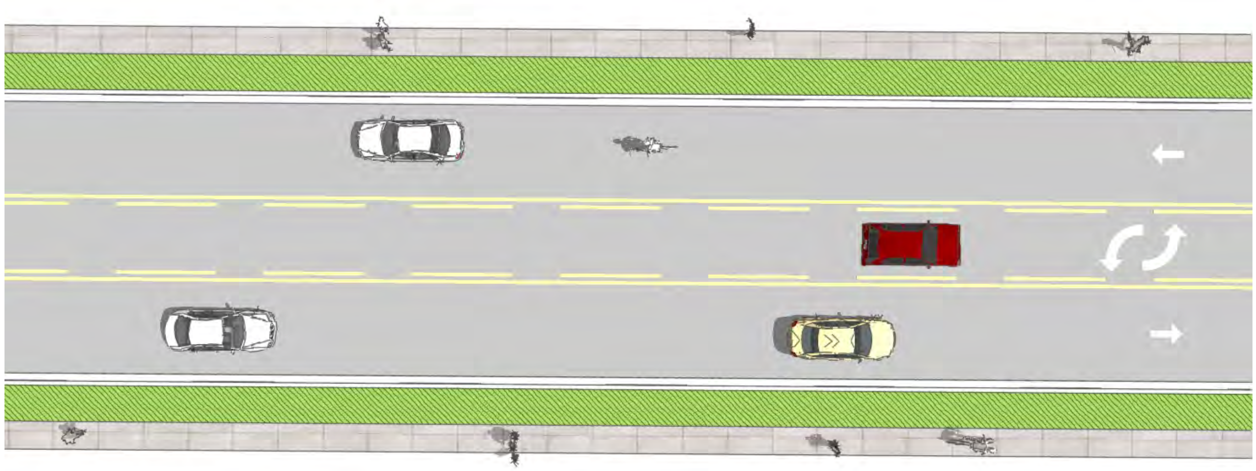


Underwood Avenue at 56th Street

Existing

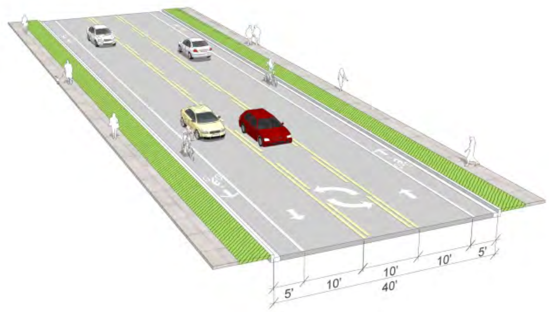


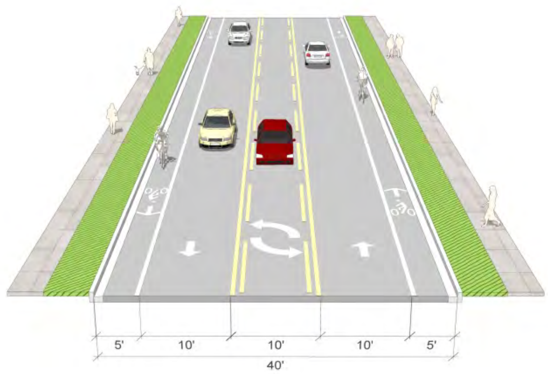


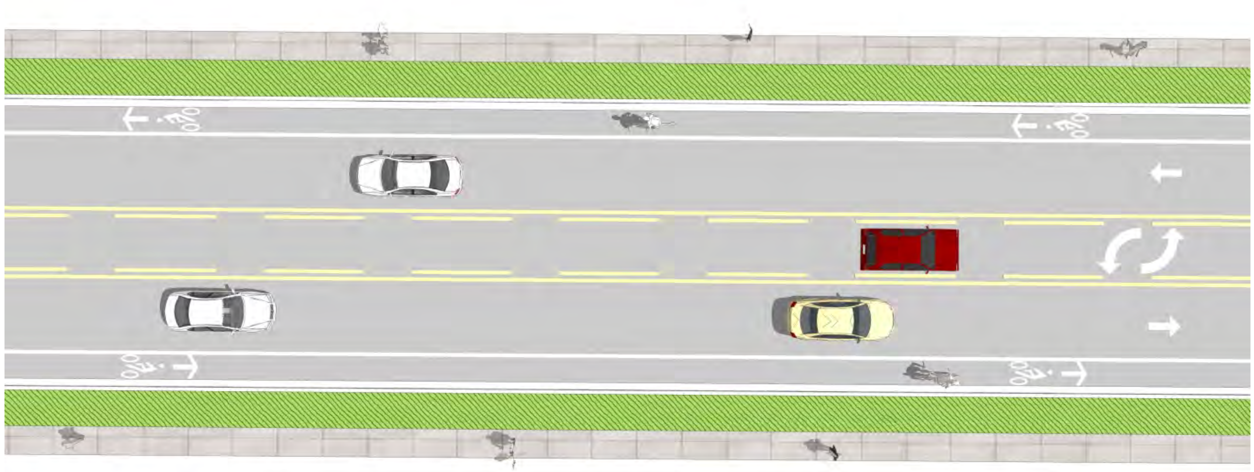


Underwood Avenue at 56th Street

Bike lanes

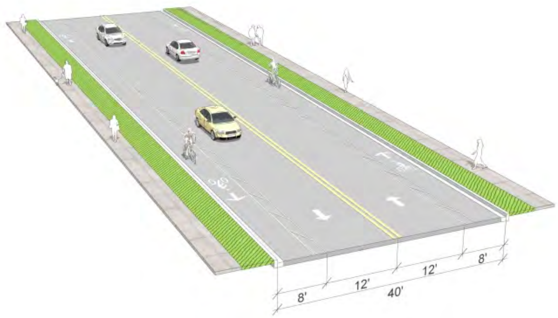


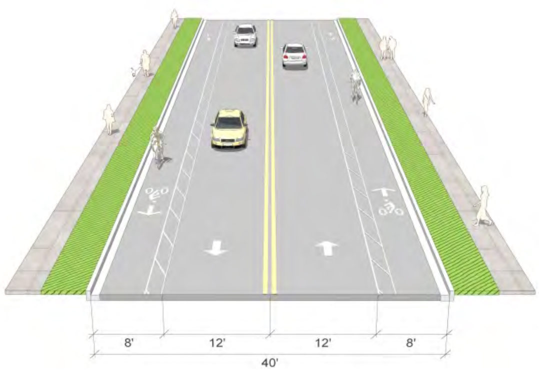




Underwood Avenue at 56th Street

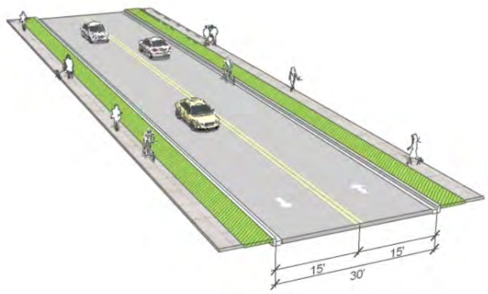
Buffered bike lanes, removal of continuous turn lane

