VOLUME 2

DAVENPORT GO

a multi-modal enhancement plan

March 2019

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DAVENPORTGO

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ACTIVE TRANSPORTATION ENVIRONMENT

This chapter outlines the existing conditions in the city pertinent to walking and biking. These conditions include the foundational plans and organizations influencing active transportation today, and the determinants of a future bicycle networks.

4

DAVENPORT TODAY

This section considers factors that can help determine the structure and character of the Davenport area active transportation network. Areas of analysis break into two general areas, demand and existing land use.

Demand

Factors that suggest a need for facilities and can be analyzed together to suggest the structure of the network. These factors include both points of origin such as population density and destinations such as parks, schools and places of employment. Areas of analysis include:

- **Existing land use**
- **Future land use**
- **Population density**
- **Employment density**
- **Community destinations**

Facilities – These factors analyze aspects of existing infrastructure and their suitability for a future active transportation network. Areas of analysis include:

- **Functional street classification**
- **Trails and bike routes**
- **Average daily traffic**

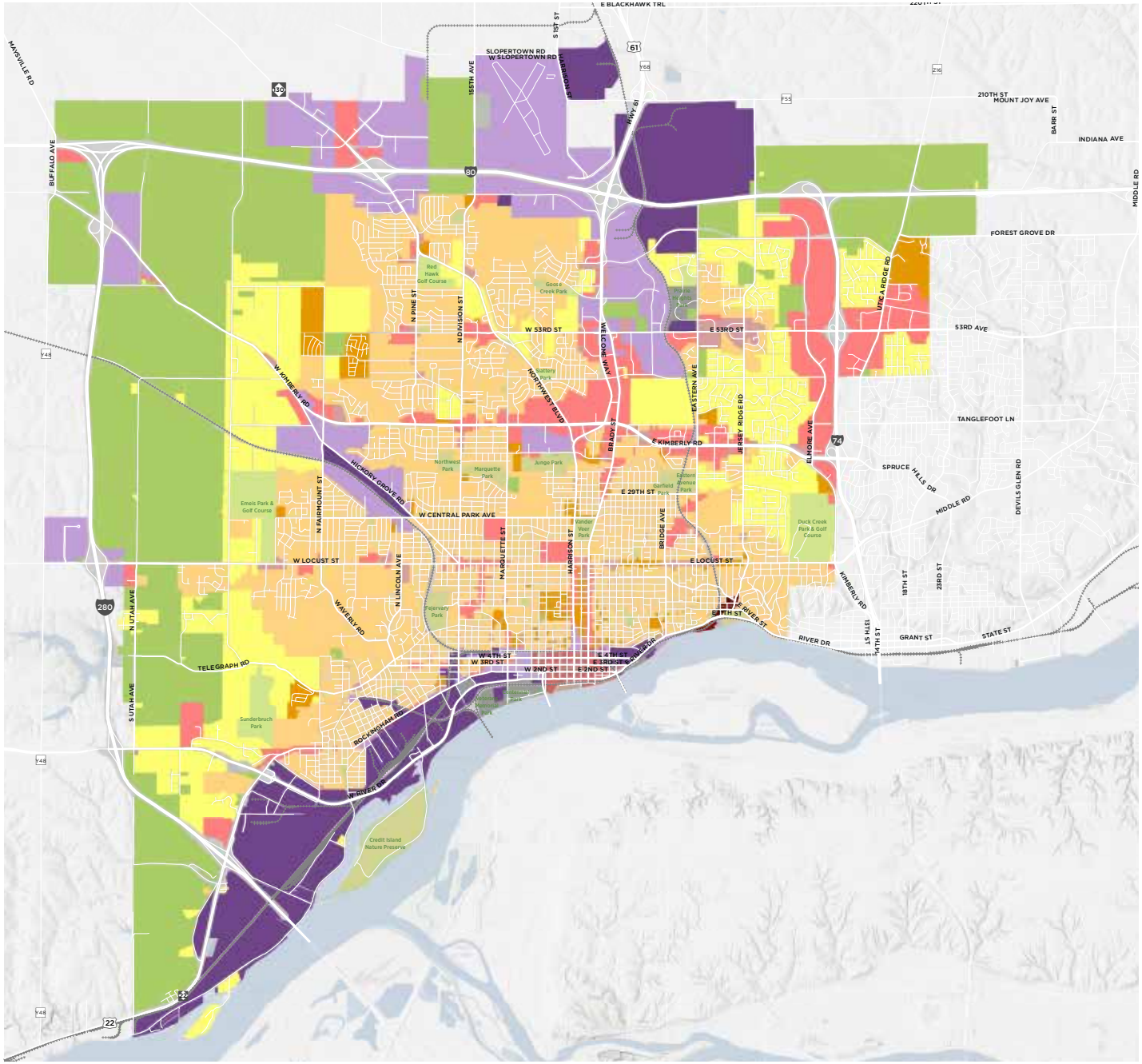
Existing Land Use

Land use patterns help determine the structure of an active transportation network. Major determinants include concentrations of higher density housing, major employers, medical complexes, civic and cultural uses, and commercial concentrations. Map 4.1 shows the current zoning districts in Davenport, a likely indication of how most properties are being used.

The streets that serve some of these key areas may not be fully compatible with bicycle transportation, but all should accommodate pedestrians and provide secondary accessways for bicyclists. Key land use factors include:

- **Downtown Davenport with its variety of amenities and attractions.** Downtown naturally developed as a pedestrian friendly atmosphere. However, over time the safety of downtown streets and crossings have decreased from increased use of the automobile and less residential uses. Today, downtown is once again a primary destination in Davenport for many users from employees to residents calling downtown home.
- **Park and recreation amenities throughout the community.** Parks are well spread to serve the existing population. Parks generally serve areas within 0.5 miles or a ten minute walk, but only when safe and adequate active transportation facilities are in place.
- **Major highway systems that border and intersect the community.** Many major roadways create barrier for cross-connectivity of the multi-modal system. These corridors are also areas of commercial destinations and employment centers.
- **Commercial centers throughout Davenport, specifically in north central and downtown Davenport.** Commercial nodes provide services to residents and visitors, generally in areas of higher automobile traffic.
- **Schools and other civic uses regularly accessed by a variety of people.** St. Ambrose University and Palmer College of Chiropractic create significant active transportation activity. The Davenport School District consists of four high schools, five intermediate schools, 18 elementary school, and two academies that are accessed by thousands of parents, teachers, and students every day.

Map 4.1: Current Zoning Map



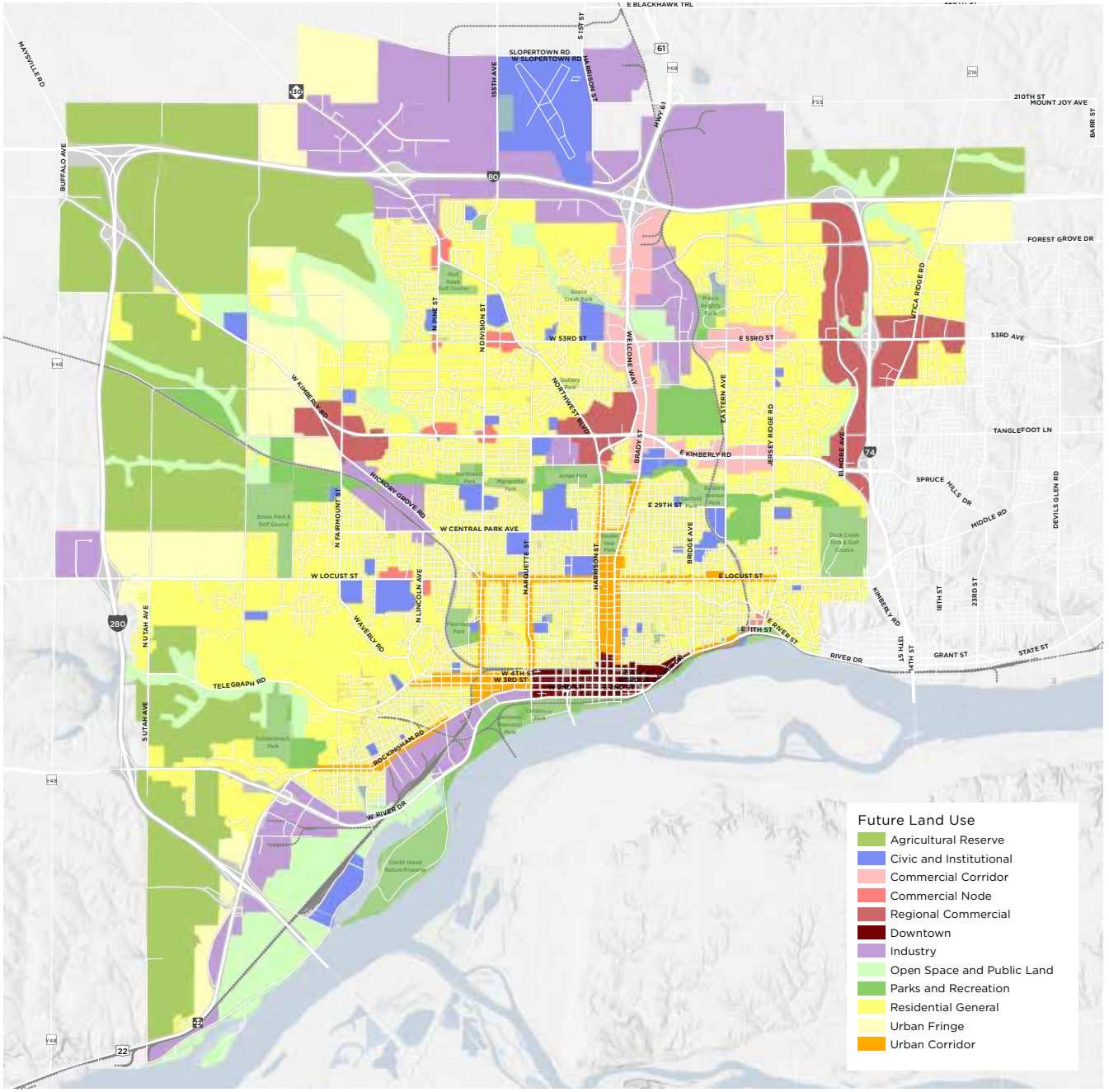
Future Land Use

An active transportation network should ultimately be master planned to serve projected growth directions, illustrated by the Future Land Use map in Map 4.2.

Key directions include:

- Expansion of the network as areas in northwest and west Davenport become developed.
- Continuation of the greenway system and riverfront access.
- Increased industrial uses to the north leading to higher employment in these areas.
- Continued commercial corridors along Interstate 74 and Highway 6.
- Expansion of 76th Street, Veterans Memorial Parkway, and Eastern Iowa Industrial Center.

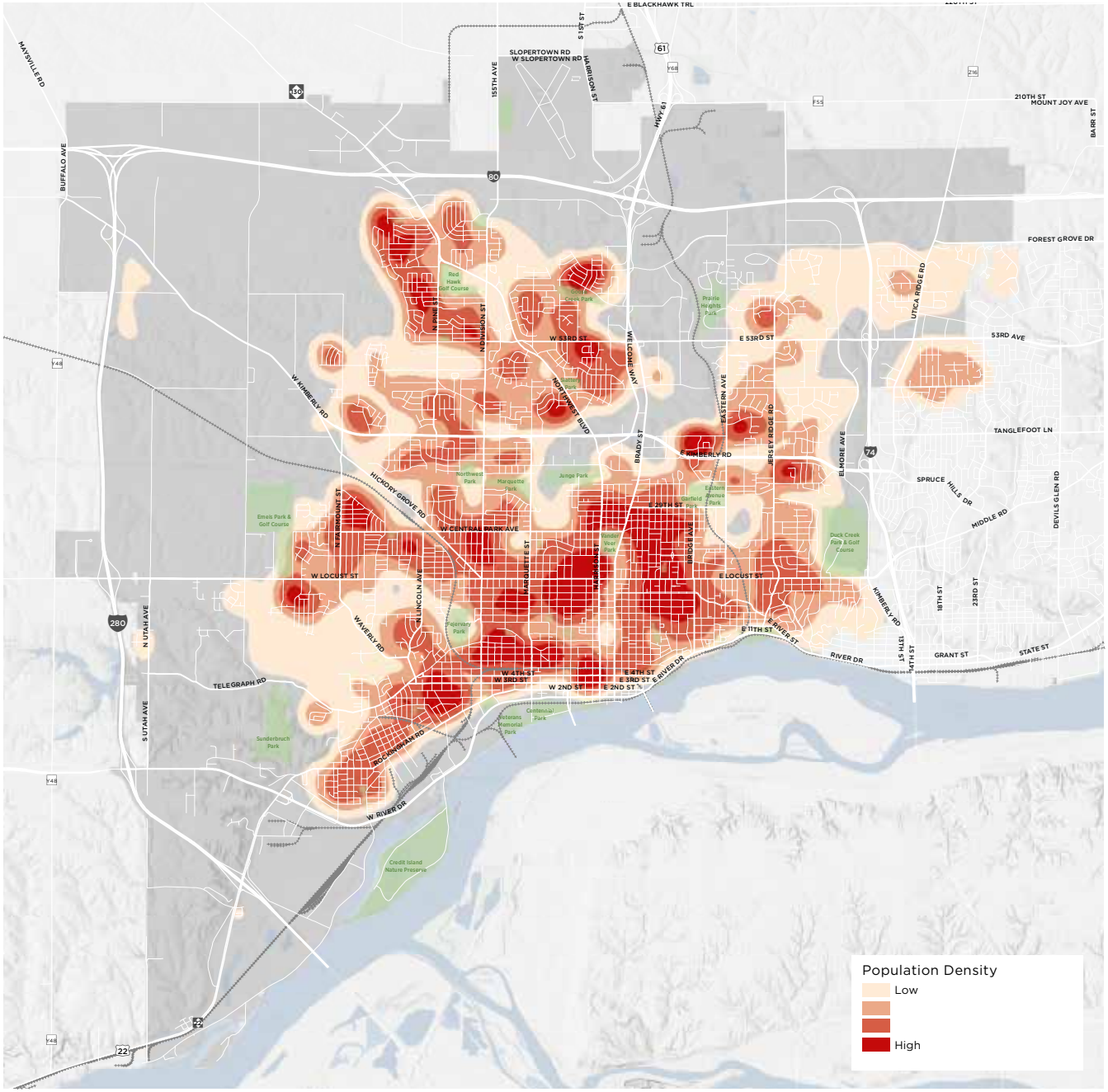
Figure 4.2: Future Land Use



Population Density

Population density is correlated to active transportation demand. As density increases, more destinations are located closer to more people, bringing biking and walking within the capability of a larger population. Map 4.3 shows the population density across Davenport. The population transitions between clusters of higher density population. The higher density nodes need safe and accessible routes to reach other areas of the community.

