TH60 CORRIDOR STUDY

Existing & Future Conditions

April 2020

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INTRODUCTION

Trunk Highway (TH) 60 and the surrounding roadway network play an important role in maintaining Windom's vitality and economic viability. The goal of the transportation network is to provide multimodal amenities that enhance quality of life, while also serving regional and local transportation needs. This study will develop a long-term vision for TH 60 that will support existing businesses and future economic development, safely accommodate all modes of transportation, encourage pedestrian and bicycle movements, and sustain community support.

TH 60 is a principal arterial within the study limits that carries up to 13,500 vehicles per day. The 4-lane highway serves as the primary route through the commercial district in the City of Windom, which presents a challenge between the mix of through travelers, local traffic, local access, and bicyclists/pedestrians trying to use or cross the highway.

TH 60 is also a major economic driver in Windom and in the region. TH 60 has and will continue to foster economic growth through a commerce-friendly corridor that ships goods, connects major markets in the Midwest, and provides access to local businesses.

STUDY AREA AND BACKGROUND

This study will evaluate segments of TH 60, TH 62, and US 71 in Windom:

- TH 60 from 490th Avenue/John Caldwell Drive to 480th Street on the Cottonwood County line.
- TH 62 from the Des Moines River bridge to TH 60
- US 71 N from Opportunity Drive/County State Aid Highway (CSAH) 15 to TH 60
- US 71 S from TH 60 to CSAH 26

This study will also evaluate 28 intersections along those segments:

- TH 60 and 6th Avenue S
- TH 60 and 3rd Avenue S
- TH 60 and US 71 S
- TH 60 and 1st Avenue S
- TH 60 and 1st Street
- TH 60 and TH 62
- TH 60 and 7th Street
- TH 60 and 8th Street
- TH 60 and 9th Street
- TH 60 and 10th Street
- TH 60 and 11th Street
- TH 60 and 12th Street
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- TH 60 and 14th Street
- TH 60 and 15th Street
- TH 60 and 16th Street
- TH 60 and US 71 N
- TH 60 and 1st Avenue N
- TH 60 and 24th Street
- TH 60 and John Caldwell Drive
- US 71 N and Langley Street
- US 71 N and 19th Street
- US 71 N and Hospital Drive
- US 71 N and 4th Avenue
- US 71 N and Opportunity Drive
- US 71 S and CSAH 25
- US 71 S and CSAH 26
- TH 62 and 4th Avenue

The study segments and intersections are shown in Figure 1.

Figure 1: Study Corridor and Key Intersections

Source : MnDOT, ESRI

November 2019

Construction History

Over approximately the last 20 years, there have been significant investments in the study corridors to improve pavement quality, safety, and operations.

- Along TH 60, a mill and overlay was completed in 2019 to improve ride quality. This project also improved storm sewer and curb ramps to meet the Americans with Disabilities Act requirements.
- Along US 71 N, turn lanes were added at the Opportunity Drive intersection in 2013 and a mill and overlay was completed in 2002.
- Along US 71 S, a mill and overlay was completed in 2001.
- Along TH 62, the roadway was fully reconstructed in 1998.

Planned Construction

Every year, MnDOT develops their Capital Highway Investment Plan, which identifies the next 10 years of projects. These projects are identified to meet the goals and objectives of the State Highway Investment Plan and is based on a reasonable level of expected funding. Over the next 10 years, MnDOT District 7 expects to invest roughly $857 million in state highway projects, including the following planned projects in the study area, as shown in Table 1.

Table 1: Planned Construction Projects in Study Area

Segment	Location	Project	Length	Cost	Year
US 71 N	TH 60 to TH 30	Mill and Overlay	12.3 Miles	$4.0 M	2020
US 71 S	TH 60 to CSAH 38 (Jackson County)	Mill and Overlay, Bridge Replacement	17.7 Miles	$9.3 M	2020
TH 60	Des Moines River Crossing	Bridge Replacement	NA	$1.2 M	2025

Previous Studies

There were a number of previous planning efforts that have been recently completed in Windom and along the study segments. These plans will provide important background information to support the development of this planning study.

Windom Comprehensive Plan (2018)

The 2018 Windom Comprehensive Plan provides a long-term decision guide for multiple topics affecting Windom, including population growth and change, future land use, the economy, transportation, and others. This plan also incorporated an active living component, both as a transportation issue and an economic development issue.

The comprehensive plan identified multiple transportation issues along TH 60. Perceived safety issues, for pedestrians and vehicles, were identified at the following intersections:

- TH 62 and 4th Street
- TH 60 and 6th Street
- TH 60 and 10th Street
- TH 60 and 12th Street
- TH 60 and 16th Street

The plan indicated their preference for a roundabout at the intersection of TH 60 and US 71 N. This plan also discussed the need to balance access management between MnDOT's standards and the City's goals for economic development.

The comprehensive plan documented sidewalk gaps and crossing locations this corridor study may be able to address:

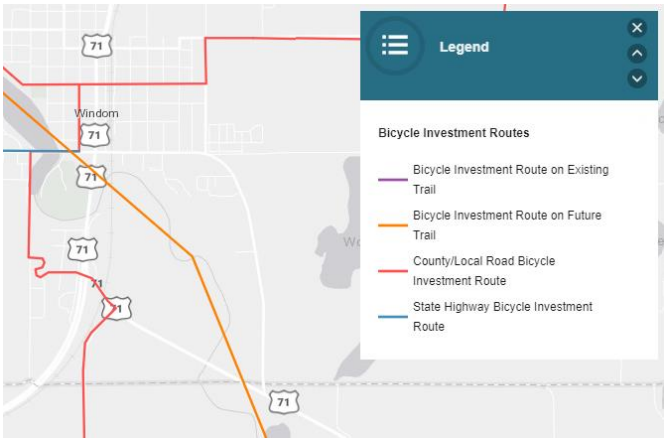
- Missing sidewalk along 3rd Avenue (frontage road to TH 60) between 1st Street and Cindy Street
- Missing sidewalk along 1st Avenue (frontage road to TH 60) between 12th Street and 6th Street
- US 71 crossing between 19th Street and Hospital Drive
- TH 62 crossing at 4th Avenue
- TH 60 crossings at signal-controlled intersections with 6th Street and 10th Street
- TH 60 crossing at 16th Street

MnDOT District 7 Bicycle Plan (2016)

In 2016, MnDOT completed the Statewide Bicycle System Plan that included goals, strategies, and actions to support bicycling across Minnesota. One of the goals is to develop a connected network of state bicycle routes. The District 7 Bicycle Plan builds on the statewide plan by identifying specific bicycle investment routes and facility types that meet the overall goals of the plan.

The District 7 Bicycle Plan acknowledged TH 60, US 71, and TH 62 within the City of Windom as being high stress routes for bicycle facilities and

Figure 2: Bicycle Investment Routes Identified in D7 Bicycle Plan



undesirable for some riders. The plan identified 10th Street, 3rd Avenue, and TH 62 as the bicycle investment routes through Windom.

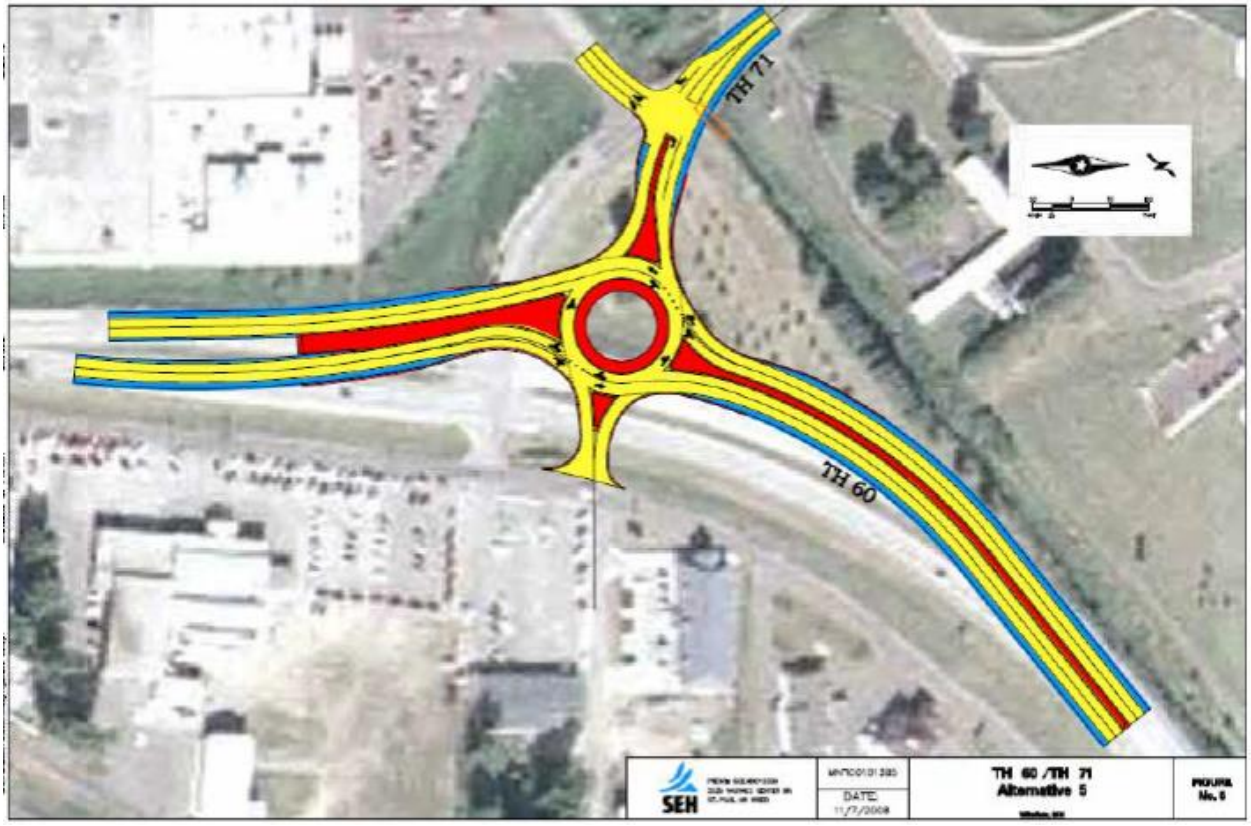
Des Moines River Valley State Trail Master Plan (2013)

The Minnesota Department of Natural Resources completed this study to identify trail opportunities along the Des Moines River Valley to generally follow the Des Moines River from the Iowa border through Jackson and Windom and connect to the Casey Jones State Trail in Currie. This plan identified two potential trailheads at Island Park along TH 62 and Tegels Park. The plan did not identify any specific route through Windom but did identify TH 60, US 71, and the railroad as barriers for any future trail. TH 62 was identified as a potential interim road route because it provides a direct east-west route between Windom and Talcot Lake County Park.

TH 60 Traffic Study (2008)

MnDOT's 2008 TH 60 Traffic Study evaluated improvements to the intersections of TH 60 and US 71 N and TH 60 and 16th Street to accommodate future traffic volumes and improve pedestrian connections across TH 60. This project ultimately identified the roundabout alternative, shown in Figure 3, because it did not impact the existing frontage road or access. No recommendation was made at TH 60 and 16th Street.

Figure 3: Roundabout at TH 60 and US 71 as shown in the 2008 TH 60 Traffic Study

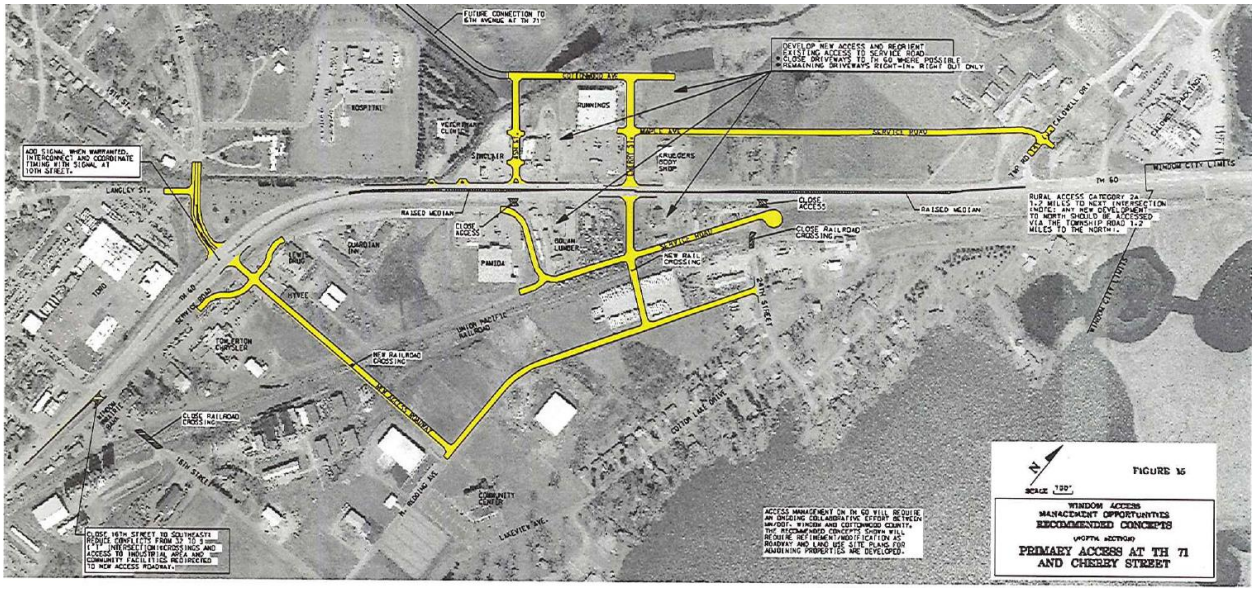


TH 60 Access Management Plan (2002)

The 2002 TH 60 Access Management Plan was a coordinated effort between MnDOT and the City of Windom to address land use access along the corridor to improve mobility and retain reasonable and safe access to and from local streets and businesses. Throughout the plan development the City of Windom and MnDOT were able to implement a number of "early action" driveway closures that were completed before the study was finalized. Other access management plans identified in this study were postponed until a new comprehensive plan could be complete. It does not appear that any of the major recommendations have been implemented:

- At the TH 60 and US 71 S intersection, the recommendation was to close the nearest accesses north and south of the intersection and construct frontage roads.
- Between the TH 60 and TH 62 intersection and the TH 60 and 11th Street intersection multiple access points were recommended for closure or access modification (right-in/right-out).
- Along TH 60 between US 71 N and John Caldwell Drive, the recommendation was to construct a series of new frontage roads to close access along TH 60.

Figure 4: Recommended Access Relocations and Frontage Roads between US 71 and John Caldwell Drive



DEMOGRAPHIC TRENDS

Population

With a population of 4,550, Windom is the largest city in Cottonwood County. The population has remained relatively stable since 1980, despite a population decrease of 21.3 percent in Cottonwood County. Historic population change is shown in Table 2.

Table 2: Windom Historic Population Change

	1980	1990	2000	2010
Windom	4,666	4,283	4,490	4,646
Cottonwood County	14,854	12,694	12,167	11,687

Age

The median age of Windom is slightly younger than Cottonwood County, but significantly older than the State of Minnesota. More than 25 percent of Windom's population is under 19 years old and 21 percent of Windom's population is 65 or older. Age statistics are shown in Table 3.

Table 3: Age Statistics

Age	2000	2010	% Change
Under 19	1,178 26.2%	1,183 25.4%	+0.4%
Over 65	976 21.8%	985 21.2%	+0.9%
Windom Median Age	41.8	42.6	+1.9%

Race

The community of Windom remains primarily white. In 2010, 88 percent of the population identified as white. This is down around six percent since 2000. The Hispanic population has quadrupled since 2000. Race statistics are shown in Table 4.