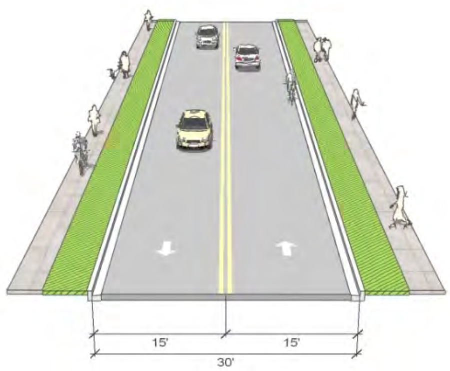


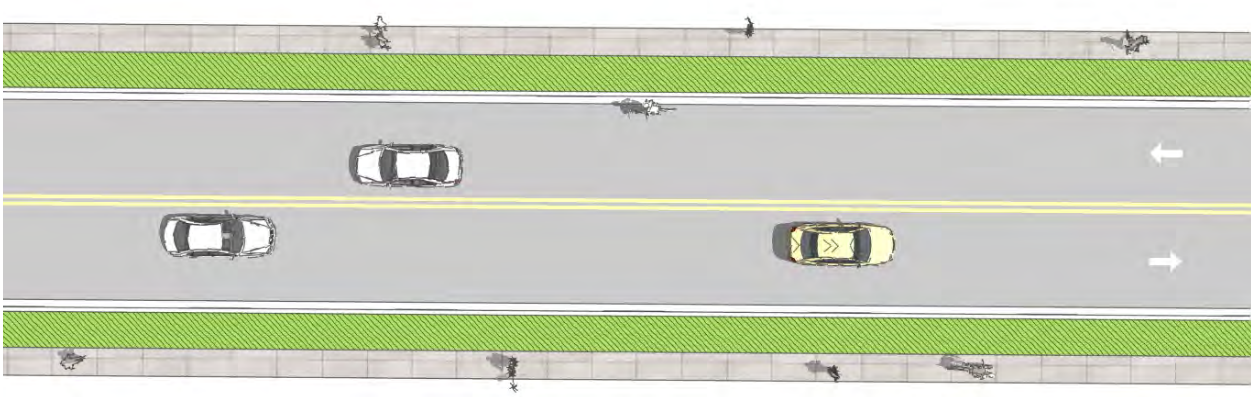


Hamilton Street at 25th Street

Existing

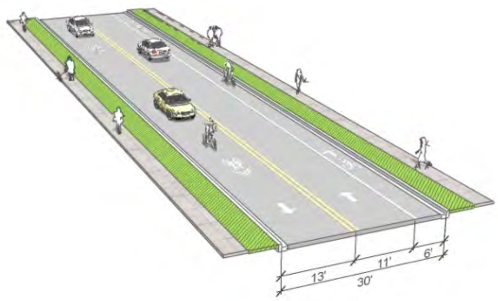


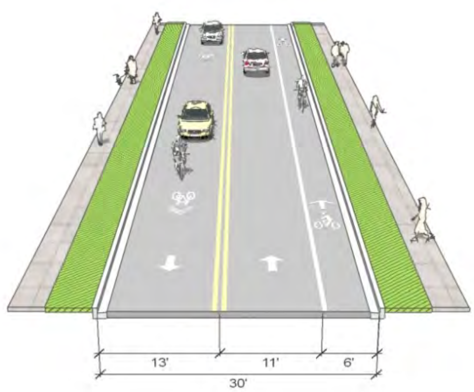


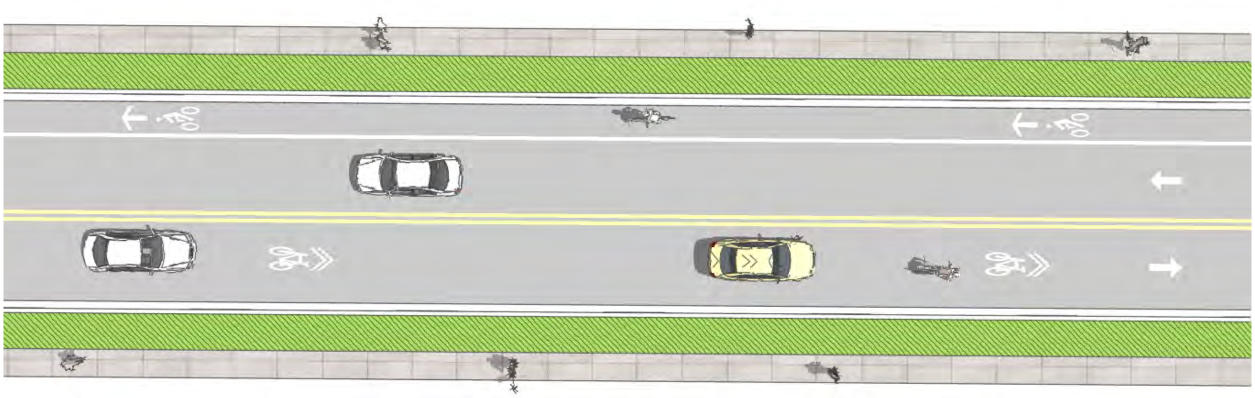


Hamilton Street at 25th Street

Climbing bike lane, shared lane marking

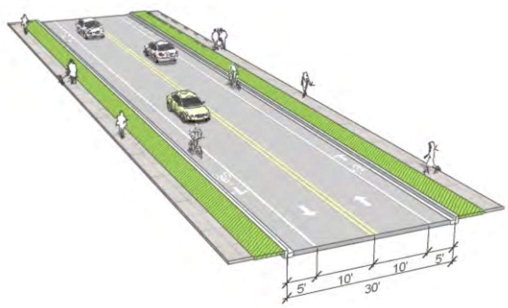


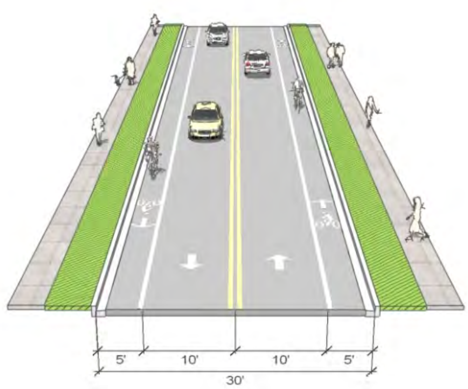


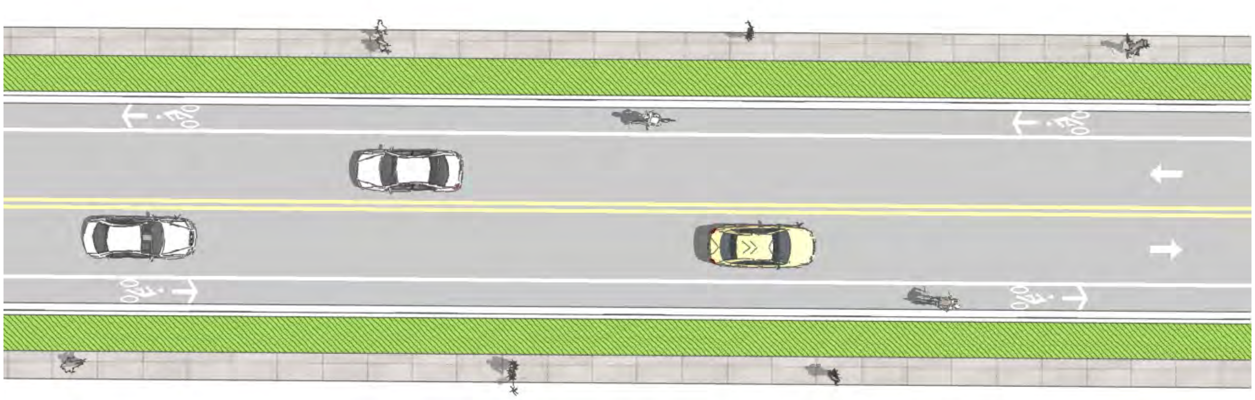


Hamilton Street at 25th Street

Bike lanes

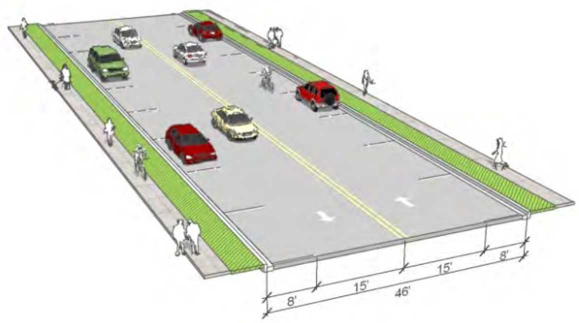


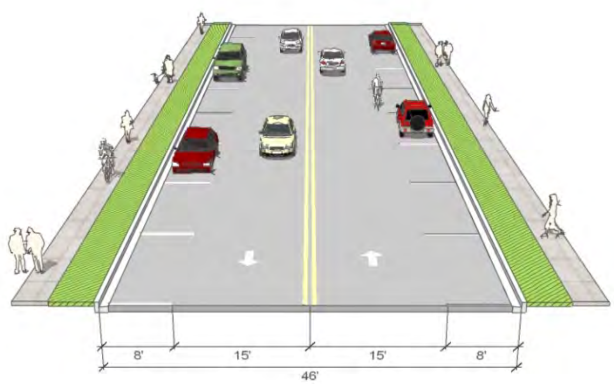


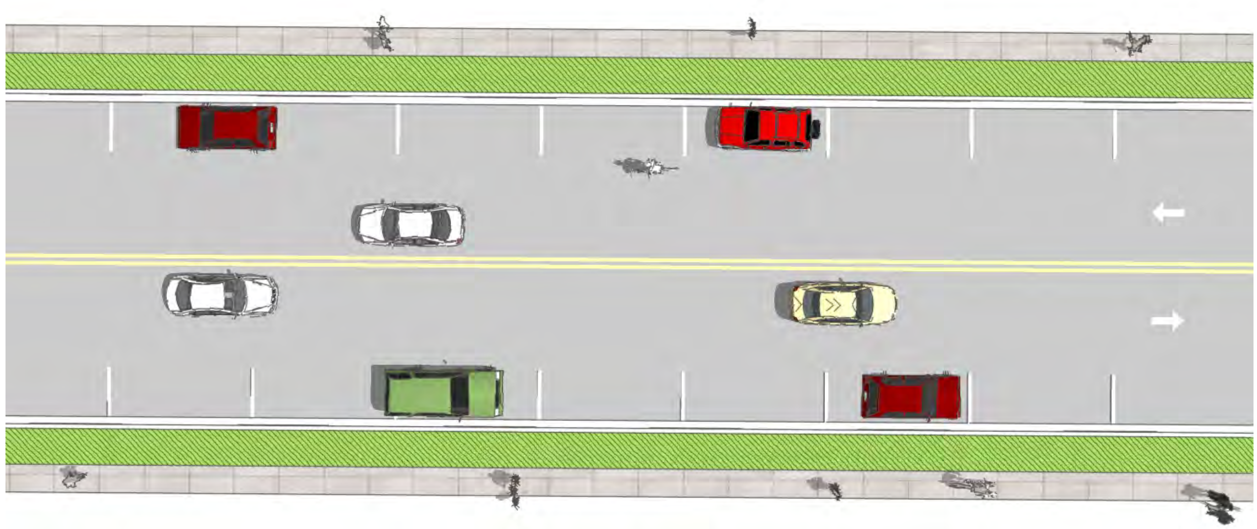


Hamilton Street at 42nd Street

Existing

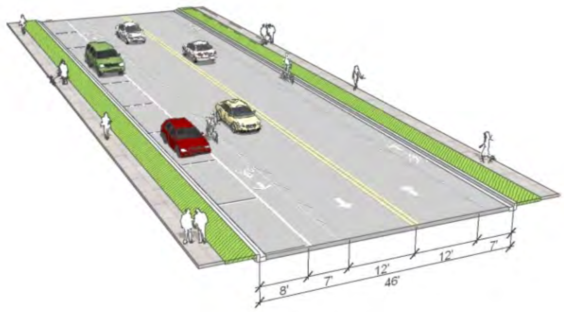


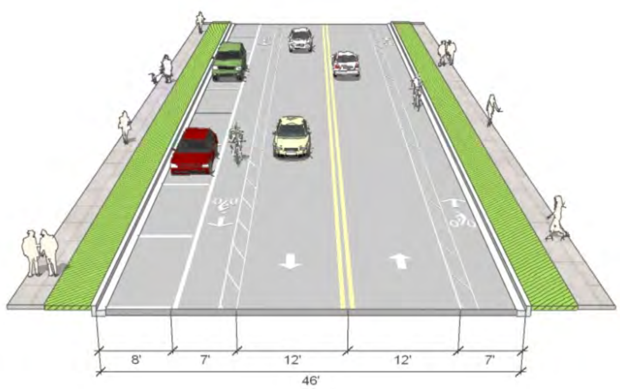


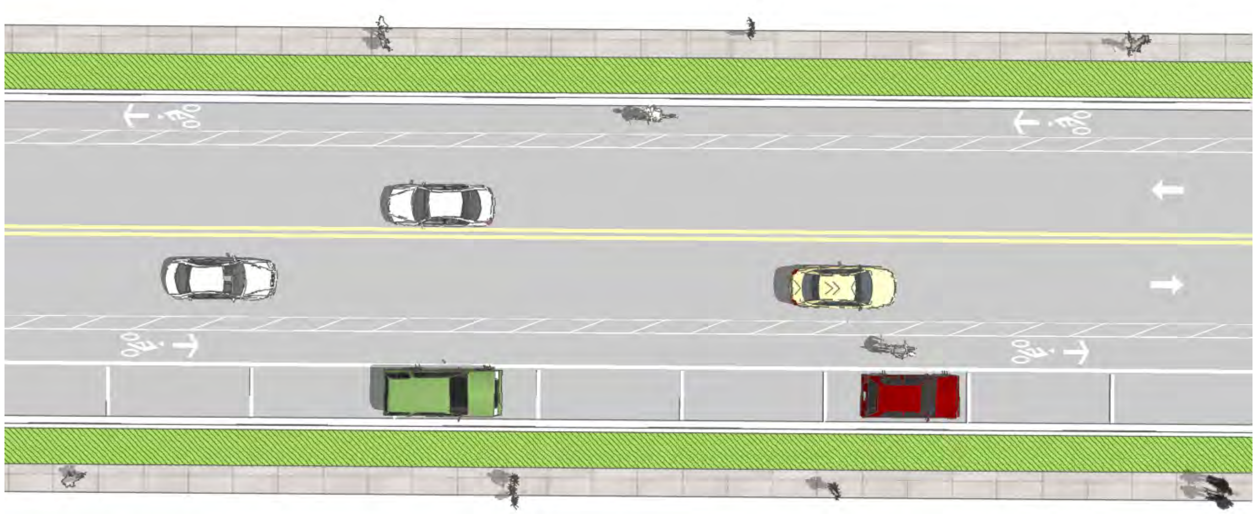


Hamilton Street at 42nd Street

Existing







Appendix C | Prioritization Model

The Bicycle and Pedestrian element of Heartland Connections includes a prioritized list of projects in key corridors. The prioritization methodology used for the Plan is based on the *10-Step Method for Prioritizing Pedestrian and Bicycle Improvement Locations Along Existing Roads* developed through Project 07-17 of the National Cooperative Highway Research Program (NCHRP) of the Transportation Research Board (TRB). The *10-Step Method* is the result of findings from a national survey, literature review, and agency interviews. Final approval from NCHRP is still pending but this methodology has been used internally on nearly a dozen plans and pilots by Toole Design Group with great success.

The adopted methodology is designed to reflect the needs established by an advisory committee or a group of some standing. Each project is scored based on criteria and weighting to be determined by the committee, in accordance with the vision and goals established for the plan. The scoring uses a combination of selected *factors* and *variables*. Factors are categories used in the prioritization process to express community/agency values and group variables with similar characteristics. Variables are characteristics of roadways, households, neighborhood areas, and other features that can be measured.

The list of projects included in the prioritization model was developed after extensive field work which identified opportunities and needs based on existing conditions. These projects are listed in Table 1.

In addition to the 16 projects here, the plan will outline additional recommendations that are either more general in nature or represent longer-range priorities. This would include items like wayfinding and improvements that are expected to occur when roads are completely reconstructed.

Table 1 - Project List

Underwood – from Happy Hollow to Fair Acres – Bike lanes and shared lane markings. Partial road diet ($100,000 to $200,000)
Oversize sidewalk from Dodge overpass at Memorial park overpass to 62nd Street - $100,000
Harney Street – two-way cycle track for 20 blocks- $500,000 – $1,000,000
24th Street –Bike lanes from Leavenworth to South Omaha and South Omaha to Chandler. Involve a 4-to-3 lane road diet ($200,000 to $1,000,000)
24th Street – Bike lanes and shared lane marking from Dodge to Lake - $100,000 to $150,000
2nd Avenue neighborhood greenway – 2 miles of assorted traffic calming devices, $1,000,000 to $1,500,000. This is corridor is going through study – reluctant recommendation.
Leavenworth – raised bicycle lane in uphill direction from 300' west of Saddle Creek to 55th and shared lane markings. Involves reconstructin of sidewalk and SLM on eastbound side - $1,000,000
Emily Street Extension – 1,000 to 2,000' of path from Saddle Creek to 48th and Howard - $300,000 to $500,000 due to possible structural work to elevate path to 48th
Burt Overpass - $1.5 million
Path connection – at 72nd and Burt - $100,000
Aspen Park Overpass and 2,000' of path - $1.75 million.
Parkview and Brentwood Wayfinding and SLMs - $125,000 to $175,000.