Map 4.3: Population Density

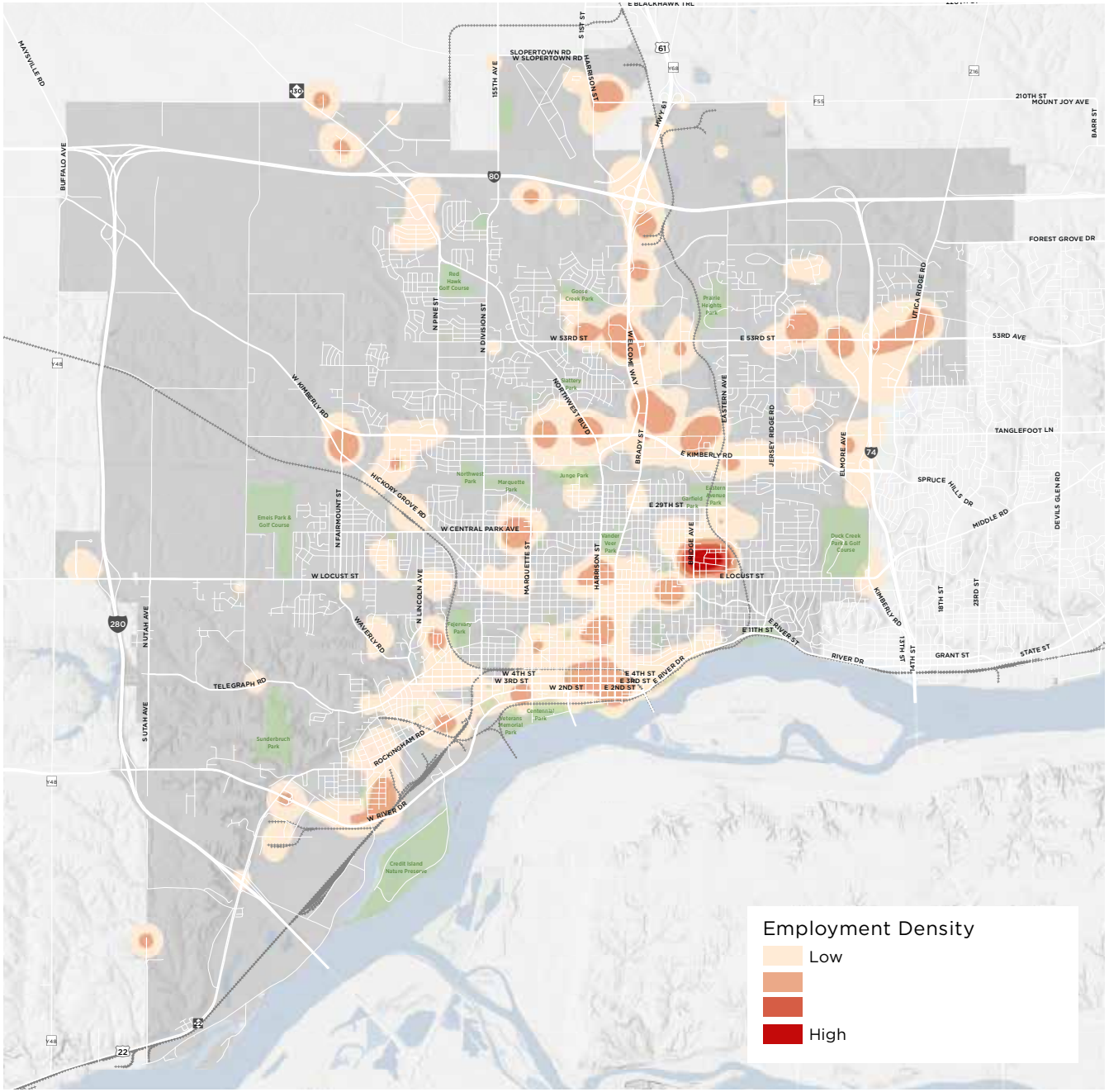


Employment

Employment density is also correlated to active transportation demand, identifying concentrated job centers. Map 4.4 uses census data to illustrate job concentrations in the city. The city's most concentrated employment areas are:

- The area around the Northpark Mall
- The commercial node at the intersection of E. 53rd Street and Jersey Ridge Road
- The areas around the NorthPark Mall
- The Genesis Medical Center and surrounding service uses
- Downtown Davenport

Map 4.4: Employment Density

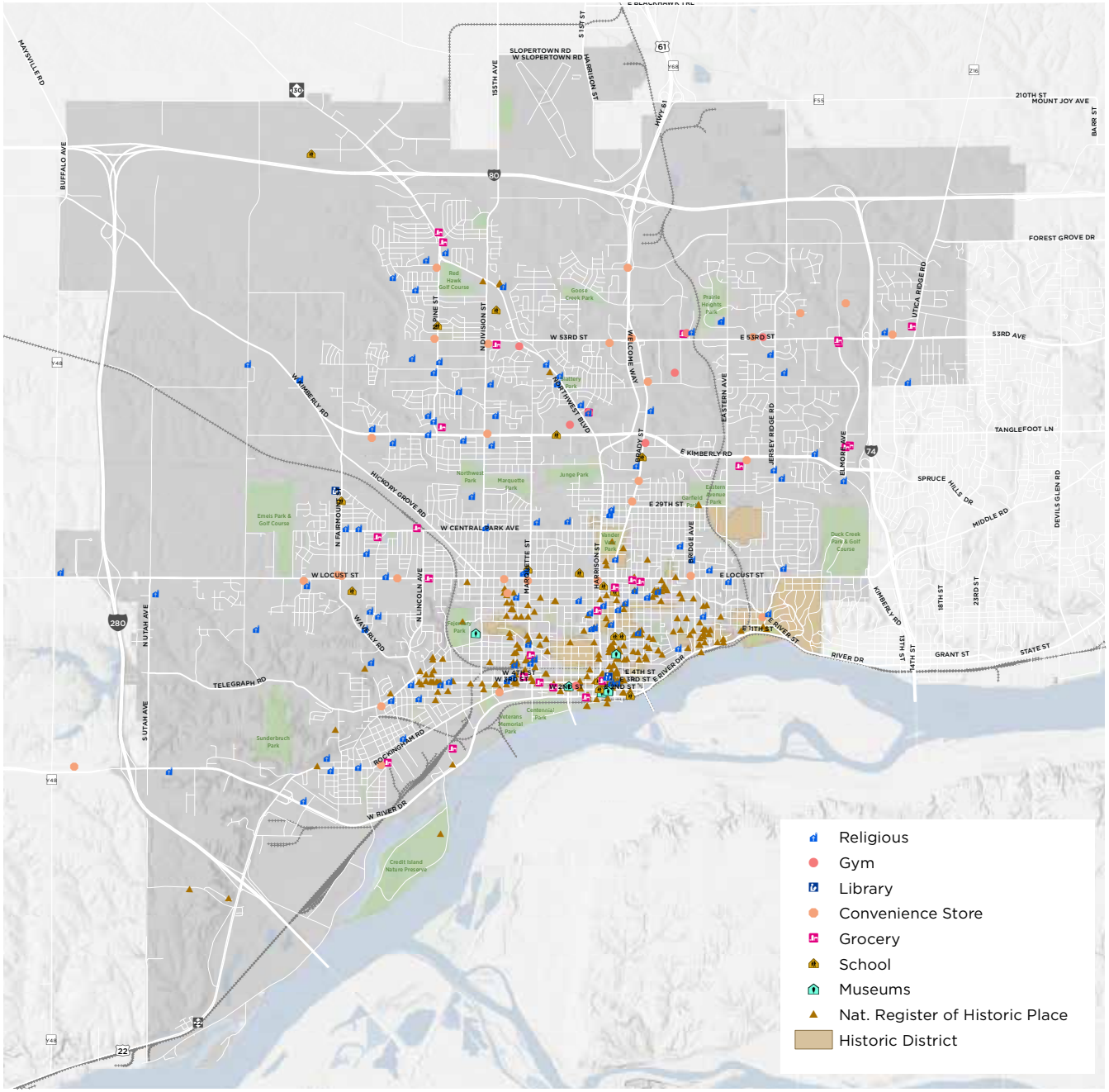


Community Destinations

A primary focus of an bicycle and pedestrian plan is to connect destinations, both commuting and recreational destination. Active transportation is, as its name states, a form of transportation to get from one place to another. Even recreational cyclists and walkers tend to have a destination in mind, whether a park, trail, commercial business, or community attraction.

Map 4.5 shows the location of many community destinations in Davenport. The map shows destinations spread throughout the community with a cluster of locations near the city core. Destinations like schools and grocery stores helps create quality neighborhoods, especially when they are accessible by foot or bike. Other destinations such as parks are a top priority for quality of life sought by potential new residents and businesses. Increasingly within the definition of parks are the trails systems that connect them together, allowing making easy connections from neighborhoods to park areas. Several gaps in the Davenport trail/ pedestrian/bicycle system are challenges to access all parks and community destinations by active transportation.

Map 4.5: Community Destinations

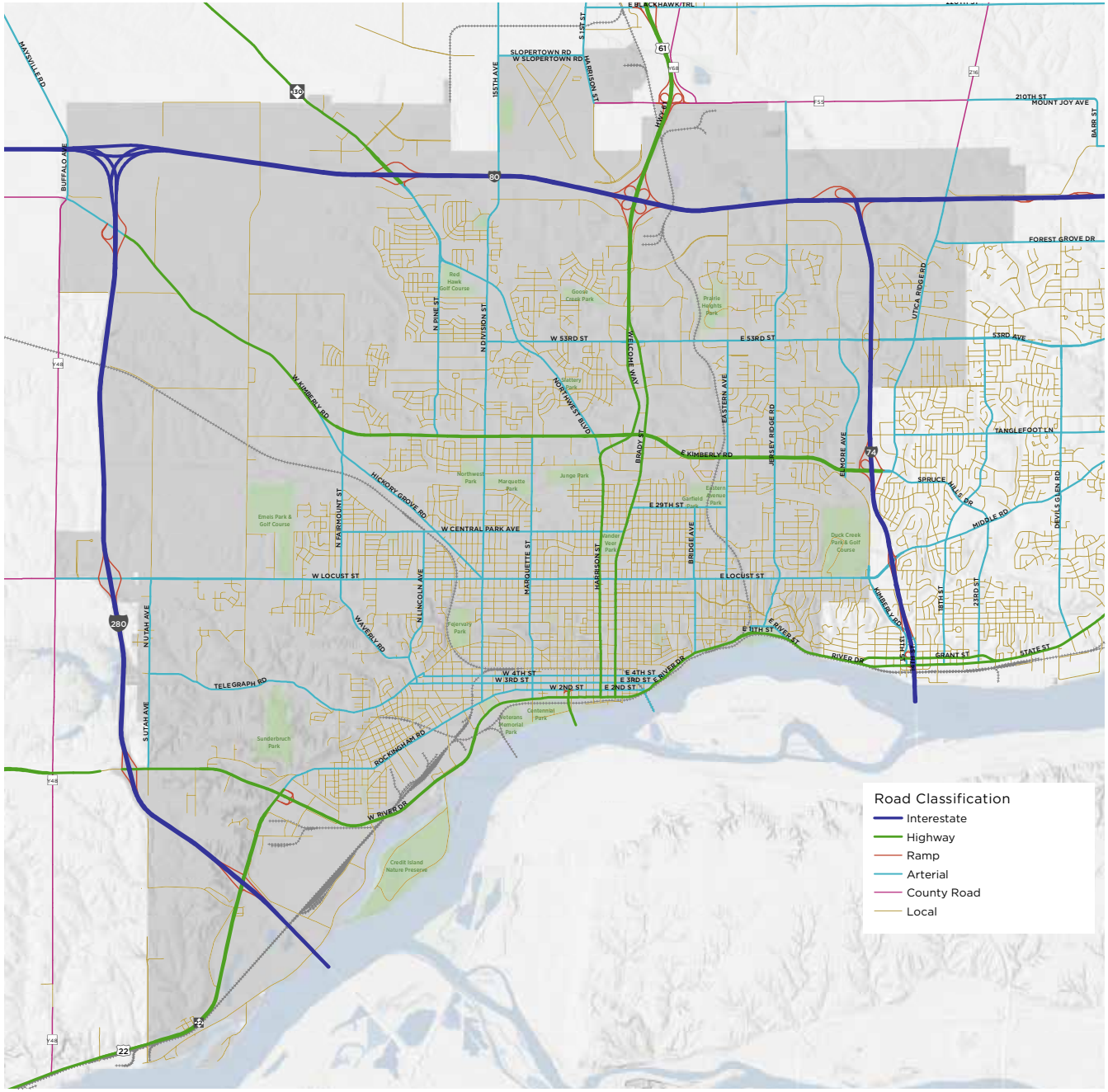


Transportation Facilities

The street and trail networks provide the framework for an active transportation system. The functional classification of streets help understand the safest and most direct routes to destinations, including where opportunities exist for off-street trails or side paths.

Map 4.6 shows the road classification network in Davenport. Interstate 80 and Interstate 74 generally mark the outer limits of the community. A series of highways and arterials spur outward from the downtown and riverfront. Primary north/south arterials include Highway 61/Brady Street, Northwest Boulevard, and Division Street. The main east/west arterials connecting to Bettendorf and rural Iowa include Locust Street, Highway 6/Kimberly Road, and 53rd Street to Northwest Boulevard. The majority of the community is accessible by the local street system and the first point of access for active transportation users.

