# Master Transportation Plan

Watertown, South Dakota

July 2021

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# Acronyms and Abbreviations

| | |
|---|---|
| AADTT | Average Daily Truck Traffic |
| ACS | American Community Survey |
| ADA | Americans with Disabilities Act |
| ADT | Average Daily Traffic |
| AWSC | All-Way Stop Control |
| DOT | Department of Transportation |
| ENS | Emergency Notification System |
| FAF | Freight Analysis Framework |
| FHWA | Federal Highway Administration |
| FRA | Federal Rail Administration |
| HAWK | High-Intensity Activated Crosswalk |
| HCM6 | Highway Capacity Manual, Sixth Edition |
| HCS | Highway Capacity Software |
| IJR | Interchange Justification Report |
| LF | Linear Foot |
| LOS | Level of Service |
| LT | Left Turn |
| MEV | Million Entering Vehicles |
| MPH | Miles Per Hour |
| MTP | Master Transportation Plan |
| MUTCD | Manual on Uniform Traffic Control Devices |
| MVMT | Million Vehicle Miles Traveled |
| NACTO | National Association of City Transportation Officials |
| NEPA | National Environmental Policy Act |
| PCI | Pavement Condition Index |
| RCI | Reduced Conflict Intersection |
| ROW | Right of Way |
| RRFB | Rectangular Rapid Flash Beacon |
| SDCL | South Dakota Codified Laws |
| SDDOT | South Dakota Department of Transportation |
| SHSP | Strategic Highway Safety Plan |
| TA | Transportation Alternatives |
| TDP | Transit Development Plan |
| TWLTL | Two-Way Left Turn Lane |
| TWSC | Two-Way Stop Control |
| USDOT | United States Department of Transportation |
| YOE | Year of Expenditure |

# Executive Summary

The Watertown Area Master Transportation Plan (MTP) update draws upon technical analyses and public engagement to develop a guide for transportation planning and investment for the Watertown area through the next 20 years. The planning process used to develop the MTP update took a collaborative approach to assessing the needs of the existing system while developing solutions that account for future growth in the area and the transportation demands associated with this growth.

The MTP update is organized to first establish the baseline conditions of the existing transportation system as well as system standards whose development will be necessary in addressing future transportation concerns. Next, a description of future transportation demands based on forecasted growth for the area over the next 20 years is presented. The MTP then identifies a series of recommendations that are tied to the vision, goals, and objectives of the Watertown area, organized into separate timeframes (short-, mid-, and long-range). The plan concludes with a description of the public engagement activities that occurred throughout the plan update's development.

## Master Transportation Plan Process

The Master Transportation Plan update incorporates a review of previous multi-jurisdictional planning efforts, including the Watertown 2020 Comprehensive Land Use Plan, the Watertown 2002 Sidewalk Plan, the 2017 Pavement Study, and the 2019 South Dakota Department of Transportation (SDDOT) Strategic Highway Safety Plan. Supplementing the findings of these efforts was a series of public engagement events to solicit feedback from community members on the most pressing issues they see affecting the city's transportation system. Through reviewing and analyzing the most recent transportation data available, the baseline conditions that reflect existing operations and safety of the system were identified. These baseline conditions also identify the current needs and issues of the multimodal system in Watertown.

The MTP update provides the framework for future policy to help alleviate future challenges. By reviewing current engineering standards and recommending revisions, the MTP goes beyond infrastructure improvements that offer improved multimodal operations catering to the diverse needs of the city and its residents.

Based on the projected growth described in the 2020 Land Use Plan, future transportation demand was derived for the multimodal system. This future demand serves as the basis for identifying improvements to the multimodal transportation system that holistically address these pressing issues through quantitatively driven solutions.

As public engagement is the cornerstone of the planning process, the final element of the MTP update describes the various public engagement events that occurred during the MTP development. The COVID-19 pandemic created some unseen challenges to public engagement as restrictions on public gatherings took place; however, the City of Watertown was able to adapt and overcome these challenges to ensure that public feedback was received and each resident had ample opportunity to voice their views.

## Master Transportation Plan Elements

The Master Transportation Plan reviews the baseline conditions for the multimodal transportation system while articulating policy and infrastructure improvements that address existing issues. By projecting future transportation demand, these recommended improvements also aim to mitigate unforeseen issues that could occur during the next 20 years. The plan is organized as follows:

- Introduction and Regional Profile
- Baseline Conditions
- Standards Development
- Future Conditions Analysis
- Public Involvement Summary

# Introduction

The Watertown Area Master Transportation Plan (MTP) update draws upon technical analyses and public engagement to develop a guide for transportation planning and investment for the Watertown area through the next 20 years. The planning process used to develop the MTP update took a collaborative approach to assessing the needs of the existing system while developing solutions that account for future growth in the area and the transportation demands associated with this growth.

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## Area Profile

### Population

The population within in the City of Watertown is 22,166, which marks an increase of 4% since 2010. Prior to 2010, the city's population grew at an average of 11% each decade since 1980. Between 2000 and 2010, population growth slowed to 5%. Overall, the population has grown 42% since 1980.

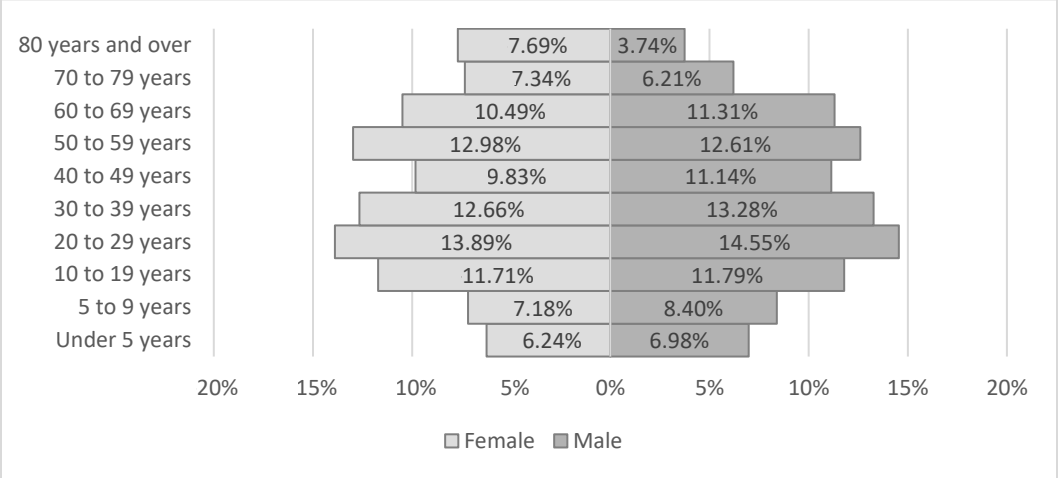
**Table 1: Population Growth in Watertown, 1980-2019**

| Year | Population | % Change |
|---|---|---|
| 1980 | 15,649 | - |
| 1990 | 17,592 | 12% |
| 2000 | 20,237 | 15% |
| 2010 | 21,318 | 5% |
| 2019 | 22,166 | 4% |

Source: U.S. Census Bureau, American Community Survey 5-year Estimates 2010, 2019

A population pyramid for the City of Watertown is shown in **Figure 1** and is based on ACS 5-year estimates for 2019. The largest proportion of male and female residents' range in age from 20 to 29, while the smallest proportion of males are aged 80 years or older and the smallest proportion of females are under 5 years of age.

**Figure 1: Population Pyramid for the City of Watertown**




Source: American Community Survey 5-year Estimates 2019

## Housing

Housing in Watertown consists mainly of owner-occupied units with an average of 2.47 individuals living in each unit. The current homeowner vacancy rate is 1.5%, while 5.9% of rental units are vacant.

**Table 2** illustrates the breakdown of vehicle ownership by occupied housing units. This is an important measure in determining travel activity within the city, as households with more automobiles tend to generate more trips per day. Another important implication is the need to provide alternative transportation modes, such as transit, bicycling, and walking, for households with 1 or no vehicles available.

As seen in **Table 2**, 40% of households have 2 vehicles available and 24% have 3 or more available. 35% of housing units have either 1 or no cars available for daily use.

**Table 2: Number of Available Vehicles for Occupied Housing Units**

| | Number of Units | Percent Share |
|---|---|---|
| **No vehicles available** | 535 | 5% |
| **1 vehicle available** | 2,946 | 30% |
| **2 vehicles available** | 3,910 | 40% |
| **3 or more vehicles available** | 2,340 | 24% |
| **Total occupied housing units** | 9,731 | |

Source: American Community Survey 5-year Estimates 2019

**Employment**

Labor force participation for Watertown is estimated to be 70.3% of the 17,503 residents over the age of 16 considered to be a part of the labor force while the unemployment rate based on ACS 5-year estimates for 2019 is estimated as 2.4%.

Major employers within Watertown include[1]:

- Watertown School District
- Prairie Lakes Healthcare System
- Terex Utilities
- Hy-Vee
- Premier Bankcard

**Commuting**

Commuting habits for the City of Watertown are compared to those in the state of South Dakota as well as the United States. As shown in **Table 3**, 93% of workers in Watertown use a personal vehicle for their commute compared to 89% for South Dakota and 85% nationally. Public transportation usage in Watertown and South Dakota is much lower than the national average while bicycling usage is similar among all three. The percentage of commuters who walk to work is highest for South Dakota when compared to Watertown and the national average.

**Table 3: Comparison of Commuting Mode Shares**

| Mode | Watertown, SD | South Dakota | United States |
|---|---|---|---|
| Car, truck, or van | 93% | 89% | 85% |
| Drove alone | 86.4% | 80.6% | 76.3% |
| Carpool | 6.6% | 8.4% | 9.0% |
| Public transportation (excluding taxicab) | 0.3% | 0.5% | 5.0% |
| Walked | 1.3% | 3.3% | 2.7% |
| Bicycle | 0.3% | 0.4% | 0.5% |
| Taxicab, motorcycle, or other means | 0.9% | 0.9% | 1.3% |
| Worked from home | 4.2% | 5.9% | 5.2% |

Source: American Community Survey 5-year Estimates 2019

The typical commute for workers in Watertown takes 15 minutes or less based on the ACS data shown in **Table 4**. Commutes longer than 20 minutes are relatively uncommon, with only 12% of workers traveling this length of time or longer to get to their job.

[1]WatertownWorks, Top Employers. https://www.watertownworks.com/

**Table 4: Commute Lengths for Watertown Workers**

| Length of Commute | Percent Share |
|---|---|
| Less than 10 minutes | 39.4% |
| 10 to 14 minutes | 34.9% |
| 15 to 19 minutes | 13.8% |
| 20 to 24 minutes | 2.7% |
| 25 to 29 minutes | 0.6% |
| 30 to 34 minutes | 1.7% |
| 35 to 44 minutes | 0.6% |
| 45 to 59 minutes | 2.2% |
| 60 or more minutes | 4.1% |

Source: American Community Survey 5-year Estimates, 2019

To better understand the movements of workers into and out of Watertown, further review of commuting data from the U.S. Census Bureau's OntheMap program was conducted. OntheMap is a web-based mapping application that complies and visualizes data related to where people work and where they live. The resulting analysis for the City of Watertown, shown in **Table 5**, revealed that most people working in the city also lived there.

**Table 5: Commuting Inflow / Outflow for the City of Watertown**

| | Total | Percent Share |
|---|---|---|
| Employed in Watertown | 14,192 | |
| Employed in Watertown and live outside of the city | 5,928 | 42% |
| Employed and live in Watertown | 8,264 | 58% |
| | | |
| Live in Watertown | 12,323 | |
| Live in Watertown and employed outside of the city | 3,698 | 32% |
| Live and employed in Watertown | 8,264 | 68% |

Source: United States Census Bureau Longitudinal Employer-Household Dynamics Program, 2018

# Baseline Conditions

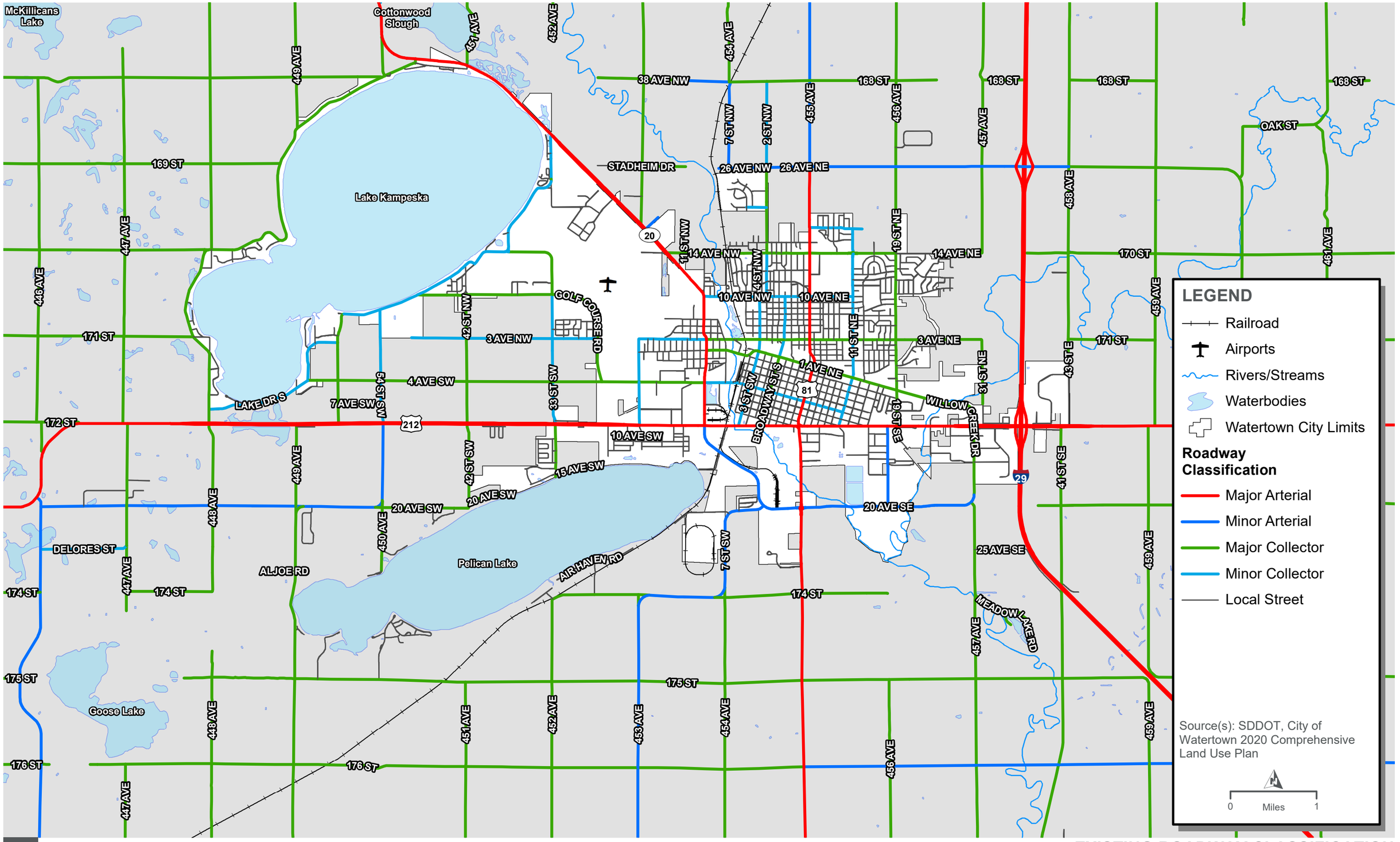
## Existing Roadway Network

The existing Watertown roadway network comprises approximately 197 miles of streets (as of June 2015), per the city's 2020 Comprehensive Land Use Plan. Primary routes throughout the city and surrounding area are identified in the current major street plan. In this plan, roads are defined by a roadway classification system which organizes roadways based on their level of mobility or access. These classifications range from major arterials with the greatest degree of mobility to local streets with the greatest degree of access. According to the major street plan, roadways are classified as major arterials, minor arterials, major collectors, alternative major collectors, minor collectors, and alternative minor collectors. An adapted version of this plan depicting existing roadway classification is shown in **Figure 2** while **Table 6** describes the characteristics of each classification discussed in the major street plan.

**Table 6: City of Watertown Major Street Plan Classifications**

| Street Classification | Characteristics | Examples in Watertown |
|---|---|---|
| **Major arterial** | • Primary roadway with that serves regional traffic with controlled access<br>• Traffic volumes exceed 15,000 vehicles per day<br>• Speed limits greater than or equal to 40 MPH<br>• Continuous for several miles through urban area and provide continuity for rural arterials | Interstate 29, US 212, US 81, SD 20 |
| **Minor arterial** | • Major roadway that serves traffic with controlled access and are of importance to the community<br>• Traffic volumes exceed 10,000 vehicles per day<br>• Speed limits greater than or equal to 35 MPH<br>• Serve through traffic and major developments | 26th Ave NE, 20th Ave S |
| **Major collector** | • Serve traffic between arterials and local roads<br>• Traffic volumes exceed 5,000 vehicles per day<br>• Speed limits greater than or equal to 30 MPH<br>• Serve multi-family residential, commercial, and industrial land uses | 19th St E, 17th St E, 14th Ave N, Broadway St |
| **Minor collector** | • Serve traffic between local roads and arterials<br>• Traffic volumes exceed 5,000 vehicles per day<br>• Speed limits of 25 MPH or greater,<br>• Serve predominately residential land uses | 11th St E, 3rd St W, 2nd St W, 10th Ave N |
| **Local street** | • Speed limits 25 MPH or less<br>• Limited continuity<br>• Designed to access adjacent land uses<br>• Do not intersect with arterial roads | 8th St NE, 12th St SE, 16th St NE |

Source: City of Watertown 2020 Comprehensive Land Use Plan




# EXISTING ROADWAY CLASSIFICATION (ADAPTED FROM CITY OF WATERTOWN MAJOR STREET PLAN)

FIGURE 2

## Bike and Pedestrian System

The bicycle and pedestrian network consist of numerous bicycle and pedestrian facilities, including sidewalks, separated paths / rails and shoulder / shared bike lanes. Continued investment in these facilities can aid the city in maintaining a welcoming environment for both pedestrians and bicyclists and benefit the overall transportation system by allowing residents ample opportunity to take trips utilizing these modal options instead of a private vehicle.

The trail network provides recreational opportunities for users and connectivity to recreational areas such as public parks, the Redlin Art Center, the Cattail Crossing Golf Course, the Bramble Park Zoo, and the uptown business district. While the Watertown trail network offers several recreational opportunities for bicyclists and pedestrians, the use of these transportation modes for commuting purposes remains low. American Community Survey (ACS) data for 2019 indicates that 0.3 percent of Watertown residents commute to work via bicycling and 1.3 percent commute to work via walking.

The bulk of existing bicycle facilities in the Watertown area are shared-use paths/trails, which total 22.6 miles. These facilities are separated from roadways and offer both bicyclists and pedestrians a wider path and increased safety due to the separation from motor vehicles. The total number of miles of shoulder bikeways is 3.4 miles, and these facilities are the second most common. Regarding planned investments in bicycle/trail facilities, Watertown has identified an additional 32.8 miles of future shared-used paths/trails. **Figure 3** displays the breakdown of all existing bicycle and pedestrian facilities in the Watertown area.

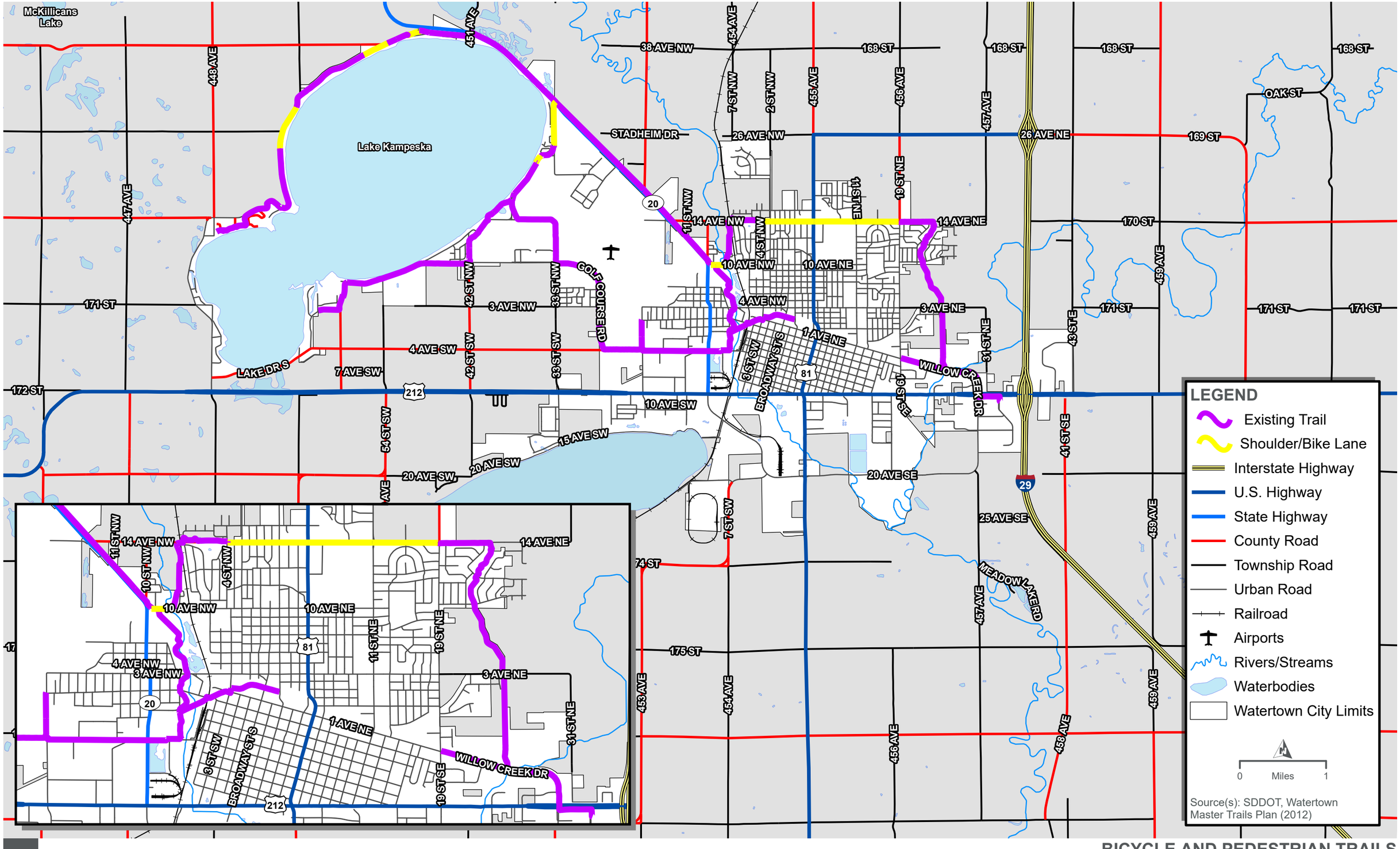
**Table 7: Existing Bicycle and Pedestrian Facilities Length**

| Facility Type | Length (mi.) |
|---|---|
| Shared-use Path/Trail | 22.6 |
| Shoulder/Bike Lane | 3.4 |
| Sidewalk | 100.1 |
| Total Existing Mileage | 126.1 |

Sidewalks are a critical facility for any urban transportation network as they facilitate pedestrian mobility and encourage active transportation through connections to other modes of transportation. Furthermore, sidewalks play a role in bolstering economic activity in commercial and mixed-use areas as they encourage foot traffic.

The 2002 sidewalk plan noted that there were more than 148 miles of sidewalk gaps missing of the 237 miles where sidewalks don't exist but are possible. As a result, a prioritization process has been developed to guide the city's investment in the sidewalk network.

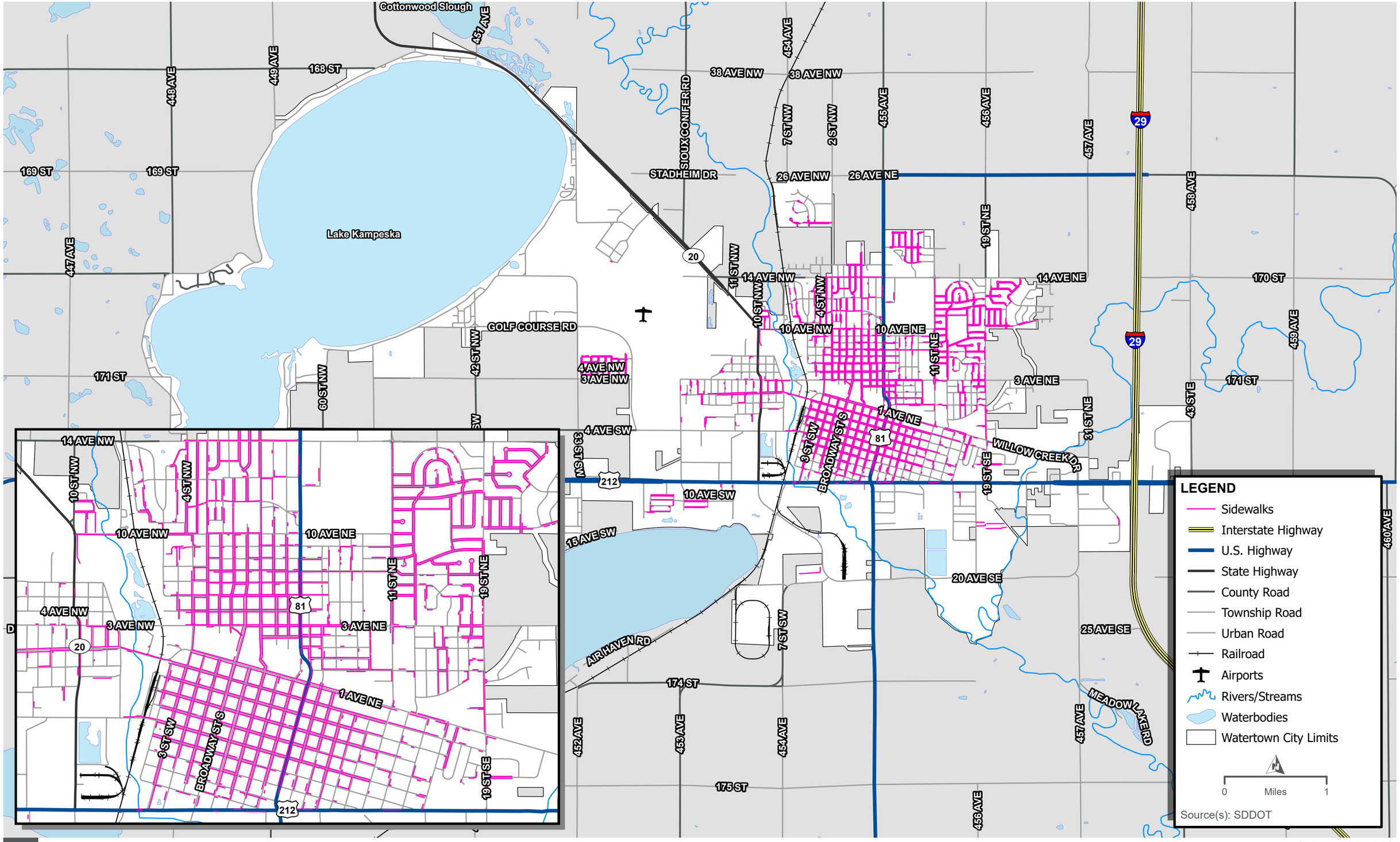
Existing and proposed bicycle and pedestrian trails are shown in **Figure 3** while the existing sidewalk network is shown in **Figure 4**.




# BICYCLE AND PEDESTRIAN TRAILS

FIGURE 3

WATERTOWN MASTER TRANSPORTATION PLAN




# SIDEWALKS

FIGURE 4

WATERTOWN MASTER TRANSPORTATION PLAN

## Transit Service

Transit service in the Watertown Area is provided by Community Transit of Watertown/Sisseton, Inc. via a curb-to-curb program comprised of 9 buses and 4 vans in the Codington County fleet. The program within the City of Watertown currently operates Monday through Friday from 8 AM to 4 PM and Saturday from 6 AM to 4 PM. Passengers must schedule rides one business day prior to the requested service. Out of town trips require a one-week notice. Passengers are encouraged to schedule return pick-ups for round trip services or alternately can schedule a "will call" return trip which is subject to service availability at the time. Current fees for curb-to-curb transit service within Watertown proper are based upon service areas as follows:

| Service Area | Service Area Description | Cost |
|---|---|---|
| Area No. 1 | Immediate Service Area (Watertown Proper) | $3.00 |
| Area No. 2 | Outlying Service Area (Lake Pelican / Lake Kampeska) | $5.00 |
| Area No. 3 | Extended Service Area (Dakota Sioux Casino / Destinations with access to Sioux Conifer Road from 167th Street to 164th Street) | $8.00 |

Source: Community Transit of Watertown/Sisseton, Inc.

Currently, through a partnership with Prairie Lakes Hospital, medical trips within the immediate service area of Watertown are free.

## Intercity Transportation

In addition to the highway links that connect the Watertown area to other parts of the state and country, there are additional modes for intercity travel including aviation and bus service.

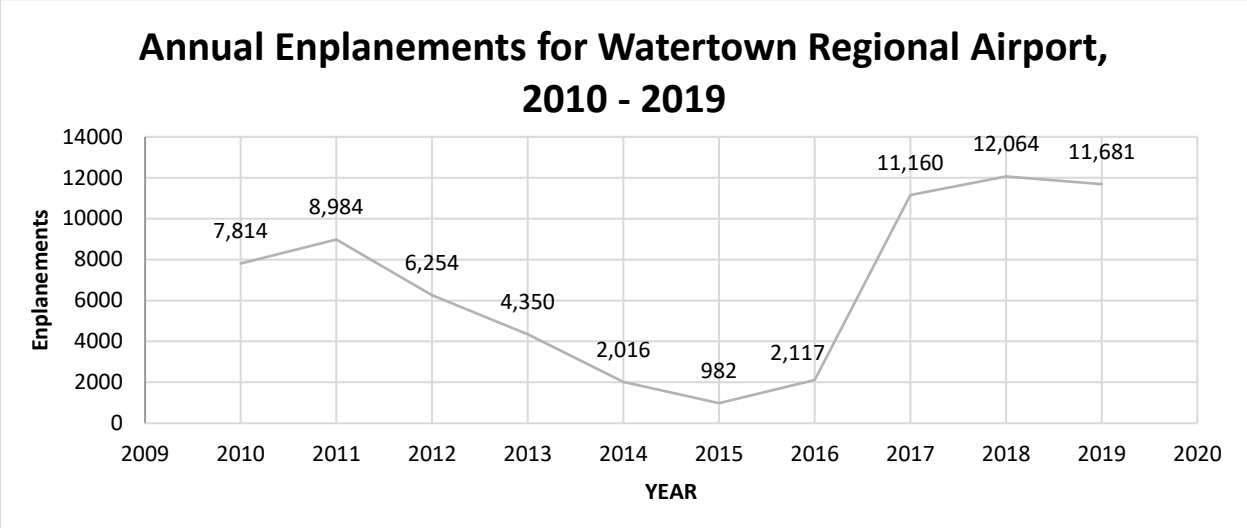
### Aviation

The Watertown Regional Airport is the home of commercial and general aviation within the Watertown area. The airport is owned by the City of Watertown and operated through the City-appointed Airport Board. The airport plays a fundamental role in the region's transportation network with a catchment area population of 150,000.

The airlines currently operating out of the Watertown Regional Airport are United Airlines (operated by SkyWest), offering daily flights to Chicago, IL (Chicago O'Hare) and Denver, CO (Denver International) which connect to approximately 130 cities.

**Figure 5** displays the annual enplanements at Watertown Regional airport for the period 2009-2019. As indicated by the figure, annual enplanements have fluctuated from year to year based upon the services provided and flights available. Since 2017, annual enplanements have been holding steady in the 11,000 to 12,000 range.

**Figure 5: Annual Enplanements for Watertown Regional Airport, 2010 - 2019**




Source: Federal Aviation Administration, Air Carrier Activity Information System (ACAIS) data

### Intercity Bus Service

The Watertown region's intercity bus service is operated by Jefferson Lines, with passenger pick-ups and drop-offs conducted at the Watertown/Jefferson Lines Curbside Bus Stop adjacent to the McDonald's restaurant located at 820 35th Circle. Jefferson Lines serves as the regional intercity bus carrier, connecting Watertown with other communities in South Dakota, along the I-29 and I-90 corridors as well communities in North Dakota, Minnesota, Iowa, and Nebraska. Jefferson Lines main service area includes the central and northwest United States, from Arkansas to Washington state.