Table 4: Race Statistics

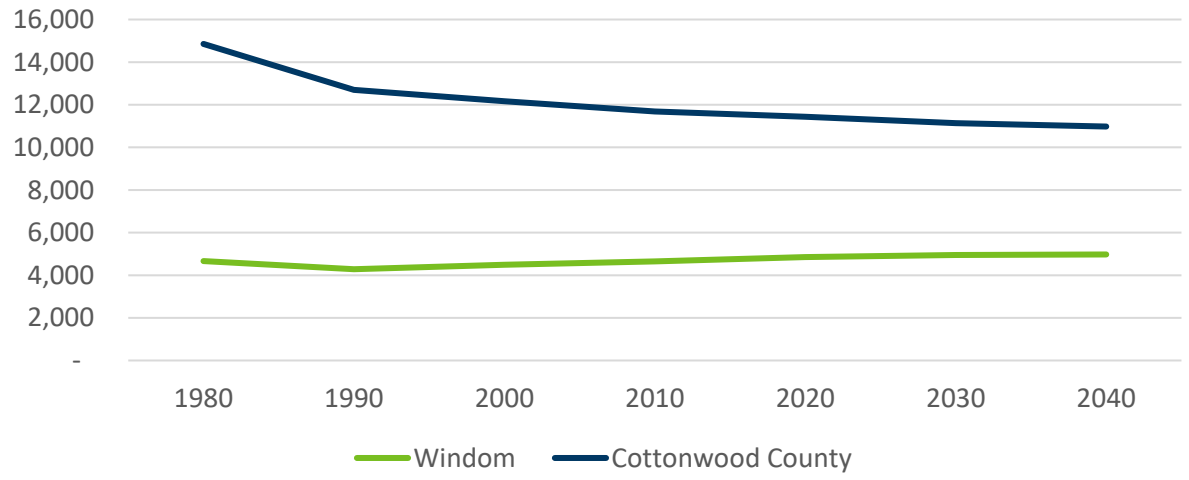
Race	2000	2010	% Change
White	4,333 96.5%	4,093 88.2%	-5.5%
Hispanic or Latino	71 1.6%	373 8.0%	+425.4%
Other	86 1.9%	180 3.9%	+109.3%

Expected Population Growth

The last Windom Comprehensive Plan worked with the Minnesota State Demographic Center to develop population projections from 2010 through 2030. These projections expect the City of Windom to grow modestly from a population of 4,646 in 2010 to 4,850 by 2020 (4.4 percent increase) and 4,950 by 2030 (2.1 percent increase). This growth is despite expected population declines in Cottonwood County from 11,687 in 2010 to 11,000 in 2030. This is a 5.9 percent decrease from 2010 to 2030.

The planning horizon for this corridor study is 2040. Using the historical data from 1980 and the Minnesota State Demographic Center population projections for Cottonwood County and the City of Windom, a linear projection can be made to 2040. This shows just a slight increase in Windom's population to 2040 to 4,975. This extended projection is unlikely to change traffic patterns, trends, and projections. The population projection to 2040 is shown in Figure 5.

Figure 5: Population Projections

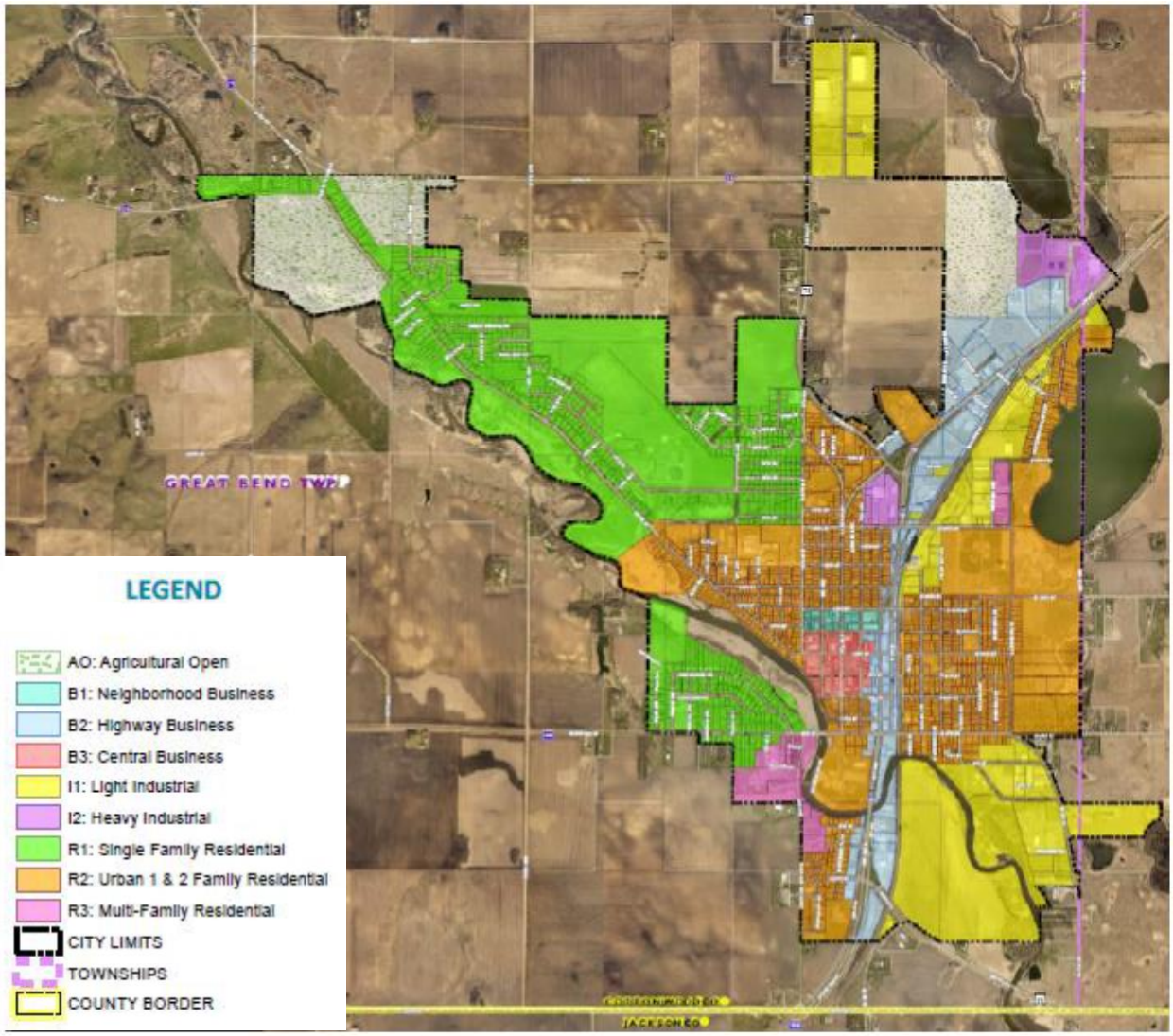


LAND USE

Land use can have many implications on the efficiency of the transportation network. For example, a primarily industrial corridor will have peak traffic flows often associated with shift work and must accommodate heavy truck movements while a primarily residential corridor will have strong peaking and directional characteristics as people go to-and-from work and will also see higher bicycle and pedestrian activity.

- Most of TH 60 in the study area is highway business, a zone designed to provide areas for commercial establishments and accommodate automobile-oriented customers, with a focus on safe access and egress to adjacent roads and highways.
- TH 62 is primarily Urban 1 and 2 family residential, which provides for low and medium density residential development.
- Along segments of US 71 and TH 60 there are pockets of light and heavy industrial to accommodate varying types of industrial uses without adversely affecting other nearby or dissimilar uses and activities.

Figure 6: Existing Land Use in Windom



Source: Windom Comprehensive Plan

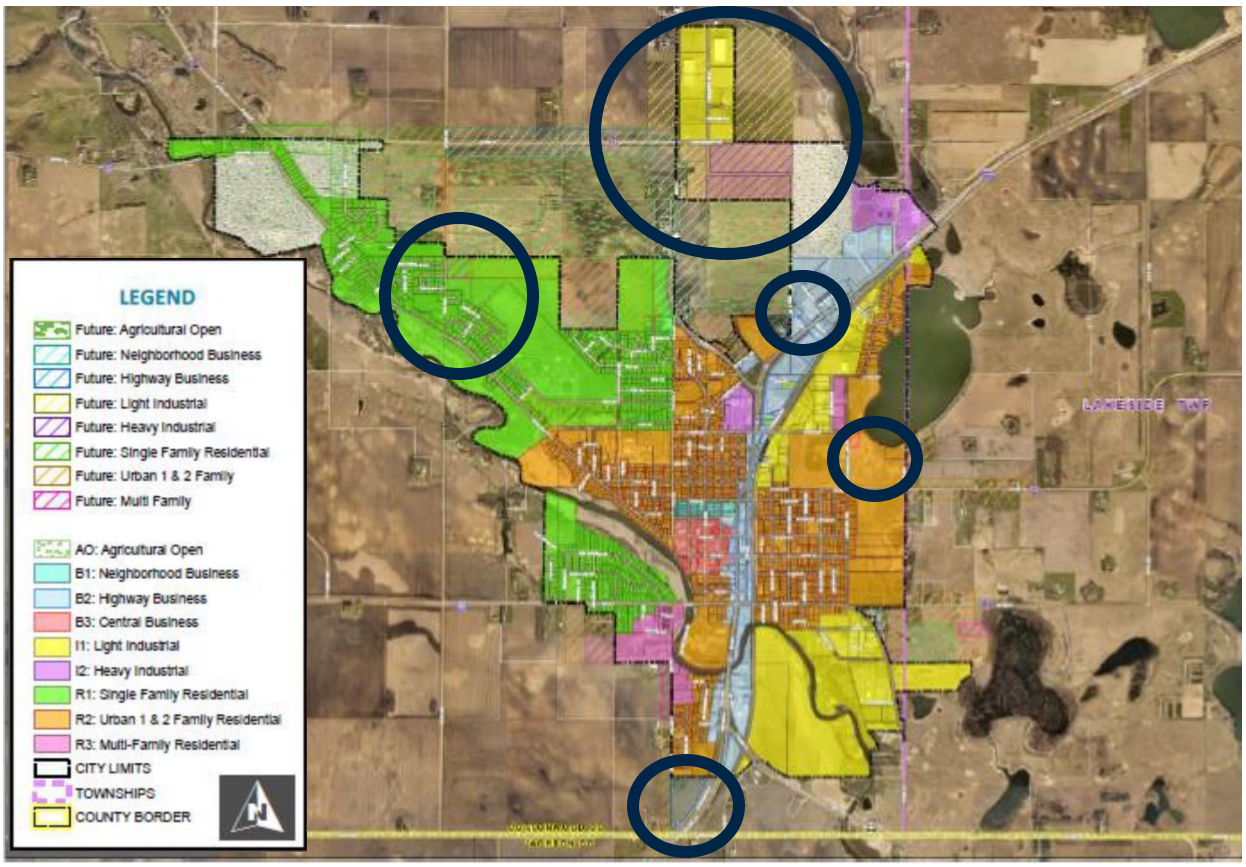
Future Land Use, Growth Areas, and Planned Developments

Future land use plans completed during the last comprehensive plan (2018) expect industrial and business growth to occur primarily on the northern edge of Windom, adjacent to the US 71 and County Road 15 corridors. Small pockets of residential growth were planned along the TH 62 corridor west of the current city limits. No major zoning changes were made to the existing development within Windom.

Within city limits and along the study corridors, there are infill development opportunities the City of Windom has identified:

- The former Shopko property along TH 60.
- The East Highway 60 Development Plan that would make around 14 acres of property available for development along TH 60 between Runnings and Windom Wash.
- The River Bend Center at the intersection of TH 60 and TH 62/County Road 17 has a three-acre lot with 1.4 acres of buildable space.

Figure 7: Future Land Use in Windom with Growth Areas Circled in Blue



Source: Windom Comprehensive Plan

ENVIRONMENTAL CONDITIONS

This section contains an overview of the current environmental conditions in and around the City of Windom that could affect alternatives development associated with the TH 60 corridor.

Environmental conditions, or affected environment, are documented in the Planning and Environmental Linkages (PEL) process (FHWA, 2020). This documentation assists in the development of the potential future National Environmental Policy Act (NEPA) documentation as well as to assist in identifying potential constraints when developing build alternatives. The corridor assessment includes the TH 60 corridor and adjacent properties including associated sidewalks, intersections, and properties.

Existing Conditions

The study area consists of TH 60, US 71, and TH 62 corridors for which existing conditions are being described to identify possible constraints that may impact or be impacted by the project. A desktop assessment of the corridor was completed using a variety of federal, state, and local resources to identify potential environmental constraints and impacts that projects within the corridor could encounter. If project alternatives are developed and refined, this assessment of potential impacts would be refined.

LAND USE

Windom is a small rural farming community that is also a regional hub in the agricultural area of southwestern Minnesota. Windom is situated between Mankato and Worthington and offers multiple services and commercial activities. TH 60 connects to the I-90 corridor and on to South Dakota. The study area consists of urban development through the central portion of Windom with agriculture at the north and sound end of the corridor.

Adjacent to the highway are a mix of commercial enterprises supportive of the agricultural economy. Businesses along the highway include banks, restaurants, grocery and hardware stores, gas stations, motels, and a car dealership. There are multiple agricultural oriented businesses such as auto parts stores and farm equipment suppliers. Large manufacturing plants and distribution centers operate in Windom:

- Toro Company manufacturing plant
- Comfrey Farm Prime Pork meat processing plant
- New Vision Co-op grain and feed supplier
- Fast Ag Solutions
- Ag Builders of Southern Minnesota Inc.
- Fortune Transportation

Windom is a regional government hub with the presence of Windom Family Medical Center (hospital and medical clinic), Windom Public School District, Windom Area High School, elementary schools, Cottonwood County Sheriff and Court Administration offices, Windom Arena, post office, public library, churches, cemeteries, and parks. The MN Departments of Natural Resources (MnDNR) and Transportation (MnDOT) have offices in Windom as well as the US Fish and Wildlife Service. Police and fire departments are in downtown Windom.

Union Pacific operates a freight rail line located approximately two blocks east of TH 60/71 (2nd Avenue) through the city. The railroad crosses over US 71S at the south end of town.

Windom Municipal Airport is located three miles north of downtown Windom and can be accessed from either TH 60 (from the east) or US 71N (from the west).

Windom has a municipally owned telecommunications company providing citywide fiber-to-the-home or business (Windom Comp Plan 2018).

Single family residential areas are located along US 71N on the northwest side of the City. There are single family houses on the west side of the highway, with driveways that access the highway. There are a limited number of multi-family residences located within the corridor. Along TH 60, there are a number of single-family dwellings that are for sale as commercial property.

PRIME AND UNIQUE FARMLANDS AND SOILS

Soil characteristics are important considerations for preventing erosion of soil during and after construction projects. Most soil types in the area are made up of well-drained loams with sandy properties. There is an area in the vicinity of the Des Moines River with soils having hydric characteristics. This area coincides with a segment of the river that is prone to flooding. The hydric soils may result in stability challenges when the bridge is replaced.

Within the study area, there are soils located in and adjacent to the TH 60 and US 71 corridors considered prime farmland (US Department of Agriculture Natural Resources Conservation Service). Much of the land area adjacent to the corridor, however, consists of commercial, industrial, and residential development. The areas of remaining agricultural land follow

- US 71 north from TH 60 to the north end of town
- US 71 and Hwy 60 heading south from Windom

These areas are shown in Figure 8.

REGULATED MATERIAL/WASTE

Regulated materials/waste and contaminated properties can be hazardous to human health and the environmental well-being of an area. The Environmental Protection Agency (EPA) is the federal agency that regulates the remediation of hazardous waste and contaminated areas. In addition to the EPA, the Minnesota Pollution Control Agency (MPCA) is responsible for monitoring environmental quality and enforcing environmental regulations, as well as finding and cleaning up leaks and spills that affect the health and the environment in Minnesota.

A resource developed by the MPCA to allow the public to identify and track information on potentially hazardous sites is called “What’s in My Neighborhood”. This resource provides information regarding potentially contaminated sites and environmental permits and registrations in the State of Minnesota.

A review of this database for the TH 60 corridor showed a variety of environmental permits and registrations for underground tanks related to feed mills, fueling stations, stormwater permits, and hazardous waste generators (related to businesses in the corridor such as laundromat, hardware stores, drugstores, auto part stores, manufacturing etc.) adjacent to the highway. There were a few locations within the corridor that required petroleum remediation due to leaking underground tanks related to fueling stations.

To fully determine the extent of potential contaminated properties within the TH 60 corridor, it is recommended a Phase I Environmental Site Assessment be completed prior to any construction activities in the corridor. These sites are shown in Figure 8.