Map 4.6: Road Classification



Bicycle Network

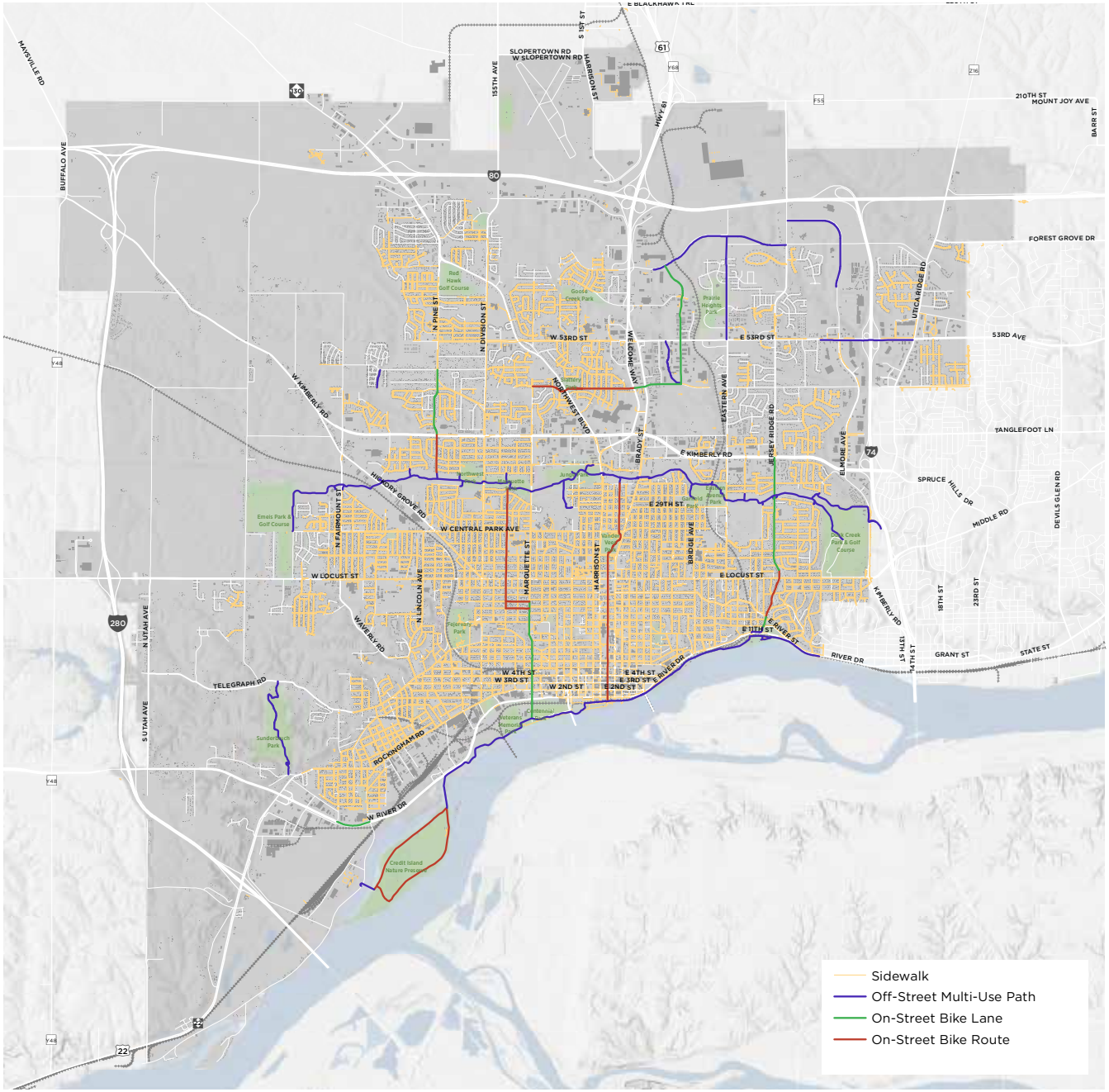
Davenport has assembled the foundation of a bicycle and trail network. Map 4.7 shows the existing network, excluding paths currently planned for implementation. The highlight of the network are two off-street multi-use paths: Duck Creek Trail and the Mississippi River Trail.

- The Duck Creek Trail is a 12.2 mile east/west trail spanning from Emeis Park in Davenport to Havens Acres Park in Riverdale. The trail is hard surfaced and is adjacent or near many neighborhoods, community amenities, schools, and network connections.

- The Mississippi River Trail spans multiple communities. Davenport's sections includes 13.3 miles. The trail is located between the Mississippi River and Highway 67. Several community destinations are accessible from the trail, assuming access is available across Highway 67/River Drive.

The other portions of the bicycle network include sporadic portions of side paths, on-street bike lanes, and designated on-street bike routes. Completing several key gaps with bike facilities in the existing network would exponentially increase bicycle connectivity in Davenport.

Map 4.7: Bicycle Facilities



Street Environments

AVERAGE DAILY TRAFFIC

The previous discussion of street classifications and existing facilities discussed the primary routes for vehicles and bicycles. Map 4.8 illustrates average daily traffic throughout the street system to identify opportunities for on-street linkages. Different ranges of traffic also are associated with different types of on-street infrastructure treatments for bicycle and pedestrian facilities: higher levels require a greater degree of separation from vehicles for many cyclists and present crossing barriers to pedestrians:

0 to 1,500 vpd: Generally comfortable for most cyclists without extensive infrastructure, relatively comfortable and crossable for most pedestrians.

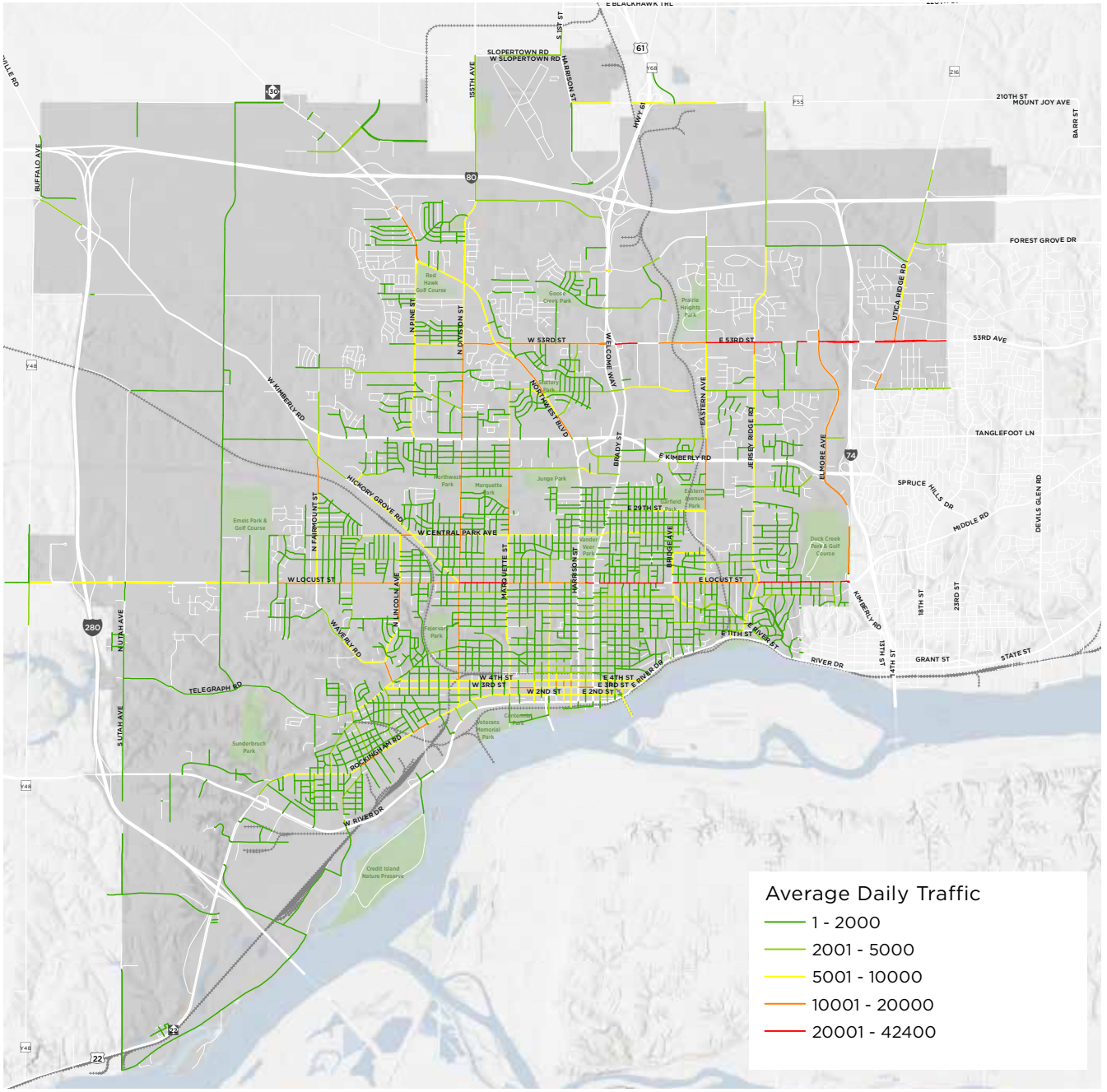
1,500-3,000 vpd: May be uncomfortable for inexperienced cyclists. Shared lane markings and conventional bike lanes as volumes approach 3,000 vpd may be required for greater comfort levels. Pedestrian crosswalks may be required.

3,000-5,000 vpd: Typical threshold for conventional bike lanes. Require well-defined crosswalks, caution signs, and possible traffic controls at key crossings.

5,000-10,000 vpd: Requires substantial experience and comfort with shared traffic from cyclists. Conventional bike lanes are typically recommended, with protected bike lanes at higher levels. Separation of sidewalks from curbs and well-designed crosswalks with traffic controls/ refuge medians at key crossings highly desirable.

Over 10,000 vpd: Protected bike lanes, enhanced side-paths or use of alternative routes for cyclists. Sidewalk separation from curb and well-designed crosswalks with traffic controls and refuge medians at key crossings are highly desirable.

Map 4.8: Average Daily Traffic

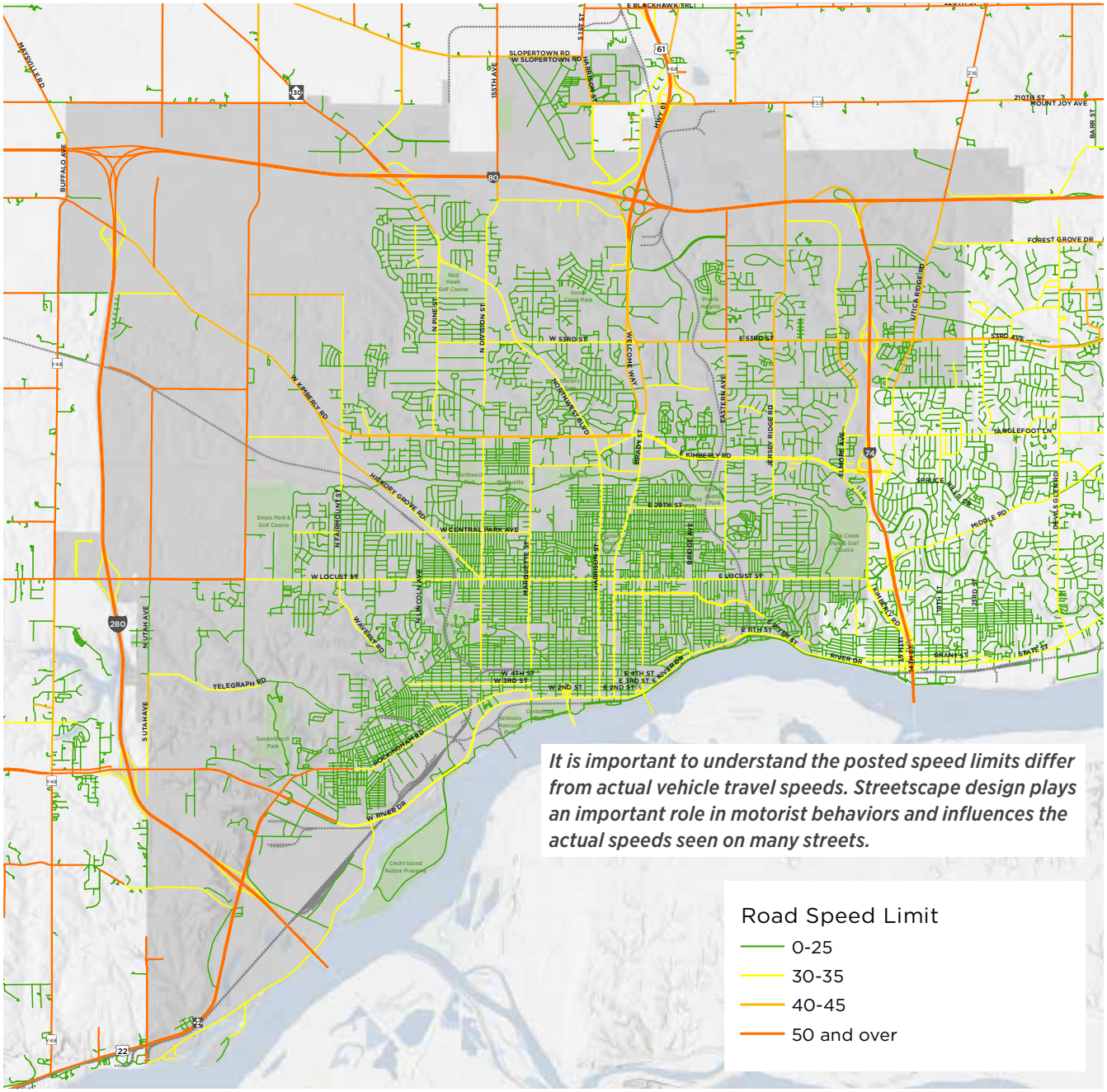


SPEED LIMITS

Map 4.9 shows the posted speed limits on Davenport streets. Determination of speed limits are correlated to the functional classification. Streets with low speed limits and low traffic counts are candidates for active transportation corridors. However, the street must also provide convenient access to destinations or the larger network.

Traffic speeds also inform where more separation is between pedestrians/bicyclists and the vehicle travel lane. For example, streets like Jersey Ridge Road that have posted speed limits of 30-35 mph. It is important to understand the posted speed limits differ from actual vehicle travel speeds. Streetscape design plays an important role in motorist behaviors and influences the actual speeds seen on many streets. Elements such as wide travel lanes, building setbacks, lane striping, frequency of intersections, among other factors ultimately determine the speed of vehicle unless there is a strict enforcement presence.

Map 4.9: Speed Limits



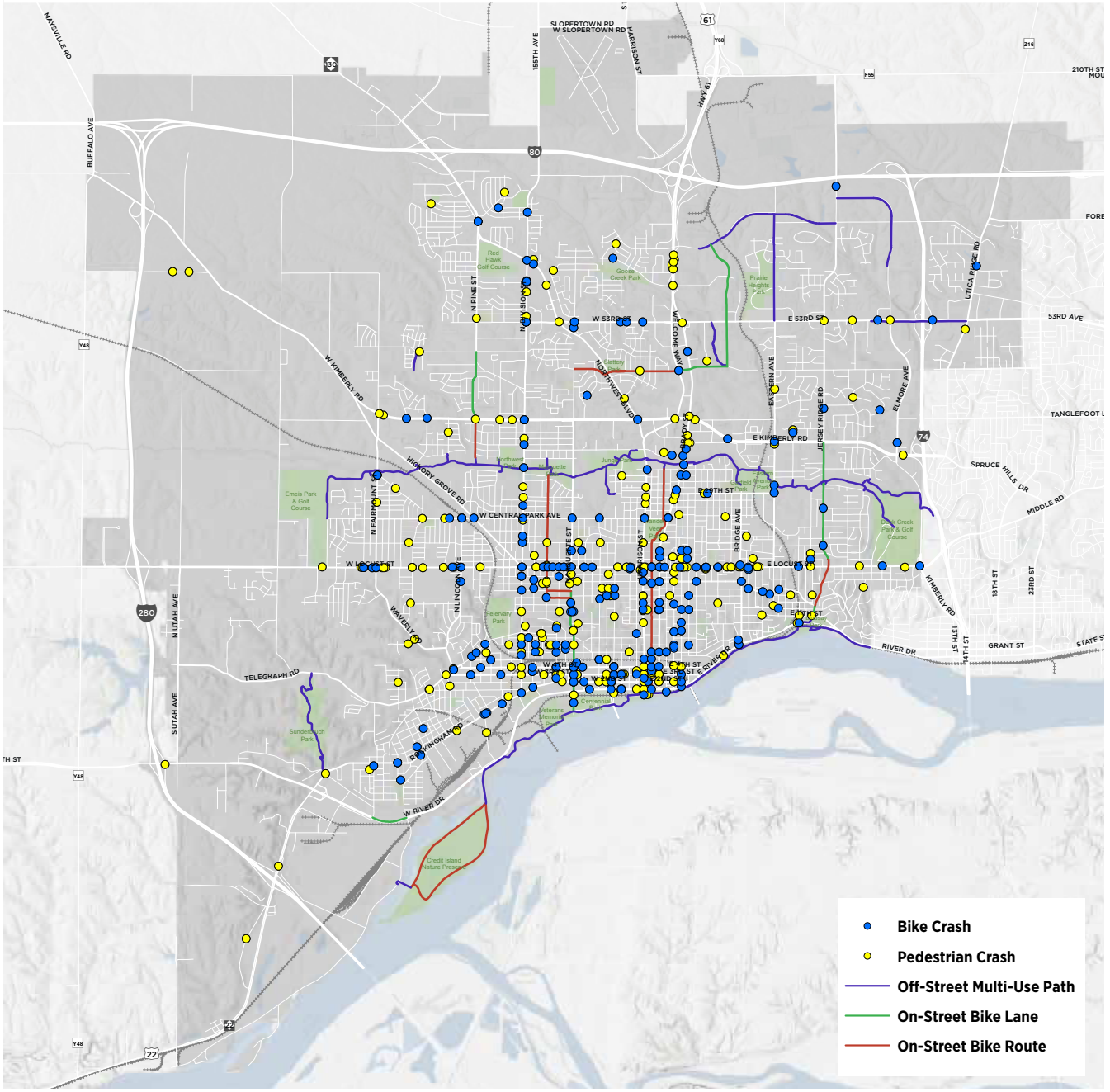
CRASH CLUSTERS

Incidence of pedestrian and bicycle crashes pinpoint specific problems that system planning must strive to address. Map 4.10 locates crash history between 2009 and 2016. It is important to note that the number of collisions reported is likely an underestimate of the actual number of collisions that take place because some parties do not report collisions to law enforcement, particularly collisions not resulting in injury or property damage. Although under-reporting and omissions of "near-misses" are limitations, analyzing the collisions can reveal spatial and behavioral trends or design factors that may contribute to collisions in Davenport. A more detailed report is included as a separate report to this plan.