## Freight System

Freight activities play an important role in the Watertown area economy and facilitating an efficient movement of goods on local and national highways is of paramount importance. To gain a better understanding of how highway freight volumes are expected to change in the Watertown Area boundaries over the next 25 years, freight forecast data was obtained from the Federal Highway Administration's Freight Analysis Framework (FAF) database. This data estimates the movement of commodities on the national highway system by using average truck payloads and assigning them to individual highways for forecasting purposes. Additional data points used by the FAF include functional classifications, number of lanes, and other pertinent highway characteristics to project future increases in tonnage moving along U.S. highways.

The assessment of FAF data for the Watertown area found that:

- Truck volumes are predicted to increase substantially over the planning horizon. FAF data indicate a predicted 60% increase in truck volumes between the 2012 baseline and year 2045. **Figure 6** illustrates 2012 truck volumes from FAF.
- Commodity tonnage increases are predicted to also increase over the planning horizon. FAF data predict a 73% increase in commodity tonnage between the 2012 baseline and year 2045. **Figure 7** illustrates 2012 commodity flows from FAF.

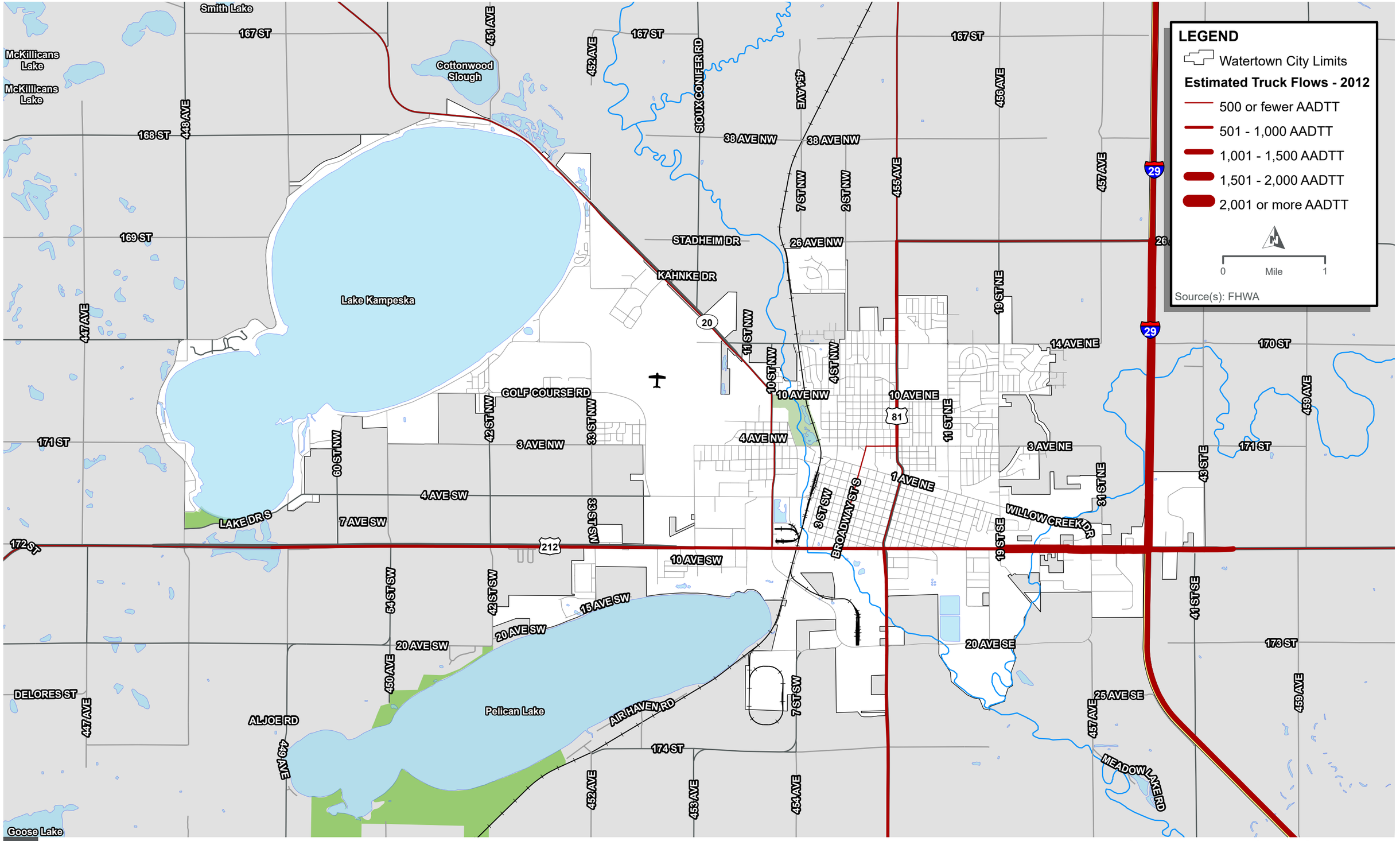
Two facilities within Watertown, I-29 and US 212, are major freight facilities. **Table 8** shows the estimated percent changes for daily truck volumes and tonnage flows for both facilities for the period 2012 through 2045. As seen in the table, truck volumes and tonnage flows along I-29 are expected to see significant growth while volumes and tonnage flows for US 212 are expected to see moderate growth during this period. This anticipated growth in truck volume and tonnage flow should be considered in the planning and design of future improvements for these facilities.

**Table 8: Truck Volume and Tonnage Flow Growth for I-29 and US 212**

| Route | AADTT | Tonnage Flows |
|---|---|---|
| | % Change | % Change |
| I-29 | 65 | 76 |
| US 212 | 56 | 44 |

Source: Freight Analysis Framework

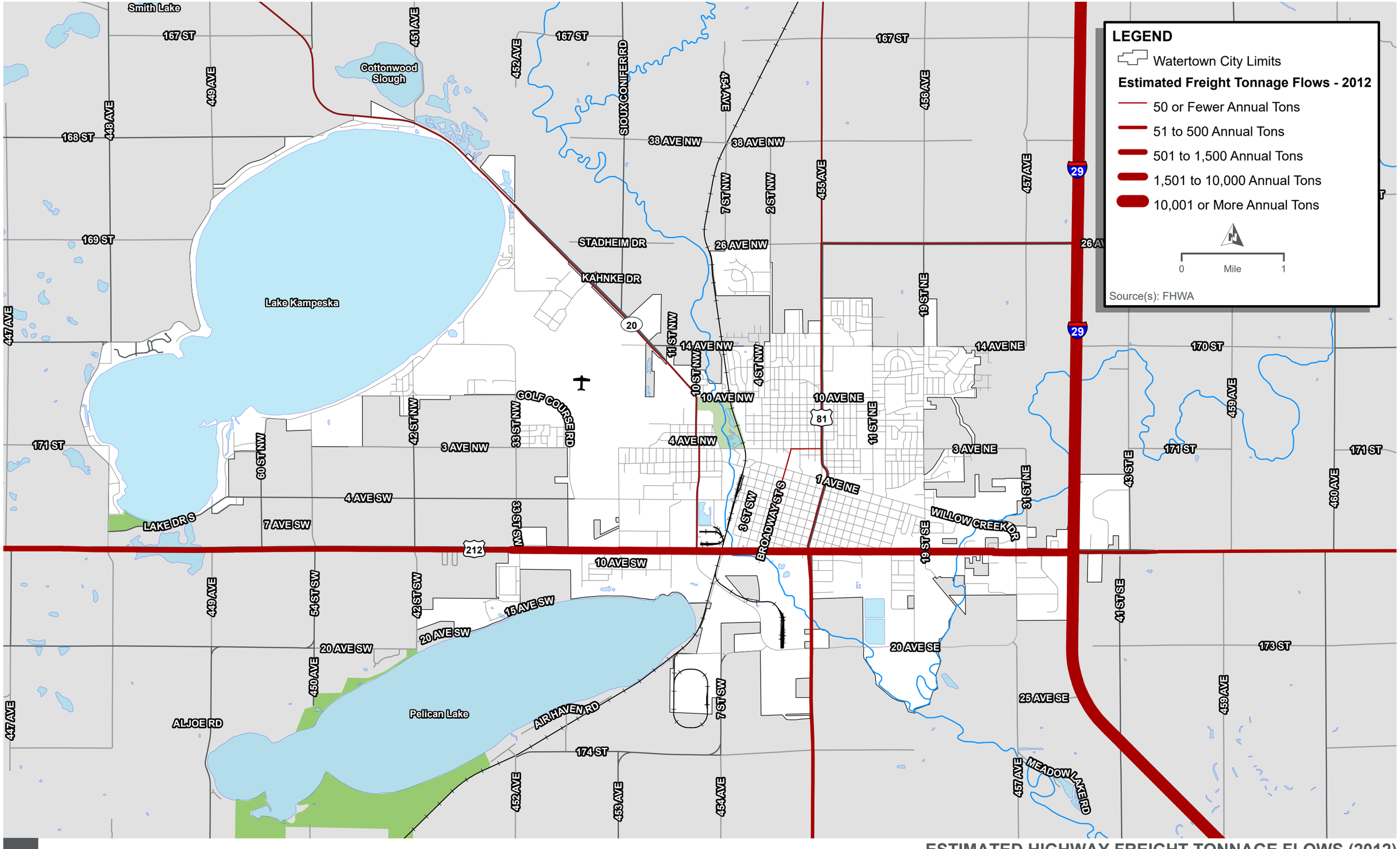
This marks a significant increase in freight activity traveling along highways in the area and has implications on public expenditures related to roadway maintenance, expansion, and the operational capabilities of the roadway network to support this increased amount of traffic.




ESTIMATED TRUCK FLOWS (2012)

FIGURE 6

WATERTOWN MASTER TRANSPORTATION PLAN




# ESTIMATED HIGHWAY FREIGHT TONNAGE FLOWS (2012)

FIGURE 7

WATERTOWN MASTER TRANSPORTATION PLAN

## Existing Traffic Operations

The following section presents the results of traffic operations analysis based on the 2020 existing conditions traffic volume scenario. This analysis consisted of a planning level number of lanes review to evaluate segment capacity and an intersection operations analysis for the study intersections.

### Planning Level Number of Lanes Review

A planning-level number of lanes review is based on Level of Service (LOS)-based capacity thresholds for different roadway cross-sections discussed in the SDDOT Road Design Manual. Color-coding in **Figure 8** is based on where the volume falls within **Table 9** thresholds. Traffic patterns, traffic signals or other intersection control, number of access points, and number of major interesting roadways are considerations that typically dictate design needs and are not necessarily accurately captured for all corridors with this plan-level method. Therefore, it is recommended that planning-level number of lanes on either side of the thresholds be considered for segments where volumes are near the cut-off point and specific improvements be analyzed in a more detailed traffic operations analysis

**Table 9: Estimated Number of Lanes**

| Total Number of Lanes | Total Design Year (ADT)[1] | |
|---|---|---|
| | Rural Level | Urban |
| 2 | < 8,000 | < 6,000* |
| 3 | [2] | 2,500 to 16,000 |
| 4 | 8,000 to 20,0003 | [3] |
| 5 | [2] | 16,000 to 30,000 |
| 6 | > 20,000[4] | > 30,000[4] |

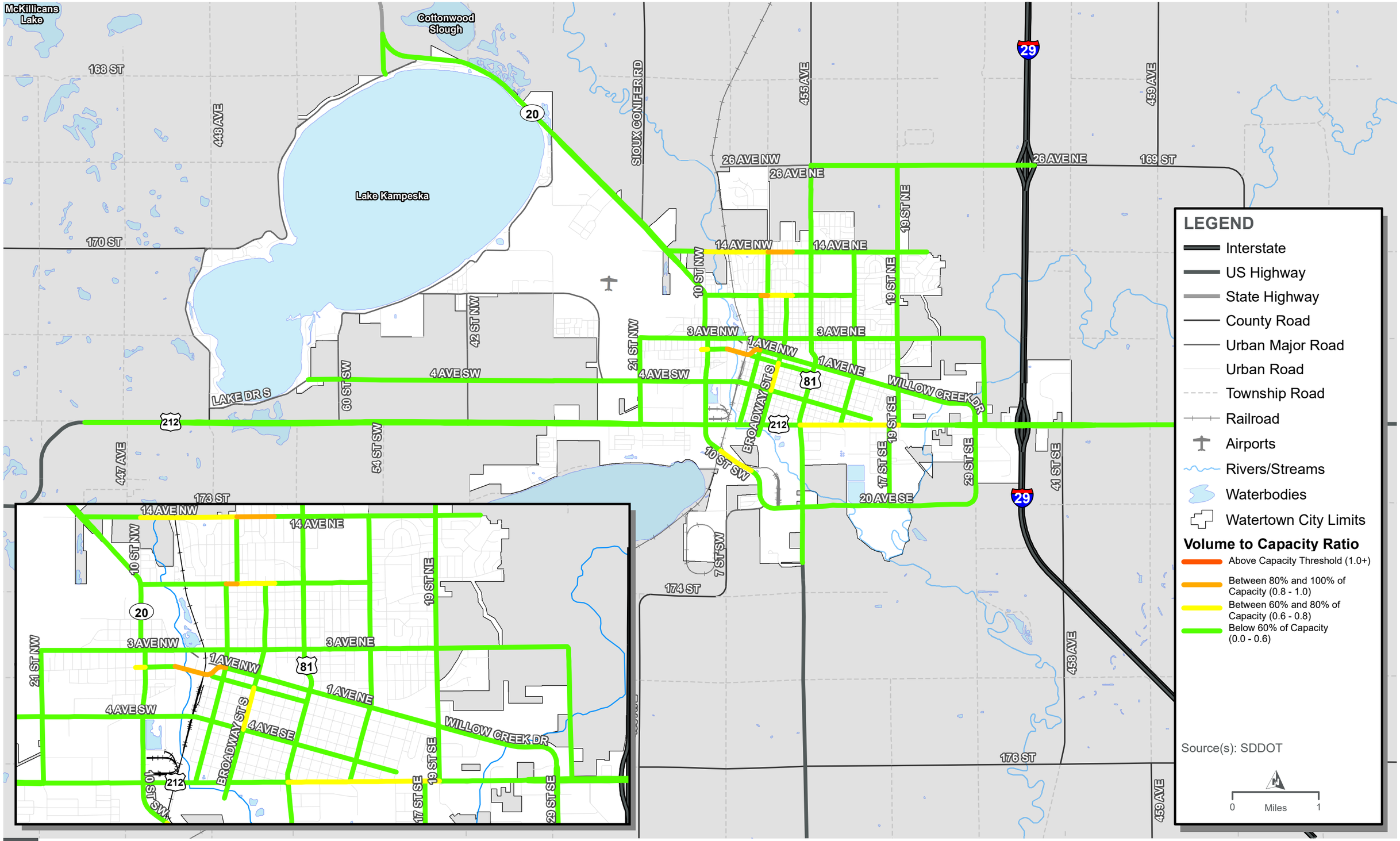
* Urban ADT threshold for 2 lanes was modified for this study to approximate LOS C conditions.

[1] Construction/Reconstruction projects are designed based on a typical 20-year ADT project beyond the anticipated year of project construction.

[2] Continuous left turn lanes may be considered based on left turn volumes and/or when intersections and/or approaches are closely spaced together.

[3] Undivided sections may be used if left turn movements are low and there is no crash history, otherwise consider installing a median or 5 lane section.

[4] Medians should be used.




# EXISTING (2020) YEAR TRAFFIC VOLUME-TO-CAPACITY EVALUATION

FIGURE 8

### Intersection Operations

The intersection traffic operations analysis was conducted for 26 study intersections using Synchro 10 software. LOS results, which is a measure of average vehicular delay at the intersection, are based on guidance from the Highway Capacity Manual 6th Edition (HCM6). LOS is reported on grading scale were A represents free flow traffic while F reflects gridlock. Thresholds for applicable LOS measures are provided in **Table 10**.

**Table 10: Level of Service Definitions**

| Level of Service | Signalized Intersection Control Delay (seconds/vehicle) | All-Way Stop, Two-Way Stop, and Roundabout Intersection Control Delay (seconds/vehicle) |
|---|---|---|
| A | ≤ 10 | ≤ 10 |
| B | > 10 – 20 | > 10 – 15 |
| C | > 20 – 35 | > 15 – 25 |
| D | > 35 – 55 | > 25 – 35 |
| E | > 55 – 80 | > 35 – 50 |
| F | > 80; volume exceeds capacity | > 50; volume exceeds capacity |

Source: Highway Capacity Manual 6th Edition

LOS goals for Watertown are as follows:

- Signalized Intersections:
  - Rural area minimum allowable LOS – LOS B
  - Urban area minimum allowable LOS – LOS C
    - Individual movements allowed to operate at LOS E or better.
- Roundabouts:
  - Minimum allowable LOS – LOS C
- Two-Way Stop-Controlled Intersections:
  - Rural area minimum allowable LOS – LOS B (worst-case stop-controlled approach)
  - Urban area minimum allowable LOS – LOS C (weighted average intersection approach)

Urban area analysis is applicable for facilities within Watertown city limits. Locations where the LOS exceeds (worse) these study goals demonstrates an operation or capacity-related need to be addressed through future system improvements. Further detail on the study intersections included in the analysis can be found in **Appendix A**.

## Origin-Destination Analysis

To analyze the movements of traffic passing through the Watertown region, traffic pattern data were sourced from StreetLight Data. Streetlight records the movements of smartphones (with no personally identifiable information) to provide on-demand historic measurements of travel activity. The data reviewed for the Watertown region covered the year 2019 except for the months of June, July and August. Summer months were withheld from the data because traffic in Watertown is impacted seasonally by the local college and K-12 school traffic, so this analysis describes traffic patterns during the academic calendar year.

The analysis established points, or "gates," in Watertown and reviewed movement counts of smartphones through these gates then adjusted them to represent estimated daily vehicle trips based on local traffic counts. **Table 11** shows a daily traffic count matrix for the level of daily traffic traveling between each gate as estimated by the analysis while **Figure 9** illustrates the relationship between gates and the amount of daily travel they record.

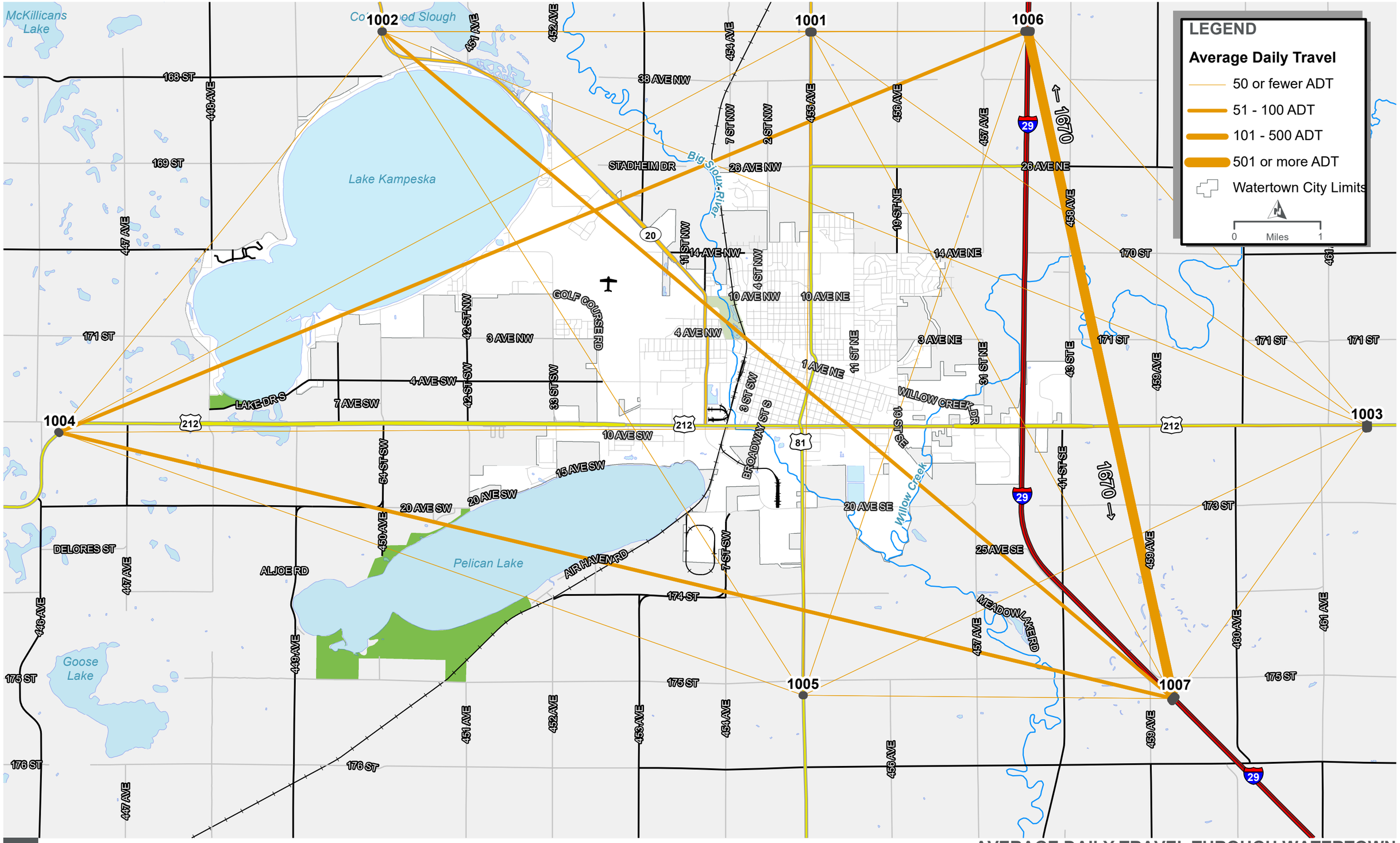
**Table 11: Average Daily Traffic Counts for Gate-to-Gate Travel in the Watertown Region**

| | | Destination | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 455th Ave | Hwy 20 | Hwy 212 E | Hwy 212 W | Hwy 81 | I-29 N | I-29 S | Total |
| Origin | 455th Ave | 0 | 5 | 5 | 5 | 10 | 5 | 5 | 35 |
| | Hwy 20 | 5 | 0 | 10 | 5 | 25 | 5 | 45 | 95 |
| | Hwy 212 E | 5 | 10 | 0 | 40 | 35 | 25 | 25 | 140 |
| | Hwy 212 W | 5 | 5 | 40 | 0 | 20 | 50 | 85 | 205 |
| | Hwy 81 | 10 | 25 | 35 | 20 | 0 | 50 | 5 | 145 |
| | I-29 N | 5 | 5 | 25 | 50 | 50 | 0 | 1,670 | 1,805 |
| | I-29 S | 5 | 45 | 25 | 85 | 5 | 1,670 | 0 | 1,835 |
| | Total | 35 | 95 | 140 | 205 | 145 | 1,805 | 1,835 | |

Source: Streetlight Data

By analyzing through traffic patterns in the Watertown region using the Streetlight data, it can be better understood exactly how individuals travel through the region and on which routes. This understanding can better inform future roadway improvements by prioritizing investment in strategies that facilitate the optimal throughput of traffic in the region.

**Appendix A** contains the complete methodology and results for the traffic operations and origin-destination analysis.




AVERAGE DAILY TRAVEL THROUGH WATERTOWN

FIGURE 9

## Traffic Operations Findings

The following are general findings derived from the 2020 existing conditions traffic operations analysis:

### Planning Level Number of Lanes Review

- A majority of roads within city limits function below 60% of SDDOT planning level capacity thresholds under existing daily traffic volumes.
- Road segments that operate between 60 percent to 80 percent of planning level capacity thresholds include:
    - US 212 from 19th Street SE to US 81
    - 14th Avenue NW from 10th Street NW to 2nd Street NW
    - 14th Avenue N from 2nd Street NW to N Maple Street
    - 10th Avenue North from 3rd Street NW to N Maple Street
    - 11th Street E from 4th Avenue SE to Arrow Avenue NE
    - Broadway Street from 4th Avenue SW to 1st Avenue NE
    - 21st Street NW from US 212 to 2nd Avenue NW
    - 4th Avenue SW from Broadway Street S to 3rd Street SW
    - W Kemp Avenue from 1st Avenue NW to Kampeska Boulevard

### INTERSECTION OPERATIONS

- All 26 of the study intersections met peak hour LOS goals and all intersections had an overall LOS of LOS B or above.
- US 212 and 23rd Street SE intersection has a two-way stop control (TWSC) worst-case approach LOS D for the northbound approach in the PM peak hour, indicating a notable delay for vehicles attempting to turn left or right onto US 212.

## Traffic Safety

Crash data was obtained from the South Dakota Department of Transportation (SDDOT) for reportable crashes on public roadways within the City of Watertown. This review looked at the five most recent, complete calendar years of crash data, 2015-2019. The data includes all motor vehicle crashes, including motor vehicle crashes with pedestrians and bicyclists. For the purpose of this analysis, several variables were identified based on safety performance measures, which are detailed below. The analysis consists of three elements:

1. **Crash Frequency:** total number of crashes occurring at intersections within Watertown city limits
2. **Crash Rates**: the number of crashes occurring at intersections per million entering vehicles
3. **2019 South Dakota Strategic Highway Safety Plan (SHSP) Emphasis Areas**: crash attribute focal points that guide future South Dakota safety investments

Throughout the review, crashes were reported by two main crash fields, injury severity and manner of collision. Injury severity is delineated into:

- **Fatal Injury:** An injury resulting in death, or an injury caused death occurring within 30 days of the crash.
- **Incapacitating Injury:** Any injury, other than fatal, that prevents the injured person from walking, driving, or continuing the activities they were capable of performing prior to the crash.
- **Non-Incapacitating Injury:** Any injury, other than a fatal or incapacitating injury, that is evident to observers at the crash scene.
- **Possible Injury:** Any injury reported that is not a fatal injury, incapacitating injury, or non-incapacitating injury.
- **Property Damage Only:** A reported crash with no injuries.

**Table 12** summarizes all crashes that occurred in Watertown during the years 2015-2019.

### City-wide Summary

A total of 2,013 crashes were reported within Watertown city limits between 2015 and 2019. The locations of these crashes, in terms of crash severity, is depicted in **Figure 10**.

**Table 12: Crash Severity**

| Crash Severity | Total # Crashes | |
|---|---|---|
| Fatal Injury | 5 | <1% |
| Incapacitating Injury | 29 | 1% |
| Non-Incapacitating Injury | 139 | 7% |
| Possible Injury | 322 | 16% |
| No Injury | 1,456 | 72% |
| Wild Animal Hit | 62 | 3% |
| Total Crashes | **2,013** | |

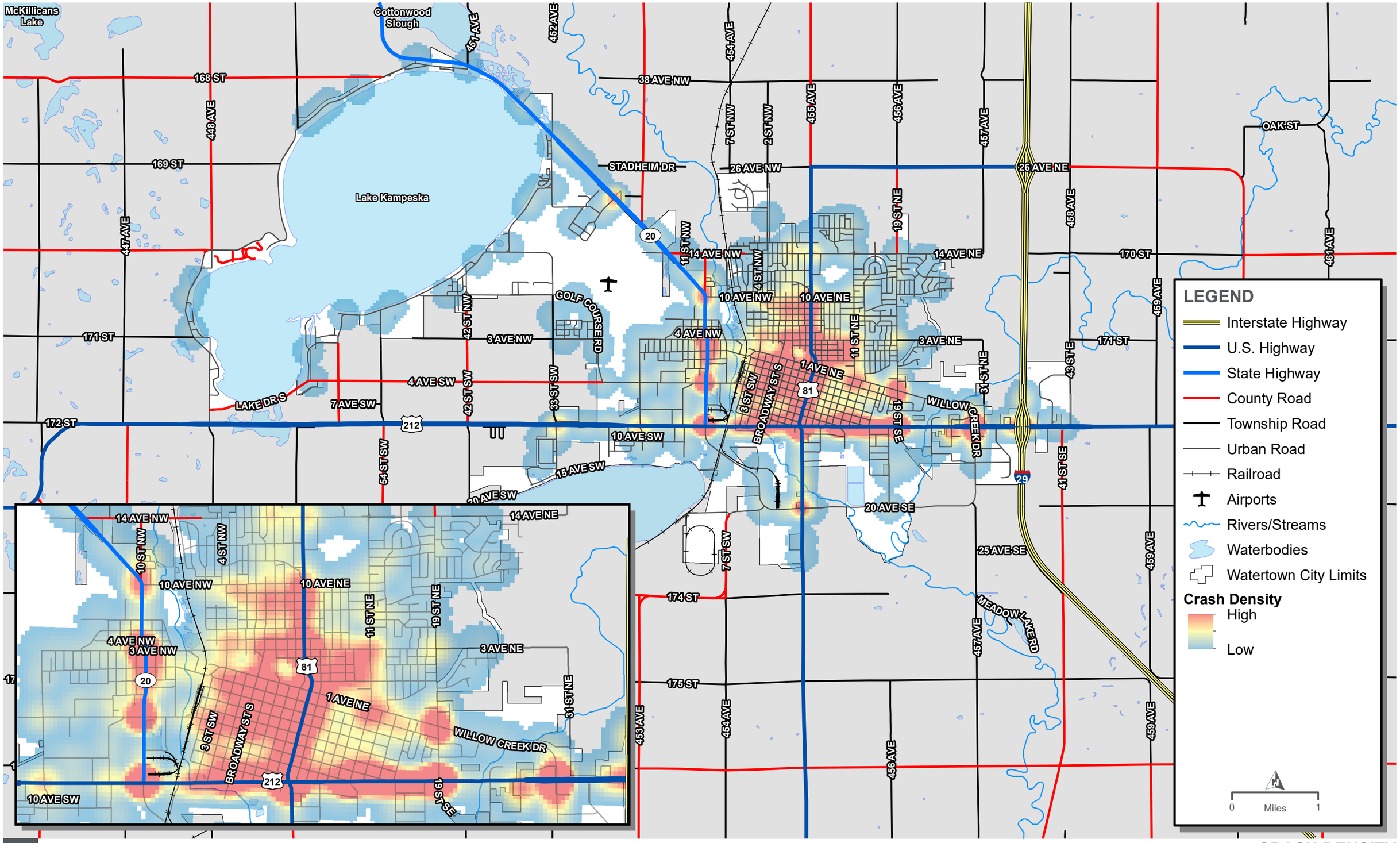
Source: SDDOT Crash Database

**Table 13** lists crash characteristics of the 2,013 crashes city-wide to support emphasis areas identified in the 2019 SDDOT Strategic Highway Safety Plan.

**Table 13: 2019 SHSP Emphasis Area Crash Characteristics**

| Crash Characteristic | Total # Crashes | |
|---|---|---|
| **Alcohol/Drugs** | 161 | 8% |
| **Intersections** | 1,105 | 55% |
| **Lane Departures** | 184 | 9% |
| **Unbuckled Vehicle Occupants** | 88 | 4% |
| **Motorcycles** | 42 | 2% |
| **Distracted Driving** | 126 | 6% |
| **Speeding/Aggressive Driving** | 294 | 15% |

Source: SDDOT Crash Database; South Dakota Strategic Highway Safety Plan, August 2019




# CRASH DENSITY

(2015-2019)

FIGURE 10

WATERTOWN MASTER TRANSPORTATION PLAN

## Intersection Crash Analysis

Crashes occurring within a 250-foot radius of an intersection in the GIS crash database were categorized as an intersection crash for this analysis. 1,105 of 2,013 crashes met this criterion. Intersections were analyzed and ranked based on the twenty highest crash frequencies and the twenty highest crash rates.

### Crash Frequency

Crash frequency is defined as the total number of crashes that occurred at an intersection. Crash frequency is important as it indicates locations that record frequent crash events, but it does not consider traffic exposure which can lead to an under-emphasis of intersections with lower volumes and an overemphasis of intersections with higher traffic volumes. The twenty highest ranked crash frequency intersections are presented in **Figure 11** and **Table 14** (in terms of injury severity).