ENVIRONMENTAL JUSTICE

The goal of the Environmental Justice (EJ) analysis is to determine whether the proposed project would result in disproportionately high and adverse impacts on minority and/or low-income populations with respect to human health and the environment. According to the 2018 US Census Bureau's American Community Survey estimates

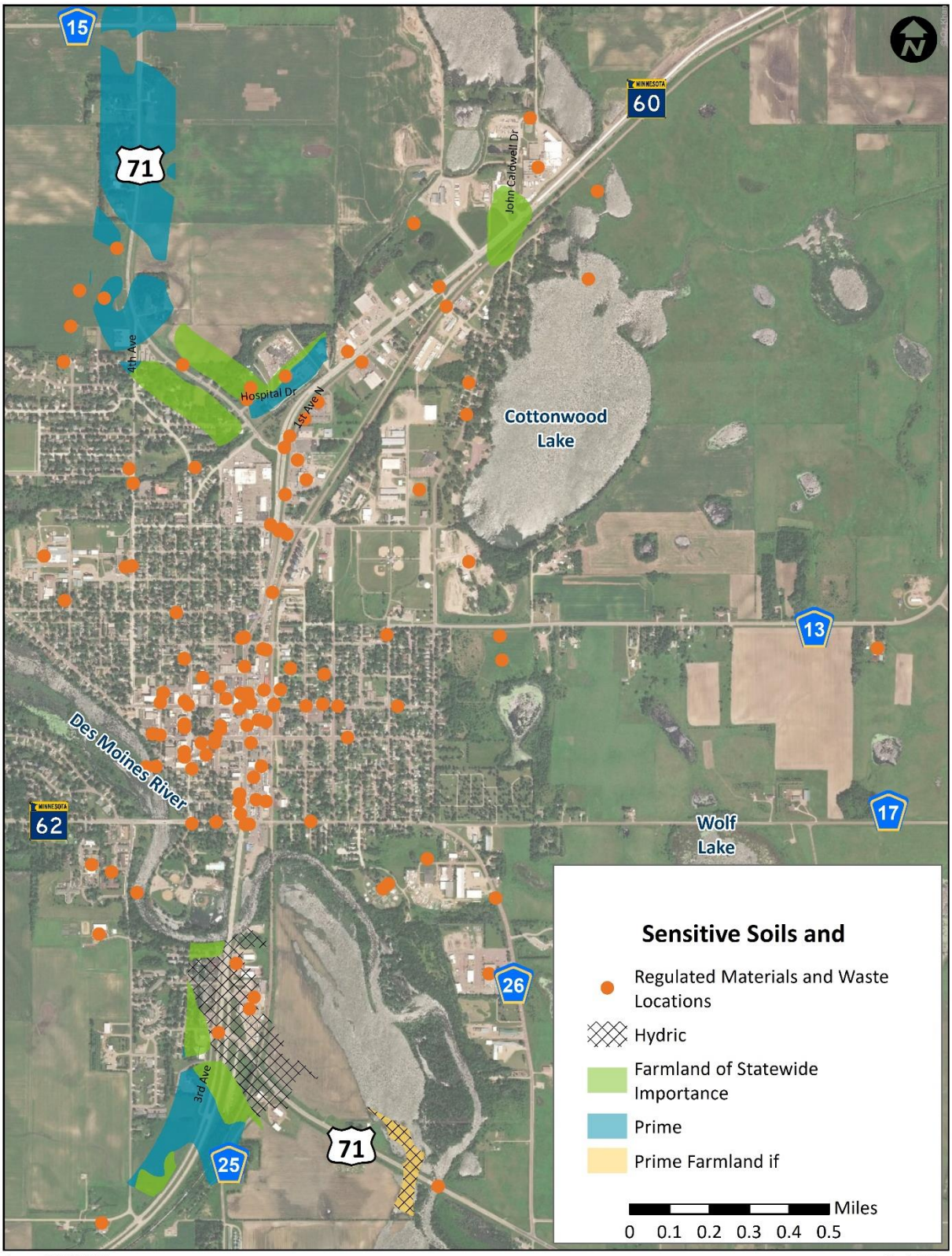
- 22.6 percent of individuals in Windom are below the poverty level, which is greater than Cottonwood County (10.4 percent) and the state level (9.6 percent).
- Median household income for residents of Windom was $36,642, approximately $16,700 less than the Cottonwood County median household income of $53,354.
- The City has a minority population of 16.6% which is similar to Cottonwood County.

Table 5: Environmental Justice Populations

	Median income	Persons in Poverty (%)	Percent Minority
Windom	$36,642	22.6%	16.6%
Cottonwood	$53,354	10.4%	14.7%
Minnesota	$68,411	9.6%	19.5%

Should impacts during construction occur along the corridor happen to be limited to the area where the identified environmental justice population is located, this population has the potential to experience disproportional impacts on a temporary basis. However, non-environmental justice populations along the corridor would be subject to similar impacts during construction activities when construction occurs adjacent to those populations. Permanent impacts of projects along the corridor are intended to improve the transportation corridor for all users. Improvements along the corridor are not anticipated to split existing neighborhoods, promote social isolation of a particular population, reduce neighborhood community access or mobility, or promote the separation of residences or sections of a neighborhood from community facilities or services. Temporary and permanent impacts to the environmental justice populations will be determined during future environmental review and project development.

Figure 8: Sensitive Soils and Sites



PEDESTRIANS AND BICYCLISTS

Pedestrian and bicyclist generators such as parks, schools, residential areas, and the downtown commercial center are in the vicinity of the Corridor. Windom has an extensive network of sidewalks within the urban core. Segments of the corridor, particularly the northern and southern ends, lack pedestrian and bicycle facilities. An *Active Living Plan* was developed in conjunction with the City's 2018 Comprehensive Plan. This plan identified gaps and improvements that would improve connectivity and safety for pedestrians and bicyclists.

- An unspecified midblock crossing of TH 60
- Crossing safety improvements at Highway 62 and 4th Avenue
- Improvements at the 3rd Avenue to Cindy Street sidewalk.

The Corridor design has the potential to improve the pedestrian and bicycle network, as well as safety conditions.

WATER RESOURCES

Surface Waters and Water Quality

The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act of 1977, provides the authority to establish water quality standards, control discharges into surface and subsurface waters, and issue permits for discharges (Section 402) and for dredged or fill material (Section 404). The Minnesota Wetland Conservation Act (WCA) regulates development activity within designated and delineated wetlands. The Public Waters Work Permit Program regulates development activity within public waters (MnDNR administered). The Des Moines River, Cottonwood Lake, and Warren Lake are designated public waters.

The corridor and waters discharging into the Des Moines River are under the jurisdiction of the Cottonwood Soil and Water Conservation District. The corridor is located within the Des Moines River Headwaters Watershed, also known as the West Fork Des Moines River Watershed. The Heron Lake Watershed District was formed in 1970 to protect and improve water resources within its boundary of which the West Fork Des Moines River is a part.

The U.S. Environmental Protection Agency maintains a list of impaired waters under Section 303(d) of the Clean Water Act. Impaired waters are those that do not meet state water quality standards or those that do not achieve designated uses. Every two years, MPCA creates a list of impaired waters that do not meet water quality standards (MPCA). The Des Moines River does not meet water quality standards for "supporting recreation or aquatic life". The river has not been listed as impaired for fish consumption (e.g. high levels of mercury).

There have, however, been efforts in the past decade to reduce the pollution sources and improve the river's water quality. Studies show that these efforts have been successful and water quality is improving. These efforts are continuing. Improvement alternatives can be developed to minimize water quality impacts and avoid aquatic habitat loss.

Other effects, such as impacts to water quality from highway stormwater runoff, and evaluation of stormwater quantity should be assessed in context with the highway design. The need for, and type of, stormwater best management practices (BMPs) can be determined during the design phase.

Wetlands

There are three locations where the roadway and wetland systems coincide. Wetlands associated with the Des Moines River are located in the coincident section of the TH 60/US 71S intersection south of the intersection with TH 62. A second wetlands group (wet ditch) crosses TH 60 between the south end of Warren Lake and the northern wetland complex of Cottonwood Lake (across the highway from the John Caldwell Drive intersection at TH60). The third wetlands network, Perkins Creek, crosses TH 71. Perkins Creek, is a waterway extending southwest from Warren Lake, immediately adjacent to TH 60 (for approximately a quarter of a mile), where it crosses under US 71 northwest of TH 60 (at Langley Street), and ends as a tributary to the Des Moines River.

A field aquatic resources delineation was completed in 2018 as part of the overlay project and may need minor updates depending on the extent of any proposed improvements. Impacts to any of the identified surface water resources will require permits pursuant to the regulations above. In general, impacts to wetlands must be avoided, minimized, and mitigated in sequence.

Floodplains

According to the Federal Emergency Management Flood Map Service Center accessed in December 2018, FEMA has not digitally published or updated the flood hazard elevations since 1989. Therefore, the flood hazard area for the corridor is not determined. Based on the existing paper map published by FEMA, three floodplain areas occur within the Corridor.

- The Des Moines River, which flows south and east to Iowa and eventually to the Mississippi River, has a substantial flood footprint where the river crosses TH 62, then flows under TH 60 and southeast to US 71S. The floodplain area extends north of the intersection of TH 60 and US 71S and TH 62 to about 11th Street.
- The second floodplain occurs at the City's northeastern border where Warren Lake (a reservoir) drains southeast to Cottonwood Lake. The flood zone crosses TH 60.
- The third floodplain crosses US 71 N (480th Avenue) as Perkins Creek at the bridge.

The Des Moines River floodplain map is from 1989 and the City has been involved in updating the floodplain data and determining the extent of the regulatory floodway. The flood area is delineated on the 1989 Flood Insurance Rate Map (FIRM)- Panel Number 270090 0001 C, which indicates that during certain conditions flooding covers TH 60/US 71 at the locations listed above.

Design alternatives must be consistent with FEMA regulations, with floodplains identified, in order to minimize the impact of floods on the community. Impacts to the floodplain from road or bridge crossings that could affect flood flows and elevations must also be considered.

The northern part of the corridor is on the edge of the local wellhead protection area. Water resources along the corridor are shown in Figure 9.

VEGETATION, WILDLIFE, AND FISH

The corridor, outside of the urban core, is bordered by agricultural land, predominantly for corn and soybeans with small pockets of pasture or rangeland. A very small percentage of land is undeveloped forest and wetlands. Vegetation in the developed areas (e.g., industrial land use, urban and rural housing, roads) of the city include landscaped yards, parks with deciduous tree cover, grass, and lawns.

Native aquatic vegetation and shoreland trees and shrubs along the shores of the Des Moines River provide higher quality habitat for waterfowl nesting and feeding as well as mammal and amphibian species; especially relative to the landscape surrounding Windom which is dominated by corn and soybean crops. The Cottonwood SWCD, the Heron Lake Watershed District, as well as non-profit conservation organizations have implemented projects to restore natural vegetation that will help water quality and encourage the return of native species. Areas of prairie habitat (native grassland vegetation) occur alongside the railroad at the northeast end of the Corridor. These prairie remnants associated with railroad ROW are identified throughout Minnesota. This area along TH 60 is also designated as a native plant community by the MnDNR's County Biological Survey.

The Des Moines River's aquatic habitat with the following species of fish prevalent throughout the watershed: northern pike, buffalo, carp, walleye, channel catfish, crappie, and bullhead.

An inventory of the natural habitats should occur to identify the presence of wildlife and plants. Further consultation with the MnDNR or USFWS would ensure compliance with applicable regulations and create avoidance and minimization procedures.

THREATENED AND ENDANGERED SPECIES

State

The list of species protected by Minnesota's Endangered Species Statute, include mammals, birds, amphibian/reptiles, spiders, insects and plants. A search of the MnDNR's Rare Species Guide returned 42 species for Cottonwood County. A request to the MnDNR's Natural Heritage Information System (NHIS) database would obtain known records of the species and potential habitat locations within the project. The Northern Long-eared Bat (NLEB) has not been documented as occurring in Cottonwood County, Minnesota. This is according to the MnDNR and USFWS data documenting NLEB distribution in Minnesota as of April 1, 2019. That the NLEB is not currently listed, however, does not indicate if there are currently bats in the area. An update will be published in April 2020 and would need to be considered during project development.

Federal

In addition to the wildlife species of concern in the state list, in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended, federal agencies are required to ensure:

- Any action funded or carried out by such agency must not be likely to jeopardize the continued existence of any federally-listed endangered or threatened species or species proposed to be listed.
- No such action can result in the destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary.

The species with Federal status listed on the MnDNR site include two insects and one plant:

- Dakota Skipper - butterfly
- Poweshiek Skipperling - butterfly
- Prairie Bush Clover

An inquiry via the USFWS Environmental Conservation Online System – ECOS-IPAC) website (USFWS) in February 2020 identified the following federally protected species as potentially located within the corridor[1]:

[1] As mentioned above, updates to the species listing occur periodically. Note locations of the NLEB have been determined in MN, and therefore a difference between the USFWS and the MnDNR may occur.

- Northern Long-eared Bat – Threatened
- Prairie Bush-clover – Threatened

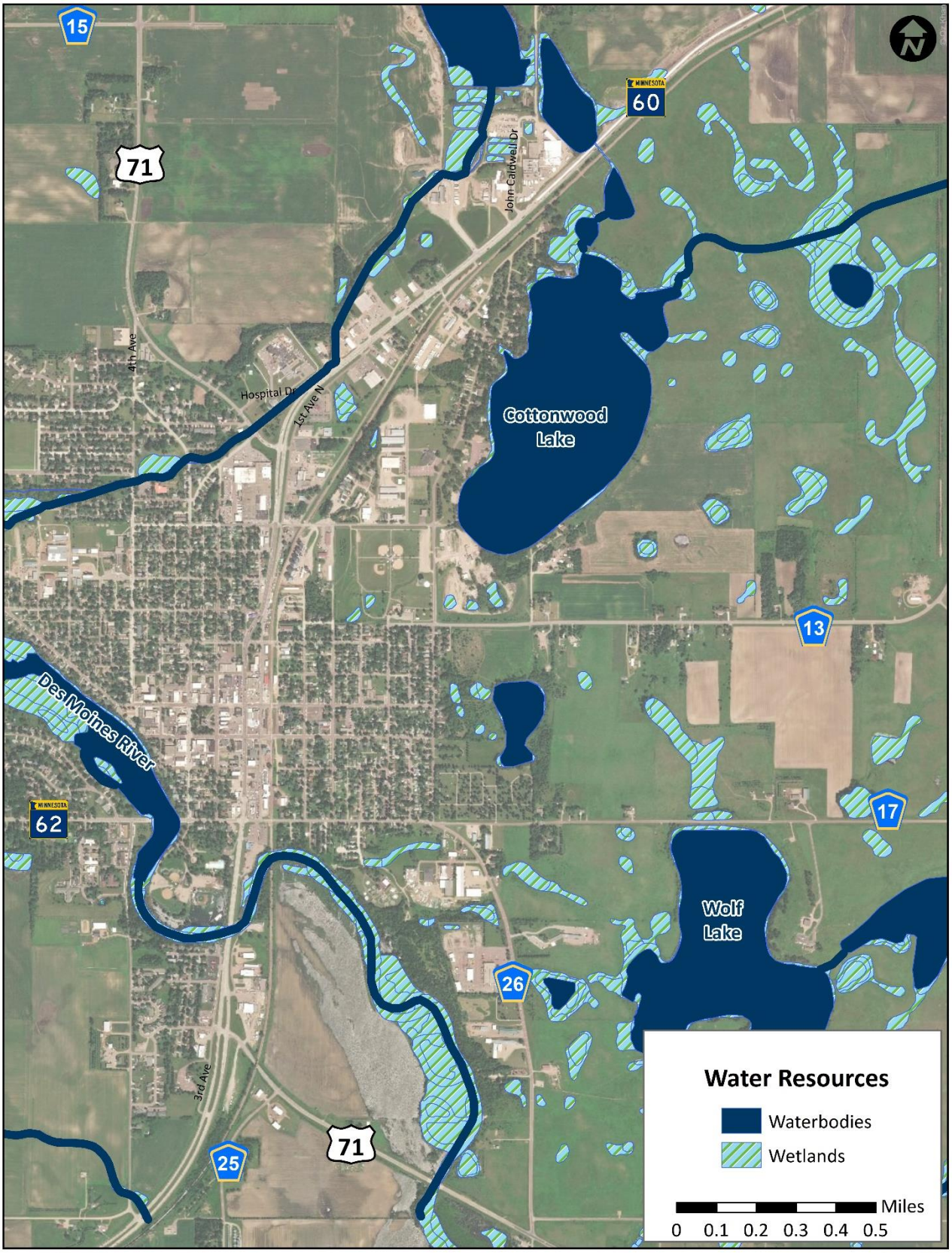
The online search using IPAC identified no critical habitats along the current highway alignments.