Analysis of the map indicates that:

- There were 236 bicycle related crashes and 264 pedestrian related crashes between 2009 and 2016.
- Many bike crashes cluster around the downtown area and major corridors like Locust Street, Brady Street, and Division Street. However, these areas also have higher traffic volumes that statistically will increase the number of accidents. Therefore, bicycle facilities become even more important.
- Pedestrian crashes are clustered in similar locations as bicycle crashes. Although are somewhat more distributed into neighborhoods.
- Areas with bicycle facilities in the vicinity appear to have fewer crash instances, both on- and off-street facilities.
- Intersections are the most prevalent location for both bike and pedestrian crashes.
- There were no fatal bicycle crashes reported in the City and nine fatal pedestrian crashes.

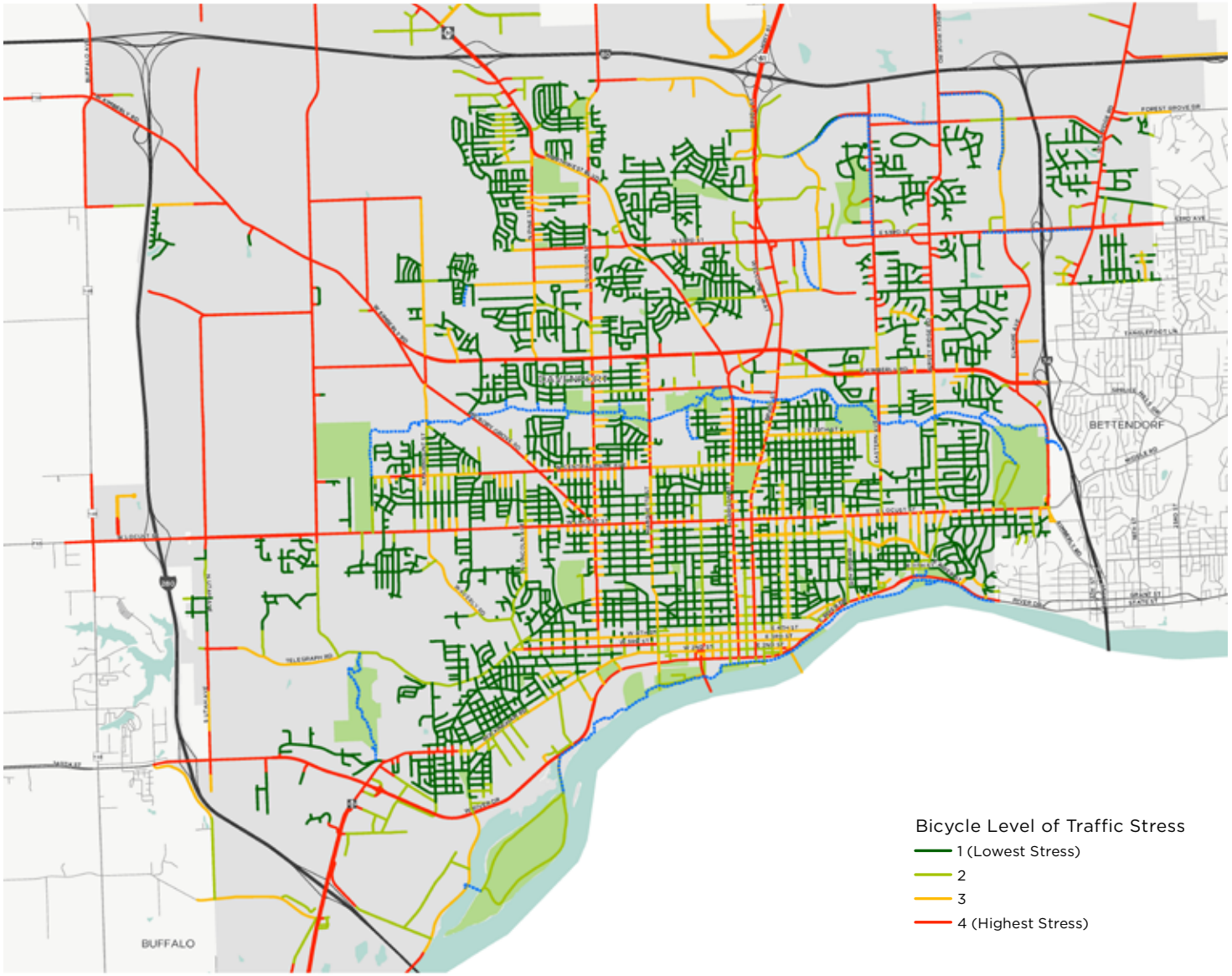
Map 4.10: Crash Locations



Level of Stress Analysis

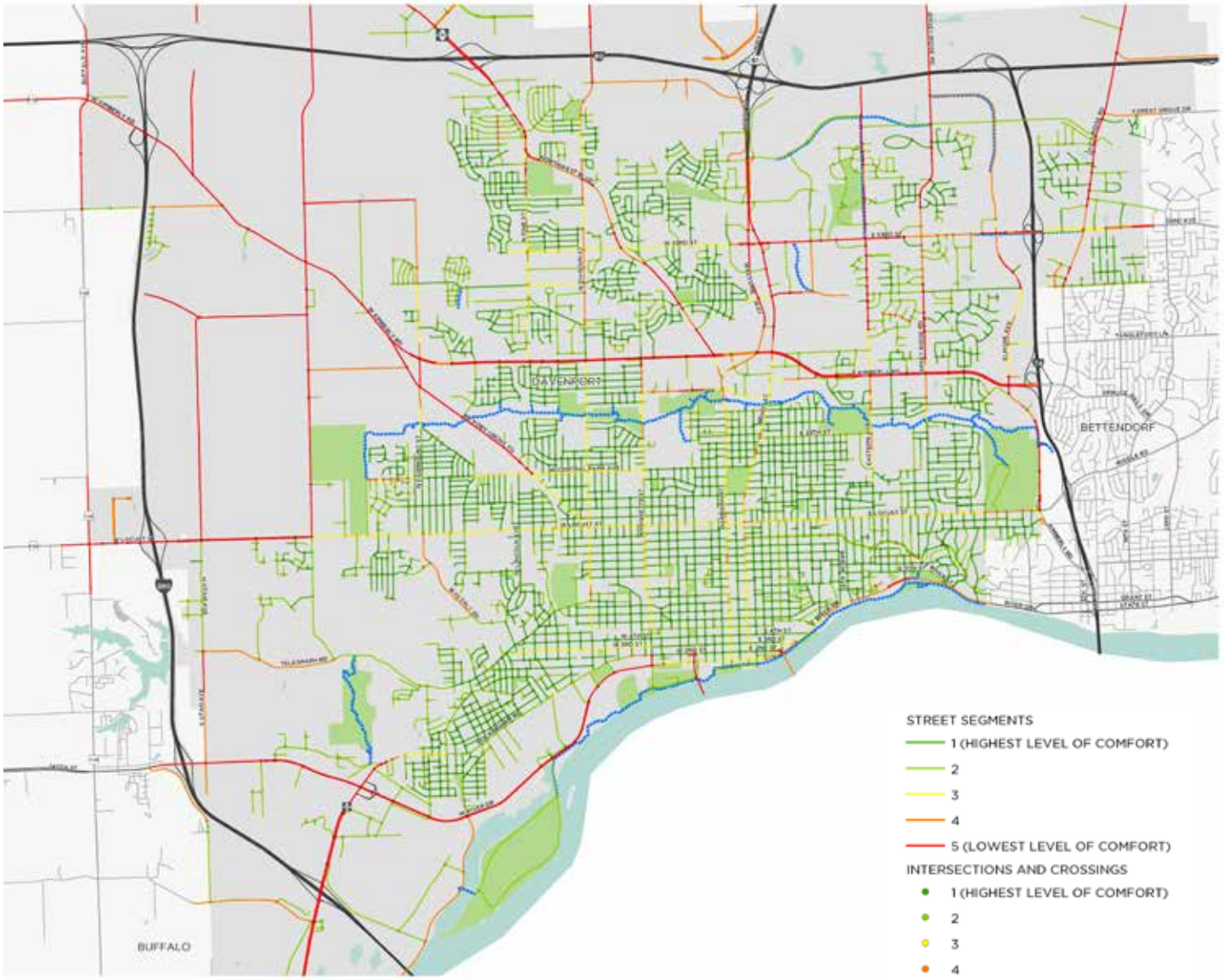
All of the previous sections provided data to calculate the level of stress for bicyclists and pedestrians along and on Davenport's street network. The results of this analysis are shown in Map 4.11 and 4.12. A stressful environment deters active transportation in addition to being unsafe for many users. The two figures are the basis for identifying active transportation improvements to higher stress segments needed for a complete network and to identify new network routes on lower stress street segments.

Map 4.11: Bicycle Level of Stress



Source: Alta Planning + Design

Map 4.12: Pedestrian Level of Stress/Service



Source: Alta Planning + Design

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MARKET FOR ACTIVE TRANSPORTATION

This chapter investigates the market for bicycling in Davenport - the number of potential cyclists and pedestrians and the preferences of that potential market. It draws heavily on new and recent census information, national trends, and the 350+ citizens who responded to the Davenport GO Multi-Modal Transportation Survey.

5

INTRODUCTION

Before building a major shopping center or apartment project, a developer usually commissions a market analysis, designed to determine whether enough people will shop or live there to support the effort and to define the features that will appeal to customers. Similarly, an active transportation master plan should also evaluate the size and character of the potential market. This helps assess the impact of a bicycle and pedestrian transportation program on factors such as motor vehicle traffic and emissions. It also helps us understand what the existing and potential bicycling community wants of the program, in turn increasing the chances that active modes can reach their potential for Davenport and the region.

This market study uses two major instruments:

- Estimates of existing and future pedestrian and bicycling demand: Using a demand model developed by Alta Planning & Design that is clear, straightforward, and easy to track for future measurement.
- The results of the Davenport GO: A Multi-Modal Transportation Plan. This survey was completed by 368 people, a very satisfactory participation rate for a community of this size, and provides valuable information about the city's potential active transportation community.

EXISTING ACTIVE TRANSPORTATION DEMAND

Tables 5.2 and 5.3 on the following pages use the Alta model to estimate existing and potential pedestrian and bicycle demand. Primary sources of information include the 2012-2016 average computations of the American Community Survey (ACS), developed by the Census Bureau, and 2010 Census data, Federal Department of Transportation, and the Safe Routes to School Program. The model makes certain assumptions about transportation choices of populations such as K-12 and college students. The sources of these assumptions are included in the table.

Davenport now has an estimated 56,366 daily pedestrian trips and about 4,987 daily bicycle trips for all purposes (including recreational activity). Walking has a 2.32 percent commuter mode share. Bicycling has a 0.42 percent commuter mode share. This contrasts with Minneapolis with a bicycling mode share of about 3.9 percent, one of the highest in the nation. Table 2.1 shows the mode share in a variety of other cities.

2030 Midpoint Demand

Tables 5.2 and5.3 provide both projections of trips made by pedestrians and bicyclists at 50 percent and 100 percent completion of the proposed system, based on a 20 year implementation schedule between now and 2040. At the mid-point, enough infrastructure has been put in place to have a significant impact on transportation choices. This midpoint model paints a picture of what Davenport's transportation could be 10-12 years from now with gradual implementation of an improved pedestrian and bicycle system. It assumes that:

- Walk-to-work commuters increase from about 2.32 percent to 3.25 percent of all workers, a very modest increase.
- Transit's share of the modal mix increases from 1.27 percent to a 3.25 percent as system and accessibility improvements continue to be made according to regional planning efforts.
- Bicycle commuting, encouraged by new infrastructure, could increase to about 1.2 percent by 2030.
- About 22.5 percent of K-8 students will walk to school, compared to an assumption of about 17 percent today. This is still far lower than the 60 percent of students who walked to school thirty years ago.

Applying these changes increases daily pedestrian trips from about 56,366 in 2016 to about 83,578 in 2030, almost doubling over the 12 year period. Bicycle trips could increase from about 4,987 to about 20,772 daily trips. These very attainable changes begin to have a real impact on the overall transportation picture in Davenport. This model assumes that by 2030, about 8% of work commuting trips will eventually be made by "active transportation" modes – transit, foot, and bicycle.

2040 Potential Demand

Tables 5.2 and 5.3 project full implementation in Davenport of the complete pedestrian and bikeway system, along with supporting education and encouragement programs. This projection assumes that the city will grow at an average annual rate of 0.30 percent during the next 20 years, the general growth rate forecasted in the Comprehensive Plan: Davenport + 2035. It also projects that active modes will claim a 10 percent mode share by 2040 and that 2 percent of Davenport's residents will cycle to work. The number of K-8 students walking to school will increase to 25 percent, still far below levels experienced thirty years ago.

All of the assumptions result in an increase of weekday pedestrian trips from 56,366 in 2016 to about 102,969; and an increase in weekday bicycle trips from about 4,987 in 2016 to about 28,196.