In terms of crash frequency, the following was found to have occurred on the major corridors within Watertown:

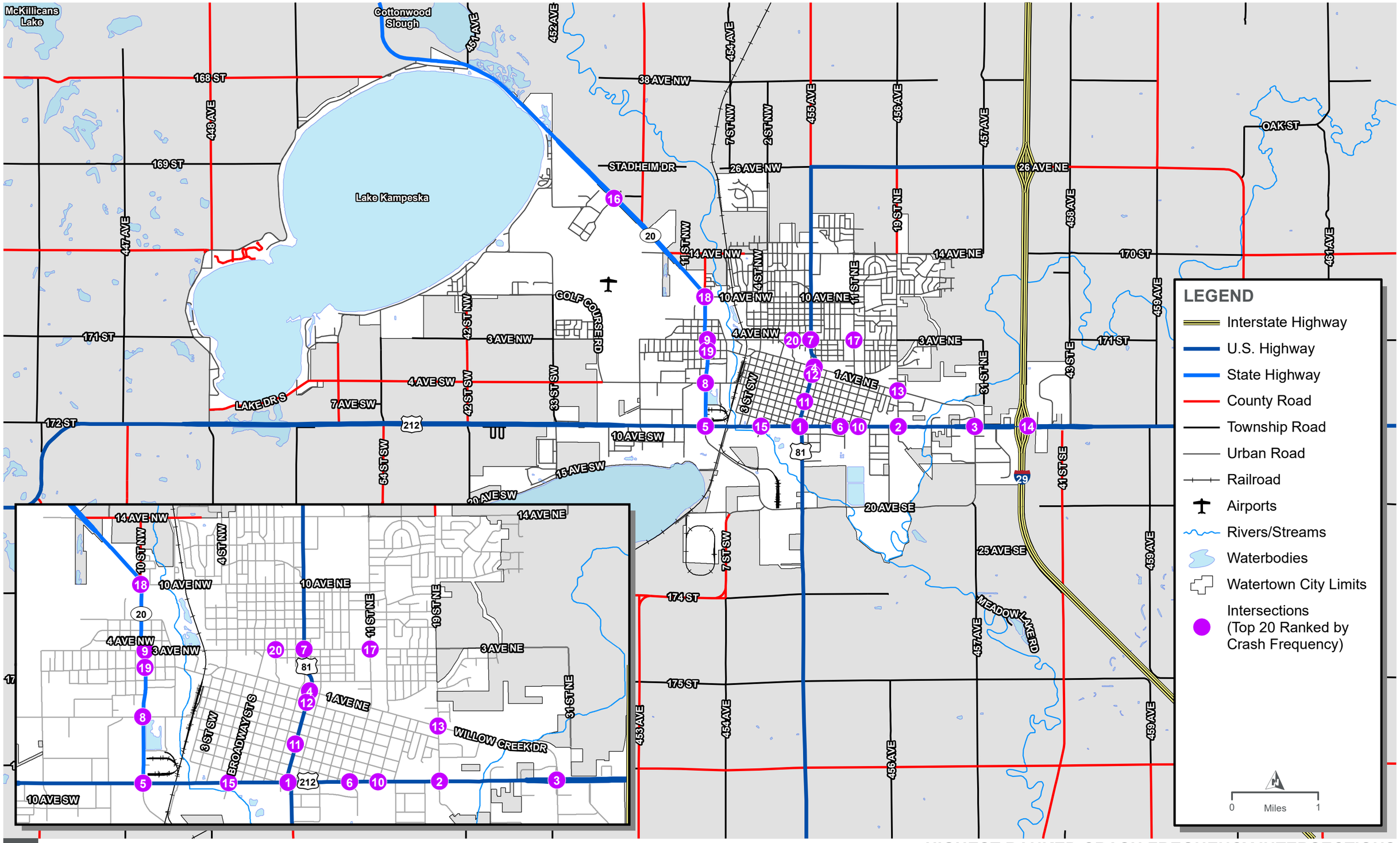
- **US 212:** 1st, 2nd, and 3rd highest crash frequency intersections (8 of 20 total)
- **US 81:** 1st and 4th highest crash frequency intersection (5 of 20 total)
- **SD 20:** 5th highest crash frequency intersections (6 of 20 total)

Overall, the US 212 and US 81 intersection exhibited the greatest number of crashes with 54. This intersection is signalized with 2 through lanes, a left-turn lane, and a channelized right-turn lane at each approach. While no fatal or incapacitating injury crashes were observed, 3 crashes were non-incapacitating injury crashes. 29 of these crashes were rear-end crashes, 22 were angle crashes, and 3 were sideswipe crashes. The US 212 intersections with 19th St SE and Willow Creek Drive had the next highest crash frequency, with 42 and 34 crashes respectively.

## Table 14: Watertown Intersection Crash Frequency Rankings -- Injury Severity (2015-2019)

| Rank | Intersection Name | Crashes (5 years) | | | | | | Daily Entering Volume | Crash Rate (Crashes / MEV**) |
|---|---|---|---|---|---|---|---|---|---|
| | | Total | Fatal Injury | *Major Injury | *Minor Injury | Possible Injury | Property Damage Only | | |
| 1 | US 212 and US 81 | 54 | 0 | 0 | 3 | 14 | 37 | 25,398 | 1.17 |
| 2 | US 212 and 19th St SE | 42 | 0 | 0 | 2 | 13 | 27 | 20,499 | 1.12 |
| 3 | US 212 and Willow Creek Dr | 34 | 0 | 0 | 1 | 4 | 29 | 11,453 | 1.63 |
| 4 | US 81 and 1st Ave NE | 27 | 0 | 0 | 2 | 7 | 18 | 16,807 | 0.88 |
| 5 | US 212 and SD 20 | 26 | 0 | 0 | 1 | 7 | 18 | 21,701 | 0.66 |
| 6 | US 212 and 11th St SE | 24 | 0 | 2 | 3 | 5 | 14 | 19,421 | 0.68 |
| 7 | US 81 and 3rd Ave NE | 22 | 0 | 0 | 1 | 3 | 18 | 13,588 | 0.89 |
| 8 | SD 20 and 4th Ave SW | 20 | 0 | 0 | 2 | 5 | 13 | 15,759 | 0.70 |
| 9 | SD 20 and 3rd Ave NW | 17 | 0 | 0 | 3 | 5 | 9 | 15,962 | 0.58 |
| 10 | US 212 and 13th St SE | 16 | 0 | 1 | 2 | 2 | 11 | 21,580 | 0.41 |
| 11 | US 81 and 4th Ave SE | 15 | 0 | 0 | 3 | 4 | 8 | 11,662 | 0.70 |
| 12 | US 81 and E Kemp Ave | 14 | 0 | 0 | 1 | 1 | 12 | 12,516 | 0.61 |
| 13 | 19th St SE and Willow Creek Dr | 13 | 0 | 0 | 2 | 4 | 7 | 12,157 | 0.59 |
| 14 | US 212 and I-29 NB | 12 | 0 | 1 | 1 | 3 | 7 | 6,371 | 1.03 |
| 15 | US 212 and Broadway St | 12 | 0 | 0 | 3 | 1 | 8 | 18,244 | 0.36 |
| 16 | SD 20 and Airport Dr | 11 | 1 | 0 | 3 | 3 | 4 | 5,084 | 1.19 |
| 17 | 11th St NE and 3rd Ave NE | 10 | 0 | 0 | 1 | 3 | 6 | 5,756 | 0.95 |
| 18 | SD 20 and 10th Ave NW | 10 | 0 | 0 | 0 | 0 | 10 | 9,530 | 0.57 |
| 19 | SD 20 and W Kemp Ave | 9 | 0 | 1 | 0 | 1 | 7 | 13,109 | 0.38 |
| 20 | N Maple St & 3rd Ave NE | 9 | 0 | 0 | 1 | 1 | 7 | 5,764 | 0.86 |

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles
Source: SDDOT Crash Database




# HIGHEST RANKED CRASH FREQUENCY INTERSECTIONS

(2015-2019)

FIGURE 11

WATERTOWN MASTER TRANSPORTATION PLAN

### Crash Rates

Crash rates were calculated to further assess traffic safety conditions within Watertown city limits. A **crash rate** is the calculation of the number of vehicular crashes per million entering vehicles (MEV) and normalizes crash frequencies based on traffic exposure. The method used for calculating crash rates utilized crash and traffic count data sourced from SDDOT. For intersections without available traffic counts, daily traffic volumes were estimated to be 1,500 ADT. The highest ranked crash rate intersections are presented in **Figure 12**.

Crash rates are based on the daily entering volumes at each intersection, which were estimated based on the data discussed above. The daily entering volumes that were calculated give insight into roadway usage and specifically the average number of vehicles using an intersection during typical weekday travel. This high-level overview provides a snapshot of traffic safety and its relationship with roadway usage throughout Watertown city limits in normal conditions.

In addition to crash rates, critical crash rates and critical index ratios were calculated for each of the twenty intersections based on the FHWA's Highway Safety Manual methodology. Critical crash rates are the comparison of a site crash rate to an average crash rate of a reference group, which in this case was intersections that observed 8 or more crashes. If a crash rate exceeds the critical crash rate, shown in the Critical Index Ratio, there is likely a safety issue.

The highest crash rate intersections are presented in terms of injury severity in **Table 15**.

Regarding the critical index ratio, five intersections had crash rates that exceeded the critical crash rate:

- **US 212 and Willow Creek Drive** (1.63 crashes/MEV, 1.5 ratio)
- **SD 20 and Airport Drive** (1.19 crashes/MEV, 1.3 ratio)
- **US 212 and US 81** (1.17 crashes/MEV, 1.2 ratio)
- **US 212 and 19th Street SE** (1.12 crashes/MEV, 1.1 ratio)
- **N Maple Street and 3rd Avenue NE** (1.03 crashes/MEV, 1.0 ratio)

### Roundabouts

During the observed 5-year period, two roundabout intersections were constructed at US 81 and 20th Avenue SE (constructed between April and August 2018) and 11th Street NE and 14th Avenue NE (completed in July 2015). While direct crash data comparisons to other study area intersections cannot be made due to these major geometric changes, crash data was examined for any indications of changes in safety trends. For this examination, SDDOT crash data from 2014 was employed in order to have at least one full year of data prior to the construction of the roundabout at 11th Street NE and 14th Avenue NE. Crash data from these intersections is shown in **Table 16**.

## Table 15: Watertown Intersection Crash Rates Rankings (2015-2019)

| Rank | Intersection Name | Crashes (5 years) | | | | | | Daily Entering Volume | Crash Rate (Crashes / MEV**) | Critical Crash Rate | Critical Index Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Fatal Injury | *Major Injury | *Minor Injury | Possible Injury | Property Damage Only | | | | |
| 1 | US 212 and Willow Creek Dr | 34 | 0 | 0 | 1 | 4 | 29 | 11,453 | 1.63 | 1.11 | 1.5 |
| 2 | SD 20 and Airport Dr | 11 | 1 | 0 | 3 | 3 | 4 | 5,084 | 1.19 | 0.91 | 1.3 |
| 3 | US 212 and US 81 | 54 | 0 | 0 | 3 | 14 | 37 | 25,398 | 1.17 | 0.99 | 1.2 |
| 4 | US 212 and 19th St SE | 42 | 0 | 0 | 2 | 13 | 27 | 20,499 | 1.12 | 1.02 | 1.1 |
| 5 | US 212 and I-29 NB | 12 | 0 | 1 | 1 | 3 | 7 | 6,371 | 1.03 | 1.24 | 0.8 |
| 6 | 11th St NE and 3rd Ave NE | 10 | 0 | 0 | 1 | 3 | 6 | 5,756 | 0.95 | 1.26 | 0.8 |
| 7 | US 81 and 3rd Ave NE | 22 | 0 | 0 | 1 | 3 | 18 | 13,588 | 0.89 | 1.08 | 0.8 |
| 8 | US 81 and 1st Ave NE | 27 | 0 | 0 | 2 | 7 | 18 | 16,807 | 0.88 | 1.05 | 0.8 |
| 9 | N Maple St and 3rd Ave NE | 9 | 0 | 0 | 1 | 1 | 7 | 5,764 | 0.86 | 0.88 | 1.0 |
| 10 | Broadway St and 4th Ave SW | 8 | 0 | 0 | 0 | 1 | 7 | 6,198 | 0.71 | 1.24 | 0.6 |
| 11 | SD 20 and 4th Ave SW | 20 | 0 | 0 | 2 | 5 | 13 | 15,759 | 0.70 | 1.06 | 0.7 |
| 12 | US 81 and 4th Ave SE | 15 | 0 | 0 | 3 | 4 | 8 | 11,662 | 0.70 | 1.11 | 0.6 |
| 13 | US 212 and 11th St SE | 24 | 0 | 2 | 3 | 5 | 14 | 19,421 | 0.68 | 1.03 | 0.7 |
| 14 | 29th St SE and 26th St SE | 8 | 0 | 0 | 0 | 0 | 8 | 6,600 | 0.66 | 0.85 | 0.8 |
| 15 | US 212 and SD 20 | 26 | 0 | 0 | 1 | 7 | 18 | 21,701 | 0.66 | 1.01 | 0.6 |
| 16 | US 81 and E Kemp Ave | 14 | 0 | 0 | 1 | 1 | 12 | 12,516 | 0.61 | 1.09 | 0.6 |
| 17 | 11th St NE and 1st Ave NE | 8 | 0 | 0 | 0 | 1 | 7 | 7,218 | 0.61 | 0.83 | 0.7 |
| 18 | 19th St SE and Willow Creek Dr | 13 | 0 | 0 | 2 | 4 | 7 | 12,157 | 0.59 | 1.10 | 0.5 |
| 19 | 6th St NE and 1st Ave NE | 8 | 0 | 0 | 1 | 4 | 3 | 7,599 | 0.58 | 0.82 | 0.7 |
| 20 | SD 20 and 3rd Ave NW | 17 | 0 | 0 | 3 | 5 | 9 | 15,962 | 0.58 | 1.05 | 0.6 |

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**MEV: Million Entering Vehicles
Source: SDDOT Crash Database

**Table 16: Roundabout Intersections (2014-2019)**

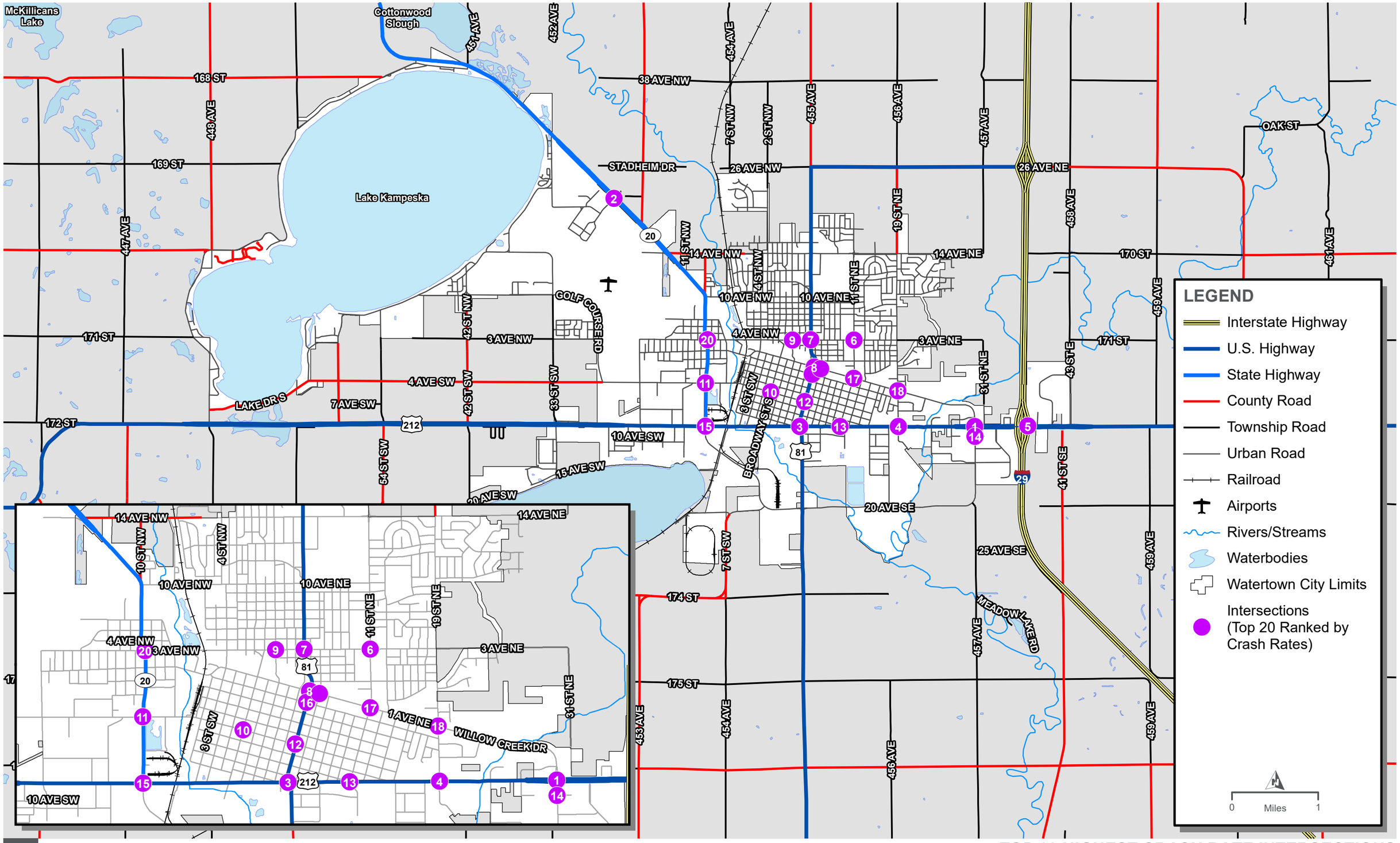
| Intersection Name | Crashes (6 years) | | | | | | | Crashes Before Roundabout Construction | Crashes After Roundabout Construction |
|---|---|---|---|---|---|---|---|---|---|
| | Total | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | | |
| **US 81 and 20th Avenue SE*** | **16** | 5 | 3 | 6 | 0 | 0 | 2 | **14 Crashes (4 years)**<br><br>**Injury Severity**<br>• 6 non-incapacitating injury crashes<br>• 3 possible injury crashes<br>• 5 no injury crashes<br><br>**Manner of Collision**<br>• 12 angle crashes<br>• 2 rear-end crashes | **2 Crashes (1 year)**<br><br>**Injury Severity**<br>• 1 possible injury crash<br>• 1 no injury crash<br><br>**Manner of Collision**<br>• 1 angle crash |
| **11th Street NE and 14th Avenue NE**** | **2** | 0 | 1 | 0 | 0 | 0 | 1 | **1 Crash (1 year)**<br><br>**Injury Severity**<br>• 1 no injury crash<br><br>**Manner of Collision**<br>• 1 rear-end crash | **1 Crash (4 years)**<br><br>**Injury Severity**<br>• 1 no injury crash<br><br>**Manner of Collision**<br>• 1 rear-end crash |

*Roundabout was constructed in between April 2018 and August 2018. 2018 crashes at this intersection occurred during construction and are not considered in the before and after crash totals.

**Roundabout construction was completed by July 2015. The one 2015 crash observed occurred on January 20th of that year and thus was included in the before total.

Color Code: Gray – crashes occurred before roundabout construction, Yellow – crashes occurred during roundabout construction year, Green – crashes occurred after roundabout construction

Source: SDDOT Crash Database




# TOP 20 HIGHEST CRASH RATE INTERSECTIONS

(2015-2019)

FIGURE 12

WATERTOWN MASTER TRANSPORTATION PLAN

**Corridor Segments**

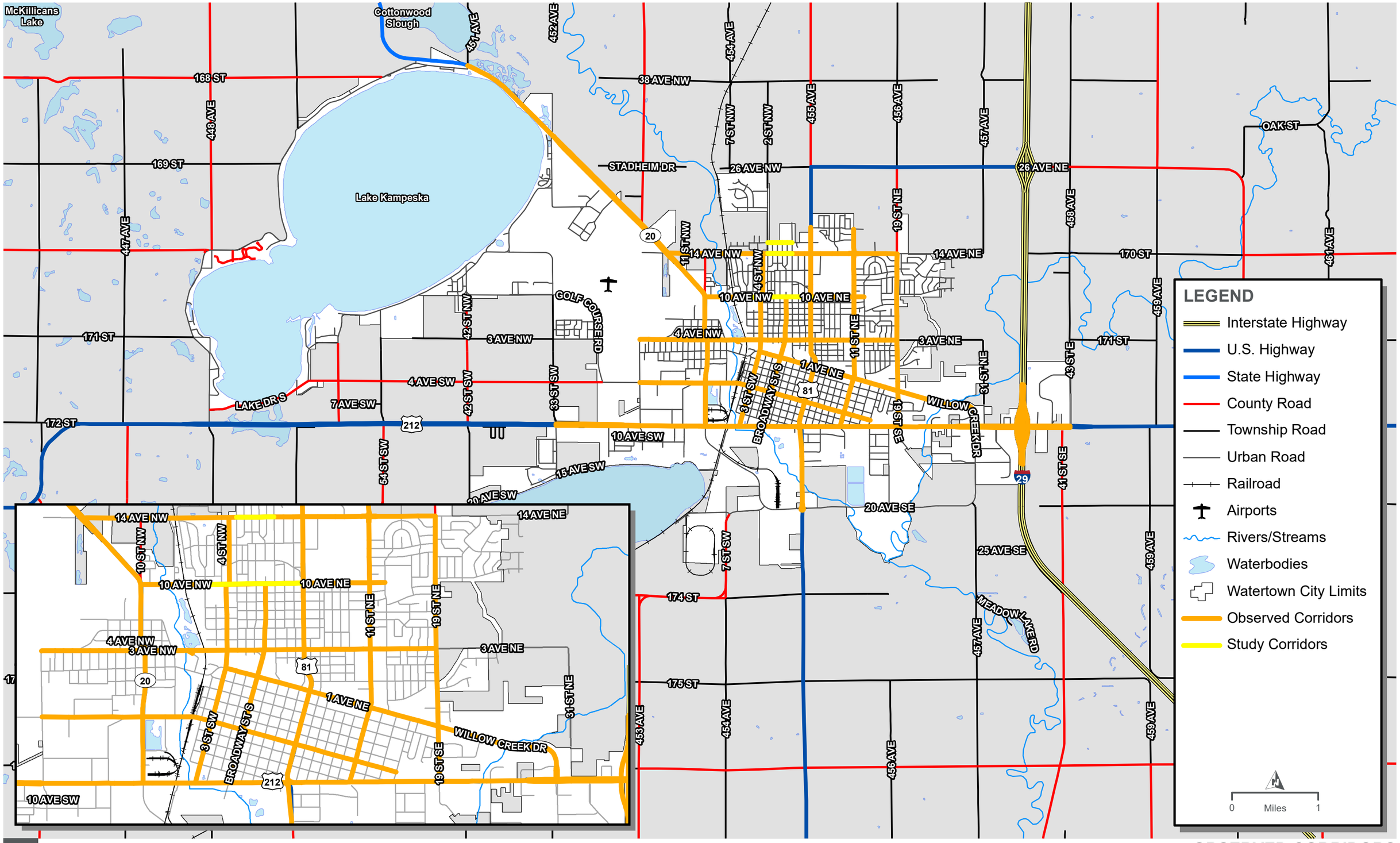
Fourteen corridors, including the three study corridors, were evaluated for segment crash rates. These segments are identified in **Figure 13** and segment crash densities are shown in **Figure 14**. Corridor segment crash rates were calculated in terms of crashes per million vehicle miles traveled (MVMT) using 2015-2019 reported crashes and traffic volumes from the most recently available daily traffic counts. The corridor crash totals and rates include only segment crashes with the respective study corridor (intersection crashes are excluded). In addition, critical crash rates were calculated based on the average segment crash rate. The crash rates and critical crash rates were compared to determine if a safety concern.

Overall, only four corridor segments exceeded the critical index ratio. These segments were along portions of US 212, US 81, 11th Street, and 3rd Avenue N. The following attributes were present among these corridor segments:

- **US 212: 11th Street SE to 19th Street SE**
  - 45 total crashes
  - 3 Incapacitating crashes
  - 4 Non-Incapacitating crashes
  - 22 angle crashes
  - 16 rear-end crashes
  - 5 sideswipe crashes
- **US 81: 20th Avenue SE to US 212**
  - 25 total crashes
  - 3 Possible injury crashes
  - 9 angle crashes
  - 11 wild animal hit crashes
- **11th Street: 1st Avenue NE to 3rd Avenue NE**
  - 7 total crashes
  - 2 angle crashes
- **3rd Avenue N: US 81 to 11th Street NE**
  - 9 total crashes
  - 5 rear-end crashes

For segments within the three study corridors, few crashes and no significant safety trends were found. Crash totals for study segments are as follows:

- **10th Avenue N: Broadway Street to US 81**
  - 1 total crash
- **10th Avenue N: Skyline Drive to Broadway Street**
  - 2 total crashes
- **14th Avenue N: 2nd Street NW to Maple Street N**
  - 1 total crash
- **16th Avenue N: 2nd Street NW to Maple Street N**
  - No crashes

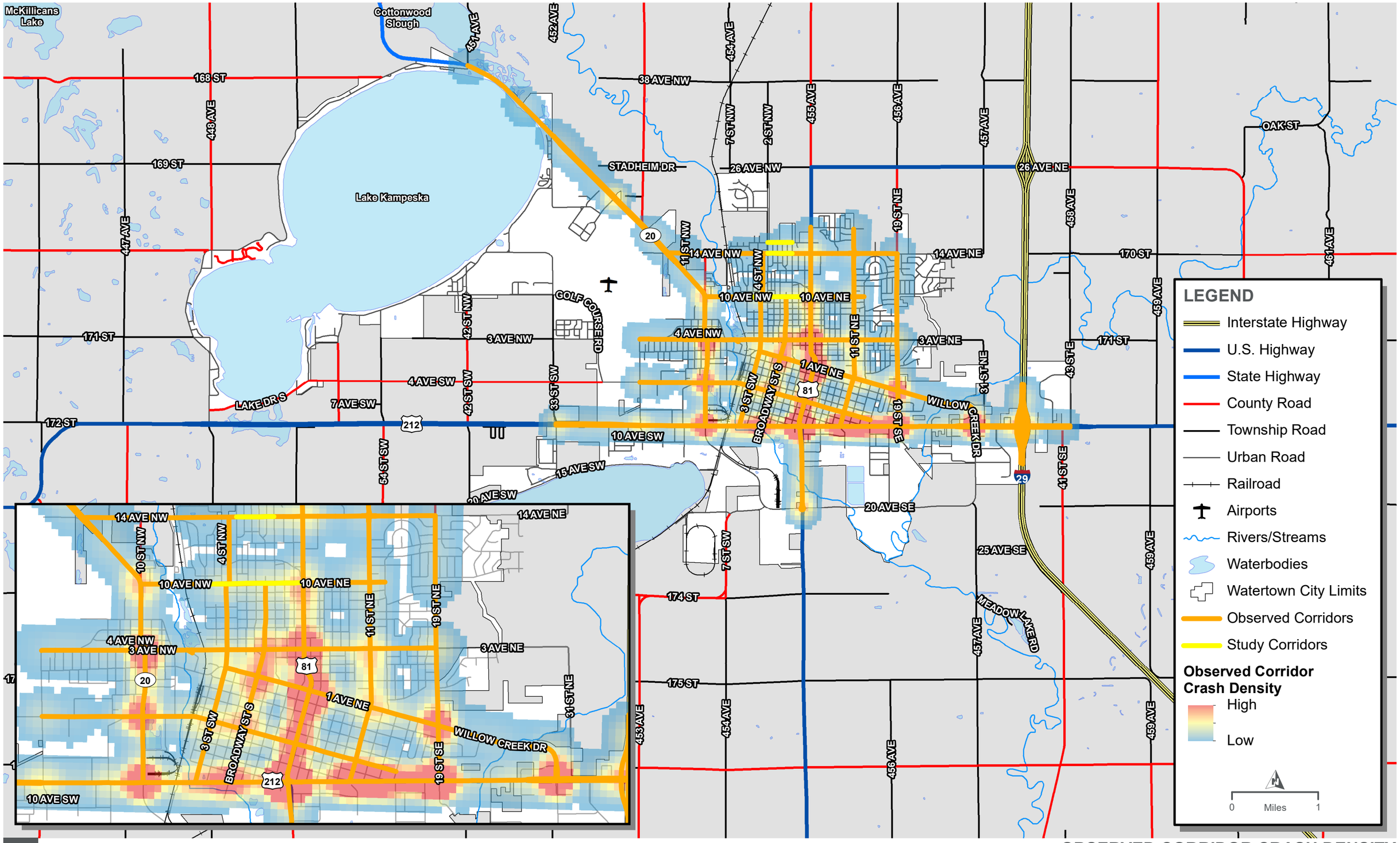



# OBSERVED CORRIDORS

(2015-2019)

FIGURE 13

WATERTOWN MASTER TRANSPORTATION PLAN




# OBSERVED CORRIDOR CRASH DENSITY

(2015-2019)

FIGURE 14

WATERTOWN MASTER TRANSPORTATION PLAN

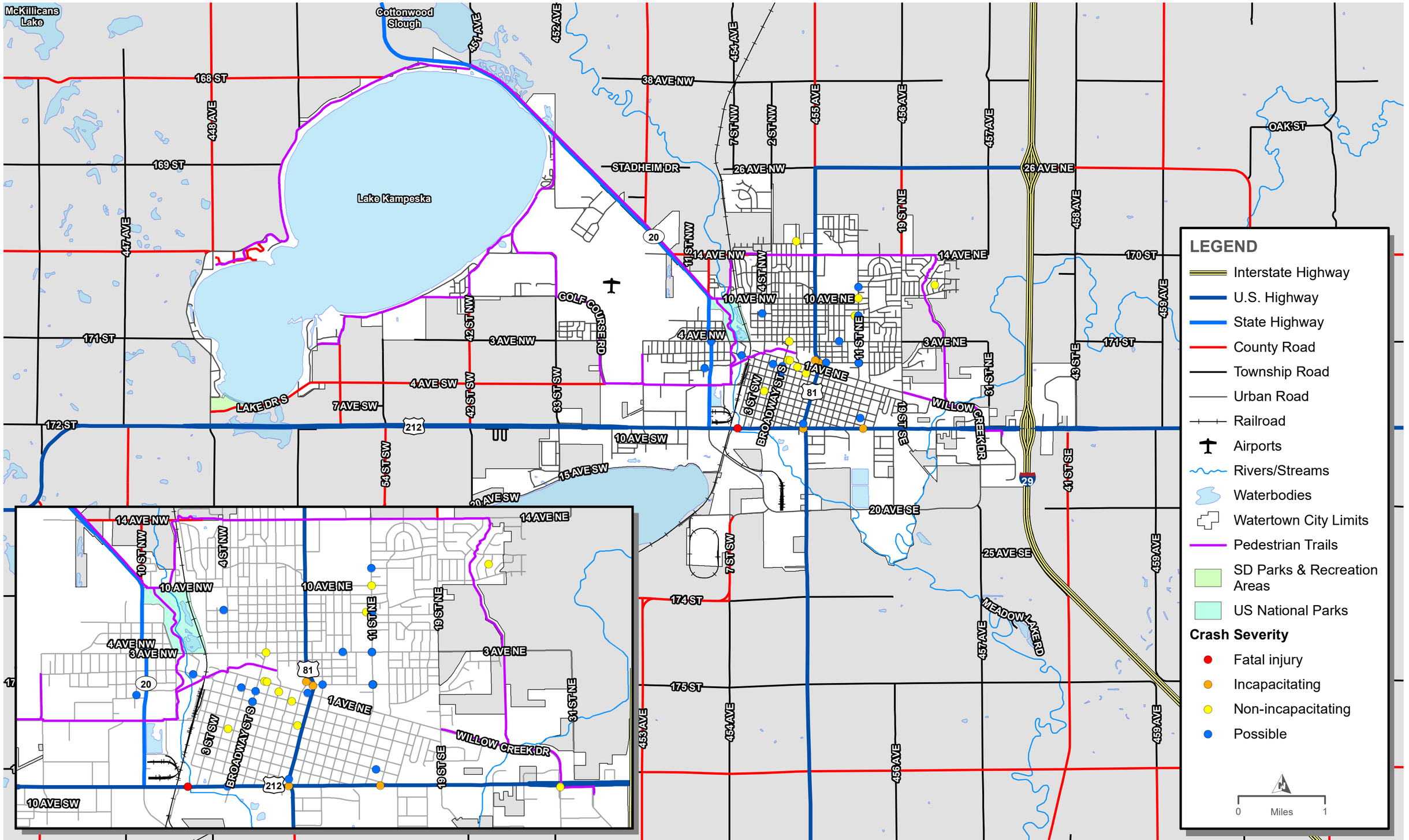
## Bicycle and Pedestrian Safety

**Table 17** presents the number of bicycle and pedestrian crashes by injury severity for the 5-year period of 2015-2019. In total, forty bicycle or pedestrian-related crashes occurred with sixteen bicycle crashes and twenty-four pedestrian crashes. All crashes resulted in an injury and seven of the forty crashes (18 percent) resulted in a fatal or serious injury. The one fatal injury occurred in 2018 on US 212, west of 3rd Street SW. **Figure 15** below displays the locations of all bicycle and pedestrian crashes.