In addition to the species listed above, most migratory birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The birds listed below are migratory birds returned in the IPAC search:

- American Bittern
- Bald Eagle
- Black Tern
- Black-billed Cuckoo
- Bobolink
- Franklin's Gull
- Lesser Yellowlegs
- Red-headed Woodpecker
- Semipalmated Sandpiper

Because of the nearby water bodies (river and lakes) as well as the general location of the corridor within a major bird migratory corridor, the potential for migratory species is increased. Consultations with state and federal agencies would identify known occurrences. Coordination with the MnDNR and USFWS to identify wildlife and plant species of concern that may be in the area and to ensure compliance with Federal and State regulations will likely be required once improvements are identified along the Corridor. Avoidance and minimization measures will then be identified and may include timing restrictions or avoidance areas. Permits may be required for impacts on protected species.

Figure 9: Water Resources



AIR QUALITY, TRAFFIC NOISE, AND VISUAL CONDITIONS

The *Clean Air Act*, as amended, requires the EPA to establish air quality standards for pollutants considered harmful to public health and the environment by setting limits on emission levels of various types of air pollutants. Cottonwood County is considered in attainment with the National Ambient Air Quality Standards.

Noise is generally defined as unwanted sound, and can be intermittent or continuous, steady or impulsive, stationary or transient. Noise levels discernible by humans and animals are dependent on several variables, including distance and ground cover between the source and receiver, background noise levels, and atmospheric conditions. Perception of noise is affected by intensity, frequency, pitch, and duration. Noise levels are quantified using units of decibels (dBA).

Projects with FHWA involvement require a noise analysis in accordance with Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772) for "Type I" projects. These projects include new construction, substantial alteration of horizontal and/or vertical alignment, addition of through-traffic lanes (including restriping). The first step in a noise analysis is assigning each land use an activity category and identifying sensitive noise receptors (i.e., areas of frequent human use). A computer model is then used to determine whether traffic noise impacts are anticipated and if noise abatement (e.g. implementation of noise barriers) is necessary. If improvements to the Corridor would be considered Type I projects, a noise analysis would be required.

Activity categories along the corridor include residential (Category B); non-residential land uses such as parks, places of worship, Section 4(f) sites, schools, trails, radio studio, etc. (Category C or D, depending on whether frequent human use occurs outside or inside, respectively); restaurants, offices, etc. (Category E); retail, utilities, etc. (Category F); and presumably undeveloped lands that are not permitted for development (Category G). If improvements to the corridor would be considered Type I projects, a noise analysis would be required during project development for areas with activity categories B through E, and potentially for activity category G.

HISTORIC AND ARCHAEOLOGICAL PRESERVATION

Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. § 306108) requires that federal agencies consider the effects of their undertakings on historic properties. A historic property is any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP). The Section 106 review process is defined in regulations promulgated by the Advisory Council on Historic Preservation, "Protection of Historic Properties" (36 CFR Part 800). For projects without federal involvement, historic properties may be afforded protection under the Minnesota Historic Sites Act, Minnesota Private Cemeteries Act, and/or Minnesota Field Archaeology Act. Adverse effects to historic properties may occur when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the NRHP, such as physical alteration, relocation, neglect, change in use, or introduction of visual, atmospheric, or audible elements.

From an aerial photo reconnaissance, it appears that potential for historic buildings exists. Water features, like the Des Moines River, have higher probabilities for archaeological sites. No official contact has been made with the Mn State Historic Preservation Office (SHPO) for a literature search. An inquiry would likely be necessary during project development.

SECTION 4(F) INVOLVEMENT

Section 4(f) of the Department of Transportation (DOT) Act of 1966 (Section 4(f)) (23 U.S.C. 138) discourages federal transportation agencies (e.g., the Federal Highway Administration (FHWA)) from approving a project that uses land from significant, publicly available parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless no feasible and practicable avoidance alternative exists.

Island Park is adjacent to the corridor at the Des Moines River, which is a State Water Trail. There may be other historic sites and public areas not readily identified with a desktop review. Further review and consultation with State and local agencies should be completed during project development to minimize harm.

SECTION 6(F) INVOLVEMENT

Section 6(f) of the Land and Water Conservation Act (LAWCON) requires that the conversion of lands or facilities acquired with Land and Water Conservation Funds (LWCF) be coordinated with the Department of Interior. When such a conversion occurs, replacement in-kind is typically required. Similar protections are in place for sites funded by state recreation grants to local governments. There are no Section 6(f) resources or state recreation grant sites along the Corridor based on review of the MnDNR list, *Permanent Land Use Requirements Through Grant Agreements Administered by the MnDNR* (2017). The USFWS manages the Cottonwood Lake Waterfowl Production Area (WPA), 306 acres along the east and northeast side of Cottonwood Lake extending to the southeast side of TH 60. Further evaluation could include a more in-depth inventory of resources that may be covered under this statute.

Other programs that help landowners protect and restore privately-owned wetlands and grasslands may be in effect for lands adjacent to TH 60. For example, the USFWS purchases permanent easements for habitat improvement. Additional research may be needed to determine if easements are present.

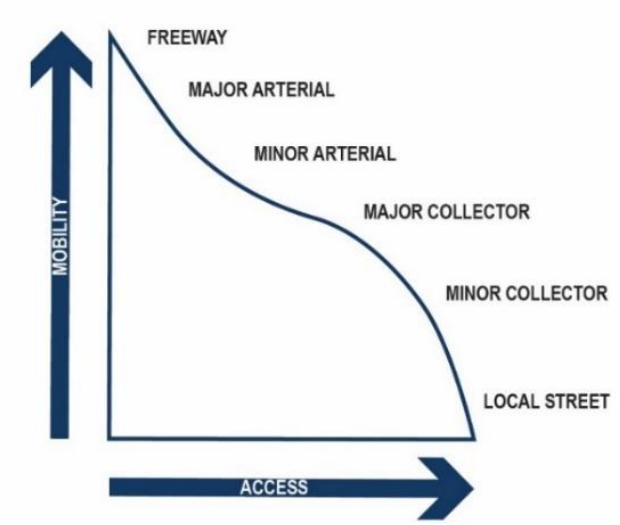
INFRASTRUCTURE

Functional Classification

Roadways must balance access and mobility. The function of the roadway is dependent on its classification; an interstate or freeway prioritizes mobility and has very strict access controls allowing for high speed, while a local road prioritizes access over mobility. Most travel involves movement through a network of roads and the functional classification system defines the role that any particular road or street plays in serving the flow of trips through an entire network.

Additionally, roadways that have a functional classification are tied to the Federal Aid and State Aid highway system, making them eligible for funding from federal and state governments. Figure 11 shows the functional classification of the roadways around the corridor.

Figure 10: Access and Mobility on Functionally Classified Roadways



Corridor Function and Connecting Roadways

The TH 60 corridor is one of the most continuous corridors in Cottonwood County, connecting larger urban centers and higher mobility roadways (I-90). It is an important commercial corridor and carries a significant volume of heavy truck traffic, whose travel time reliability and travel efficiency is important. However, it also bisects the City of Windom where slower traffic speeds benefit pedestrians, bicyclists, and local businesses. These two purposes can conflict with each other.

Since the 1950's, MnDOT has been working to complete an expressway from Sioux City to Mankato along the TH 60 corridor. The last segment to be expanded to four-lanes, between Windom and Mountain Lake, was completed in 2018. In addition to these efforts, developing a parallel route or bypass around Windom has been proposed by some members of the public to reduce perceived travel time increases associated with lower speeds through the City of Windom. A Corridors of Commerce application was submitted by a member of the public to MnDOT to develop a 4-lane divided highway bypass around the western side of Windom to increase travel time efficiency.

The City of Windom's Active Living Plan within its Comprehensive Plan identifies the benefit of improving the transportation network in their community to accommodate all modes of traffic, including bicycle and pedestrian facilities, including on TH 60. The Comprehensive Plan identified the need to work with MnDOT to better incorporate local input and improved active living facilities along state highways in the city.

Figure 11: Functional Classification

Typical Sections

Throughout the study area, the context and typical design of the corridor evolves multiple times.

- TH 60 between John Caldwell Drive and 1st Avenue N is a five-lane rural roadway, with two through lanes in each direction and a center turn lane. The rural description indicates there is no curb and gutter.
- TH 60 between 1st Avenue N and 16th Street is a four-lane divided rural roadway with wide outside shoulders and turn lanes at intersections. 1st Avenue acts as a frontage road on the east side of this segment.
- TH 60 between 16th Street and 12th Street is a four-lane undivided rural roadway. The sidewalks in this segment are disconnected and there are wide shoulders.
- TH 60 between 12th Street and TH 62 is a four-lane undivided urban roadway (curb and gutter) with sidewalks on both sides. Throughout most of this segment there is an asphalt buffer between the sidewalk and the roadway.
- TH 60 between TH 62 and 1st Avenue S is a four-lane undivided urban roadway with a four-foot sidewalk and asphalt buffer on the west side of the roadway. There are no turn lanes in the segment.
- TH 60 between 1st Avenue S to the Cottonwood/Jackson County line is a four-lane divided rural roadway with wide outside shoulders and turn lanes at intersections. The four-lane divided highway is maintained between 3rd Avenue S and 1st Avenue S, with frontage roads.
- US 71 N between TH 60 and Opportunity Drive is a two-lane undivided rural roadway with wide shoulders and turn lanes at some intersections.
- US 71 S between TH 60 and CSAH 26 is a two-lane undivided rural roadway with wide shoulders. There is a southbound right turn lane, with a northbound bypass lane to accommodate left turn movements. There are right turn lanes at CSAH 26 and the business to the south to accommodate through movement traffic
- TH 62 between TH 60 and the Des Moines River crossing is a two-lane undivided urban roadway with 6-foot sidewalks on both sides of the roadway.

Figure 12: Typical Sections for TH 60

Pavement Conditions

Federal Highway Administration and multiple state departments of transportation have found timely pavement rehabilitation has the potential to be six to 14 times more cost-effective than rebuilding a deteriorated road. Another study, completed by TRIP in 2018, found that rough roads add an average of $599 to the annual cost of car ownership due to damaged tires, suspension, reduced fuel efficiency, and accelerated vehicle depreciation.

MnDOT regularly collects pavement data for the Trunk Highway system and the County State Aid Highway system on four metrics: ride quality, surface rating, pavement quality, and remaining service life.

- Ride quality is a smoothness index to represent the rating a typical road user would give to the pavement's smoothness as felt while driving.
- Surface rating collects pavement distress based on visible surface defects.
- Pavement quality gives an overall indication of the condition of the pavement.
- Remaining service life is an estimate in years until the ride quality will reach a point it is uncomfortable to drive on and a major rehabilitation is likely needed.

Table 6 shows the general conditions of each metric for the segments of this corridor study. Regular maintenance, like resurfacing can improve the ride quality but not necessarily extend the overall remaining service life. The 2019 overlay project along TH 60 likely improved the ride quality and surface rating but cannot mitigate the underlying conditions that are reflected in the pavement quality and remaining service life metrics. Pavement quality is shown in Figure 14.

Table 6: Pavement Conditions

Segment	Ride Quality	Surface Rating	Pavement Quality	Remaining Service Life
TH 60 – Northern terminus to TH 62	Good	Good	Good	Fair
TH 60 – South of TH 62	Fair	Good	Good	Poor
US 71 – North*	Fair	Good	Good	Poor
US 71 – South*	Fair	Good	Good	Poor
TH 62	Poor	Good	Fair	Fair

*Pavement preservation programmed for 2020.

Bridge Conditions

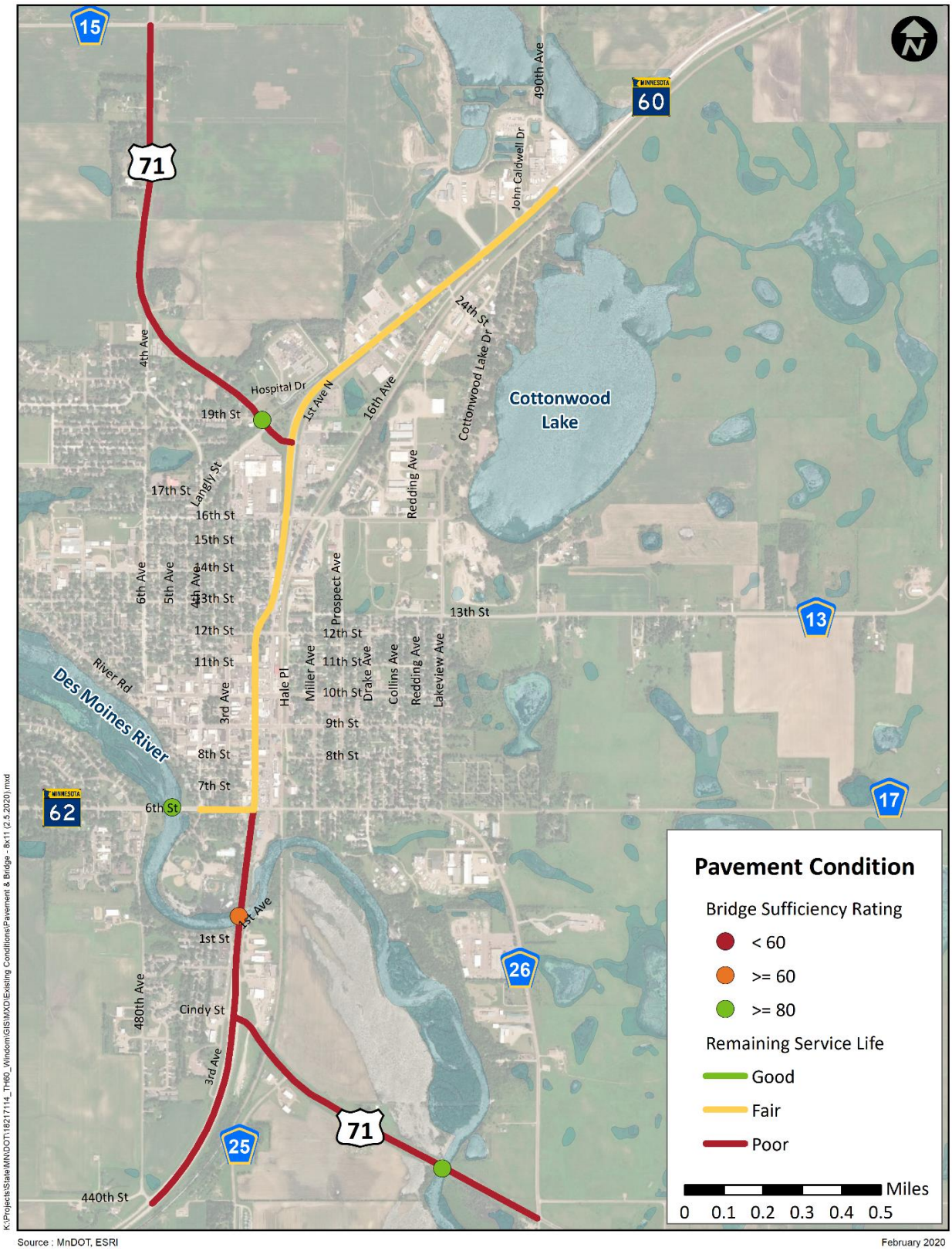
Bridges are regularly inspected to verify their condition. Inspections report a variety of conditions, including deck condition, superstructure, and substructure conditions as well as a sufficiency rating (out of 100). There are three bridge structures and one culvert in the study area:

- US 71 S (#17008), one mile southeast of TH 60, was built in 2010. This 188-foot bridge crosses the Des Moines River with a main span length of 62 feet and a roadway width of 48 feet. The 2016 inspection found this bridge structure to have a good deck condition, and very good superstructure and substructure condition. It has a sufficiency rating of 97.70.
- TH 60 (#17001), 0.3 miles south of TH 62, was built in 1971. This 208-foot bridge crosses the Des Moines River with a main span length of 78 feet and a roadway width of 52 feet. The 2016 inspection found this bridge structure to have a fair deck condition, fair superstructure condition, and satisfactory substructure condition. It has a sufficiency rating of 69.20.
- TH 62 (#17002), 0.2 miles west of TH 60, was built in 1974. This 278-foot bridge crosses the Des Moines River with a main span length of 76 feet and a roadway width of 44 feet. The 2016 inspection found this bridge structure to have a satisfactory deck condition, a good superstructure condition, and a good substructure condition. It has a sufficiency rating of 97.20.
- US 71 N (#8701), west of Langley Street, was built in 1940. This 12.5-foot culvert crosses a local stream. It has a sufficiency rating of 94.50.