In addition to making a significant contribution to the carrying capacity of streets in Davenport, active transportation also can have significant health benefits. Assuming that the average bicycle trip is about two miles and the average pedestrian trip is 0.5 miles, the projected number of added trips made by active transportation adds 46,418 bicycle miles (or 3,868 hours at 12 mph) and 23,301 pedestrian miles (or 7,767 hours at 3 mph). The impact of this level of physical activity and calorie consumption can be highly beneficial to the city's residents.

It is also important to note that these projections do not include technological change that can make bicycling even more widespread. Many observers believe that the introduction of e-bikes, which use a small electric motor to assist pedal-driven bicycles, will broaden the appeal of bicycling for transportation. On-street infrastructure is particularly well-suited to accommodating these more capable vehicles.

Table 5.1: Comparative Cities' Mode Share

CITY	TOTAL COMMUTERS	WALK %	BIKE %
Davenport, IA	46,491	2.3	0.4
Omaha, NE	204,463	2.8	1.0
Cedar Falls, IA	21,886	9.9	0.9
Des Moines, IA	102,291	2.8	0.4
Dubuque, IA	28,631	4.9	0.4
Sioux City, IA	39,661	1.7	0.2
Duluth, MN	41,795	5.8	0.8
Edina, MN	22,150	1.5	0.7
Lee's Summit, MO	45,488	0.4	-
Lincoln, NE	141,747	2.8	1.7
Fargo, ND	65,138	3.5	0.7
Beaverton, OR	45,685	3.4	1.1
Gresham, OR	47,569	2.6	0.7
Sioux Falls, SD	89,272	2.1	0.4
Bellingham, WA	39,308	8.3	3.3
Cedar Rapids IA	65,912	2.9	1.8

Source: 2012-2016 American Community Survey

Table 5.2: Existing and Projected Pedestrian Trips, 2016-2040

PEDESTRIAN TRIPS	2016 BASE YEAR	2016 SHARE (%)	2020	2020 SHARE (%)	2030	2030 SHARE (%)	2040	2040 SHARE (%)	ASSUMPTIONS/SOURCES
Population	102,305		104,898		108,360		111,655		2016: ACS Base; 2016-2040 0.3% average annual growth rate from the Comprehensive Plan
Population 16 Years and Older	48,259	47.17%	49,482		51,115		52,670		2012-2016 ACS
Total Population Commuting to Work	46,491	45.44%	47,669		49,243		50,740		2012-2016 ACS
Walk to Work	1,062	2.28%	1,192	2.50%	1,600	3.25%	2,030	4.00%	Base year: 2012-2016 ACS
Work at Home Population 16+	1,786	3.70%	1,831	3.70%	1,891	3.70%	1,949	3.70%	2012-2016 ACS
Work at Home Pedestrian Trips	446	25%	458	25%	473	25%	487	25%	25% make one ped trip
Take Transit to Work	579	1.25%	1,192	2.50%	1,600	3.25%	2,030	4.00%	Base year: 2012-2016 ACS
Walk to Transit	444	75%	894	75%	1,200	75%	1,522	75%	75% walk to transit
School Population K-8	13,197	12.90%	13,531	12.90%	13,978	12.90%	14,403	12.90%	2012-2016 ACS
K-8 Pedestrian Trips	2,217	16.80%	2,706	20.00%	3,145	22.50%	3,601	25.00%	National Center for Safe Routes to School, 2013, 15.2% walk to/ 18.4% walk home from school
School Population 9-12	3,785	3.70%	3,881	3.70%	4,009	3.70%	4,131	3.70%	2012-2016 ACS
9-12 Pedestrian Trips	208	5.50%	233	6.00%	321	8.00%	413	10.00%	5.5% walk to school
College Aged Population	10,537	10.30%	10,804	10.3%	11,161	10.3%	11,500	10.3%	2012-2016 ACS (18-24 year olds)
College Aged Pedestrian Trips (not to work)	3,161	30.00%	3,781	35.00%	4,464	40.00%	5,750	50.00%	
Total Pedestrian Commuters	7,556		9,264		11,204		13,803		
Total Pedestrian Commuter Trips	15,112		18,528		22,407		27,606		2 trips for each commuter
Other Trips Ratio (commuter to non-commuter trips)	2.73		2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Pedestrian Trips	41,254		50,580		61,171		75,364		Commuter Trips x Other Trips Ratio
Total Daily Pedestrian Trips	**56,366**		**69,108**		**83,578**		**102,969**		

Table 5.3: Existing and Projected Bicycle Trips, 2016-2040

PEDESTRIAN TRIPS	2016 BASE YEAR	2016 SHARE (%)	2020	2020 SHARE (%)	2030	2030 SHARE (%)	2040	2040 SHARE (%)	ASSUMPTIONS/SOURCES
Population	102,305		104,898		108,360		111,655		2016: ACS Base; 2016-2040 0.3% average annual growth rate from the Comprehensive Plan
Population 16 Years and Older	48,259	47.17%	49,482		51,115		52,670		2012-2016 ACS
Total Population Commuting to Work	46,491	45.44%	47,669		49,243		50,740		2012-2016 ACS
Bike to Work	195	0.42%	381	0.80%	591	1.20%	1,015	2.00%	Base year: 2012-2016 ACS
Work at Home Population 16+	1,786	3.70%	1,764	3.70%	1,822	3.70%	1,877	3.70%	2012-2016 ACS
Work at Home Bike Trips	89	5.00%	88	5.00%	91	5.00%	94	5.00%	5% make one bike trip
Take Transit to Work	592	1.27%	1,192	2.50%	1,600	3.25%	2,030	4.00%	Base year: 2012-2016 ACS
Bike to Transit	12	2.00%	24	2.00%	48	3.00%	81	4.00%	2% bike to transit
School Population K-8	13,197	12.90%	13,531	12.90%	13,978	12.90%	14,403	12.90%	2012-2016 ACS
K-8 Bike Trips	290	2.20%	406	3.0%	559	4%	720	5%	National Center for Safe Routes to School, 2013, 2.2% bike to school
School Population 9-12	3,785	3.70%	3,881	3.70%	4,009	3.70%	4,131	3.70%	2012-2016 ACS
9-12 Bike Trips	38	1.00%	58	1.5%	100	2.50%	145	3.5%	1.00% bike to school
College Aged Population	10,537	10.30%	10,804	10.30%	11,161	10.30%	11,500	10.30%	2012-2016 ACS (18-24 year olds)
College Aged Bike Trips (not to work)	44	10.00%	1,080	10.00%	1,395	12.50%	1,725	15.00%	
Total Bike Commuters	668		2,038		2,784		3,780		
Total Bike Commuter Trips	1,337		4,076		5,569		7,559		2 trips for each commuter
Other Trips Ratio (commuter to non-commuter trips)	2.73		2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Bike Trips	3,650		11,127		15,203		20,637		Commuter Trips x Other Trips Ratio
Total Daily Bike Trips	**4,987**		**15,203**		**20,772**		**28,196**		

COMMUNITY ENGAGEMENT

One element of evaluating the market for active transportation involved hearing how people in the community are using the existing system, where the gaps are, and where future priorities may lie. These everyday users of the Davenport system provided valuable insight to develop a priority based active transportation system. Input was gathered several ways:

Field reconnaissance and stakeholder groups. These visits included initial field work on bicycle and interest/stakeholder group discussions, helping us become familiar with issues and the overall structure of Davenport neighborhoods and street system. During this process, we rode most of the city's candidate streets and compiled an extensive photographic inventory

Bicycle and Pedestrian Survey. This survey, explored the characteristics of Davenport citizens and other interested participants in walking and bicycling and measured their level of comfort with different types of facilities. The survey attracted 368 responses and produced information to help frame the direction of this plan.

Community Workshop. The community workshop was held in August 2017 to solicit input from stakeholders on the emerging bicycle network and facility concepts. Held at the Credit Island Pavilion, dozens of participants learned about the project and contributed their ideas.

Public Open House. A public open house event on February 19, 2018 at the Figge Art Museum provided extensive displays and a presentation of the plan's preliminary recommendations for review and comment. Comments were incorporated into revisions to the plan and the proposed network. Project website. A project website, provided updates, advertised meetings, and gathered input throughout the planning process.

Map my ride. An interactive map on the project website allowed people to click and draw areas in Davenport to identify community destinations, bicycling barriers, their current bike route, and their desired bike route.

Community survey. A community survey was launched at the beginning of the project and made available on-line. The survey presented questions on people's active transportation usage and comfort level in Davenport. Several preferred themes emerged that became incorporated into final system. The results of the survey are described in more detail on the following pages.

Community kick-off event. A community kick-off meeting took place in July 2017. The event introduced the project to engage people in discussions with other stakeholders.

Focus groups. Focus groups in July included open discussions with the Quad Cities Bicycle Club, the Bi-state Trails Committee, the school district, young professionals, and other stakeholders. The meetings included a full day of discussions about the issues and challenges facing active transportation users in Davenport to get an in-depth understanding of issues and opportunities.

Design studio. A multiple day design studio in August engaged residents, business owners, and other stakeholders directly in conceptual planning for new bicycle routes, existing route improvements, and connectivity throughout Davenport. Participants shared their ideas, issues, and concerns informally with the design team, helping define and test concepts.
Open house event. A public open house occurred in February, 2018. The open house provided the public an opportunity to review and comment on a refined bicycle network plan and implementation strategies before further development and adoption.

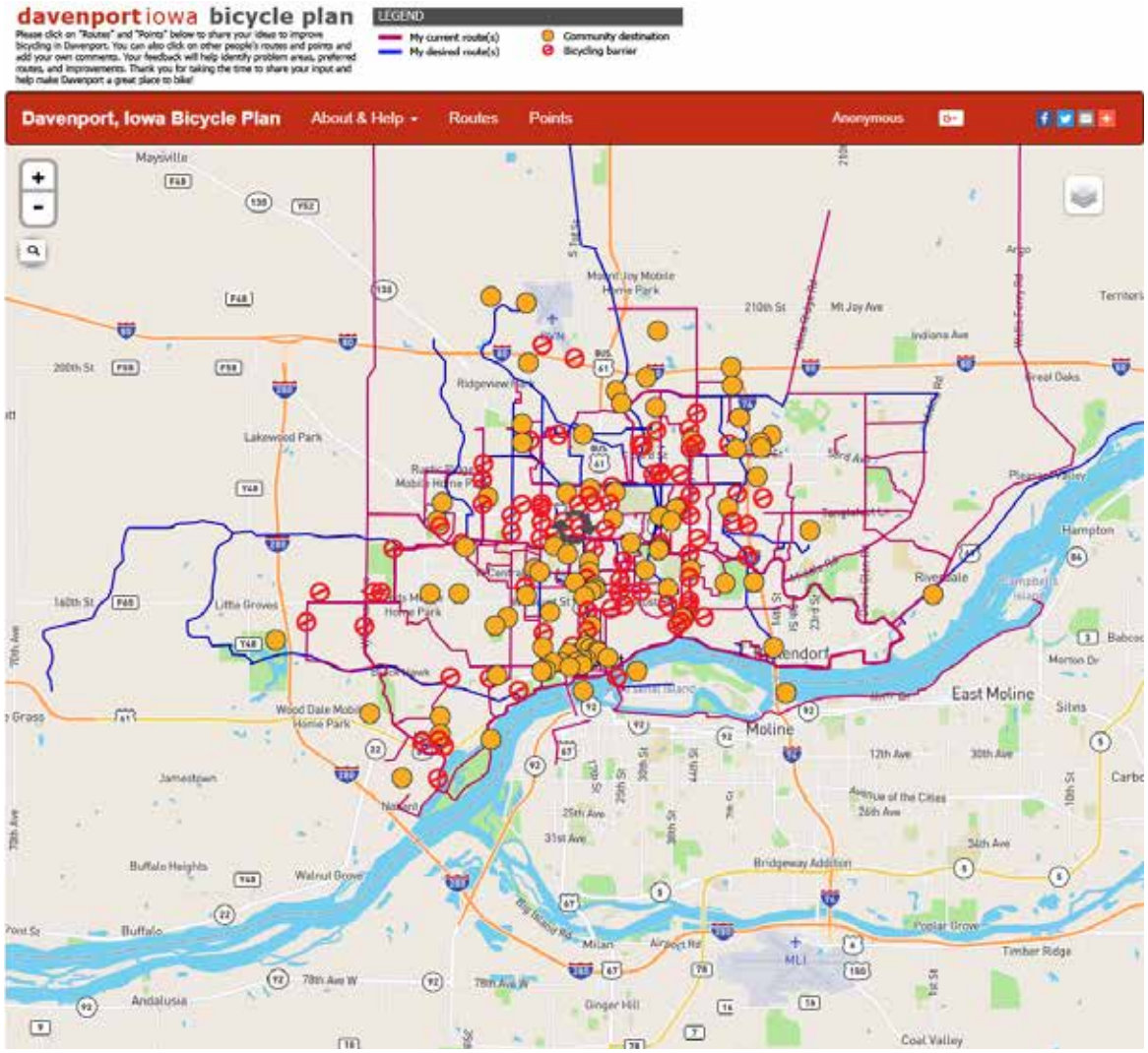
A steering committee consisting of city staff, bicycle groups, community members, and other stakeholders met regularly throughout the planning process and helped respond to ideas, provide further input, grant direction to the planning team.

MAP MY RIDE

Through the duration of the project a "Map My Ride" feature was available on the project website. Figure 5.1 shows the responses. The responses unveiled several themes:

- Many community destination are located downtown. Other destinations spread throughout the community relate to schools, parks, and recreation features such as community YMCA locations.
- There are desired routes to the north and west. Many of the desired routes are extension of existing trails or routes that could be completed with crossing improvements at various man made barriers.
- Noted barriers were widespread throughout the community. Most barriers related to pavement condition, intersection safety, and high traffic volumes. Areas of clustered barriers include:
  - The southern most stretch of Jersey Ridge Road.
  - Intersection of 46th Street and Eastern Avenue.
  - Several areas on the Duck Creek path related to crossings, trail conditions, and other hazards.
- Many barriers were noted on respondents' current route. Meaning there are not easier route options and they are forced to encounter these barriers each time they bike.

Figure 5.1: Map My Ride Responses



Source: Alta Planning + Design

DAVENPORT GO SURVEY

The community survey helps define the preferences and opinions of all people that may experience Davenport's active transportation system, whether a current user or prospective user. The responses provide important guidance for designing the network. While the survey gathered information about both bicyclists and pedestrians, most questions were geared toward bicyclists.

Respondent Characteristics

LIVE AND WORK

Respondents represent all parts of the community and region:

- About 40% of respondents live in northeast and southeast Davenport where a large portion of Davenport's population resides. Another 30% indicate they live in outside of Davenport (Bettendorf, Rock Island, etc.)
- Respondent's place of work is distributed well across the region. About 17% work in south central Davenport, the area including downtown, and about 16% work in northeast Davenport. Therefore, a multi-modal system that reaches all parts of the community is needed.