**Table 17: Bicycle and Pedestrian Crashes by Severity**

| Year | Fatal Injury | *Major Injury | *Minor Injury | Possible Injury | No Injury | Unknown | **Total |
|---|---|---|---|---|---|---|---|
| 2015 | 0 | 1 | 7 | 6 | 0 | 0 | 14 |
| 2016 | 0 | 0 | 0 | 5 | 0 | 0 | 5 |
| 2017 | 0 | 1 | 2 | 3 | 0 | 0 | 6 |
| 2018 | 1 | 3 | 2 | 2 | 0 | 0 | 8 |
| 2019 | 0 | 1 | 4 | 2 | 0 | 0 | 7 |
| **Total** | **1** | **6** | **15** | **18** | **0** | **0** | **40** |

*Incapacitating injuries are referred to as Major Injury, non-incapacitating injuries are referred to as Minor Injury
**** Total number of crashes includes all crashes within Watertown city limits.
Source: SDDOT Crash Database




# BICYCLE AND PEDESTRIAN CRASHES

(2015-2019)

FIGURE 15

WATERTOWN MASTER TRANSPORTATION PLAN

## Railroad Crossings

Rail lines cross through Watertown in the north/south direction on the western-central side of the city. This line is owned and operated by BNSF Railway and is part of a connection between Huron, SD and Benson, MN. There is one 54-car loading facility in Watertown, which is an ethanol plant is located northwest of the intersection of US 81 and 20th Avenue SE.

The Federal Railroad Administration (FRA) maintains an inventory of rail crossings throughout the United States. Their inventory indicates 10 public and private highway/rail crossings within Watertown city limits.

The crash history at highway/rail crossings was reviewed between 2015 and 2019. Twelve reported crashes occurred at or were related to a rail crossing, which are summarized in **Table 18** and shown in **Figure 16**.

**Table 18: Railroad Crossing Crashes (2015-2019)**

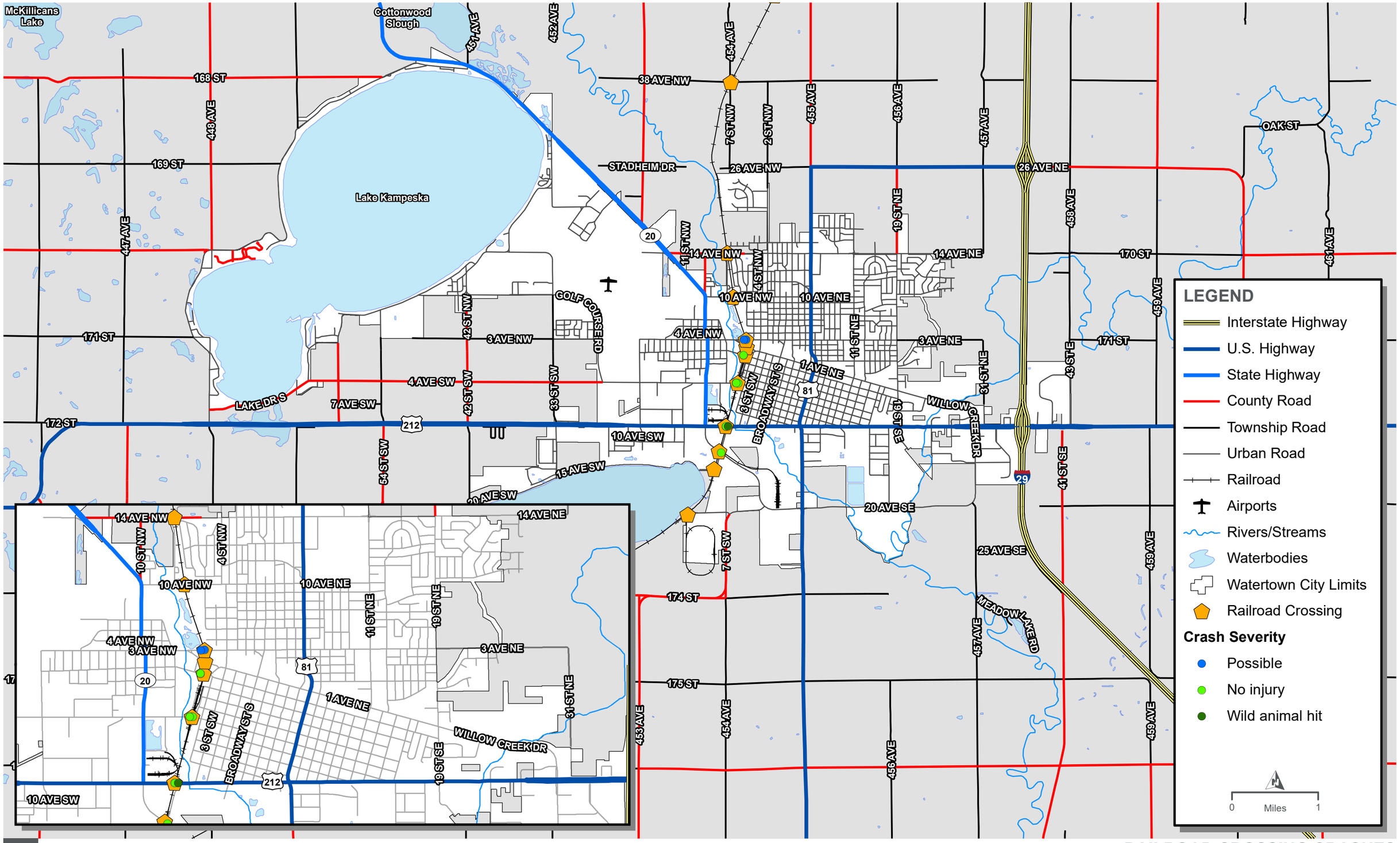
| Roadway Corridor | Crossing Location | Crossing Number | Railroad | Total Crashes | Trains/ Day | Crossing Control |
|---|---|---|---|---|---|---|
| **3rd Avenue NW** | West of Skyline Drive | 075499N | BNSF | 2 | 2 | Active – flashing lights (mast mounted) |
| **W Kemp Avenue** | East of 6th Street NW | 075502U | BNSF | 2 | 2 | Active – flashing lights (mast and cantilever mounted) |
| **4th Avenue SW** | West of 5th Street SW | 075503B | BNSF | 4# | 1 per week | Active – flashing lights (mast and cantilever mounted) and gate arms |
| **US 212** | West of 3rd Street SW | 075504H | BNSF | 3# | 1 per week | Active – flashing lights (mast and cantilever mounted) |
| **10th Street SW** | West of Fish Road | 929051F | BNSF | 1 | 1 per week | Passive – ENS sign |

# Includes a vehicle-train crash
Source: SDDOT Crash Database, FRA GIS Database

Crashes were largely dispersed across the five crossing locations with observed crashes. The most, four crashes, were reported at the BNSF crossing on 4th Avenue SW just west of 5th Street SW. Other than half of these crashes being labeled as rear-end crashes, no discernable trends appeared for the crashes at this crossing.

There were two vehicle-train collisions reported in the 5-year analysis period. One occurred at the 4th Avenue SW crossing and the other occurred at the US 212 crossing just west of 3rd Street SW. Both crashes resulted in no injury.

Overall, the dispersion of crashes across five crossing locations illustrate the random nature of crossing crashes, even in urban areas with higher volumes. It is important to continually improve crossings through a systematic process of identifying and addressing potential issues of vehicle-train, vehicle-pedestrian, and vehicle-vehicle conflicts as well as single-vehicle roadway departure risks.




# RAILROAD CROSSING CRASHES

(2015-2019)

FIGURE 16

WATERTOWN MASTER TRANSPORTATION PLAN

# Standards Development

## Major Streets/Roadway Classification System

The existing roadway functional classification system was refined to meet specific needs for the City of Watertown and to correspond to the Watertown Comprehensive Plan classification system. The functional classification describes the type of service a road segment provides and is also used to determine federal funding eligibility.

The 2020 Major Street Plan for the City of Watertown includes road functional classification designations for existing and proposed future streets. Roads in the city are designated as:

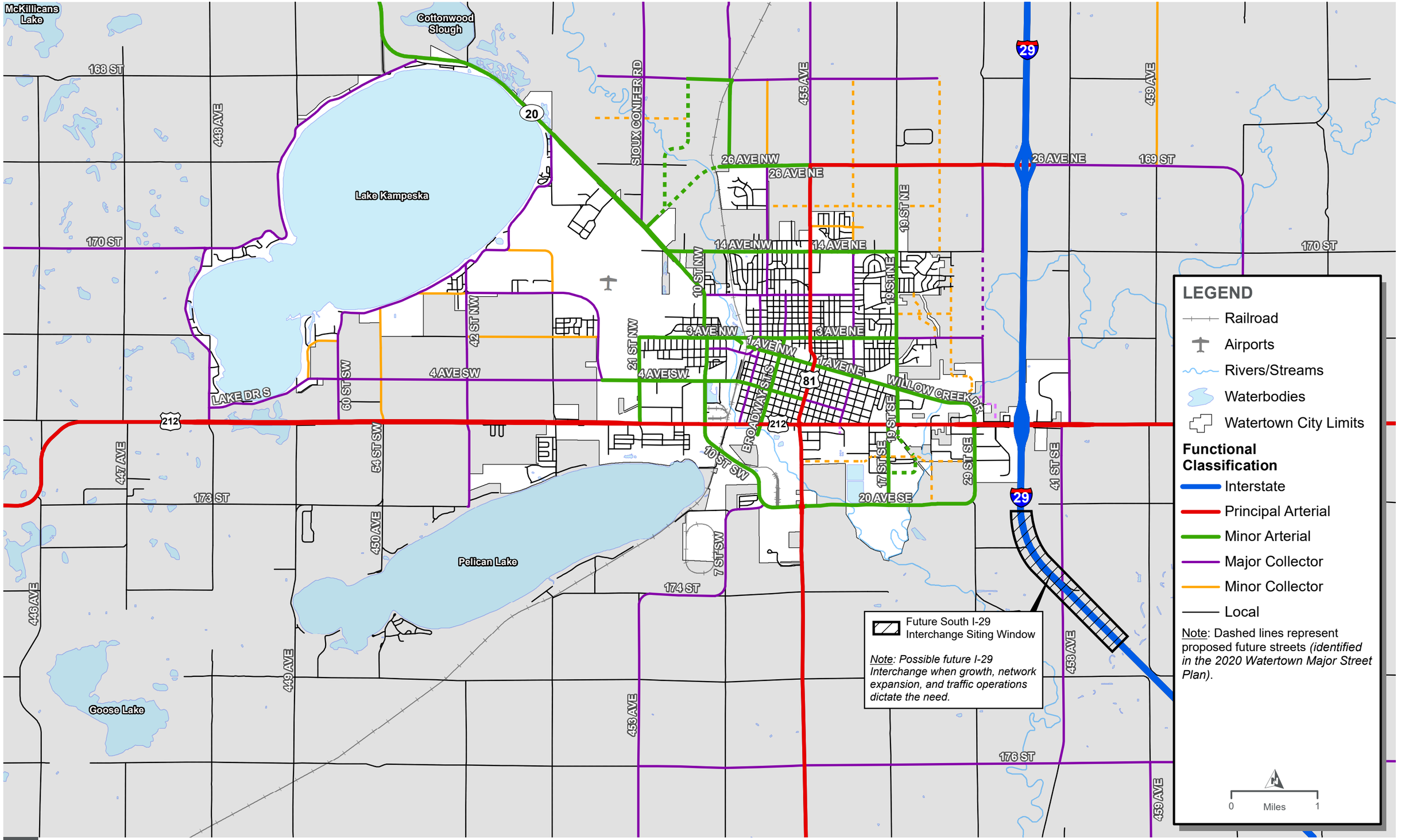
- Interstate
- Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local Road/Street

**Figure 17** depicts the functional classification system.

Concurrently with functional classification, the Watertown 2020 Major Street Plan was reviewed and updated for a 20-year planning horizon. This review incorporated future major and minor collectors as well as planned roadway improvements. Planned improvements outlined in the 2020 Watertown Comprehensive Plan and US Highway 212 Phase II Traffic Impact Study include:

- **Northern Connector:** Complete a northern collector from SD20 to I-29 for cross-town traffic. Routes considered were a direct connection from 26th Avenue NW to SD20 and an indirect connection via 7th Street W, 38th Avenue N, and new roadway to SD20. The proposed indirect route would not require a second railroad crossing.
- **11th Street SE:** Extend 11th Street SE south of the US212/11th Street SE intersection to 10th Avenue SE.
- **14th Street SE:** Reconfigure corridor at the north leg of the US212/14th Street SE intersection to better align with the south leg.
- **17th Street SE:**
    - Remove access to US212 in order to limit potential conflict points.
    - Extend 10th Avenue SE east to 19th Street SE.
    - Consider a possible extension from 19th Street SE that would connect 17th Street SE via a new road on the northern edge of the Anza Soccer Complex.
- **19th Street SE:** Remove frontage road access near US212/19th Street SE intersection to improve access spacing and reduce conflict points.

The updated Major Street Plan is also shown in **Figure 17**. Dashed lines indicate proposed future minor arterials and major and minor collectors.




# MAJOR STREET PLAN

FIGURE 17

## Truck Route Network

The city of Watertown currently addresses Truck Routes in Section 19.1202 of the Revised Ordinances of the City of Watertown. As follows:

***19.1202: TRUCK ROUTES***

*When deemed necessary for the safety or convenience of the public, the Mayor, pursuant to powers granted in Section 19.0501, shall have the authority to establish truck routes within this City and to prohibit truck traffic upon such streets as deemed necessary. The Mayor may, in his or her discretion, limit the size of trucks upon certain streets or ban such traffic completely. Such action of the Mayor shall be referred to the full Council for vote. (E-222-1) (Ord 16-21; Rev 12-30-16)*

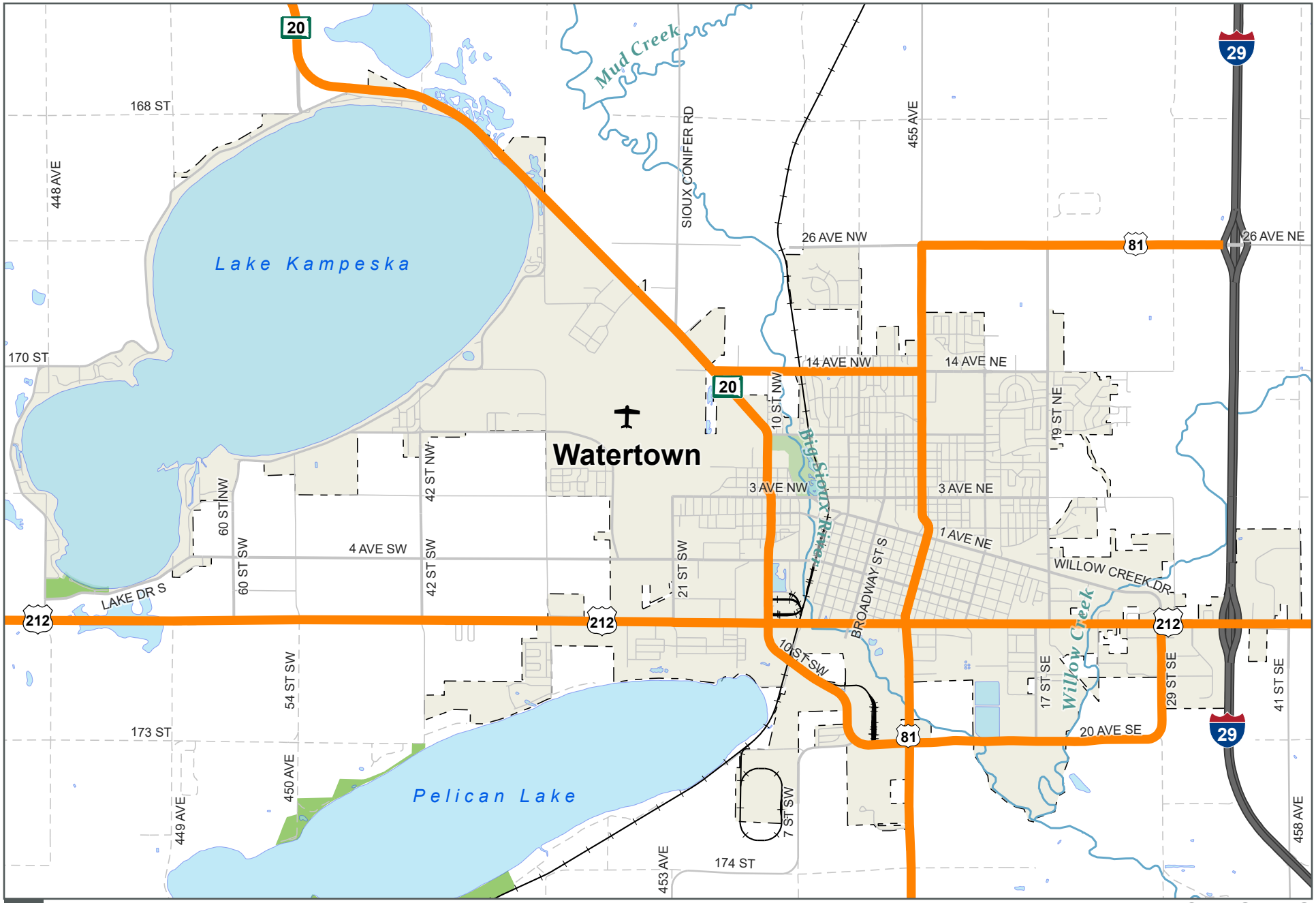
The primary truck routes through Watertown are on the State and National Highway System and include:

- Interstate 29
- US Highway 212
- US Highway 81
- SD Highway 20

An additional truck route in the city is the South Bypass (20th Ave. S./SE). Although not formally designated, 14th Ave. NE/NW between US81 and SD20 sees frequent truck traffic. A major issue facing the 14th Ave NE/NW route is the inability of the existing pavement to support truck traffic so a decision by the City to designate this a City Truck Route would require a new pavement design and reconstruction of the street. Although currently not formally designated as a truck route and no known concerns with regards to truck traffic being raised, this corridor should be monitored and re-evaluated if safety issues and/or pavement condition become a concern. Ultimately, as the roadway network continues to expand, a northwest truck by-pass from I-29/US81 to SD20 could be considered.

Further consideration for the current truck route ordinance would be a modification to define a truck Gross Vehicle Weight Rating should the use of local/collector network streets become an issue. The ordinance could include an official Truck Route map depicting the primary truck routes through Watertown using specific/identified routes on the Urban Minor Arterial network. Stipulations for local delivery trucks could also be required for delivery to a destination point and back to a designated truck route using the most direct route. For more detail concerning city truck routes, refer to **Appendix B**.

Current city truck routes are shown in **Figure 18**.




## TRUCK ROUTES

FIGURE 18

WATERTOWN MASTER TRANSPORTATION PLAN

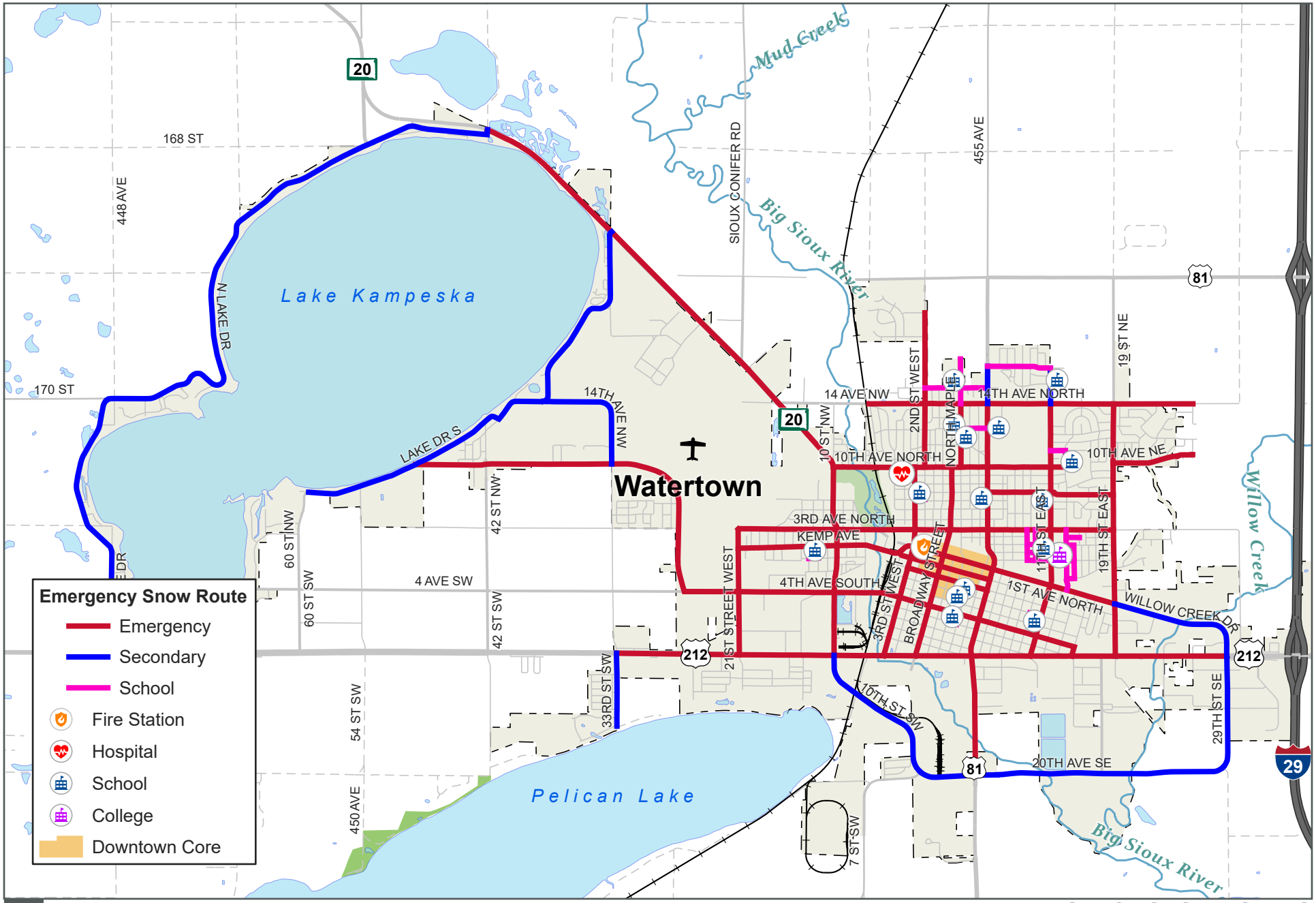
**Emergency/Hospital Routes**

Watertown has developed a network of Emergency Snow Routes to provide access to critical facilities and infrastructure during adverse winter weather conditions. The signed emergency snow routes span west to east from 21st Street West to 19th Street East and north to south from 14th Avenue North to US212, serving the urban core. During winter events with more than 2" of snow accumulation, parking is prohibited on the routes to provide the space necessary to ensure access to critical infrastructure and services. One item of consideration is there are currently no grade separated railroad crossings within Watertown. The Fire Station and Hospital are both located east of the railroad. **Figure 19** depicts Watertown's current Emergency/Snow Routes.

The established priorities for snow removal are as follows:

1. Highway US212, US81 and SD20
2. Emergency Snow Routes
3. Schools and Hospitals
4. Uptown business core
5. Police, Fire, and Rescue calls which need assistance, which may become priority #1
6. All other streets by efficiency of routes as determined by the Street Department

It is recommended as the street network continues to expand and the urban minor arterial and urban major collector grid is further developed, Emergency Snow Routes should be amended/extended to include the new road facilities which provide access to critical services. The future urban minor arterials/major collectors identified on the Major Street Plan would be the first routes to consider when reviewing additional Emergency Snow Routes.




# EMERGENCY SNOW ROUTES

FIGURE 19

WATERTOWN MASTER TRANSPORTATION PLAN

### Pavement Maintenance/Rehabilitation

The City of Watertown completed a Pavement Management Analysis Study in May of 2017 to analyze the pavement condition of approximately 155 miles of pavement within the city and make recommendations to guide pavement rehabilitation and maintenance for the immediate future. The 2017 study estimated the City has $138 million invested in the paved roadway network making it a high priority asset for the community.

As funding levels become stressed, it is more imperative to maximize the dollars allocated to street maintenance and rehabilitation and extend the life of the asset. Pavement management is a comprehensive cyclical program which includes evaluating, planning, budgeting, designing, constructing/rehabilitating, and monitoring. While it may be counterintuitive to fund repairs on streets that are generally good condition, repairs or rejuvenation on these streets will cost less over the lifetime of the asset versus streets that have deteriorated to a poor condition and require intensive rehabilitation or complete reconstruction. Pavement deterioration accelerates rapidly once the pavement hits a tipping point where age and environmental factors converge.

A successful pavement management program follows policies and practices which delay the total reconstruction of a pavement section as long as possible while remaining in the cost-effective zone for rejuvenation/rehabilitation. The ultimate goal of a pavement management program is to keep the overall road network at the targeted pavement condition level through strategic maintenance and rehabilitation which will ultimately optimize funding and spend the dollars where they are most impactful.

As part of the 2017 Pavement Management Analysis Study, approximately 155 miles of pavement was field surveyed and assigned a Pavement Condition Index (PCI) score based upon the findings in the field and categorized with a descriptive rating. **Table 19** below describes the rating system used to classify pavement condition as part of the study.

**Table 19: Pavement Condition Index (PCI) Rating System**

| PCI Range | Description | Relative Remaining Life | Definition |
|---|---|---|---|
| 85 – 100 | Excellent | 15 to 25 Years | Like new condition – little to no maintenance required when new; routine maintenance such as crack and joint sealing. |
| 70 – 85 | Very Good | 12 to 20 Years | Routine maintenance such as patching and crack sealing with surface treatments such as seal coats or slurries. |
| 60 – 70 | Good | 10 to 15 Years | Heavier surface treatments and thin overlays. Localized panel replacements. |
| 40 – 60 | Fair to Marginal | 7 to 12 Years | Heavy surface-based inlays or overlays with localized repairs. Moderate to extensive panel replacements. |
| 25 – 40 | Poor | 5 to 10 Years | Sections will require very thick overlays, surface replacement, base reconstruction, and possible subgrade stabilization. |
| 0 – 25 | Very Poor | 0 to 5 Years | High percentage of full reconstruction. |

Source: City of Watertown, SD Pavement Management Analysis Report, May 2017

The PCI rating for a street segment can help determine the type of rejuvenation or rehabilitation required to restore the pavement to a better condition. The PCI scale ranges from 0 (worst) to 100 (best) condition. **The overall results of the 2017 analysis found the average PCI of the roadway network in Watertown to be 61, or at the lower end of the "good" classification.** The 2017 study also noted that for other agencies surveyed by the study contractor, most overall network average ratings for other communities they have surveyed fell in the 60 to 65 range.

Additionally, "backlog" or streets that have dropped to a point where partial or total reconstruction is necessary was identified. The backlog is typically expressed as a percentage of the roads requiring reconstruction as compared to the network total. The 2017 study found a backlog of 4%, which will be hard to maintain from a funding standpoint due to the fact there is a fair amount of streets which are about to hit the tipping point and will require a higher level of more costly rehabilitation. In order to keep funding manageable, a targeted backlog of 10% to 15% would be desired.

The 2017 study reviewed several budget scenarios and identified funding levels to achieve different overall PCI ratings and associated backlog. Ultimately, a pavement maintenance program with an annual funding level of $2.4M was identified which calculated the PCI to improve to 63 and maintain a backlog controlled at the 15% threshold. The plan also identified a 5-year rehabilitation plan by street segment/year.

Based upon discussions with the City during this study, the City has funded annual pavement maintenance in the $2.4M range as per the recommendations of the prior study. The City currently is funding pavement maintenance in several annual projects as follows:

- Schedule A: $1M – large mill and overlay project
- Schedule B: $.5M – neighborhood reconstruct/mill/overlay
- Schedule C: $.5M – neighborhood reconstruct/mill/overlay
- Crack sealing/fog sealing: $.4M – various streets
- Large patching project/miscellaneous concrete repairs: $.15M – various streets

As the City has generally followed the $2.4M annual pavement maintenance funding appropriation and is in year 4 of 5 following the implementation of the 5-year identified plan/funding, it is recommended to complete year 5 of the program and consider a follow-up PCI study in 2023 or 2024. A follow-up PCI study will determine if the targeted funding allocation and program is resulting in the overall PCI increasing to an average of 63 and keeping a backlog of less than 15%, thus achieving the goals/strategy of the 5-year plan and providing measurable data to justify continuance of the program.

See **Appendix B** for more information on pavement management.

## Design Standards/Development Coordination

The City of Watertown adopted the City of Watertown Engineering Design Standards for Public Improvements on March 16, 2020. These standards apply to all public improvements within the incorporated area of the City of Watertown except where superseded by federal or state requirements. The Design Standards apply to transportation related improvements and infrastructure, which are highlighted in Chapter 5, Street Access and Parking Lot Criteria and Chapter 8, Street Design and Pavement Thickness. A review of each segment of the transportation related standards for Watertown can be found in **Appendix B**.

## Noted Issues and Development Concerns

### Missed Opportunities for Subdivision Connectivity

As the City continues to grow, it is important to provide connectivity between adjoining subdivisions as well as establish a network of future arterial and collector streets to provide orderly, adequate, and efficient transportation connections for developing areas. Watertown has adopted an ordinance to facilitate connections between subdivisions and provide continuity for the arterial and collector network as follows:

Section 24.0506 RELATION TO ADJOINING STREET SYSTEMS of the Revised Ordinances – City of Watertown, South Dakota states:

*The arrangement of streets in new subdivisions shall make provisions for the continuation of the principal existing streets in adjoining areas (or their proper projection where adjoining land is not subdivided) in so far as they may be deemed necessary by the Plan Commission for public requirements. The width of such streets in new subdivisions shall not be less than the minimum width established in the Engineering Design Standards. The street and alley arrangement shall be such as not to cause a hardship to owners of the adjoining properties. In general, provisions should be made for through streets at intervals not exceeding one-half mile, and for street connections to future subdivisions at intervals not less than one quarter mile. Offset streets should be avoided. (Ord. 11-18; Add 11-4-11)*

The City has also developed and adopted a Major Street Plan as part of the City of Watertown – 2020 Comprehensive Land Use Plan to identify the approximate locations of the future arterial and collector street network. It is especially important to review development applications regarding their role in providing continuity for the future arterial and collector network. If a development spans the area for which a future arterial or collector has been identified, accommodations for routing the corridor through the development should be made to provide continuity for the extension of the route, including dedicating the necessary right-of-way width as identified in the City's Design Standards for the corresponding street classification. In some cases due to topographical or environmental constraints, considerations may need to be given to a curvilinear route, but the overall goal of providing the most direct route through the development for an arterial or collector street should be a priority. Connections for streets with a classification lower than arterial or collector can be more flexible but should still be pursued in the development process in order to promote a higher level of mobility, not only for vehicular traffic, but also for bicycle and pedestrian traffic.

The City developed a Check List for Preliminary Plan Approval, which contains items associated with the Street Plan for the proposed development, including:

- Compliance with Major Street Plan
- Compliance with Access Plan for Highways
- Proposed Street & Right-of-Way Widths

- Typical Sections
- Conformance with Engineering Design Standards

This check list should continue to be reviewed for each subdivision development application for conformity with the Major Street Plan as well as applicable street design standards. If a proposed preliminary subdivision plan has an arterial or collector street as identified on the Major Street Plan within its boundary, it is recommended accommodations for the street should be provided as part of the subdivision process.

***Half Streets***

There are two instances in Watertown where a "Half Street" exists:

- 14th Ave. NE
- 16th Ave. N

**16th Avenue N Half Street Example**


Source: Google Maps

This is a "temporary" condition where half of a street section has been dedicated and constructed (example shown above). In both current cases the "Half Street" provides curb and gutter on the south side of the street and asphalt pavement to the centerline of the street. There is limited to no shoulder, no pavement markings or signage to define the edge of the temporary surface or change in condition to the motorist as the street section transitions from a Full Street to a Half Street. This condition is likely due to the fact that the proposed street was at the edge of the city limits and in both cases, there were no immediate development plans for the agricultural land abutting the north side of the street to require participation in dedicating and constructing a "Full Street".