The TH 60 bridge is in the worst condition and has been identified for possible replacement in 2025. Figure 14 shows bridge conditions.

Figure 13: TH 60 Bridge over the Des Moines River

Figure 14: Pavement and Bridge Conditions



Utilities

An initial investigation indicates that utilities in MnDOT right of way include electric, gas, communication (both copper and fiber optic), water, sanitary sewer, and storm sewer. Further discussion with the City of Windom will be required to determine potential future utility needs. As any project is programmed additional coordination with any private utilities should be considered.

Right-of-Way

Right-of-way (ROW) is the available space owned by MnDOT on which the trunk highways reside. ROW is often a constraining factor in developing alternatives, because acquiring additional ROW can be costly, increase project delivery deadlines, or stop a project altogether. ROW widths vary along the corridor, depending on the location.

- North of US 71 N, TH 60 ROW is approximately 125'.
- Between 12th Street and TH 62, TH 60 ROW is approximately 66'.
- Between 6th Street and the Des Moines River, TH 60 ROW is approximately 150'.
- South of the Des Moines River, TH 60 ROW is greater than 250'.
- US 71 N ROW is approximately 150'.
- US 71 S ROW is approximately 200'.
- TH 62 ROW is approximately 66'.

Lighting

MnDOT provides lighting warrants to provide conditions that should be satisfied to justify the installation of lighting. However, local conditions like sight distance, crash rates, etc. may require roadway lighting even if warrants are not met. Additionally, meeting these warrants does not require MnDOT or any other jurisdiction to provide lighting or participate in its cost. Generally, the warrants are provided for roadway types, land use, crashes, traffic volumes, and other conditions that may require roadway lighting. A full lighting warrant analysis would be completed during project development when a project is programmed. Lighting analysis during project development would also determine if the existing lighting is appropriate, or if additional or different lighting should be provided.

Currently, along the corridor segments:

- TH 60 north of US 71 N has lighting between the US 71 N intersection and 24th Street. No lighting is provided north of 24th Street.
- TH 60 between US 71 N and US 71 S has lighting.
- TH 60 south of US 71 S has no roadway lighting.
- TH 62 has lighting for the entire study area extent (TH 60 to 4th Avenue)
- US 71 N has lighting from 4th Avenue to the TH 60 intersection. No lighting is provided west of 4th Avenue.
- US 71 S has lighting from the TH 60 intersection to approximately 400' east.

All the lightings discussed along TH 60 is currently owned and maintained by the City of Windom.

Access

Access management is the process of balancing the competing needs of traffic movement and land access. Access points introduce conflict and friction into the traffic stream. Allowing dense, uncontrolled access spacing results in safety, operational, and aesthetic deficiencies:

- According to NCHRP Report 420, Impact of Access Management Techniques, every unsignalized driveway increases the corridor crash rate by approximately two percent.
- Research included in the Highway Capacity Manual found that roadway speeds were reduced an average of 2.5 miles per hours for every ten access points per mile.

MnDOT Access Designations

MnDOT developed guidelines for managing access to the state highway system. Every highway segment is assigned two designations based on the 2008 *Access Management Manual*:

- Primary access category based on the roadway's functional and strategic importance. There are seven primary categories including high-priority interregional corridors, medium-priority interregional corridors, regional corridors, principal arterials, minor arterials, and collectors, and specific access management plan. Despite the similar naming conventions, there is not necessarily a relationship between a roadway with the same functional classification and primary access category.
- Subcategory based on the existing and planned land use. There are five subcategories including interstate freeway, non-interstate freeway, urban core, urban/urbanizing, and rural.

The recommended spacing and number of accesses varies with the highway's primary and subcategory designations. The designations for each study segment are discussed below and shown in Figure 15.

- TH 60 is a medium-priority interregional corridor with four subcategory segments in the study area.
  - Urbanizing between 490th Avenue/John Caldwell Drive to US 71 N
  - Urban Core between US 71 N and TH 62
  - Urbanizing between TH 62 and the southern limits of Windom
  - Rural between the southern limits of Windom and the Cottonwood/Jackson County line
- US 71 N is a high-priority regional corridor with two subcategory segments in the study area.
  - Urbanizing between TH 60 and the northern limits of Windom
  - Rural between the northern limits of Windom and Opportunity Drive
- US 71 S is a high-priority regional corridor with two subcategory segments in the study area.
  - Urbanizing between TH 60 and the southern limits of Windom
  - Rural between the southern limits of Windom and CSAH 26
- TH 62 is a minor arterial classified as urbanizing from the Des Moines River crossing to TH 60.

Current Access Locations

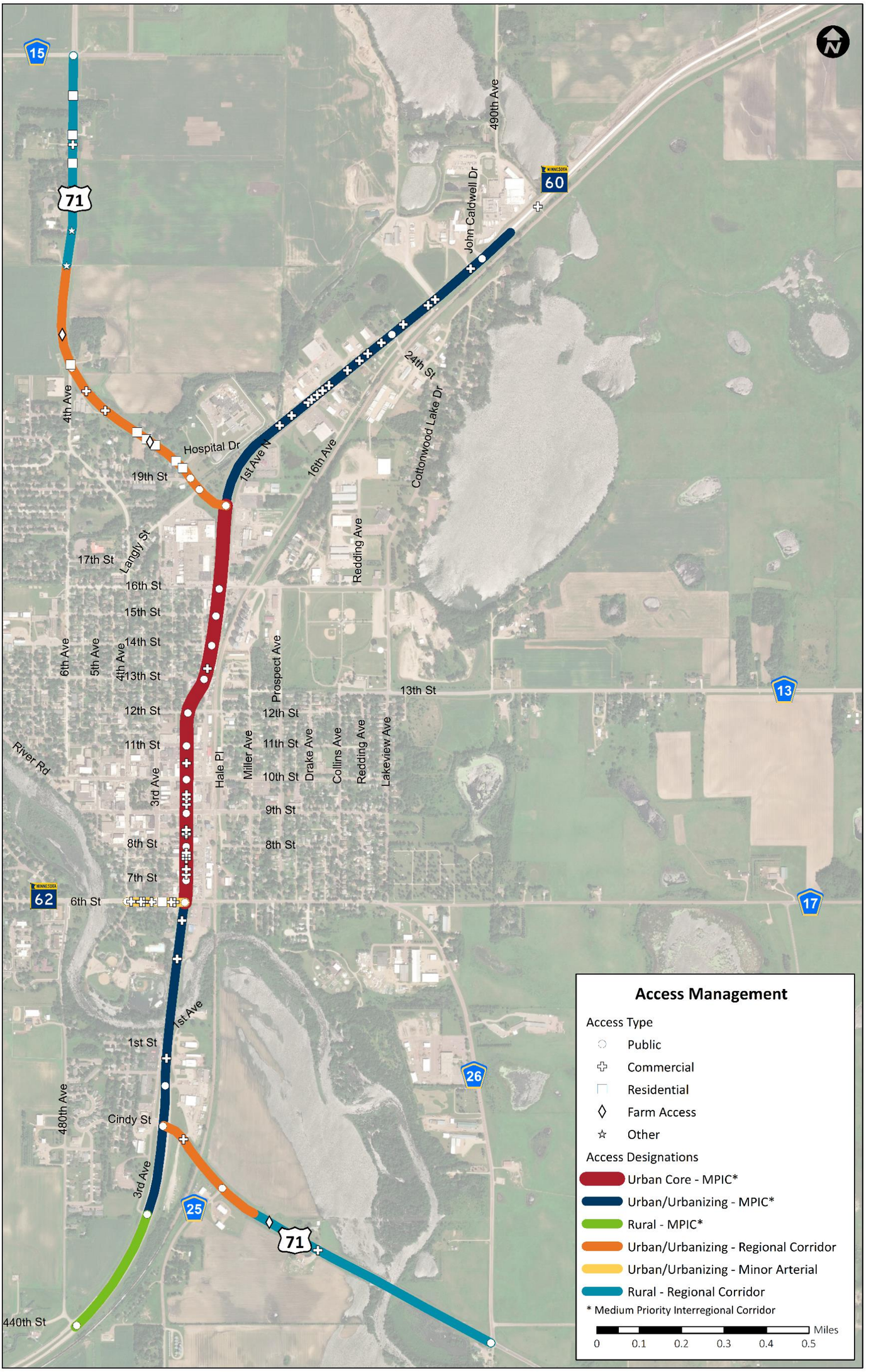
Along all study segments there are 93 public and private access points. Table 7 shows the number of current access points and recommended access points based on the primary and subcategory access

designations for each segment. Every segment is well above the recommended access density, with most segments having five times as many access points as recommended.

The access locations are shown in Figure 15.

Table 7: Current Access Points and Guidelines

Segment	Classification	Access Points	Miles	Existing Access Points per Mile	Recommended Access Points per Mile	% Over Recommended Access Points per Mile
TH 60 – 6th Ave S to 3rd Ave S	Medium-Priority Interregional – Rural	2	0.32	7	2	350%
TH 60 – 3rd Ave S to TH 62	Medium-Priority Interregional – Urbanizing	7	0.74	10	4	250%
TH 60 – TH 62 to US 71 N	Medium-Priority Interregional – Urban Core	27	0.95	29	4	725%
TH 60 – US 71 N to John Caldwell Dr	Medium-Priority Interregional – Urbanizing	18	0.95	20	4	500%
US 71 N – 4th Ave to CSAH 15	High-Priority Regional – Rural	9	0.49	19	2	950%
US 71 N – TH 60 to 4th Ave	High-Priority Regional – Urbanizing	16	0.75	22	4	550%
US 71 S – TH 60 to CSAH 25	High-Priority Regional – Urbanizing	2	0.30	7	4	175%
US 71 S – CSAH 25 to CSAH 26	High-Priority Regional – Rural	3	0.64	5	2	250%
TH 62 – TH 60 to 4th Ave	Minor Arterial – Urbanizing	9	0.14	66	8	825%



Source: MnDOT, ESRI

November 2019

Figure 15: Access Locations

Traffic Control

Selecting the appropriate traffic control device requires consideration of traffic safety, patterns and volumes, roadway geometry, lane configurations and multimodal aspects. The *Manual of Uniform Traffic Control Device* (MUTCD) provides guidance and standards on the installation of traffic control methods which considers vehicular volume, pedestrian volumes, and crash frequency thresholds for multiple roadway contexts. Warrant analysis does not require all-way stops or traffic signals to be installed and MnDOT policy typically requires multiple warrants being satisfied to consider alternative traffic control solutions. However, the analysis highlights the locations that may benefit from traffic control upgrades or removal. Research conducted by FHWA found that that removing unwarranted signals may

- Decrease all crash types up to 24 percent.
- Decrease injury crashes up to 53 percent.
- Decrease rear-end crashes up to 29 percent.

Currently, only the TH 60 and 10th Street and TH 60 and 6th Street intersections are traffic signal controlled. The other study intersections have two-way stop control (TWSC) on the minor approaches. Warrant analysis was conducted at the study intersections using the collected/provided traffic data for four different traffic signal and the multi-way stop warrants under current conditions. Warrants 1a and 1b, 2, and 3 relate to traffic volumes for eight-hour volumes, four-hour volumes, and peak hour volumes, respectively. Warrants 1a and 1b use different traffic thresholds on the major approaches. Warrant 1b is used when the traffic volumes on the major approach is significantly higher than minor approach volumes. In accordance with MnDOT guidance for warrant analysis, minor street right-turn volumes were excluded for dedicated right-turn lanes and included at 50 percent for shared right-turn lanes. Table 8 shows required hours of specific volumes to meet each warrant and how many hours are being fulfilled with the current traffic volumes. Figure 16 shows the existing traffic control at each study intersection and Figure 17 shows the results of the signal warrant analysis.

Based on the warrant analysis for current traffic volumes, the existing signals are warranted. The intersections of TH 60 and US 71 N, TH 60 and 16th Street, and TH 60 and 9th Street meet warrants:

- TH 60 and US 71N meets multiple warrants, using the 100% hourly volume values.
- TH 60 and 16th Street meets warrant 1B, using the 100% hourly volume values.
- TH 60 and 9th Street only meets warrant 1B with the 70 percent factor applied.

Meeting any of the MUTCD warrants may be enough to justify installation of a traffic signal. However, most agencies including MnDOT prefers meeting any of the warrant parameters below:

- Intersection meets Warrant 1A, 1B (Eight Hour Vehicular Volume), or 7 (Crash Experience) of the MUTCD, or
- Current traffic volumes do not meet Warrant 1A or 1B, but development in the area will occur such that the warrants will be met in a reasonable period.

Table 8: 2019 Traffic Control Warrant Analysis

Intersection	Existing Traffic Control	1A	1B	2	3	MWSA
TH 60 and US 71 N	TWSC	**15/8**	**12/8**	**11/4**	**3/1**	5/8
TH 60 and 16th Street	TWSC	1/8	**10/8**	3/4	0/1	1/8
TH 60 and 15th Street	TWSC	0/8	1/8	0/4	0/1	0/8
TH 60 and 14th Street	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and 13th Street	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and 12th Street	TWSC	0/8	5/8	1/4	0/1	0/8
TH 60 and 11th Street	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and 10th Street	Signal	**12/8**	**12/8**	**8/4**	**3/1**	**8/8**
TH 60 and 9th Street	TWSC	0/8	**8/8**	1/4	0/1	0/8
TH 60 and 8th Street	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and 7th Street	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and TH 62	Signal	**15/8**	**12/8**	**12/4**	**4/1**	**15/8**
TH 60 and 1st Street	TWSC	0/8	1/8	0/4	0/1	0/8
TH 60 and 1st Avenue S	TWSC	0/8	4/8	0/4	0/1	0/8
TH 60 and US 71 S	TWSC	0/8	5/8	0/4	0/1	0/8
TH 60 and 3rd Avenue S	TWSC	0/8	0/8	0/4	0/1	0/8
TH 60 and 6th Avenue S	TWSC	0/8	0/8	0/4	0/1	0/8
US 71 N and Opportunity Drive	TWSC	0/8	0/8	0/4	0/1	0/8
US 71 N and 4th Avenue	TWSC	0/8	0/8	0/4	0/1	0/8
US 71 N and Hospital Drive	TWSC	0/8	0/8	0/4	0/1	0/8
US 71 N and 19th Street	TWSC	1/8	0/8	0/4	0/1	0/8
US 71 N and Langley Street	TWSC	1/8	0/8	0/4	0/1	0/8
US 71 S and County Road 25	TWSC	0/8	0/8	0/4	0/1	0/8
US 71 S and County Road 26	TWSC	0/8	0/8	0/4	0/1	0/8
TH 62 and 4th Avenue	TWSC	2/8	0/8	0/4	0/1	2/8

Warrant 1A – Minimum Vehicular Volume; Warrant 1B – Interruption of Continuous Traffic; Warrant 2 – Four-Hour Vehicular Volume; Warrant 3 – Peak hour; Multi-way Stop Applications (MWSA)