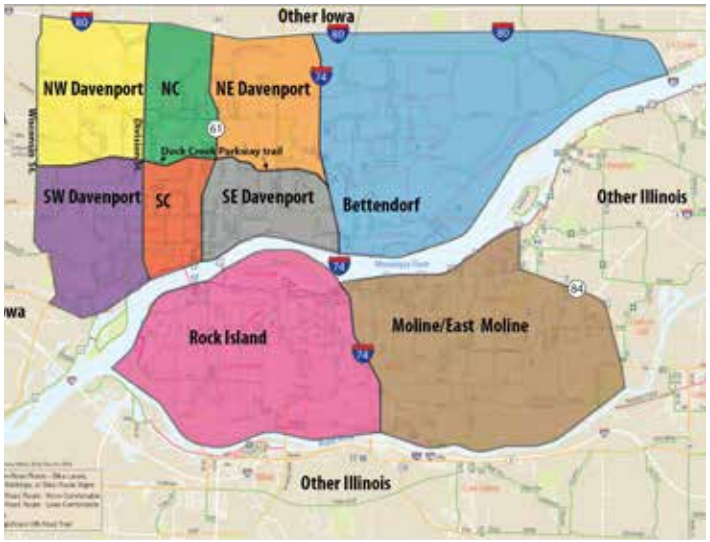


Figure 5.2: Survey Regions

BICYCLING AND WALKING HABITS

The existing active transportation habits in Davenport helps understand the frequency of facility use and provides one metric to evaluate improvements.

Pedestrian Characteristics

As a universal mode of transportation, walking is enjoyed by many residents in Davenport on a regular basis. Figure 5.3 shows 32% of participant-reported walking several times a week to every day. 29% reported walking once or twice a week. This is a high indication that residents will utilize any improvements to the pedestrian mobility system.

An overwhelming number of people reported regular exercise or workout as the primary reason for walking. Figure 5.4 shows over 30% reported walking for social visits and trips to parks or recreational facilities. 14-25% walk for family outings, shopping, routine errands and trips to library and museums. Less than 10% reported walking for work, school, and business-related activities. Overall, the main reason for walking in the community is recreational related.

Bicyclist Characteristics

The largest group of respondents were cyclists most interested in improved infrastructure. The two largest groups, 36% each, characterized themselves as believing new facilities will improve their experience and encourage more usage, and also concerned about the safety of riding in mixed automobile traffic.

Responses from regular cyclists (regular and frequent) account for 55% compared to 17% from infrequent riders (infrequent or very infrequent). The engagement from regular riders is a hopeful sign that any improvements to the system will see a high level of activity. This trend is illustrated in Figure 5.5.

Exercise is the main purpose for cycling for 80% of the respondents. Recreation-related purposes are most frequent reasons mentioned for bicycling in Figure 2.6. 30% of the respondents report bicycling to work, school, and family outings. A smaller but significant group use bicycles for shopping and going to meetings within the city.

Figure 5.3: Purposes of Walking

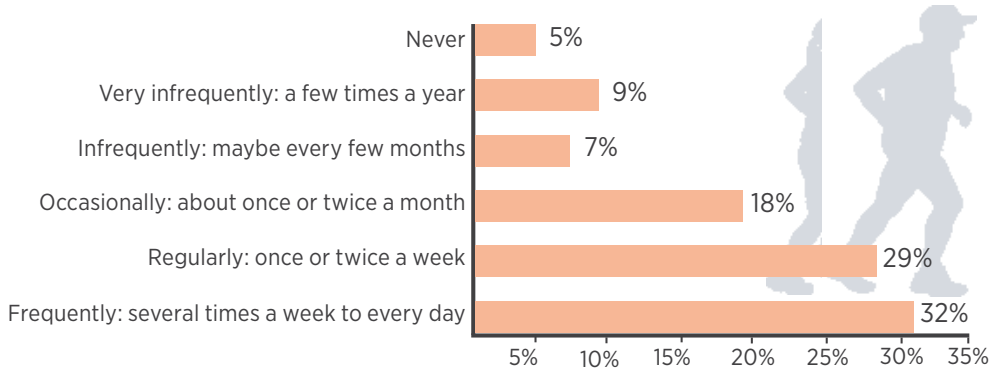
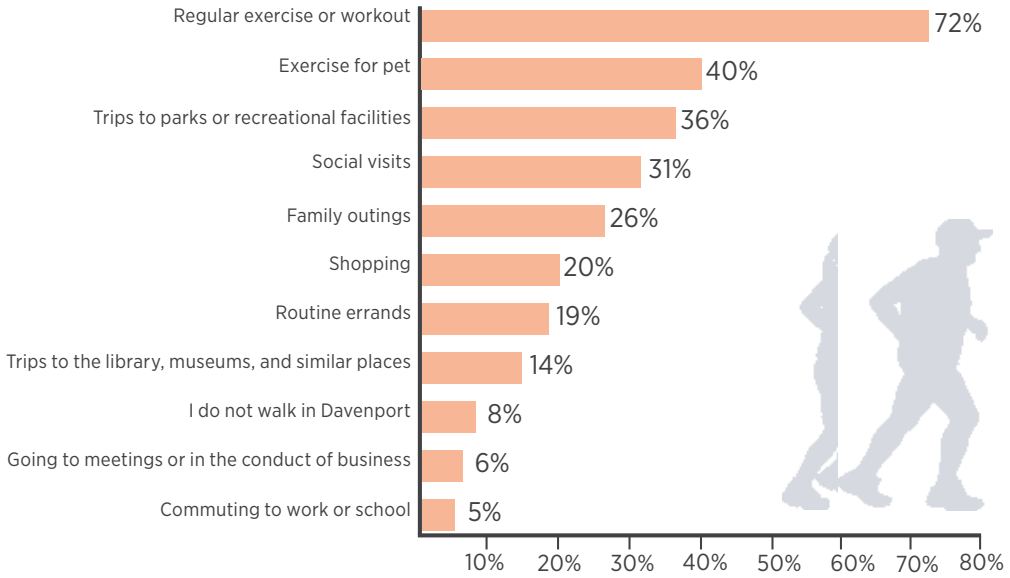


Figure 5.4: Frequency of Walking



Survey Conclusions

The survey provides many insights into the needs, deficiencies, and opportunities for the multi-modal network.

Community wide access. Respondents work across the region and find it important to have access to destinations spread throughout the community.

Strong bicycle presence. Many respondents identified as committed cyclists who ride frequently. However, a large majority ride for recreation purposes rather than a means of transportation. These groups would help advocate usage of new facilities and programming for others to follow.

Connectivity. Many of the top important destinations to reach in the community are schools and parks. These destinations should be safely accessible to all users and experience level.

Infrastructure diversity. The most comfortable bicycle environments for respondents are separated from traffic, including many infrastructure types not seen in Davenport. Respondents indicate a flexibility to tray new types of pedestrian and bicycle facilities in Davenport streets

Holistic improvement strategies. Respondents placed a high priority on both infrastructure improvements and supporting initiatives like safety programs. However, strategies that do not separate bicyclists from motorist, such as signage and shared lane markings, are not viewed as effective.

COMMITTED AND FEARLESS: I am a committed bicyclist who rides in mixed traffic on every street. I don't believe that any significant further action on bicycle facilities is necessary. ***2.56%***

COMMITTED URBAN CYCLIST: I am a committed bicyclist who rides in mixed traffic on most streets, but believes that new facilities like bike lanes, bike routes, and trails are needed to improve Davenport's biking environment for me and encourage other people to ride more often. ***36.22%***

INTERESTED AND CONCERNED: I am interested in bicycling and use low-traffic streets, but am concerned about the safety of riding in mixed automobile traffic. More trails and bike lanes and routes would increase the number of trips that I make by bicycle. ***36.86%***

RECREATIONAL TRAIL USER: I am a recreational or occasional bicyclist and ride primarily on trails. I would like to see more trails, but am unlikely to ride on city streets even with bike lanes. ***12.82%***

INTERESTED NON-RIDER: I do not ride a bicycle now, but might be interested if Davenport developed facilities that met my needs better or made me feel safer. ***5.13%***

NON-RIDER UNLIKELY TO RIDE: I do not ride a bicycle, and am unlikely ever to do so. ***6.41%***

Figure 5.5: Frequency of Cycling

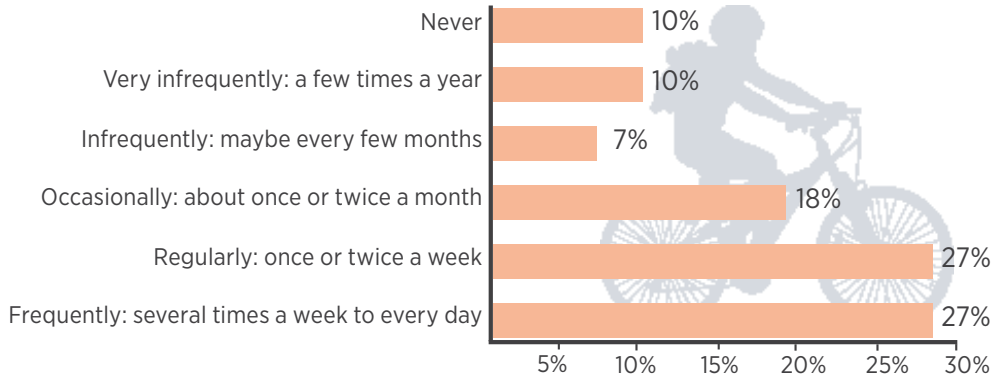
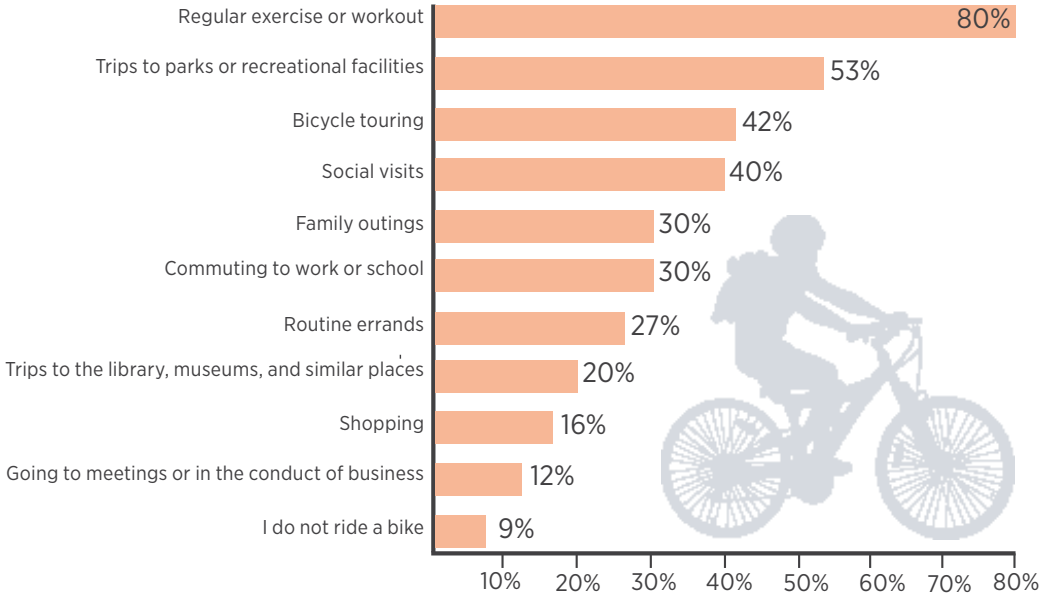


Figure 5.6: Purposes of Cycling



Trail Usage

Participants were asked how often they use major trails in the Davenport region, shown in Table 2.4. More than 50% reported using the Mississippi Riverfront and Duck Creek Parkway Trails on a regular basis. While, 23-31% regularly use the Great River Trail (Rock Island/Moline) and Veterans Memorial Parkway Trails. Less frequently used trails include the Sunderbrunch Park Trails, the 53rd Street Trail, and Hennepin Canal Trail (Moline).

Table 5.4: Frequency of Trail Usage

TRAIL	NEVER/VERY INFREQUENTLY	OCCASIONALLY	REGULARLY/ FREQUENT
Duck Creek Parkway Trail	16.5%	32.6%	50.0%
Mississippi Riverfront Parkway Trail	15.4%	33.0%	51.6%
Veterans Memorial Parkway Trail	30.9%	31.9%	23.1%
Sunderbrunch Park Trails	40.3%	38.0%	17.2%
53rd Street Trail	51.0%	21.6%	4.6%
Great River Trail (Rock Island/Moline)	31.9%	32.3%	31.3%
Hennepin Canal Trail (Moline)	55.2%	27.1%	5.6%