The City of Watertown has addressed "Half Streets" in Section 24.0509 HALF STREETS of the Revised Ordinances – City of Watertown, South Dakota as follows:

1. Whenever and existing half street is adjacent to a tract being subdivided, the other half of the street shall be platted with said subdivision.
2. A preliminary plan of a subdivision may show half of a street adjoining property, which has not been subdivided, but no lot abutting on such half street shall have a building permit issued for it until such time as the other half street is dedicated. (Ord. 11-18; Add 11-4-11)

While the construction of Half Streets addresses the immediate responsibility/funding issue associated with adjacent separate ownership parcels developing under different schedules, it has the potential to create issues with street functionality. The "temporary" duration of the Half Street configuration could last many years should the undeveloped parcel remain in an undeveloped condition. In both existing cases, the rural edge of the street has not been delineated and a temporary shoulder has not been provided, it also does not appear the road subgrade and base course was extended much beyond the edge of pavement. In the case of 16th Ave. N, it does not appear there is width for two vehicles to pass without driving off of the asphalt surface. It is not known if proper drainage has been provided on the rural side of the street, which could result in premature damage to the paved street subgrade. Further, as a result of the indefinite time period until the second half of the street is constructed and not having a uniform subgrade and base course material, there could also be longevity/durability concerns with the overall street section once the second half is constructed.

There are multiple options which could address the issue of "Half Streets" which include:

1. Continue with current practice of Half Streets with additional minimum design considerations to include:
    a. Provide adequate width for 2 vehicles to pass head-to-head.
    b. Provide a shoulder on the rural edge of pavement with pavement markings until an urban is constructed
    c. Extend the subgrade preparation and base material to a specified width beyond the street centerline in accordance with the depth of the overall pavement section
    d. Provide adequate rural ditch section
2. Require all new developments to be "stand-alone" or self-supporting and construct all necessary infrastructure to support the development (first developer builds the entire street)
    a. A development funding "re-capture" or assessment policy could be developed in tandem with this policy to allow the initial developer an opportunity to recover some costs
    b. Work with the developer to provide an alternative layout for their development which would not require Half Street construction
3. For streets which are designated Arterial or Collector streets consider City participation to fully develop the street section at time of initial construction

a. This scenario could also allow for an assessment onto the adjacent property and allow the City to recover any upfront costs

Based upon the two existing examples of Half Streets in Watertown it is recommended that options be further considered and vetted to find a best fit for Watertown to address Half Streets due to the unknown duration for which a Half Street could exist as well as the operational and safety drawbacks associated with a Half Street.

#### Rural Cross-Section Local Streets

The City of Watertown Design Standards allows the design and construction of a rural subdivision road cross-section for developments outside of the city limits where extraterritorial platting jurisdiction applies and within the city limits where a proposed subdivision adjoins an existing rural subdivision and lot densities are less than one house per acre. Section 8.13 and 8.14 of the City Design Standards address the design of these rural streets. It is not uncommon for communities to have a rural street design criterion for very low density (1 dwelling per acre max.) residential developments on the urban fringe. If the density of homes per acre increases beyond one unit per acre, operational issues associated with rural subdivision streets start to become apparent, including but not limited to:

- Inadequate surfacing width for higher traffic volumes
- Lack of Maintenance and continuity of drainage and ditches
- Lack of pedestrian facilities

Watertown does not currently have zoning for rural residential subdivisions within the city limits, therefore it is recommended that careful consideration be given to rural subdivision streets for developments within the city limits. While the one dwelling per acre requirement would typically satisfy a “low density” requirement, consideration should be given to increasing the minimum front yard setbacks to ensure adequate space is provided to provide ample off street parking and continuity of the required drainage ditches and conveyance for any development within the city which propose to provide a rural street cross section.

Additionally, when areas containing existing development are being considered for annexation or the city is being requested to take over maintenance of township or county roads, an inspection of the road infrastructure should be conducted and design plans/as-built drawings for the facility should be reviewed to determine compliance with the City’s rural road standards. This process will assist in identifying road facilities that may need upgrades or rehabilitation prior to the City entertaining ownership/maintenance and not placing a financial burden on the City to make upgrades/repairs.

#### When to Pave Gravel Roads

As Watertown continues to grow into the urban fringe areas, the City will undoubtedly encounter and annex areas that contain gravel roads. Typically, the levels of traffic using a road will dictate from a maintenance/cost of maintenance perspective when a road should be paved. Once the level and type of traffic reach a tipping point, maintaining a gravel road will ultimately become more costly than that of a paved road. Additionally, the types of traffic and function of the road should also be reviewed as they both place different demands on the roadway. Is the route subject to loads heavier than passenger vehicles? Or is the road an arterial or collector road and likely subject to through traffic. These questions may also dictate the need for a paved

section. In general, average daily traffic volumes (ADT) from a low of 50 vehicles per day to 400 or 500 ADT would warrant the paving of a street/road section.

Ultimately, the City of Watertown Engineering Design Standards require a paved surface of Asphaltic Concrete or Portland Cement Concrete for all classifications of streets. However, should an "island" or "peninsula" of County road be contained in a segment of corridor within the city, the volume thresholds as well as guidance from the USDOT/FHWA manual "Gravel Roads Construction & Maintenance Guide", Appendix D "When to Pave a Gravel Road" could be used in the decision making process to require paving of the roadway section under review.

At link to the USDOT/FHWA guide is provided at:
https://www.fhwa.dot.gov/construction/pubs/ots15002.pdf

#### Existing Wide Right-of-Way (ROW) Streets

Within Watertown, the streets and most public utilities are contained within street ROW extending beyond the street section proper and contains additional space for utilities, drainage, and sidewalk. There are several areas within Watertown that have ROW widths in excess of the current standard for their corresponding street classification. In many instances in the core area of Watertown, local streets have an 80' wide ROW. The current standard for a local street is to provide a 66' wide ROW. This means in several areas there is additional area beyond the necessary width required which is under the ownership of the municipality. City staff requested as part of the Standards Development Process to review the possibility of vacating a portion of the ROW above and beyond what is currently required for local streets with "wide" ROWs.

**Appendix B** details recommended actions for the city to take in addressing excess ROW for local streets.

### *Traffic Level of Service*

As outlined in the Baseline Conditions section, operational performance of streets/highway and intersections is evaluated in terms of the quality of service, which describes how well a transportation facility operates from the traveler's perspective.

Section 5.1.2.8 of the Watertown Design Standards establishes a LOS C for the peak hour as the design objective for the City of Watertown. The establishment of a LOS C for intersections is a common threshold for acceptable delay for small/medium sized urban communities. For larger communities in heavily urbanized areas, an intersection LOS D with individual movements of LOS E may be acceptable for peak hours where the costs or impacts to provide LOS C may be prohibitive.

As part of the traffic operations analysis for this study the following LOS goals were established:

- **Signalized Intersections**:
  - Rural area minimum allowable LOS—LOS B
  - Urban area minimum allowable LOS—LOS C
    - Individual movements allowed to operate at LOS E or better
- **Roundabouts**:
  - Minimum allowable LOS—LOS C

- **Two-Way Stop Controlled Intersections**:
    - Rural area minimum allowable LOS—LOS B (worst-case stop-controlled approach)
    - Urban area minimum allowable LOS—LOS C (weighted average intersection approach)

As such, for the urbanized areas within the Watertown city limits, the established threshold of LOS C for peak hour intersection delay would seem appropriate.

**Road Map to a New Interchange**

As Watertown continues expand its commercial and industrial development south of US212 and west of I-29, additional access to I-29 may be desirable to support large industrial and heavy commercial uses. The Federal Highway Administration (FHWA) Policy on Access to the Interstate System, May 22, 2017, provides guidance and defines the considerations and requirements associated with a request for a new access. This policy is provided in **Appendix C**. Additional criteria associated with interchange spacing (distance between adjacent interchange crossroads) will drive where a possible future southern interchange could be sited. Required interchange crossroad spacing is as follows:

- Urban Interchanges – 1 mile minimum spacing between crossroads
- Rural Interchanges – 2 mile minimum spacing between crossroads

**Figure 20** has been developed to identify the possible windows of opportunity where a future interchange could be sited (based upon current criteria), should the need arise at some point in the future.

Watertown can position itself to be ready in the future when the need ultimate arises by taking the following steps:

- Document the potential need for a new interchange in long-range planning documents (Master Transportation Plan and Comprehensive Plans)
- Update and/or develop a Travel Demand Model for the community such that future planning scenarios can be developed to support traffic operations analysis and scenarios for a future Interchange Justification Report (IJR)/Analysis
- As development continues to come to fruition during the current planning horizon, identify the corridors needed to support the growth and conduct a corridor study to determine the transportation facility needs to support it. This study would look at potential improvements to existing corridors as well as new corridors to support growth throughout the area.
- Work with the SDDOT to monitor the current US212 interchange and identify when capacity is anticipated to be reached – the 2020 Decennial Interstate Study does not identify a new access to be required at this time
- Build off of the corridor study and prepare an interchange access study to lay the framework for a formal access request when the need is apparent. This study will identify access type (interchange or crossing) and location recommendations.
- When the need is apparent, develop IJR and NEPA documentation and work with SDDOT to submit access request to FHWA for approval
- If submitting for federal grants, this process typically begins following the interchange access study or IJR/NEPA

SOUTH DAKOTA WATERTOWN

# ROADMAP TO A NEW SOUTH INTERCHANGE


## DOCUMENT NEED

Document the potential need for a new interchange in long-range planning documents (Master Transportation Plan and Comprehensive Plans)

## TRAVEL DEMAND MODEL

Update and/or develop a Travel Demand Model for the community such that future planning scenarios can be developed to support traffic operations analysis and scenarios for a future Interchange Justification Report (IJR)/Analysis

## IDENTIFY & STUDY NEEDS

As development continues to come to fruition during the current planning horizon, identify the corridors needed to support the growth and conduct a corridor study to determine the transportation facility needs to support it. This study would look at potential improvements to existing corridors as well as new corridors to support growth throughout the area.

## ANTICIPATE CAPACITY NEEDS

Work with the SDDOT to monitor the current US212 interchange and identify when capacity is anticipated to be reached – the 2020 Decennial Interstate Study does not identify a new access to be required at this time

## DETERMINE TYPE AND LOCATION

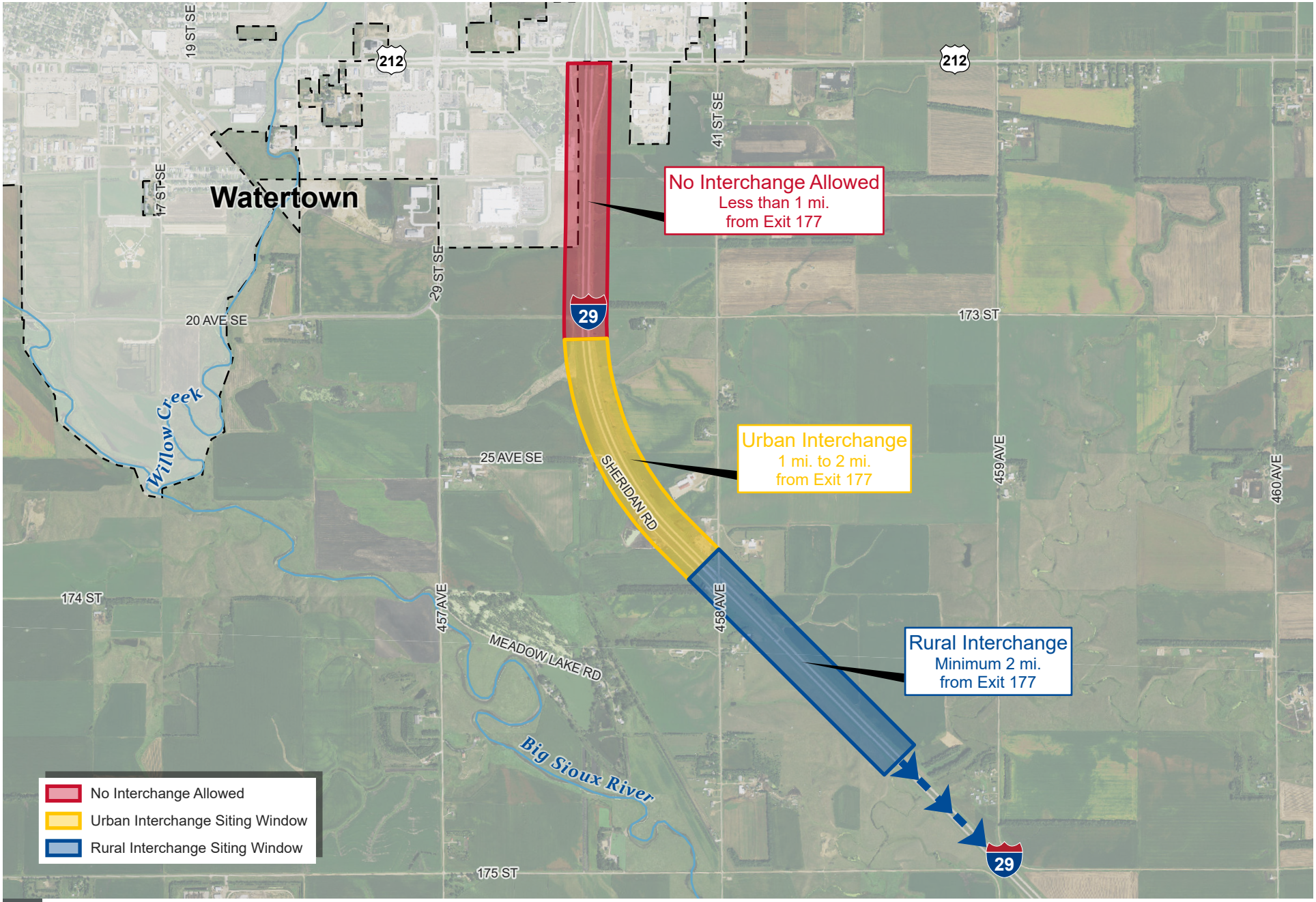
Build off of the corridor study and prepare an interchange access study to lay the framework for a formal access request when the need is apparent. This study will identify access type (interchange or crossing) and location recommendations.

## REQUEST ACCESS

When the need is apparent, develop IJR and NEPA documentation and work with SDDOT to submit access request to FHWA for approval

## SECURE GRANT FUNDING

If submitting for federal grants, this process typically begins following the IJR/NEPA process.




## WATERTOWN SOUTH INTERCHANGE SITING

FIGURE 20

WATERTOWN MASTER TRANSPORTATION PLAN

## Bicycle and Pedestrian Standards

This section of the MTP provides a set of recommendations to improve walking and bicycling conditions in the City of Watertown, South Dakota. Recommendations were developed based upon public input, the Baseline Conditions section, and the 2012 Watertown Trail Master Plan. Recommendations for bicycle and pedestrian improvements were grouped into the following categories:

- Key Pedestrian Intersections and Crossings
- Key Mid-Block Crossings
- Off-Street Trails
- On-Street Bicycle Facilities
- Sidewalk Network Gaps

The following national state-of-the-practice guidance documents were used to inform recommendations:

- FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- City of Boulder Pedestrian Crossing Treatment Installation Guidelines
- FHWA Manual on Uniform Traffic Control Devices (MUTCD)
- NACTO Designing for All Ages and Abilities

Recommendations for bicycle and pedestrian improvements are provided in the following sections. In summary, the recommendations include:

- **50** street intersection improvements
- **3** key mid-block crossing improvements
- **60** trail crossing enhancements
- **32 miles** of new trails
- **13 miles** of new on-street bicycle facilities
- **140 miles** of new sidewalks

**Table 20** shows the breakdown estimated cost of each improvement type. Costs for key crossings, sidewalks, trails, and bicycle facilities. were calculated using high-level planning cost estimates that include contingencies. Actual project costs may be different from these preliminary estimates.

**Table 20: Total Estimate Cost of Recommended Bicycle and Pedestrian Improvements**

| Quantities | |
|---|---|
| **Description** | **Cost** |
| **Intersections and Key Crossings Along Sidewalk Feeder Network Total** | $610,000 |
| **Key Mid-block Crossings** | $250,000 |
| **Install Tier 1 Sidewalks Total*** | $9,780,000 |
| **New Trails Total** | $17,260,000 |
| **Trail Crossings Total** | $1,220,000 |
| **On-Street Bicycle Facilities Total** | $2,270,000 |
| **Project total** | **$31,390,000** |

***Tier I sidewalks only encompass a portion of missing sidewalks which are the highest priority to construct. More information is available in the Sidewalk Network Gaps section.**

Multiple funding opportunities are available to the City of Watertown to implement these bicycle and pedestrian improvements. The South Dakota DOT provides funding for alternatives modes of transportation under the federal Transportation Alternatives (TA) program. Approximately $5.3 million in TA funding is made available each year, with local agencies competing for roughly $2.1 million. Eligible projects include pedestrian and bicycle facilities, recreation trails, and safe routes to school projects, with projects ranging from $50,000-$400,000 and include a minimum local match of 18.05%.[2]

[2] https://dot.sd.gov/programs-services/programs/transportation-alternatives#listItemLink_1419

**Key Pedestrian Intersections and Crossings**

The City of Watertown Master Trails Plan (2012) defined a "Sidewalk Feeder Linkage" system that allows for connections to trails and bicycle facilities throughout the City of Watertown. This network includes:

- 3rd Avenue Northwest/Northeast
- Kemp Avenue
- 4th Avenue South,
- Broadway
- 19th Street East
- 11th Street East

This feeder network was analyzed for pedestrian connectivity, gaps in sidewalks, ADA accessibility, and potential safety improvements. Identified locations for crossing improvements included key intersections of the sidewalk feeder system, areas near schools, parks, and the Uptown Commercial District. These 50 locations were identified as priority crossing locations.

Additionally, recommended city-wide policies to upgrade all pedestrian crossings should include continental crosswalks, four-way stops near schools, parks, and other public amenities, detectable warning surfaces (truncated domes) at all crossings, and traffic signals with pedestrian count-down timers where applicable.

It is recommended to conduct multiway stop sign engineering studies at all proposed multiway stop locations to determine if pedestrian and vehicle volumes support installation of multiway stops or if adding pedestrian warning signs would be more appropriate to facilitate pedestrian crossings In addition to these sidewalk and intersection improvements, these key routes should be considered for the installation of pedestrian-scale lighting where nighttime lighting is currently lacking. Below are example improvements.

**Continental Crosswalks with ADA Accessible Curb Cuts and Detectible Warning Surfaces[3]**

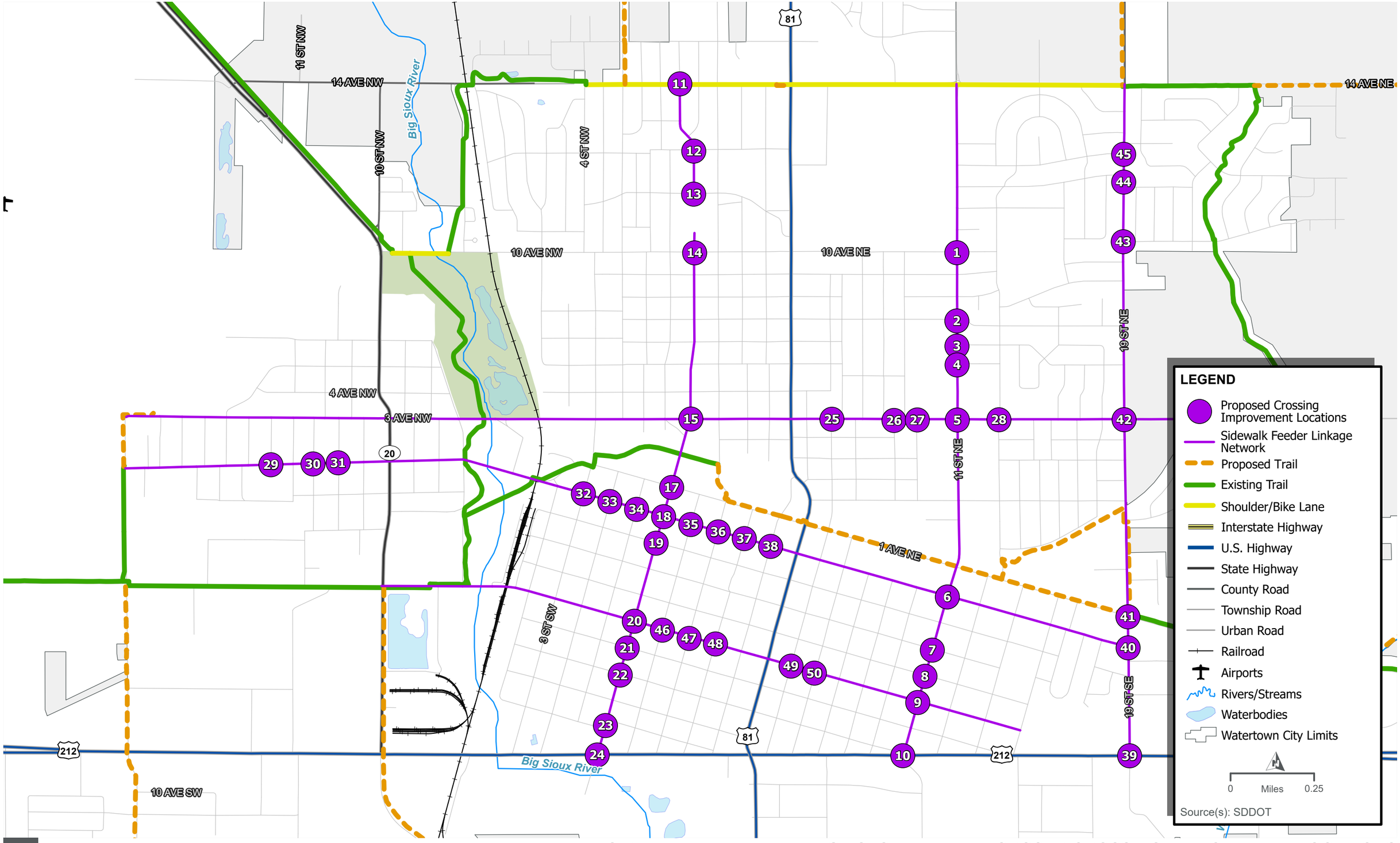
**Pedestrian Countdown Signal[4]**


**Figure 21** shows the existing feeder linkage system and proposed locations for crossing improvements. **Table 21** describes in detail the existing condition and proposed improvements at each location; a more detailed table can be found in the **Appendix B**.

[3] https://www.transitchicago.com/assets/1/6/ASAP_Presentation_for_MPAC_-_051017.pdf
[4] spokesman.com

**Table 22** details the estimated cost information for all proposed crossing locations.

Beyond the Sidewalk Feeder Linkage Network, a more detailed corridor-wide pedestrian study of US-212 is also recommended to identify opportunities for safety improvements including sidewalk infill and pedestrian crossings.




# SIDEWALK FEEDER LINKAGE SYSTEM AND PROPOSED CROSSING IMPROVEMENT LOCATIONS

FIGURE 21

## Table 21: Proposed Crossing Improvements

| ID | Location | Proposed Improvements |
|---|---|---|
| 1 | 11th St NE & 10th Ave NE | Continental Crosswalks |
| 2 | 11th St NE & 7th Ave NE | Conduct multiway stop sign engineering study; continental crosswalks |
| 3 | 11th St NE & 6th Ave NE | Conduct multiway stop sign engineering study; square up intersection; continental crosswalks; continue crosswalks through parking lot |
| 4 | 11th St NE & 5th Ave NE | Conduct multiway stop sign engineering study; continental crosswalks |
| 5 | 11th St NE & 3rd Ave NE | Upgrade signal to have pedestrian count-down; make ADA accessible on west side |
| 6 | 11th St NE & E Kemp Ave | Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps |
| 7 | 11st St NE & 2nd Ave SE | Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps |
| 8 | 11st St NE & 3rd Ave SE | Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps |
| 9 | 11st St NE & 4th Ave SE | Conduct multiway stop sign engineering study; continental crosswalks; make ADA accessible, infill sidewalk gaps |
| 10 | 11st St NE & US-212 | Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps |
| 11 | N Broadway & 14th Ave NW | Continental Crosswalks; make south side ADA Accessible, infill sidewalk gaps |
| 12 | N Broadway & 12th Ave NE | Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps |
| 13 | N Broadway & N Highland Blvd | Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps |
| 14 | N Broadway & 10th Ave NW | Conduct multiway stop sign engineering study; make north side ADA Accessible; continental crosswalks; infill sidewalk gaps |
| 15 | N Broadway & 3rd Ave NW | Conduct multiway stop sign engineering study; continental crosswalks |
| 16 | N Broadway & Carpenter Pl | Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on east sidewalks |
| 17 | N Broadway & 1st Ave NW | Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts |
| 18 | N Broadway & E Kemp Ave | Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts |
| 19 | N Broadway & 1st Ave SW | Continental crosswalks; Add Detectable Warning Surface on all curb cuts |
| 20 | N Broadway & 4th Ave SW | Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on all curb cuts |
| 21 | N Broadway & 5th Ave SW | Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on SW curb cuts |
| 22 | N Broadway & 6th Ave SW | Conduct multiway stop sign engineering study; continental crosswalks; add Detectable Warning Surface on NW curb cuts |

| ID | Location | Proposed Improvements |
|---|---|---|
| 23 | N Broadway & 8th Ave SW | Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts |
| 24 | N Broadway & US-212 | Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps |
| 25 | 3rd Ave NE & 6th St NE | Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts |
| 26 | 3rd Ave NE & 8th St NE | Conduct multiway stop sign engineering study; continental crosswalks |
| 27 | 3rd Ave NE & 9th St NE | Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps |
| 28 | 3rd Ave NE & 13th St NE | Conduct multiway stop sign engineering study; continental crosswalks; Detectable Warning Surface; infill sidewalk gaps |
| 29 | W Kemp Ave & 15th St NW | Conduct multiway stop sign engineering study; continental crosswalks |
| 30 | W Kemp Ave & 13th St NW | Conduct multiway stop sign engineering study; continental crosswalks |
| 31 | W Kemp Ave & 12th St NW | Conduct multiway stop sign engineering study; continental crosswalks |
| 32 | W Kemp Ave & 3rd St SW | Continental Crosswalks; Detectable Warning Surface |
| 33 | W Kemp Ave & 2nd St SW | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |
| 34 | W Kemp Ave & 1st St SW | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |
| 35 | E Kemp Ave & N Maple | Upgrade signal to have pedestrian count-down; Continental Crosswalks; Detectable Warning Surface |
| 36 | E Kemp Ave & 2nd St SE | Upgrade signal to have pedestrian count-down; Continental Crosswalks |
| 37 | E Kemp Ave & 3rd St SE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |
| 38 | E Kemp Ave & 4th St SE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |
| 39 | 19th St SE & US-212 | Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps |
| 40 | 19th St SE & E Kemp Ave | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on west side |
| 41 | 19th St SE & 1st Ave NE/ Willow Creek Dr | Continental Crosswalks |
| 42 | 19th St SE & 3rd Ave NE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface on NW |
| 43 | 19th St SE & 10th Ave NE | Conduct multiway stop sign engineering study; Continental Crosswalks |
| 44 | 19th St SE & 12th Ave NE | Conduct multiway stop sign engineering study |
| 45 | 19th St SE & 13th Ave NE | Conduct multiway stop sign engineering study; Continental Crosswalks |
| 46 | 4th Ave SE & S Maple | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |

| ID | Location | Proposed Improvements |
|---|---|---|
| 47 | 4th Ave SE & 2nd St SE | Conduct multiway stop sign engineering study; Continental Crosswalks |
| 48 | 4th Ave SE & 3rd St SE | Conduct multiway stop sign engineering study; Continental Crosswalks |
| 49 | 4th Ave SE & 6th St SE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |
| 50 | 4th Ave SE & 7th St SE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface |

**Table 22: Proposed Crossing Improvement Estimated Costs**

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **Construct ADA Ramp at all four corners** | Each | 12 | $40,000 | $480,000 |
| **Add Detectable Warning Surface (Truncated Domes) at all four corners** | Each | 20 | $2,000 | $40,000 |
| **Continental Crosswalks (Assume 4 Legs)** | Each | 45 | $2,000 | $90,000 |
| **Project total** | | | | **$610,000** |

### Key Mid-Block Crossings

In addition to identifying key pedestrian crossings at intersections along the “Sidewalk Feeder Linkage” network, mid-block crossings were identified to provide greater access to schools in Watertown. These mid-block crossings would include continental crosswalks, curb extensions (paint and post), yield to pedestrians and bikes signs, and in-street pedestrian crossing signs.

City-wide policy for all mid-block crossings should follow these recommendations, with prioritization of mid-block crossings along the “Sidewalk Feeder Linkage” routes. Below are examples of a mid-block crossing with continental crosswalks, curb extensions and signage.

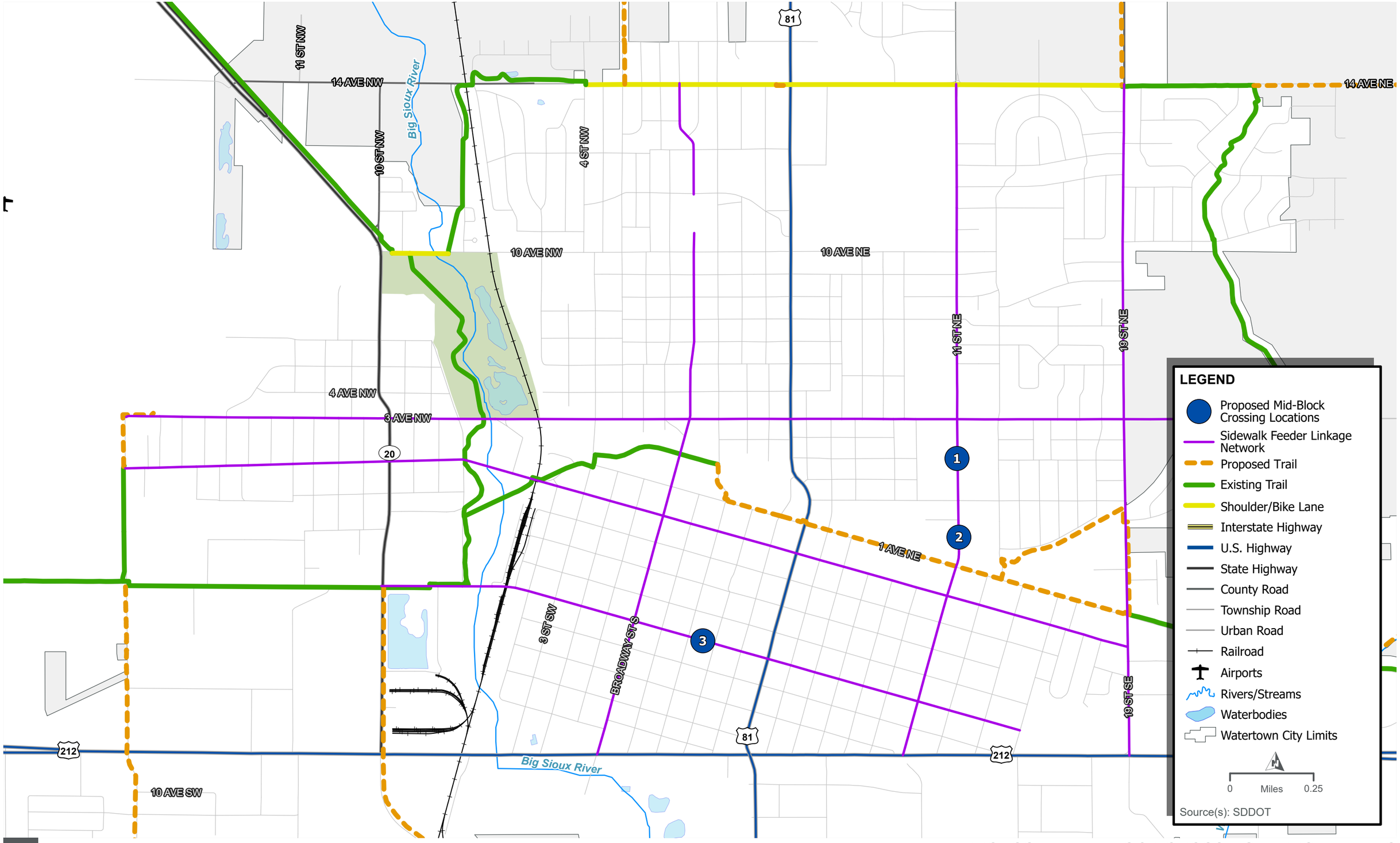
**Mid-Block Crossing**[5]

**Yield to Pedestrians and Bikes Sign**[6]


**In-street Pedestrian Crossing Sign**[7]


**Figure 22** and **Table 23** show the locations and proposed improvements. **Appendix B** has more detail for each proposed crossing location. **Table 24** details the estimated cost information for all proposed mid-block crossing locations.