69th – from Manderson to Pacific – neighborhood greenway including traffic calming and 150' of oversizing of sidewalk on Dodge, countdown signals at Dodge. $600,000 to $800,000.
96th Street Overpass - $2 million not including traffic control
Center interchange Crossing – 108th to 114th (retrofit or wait for reconstruction?)
60th Street bike lanes – 4 to 3 lane conversion. $300,000 to $400,000
Bike lanes markings on Pine - .5 mile, $100,000 including eradication
Side path connection from Big Papio Trail to Regency Pkwy on N side of Pacific
Path - south side of Dodge between 81st and 76th
Harrison - Side path from Brookridge to 118th
Big Papio connections to Dodge Frontage Roads

This ranking is based on four factors: Constraints, Demand, Connectivity, and Equity.

- **Constraints** represents potential limiting factors related to a project and includes information about available right-of-way and costs.
- **Demand** indicates how likely a facility is to be used by bicyclists. This involves information about population and employment near the project, as well as specific trip attractors like bike share stations, parks, and schools.
- **Connectivity** captures the degree to which improvements along a given corridor might enhance the reach of Omaha's bicycle network by connecting to existing bicycle facilities or planned projects.
- **Equity** considers whether an improvement addresses the needs of any disadvantaged population. This is represented by a project's location relative to areas of low-income population, neighborhoods where car ownership is relatively low, or areas with above-average numbers of persons over the age of 65.

The final corridor ranking is influenced by the weights assigned to each factor by the steering committee and project team. Weights are numbers used to indicate the relative importance of factors. A complete list of factors, factor weights, variables, and data sources used is provided here in Table 1.

Table 2 - Factors, Variables, and Weights

Factor	Factor Weight	Variable	Definition	Source
Constraints	8	Available right-of-way	Yes/No	MAPA
		Order of magnitude cost per mile	Estimated project cost per mile	Toole Design Group
Demand	10	Number of bike share stations within ½ mile	Existing and planned stations within ½ mile of project	Heartland B Cycle
		Population density within ¼ mile	Maximum population density of census tracts within ¼ mile of project	MAPA
		Employment density within ¼ mile	Maximum employment density of Traffic Analysis Zones within ¼ mile of project	MAPA
		Serves a campus of higher education	Is there a campus of higher education within ½ mile of	MAPA

			project	
		Serves a regional park	Is there a regional park within ½ mile of project	MAPA
Connectivity	8	Mitigates an existing bicycle barrier	Does the project address a significant gap in the bicycling system	Project team
		Connects to existing or planned bike facility	Does the project connect to an existing path or bike lane, or does it connect to another project included in this prioritization exercise	MAPA
		Connects to a transit center or planned BRT stop	Is there a transit center or planned BRT stop within ½ mile of the project	MAPA
Equity	4	Serves an area with a high percentage of households with no auto	Is there a census tract within ½ mile of the project where the percentage of households without an auto is more than 2 standard deviations above the metro average	MAPA
		Serves an area with a high percent of population in poverty	Is there a census tract within ½ mile of the project where the percentage of population in poverty is more than 2 standard deviations above the metro average	MAPA
		Serves an area with a high percentage of population older than 65	Is there a census tract within ½ mile of the project where the percentage of population above the age of 65 is more than 2 standard deviations above the metro average	MAPA

In some instances, the measurement of each variable requires additional definition.