Figure 5.7: Importance of Various Destinations for Cycling

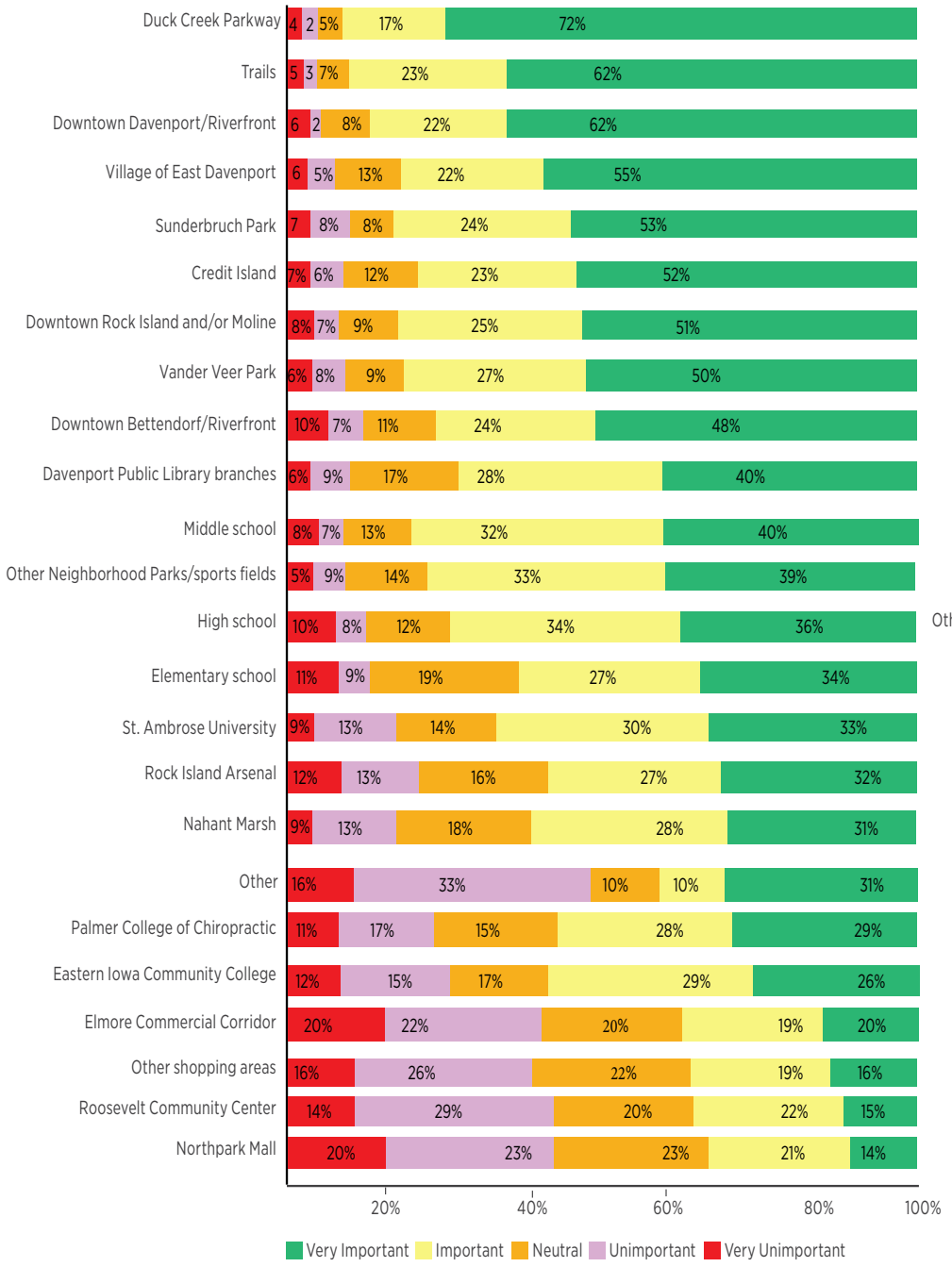
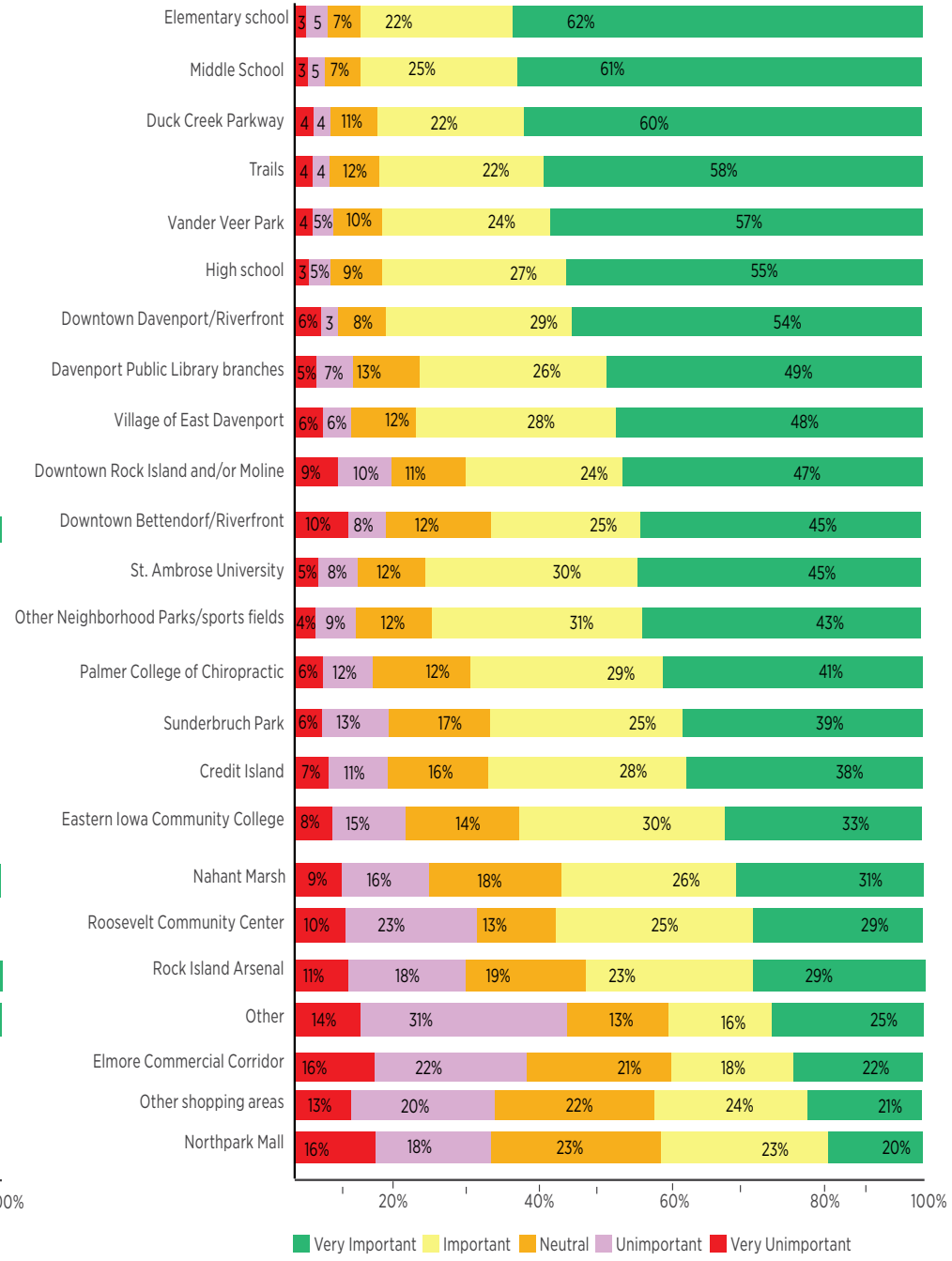


Figure 5.8: Importance of Various Destinations for Walking



Destinations

Improving and developing a safe non-motorized mobility network throughout Davenport requires knowledge of how residents perceive the importance of various locations for cycling and walking. The survey listed a number of different community destinations and asked respondents to rank them based on the level of importance to them for biking and walking access.

Figures 5.7 and 5.8, on the next page, describe the results, indicating the percentage of participants who considered good access very important to unimportant. These, in turn, suggest the places that the network should serve.

For good bicycle access, over 70% of the respondents ranked the following as important or very important:

- Trails
- Duck Creek Parkway
- Downtown Davenport/Riverfront
- Vander Veer Park,
- Downtown Rock Island and/or Moline
- Credit Island,
- Sunderbruch Park
- Village of East Davenport
- Other Neighborhood Parks or sports fields
- Middle school

For good walking access, over 80% of the respondents ranked the following as important or very important:

- Downtown Davenport/Riverfront,
- High school,
- Vander Veer Park,
- Trails,
- Duck Creek Parkway,
- Middle school, and
- Elementary school

Over 70% ranked the following as important or very important for good walking access:

- St.Ambrose University,
- Davenport Public Library branches,
- Other Neighborhood Parks or sports fields, and
- Downtown Bettendorf/Riverfront

Infrastructure Types

Much of the survey was designed to assess the comfort of current and prospective bicyclists with different types of bicycle environments. The survey asked participants to respond to a gallery of photographs of streets and facilities. Most of the images for evaluating streets were local to Davenport, while infrastructure solutions typically came from other cities. Respondents could choose from five ratings. Rating categories for the examples presented included:

1. "This presents a very safe route that can be used by all people." (2X weighting factor)
2. "This is a comfortable cycling route for most users." (1.5X weighting factor)
3. "I am comfortable using this street myself, but do not advise it for inexperienced cyclists or younger riders." (No weighting factor)
4. "I am uncomfortable with this street, but might use it for very short distances." (No weighting factor)
5. "I am very uncomfortable riding here and would never ride on it." (No weighting factor)

The images to the right and on the following page groups images on the basis of the weighted score, calculated by applying the weighting factor to each category.

The **top-rated settings** include multi-use trails, four-lane divided with sidepath, enhanced sidepaths/widened sidewalks, barrier separated cycle tracks, multi-use neighborhood paths, and paths within a boulevard median. **Examples in Davenport include the path along Veterans Memorial Parkway and the Duck Creek Path.**

The **second highest-rated settings** include local streets, divided boulevards, neighborhood bike lanes, protected/green bike lanes, and bicycle boulevards. **Examples include 46th Street and Kirkwood Boulevard.**

Group 1: Generally seen as comfortable for all users

Multi-Use Trail

4-Lane Divided Side Path

Multi-Use Neighborhood Path

Enhanced Sidepath / Sidewalk

Barrier Separated Cycle Track

Path in Boulevard Median

D Indicates Davenport Setting

The **third highest-rated settings** included the most variety. People like the idea of bicycling on these settings, but infrequent cyclists may hesitate to use. These included environments such as narrow striped shoulders, bike lanes in urban environments, arterials with paved shoulders, one-way local streets, and multi-lane arterials with separation/buffering from vehicles.

Also important were the lowest rated settings, which included multi-lane arterials with no buffering, urban minor arterials, and shared lane markings.

Group 2: Generally seen as comfortable for most users


Two-lane Local Street


Divided Boulevards


3-Lane, Bike Lanes, Non-Urban Environment


Protected Bike Lane, Bollards


Green Protected Bike Lane


Bicycle Boulevard


Bike Lane, Sidepath/Sidewalk


Green Bike Lane

Group 3: Generally seen as comfortable for most users, but somewhat more focused on experience


2 Lane Narrow Striped Shoulder


3-Lane, Bike Lanes, Urban Environment


2-Lane Collector,Striped Pkg Lane


2-Lane Designated Bike Route


One-Way Local Street


2-Lane Collector


2-Lane Arterial, Paved Shoulders


2-Lane Rural Section


Major Arterial Complete Street


2-Lane Arterial, Bike Lanes


Hybrid Sharrow/Bike Lane


Green Bike Lane


4 to3 Lane Conversion, Bike Lane


Center of Street Cycle Track

Group 4: Generally seen as facilities for experienced cyclists


2-Lane Urban Minor Arterial


2-Lane Minor Arterial


2-Lane with Sharrows

Group 5: Generally seen as uncomfortable for inexperienced riders and many experienced cyclists


4-Lane Arterial


4-Lane One-Way Major Arterial

Strategies for Improvement

Respondents were asked to rank the effectiveness of various actions to improving bicycle trips in Davenport.

Over 70% believe the following would be effective or very effective:

- Better crossings/intersection control of major streets
- Protected bike lanes buffered from traffic
- More trail development
- Widened sidewalks or paths along major streets
- Better project design that encourages bicycle access
- A strong bicycle advocacy organization
- Bike safety activities designed for kids

Several of the highest ranking actions involve capital infrastructure investments. However, respondents also tended to feel the advocacy and education programs would also be effective to improve the bicycling environment in Davenport.

Table 5.5: Effectiveness of Various Actions

VERY EFFECTIVE OR EFFECTIVE OVER 70%	VERY EFFECTIVE OR EFFECTIVE 70-50%	VERY EFFECTIVE OR EFFECTIVE 50% OR LESS
Better crossings / intersection control of major streets	A system of designated on-street bicycle routes that lead to important destinations	Wayfinding and directional signs
Protected bike lanes buffered from traffic	Better pavement markings at intersections	Posting “Bicyclists May Use Full Lane” Signs
More trail development	Better sidewalk ramps at intersections	Shared lane markings
Widened sidewalks or paths along major streets	Count down crossing signals	A “bike station” with showers, repair, and bike parking facilities
Better project design that encourages bicycle access	More safe routes to school’s projects and activities	A bike-sharing program
A strong bicycle advocacy organization	Enforcement of laws that protect vulnerable road users, such as minimum passing distance laws	
Bike safety activities designed for kids	Better motorist education programs	
	Improved bicycle safety and education activities	
	More special events, such as benefit rides	
	Challenges and promotions for bicycle commuters	
	More information about bicycling clubs, events, programs	
	More community bicycling events	

VOLUME 2

ACTIVE TRANSPORTATION BARRIERS

This chapter addresses various physical barriers to active transportation in the city. Its principal focuses are arterial streets and intersections that cross major routes in the proposed network. It presents a toolkit of solutions that can be adapted to the specific contexts found in Davenport.

6

Concord St intersection with Rockingham Road: a signalized intersection on a major pedestrian and bicycle route where pavement crossing markings would create a safer, more visible environment for active transportation.

BARRIERS IN THE NETWORK

Arterial streets, major intersections, steep grades, streams, railroads, and other natural and built barriers present significant obstacles to continuous bicycle and pedestrian route networks in Davenport and other major cities. Of these, major streets and intersections present the most persistent problems. Difficult crossings require a higher level of experience and comfort with traffic, reducing the number of people who are likely to walk or bike to various destinations. They create special problems for children, whose parents fear for their safety as they attempt to cross major traffic corridors; and people who require some additional time to cross.

To some degree, the network design presented in Chapter One inherently addresses barriers by planning routes that cross major corridors at signalized intersections, connect into bridge crossings of waterways, or avoid hills with grades beyond the capacity of all but the most capable climbers. But many barriers are unavoidable and busy streets always present challenges regardless of traffic control. This chapter identifies these challenge areas and presents concepts that can apply to specific circumstances. Chapter Two, presenting route details, provides more detailed design guidance and crossing concepts for some of the most challenging of these situations.

Major barriers to continuity in the Davenport network include the following:

- **Major multi-lane, high volume and speed arterials.** While major streets always present challenges, the Kimberly and Brady/Harrison corridors are especially difficult. Kimberly Road, a four-lane divided highway with a wide median and shoulders, is a formidable barrier because of its width and heavy high speed traffic. It presents an even greater obstacle as the section increases to six lanes plus turn lanes in the Northpark area between Brady and Welcome Way. Every major north-south route must cross Kimberly at some point. Brady, Harrison, and Welcome Way, as multi-lane and mostly one-way arterials, require people crossing at unsignalized intersections to find gaps in four lanes of continuous traffic, an extremely difficult task. Interstate 74 also has only two crossing s without interchanges at Veterans Memorial Parkway and the Duck Creek Trail.

- **Other major streets.** Other minor arterial and even collector corridors have operational characteristics that create significant barriers. Many of these streets (Locust, Jersey Ridge, Hickory Grove, Division) present traditional four-lane sections in a 40-foot street channel, requiring pedestrians and bicyclists to address two lanes in each direction without refuge. Other two-lane arterials (Eastern, Northwest) have continuous traffic flows with limited gaps for crossing.

- **Railroads.** Davenport's railroads are relatively low-speed, low-volume lines that present barriers more physical than operational. For example, the Canadian Pacific branch to Eldridge interrupts 46th Street, a principal east-west corridor in the proposed active network and an important gap in the city's street grid; and the north-south Iowa Interstate line limits east-west access between Locust and Central Park, including a potential connection of Lombard Street. The Iowa Interstate also parallels the Riverfront Trail. Connections to the trail generally cross the rails at right angles, but wet conditions or rough tracks can create hazards.

- **Offset intersections.** Several on-street routes cross busy streets at offset intersections. These include 14th and 15th Streets across Brady and Harrison and Forest Road across 46th Street and Locust Street.

These general barriers, combined with field inspection and analysis of several factors, including average daily traffic, width of corridors, observation of signal cycles, and other factors, led to a preliminary list of barrier points that are addressed in the route details. As part of the development of details in the next phase of this planning process. Map 6.1 categorizes and maps these points, and Table 6.1 lists them with their specific required conditions. Table 6.2 describes a toolbox of intersection and barrier improvements, including the types of intersection problems that they can address.