Figure 16: 2019 Traffic Control

Source : MnDOT, ESRI

November 2019

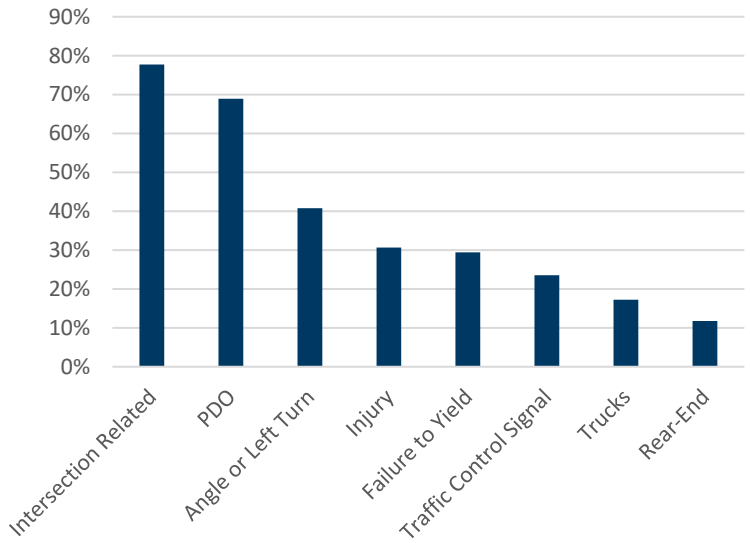
Figure 17: 2019 Traffic Volumes and Traffic Control Warrants

Source : MnDOT, ESRI

February 2020

CRASH HISTORY

Reviewing historic crash information can help identify existing deficiencies that can be addressed through this study. Ten years of crash records from January 1, 2009 through December 31, 2018 were provided by MnDOT. Throughout the study area there were 243 crashes. This corresponds to an average of 24.3 crashes per year with 7.4 crashes per year resulting in an injury, including the possible injury classification. There were no fatalities or serious injuries reported in the study area. An evaluation of total crash data identified the following most prevalent crash trends:



- 77.7 percent of crashes occurred at intersections or driveways
- 68.9 percent of crashes resulted in property damage only
- 40.8 percent of crashes were angle or left turn crashes
- 29.4 percent of crashes were due to failure to yield or running a red light
- 23.5 percent of crashes occurred at the two signalized intersections
- 17.2 percent of crashes involved trucks
- 11.8 percent of crashes were rear end crashes

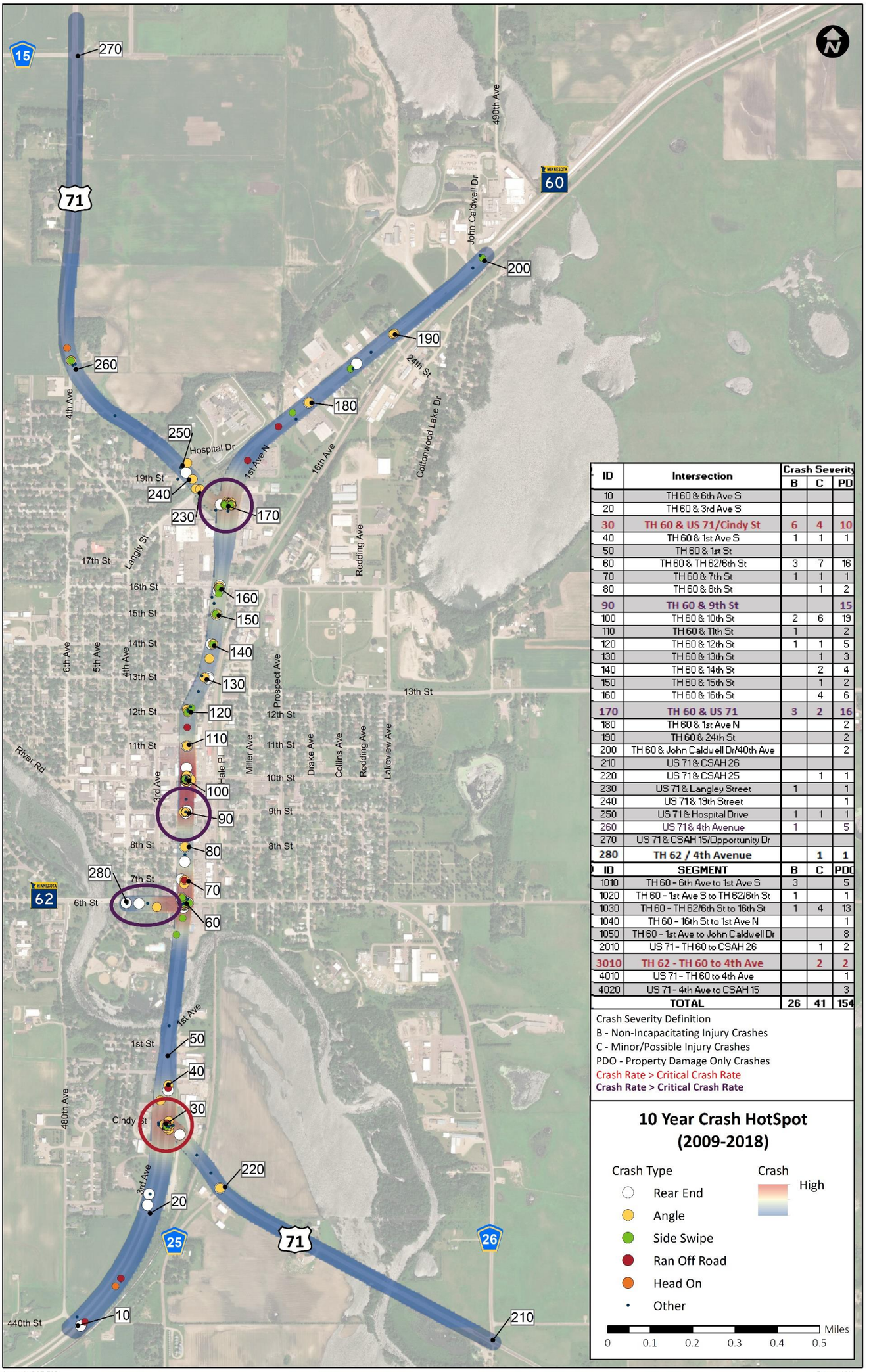
Crash Hot Spots

To identify overrepresented crash locations within the study area, the critical crash rate method was used. This method was developed by MnDOT and uses traffic volumes and crash rates and compares this rate against crash rates for similar facilities, based on MnDOT data. This methodology helps identify intersections and segments that may have fewer overall crashes, but on a per car basis, a higher rate of crashes.

According to the critical crash analysis methodology, intersections and segments with crash rates above the critical rate are considered overrepresented and in need of further review because there is a high probability that conditions at the site are contributing to the higher crash rate. Based on this analysis, there was one intersection and one segment above the critical crash rate, with three additional intersections above the average crash rate for similar facilities. Intersections and segments with crash rates under the critical crash rate does not mean that crash trends do not exist at those intersections or segments.

Crash data is illustrated in Figure 18.

Figure 18: Crash Density and Frequency



ID	Intersection	Crash Severity		
		B	C	PD
10	TH 60 & 6th Ave S			
20	TH 60 & 3rd Ave S			
30	**TH 60 & US 71/Cindy St**	**6**	**4**	**10**
40	TH 60 & 1st Ave S	1	1	1
50	TH 60 & 1st St			
60	TH 60 & TH 62/6th St	3	7	16
70	TH 60 & 7th St	1	1	1
80	TH 60 & 8th St		1	2
90	**TH 60 & 9th St**			**15**
100	TH 60 & 10th St	2	6	19
110	TH 60 & 11th St	1		2
120	TH 60 & 12th St	1	1	5
130	TH 60 & 13th St		1	3
140	TH 60 & 14th St		2	4
150	TH 60 & 15th St		1	2
160	TH 60 & 16th St		4	6
170	**TH 60 & US 71**	**3**	**2**	**16**
180	TH 60 & 1st Ave N			2
190	TH 60 & 24th St			2
200	TH 60 & John Caldwell Dr/40th Ave			2
210	US 71 & CSAH 26			
220	US 71 & CSAH 25		1	1
230	US 71 & Langley Street	1		1
240	US 71 & 19th Street			1
250	US 71 & Hospital Drive	1	1	1
260	US 71 & 4th Avenue	1		5
270	US 71 & CSAH 15/Opportunity Dr			
280	**TH 62 / 4th Avenue**		**1**	**1**

ID	SEGMENT	B	C	PDO
1010	TH 60 - 6th Ave to 1st Ave S	3		5
1020	TH 60 - 1st Ave S to TH 62/6th St	1		1
1030	TH 60 - TH 62/6th St to 16th St	1	4	13
1040	TH 60 - 16th St to 1st Ave N			1
1050	TH 60 - 1st Ave to John Caldwell Dr			8
2010	US 71 - TH 60 to CSAH 26		1	2
3010	**TH 62 - TH 60 to 4th Ave**		**2**	**2**
4010	US 71 - TH 60 to 4th Ave			1
4020	US 71 - 4th Ave to CSAH 15			3
	TOTAL	**26**	**41**	**154**

Crash Severity Definition
B - Non-Incapacitating Injury Crashes
C - Minor/Possible Injury Crashes
PDO - Property Damage Only Crashes
Crash Rate > Critical Crash Rate
Crash Rate > Critical Crash Rate

10 Year Crash HotSpot (2009-2018)

Crash Type
- Rear End
- Angle
- Side Swipe
- Ran Off Road
- Head On
- Other

Crash: High

0 0.1 0.2 0.3 0.4 0.5 Miles

Crash Trend Analysis

TH 60

There were 194 crashes (157 intersection related, and 37 segment related) along the TH 60 segment of the study area.

- The intersection of TH 60 with US 71/Cindy Street experienced a crash rate higher than the critical crash rate for similar intersections.
- The intersections of TH 60 at US 71N and at 9th Street experienced crash rates higher than statewide average crash rates but less than critical crash rate for similar intersections.

TH 60 AND US 71 S

At the intersection of TH 60 with US 71/Cindy Street, there were 20 crashes (6 incapacitating, 4 possible injury, and 10 property damage crashes) reported during the analysis period for a crash rate of 0.52. The crash rate observed was greater than the critical crash rate for similar intersections. Angle crashes (10) were the most common type of crashes at the intersection. The skewed approach of the intersection may result in insufficient sight distance and awkward sight lines that may have contributed to the angle crashes at this intersection.

Figure 19: TH 60 and US 71 S Intersection

TH 60 AND TH 62

At the intersection of TH 60 with TH 62, there were 26 crashes (3 minor injury, 7 possible injury, and 16 property damage crashes) reported during the analysis period for a crash rate of 0.46. Rear end (10) were the most common type of crashes at the intersection. Five of these rear end crashes occurred on the northbound approaches. The first traffic signal and changing context may interfere with driver expectancy, resulting in rear end crashes. Rear end crashes are common at traffic signals. The low crash rate at this intersection indicates the crash trends here are similar to other facilities.

TH 60 AND 10TH STREET

At the intersection of TH 60 and 10th Street, there were 27 crashes (2 minor injury, 6 possible injury, and 19 property damage crashes) reported during the analysis period for a crash rate of 0.48. Angle and left-turn (14) were the most common types of crashes at the intersection. Seven of these angle crashes involved a driver on the northbound approach.

TH 60 AND US 71 N

At the intersection of TH 60 and US 71 N there were 21 crashes (3 minor injury, 2 possible injury, and 16 property damage crashes) reported during the analysis period for a crash rate of 0.42. The crash rate observed is higher than the statewide average but less than critical crash rate for similar intersections. Angle and left-turn (16) were the most common types of crashes at the intersection with failure to yield

being the predominant contributing factor. Seven of these crashes involved vehicles traveling southbound. The speeds and changing context may contribute to the failure to yield at the intersection. Additionally, this intersection meets signal warrants.

BETWEEN TH 62 AND 1ST AVENUE N

The nearly one-mile segment between TH 62/6th Street and 1st Avenue N experienced 156 total crashes, including 68 right-angle (43.6 percent) and 30 rear-end crashes (19.2 percent), including segment and intersection crashes for a crash rate of 5.56. The observed crash rate is higher than critical crash rate for similar segments.

Typically, rear end crashes make up 33 percent of all crashes on urban roads and right-angle crashes make up 20 percent of all crashes on urban roads. This segment has more than seven times the recommended accesses, which may contribute to the frequency of crashes. Reducing the number of accesses to MnDOT recommended spacing may reduce crash potential by 21.5 percent according to NCHRP Report 420.

Rear end crashes made up 26.3 percent of segment only crashes on TH 60 between TH 62 and 1st Avenue N. Many of these crashes occurred as a driver was waiting to turn left at an access and was then rear ended. This is common on four-lane sections with no turn lanes where through traffic conflicts with stopped turning traffic. However, opportunities exist to mitigate this crash type.

US 71

US 71N - BETWEEN TH 60 AND CSAH 15/OPPORTUNITY DRIVE

There were 16 crashes (12 intersection related, and 4 segment related) reported in the 1.2-mile long segment during the analysis period for a crash rate of 0.88. None of the intersections or segments exceeded the statewide average or critical crash rates for similar types of facilities. Eight of these crashes were angle or left turn crashes associated with the multiple access points along the corridor. US 71 N from TH 60 to 4th Avenue has 4.5 times the recommended number of access points.

US 71S - BETWEEN TH 60 AND CSAH 26

There were 5 crashes (2 intersection related, and 3 segment related) reported in the segment during the analysis period for a crash rate of 0.63. None of the intersections or segments exceeded the statewide average or critical crash rates for similar type of facility.

TH 62

The nearly 750-feet segment of TH 62 between 4th Avenue and TH 60 experienced six crashes (2 intersection related, and 4 segment related) during the analysis period for a crash rate of 3.51. The segment experienced higher than the critical crash rate for similar type of facility. No predominant trend was observed for the crashes in this segment.

Pedestrian and Bicycle Crashes

Between 2009 and 2018, there were three pedestrian crashes, all on TH 62. Two crashes occurred at 4th Avenue, where there are marked crosswalks but the east and west approaches are not stop controlled. The other crash occurred at 3rd Avenue where there are no marked crosswalks and the east and west approaches are not stop controlled. All drivers reported they did not see the pedestrian crossing TH 62.

There were no bicycle crashes.

EXISTING MULTIMODAL ANALYSIS

Traditionally, transportation planning approaches have placed special emphasis on achieving certain levels of service for vehicular traffic, with cycling, walking, and other modes sometimes being an afterthought. An auto-centric approach does not respond well to demand for other travel modes and can lead to uninviting or even unsafe facility design for roadway users that cannot or choose not to drive. To provide a more complete evaluation of a transportation system, multimodal levels of service (MMLOS) were used to better account for all potential transportation opportunities due to an unbalanced emphasis on automobile traffic. The MMLOS includes vehicular, freight, bicycle, and pedestrian modes. Each of the sections below will detail issues and existing operations for each specific modal environment, concluding with an unweighted multimodal level of service.

Vehicular Conditions

Turning Movements

Turning movements for 48-hours on typical weekdays were collected at each of the study intersections. These turning movements were used to complete the vehicular operational analysis and are included in the appendix. Current average daily traffic is shown in Figure 23.

TRAFFIC TRENDS

Traffic volumes vary widely across the study segments.

- On TH 60
  - On the northern end, daily traffic is currently around 6,400 vehicles each day with around 20 percent heavy truck traffic.
  - Between US 71 N and TH 62, TH 60 daily traffic is currently 13,500, with around 15 percent heavy truck traffic.
  - South of US 71 S, TH 60 carries around 7,600 vehicles per day, with around 15 percent heavy truck traffic.
  - Typical truck traffic on the statewide trunk highway system is eight to nine percent. I-90 south of Windom carries around 15 percent truck traffic.
- US 71 N carries around 4,150 vehicles per day north of Windom city limits, with around 15 percent heavy truck traffic.
- US 71 S carries around 2,220 vehicles per day south of Windom city limits, with around 21 percent heavy truck traffic.
- TH 62 carries around 3,350 vehicles per day, with around 12 percent heavy truck traffic.

Directional distributions vary by location along TH 60.

- On TH 60, north of US 71 N, southbound traffic is 51 percent of daily traffic. The northbound direction's evening peak occurs earlier than the southbound evening peak.
- On TH 60, south of 10th Street, northbound traffic and southbound traffic is evenly split throughout the course of a regular day. Northbound experiences a slightly more pronounced noon peak, but the evening peak of southbound traffic is nearly 10 percent higher than northbound traffic.

» On TH 60, south of US 71 S, southbound traffic is 51 percent of daily traffic. Southbound traffic during the afternoon is around 17 percent higher than northbound traffic.