Scoring is accomplished by converting the measure for each variable into a score from 0-10 using one of the scaling methods described in the *10-Step Method*. In some cases, as in the variable relating to project costs, the score scales based on a comparison against all other projects. In other cases, as in the Boolean (yes/no) variables, the score is scaled based on an absolute relationship ("yes" translates to 10 points, "no" is worth 0). Once the variables are scaled, the average variable score within each category is calculated. This value is weighted by the appropriate factor weight presented in Table 1 to produce an overall factor score. Factor scores are added up to arrive at a final project priority score.

Scoring Example

To illustrate how the scoring process works, a sample score has been completed for the 2nd Avenue Neighborhood Greenway project in Council Bluffs. Table 2 includes the measures and scores for each factor and variable at each step in the scoring process.

Scoring descriptions for each factor are given below:

- **Constraints** – Because right-of-way is already available, the project receives a score of 10 for that variable. The cost per mile is rated proportional to all the other project costs and assigned a score of 9.8, which indicates that this project represents only a small fraction of the costs of some of the other projects. The variable scores are averaged to 9.9 and this is multiplied by the weight assigned to the Constraints factor (8) and scaled to 100 for a final score of 79.3. (9.9 x 8 x 100 = 79.3).

- **Demand** – This project had 5 bike share stations within ½ mile. This is compared to the counts for the other projects and then scaled proportionally, resulting in a scaled score of 5.6. Population and employment densities are similarly compared to the other projects and scaled, yielding scores of 6.7 and 10. The project does not serve a campus of higher education so it receives no points for that variable, but it does serve a regional park, which adds 10 points to the total. The average variable score of 6.4 is then weighted according to the assigned weight (10) and scaled to 100, resulting in a score of 64.4. (6.44 x 10 x 100 = 64.4).
- **Connectivity** – These variables are all yes/no measures. This project connects to an existing or planned bike facility so it receives 10 points, but is assigned no points for the other variables. Its average (3.3) is multiplied by the factor weight (8) and scaled to 100 for a score of 26.7. (3.3 x 8 x 100 = 26.7).
- **Equity** – These variables are also yes/no measures, for which the project satisfies the thresholds for serving households with no auto and serving populations in poverty. These two variables are awarded 10 points, which results in an average of 6.7. This is multiplied by the weight (4) and then scaled to 100 for a score of 26.7. (6.7 x 4 x 100 = 26.7).

The weighted scores of each factor are tallied, which produces a total score of 197.1 for this project.

Table 3 – 2nd Avenue Neighborhood Greenway Scoring Calculations

		Variable Measure	Scaled Score	Factor Average	Weighted Score
Constraints (weight = 8)	Available Right-of-Way	Yes	10	9.9	79.3
	Order of magnitude cost per mile	$480,000	9.9		
Demand (weight = 10)	Number of bike share stations within ½ mile	5	5.6	6.4	64.4
	Population density within ½ mile (person per acre)	10.9	6.7		
	Employment density within ½ mile (employees per acre)	38.2	10		
	Serves a campus of higher education	No	0		
	Serves a regional park	Yes	10		
Connectivity (weight = 8)	Mitigates an existing bicycle barrier	No	0	3.3	26.7
	Connects to existing or planned bike facility	Yes	10		
	Connects to a transit center or planned BRT stop	No	0		
Equity (weight = 4)	Percent of households with no auto	Yes	10	6.7	26.7
	Percent of population in poverty	Yes	10		
	Percent of population older than 65	No	0		
				Total	197.1

Table 4 identifies the overall prioritization score assigned to each project in ranked order.

Table 4 - Prioritization Scores

Project Information	Prioritization Score	Prioritization Rank
Harney Street – two-way cycle track for 20 blocks	239.2	1
24th Street –Bike lanes from Leavenworth to South Omaha and South Omaha to Chandler	228.6	2
Underwood – from Happy Hollow to Fair Acres – Bike lanes and shared lane markings	201.8	3
69th – from Manderson to Pacific – neighborhood greenway including traffic calming and 150’ of oversizing of sidewalk on Dodge, countdown signals at Dodge	201.8	4
Leavenworth – raised bicycle lane in uphill direction from 300’ west of Saddle Creek to 55th and shared lane markings	197.4	5
2nd Avenue neighborhood greenway – 2 miles of assorted traffic calming devices	197.1	6
Emily Street Extension – 1,000 to 2,000’ of path from Saddle Creek to 48th and Howard	195.6	7
24th Street – Bike lanes and shared lane marking from Dodge to Lake	193.2	8
Path - south side of Dodge between 81st and 76th	186.2	9
Bike lanes markings on Pine	175.2	10
Oversize sidewalk from Dodge overpass at Memorial park overpass to 62nd Street	175.0	11
60th Street bike lanes – 4 to 3 lane conversion	173.1	12
Side path connection from Big Papio Trail to Regency Pkwy on N side of Pacific	166.2	13
Harrison - Side path from Brookridge to 118th	159.7	14
Big Papio connections to Dodge Frontage Roads	157.3	15
Aspen Park Overpass and 2,000’ of path	149.0	16
96th Street Overpass	133.3	17
Center interchange Crossing – 108th to 114th	120.0	18
Parkview and Brentwood Wayfinding and SLMs	119.9	19
Burt Overpass	119.3	20
Path connection – at 72nd and Burt	116.3	21

The results appear to be grouped into four general tiers. The top tier includes project scores at or above 190. These projects best address bicycling system needs. They are centrally located and serve neighborhoods with good potential for cycling activity. The next tier ranges from 170 to 190. These projects provide good connectivity across important parts of the metro area, but are either not as centrally located as the top tier or don’t serve as many key destinations.

The third tier projects from between 120 to 170 tend to address important gaps in the network but are either not located in key parts in the system, or don’t provide immediate access to the destinations or neighborhoods with the highest potential for cycling.

The last tier of projects consists of scores at or below 120. These projects tend to be expensive and serve more remote parts of the metro area.

Appendix D | Stakeholder Presentation on Principles of Walkable Environments

Minimum Qualities of Walkable Environments

All inhabited places in the world have pedestrians but that does not mean that all the places are "walkable". For a place to be considered walkable, it needs to have various positive qualities that add up to being walkable. Understanding the qualities that combine to create a walkable environment will advance both the appreciation and the pursuit of walkability. Below is the shortest list of necessary qualities that are sufficient for a walkability environment. As the context becomes more challenging, an increasing number of qualities needs to be present in order for the place to be considered walkable. Every walkable environment needs to have the three fundamental qualities of walkability. They are comfortable, engaging, and accessible.

Comfortable – The pedestrian has a feeling of personal safety and is at ease with his or her surroundings.

When it comes to comfort, the "feeling of safety" is far more important than being "safe". "Safe" is the statistical condition towards the end of the scale of risk in which nothing harmful can happen to a pedestrian. The perceptions of safety, in various environments, vary greatly depending on the pedestrian's gender, dress and deportment, age, physical ability, time of day, mental acuity, etc. To be comfortable, it is necessary that an environment be *perceived as* safe and, in a perfect world, *be* safe. However, a walkable environment does not need to be a "safe" environment. The risk of death, injury, mugging, tripping, pollution, rock falling, collision, abduction, getting attacked by a bear, or other cause of harm may vary greatly along a pedestrian's chosen route compared to other routes? The average pedestrian (e.g., tourist, shopper, recreational jogger, commuter, school kid, etc.) likely has little to no quantitative information about how safe or unsafe he or she actually is. However, without a doubt, the average pedestrian has an acute sense about how safe he or she feels, rightly or wrongly.

Engaging – The environment provides sustained appeal or interest to the pedestrian.

Nice walks can be taken along retail streets, through neighborhoods, through parks, along trails, and along fairly deserted beaches. All can provide engaging environments. In every case, they can all be appealing and of interest to the pedestrian, but the level of complexity can range dramatically from low, but breathtakingly beautiful, like the beach; to high, like the retail street. Attributes such as human scale, nice aesthetics, etc., are context-dependant and are all captured in the idea of "engaging".

"Engaging" also addresses the tricky issue of scale. Though a beach can be highly engaging, it and the ocean are also as vast as vast can be. In an urban setting like in Chicago, the buildings are very tall. However, many streets in Chicago are engaging due to well designed sidewalks and ground floors of the buildings. Contrast these sidewalk environments those in Miami, where the building architects strived for iconic but delivered poorly designed lower floors and ground planes which feel disconnected from the sidewalks due to the lack of windows and doors as well as motes, barriers of landscaping, stair cases, useless ceremonial plaza spaces, poorly done elevation changes, etc., between the sidewalks and buildings, none of which are engaging to the pedestrian. Consequently, many Miami streets are not engaging and, thus, have poor walkability.

Accessible – The environment is capable of being used easily by the pedestrian.