[5] https://louisville.edu/sustainability/images/IMG_0674.JPG/image_view_fullscreen
[6] https://mutcd.fhwa.dot.gov/htm/2009/part2/fig2c_10_longdesc.htm
[7] https://mutcd.fhwa.dot.gov/htm/2009/part2/fig2b_02_longdesc.htm




# PROPOSED MID-BLOCK CROSSING IMPROVEMENTS

FIGURE 22

### Table 23: Proposed Mid-Block Crossing Elements

| ID | Location | Proposed Improvements |
|---|---|---|
| 1 | 11th St NE between 3rd Ave NE & Arrow Ave NE | Mid-block crossing connecting Watertown Sr High School and Lake Area Technical College - need further study to determine exact location<br><br>Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6) |
| 2 | 11th St NE between Arrow Ave NE & 1st Ave NE | Mid-block crossing connecting overflow parking and Lake Area Technical College<br><br>Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6) |
| 3 | 4th Ave SE between 2nd St SE & 3rd St SE | Mid-block crossing connecting parking lot and Roosevelt Elementary School<br><br>Continental Crosswalk & curb extension (paint and post), upgrade sign to yield to pedestrian and bikes (W11-15 with W11-15P), in-street pedestrian crossing signs (R1-6) |

### Table 24: Proposed Mid-Block Crossing Improvement Estimated Costs

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **Crosswalks, Pavement Markings and Warning Signs (Typical)** | Each | 3 | $3,000 | $9,000 |
| **Construct ADA Ramp** | Each | 6 | $10,000 | $60,000 |
| **Concrete Curb Extension (Typical)** | Each | 3 | $60,000 | $180,000 |
| **Project total** | | | | **$249,000** |

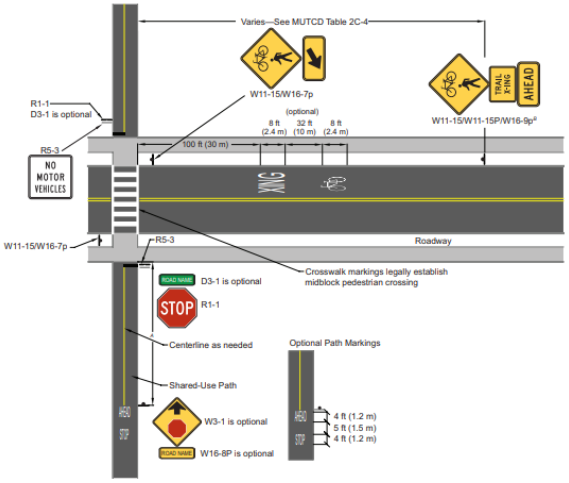
## Off-Street Trails

There is currently a strong network of existing off-street trails in the City of Watertown. The city currently includes the following trails:

- Highway 20 Trail
- North Lake Kampeska Trail
- South Lake Kampeska Trail
- Golf Course Trail
- 4th Avenue Trail
- Big Sioux River Trail
- Uptown Trail
- Willow Creek Trail
- 14th Avenue Trail
- 1st Avenue Trail

The project team reviewed the 2012 Watertown Trails Master Plan and provided additional detail and cost estimates to build out the recommended improvements included in the that plan. Where new trails were recommended, a 10-foot-wide concrete off-street trial was assumed as the typical design. Recommended improvements include upgrading crosswalks and warning signs, High-Intensity Activated Crosswalks (HAWK), Rectangular Rapid Flashing Beacons (RRFB), and concrete median islands with refuge. There is one example of a HAWK in Watertown, located on US-81 between 12th Avenue NE and 11th Avenue NE. The images below show examples of these improvements.

**Uncontrolled Crossing with Crosswalks, Pavement Markings, and Warning Signs**

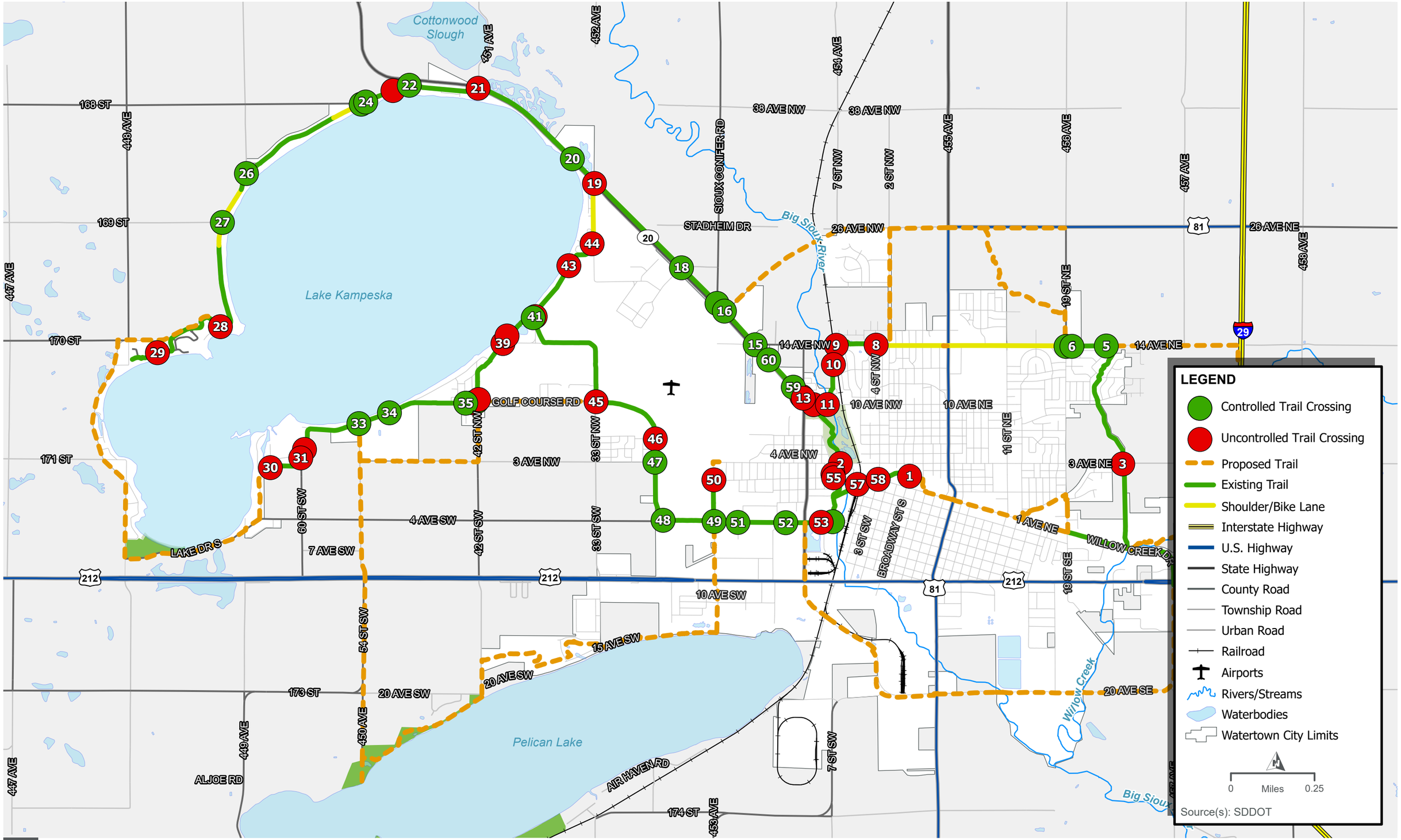



**8-foot x 20-foot Concrete Median Island with Refuge**

**High-Intensity Activated Crosswalk Beacon (HAWK)**

**Rectangular Rapid-Flashing Beacon (RRFB)**

**Figure 23** and **Table 25** show the locations of proposed improvements. **Appendix B** has more detail for each proposed crossing location. **Table 26** and **Table 27** detail the estimated cost information for all proposed new trails and trail crossing improvement locations.




**PROPOSED NEW TRAIL AND TRAIL CROSSING IMPROVEMENT LOCATIONS**

FIGURE 23

## Table 25: Proposed Trail Crossing Improvements

| ID | Name | Location | Crosswalks, Pavement Markings and Warning Signs (Typical) | HAWK Signal | RRFB | Construct ADA Ramp | Add Detectable Warning Surface (Truncated Domes) | 8' x 20' Concrete Median Island With Refuge (Typical) | Other Proposed Improvement |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Uncontrolled Crossing | N Broadway & S Kempeska Blvd | | | | | 2 | | |
| 2 | Uncontrolled Crossing | 3rd Ave NW near 1st Ave NW | | | | | | 1 | |
| 3 | Uncontrolled Crossing | 3rd Ave NE near 22nd St E | 1 | | | | 2 | | |
| 4 | Uncontrolled Crossing | 33rd St SE near US-212 | | | | | | | |
| 5 | Controlled Crossing | 14th Ave & 22nd St E | 1 | | | 2 | | | |
| 6 | Controlled Crossing | 14th Ave NE & 20th St NE | 1 | | | 2 | | | |
| 7 | Controlled Crossing | 14th Ave NE & 19th St E | 1 | | | | | | |
| 8 | Uncontrolled Crossing | 14th Ave NW & 4th St NW | 1 | | | 2 | | | Change to All-way Stop |
| 9 | Uncontrolled Crossing | 14th Ave NW & 6th St | 1 | | | | 1 | | |
| 10 | Uncontrolled Crossing | 7th St NW south of 14th Ave NW | | | | | | | |
| 11 | Uncontrolled Crossing | 10th Ave NW near 7th St NW | | | | | | 1 | |
| 12 | Uncontrolled Crossing | 10th Ave NW east of 9th St NW | | | | | | 1 | Move crossing to the east to cross where trail meets the road coming from the south |
| 13 | Uncontrolled Crossing | SD-20 Slip Ramp south of 10th St NW | 1 | | | | 1 | | Close slip ramp |
| 14 | Uncontrolled Crossing | 10th St NW & SD-20 | 1 | | | | | | |
| 15 | Controlled Crossing | 14th Ave NW & SD-20 | 1 | | | | | | |
| 16 | Controlled Crossing | 26th Ave NW & SD-20 | 1 | | | | | | |
| 17 | Controlled Crossing | Sioux Conifer Rd & SD-20 | 1 | | | | | | |
| 18 | Controlled Crossing | Airport Dr & SD-20 | 1 | | | | 2 | | |
| 19 | Uncontrolled Crossing | SD-20 & S Lake Dr | | 1 | | 2 | | | |

| ID | Name | Location | Crosswalks, Pavement Markings and Warning Signs (Typical) | HAWK Signal | RRFB | Construct ADA Ramp | Add Detectable Warning Surface (Truncated Domes) | 8' x 20' Concrete Median Island With Refuge (Typical) | Other Proposed Improvement |
|---|---|---|---|---|---|---|---|---|---|
| 20 | Controlled Crossing | Forsberg Park & SD-20 | 1 | | | | 2 | | |
| 21 | Uncontrolled Crossing | SD-20 & N Lake Dr/451st Ave | | 1 | | | 2 | | |
| 22 | Controlled Crossing | SD-139 east of SD-20 connection | 1 | | | | 2 | | |
| 23 | Uncontrolled Crossing | SD-139 & N Lake Dr | 1 | | | | 1 | | |
| 24 | Controlled Crossing | SD-139 & 458th Ave | 1 | | | | | | |
| 25 | Controlled Crossing | SD-139 & County Rd 8 2/10 | 1 | | | | | | |
| 26 | Controlled Crossing | SD-139 & 449th Ave | 1 | | | | | | |
| 27 | Controlled Crossing | SD-139 & 169th Ave | 1 | | | | | | |
| 28 | Uncontrolled Crossing | SD-139 east of Sunset Dr | 1 | | | | | | |
| 29 | Uncontrolled Crossing | Codington Memorial Park & Campground | 1 | | | | | | |
| 30 | Uncontrolled Crossing | Pompeska Dr & S Lake Dr | 1 | | | | | | |
| 31 | Uncontrolled Crossing | S Lake Dr & Prairie Hills Dr | 1 | | | | | | |
| 32 | Uncontrolled Crossing | S Lake Dr north of Prairie Hills Dr | | | 2 | | | | Drop speed limit to 35MPH |
| 33 | Controlled Crossing | Co Rd 17 5/10 & 54th St W | 1 | | | | | | |
| 34 | Controlled Crossing | Co Rd 17 5/10 & Prairie Winds Golf Club | 1 | | | | 2 | | |
| 35 | Controlled Crossing | CO Rd 12 3/10 & 43rd St NW | | | | | | | |
| 36 | Uncontrolled Crossing | CO Rd 12 3/10 west of 43rd St NW | 1 | | | | | | |
| 37 | Controlled Crossing | 42nd St NW & County Rd 12 3/10 | 1 | | | | | | |
| 38 | Uncontrolled Crossing | 42nd St NW Slip Ramp | 1 | | | | | | |
| 39 | Uncontrolled Crossing | S Lake Dr & Jackson Park (south entrance) | 1 | | | | | | |

| ID | Name | Location | Crosswalks, Pavement Markings and Warning Signs (Typical) | HAWK Signal | RRFB | Construct ADA Ramp | Add Detectable Warning Surface (Truncated Domes) | 8' x 20' Concrete Median Island With Refuge (Typical) | Other Proposed Improvement |
|---|---|---|---|---|---|---|---|---|---|
| 40 | Uncontrolled Crossing | Jackson Park (south) | 1 | | | | 2 | | |
| 41 | Uncontrolled Crossing | S Lake Dr & Jackson Park (north entrance) | 1 | | | | 2 | | |
| 42 | Controlled Crossing | Jackson Park (north) | 1 | | | | 2 | | |
| 43 | Uncontrolled Crossing | S Lake Drive west of Casino Speedway | 1 | | | | 2 | | |
| 44 | Uncontrolled Crossing | Stokes-Thomas Lake City Park & S Lake Dr | | | | | 2 | | |
| 45 | Uncontrolled Crossing | Co Rd 12 3/10 & 33rd St NW | 1 | | | | 2 | | |
| 46 | Uncontrolled Crossing | 5th Ave NW & Co Rd 12 3/10 | 1 | | | | 2 | | |
| 47 | Controlled Crossing | 3rd Ave NW & Co Rd 12 3/10 | 1 | | | | 2 | | |
| 48 | Controlled Crossing | Co Rd 12 3/10 & 4th Ave SW | 1 | | | | 2 | | Change to All-way Stop |
| 49 | Controlled Crossing | 4th Ave SW & Co Rd 14A | 1 | | | | 4 | | |
| 50 | Uncontrolled Crossing | 21st St NW & W Kemp Ave | 1 | | | | 2 | | |
| 51 | Controlled Crossing | 4th Ave SW & 19th St SW | 1 | | | | 2 | | |
| 52 | Controlled Crossing | 4th Ave SW & 14th Ave SW | 1 | | | | 2 | | |
| 53 | Uncontrolled Crossing | 4th Ave SW west of S Kampeska Blvd | 1 | | | | 2 | | |
| 54 | Controlled Crossing | 4th Ave SW & S Kampeska Blvd | 1 | | | | 1 | | |
| 55 | Uncontrolled Crossing | W Kemp Ave & Kampeska Blvd | 1 | | | | | | |
| 56 | Uncontrolled Crossing | Kampeska Blvd north of W Kemp Ave | 1 | | | | | | |
| 57 | Uncontrolled Crossing | W Kemp Ave east of 6th St NW | 1 | | | | 2 | | |
| 58 | Uncontrolled Crossing | 1st Ave NW & 3rd St NW | 1 | | | | 4 | | |
| 59 | Controlled Crossing | Codington County Hwy Shop & SD-20 | 1 | | | | 2 | | |
| 60 | Controlled Crossing | Fireside Camper & SD-20 | 1 | | | | 2 | | |

**Table 26: Proposed New Trail Estimates Costs**

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **Install 10' concrete trail** | LF | 172,510 | $100 | $17,251,007 |
| **Project total** | | | | **$17,251,007** |

**Table 27: Proposed Trail Crossing Improvement Costs**

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **Crosswalks, Pavement Markings and Warning Signs (Typical)** | Each | 49 | $3,000 | $147,000 |
| **RRFB** | Each | 2 | $30,000 | $60,000 |
| **HAWK** | Each | 2 | $300,000 | $600,000 |
| **Construct ADA Ramp** | Each | 8 | $10,000 | $80,000 |
| **Add Detectable Warning Surface (Truncated Domes)** | Each | 58 | $500 | $29,000 |
| **8' x 20' Concrete Median Island with Refuge (Typical)** | Each | 3 | $100,000 | $300,000 |
| **Project total** | | | | **$1,216,000** |

### On-Street Bicycle Facilities

There are currently existing shoulder bicycle routes on the following street segments:

- 14th Ave NE (1.5 mi shoulder bikeway/bike lane)
- 10th Ave NW – trail connection (0.1 mi shoulder bikeway/bike lane)
- North Lake Kampeska Trail (1.4 mi shoulder bikeway/bike lane)
- South Lake Kampeska Trail (0.6 mi shoulder bikeway/bike lane)

On-street bicycle facilities have been proposed in addition to these existing shoulder bicycle routes and the trail network improvements discussed above. On-street bicycle facilities were proposed for all routes identified as “Sidewalk Feeder Linkage” routes in the 2012 City of Watertown Master Trail Plan. Recommended facilities were tailored to the Watertown street network evaluating existing street and right-of-way width, traffic speeds and volumes and land use context. The images below show example recommended bicycle facilities.

**Bicycle Boulevard**[8]

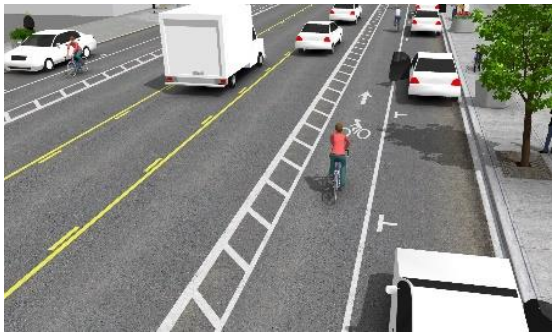
**Characteristics**:

- Signage, markings, and traffic calming measures
- Intended for low-speed, low-volume roads
- Location should have existing connection(s) to system

**Conventional Bike Lane**[9]

**Characteristics**:

- Portion of ROW dedicated for use by bicyclists
- Designated by signage, striping, and / or pavement markings
- Enable predictable movements for bicyclists and motorists



**Buffered Bike Lane**[10]

**Characteristics**:

- Similar design characteristics as conventional bike lanes
- Designated buffer provides physical separation from lanes of vehicular traffic
- Barrier can be additional striping, or physical barrier such as parking lane or median

[8] https://twitter.com/NYCMayor/status/1355207355739365388/photo/1
[9] https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/conventional-bike-lanes/
[10] https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/buffered-bike-lanes/

A series of on-street facility treatments were identified for roadways within Watertown. These recommend facilities were identified based on current traffic volumes and lane geometry. The on-street treatments recommended for Watertown are:

**Broadway**

- ADT:
  - 2,080 north of 3rd Ave NE
  - 3,070 south of 3rd Ave NE
- Recommendations:
  - Bicycle Boulevard from 10th Ave NE to 3rd Ave NE (0.5 miles)
  - Sharrows from 3rd Ave NE to 3rd Ave SE (0.55 miles)
  - Buffered Bike Lane from 3rd Ave SE to 9th Ave SE/US-212 (0.5 miles)

**11th Street East**

- ADT:
  - 1,810 between 14th Ave NE and 7th Ave NE
  - 2,500 between 7th Ave NE and 3rd Ave NE
  - 2,800 south of 3rd Ave NE
- Recommendation:
  - Conventional Bike Lane from 14th Ave NE to 9th Ave SE/US-212 (2 miles)

**19th Street Southeast**

- ADT:
  - 3,760 between 14th Ave NE and 10th Ave NE
  - 7,280 between 10th Ave NE and 3rd Ave NE
  - 6,460 between 3rd Ave NE and Arrow Ave NE
  - 9,540 between Arrow Ave NE and 1st Ave NE
  - 6,470 between 1st Ave NE and 9th Ave SE/US-212
- Recommendations:
  - Remove two-way left turn lane (TWLTL) and add buffered bike lanes between 14th St NE and 9th Ave SE/US-212 (2 Miles)

**East Kemp Avenue**

- ADT:
  - 1,490 between 3rd St NW and 5th St NE/US-81
- Recommendation
  - Bike Boulevard between 21st St NW and 19th St SE (3 Miles)

**4th Avenue Southeast/Southwest**

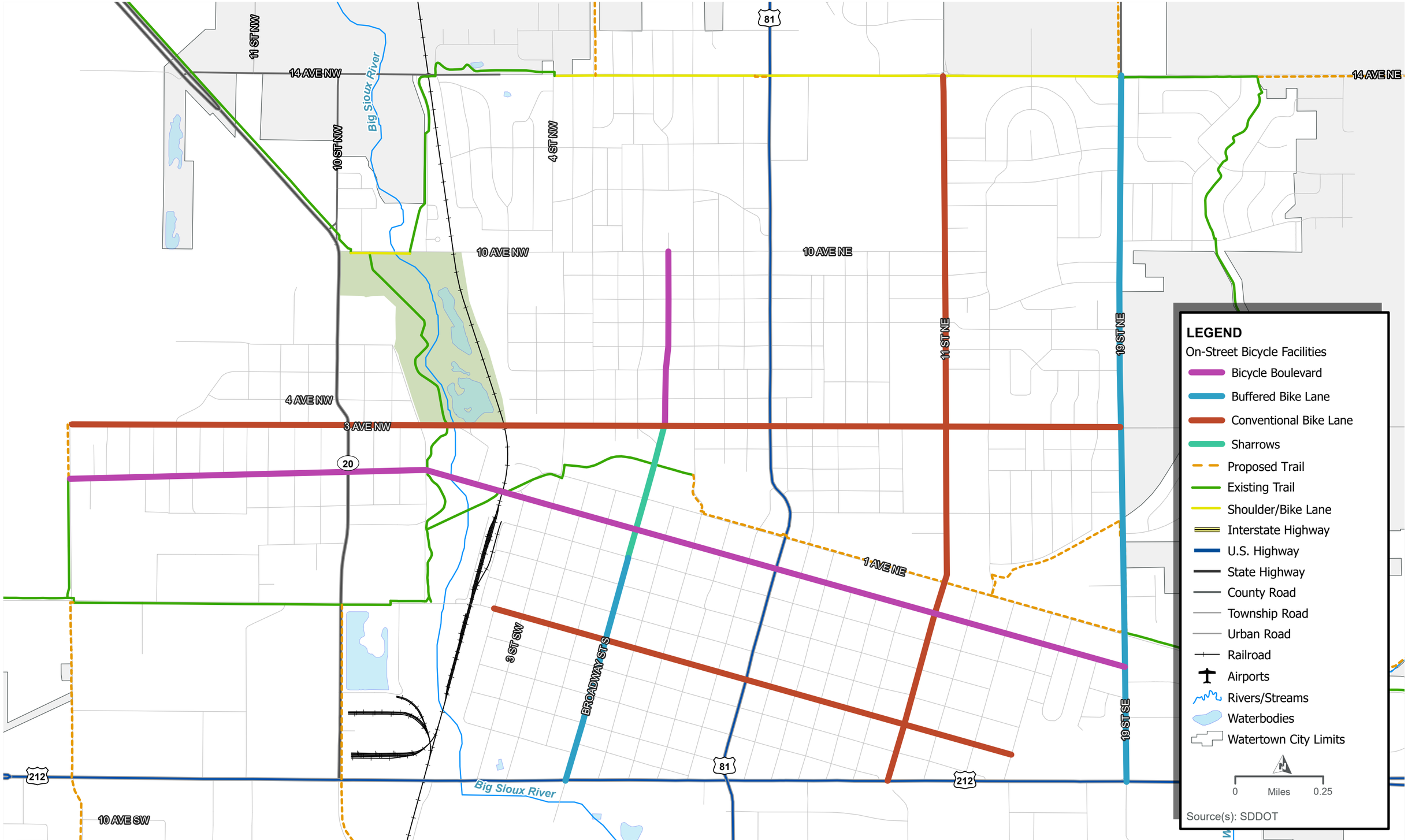
- ADT:
  - 5,900 between 21st St NW and 10th St NW/SD-20
  - 4,930 between 10th St NW/SD-20 and 3rd St SW
  - 3,190 between 3rd St SW and Broadway
  - 2,510 between Broadway and 5th St NE/US-81
  - 1,590 between 5th St NE/US-81 and 14th St SE

- Recommendations:
    - Conventional Bike Lanes between 4th St SW and 14th St SE (1.5 Miles)

**3rd Avenue Northwest/Northeast**

- ADT:
    - 1,860 between 21st St NW and 17th St NW
    - 2,830 between 17th St NW and 10th St NW/SD-20
    - 5,700 between 10th St NW/SD-20 and Broadway
    - 4,350 between Broadway and 4th St NE/US-81
    - 3,580 between 4th St NE/US-81 and 7th St NE
    - 3,670 between 7th St NE and 11th St NE
    - 2,200 between 11th St NE and 19th St NE
    - 660 between 19th St NE and 31st St NE (dirt road in this segment)
- Recommendations:
    - Conventional or Buffered Bike Lanes (depending on pavement width) from 21st St NW to 19th St NE

**Figure 24** shows the locations of proposed improvements and **Table 28** details the estimated cost information.




# PROPOSED ON-STREET BIKE FACILITY LOCATIONS

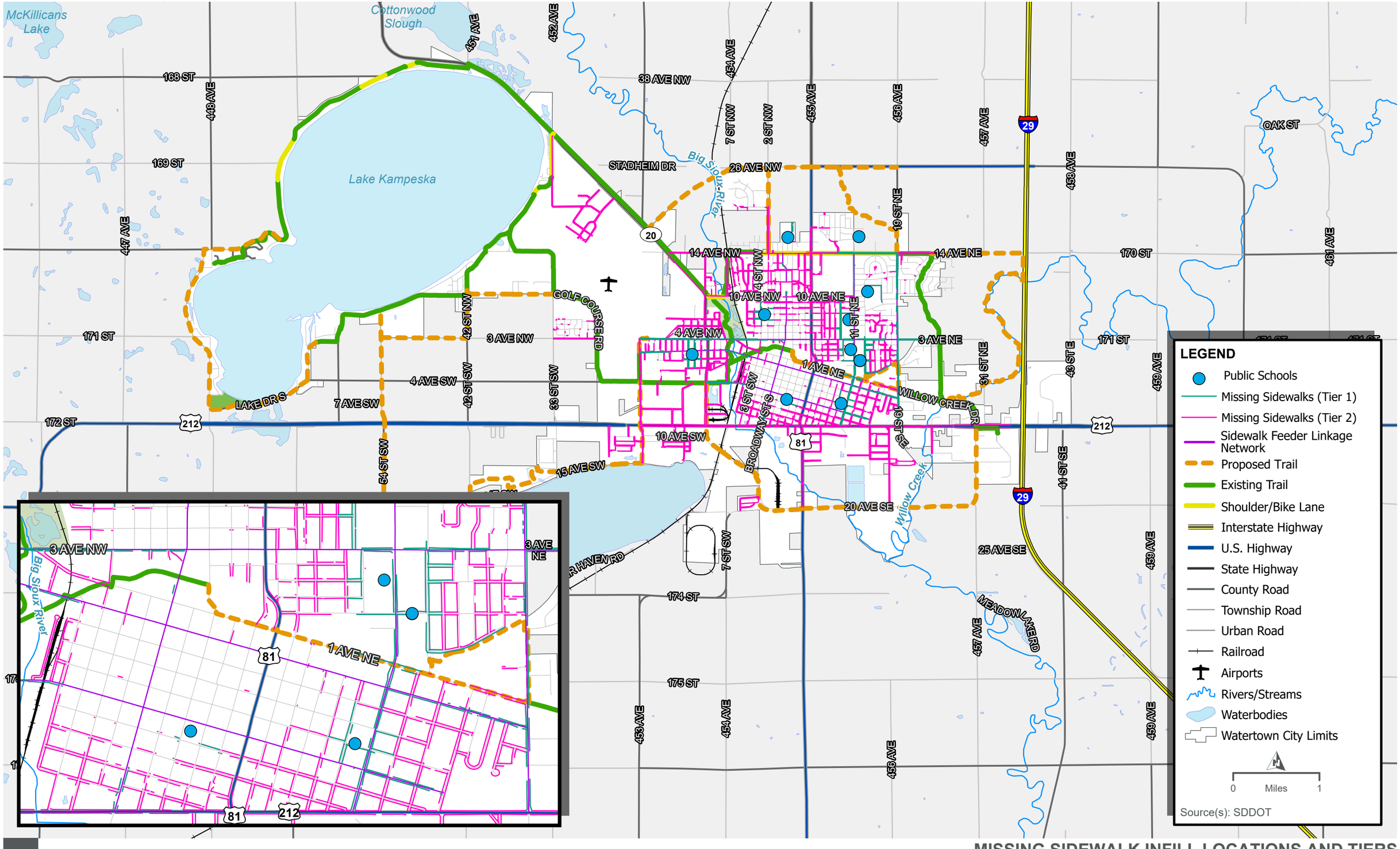
**Table 28: Proposed On-Street Bike Facility Estimated Costs**

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **Bike Lanes** | Miles | 4.55 | $135,000 | $1,019,250 |
| **Buffered Bike Lanes** | Miles | 2.00 | $185,000 | $370,000 |
| **Bicycle Boulevard (Includes Traffic Calming, Signing and Striping** | Miles | 3.50 | $250,000 | $875,000 |
| **Project total** | | | | **$2,264,250** |

### Sidewalk Network Gaps

Existing and missing sidewalk data were collected in a previous City of Watertown project. Building off this data, the project team developed a two-tier priority system for building the remaining missing sidewalks in the city. The first tier includes sidewalks along the Sidewalk Feeder Linkage routes identified in the 2012 Watertown Trails Master Plan and any sidewalks within the surrounding blocks of public schools in the City of Watertown. The second tier includes all other missing sidewalks in the City of Watertown.

**Figure 25** on the following page shows the locations of existing sidewalks, Tier 1 missing sidewalks, Tier 2 missing sidewalks, and the existing and proposed trail network for reference. **Table 29** on the subsequent page shows the estimated cost to install sidewalks in these locations.




## MISSING SIDEWALK INFILL LOCATIONS AND TIERS

FIGURE 25

**Table 29: Tier 1 Missing Sidewalk Infill Estimated Costs**

| Quantities | | | | |
|---|---|---|---|---|
| **Description** | **Unit** | **Quantity** | **Unit Price** | **Cost** |
| **(Tier 1) Install 5-foot-wide concrete sidewalk and curb and gutter** | LF | 114,958 | $85 | $9,771,390 |
| **Project total** | | | | **$9,771,390** |

One strategy to address sidewalk gaps for the City of Watertown is to incorporate sidewalk improvements into other neighborhood improvement and road resurfacing projects. Additionally, looking at sidewalk infill on a case by case basis as other projects come up may be more manageable than looking at the City as-a-whole. Other cities have allocated annual budget dollars to a sidewalk fund so that they can continually infill sidewalks each year.

Advisory sidewalks or pedestrian lanes within the existing ROW are another interim solution to sidewalk infill. Pedestrian lanes may include signing, striping, and/or bollards. As seen in the images below, these types of facilities include striping or otherwise separating a portion of the existing roadway for pedestrians rather than building new concrete sidewalk above the curb.

**Pedestrian Lane with Bollards[11]**

**Pedestrian Lane with Signing and Striping[12]**

11 https://www.cbc.ca/news/canada/calgary/adaptive-sidewalks-calgary-1.5125310

12 https://ruraldesignguide.com/visually-separated/pedestrian-lane

# Future Conditions Analysis

Potential impacts from future-year traffic volumes were evaluated as part of the MTP update process. Evaluation of these future year traffic volumes allows for the identification of potential capacity and operational issues arising from future traffic and solutions to these issues can be developed.

## Future Conditions Traffic Volume Scenarios

The two future-year scenarios used are a 2030 Interim Conditions and 2040 Planning Horizon Conditions scenario. Both scenarios assume a “no-build” condition, so forecasted traffic operated on the existing roadway network with any facility or capacity adjustments.

The 2030 Interim Conditions and 2040 Planning Horizon Conditions traffic volumes were developed from 2020 Baseline Conditions volumes and future land use trip generation derived from the City of Watertown 2020 Comprehensive Land Use Plan.