Figure 20: Daily Directional Trends on TH 60 North of US 71 N

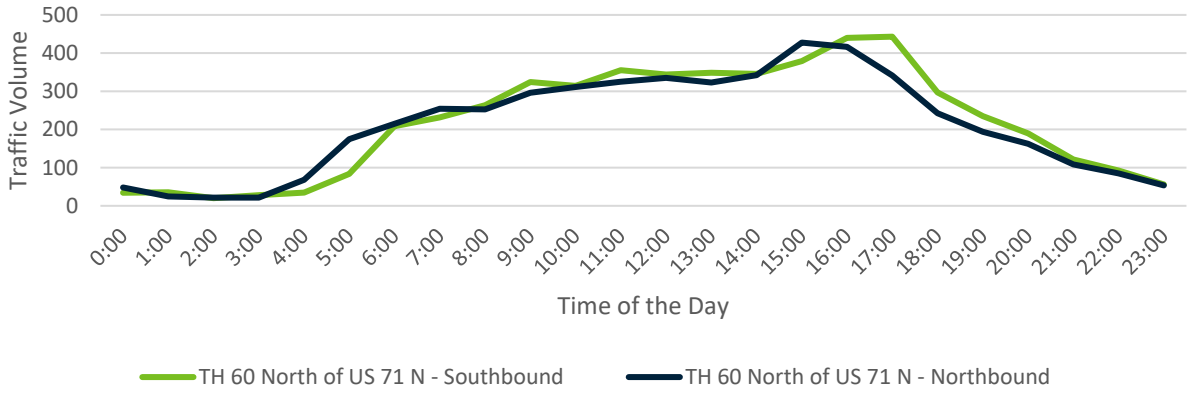


Figure 21: Daily Directional Trends on TH 60 South of 10th Street

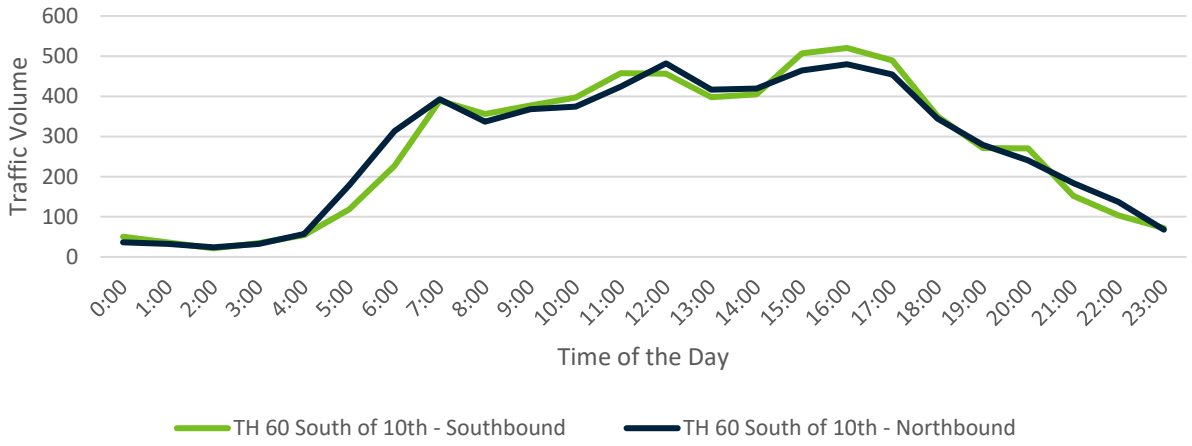


Figure 22: Daily Directional Trends on TH 60 South of US 71 S

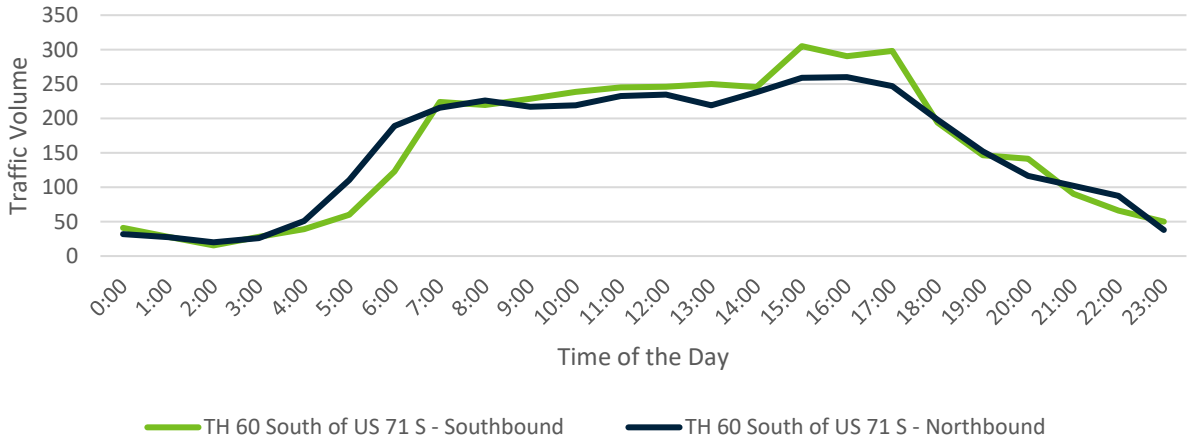


Figure 23: 2018 Traffic Volumes

Source : MnDOT, ESRI

November 2019

Traveler Trends

StreetLight data uses information from mobile devices to collect information about origins, destinations, and travel time. StreetLight data was used to understand traffic patterns on TH 60, TH 62, and US 71 and where travelers using these corridors are coming from and going to.

Most traffic on TH 60 and US 71 N is inter-regional traffic.

- 67 percent of traffic using TH 60 from the south is inter-regional traffic traveling 100 or more miles.
- 75 percent of traffic using TH 60 from the north is inter-regional traffic traveling 100 or more miles.
- 76 percent of traffic using TH 60 through downtown is inter-regional traffic traveling 50 or more miles.
- 54 percent of traffic using US 71 N is inter-regional traffic traveling 100 or more miles.
- 22 percent of traffic using US 71 S is inter-regional traffic traveling 100 or more miles.
- Inter-regional traffic through Windom (to and from Worthington and St. James) on TH 60 increases by about 16 percent on the weekend.

Traffic patterns on TH 60 varies by time of day and trip purpose.

- 35 percent of trips on TH 60 are home based-commercial or commercial-home based.
- 57 percent of trips on TH 60 are commercial-commercial or commercial-other.
- Two percent of local trips coming and going along TH 60 are less than one-mile and 15 percent of trips are less than five miles. With high quality facilities, these trips could be made by walking (trips less than one-mile) or biking (trips less than five miles).

Figure 24: Trip Travel Time on TH 60 through Downtown

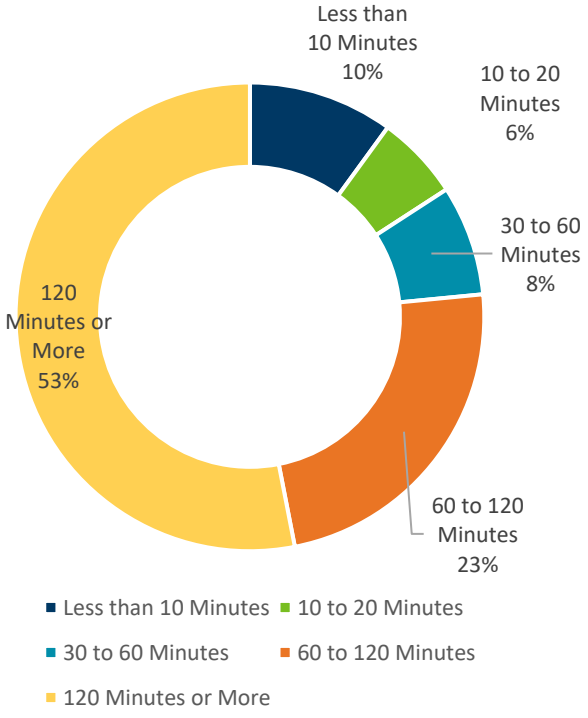
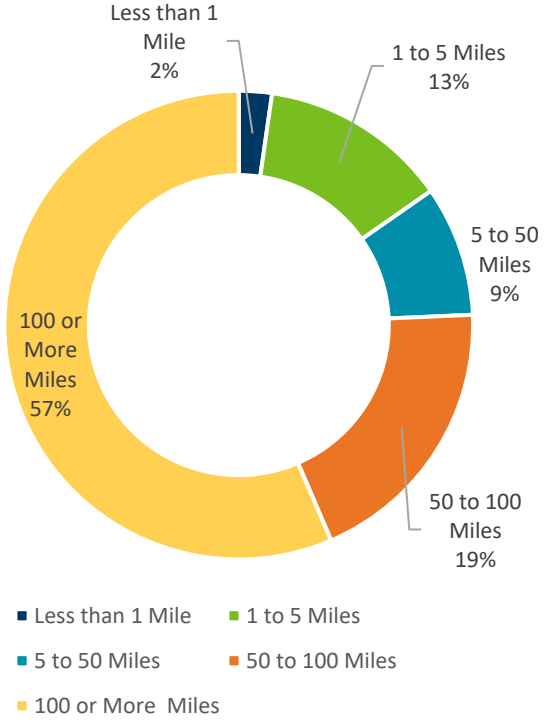


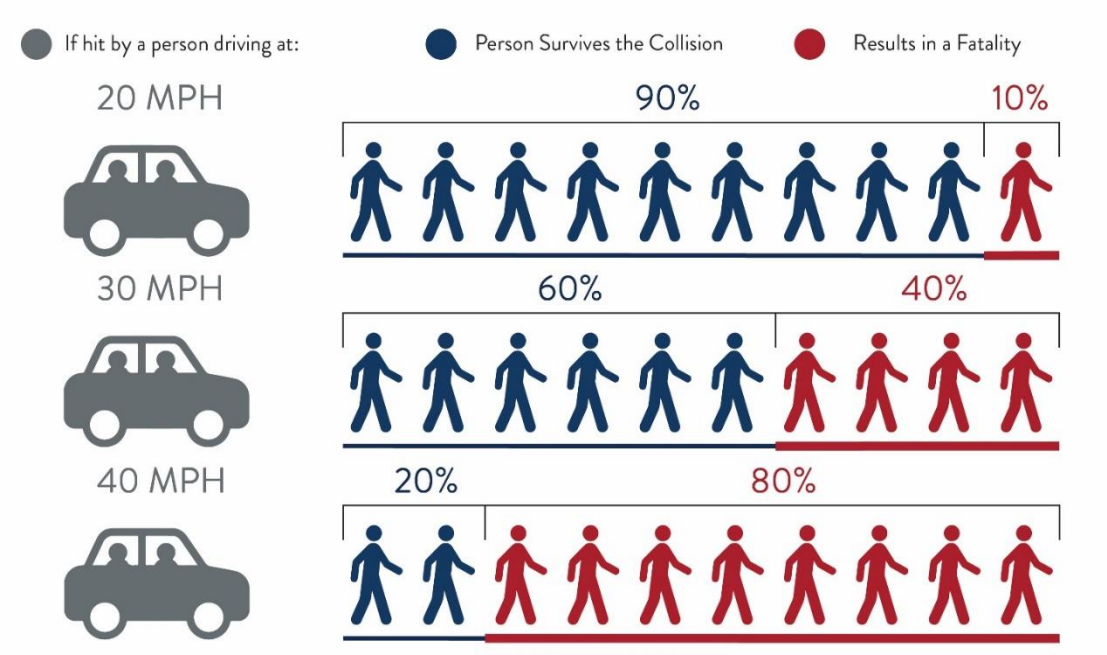
Figure 25: Trip Length on TH 60 through Downtown



Speeds

Research has shown that speeds a driver chooses to travel are a function primarily of roadway design, context, and congestion, not necessarily the posted speed limit. Higher speeds contribute to increased severity of vehicular crashes and increases the likelihood that a vehicle-pedestrian crash results in a fatality. At 20 miles per hour, there is a 90 percent chance a pedestrian survives a crash. At 30 miles per hour, there is a 60 percent chance a pedestrian survives a crash. At 40 miles per hour, there is just a 20 percent chance a pedestrian survives a crash.

Figure 26: Relationship between Speed and Pedestrian Survivability



COLLECTED SPEED DATA

Speed data was collected at 10 different locations along TH 60 as shown in Figure 27. Most locations see 85th percentile speeds, the speed at which 85 percent of cars travel at or below, very close to posted speed limits. However, some locations were significantly over or under the posted speed limits.

- At 24th Street, northbound speeds are posted at 65 miles per hour, but the 85th percentile speeds were 47 miles per hour or 28 percent lower.
- At 1st Avenue N, the southbound posted speed limit is 40 miles per hour, but the 85th percentile speed was 47 miles per hour or 18 percent higher.
- Between 13th Street and 14th Street, speeds are posted at 30 miles per hour. The southbound 85th percentile speed was 35 miles per hour, or 17 percent higher.
- South of TH 62, posted speeds are 30 miles per hour for the northbound direction and the 85th percentile speed was 39 miles per hour, or 30 percent higher. Southbound posted speeds are 45 miles per hour with the 85th percentile speed at 41 miles per hour or nine percent lower.
- South of US 71 S, posted speed limits are 45 miles per hour for both directions. The northbound 85th percentile speed was 50 miles per hour (11 percent higher) and southbound 85th percentile speed was 54 miles per hour (20 percent higher).