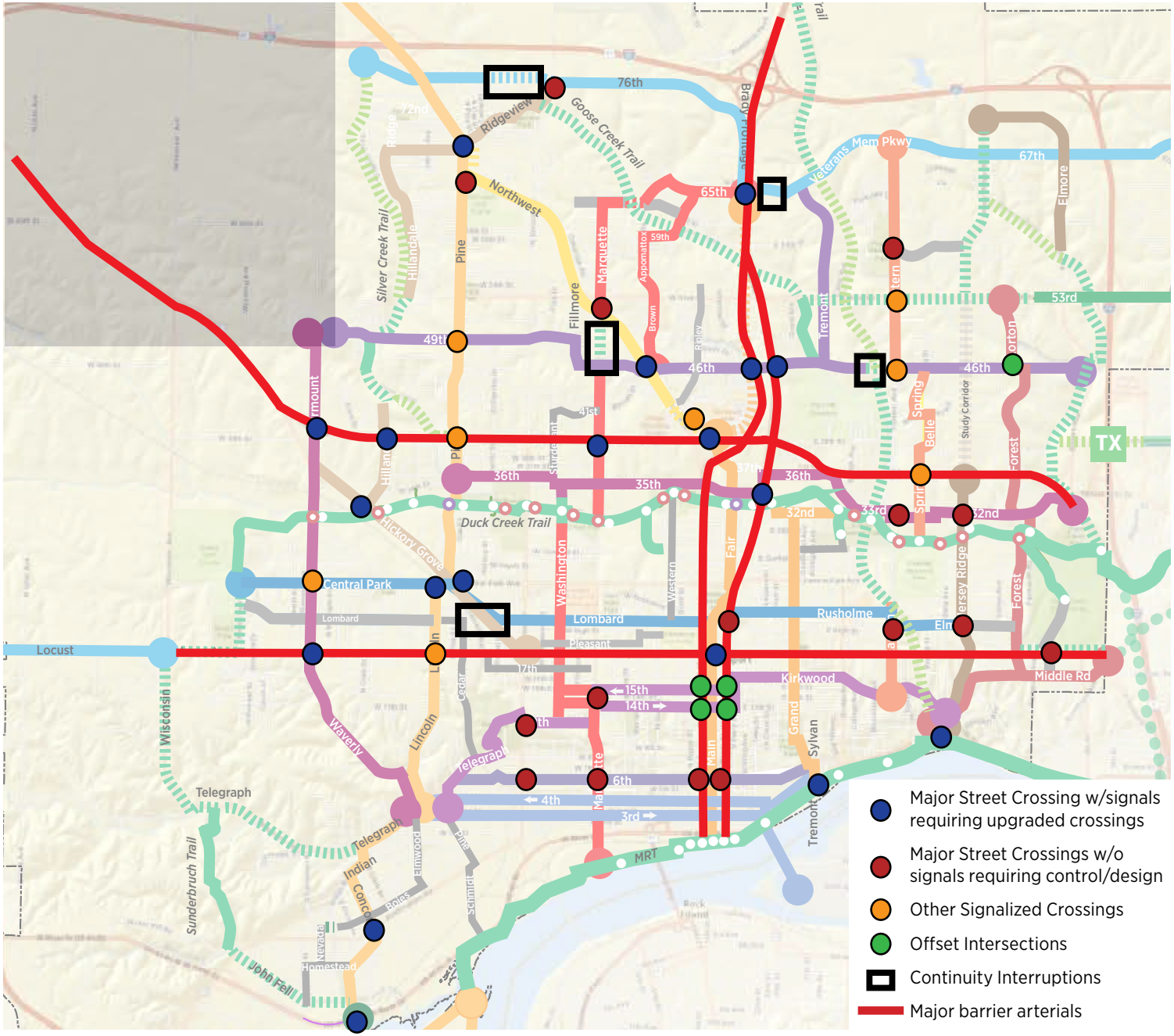
Subsequent illustrations show more detailed consideration of various potential solutions. Application of these to specific locations in Davenport will be determined by further engineering evaluation, including a traffic study where relevant.

Forest and Kimberly, an example of good design for pedestrians crossing a major arterial. Signals were added to this intersection with well-defined crosswalks and crossing refuge areas in the median.

Table 6.1: Barrier Categories

CONTEXT	CONDITION	EXAMPLE
Major street crossings with signals/crossing upgrades	Traffic signal control. Some cases are large intersections with poor definition of pedestrian and bicycle paths. Treatments include high visibility crosswalks, bicycle crossing markings, refuge medians	65th/Veterans Parkway and Brady Street, Main Street and Kimberly Road
Major street crossings without signals	Routes on secondary streets crossing arterials or major collectors without traffic control. Possible treatments include warning signage, high visibility pavement markings, flashing beacons, hybrid beacons, full pedestrian signals, refuge medians	Lombard at Brady, Elm at Jersey Ridge, 6th and Brady, 58th and Eastern
Other signalized crossings	Traffic signal control with good intersection and crossing design. Crosswalk visibility may be enhanced in some cases.	Kimberly and Forest, 49th and Pine
Offset intersections	Two legs of an intersection are offset from one another. Possible treatments include establishing one crossing point and using short sidepath segments to transition to single alignment; or use pavement markings to guide path through the intersection.	14th and 15th and Harrison, 46th and Forest Road
Continuity interruptions	Breaks in route continuity created by lack of railroad crossings, streams or gaps in streets. Treatments include alternate routes or reasonable diversions consistent with network standards; new bridges; or interim paths on proposed street links.	Marquette between Northwest Blvd and 46th; 46th between Tremont and Eastern

Map 6.1: Barrier Locations



PEDESTRIAN CROSSING CONTEXTUAL GUIDANCE
At unsignalized locations

FACILITY TYPE	Local Streets 15-25 mph		Collector Streets 25-30 mph			Arterial Streets 30-45 mph							
	2 lane	3 lane	2 lane	2 lane with median refuge	3 lane	2 lane	2 lane with median refuge	3 lane	4 lane	4 lane with median refuge	5 lane	6 lane	6 lane with median refuge
1 Crosswalk Only (high visibility)	✓	✓	EJ	EJ	X	EJ	EJ	X	X	X	X	X	X
2 Crosswalk with warning signage and yield lines	EJ	✓	✓	✓	✓	EJ	EJ	EJ	X	X	X	X	X
3 Active Warning Beacon (RRFB)	X	EJ	✓	✓	✓	✓	✓	✓	X	✓	X	X	X
4 Hybrid Beacon	X	X	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓	✓	✓
5 Full Traffic Signal	X	X	EJ	EJ	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓
6 Grade separation	X	X	EJ	EJ	EJ	X	EJ	EJ	✓	✓	✓	✓	✓

LEGEND
Most Desirable ✓
Engineering Judgement EJ
Not Recommended X

River Drive and Mound. Improved crossing markings and railroad warnings will link the Village of East Davenport routes to the riverfront more effectively.

Table 6.2: Barrier Crossing Techniques

TECHNIQUE	DESCRIPTION	POTENTIAL APPLICATION
Grade separation	Overpass or underpass that separates bike/ped traffic from crossing arterials	First Bridge, I-74 crossing connected to Tanglefoot Lane, Goose Creek Trail undercrossing
Pedestrian refuge median	Island in middle of a two-way street, allowing pedestrians and bicyclists to address crossing traffic in one direction at a time from a protected place.	Trail or route crossings of arterials and major collectors where turning movements are not necessary. Elm at Eastern, 14/15 and Marquette offset intersections, 12th and Division
High visibility crosswalks	Well-defined crosswalks, using durable reflective materials and typically using Continental or Zebra/Ladder crosswalk markings, Also includes green or chevron markings to guide bicycle path or lane across intersection.	Arterial street crossings with significant pedestrian and bicycle traffic. 14th and Harrison, Kimberly and Pine, 35th and Brady
Beacons: HAWKS (High Intensity Activated Crosswalk Beacon) and flashing beacons.	Pedestrian actuated signals. HAWK signals often used at midblock and for trail crossings and include flashing yellow and solid red stop sequence. Flashing beacons typically located at intersections and use flashing lights but no red signal. In January, 2018, one such beacon, Rectangular Rapid Flashing Beacons (RRFB's) were removed from MUTCD approval because of patent issue. These beacons appeared to be effective and their approval status should be monitored.	Trail crossings, other unsignalized crossings of major streets. Lombard and Brady,
Protected Intersection	New intersection design providing a protected, high visibility corner location for bicyclists and pedestrians.	Veterans and Brady, Main and Locust

Figure 6.1: Intersection Concepts, Neckdowns

Neckdowns

Context:
"Bicycle boulevards" – relatively low volume streets with good continuity

Technique:
Curb extensions that reduce the curb to curb width at an intersection to 22- to 24-feet. Especially appropriate in Davenport where many network streets are 32- to 36-feet wide.

Benefits

- Reduces average traffic speed.
- Reduces distance of pedestrian crossing
- Provides some protection for parked cars
- May provide opportunities for neighborhood plantings and beautification

Figure 6.2: Intersection Concepts: Pavement Markings

Intersection Pavement Markings

Context:
Crossings of major intersecting streets by on-street active network routes

Technique:
• High visibility crosswalks with pavement markings using various methods to define a bicycle track across an intersection
• May be used in combination with rapid rectangular flashing beacons or hybrid signals

Benefits
• Increases visibility of pedestrians and bicyclists
• Notifies motorists on intersecting major streets of presence of a significant number of active users

Figure 6.3: Intersection Concepts, Bike Boxes

Bike Box

Context:
Locations (often signalized intersections) where bike routes intersect or other locations that involve a significant number of left-turning movements for bicyclists otherwise traveling in a bike facility or "as far to the right as practicable."

Technique:
Painted area behind the stop bar defined for use by bicyclists

Benefits

- Reduces incidence of bicyclists turning left across traffic from the right-hand side of a road
- Reduces incidence of crashes at intersections

Figure 6.4: Intersection Concepts, Pedestrian Refuge Median

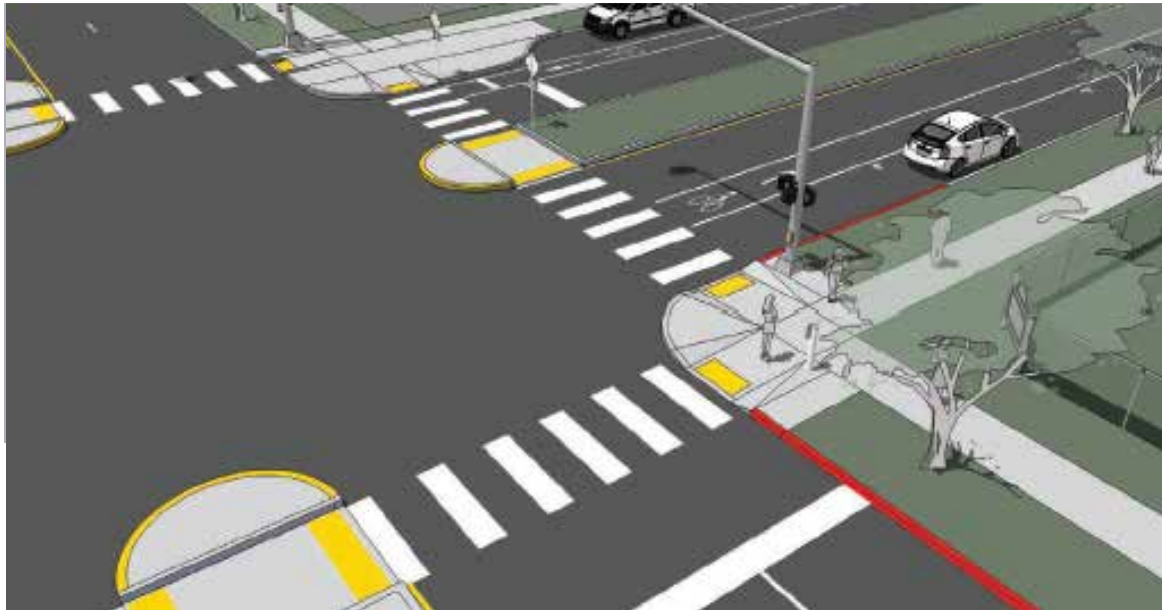
Pedestrian Refuge Median

Context:
Trail crossings of major streets
Bike/ped crossings of major streets where left-turns are not required

Technique:
• Refuge median in a two-way turn lane. Alternative is removal of parking from crossing area and diverging lanes slightly to provide space for the median
• High visibility crosswalks and pavement markings
• Used in conjunction with yellow caution signs.
• May include flashing beacons or HAWK protection

Benefits
• Increases visibility of pedestrians and bicyclists
• Notifies motorists on intersecting major streets of presence of a significant number of active users

Figure 6.5: Intersection Concepts, Reduced Curb Radius



Reduced Curb Radius

Context:
Urban street intersections along bicycle and pedestrian routes

Technique:
Reduce curb radius at intersections. Most appropriate at locations with few vehicles that require long radius turns such as local street intersections or intersections of local and collector streets

Benefits

- Requires drivers of right turning vehicles to slow as they make turns, increasing safety for users of sidepaths
- Reduces incidence of “right-hook” crashes.

Reduced curb radius. *The two tier mountable curb provides the benefits of a small curb radius but still provides the larger radius necessary for safe passage of trucks and other large vehicles.*

Figure 6.6: Intersection Concepts, Protected Intersection

Protected Intersections

Context:
Intersections of streets with sidepaths or trails with major arterials and wide highways

Technique:
• New intersection design in frequent use in Europe and beginning to be implemented in US, providing a visible, protected space for pedestrians and bicycles to cross wide and busy intersections.
• Protected space is separated from turning traffic by an island
• Requires a two-stage crossing for bicyclists turning left to an intersecting trail or major street

Benefits
• Increases visibility of pedestrians and bicyclists
• Reduces the perceptual width of large intersections
• Provides high visibility for vulnerable users, placing them in a setting where they are both protected and in a preferred position entering an intersection

Top: Protected intersection in Salt Lake City. Above: Concept for an arterial crossing with bike lanes and paths in Wauwatosa, WI

Figure 6.7: Intersection Concepts, High Visibility Crosswalks

High visibility crosswalks on Wilshire Boulevard in Santa Monica, CA establish pedestrian visibility zones on a 6-lane arterial corridor.

High Visibility Crosswalks

Context:
Large street intersections that dominate pedestrian scale

Technique:
Develop crosswalks with sufficient width and marking density to establish crosswalk area as a highly visible pedestrian territory.

Benefits

- Provides enhanced intersection safety for pedestrians.
- Creates a scale of markings that is not overwhelmed by major multi-lane intersections

Clockwise from left: HAWK signal and crosswalks on Woodchuck Bicycle Boulevard in Wichita, KS; flashing beacon in Wauwatosa, WI; advance warning and beacon on Prairie Sunset Trail in Goddard, KS

Crossing Signs and Beacons

Context:
Crossings of major streets that do not warrant full signalization

Technique:
Variety of equipment types, based on traffic volume and street width, including waning signs, flashing beacons, and hybrid beacons (HAWK)

Benefits

- Advise motorists of the presence of pedestrians and bicyclists
- Range of applications to adapt to specific situation
- Less expensive or disruptive of traffic flow than full signalization