"Accessible" and "universally accessible" are not synonymous. There are many environments (i.e., downtown streets in San Fransico, some trails in Vancouver's Stanley Park, etc.) that are completely accessible for average people with average physical capabilities but not accessible to people with disabilities. Many disabled people can only walk very short distances, cannot handle slopes or steps, require a wheel chair, have a heart condition, etc. However, the myriad of environments that average people find very accessible are not "unwalkable" because a person in a wheel chair cannot use them. There is a difference between accessible environments and ideas about universal access, barrier-free design, equity, legal, etc. In the personal sections of newspapers, when people have 25 words or less to attract a potential mate, how many of them list "walks along the beach"? Obviously, beaches are highly walkable environments even though they are rarely universally accessible?

Interestingly, the National Park Service provides trails that would be impossible for a person in a wheel chair to use but would be easy for people with average abilities to use. They also provide trails that are universally accessible so that most everyone, with a variety of the ability levels, can have a good "park experience." Both types of trails are accessible and, hence, walkable. The Park Service also provides trails that would be very challenging to average people. Traversing these trails requires training ahead of time, special preparations, and, ideally, letting the park authorities know the route and expected return time in case of problems and so a rescue can be organized if necessary. These trails are not "accessible" but are "navigable."

Summary of Walkable Environments

Comfortable, engaging, and accessible are necessary and sufficient to cover the technical, physical, and psychological aspects of simple walkable environments, such as beaches and National Parks. However, they are necessary, but not sufficient, for more complex environments such as cities, downtowns, main streets, and campuses.

<u>Walkable Cities</u>

Cities need to be comfortable, engaging, and accessible as well as "convenient" and "connected" in order to be considered walkable. "Convenient" and "connected" are very related. To some extent, "connected" could be considered part of "convenient" but it is of such importance to walkable cities, it is called out as a separate quality.

Convenient - Convenient cities foster efficient social and economic exchange by having what pedestrians routinely need and want nearby through the appropriate mix and density of land uses.

Connected - Connected cities have land uses, open spaces, streets, and people visually and physically linked together with multiple routing options via their street network, paths, trails, parks, intersections, crossings, and other connections to increase the utility of the city for pedestrians.

A walkable environment does not necessarily connote convenience or connectedness. The previous examples of walkable environments, along the beach or in a national park, are likely not convenient or connected but they are still walkable. Similarly in cities, a large a residential development may provide walkable environment within its boundaries but it may not be connected or convenient to anything else on foot. Consequently that city is not walkable. In walkable cities, the neighborhoods, districts, corridors, centers, parks, the downtown, the main street, and other parts are each walkable and they are connected and adequately dense and mixed to be convenient.

Walkable Downtown or Main Street

Downtowns require the aforementioned five qualities of walkability and they also need to be "vibrant." Main Streets need to be even more vibrant.

Vibrant - The pedestrian perceives the place as being full of life, energy, and activity.

Of all the places in the city, where exchange should be the richest, it is in the city's downtown. Consequently, for a downtown to be considered walkable, pedestrians should perceive a notable rise in the life, energy, and activity going on, compared to outside of the downtown. This requires a higher concentration and mix of land uses with higher levels of convenience and connections such that there are higher levels of exchange of services, entertainment, goods, labor, social contact, etc. Typically, vibrancy is maximized along streets via: i) continuous building facades, with varying materials, windows, architectural detailing, displays, and buildings fronting the sidewalks; ii) adequate sidewalk widths; iii) on-street parking; iv) slow design speeds for streets; v) two-way streets; vi) street trees; and vii) well scaled and integrated squares, plazas, and parks.

Similarly, of all the places in the downtown, where exchange should be the richest, it is along the city's main street. The vibrancy should be higher on the main street compared with the balance of the downtown.

Walkable Campuses

For places that have regular turnovers in their populations like university campuses or military bases, the expectation is that the place is "legible" in order to be walkable.

Legible – Pedestrians should find the campus understandable, intuitively navigable, and have the ability to easily become and stay oriented through it basic layout and design.

Wayfinding involves signs, markings, maps, etc. Wayfinding supplements the inherent legibility of a place. The better the legibility, the less wayfinding is necessary.

Ideal Walkable Environments

Walkable environments are ideally are "safe" and "equitable" but do not have to be either to be walkable.

Safe – The pedestrian is secure from danger or harm.

Equitable – The environment is provides fair or equal utility for all pedestrians, regardless of their age, physical ability, or mental capacity.

Every walkable environment poses some risk to the pedestrian and there is a large range of risk, depending on the particular environment and circumstances. Walking down a beach, in a national park, through a town square, or along a street all have different risks and levels of risk for different people. "Walkable" does not imply "safe".

"Walkable" does not imply "equitable" either. However, advances in design techniques, designers' sensitivities, design guidelines, an accessibility laws have greatly increased the accessibility of many walkable environments to people who had previously and routinely been excluded. Also, there is a growing menu of ways to turn previously unwalkable environments into walkable environments. For example, there are many street types now that are much more inclusive than conventionally designed streets such as shares spaces, complete streets, traffic calmed streets, road diets, etc.

Many of the advances, especially with respect to equity in streets design in cities, have not been accepted or applied as often or as completely as one might want. The inequities are far deeper than the differences of accommodation of pedestrians with differing abilities. The far larger inequity in cities is between pedestrians, in general, and motorists. The deep seated inequities are due to: i) lack of awareness by the involved professionals, cities, and the public; ii) the involved professions' value placed on automobile speed and accommodation; iii) lobby groups and powerful industries who profit from conventional practices pressing for more of the same; iv) out-of-date and out-of-touch funding practices, particularly at the federal and state levels; v) incomplete and out-of-date design manuals, standard practices, and measures of effectiveness, particularly for arterial and collector streets; vi) automobile-focused computer modeling and forecasting; and vii) the disconnect between the people responsible for transportation and people responsible for other aspects of city-making. Such anti-walkability tradeoffs are routinely considered reasonable by the federal government, departments of transportation, cities, politicians, and developers. But attitudes are slowly changing. The idea is to keep raising the bar on walkability, safety, and equity so that our environments, streets, places, and cities can improve.

Summary of Qualities for Walkability

All environments	Comfortable
	Engaging
	Accessible

Cities	Convenient
	Connected
Downtown & Main Street	Vibrant
Campuses	Legible
Ideally	Safe
	Equitable

Appendix E | Bicycle Facility Tech Sheets

This appendix includes technical information relating to a variety of bicycle facility types. They can be shared with local jurisdictions throughout the Omaha Metro Area as a resource for designing and implementing new accommodations.

Bicycle Boulevards / Neighborhood Greenways

Facility Technical Sheet

Description

Lower volume, lower speed residential streets designed to prioritize bicycle through travel while discouraging motor vehicle traffic and maintaining relatively low motor vehicle speeds.

Benefits

- Suitable for most ages and abilities.
- Calms traffic speeds; slower speeds are safer and help reduce crash injuries.
- Typically retrofitted within existing right-of-way.
- Reduces cut-through traffic.

Challenges

- Impacts to traffic patterns.
- Emergency, transit and maintenance vehicle access.
- Developing appropriate treatments at major intersections.
- Wayfinding to community destinations on major roadways.

Neighborhood traffic circles and other traffic-calming devices are common elements on Bicycle Boulevards.

Design Criteria

- Target speeds are typically around 20 mph; there should be a maximum < 15 mph speed differential between bicyclists and vehicles.
- Preferred ADT: up to 1,500.
- Recommended Maximum ADT: 3,000.

Additional Considerations

- Run parallel—rather than along—transit and heavy truck routes.
- Traffic control at intersections should prioritize the bicycle movement and minimize stops, whenever possible.
- Include traffic calming measures such as street trees, traffic circles, chicanes, and speed humps.
- Diverters or semi-diverters can redirect cut-through vehicle traffic and reduce traffic volume.
- Pilot programs to test impacts should be considered.
- Wayfinding signs should be provided to connect users to destinations.
- Additional treatments for major street crossings may be needed, such as median refuge islands, rapid flash beacons, bicycle signals, and HAWK or half signals.

References & Resources

- AASHTO Guide for the Development of Bicycle Facilities (2012)
- NACTO Urban Bikeway Design Guide (2012)
- Manual on Uniform Traffic Control Devices (2009)
- Fundamentals of Bicycle Boulevard Planning & Design (2009)
- Minikel (2011). Cyclist safety on bicycle boulevards and parallel arterial routes in Berkeley, California. Department of Urban Studies and Planning, Massachusetts Institute of Technology.

Example Location(s) Where Applied

Minneapolis, MN; Portland, OR; Boston, MA; Berkeley, CA; Baltimore, MD; Madison, WI.

Shared Lane Markings

Facility Technical Sheet

Description

Shared lane markings (or "sharrows") are pavement markings that denote shared bicycle and motor vehicle travel lanes. The markings indicate where the bicyclist should be anticipated to operate.

Benefits

- May increase motorist awareness of the potential presence of bicyclists.
- Can act as wayfinding aids.
- The shared space is more likely to be swept and plowed than separated facility types.
- Low cost of implementation

Challenges

- May not be suitable for all users as they do not provide separate space for bicyclists.
- May have higher maintenance needs than other facility types due to the wear and tear presented by motor vehicles driving over the pavement markings.

The placement of Shared Lane Markings varies based on lane width and the presence of on-street parking.

Design Criteria

- Posted speed limits of 35 mph or less.
- The marking's centerline must be minimum 4' from curb where parking is prohibited.
- The marking's centerline must be minimum 11' from curb where parking is permitted.
- For narrow lanes, it may be desirable to center shared lane markings along the centerline of the outside travel lane.