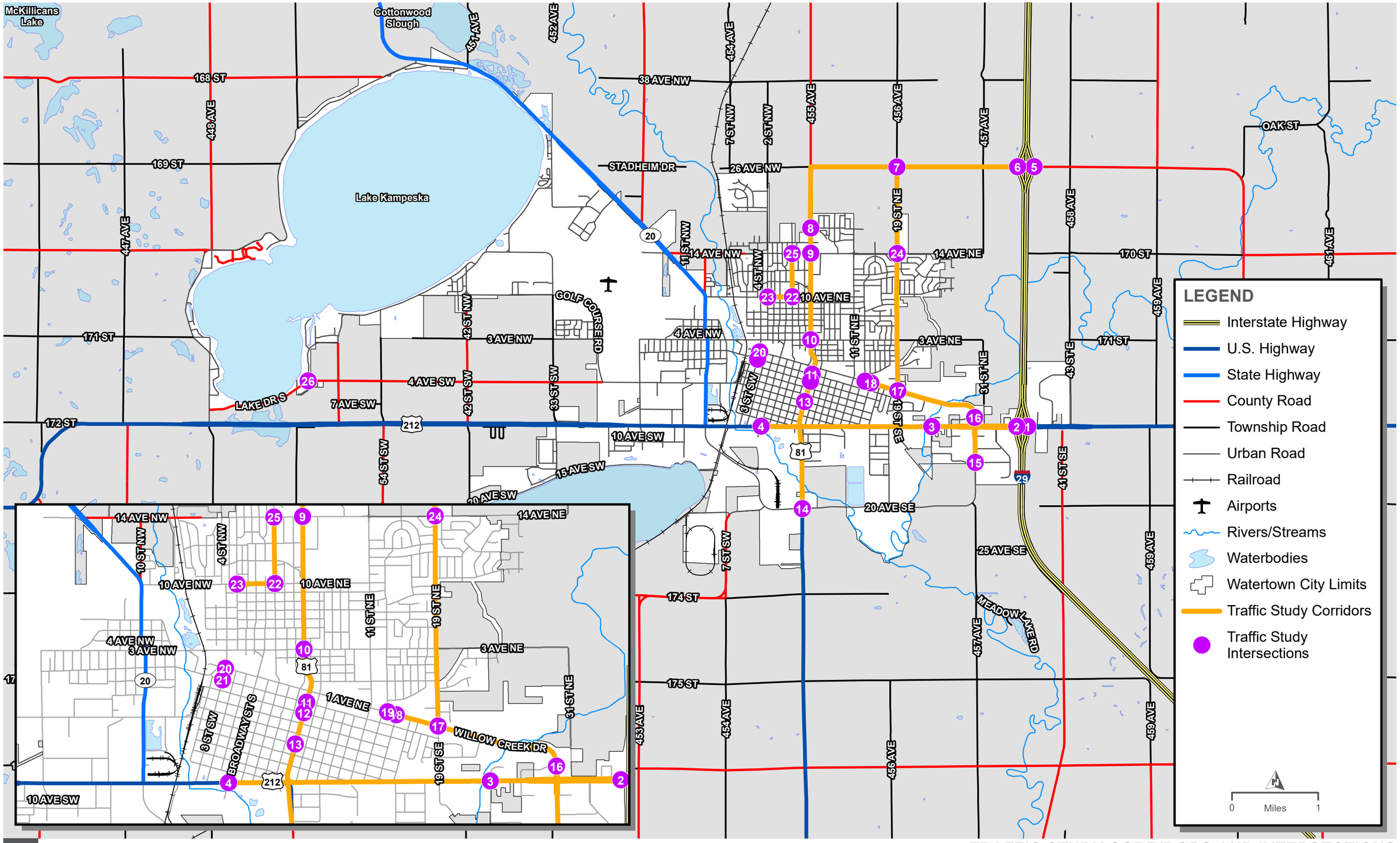
**Scenario Development**

AM and PM peak hour intersection turning movement volumes were developed for future conditions traffic volume scenarios along the following corridors (shown in **Figure 26)**:

- **US 212 (9th Avenue SE)** – from Broadway Street S to I-29 NB Exit 177 RTI
- **US 81(5th Street E/26th Avenue NE)** – from 20th Avenue SE to I-29 NB Exit 180 RTI
- **1st Avenue NE/Willow Creek Drive (29th Street SE)** – from US 212 to 13th Street NE
- **19th Street (456th Avenue)** – from 1st Avenue NE to US 81 (26th Avenue NE)
- **3rd Street NW** – from W Kemp Avenue to 1st Avenue NW
- **10th Avenue NW** – from 2nd Street W to N Maple Street
- **N Maple Street** – from 10th Avenue N to 14th Avenue N

In addition, similar peak hour scenarios were developed for the isolated South Lake Drive and 4th Avenue SW intersection.

2020 Existing Conditions volumes were factored to years 2030 and 2040. In addition, future development volumes were added to the factored volumes for each scenario based on future land uses outlined in the Comprehensive Land Use Plan.




# TRAFFIC STUDY CORRIDORS AND INTERSECTIONS

FIGURE 26

WATERTOWN MASTER TRANSPORTATION PLAN

### Growth Factors

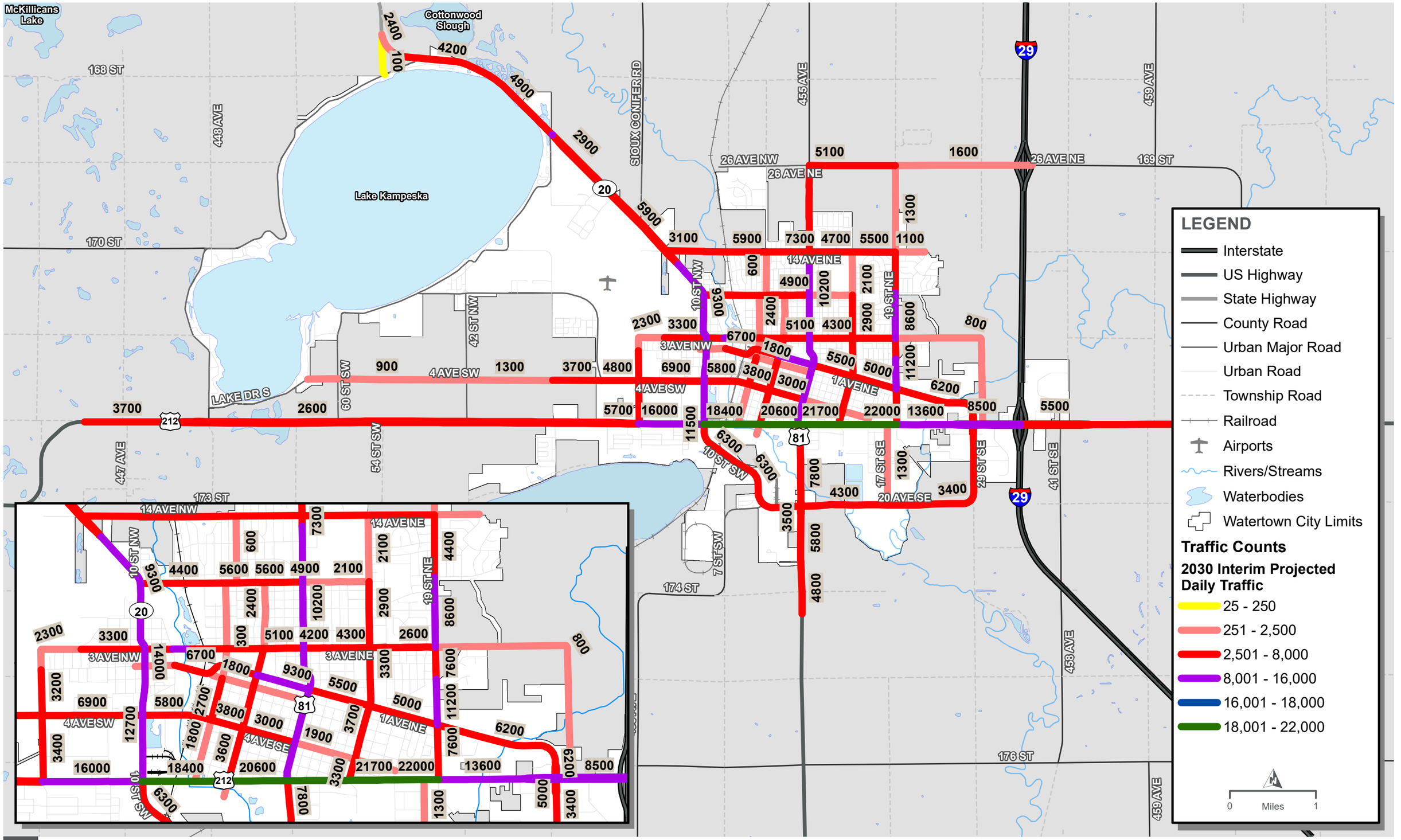
2020 Existing Conditions volumes were factored to years 2030 and 2040 based on SDDOT-provided growth rate factors for Codington County. Interpolation was used to calculate growth factors for 2030 Interim Conditions volumes (10-year growth).

County-wide Growth Factors:

- Urban Arterials / Collectors / Locals (Codington County)
  - 10-year: 1.177
  - 20-year: 1.353
- Rural Arterials / Collectors / Locals (Codington County)
  - 10-year: 1.165
  - 20-year: 1.330

### Future-Year Scenario Traffic Volumes

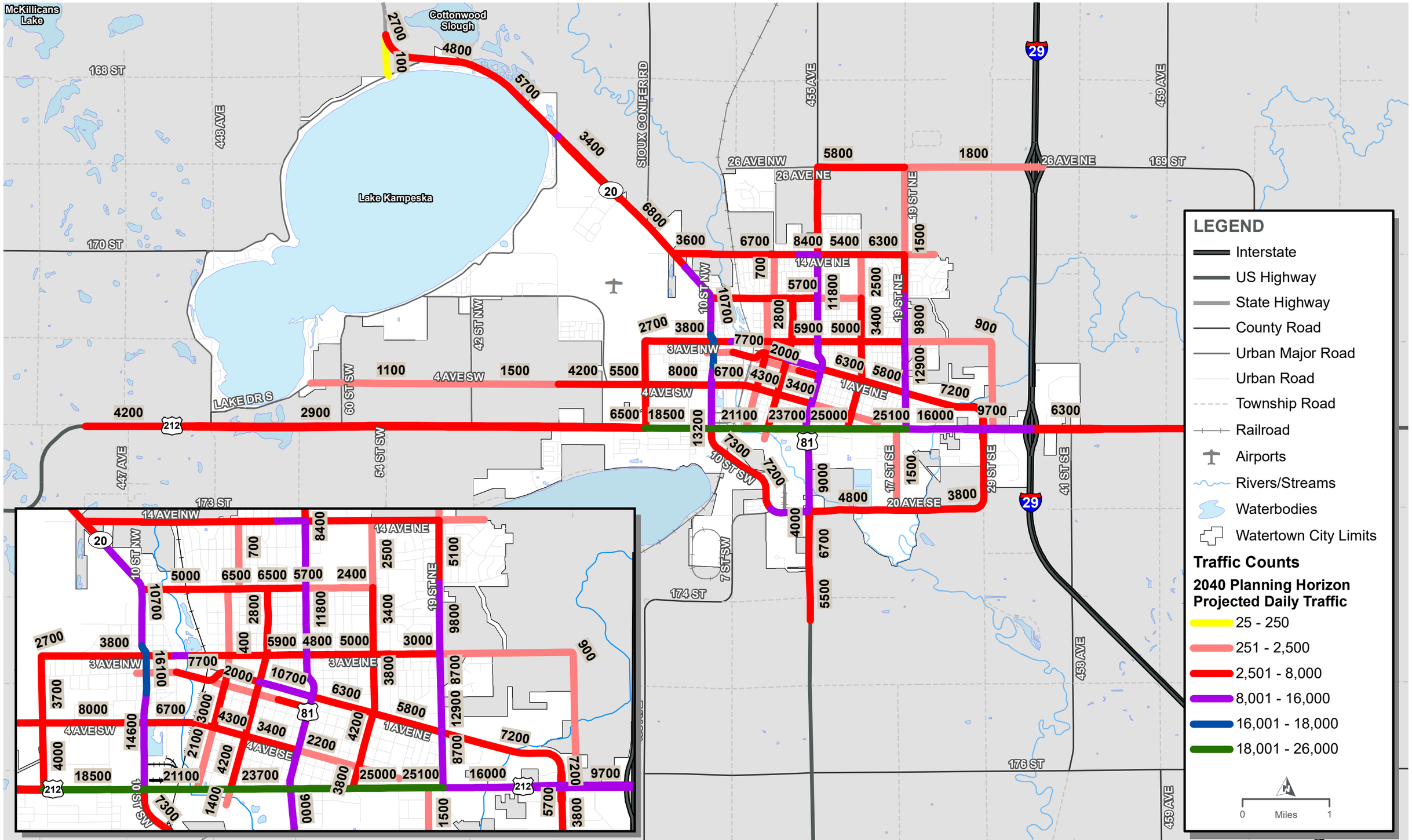
The future-year 2030 Interim Conditions traffic volumes are presented in **Figure 27** while the future-year 2040 Planning Horizon Conditions traffic volumes are presented in **Figure 28**.




# 2030 INTERIM SCENARIO DAILY TRAFFIC VOLUMES

FIGURE 27

WATERTOWN MASTER TRANSPORTATION PLAN




# 2040 PLANNING HORIZON SCENARIO DAILY TRAFFIC VOLUMES

FIGURE 28

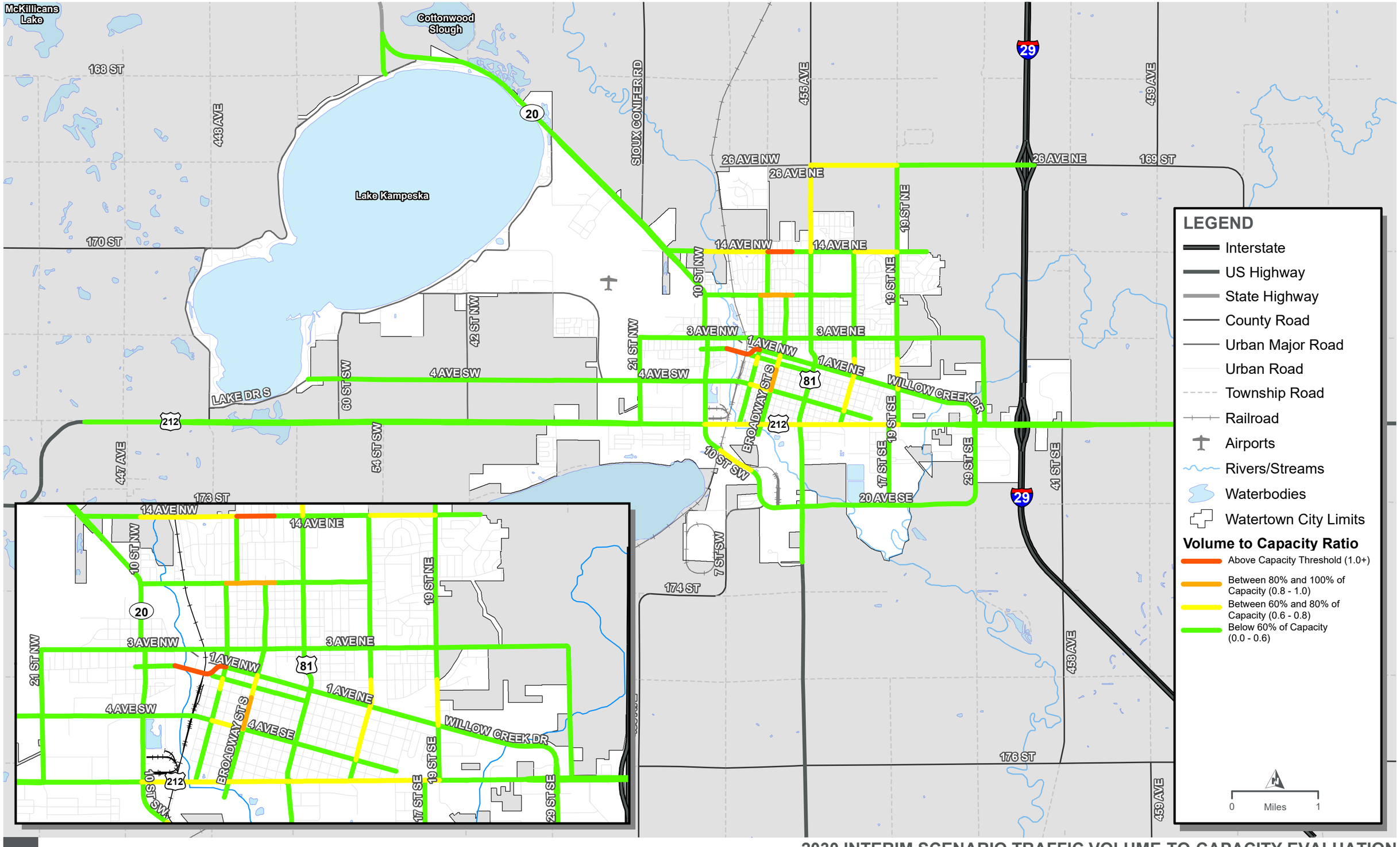
WATERTOWN MASTER TRANSPORTATION PLAN

## Future Conditions Traffic Operations

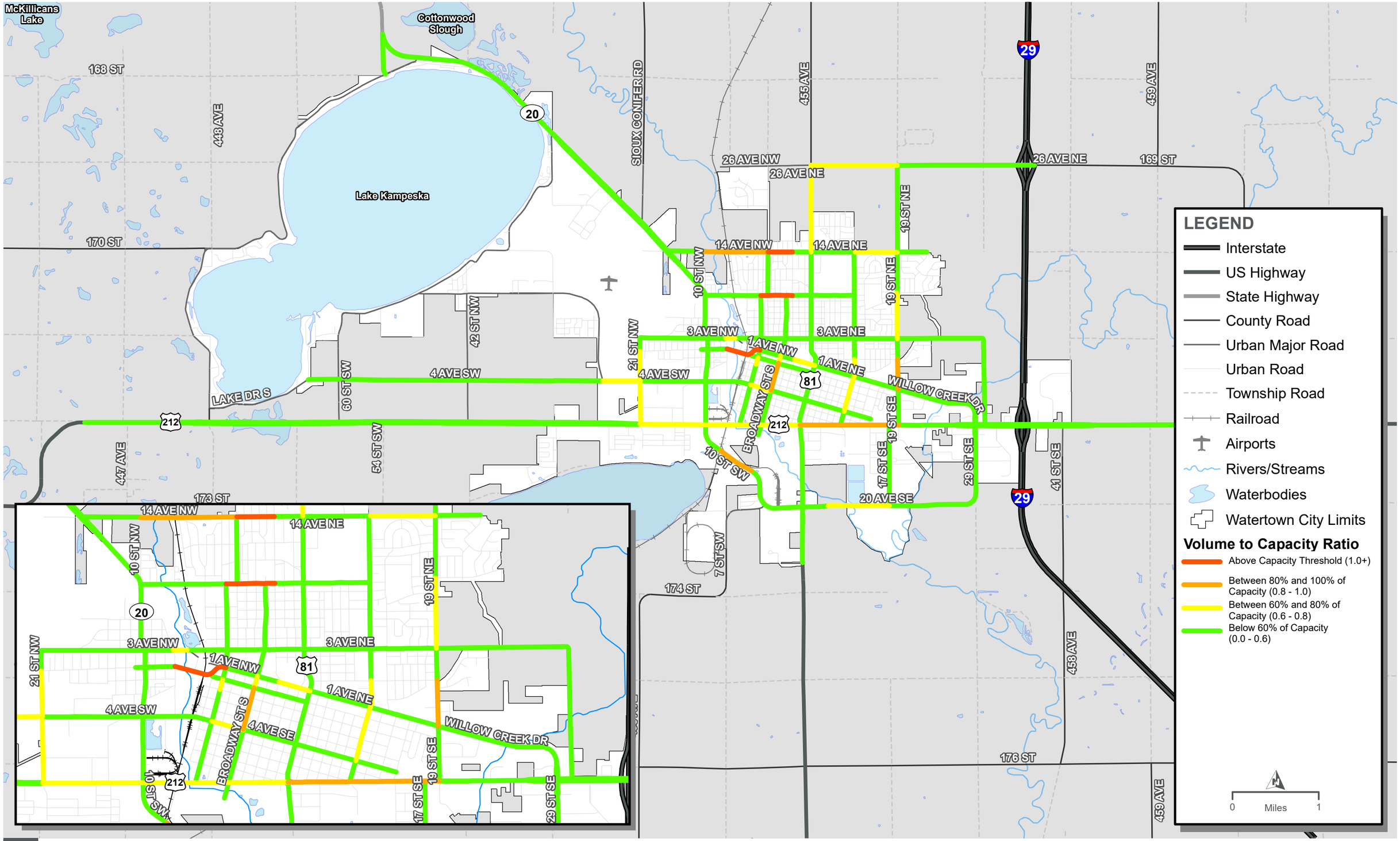
The following section discusses the results of traffic operations analyses based on future-year volume scenarios 2030 Interim Conditions and 2040 Planning Horizon Conditions. Like the Baseline Conditions traffic operations analysis, this analysis consisted of a planning level number of lanes review and intersection operations analysis for the study intersections. This helps to identify future needs along study corridors and intersections. For these scenarios, it is assumed that signal timings would be updated as traffic increases and patterns change, so signal timings were optimized in the 2030 Interim and 2040 Planning Horizon Synchro models.

### Planning Level Number of Lanes Review

The same Planning Level Number of Lanes Review methodology used in the Baseline Conditions was applied to future-year traffic forecasts. Color-coding in **Figure 29** and **Figure 30** is based on where the volume falls within the thresholds shown in the Baseline Conditions section of the MTP (**Table 9**). Traffic patterns, traffic signals or other intersection control, number of access points, and number of major intersecting roadways are considerations that typically dictate design needs. Therefore, it is recommended that planning-level number of lanes on either side of the thresholds be considered for segments where volumes are near the cut-off point and specific improvements be analyzed in a more detailed traffic operations analysis.




# 2030 INTERIM SCENARIO TRAFFIC VOLUME-TO-CAPACITY EVALUATION




# 2040 PLANNING HORIZON SCENARIO TRAFFIC VOLUME-TO-CAPACITY EVALUATION

FIGURE 30

## Intersection Operations

The intersection traffic operations analysis was conducted using Synchro 10 software. Level of Service (LOS) results, which is a measure of average vehicular delay at the intersection, are presented from the Highway Capacity Manual 6th Edition (HCM6) reporting module from Synchro. Thresholds for applicable LOS measures are the same used in the Baseline Conditions intersection operations analysis, provided in **Table 10**.

Urban area analysis is applicable for facilities within Watertown city limits. Locations where the LOS exceeds (worse) these study goals demonstrates an operation or capacity-related need to be addressed later in the study.

2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) conditions scenario operational measures can be found in **Appendix D**.

## Traffic Operations Findings

The following are general findings derived from the 2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) Conditions traffic operations analysis.

### Planning Level Volume to Capacity Operations

Corridor segments with an observed capacity of 80% and greater (or an observed capacity of 60% and greater for US and SD highways) in a future-year scenario are outlined in **Table 30**.

### Table 30: Future (No-Build) Conditions Volume-to-Capacity Operations

| Corridor | Segment | Existing Conditions | 2030 No Build Conditions | 2040 No Build Conditions |
|---|---|---|---|---|
| US 212 | 14th Street E to 19th Street E | 0.62 | 0.73 | 0.84 |
| | US 81 to 14th Street E | 0.61 | 0.72 | 0.83 |
| | Broadway Street S to US 81 | 0.59 | 0.69 | 0.79 |
| | SD 20 to Broadway Street S | 0.52 | 0.61 | 0.70 |
| | West of 21st Street W to SD 20 | 0.46 | 0.54 | 0.62 |
| US 81 | 14th Avenue NE to 19th Street NE (456th Avenue) | 0.55 | 0.64 | 0.73 |
| 20th Avenue S | Broadway Street S to West of Larabee Road | 0.67 | 0.78 | 0.90 |
| Kemp Avenue | Kampeska Boulevard to 1st Avenue NW | 0.95 | 1.12 | 1.29 |
| 10th Avenue N | 3rd Street NW to 2nd Street NW | 0.83 | 0.98 | 1.13 |
| | 2nd Street NW to N Maple Street | 0.79 | 0.94 | 1.08 |
| 14th Avenue N | 10th Street NW to 6th Street NW | 0.64 | 0.75 | 0.87 |
| | 6th Street NW to 2nd Street NW | 0.62 | 0.73 | 0.84 |
| | 2nd Street NW to N Maple Street | 0.95 | 1.11 | 1.28 |
| Broadway Street | 4th Avenue SW to 1st Avenue SW | 0.73 | 0.86 | 0.98 |
| | 1st Avenue SW to Kemp Avenue | 0.65 | 0.77 | 0.88 |
| 19th Street E | 1st Avenue NE to Arrow Avenue NE | 0.59 | 0.70 | 0.81 |

### Intersection Operations

Intersections that did not meet study LOS goals or had poor stop-controlled approach LOS at two-way stop-controlled intersections in a future-year scenario are outlined in **Table 31**.

**Table 31: Future (No-Build) Conditions Intersection Operations**

| Intersection | Control | Existing Conditions | | 2030 No Build Conditions | | 2040 No Build Conditions | |
|---|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | AM | PM |
| N Maple Street & 14th Avenue N | All-Way Stop-Control | B | B | D | B | F | C |
| US 212 & I-29 SB Exit 177 RTI | Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)* | A (B) | A (B) | A (C) | A (D) | A (C) | A **(E)** |
| US 212 & 23rd Street SE | Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)* | A (B) | A (D) | A (C) | A **(F)** | A (C) | D **(F)** |
| 29th Street SE and 15th Avenue SE | Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)* | A (B) | A (C) | A (B) | C **(F)** | A (B) | F **(F)** |
| US 81 & 18th Avenue NE | Two-Way Stop-Control (Worst-Case Stop-Controlled Approach)* | A (B) | A (B) | A (C) | A (B) | A (D) | A (C) |

* Two-way Stop Control Intersection Note: It is not uncommon to see LOS F at two-way stop control intersections in urban areas during the peak hours. Delay represented by LOS values in this figure does not warrant signalization of the respective intersection.

## Traffic Operations and Capacity Build Alternatives

Build alternatives listed in this section were developed to address operational and capacity needs identified by the 2030 Interim (No-Build) Conditions and 2040 Planning Horizon (No-Build) Conditions operational analyses. In addition, an exploratory analysis was conducted at select study intersections deemed suitable candidates for a single-lane roundabout.

### Approach to Developing Need-Based Build Alternatives

Build alternatives were developed for each intersection or roadway segment that demonstrated a 2030 Interim or 2040 Planning Horizon operational or capacity need using the following methodology and alternative strategies:

- **Two-way stop-control –** Two-way stop-control intersection alternative was evaluated at some locations where an existing all-way stop-control intersection was conducive to potential two-way stop-control.
- **Turn Lanes at Unsignalized Intersections –** Turn lanes were evaluated at unsignalized intersections with future operational needs and volumes that exceed turning lane warrant thresholds.

- **Signalized Intersections –** Signalized intersection Build alternatives were evaluated where needed. The Build alternative presented represents a 'minimum build' configuration to meet study LOS goals.
    - **Signal Warrants –** The approach to building out signalized The Manual of Uniform Traffic Control Devices (MUTCD) outlines volume warrants for the installation of a traffic signal at locations permissible by state code. For this study, future-year traffic volumes were reviewed from a planning-level perspective to identify a generalized timeframe for when a traffic signal may be warranted. HCS-based signal warrant analysis sheets are provided in the **Appendix D**.
- **Single-lane Roundabouts –** A single-lane roundabout was analyzed at locations where the incoming corridor cross-section was a 2-lane or 3-lane roadway (one through lane in each direction).
- **Corridors –** Typically built-out in terms of needs identified in the Planning Volume to Capacity Analysis based on projected 2030 and 2040 Daily Traffic Volumes.
- **Intersections where an operations or capacity need not identified –** If an intersection or roadway segment did not show an operational or capacity need in the No-Build conditions analyses (with the exception of intersections analyzed for the exploratory single-lane roundabout analysis), a future-year build alternative was not developed as it is anticipated that the location was sufficient through the planning horizon.

The complete list of identified traffic operations and capacity build alternatives is in **Appendix D**.

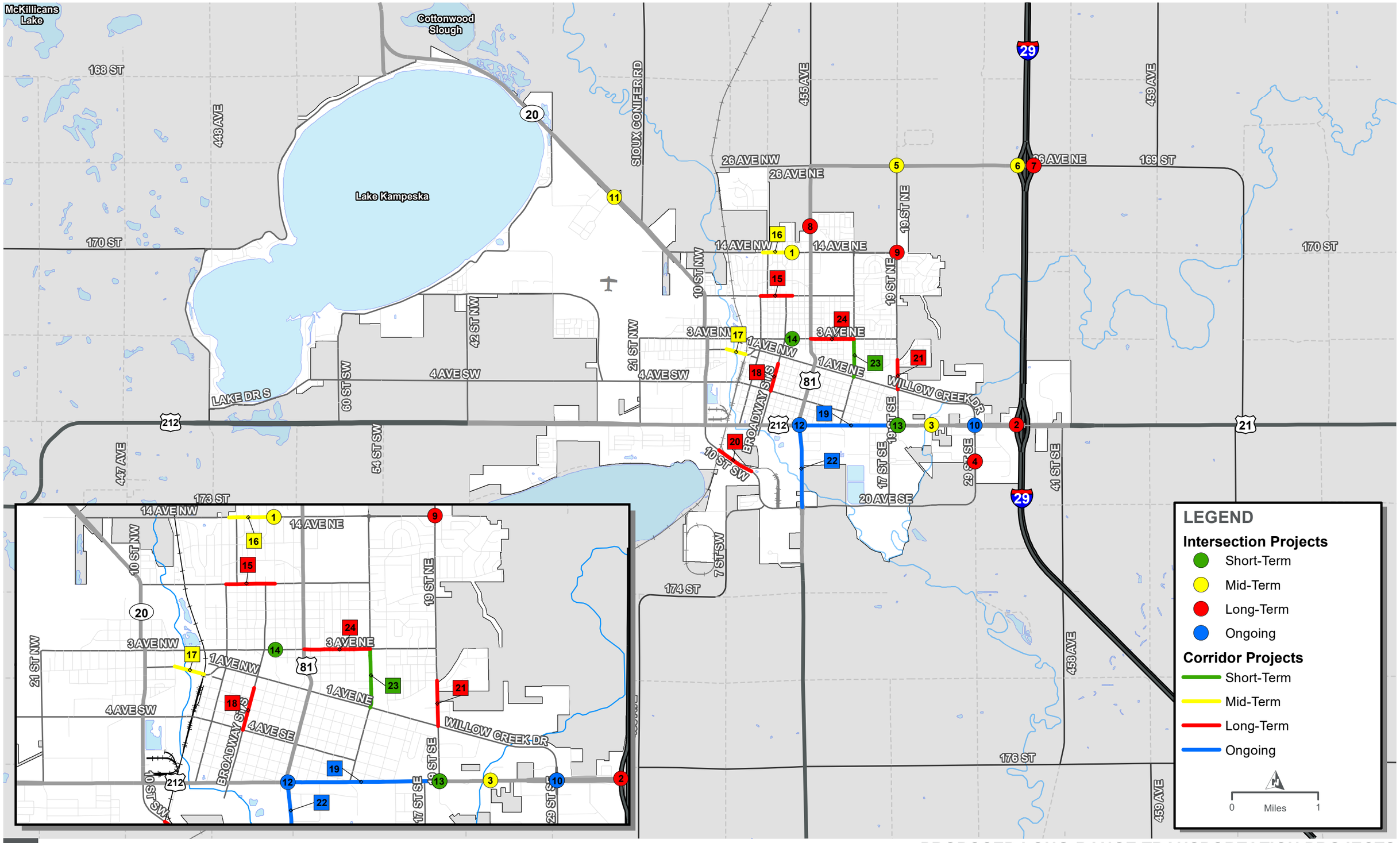
## Safety Improvement Build Alternatives

Many of the intersections and corridor segments experiencing crash rates that exceeded the critical crash rate, as noted in the Baseline Conditions section, are not identified as capacity and operational improvements. **Table 32** contains the proposed Build alternatives for addressing safety-related needs not related to capacity or traffic operations issues.

## Proposed Long-Range Transportation Projects

### Roadway Projects

The build alternative projects identified through the intersection operations, capacity, and safety analyses were evaluated to develop a list of proposed projects for the City of Watertown to consider when programming future improvements. **Figure 31** depicts the location of each proposed project while **Table 32** provides detail for each.




# PROPOSED LONG-RANGE TRANSPORTATION PROJECTS

FIGURE 31

WATERTOWN MASTER TRANSPORTATION PLAN

## Table 32: Summary of Proposed Long-Range Transportation Projects

| Project ID | Location | Project Type |
|---|---|---|
| 1 | N Maple Street & 14th Avenue North Intersection | Intersection (Operations)<br>- Maintain All-Way Stop Control (AWSC)<br>  - Add EB LT & WB LT Lanes<br>- Install Two-Way Stop Control (TWSC) at NB and SB Approaches<br>  - Add EB LT & WB LT Lanes<br>  - Add NB LT & SB LT Lanes (2040) |
| 2 | US 212 & I-29 SB Exit 177 RTI | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - SB LT Lane |
| 3 | US 212 & 23rd Street SE Intersection | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add NB LT & SB LT Lanes<br>  - Add EB RT (2040)<br>- Install Signal |
| 4 | 29th Street SE & 15th Avenue SE Intersection | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add SB RT, EB LT, & WB LT Lanes<br>  - Add NB RT Lane (2040)<br>- Install Roundabout (Exploratory)<br>- Install Signal (2040) |
| 5 | US 81 & 19th Street NE (456th Avenue) Intersection | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add EB LT, EB RT, WB LT, & WB RT Lanes<br>- Install Roundabout (Exploratory) |
| 6 | US 81 & I-29 SB Exit 180 RTI | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add EB RT & WB LT Lanes |
| 7 | US 81 & I-29 NB Exit 180 RTI | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add EB LT Lane |
| 8 | US 81 & 18th Avenue NE Intersection | Intersection (Operations)<br>- Maintain Two-Way Stop Control (TWSC)<br>  - Add WB LT Lane |
| 9 | 19th Street NE & 14th Avenue NE Intersection | Intersection (Operations)<br>- Install Roundabout (Exploratory) |
| 10 | US 212 & Willow Creek Drive Intersection | Intersection (Safety)<br>- Continue periodic signal timing as traffic patterns evolve. |
| 11 | SD 20 & Airport Drive Intersection | Intersection (Safety)<br>- Consider constructing a Reduced Conflict Intersection (RCI) to reduce severity and frequency of crashes. |
| 12 | US 212 & US 81 Intersection | Intersection (Safety)<br>- Continue periodic signal timing as traffic patterns evolve. |
| 13 | US 212 & 19th Street SE Intersection | Intersection (Safety)<br>- Continue periodic signal timing updates as traffic patterns evolve.<br>- Explore applying different signal head configurations and reflective signal tape.<br>- Consider removing additional signage from signal mast arms and poles and relocate to sign posts along roadside. |

**Table 31 continued**

| Project ID | Location | Project Type |
|---|---|---|
| 14 | N Maple Street & 3rd Avenue NE Intersection | Intersection (Safety)<br>- Remove objects and on-street parking within intersection sight distance triangles.<br>- Improve intersection visibility by providing larger stop signs and/or flashing LEDs around stop signs.<br>- Provide a stop line on minor approaches.<br>- Add a supplemental stop sign on left side of approach. |
| 15 | 10th Avenue North – 3rd Street NW to N Maple Street* | Corridor (Operations)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |
| 16 | 14th Avenue North – 2nd Street NW to N Maple Street | Corridor (Operations)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |
| 17 | Kemp Avenue – Kampeska Boulevard to 3rd Street W | Corridor (Operations)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |
| 18 | Broadway Street – 4th Avenue SW to Kemp Avenue | Corridor (Operations)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |
| 19 | US 212 – US 81 to 19th Street SE | Corridor (Operations/Safety)<br>- Review future requests for redevelopment and changes in access for opportunities to further access management techniques. |
| 20 | 20th Avenue South – Broadway Street S to Larabee Road | Corridor (Operations)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |
| 21 | 19th Street East – 1st Avenue NE to Arrow Avenue NE | Corridor (Operations)<br>- RT lanes at Major Intersections and/or additional Collector roads to handle eastern development traffic. |
| 22 | US 81 – 20th Avenue SE to US 212 | Corridor (Safety)<br>- Review future requests for redevelopment and changes in access for opportunities to further access management techniques. |
| 23 | 11th Street East – 1st Avenue NE to 3rd Avenue NE | Corridor (Safety)<br>- Install additional speed limit signage.<br>- Install speed feedback signs.<br>- Upgrade signal at 11th Street NE and 3rd Avenue NE with Pedestrian countdown.<br>- Install mid-block crossings between Watertown Sr High School and Lake Area Technical College and between overflow parking and Lake Area Technical College.<br>- Install continental crosswalk and curb extension, upgrade sign to yield to pedestrian and bikes, and add in-street pedestrian crossing signs. |
| 24 | 3rd Avenue North – US 81 to 11th Street NE | Corridor (Safety)<br>- 2/3 lane section (TWLTL or LT lane at major intersections). |

*This recommendation is being addressed as city is currently constructing this segment as a 3-lane facility

### Proposed Bicycle and Pedestrian Projects

Proposed bicycle and pedestrian improvements are described in the **Bicycle and Pedestrian Standards** section of the MTP.

## Recommended MTP Projects

Proposed MTP projects were further reviewed to develop a recommended list of projects that would address the most pressing issues facing Watertown's transportation system. Planning-level project costs were also developed and are presented in terms of 2020 dollars and a year-of-expenditure (YOE) cost that accounts for an annual cost increase of 3%. Roadway projects are presented in short-, mid-, and long-term time bands based on need. Recommended bicycle and pedestrian projects are presented in terms of priority, with projects that address more pressing needs or can correspond with a roadway project considered as the highest priority.

**Table 33: Recommended Roadway Projects**

| Time Frame | Project ID | Project Description | Cost (2020 $) | Cost (YOE $) |
|---|---|---|---|---|
| Short-Term (2020 - 2025) | 13 | US 212 & 19th Street SE Intersection | $75,000 | $80,000 |
| | 14 | N Maple Street & 3rd Ave NE Intersection | $10,000 | $10,000 |
| | 23 | 11th Street East – 1st Avenue NE to 3rd Avenue NE | $900,000 | $970,000 |
| **Total** | | | **$985,000** | **$1,060,000** |
| Mid-Term (2026-2035) | 1 | N Maple Street & 14th Ave North Intersection | $10,000 | $10,000 |
| | 3 | US 212 & 23rd Street SE Intersection | $800,000 | $1,090,000 |
| | 5 | US 81 & 19th Street NE (456th Avenue) Intersection | $1,000,000 | $1,360,000 |
| | 6 | US 81 & I-29 SB Exit 180 RTI | $500,000 | $680,000 |
| | 11 | SD 20 & Airport Drive Intersection | $1,500,000 | $2,050,000 |
| | 16 | 14th Avenue North – 2nd Street NW to N Maple Street | $1,500,000 | $2,050,000 |
| | 17 | Kemp Avenue – Kampeska Boulevard to 3rd Street W | $2,000,000 | $2,730,000 |
| | 23 | 11th Street East – 1st Avenue NE to 3rd Avenue NE | $900,000 | $1,230,000 |
| **Total** | | | **$8,210,000** | **$11,200,000** |
| Long-Term (2036-2040) | 2 | US 212 & I-29 SB Exit 177 RTI | $800,000 | $1,360,000 |
| | 4 | 29th Street SE & 15th Avenue SE Intersection | $800,000 | $1,360,000 |
| | 7 | US 81 & I-29 NB Exit 180 RTI | $250,000 | $430,000 |
| | 9 | 19th Street NE & 14th Avenue NE Intersection | $1,500,000 | $2,550,000 |
| | 15 | 10th Avenue North- 3rd Street NW to N Maple Street | $1,750,000 | $2,980,000 |
| | 18 | Broadway Street – 4th Avenue SW to Kemp Avenue | $1,650,000 | $2,810,000 |
| | 20 | 20th Avenue South – Broadway Street S to Larabee Road | $1,000,000 | $1,700,000 |
| | 21 | 19th Street East – 1st Avenue NE to Arrow Avenue | $800,000 | $1,360,000 |
| | 24 | 3rd Avenue North – US 81 to 11th Street NE | $1,600,000 | $2,720,000 |
| **Total** | | | **$10,150,000** | **$17,280,000** |

### Recommended Bicycle and Pedestrian Projects

Recommended bicycle and pedestrian projects were further reviewed to develop a recommended list of projects. Projects were categorized in terms of priority, with higher priority projects being considered to address the most pressing needs of the system and thus should be programmed first. Bicycle and pedestrian projects that address safety needs or are located in proximity to recommended roadway projects were identified as highest priority while trail expansion projects were identified as the lowest priority. All other projects are identified as medium priority. **Table 34** shows recommended MTP bicycle and pedestrian projects, which are those identified as the highest priority projects. Sidewalk infill costs, shown in **Table 35**, are categorized in short-, mid-, and long-term, similar to the roadway projects and reflect the cost of sidewalk infill that would be phased along with the recommended roadway projects. These sidewalk infill project costs were developed based on the sidewalk infill needs and their proximity to the recommended roadway projects. **Figure 32** shows the locations of the proposed high priority projects. The complete list of bicycle and pedestrian projects by priority are shown in **Appendix D**.

**Table 34: Recommended Bicycle and Pedestrian Projects**

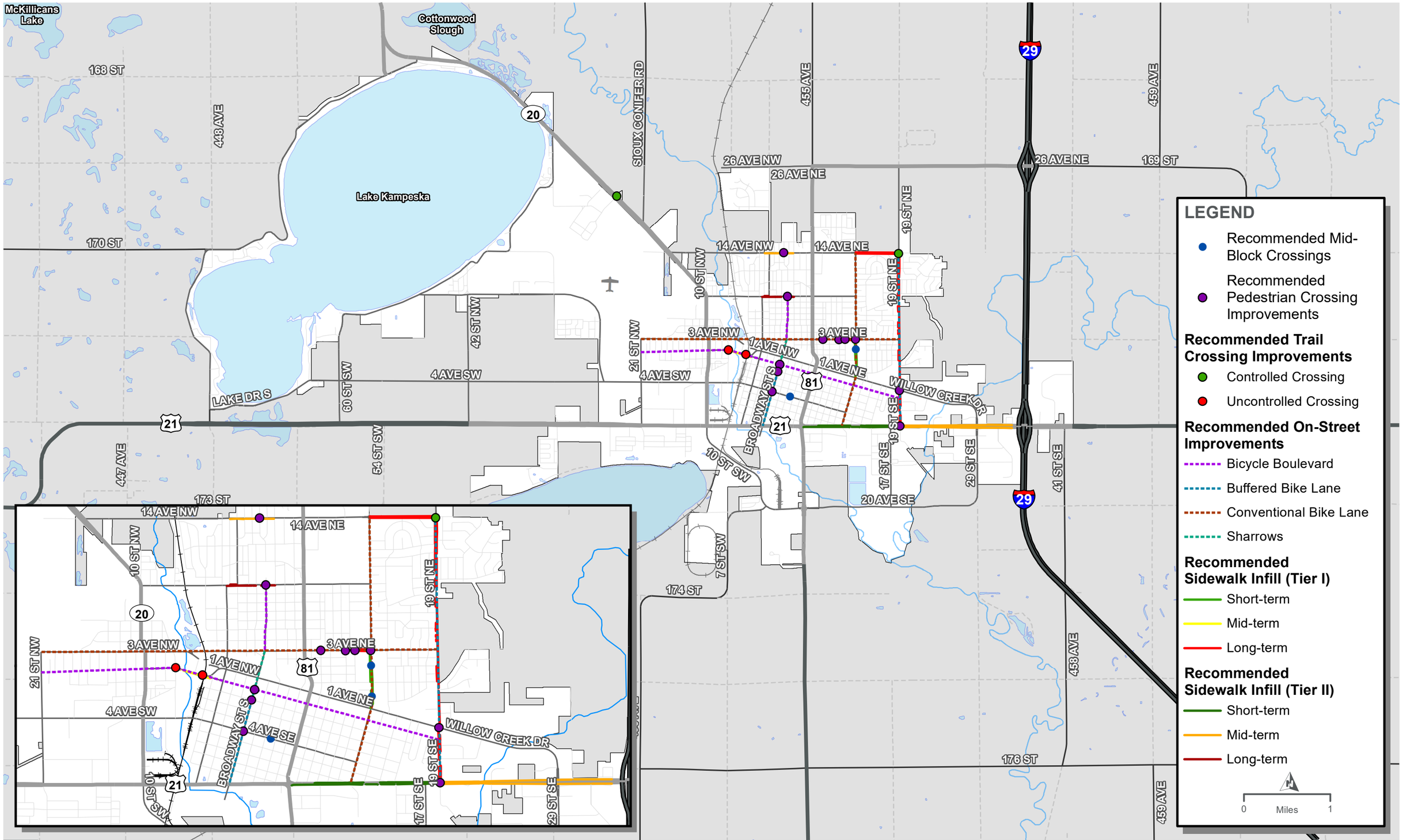
| ID | Location | Proposed Improvement | Type | Cost (2020 $) | Priority |
|---|---|---|---|---|---|
| 5 | 11th St NE & 3rd Ave NE | Upgrade signal to have pedestrian count-down; make ADA accessible on west side | Crossing Improvement | $40,000 | High |
| 11 | N Broadway & 14th Ave NW | Continental Crosswalks; make south side ADA Accessible, infill sidewalk gaps | Crossing Improvement | $42,000 | High |
| 14 | N Broadway & 10th Ave NW | Conduct multiway stop sign engineering study; make north side ADA Accessible; continental crosswalks; infill sidewalk gaps | Crossing Improvement | $42,000 | High |
| 17 | N Broadway & 1st Ave NW | Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts | Crossing Improvement | $4,000 | High |
| 18 | N Broadway & E Kemp Ave | Upgrade to all overhead traffic signals; Upgrade signal to have pedestrian count-down; continental crosswalks; Add Detectable Warning Surface on all curb cuts | Crossing Improvement | $4,000 | High |
| 19 | N Broadway & 1st Ave SW | Continental crosswalks; Add Detectable Warning Surface on all curb cuts | Crossing Improvement | $4,000 | High |
| 24 | N Broadway & US-212 | Upgrade signal to have pedestrian count-down; make ADA accessible; infill sidewalk gaps | Crossing Improvement | $80,000 | High |
| 25 | 3rd Ave NE & 6th St NE | Conduct multiway stop sign engineering study; continental crosswalks; infill sidewalk gaps, add curb cuts | Crossing Improvement | $2,000 | High |
| 26 | 3rd Ave NE & 8th St NE | Conduct multiway stop sign engineering study; continental crosswalks | Crossing Improvement | $2,000 | High |
| 38 | E Kemp Ave & 4th St SE | Conduct multiway stop sign engineering study; Continental Crosswalks; Detectable Warning Surface | Crossing Improvement | $4,000 | High |

### Table 33 continued

| ID | Location | Proposed Improvement | Type | Cost (2020 $) | Priority |
|---|---|---|---|---|---|
| 51 | 11th St NE between 3rd Ave NE & Arrow Ave NE | Mid-block crossing connecting Watertown Sr High School and Lake Area Technical College - need further study to determine exact location; continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs | Midblock Crossing | $83,000 | High |
| 52 | 11th St NE between Arrow Ave NE & 1st Ave NE | Mid-block crossing connecting overflow parking and Lake Area Technical College, continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs | Midblock Crossing | $83,000 | High |
| 53 | 4th Ave SE between 2nd St SE & 3rd St SE | Mid-block crossing connecting parking lot and Roosevelt Elementary School; continental crosswalk and curb extension, upgrade sign to yield to ped and bikes, in-street ped crossing signs | Midblock Crossing | $83,000 | High |
| 60 | 14th Ave NE & 19th St E | Controlled Crossing | Trail Crossing Improvement | $3,000 | High |
| 71 | Airport Dr & SD-20 | Controlled Crossing | Trail Crossing Improvement | $4,000 | High |
| 108 | W Kemp Ave & Kampeska Blvd | Uncontrolled Crossing | Trail Crossing Improvement | $3,000 | High |
| 110 | W Kemp Ave east of 6th St NW | Uncontrolled Crossing | Trail Crossing Improvement | $4,000 | High |
| 115 | Broadway, 10th Ave to 7th Ave | Bike boulevard | Bike Boulevard | $125,000 | High |
| 116 | Broadway, 3rd Ave NE to 3rd Ave SE | Sharrows | Sharrows | $74,250 | High |
| 117 | Broadway, 3rd Ave SE to 9th Ave SE / US 212 | Buffered bike lane | Buffered Bike Lane | $0 | High |
| 118 | 11th Street E, 14th Ave NE to 9th Ave SE / US 212 | Conventional bike lane | Conventional Bike Lane | $270,000 | High |
| 119 | 19th Street SE, 14th St NE to 9th Ave SE / US 212 | Buffered bike lane | Buffered Bike Lane | $370,000 | High |
| 120 | E Kemp Ave, 21st St NW to 19t St SE | Bike boulevard | Bike Boulevard | $750,000 | High |
| 122 | 3rd Ave NW, 21st NW to 19th St NE | Buffered bike lane | Buffered Bike Lane | $135,000 | High |

### Table 35: Sidewalk Infill Costs by Time Frame

| Time Frame | Cost (2020 $) | Cost (YOE $) |
|---|---|---|
| **Short-term (2020 – 2025) Sidewalk Infill** | $1,013,455 | $1,090,000 |
| **Mid-term (2026 – 2035) Sidewalk Infill** | $1,378,190 | $1,880,000 |
| **Long-term (2036 – 2040) Sidewalk Infill** | $1,920,405 | $3,270,000 |




# PROPOSED LONG-RANGE BIKE AND PEDESTRIAN PROJECTS

FIGURE 32

### Recommended Transit Projects

Input received during the public involvement activities of the MTP update indicated local support for a transit system that reflects a fixed-route bus system that would not require advance notice for service. A Transit Development Plan (TDP) can assist Community Transit assess current transit operations and evaluate different solutions to current transit issues, including the feasibility of a fixed-route bus system.

### Recommended Air Projects

While no specific improvements for the Watertown Regional Airport are identified in the MTP update, it is advised that the City of Watertown continues supporting and enhancing access and connectivity of the multi-modal system to the airport facilities.

# Public Involvement

Public involvement played a critical role in the development of this plan and in shaping the future transportation system. While public involvement events are traditionally held in-person, restrictions on public gatherings related to the COVID-19 pandemic resulted in a series of online meetings and surveys.

## Public Meeting #1

The first public meeting was held via an online format which was open for review and comment from January 2nd through January 31st, 2021. The public meeting was advertised in local media, Watertown Public Opinion and Coteau Shopper, the MTP project website, SDDOT press release and website, City of Watertown's website, and the City's Facebook page.

Attendance for online meeting is summarized below. The intent of this online meeting was to solicit feedback from community members regarding the needs of the roadway, bicycle and pedestrian, transit, and air transportation issues and needs. Key input from the public received during the online meeting is summarized below; complete results for Public Meeting #1 are in **Appendix F**.

| | |
|---|---|
| **Total Page Views:** | 233 |
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| **Total Users:** | 246 |
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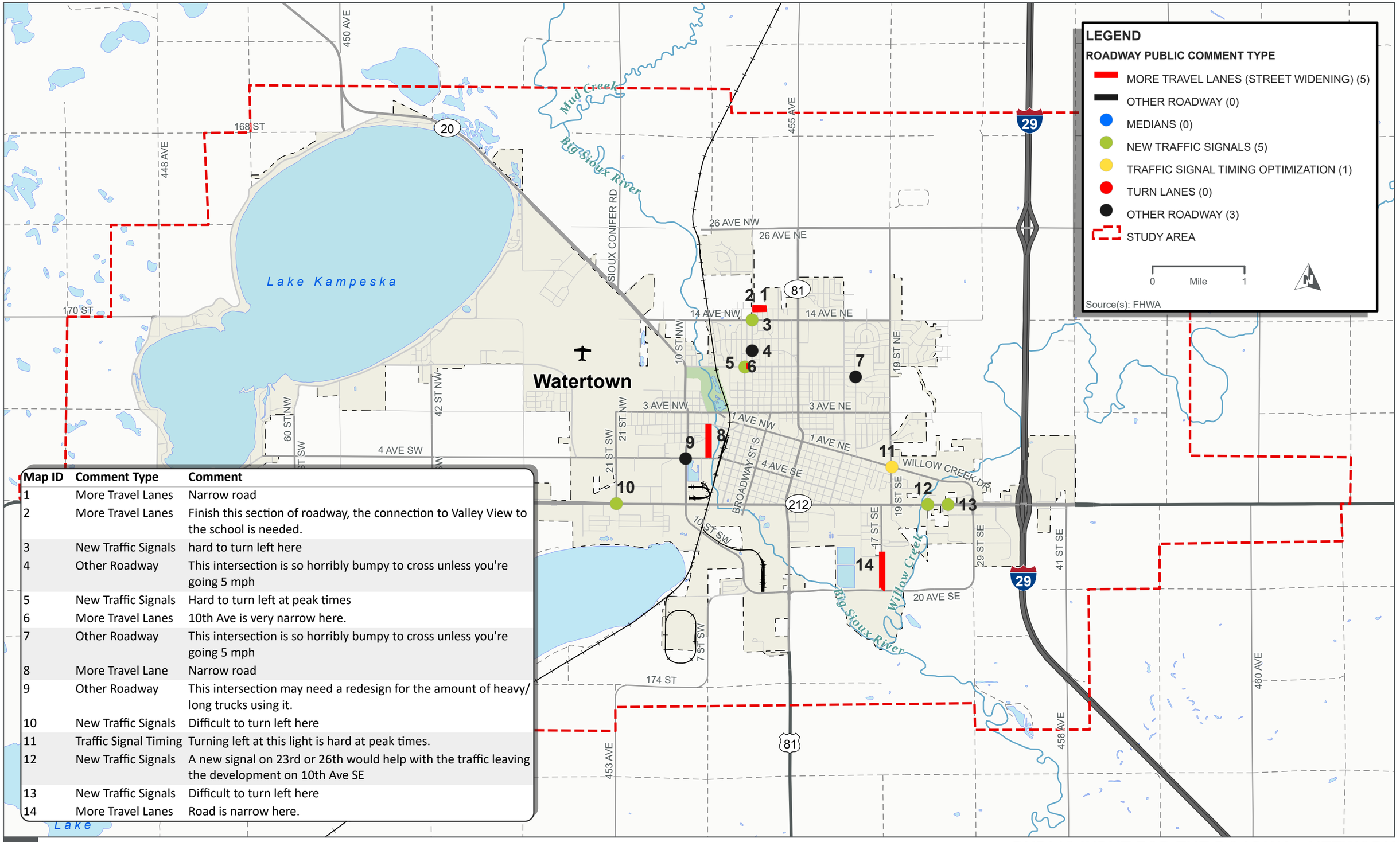
### Results

#### Roadway Needs

Attendees of Public Meeting #1 shared ideas for solutions to the most pressing roadway needs facing the City of Watertown. The solutions included:

- More travel lanes (street widening)
- New traffic signals
- Traffic signal timing optimization / coordination
- Turn lanes
- Medians / access control

**Figure 33** shows the comments and target location of participant identified issues / recommendations for the roadway system.




| Map ID | Comment Type | Comment |
|---|---|---|
| 1 | More Travel Lanes | Narrow road |
| 2 | More Travel Lanes | Finish this section of roadway, the connection to Valley View to the school is needed. |
| 3 | New Traffic Signals | hard to turn left here |
| 4 | Other Roadway | This intersection is so horribly bumpy to cross unless you're going 5 mph |
| 5 | New Traffic Signals | Hard to turn left at peak times |
| 6 | More Travel Lanes | 10th Ave is very narrow here. |
| 7 | Other Roadway | This intersection is so horribly bumpy to cross unless you're going 5 mph |
| 8 | More Travel Lane | Narrow road |
| 9 | Other Roadway | This intersection may need a redesign for the amount of heavy/ long trucks using it. |
| 10 | New Traffic Signals | Difficult to turn left here |
| 11 | Traffic Signal Timing | Turning left at this light is hard at peak times. |
| 12 | New Traffic Signals | A new signal on 23rd or 26th would help with the traffic leaving the development on 10th Ave SE |
| 13 | New Traffic Signals | Difficult to turn left here |
| 14 | More Travel Lanes | Road is narrow here. |

**PUBLIC INPUT FOR THE ROADWAY NETWORK**

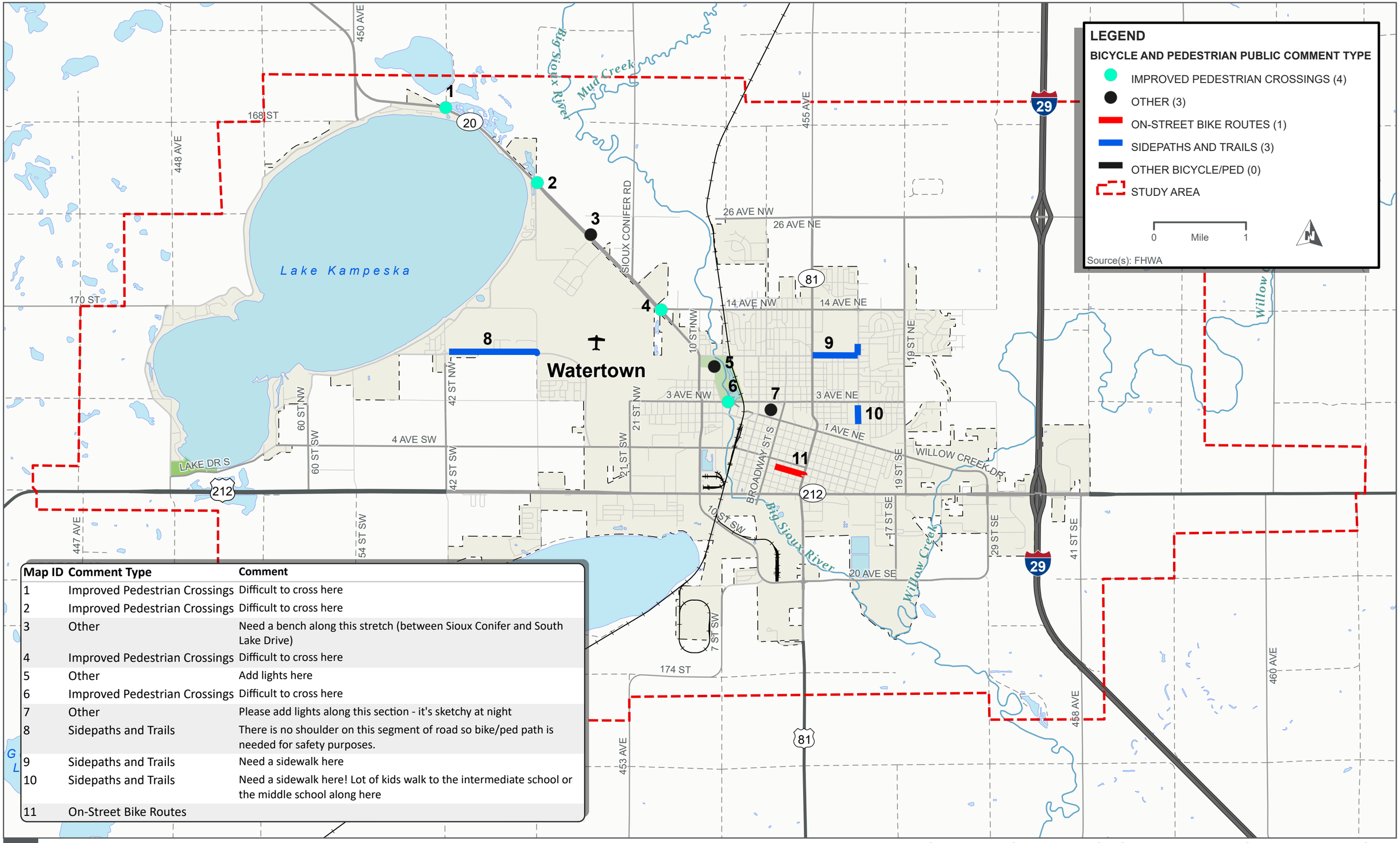
FIGURE 33

### Bike and Pedestrian Needs

Similar to the roadway network, meeting attendees were asked to offer input regarding potential solutions for addressing bicycle and pedestrian issues throughout the city. The solutions proposed by the attendees included:

- Improved pedestrian crossings
- On-street bike routes
- Sidepaths and trails

**Figure 34** shows the comments and target location of participant identified issues / recommendations for the bicycle and pedestrian system.




| Map ID | Comment Type | Comment |
|---|---|---|
| 1 | Improved Pedestrian Crossings | Difficult to cross here |
| 2 | Improved Pedestrian Crossings | Difficult to cross here |
| 3 | Other | Need a bench along this stretch (between Sioux Conifer and South Lake Drive) |
| 4 | Improved Pedestrian Crossings | Difficult to cross here |
| 5 | Other | Add lights here |
| 6 | Improved Pedestrian Crossings | Difficult to cross here |
| 7 | Other | Please add lights along this section - it's sketchy at night |
| 8 | Sidepaths and Trails | There is no shoulder on this segment of road so bike/ped path is needed for safety purposes. |
| 9 | Sidepaths and Trails | Need a sidewalk here |
| 10 | Sidepaths and Trails | Need a sidewalk here! Lot of kids walk to the intermediate school or the middle school along here |
| 11 | On-Street Bike Routes | |

## PUBLIC INPUT FOR THE BICYCLE AND PEDESTRIAN NETWORK

### Online Survey

A 17-question survey asking for feedback regarding the existing transportation system was available for participants of Public Meeting #1; 29 of the attendees submitted survey responses. Key feedback from the survey included:

- The majority of respondents felt the existing streets are in fair condition and provide fair connectivity
- New traffic signals and better pavement condition are the top two improvements to enhance the street network
- Distracted drivers and road conditions pose the greatest risks to traffic safety
- The paths and sidewalks provide fair connectivity for bicyclists and pedestrians
- Shared use paths are the most comfortable facility for bicycling
- Filling in sidewalk gaps and expanding the trail system to connect with more recreation areas would best improve the bicycle and pedestrian network
- Maintaining the existing street system and maintaining existing bicycle and pedestrian system should be the top budget priorities

The complete survey questions and responses are found in **Appendix F**.

## Public Meeting #2

A second public meeting was held to solicit public input on the future conditions, standards development, and draft recommendations for future transportation improvements. Due to restrictions on public gatherings related to the COIVD-19 pandemic, an online meeting format was used rather than a traditional in-person format. The online meeting was open for review and public comment from Saturday, May 1st through Monday, May 31st, 2021. Advertisements for the meeting were posted in the Watertown Public Opinion, Coteau Shopper, project website, SDDOT press release and website, City of Watertown website, and the City's Facebook page.

Attendance for the meeting is summarized below. For more information on Public Meeting #2, refer to **Appendix F**.

| | |
|---|---|
| **Total Page Views:** | 472 |
| **Unique Page Views:** | 410 |
| **Average Time on Page:** | 1 minute 2 seconds |
| **Top Visitor Locations:** | Watertown<br>Aberdeen<br>Sioux Falls<br>Pierre |

## Additional Public Presentations

A presentation to the City of Watertown Public Works, Finance, and Safety Committee was provided at 4:00 p.m. on Monday, May 17th, 2021 at the Watertown City Hall Council Chambers. The presentation was streamed online and broadcast through the City's public access system. The presentation provided an overview of the project including the existing conditions analysis, the safety analysis, the origin-destination analysis, the future conditions analysis and recommendations, and the standards development analysis and recommendations. Members of the Public Works Committee had the opportunity to ask questions about the work completed to date and provide input into the study. Topics of discussion/questions from the committee

included a request to provide multiple options for physical buffers/barriers for bike lanes, the inclusion of a future southern interchange in the major street plan, a concern presented regarding the speed limits/speeding on US 212 near 21st Street West, and possible additional in-person public involvement. Responses to the discussion items/questions were addressed as follows:

- Options/examples for physical barriers for bike lanes can be provided in the Draft Report
- Recommendations for interim steps/milestones towards a future southern interchange will be provided such that when growth/development dictates a need the City can be prepared with necessary information
- A speed study was not conducted as part of the MTP, however there were no specific crash trends with regard to speed identified in the US212 corridor in the vicinity of 21st Street West
- The online public involvement was a result of the COVID-19 restrictions during the study, however it was noted that online meetings appeared to be very well attended

# Appendix A

# Baseline Conditions

# Appendix B

# Standards Development

# Appendix C

# FHWA Policy on Access to the Interstate System

# Appendix D

# Future Conditions Analysis

# Appendix E

# Recommended MTP Projects

# Appendix F

# Public Involvement

# Appendix G

# Methods and Assumptions

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