Additional Considerations

- Typically used on local, collector, or minor arterial streets with low traffic volumes.
- Typically feasible within existing right-of-way and pavement width even in constrained situations that preclude dedicated facilities.
- May be used to fill gaps between bike lanes or other dedicated facilities for short segments where there are space constraints.
- Commonly used on bicycle boulevards to reinforce the priority for bicyclists.
- May be used for downhill travel in conjunction with climbing lanes intended for uphill travel.
- Typically supplemented by signs, especially Bikes May Use Full Lane (R4-11).
- When applied on higher speed/volume roads, consider alternative routes suitable for users of all abilities.

References & Resources

- AASHTO Guide for the Development of Bicycle Facilities (2012)
- NACTO Urban Bikeway Design Guide (2012)
- Manual on Uniform Traffic Control Devices (2009)

Example Location(s) Where Applied

Omaha, NE; Kansas City, MO; North Kansas City, MO; Fort Worth, TX; Oklahoma City, OK; Long Beach, CA.

Bike Lanes

Facility Technical Sheet

Description

On-road facilities designated for exclusive use by bicyclists through pavement markings and signs (optional). Typically applied to thoroughfare and collector streets where volumes and/or speeds would otherwise discourage bicycling.

Benefits

- Dedicated space for bicyclists (except near intersections where motorists may enter bike lanes to make right turns).
- Can act as wayfinding aids.
- Established facility type that is understood by most road users.
- May encourage more bicycle travel.
- Can lower motor vehicle speeds in some settings.

Challenges

- May not be appropriate for all types of bicyclists.
- Potential risk of "dooring" when placed adjacent to parking.
- Potential for vehicles driving/parking in the bicycle lane.

Bike lanes provide dedicated space for bicyclists, but may present risks (such as "dooring") depending on their design.

Design Criteria

- Typical width: 5' (minimum 4' to gutter seam or curb)
- Minimum width next to parked cars: 5'
- May be wider adjacent to narrow parking lanes and in areas with high on-street parking turnover.
- Include pavement markings to indicate one-way travel.

Additional Considerations

- May be placed on the left side of one-way roadways to avoid adjacency with on-street parking on the right side.
- May optionally be placed on only one side of a roadway in the uphill direction as a climbing lane if space is limited.
- Two-way bicycle travel may be achieved on some one-way streets by providing a contra-flow bike lane.
- Depending on the design of the roadway, bicyclists may have to operate in mixed traffic (such as to make turns).
- For high-speed or high-volume roads, alternative routes suitable for users of all abilities should be considered.
- Consider whether passing between two bicyclists is desirable and adjust lane widths accordingly.
- May include buffers (minimum 18") between bike lane and travel lane and/or between bike lane and parking lane to provide additional separation.

References & Resources

- AASHTO Guide for the Development of Bicycle Facilities (2012)
- NACTO Urban Bikeway Design Guide (2012)
- Manual on Uniform Traffic Control Devices (2009)
- Omaha Streetscape Handbook (2008)

Example Location(s) Where Applied

Omaha, NE; Kansas City, MO; Olathe, KS; Madison, WI; Austin, TX; Chicago, IL; San Diego, CA; Tucson, AZ, Boston, MA.

Heartland connections

Paved Shoulders

Facility Technical Sheet

Description

Additional pavement width outside of the travel lanes that reduce crashes, aid maintenance, and provide space for bicyclists and pedestrians (although paved shoulders typically do not meet accessibility requirements for pedestrians).

Benefits

- Provide separated space for bicyclists and can be used by pedestrians.
- Reduce run-off-road motor vehicle crashes.
- Reduce pavement edge deterioration and accommodate maintenance vehicles.
- Provide emergency refuge for public safety vehicles and disabled vehicles.

Challenges

- Typically placed along high-speed roads.
- May not facilitate through-intersection bicycle movement unless specifically designed to do so.
- For pedestrians, paved shoulders are not able to meet accessibility requirements and intersections typically lack crosswalks and pedestrian signals.

Wide paved shoulders reduce run-off-road crashes, improve roadway maintenance, and can provide space for bicyclists.

Design Criteria

- Minimum width without milled rumble strips: 4' from edgeline to edge of pavement (5' if adjacent to curb or guardrail).
- Minimum width with milled rumble strips: 4' from rumble strip to edge of pavement (5' if adjacent to curb or guardrail).

Additional Considerations

- There are several situations in which additional shoulder width should be provided including motor vehicle speeds exceeding 50 mph, moderate to heavy volumes of traffic, and above-average bicycle or pedestrian use.
- The placement of milled rumble strips may significantly degrade the functionality of paved shoulders for bicyclists. Rumble strips should be placed as close to the edge line as practicable. Alternatively, rumble stripes may be used.
- Where rumble strips are present, gaps of at least 12' should be provided every 40-60'.
- Intersections with unpaved roads and driveways often result in gravel and debris deposited on paved shoulders. Paving the aprons of these intersections can mitigate the negative effect.

References & Resources

- AASHTO Guide for the Development of Bicycle Facilities (2012)
- AASHTO Policy on Geometric Design of Highways and Streets (2013)
- Manual on Uniform Traffic Control Devices (2009)

Example Location(s) Where Applied

Nebraska; Kansas; Iowa; Wisconsin; Oregon; New York; Pennsylvania.

Bike Routing/Wayfinding

Facility Technical Sheet

Description

A system of signs and pavement markings that guide bicyclists along preferred routes (which may or may not be numbered) to destinations across the city and region. Signs may state distance to destinations or include route numbers.

Benefits

- Improves the usefulness of the bicycle network, especially when routes are diverted away from well-known streets.
- May encourage the use of lower-stress bikeways.

Challenges

- Can cause unnecessary confusion if the selection of destinations and placement of signs is not optimized.
- Can contribute to sign clutter.

Directional signs (top), regional route signs (bottom right), and confirmation signs (bottom left).

Design Criteria

- Include destination, direction, and distance.
- Place the nearest destination in the sign's top position.
- Place directional signs on the near side of intersections.
- Place confirmation signs on the far side of intersections.
- Sign design can be customized, but the clarity and accuracy of the information must be the top priority.
- Coordinate with existing/programmed bikeways and bicycle route maps.

Additional Considerations

- Bicycle route signs should provide bicyclists with direction, destination, and distance information to commercial centers, rail stations, shared use paths, and other popular destinations.
- The location of signs and represented destinations should be planned in a comprehensive manner, considering the likely routes of bicyclists and probable destinations.
- To assist the bicyclist, the system should provide three general forms of guidance:
  - Directional signs: placed at decision points where routes intersect and where routes turn from one street to another.
  - Regional route signs: Placed along designated routes.
  - Confirmation signs (also called designation signs): used to confirm route choice.

References & Resources

- NACTO Urban Bikeway Design Guide (2012)
- Manual on Uniform Traffic Control Devices (2009)
- The Mid-America Regional Council and The Kansas City Metro Chapter Of The American Public Works Association Best Practices Local Bikeway Planning and Design Guide (2012)

Example Location(s) Where Applied

Stevens Point, WI; Jefferson County, WI; Baltimore, MD; Oakland, CA; Cambridge, MA; Chicago, IL.

Heartland connections

Bikeway Intersection Pavement Markings & Signal Design

Facility Technical Sheet

Description

Intersections can be optimized to accommodate bicyclists by including pavement markings that increase visibility and reduce conflicts and designing signals to serve the unique operating characteristics of bicyclists.

Benefits

- Enhanced pavement markings warn users of potential conflict locations, help define expected behaviors, and encourage turning motorists to yield to bicyclists.
- Improved signal designs provide adequate time for bicyclists to clear signalized intersections, minimize bicyclist delay, and reduce the likelihood that bicyclists will disobey the signal.

Challenges

- Excessive pavement markings may result in confusion or clutter.
- Bicycle-oriented signals may result in a slight loss of capacity at the intersection and may increase red-light running.

Bike boxes and green pavement (combined in this example) are two tools for improving intersections for bicyclists.

Design Criteria

- A variety of pavement markings can enhance intersections, guide bicyclists, and warn of potential conflicts.
- Bicyclists should be accommodated by lengthening the green and red phases of traffic signals and ensuring loop detectors sense bicycles. Bicycle-specific signals may be used and have received interim approval from FHWA.
- Refer to the references and resources listed below for specific design criteria.

Additional Considerations

- Pavement marking treatments used at intersections can include dashed white lines, symbols including chevrons and bicycle symbols, and green pavement
- Pavement marking treatments will vary depending on the context and character of each intersection and should be chosen based on engineering judgment.
- Corridor-wide intersection treatment can maintain consistency; however, spot treatments can be used to highlight conflict locations.
- Detection should be provided for bicyclists at signalized intersection approaches requiring actuation. It should not be expected that on-road bicyclists will be required to leave the roadway to actuate a signal. Video detection, microwave and infrared detection can be an alternate to loop detectors.

References & Resources

- AASHTO Guide for the Development of Bicycle Facilities (2012)
- Manual on Uniform Traffic Control Devices (2009)
- OTREC Operational Guidance for Bicycle-Specific Traffic Signals (2013)
- Jensen, SU. Safety effects of blue cycle crossings: A before-after study. Accident Analysis & Prevention, 40(2), 742-750. (2008)
- Thompson, SR. Bicycle-Specific Traffic Signals: Results from a State-of-the-Practice Review (2012)

Example Location(s) Where Applied

Pavement Markings: Seattle, WA; Minneapolis, MN; Boston, MA; Washington D.C.

Signal Design: Portland, OR; San Francisco, CA; Madison, WI; Santa Clara Valley, CA

Shared-Use Paths

Facility Technical Sheet

Description

A shared-use path is a two-way facility physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users.

Benefits

- Separated from motor vehicle traffic.
- May be more appropriate for children, seniors, and persons with disabilities.
- Provides recreational opportunities in addition to transportation.

Challenges

- Costly and complicated right-of-way acquisition.
- Topography and drainage can greatly impact design.
- High construction costs.
- Can present safety concerns when placed adjacent to a roadway with frequent driveway or intersection crossings.

Shared-use paths may parallel streets, highways, utility easements, railroads, and natural features such as rivers.

Design Criteria

- Minimum width: 10'. Widths as narrow as 8' are acceptable for short distances under physical constraint. Warning signs should be considered at these locations.
- In locations with heavy volumes or a high proportion of pedestrians, widths exceeding 10' are recommended. A minimum of 11' is required for users to pass with a user traveling in the other direction.

Additional Considerations

- A shared-use path should be designed to suit the characteristics of cyclists. This includes establishing a design speed (typically 18 mph) and designing curb radii appropriately.
- To accommodate high volumes and reduce conflicts between different user types, a path wider than the minimum can be provided or modes can be separated by constructing parallel paths for bicyclists and pedestrians.
- On a path that is shared by both transportation and recreational bicyclists, additional path width is desirable to allow users to pass.
- On wider paths, signage to remind users to keep right except to pass should be provided.
- Along paths that provide attractive recreational opportunities, consider adding amenities such as benches, rest areas, and scenic overlooks.

References & Resources

- Omaha Streetscape Handbook (2008)
- AASHTO Guide for the Development of Bicycle Facilities (2012)
- FHWA Shared-Use Path Level of Service Calculator (2006)
- Manual on Uniform Traffic Control Devices (2009)

Example Location(s) Where Applied

Nearly every city in Nebraska and Iowa has examples of shared-use paths.

Sidewalks

Facility Technical Sheet

Description

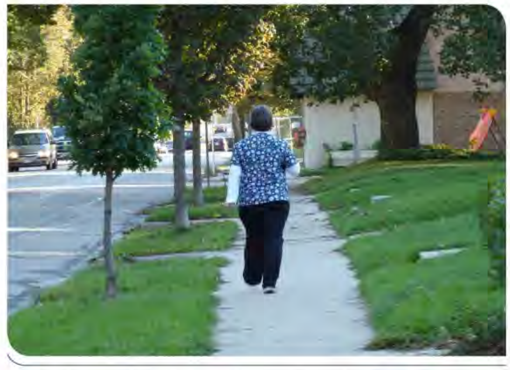
Sidewalks provide dedicated pedestrian space along streets and roadways. Sidewalks typically exist within the street right of way.

Benefits

- Provide dedicated space for pedestrians within the public right of way.
- Reduce conflicts between pedestrians, motorists, and bicyclists.

Challenges

- Need to be well maintained, especially during winter months when snow and ice are encountered.
- Require regular inspection to look for cracks and other damage that could present a trip hazard; damage should be repaired as soon as feasible.
- Curb ramps can be a problem for pedestrians with visual impairments because they minimize the tactility of the transition point between the sidewalk and the roadway.



Sidewalks provide a dedicated space for pedestrians along streets and roadways.

Design Criteria

- Maximum slope: 1:12 (8.33%).
- Maximum cross-slope: 2% (1–2% with tight tolerances recommended).
- Minimum Width: 4 feet
- Recommended width: 5 feet; wider in commercial areas

Additional Considerations

- Providing a furnishing zones or terraces (the space between the curb and sidewalk) between the sidewalk and the street increases comfort for pedestrians and provides space for bike racks, transit shelters, and other amenities.
- Curb ramps must be provided where sidewalks transition to crosswalks at intersections.
- Bicycles may legally be ridden on sidewalks in Omaha and other MAPA communities. Bicyclists should always yield to pedestrians on sidewalks and should excrecise extreme caution at driveways and street crossings as motorists are not expecting bicyclists at these locations.

References & Resources

- FHWA Designing Sidewalks and Trails for Access Part I: Review of Existing Guidelines and Practices (1999)
- FHWA Designing Sidewalks and Trails for Access Part II: Best Practices Design Guide (2001)
- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG; 2011)

Example Location(s) Where Applied

Nearly every community in the United States has sections of sidewalks.

Curb Ramps

Facility Technical Sheet

Description

Curb ramps provide transition between sidewalks and crosswalks and must be installed at all intersection and midblock pedestrian crossings, as mandated by federal legislation (1973 Rehabilitation Act and ADA 1990).

Benefits

- Universally, widespread benefits apply to people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, or who have mobility restrictions that make it difficult to step up and down high curbs.

Challenges

- Curb ramp designs can be challenging especially at intersections with large radii or on streets within narrow right-of-ways.
- Need to be well maintained, especially during winter months when snow and ice are encountered
- Curb ramps can be a problem for pedestrians with visual impairments because they minimize the tactility of the transition point between the sidewalk and the roadway.

Curb ramps must include truncated domes. Sedimentation and snow accumulation are challenges.

Design Criteria

- Maximum slope: 1:12 (8.33%).
- Maximum slope of side flares: 1:10 (10%).
- Maximum cross-slope: 2% (1–2% with tight tolerances recommended).
- Truncated domes (the only permitted detectable warning device) must be installed on all new curb ramps to alert pedestrians to the sidewalk and street edge.

Additional Considerations

- Furnishing zones or terraces (the space between the curb and sidewalk) of 7′ of width provide just enough space at intersections for curb ramps to gain sufficient elevation to a sidewalk.
- Separate curb ramps should be provided for each crosswalk at an intersection rather than a single ramp at a corner for both crosswalks. The separate curb ramps improve orientation for visually impaired pedestrians by directing them toward the correct crosswalk.
- Curb ramps are required to have landings. Landings provide a level area with a cross slope of 2% or less in any direction for wheelchair users to wait, maneuver into or out of a ramp, or bypass the ramp altogether. Landings should be 5′ by 5′ and shall, at a minimum, be 4′ by 4′.
- All newly constructed and altered roadway projects must include curb ramps. Agencies with more than 50 employees are required to have a transition plan in place to address the staging of the curb ramp upgrades.

References & Resources

- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG; 2011)

Example Location(s) Where Applied

Required by law as part of any new sidewalk construction occurring within Nebraska, Iowa, and the United States.

Marked Crosswalks

Facility Technical Sheet

Description

A variety of facility types intended to increase the safety of pedestrians crossing streets and roads. In addition to pavement markings, crosswalks may include signals/beacons, warning signs, and raised platforms.

Benefits

- Increases the visibility of pedestrians crossing at intersections and controlled mid-block crossings.
- Can have traffic-calming effects if raised or if curb extensions are provided.

Challenges

- Road grades and crowns pose challenges for constructing crosswalks that meet accessibility requirements.
- Multi-lane streets and rural intersections require longer crosswalks and are less comfortable for pedestrians.
- Enforcing stop-bar compliance is important so that drivers do not stop in crosswalks.

Raised crosswalks have traffic-calming effects. This crosswalk crosses two travel lanes, a bike lane, and a parking lane.

Design Criteria

- Place on all legs of signalized intersections, in school zones, and across streets with more than minor levels of traffic.
- Add rapid-flash beacons, signals, crossing islands, curb extensions, and/or other traffic-calming measures when ADT exceeds 12,000 on 4-lane roads or speeds exceed 40 mph on any road.
- Refer to the references and resources listed below for specific design criteria.

Additional Considerations

- There are many different styles of crosswalk striping and some are more effective than others. Ladder, zebra, and continental striping patterns are understood to be more visible to drivers.
- Signal phasing is very important. Pedestrian signal phases must be timed based on the length of the crossing. If pedestrians are forced to wait longer than 40 seconds, non-compliance is more likely.
- Raised crossings calm traffic and increase the visibility of pedestrians.
- Curb extensions, also known as bulb-outs and bump-outs, reduce the distance pedestrians have to cross and calm traffic.
- In Nebraska and Iowa, legal crosswalks—whether marked or unmarked—are present as an extension of sidewalks.

References & Resources

- Omaha Streetscape Handbook (2008)
- NACTO Urban Street Design Guide (2013)
- Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines (2005)
- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG; 2011)
- ADA Accessibility Guidelines (2004)
- Manual on Uniform Traffic Control Devices (2009)

Example Location(s) Where Applied

Cities that have studied marked crosswalks: Boston, MA; Boulder, CO; Clearwater, FL; New York, NY.

Crossing Islands

Facility Technical Sheet

Description

Raised islands located along the centerline of a street, as roundabout splitter islands, or as "pork chop" islands where right-turn slip lanes are present. They provide refuge for pedestrians and allow multi-stage crossings of wide streets.

Benefits

- Provide safe refuge when crossing wide, multi-lane streets.
- Allow shorter signal phases since crossings can be broken down into two or more stages.
- Improve crossings at unsignalized locations, as pedestrians are only required to negotiate one direction of traffic at a time.
- Have traffic calming effects.

Challenges

- Noncompliance with pedestrian signals may decrease with multi-stage crossings due to impatience or feelings of vulnerability.
- While preferable, cut-through medians may accumulate debris and snow more than ramped islands.

This crossing island doubles as a partial diverter. Curb ramps are "cut through," allowing pedestrians to remain at-grade.

Design Criteria

- Minimum width: 6' (8' recommended to accommodate higher pedestrian volumes, bicyclists, and wheelchair users).
- Curb ramps with truncated dome detectable warnings and 5' by 5' landing areas are required.
- A nose that extends past the crosswalk is not required, but is recommended.
- Vegetation and other aesthetic treatments may be incorporated, but must not obscure visibility.

Additional Considerations

- There are two primary types of crossing islands. The first cuts through the island, keeping pedestrians at street-grade. The second ramps pedestrians up above street grade and may present challenges to constructing accessible curb ramps unless they are more than 17' wide.
- Cut-through widths should equal the width of the crosswalk. Cut-throughs may be wider in order to allow the clearing of debris and snow, but should not encourage motor vehicles to use the space for u-turns.
- Crossing islands can be coupled with other traffic-calming features, such as partial diverters.
- Crossing islands may be used to connect two or more off-set crosswalks. This treatment can be used to mitigate challenges associated with off-set intersections and do improve compliance with two-stage crossings.

References & Resources

- NACTO Urban Street Design Guide (2013)
- Manual on Uniform Traffic Control Devices (2009)

Example Location(s) Where Applied

Chicago, IL; Washington, DC; Madison, WI.

Appendix F | Pedestrian Audits

Meeting Minutes

Project: Heartland Connections Regional Bicycle / Pedestrian Plan

Subject: Walking Audits

Date: Tuesday, August 25, 2026

Location: Omaha

Attendees: Attendees Column 1 | Attendees Column 2 (Tab to add more rows)

	Topic	*Facilitator*	*Start*	*End*
1	67th Street and Center Street (Aksarben Village / UNO Arena)	Name	Time	Time

- Do not add right hand turn lanes
- Grade parking to be slightly elevated above street, narrowing perceived street width
- Trees should be between sidewalk and parking
- Pedestrian refuge on Center Street?

2	72nd Street and I-80 (Interstate Crossing)	Name	Time	Time

- Add sidewalks underneath interstate
- Pedestrian crossing facilities at on/off ramps
- Removing right hand turn lane onto interstate would free up space for sidewalk facilities

3	132nd and L Street (West Omaha)	Name	Time	Time

- Implement regulations to prevent future roadways from being built like this

- Ensure pedestrian signals are functional and accurately timed (20 seconds not long enough to safely cross the intersection)
- Ensure pedestrian buttons are easily accessible
- Difficult to retrofit, could add pedestrian refuge in median with button

Cyclist trying to cross 132nd mid-block because there were no sidewalks on the west side of the street

With 7+ lanes in each direction, the intersection is a dangerous and inhospitable place for pedestrians

We had to cross a busy continuious right turn lane in order to reach the pedestrian signal, then we had to wait through two light cycles before getting a walk signal

		Name	Time	Time
4	24th and California / Burt / Cuming Streets (Creighton)			

- Consider pavers in intersection and smooth concrete crosswalks (ADA friendly)
- Do not place street furniture in conflict with pedestrian walkways
- Eliminate unnecessary curb cuts
- Potential road diet on 24th at Creighton main entrance (4 lane to 2

lane)

- Remove traffic light at 24th and Creighton, giving pedestrians priority
- North 20th Street (East Side) is a good example of a pleasant pedestrian experience

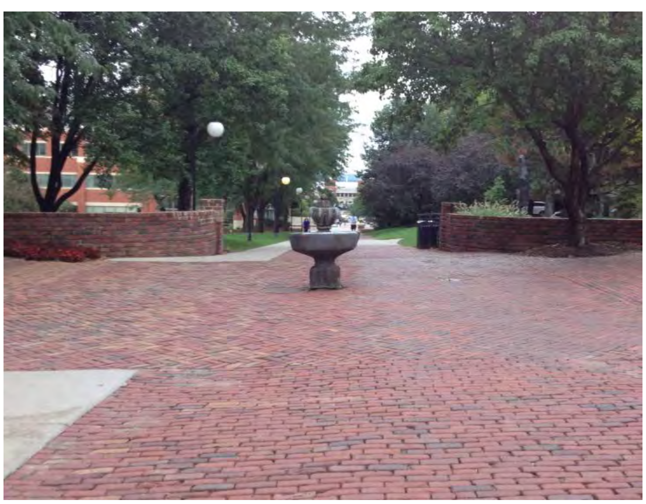
Eliminate unnecessary curb cuts along Cumming Street

Beware of placing street furniture that conflict with pedestrian paths

Trees should act as a buffer shielding pedestrians from the moving vehicles, not the parking lot

Pedestrians should be given priority crossing 24th Street, potentially with a ‘speed table’ that keeps the sidewalk grade

Sidewalk on the Eastern half of 20th Street is a good example of trees and parked cars separating pedestrians from the street



Although this example is a pedestrian promenade, it is a good example of fountains and other 'obstacles' in the middle of intersections. They add beauty to the street while also slowing traffic through the intersection.

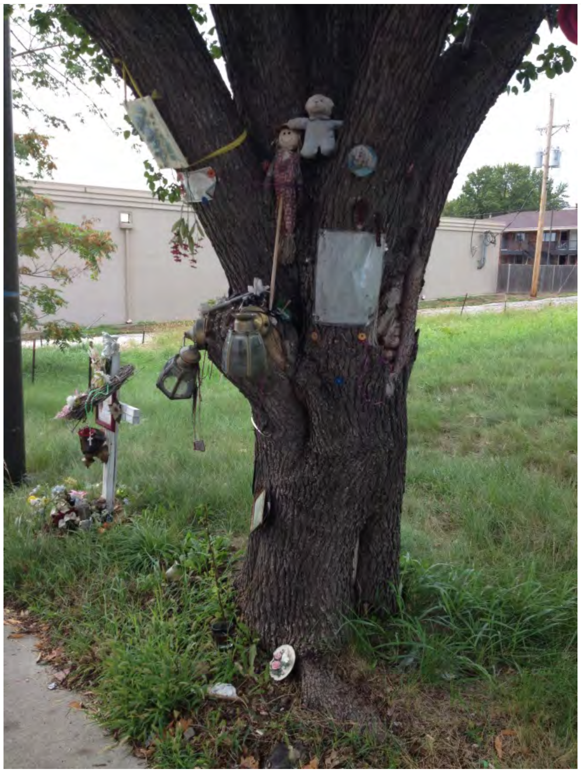
5 Saddle Creek to Emile (Leavenworth) Name Time Time

- Potentially add a wide shared right hand lane on Leavenworth
- Focus pedestrian amenities at critical ‘nodes’ ie. Bus stops, public parks, retail areas

Looking East on Farnam Street across Saddle Creek. Potential to extend pathway on the north side of the street to provide a wider sidewalk for pedestrians and cyclists.

6 37th – 40th Street and Dodge Name Time Time

- Pedestrians cross at 39th because it is the safest place along that stretch of Dodge – at the crest of a hill
- The hill creates blind spots for drivers to see pedestrians, which is especially dangerous because they often drive 10+ mph faster than the posted speed.
- Dodge is an auto-oriented road, any traffic calming - wider sidewalks, street trees, on-street parking, pedestrian crossing signals would greatly benefit pedestrians



Memorial site for people who have been killed at these intersections on Dodge Street

Crest of the hill at 39th Street, looking East

Pedestrian Crossing Dodge at 40th Street

7 69th – 74th and Dodge | Time | Time

- There are a surprising number of pedestrians crossing this intersection, considering the lack of facilities
- New development shows some improvement, with a consistent sidewalk connecting all the developments

New sidewalk on the north side of Dodge is an (slight) improvement to the pedestrian experience

Drive lane between commercial stores should connect, allowing people access between stores without having to get onto Dodge

8 South Omaha – 24th Street Business District Name Time Time

- The district functions fairly well from a pedestrian movement and activity perspective.
- If the streetscape project had involved complete reconstruction of the roadway, then the elevation of the roadway could have been lowered in relation to the sidewalk.
- The fixed-in-place seating elements eliminate the possibility of usable outdoor space and café areas.
- Stormwater drainage treatments could have been handled differently, specifically through the inclusion of channel gutters between the travel lanes of the street and parking.

9 Bellevue – Galvin Road & Harvell Drive Name Time Time

- This is a massive intersection. New pedestrian facilities would require considerations of design speeds for eastbound traffic on Harvell as cars come down the hill.
- In addition, the large storm sewer running perpendicular to and under Harvell will impact where facilities could be placed.
- The team came up with a solution that extended new pedestrian facilities outward from intersection, helping to connect better to surrounding retail areas and Bellevue University. The “loop” would involve new midblock crossings of both Harvell and Galvin.

10 Council Bluffs – 100 Block of Broadway Name Time Time

- Most drivers utilize this section of Broadway as a cut-thru between downtown and Kanesville Avenue to the east.
- Car speeds make walking in the district uncomfortable at times.
- The streetscape seems nice and well-maintained.
- Here again, if the roadway had been completely reconstructed, elevations could have been adjusted to better emphasize the sidewalks.

11 Council Bluffs – 25th & West Broadway Name Time Time

- See Ian for comments from he & Doug.