Figure 27: 85th Percentile and Posted Speed Limits

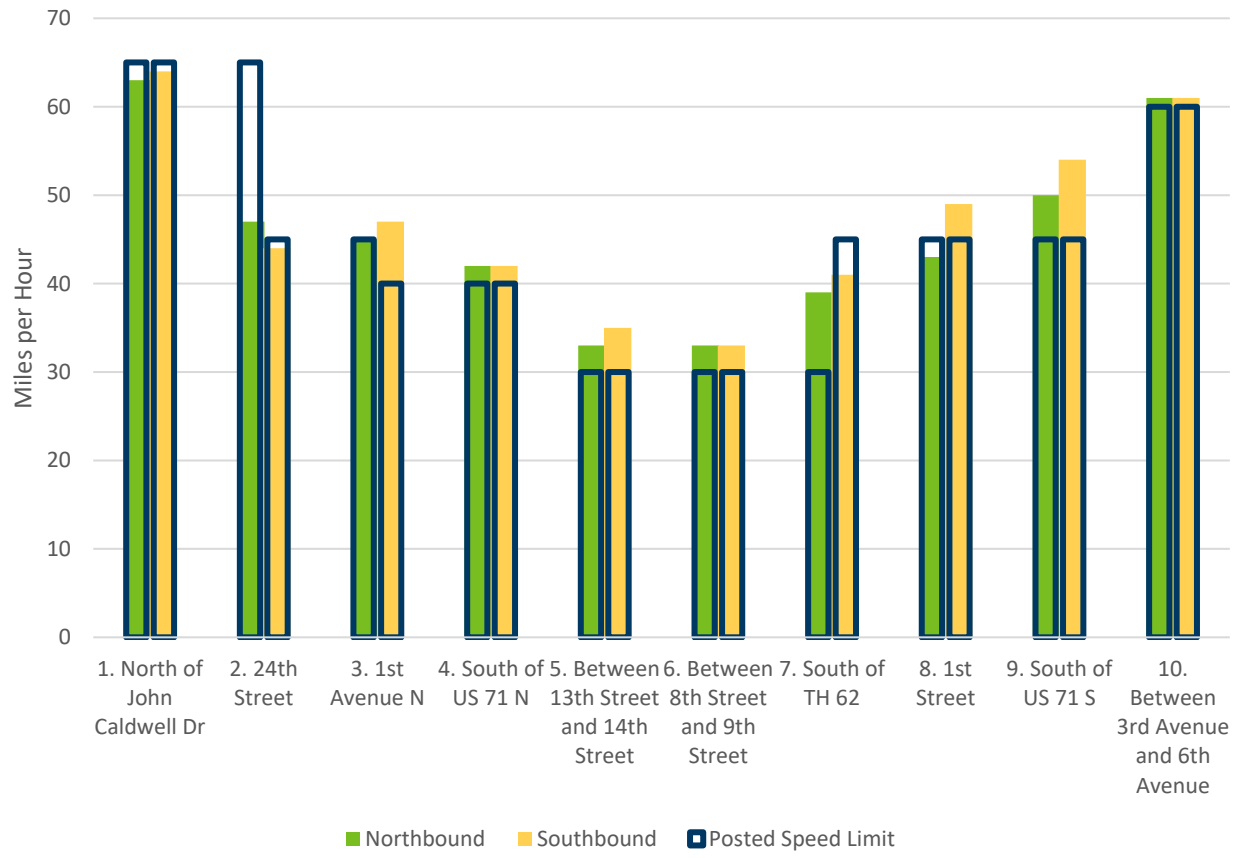
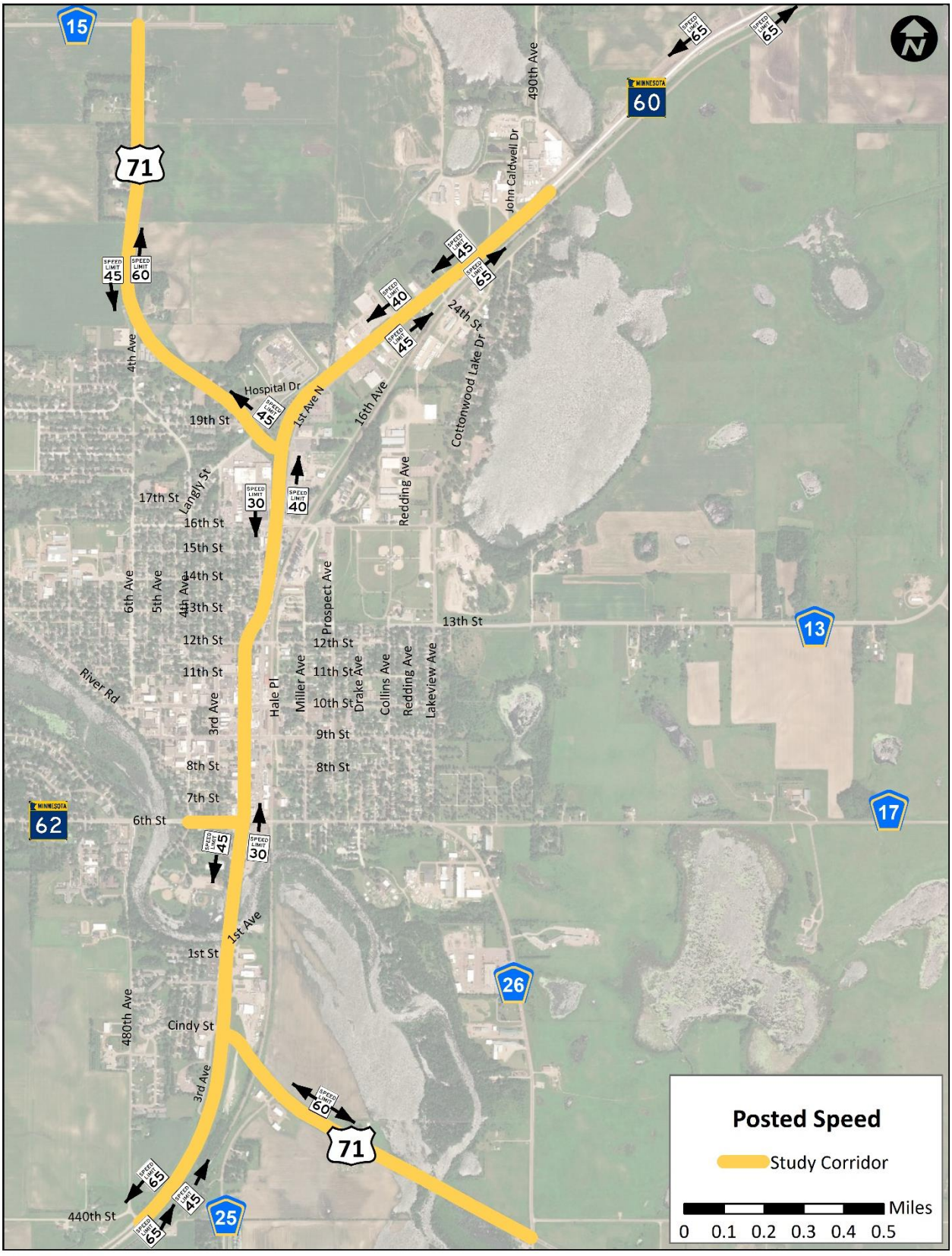


Figure 28: Posted Speeds



Source : MnDOT, ESRI

February 2020

Vehicular Level of Service

Vehicular traffic operations were analyzed at the key intersections. Intersection capacity analysis was evaluated in terms of delay and level of service (LOS). LOS is a term used to describe the operational performance of transportation infrastructure elements; it assigns a grade value that corresponds to specific traffic characteristics within a given system, as shown in Table 9. At intersections, LOS is a function of average vehicle delay, whereas LOS for a roadway section is defined by the average travel speed. LOS "A" represents free flow traffic whereas LOS "F" represents gridlock. LOS "D" or worse is considered deficient, in accordance with the MnDOT standards. Capacity analysis was conducted using Vissim microsimulation software, which simulates the movement of every vehicle through an intersection and then collects information for associated performance measures like delay, queue lengths, travel times, and density.

Table 9: Level of Service Thresholds

Control Delay (Sec/Veh)		Level of Service
Unsignalized	Signalized	
≤ 10	≤ 10	A
10 – 15	10 – 20	B
15 – 25	20 – 35	C
25 – 35	35 – 55	D
35 – 50	55 – 80	E
> 50	> 80	F

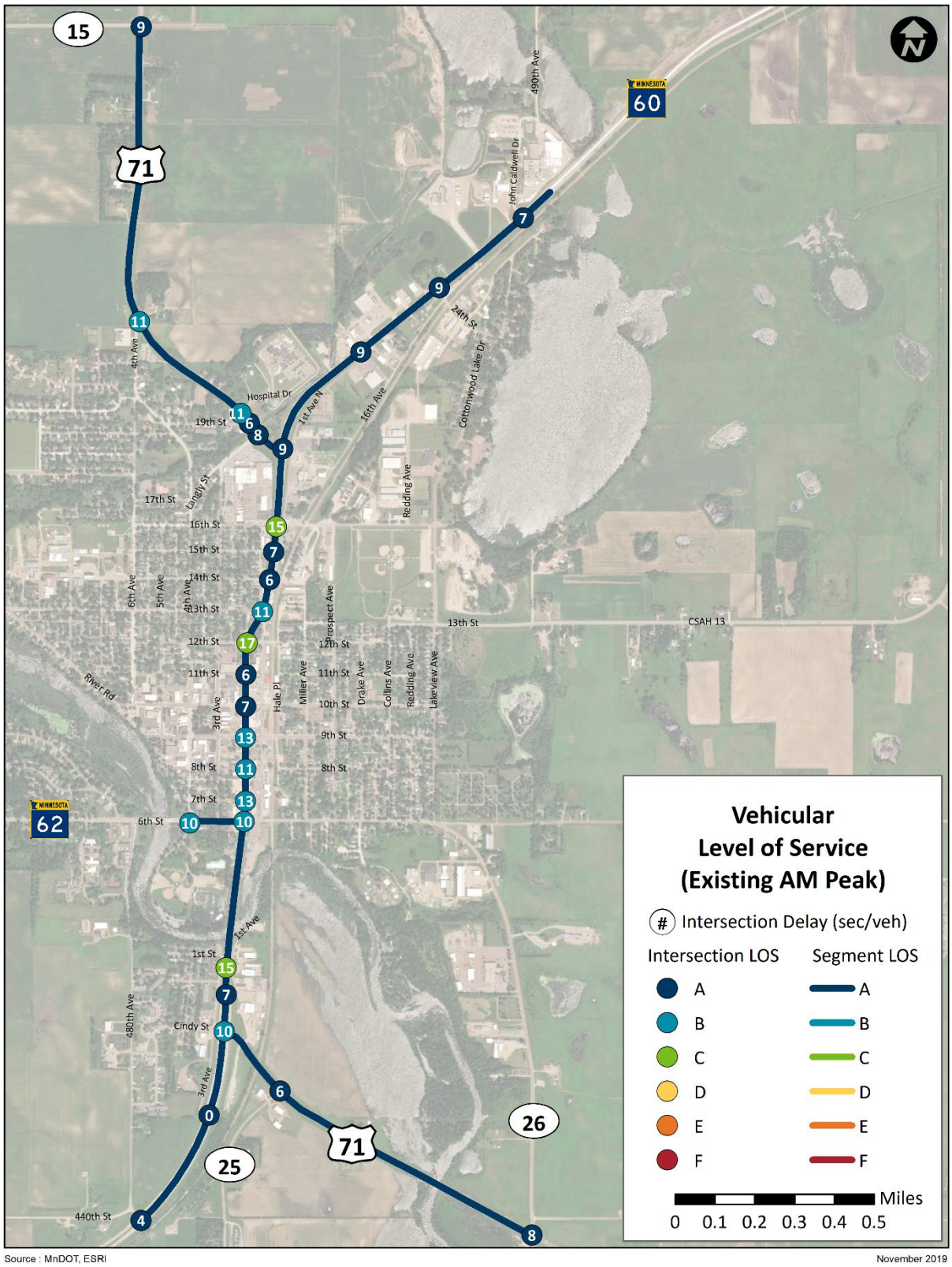
PEAK HOUR OPERATIONS

Vehicular traffic operations are very good during the peak hours of a typical day.

- During the morning peak hour (7 AM), every intersection operates at LOS "A" and all approaches are LOS "C" or better.
- During the evening peak hour (4 PM), every intersection operates at LOS "A". Minor approaches begin to experience longer delays, specifically at TH 60 and 8th Street. Deficient minor approach delays are common at two-way stop control intersections when the major approach has high traffic volumes.

Morning peak hour operations are shown in Table 10, with the overall intersection operations and the worst approach shown in brackets. Figure 29 and Figure 30 shows the current vehicular level of service for the morning and evening peak hours, respectively.

Figure 29: Vehicular Level of Service for Existing AM Peak Hour



Source : MnDOT, ESRI

November 2019

Figure 30: Vehicular Level of Service for Existing PM Peak Hour

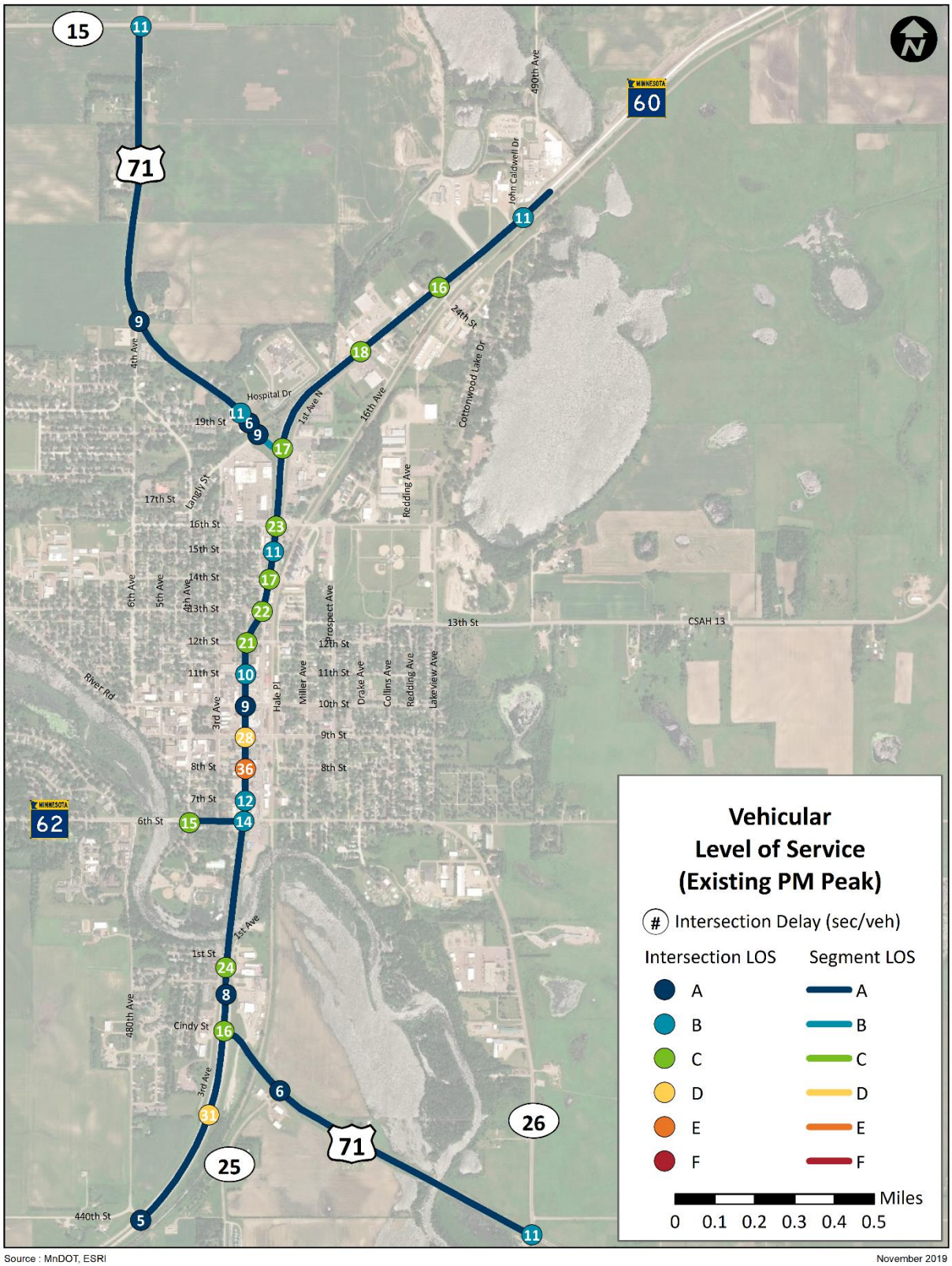


Table 10: 2019 AM and PM Intersection Operations

	2019 AM	2019 PM		2019 AM	2019 PM
TH 60 and 6th Avenue S	A [A]	A [A]	TH 60 and 15th Street	A [A]	A [B]
TH 60 and 3rd Avenue S	A [A]	A [D]	TH 60 and 16th Street	A [C]	A [C]
TH 60 and US 71 S	A [A]	A [C]	TH 60 and US 71 N	A [A]	A [C]
TH 60 and 1st Avenue S	A [A]	A [A]	TH 60 and 1st Avenue N	A [A]	A [C]
TH 60 and 1st Street	A [B]	A [C]	TH 60 and 24th Street	A [A]	A [C]
TH 60 and 6th Street	A [C]	A [C]	TH 60 and John Caldwell Drive	A [A]	A [B]
TH 60 and 7th Street	A [B]	A [B]	US 71 S and CSAH 26	A [A]	A [B]
TH 60 and 8th Street	A [B]	A [E]	US 71 S and CSAH 25	A [A]	A [A]
TH 60 and 9th Street	A [B]	A [D]	US 71 N and Langley St	A [A]	A [A]
TH 60 and 10th Street	A [C]	A [C]	US 71 N and 19th Street	A [A]	A [A]
TH 60 and 11th Street	A [A]	A [A]	US 71 N and Hospital Drive	A [B]	A [B]
TH 60 and 12th Street	A [C]	A [C]	US 71 N and 4th Avenue	A [B]	A [A]
TH 60 and 13th Street	A [B]	A [C]	US 71 N and CSAH 15	A [A]	A [B]
TH 60 and 14th Street	A [A]	A [C]	TH 62 and 4th Avenue	A [B]	A [C]

**X[X] = overall level of service [worst approach level of service]*

Travel Time Reliability

Travel time reliability measures the extent of unexpected delay, as measured from day-to-day and across different times of the day. Most travelers are less tolerant of unexpected delays because they cannot be incorporated into planned travel time, resulting in late arrivals; alternatively budgeting twice as long as needed for a trip also can result in wasted time. The Level of Travel Time Reliability (LOTTR) is defined as the ratio of the 85th percentile travel time to an average travel time for all vehicles. LOTTR will never be less than one while a LOTTR of 1.50 and greater indicate severe unreliability for the given confidence interval. For example, a LOTTR of 2.00 means that motorists should plan for twice the amount of travel time to arrive at their destinations on time.

Travel times and reliability were calculated for four routes along US 71 and TH 60.

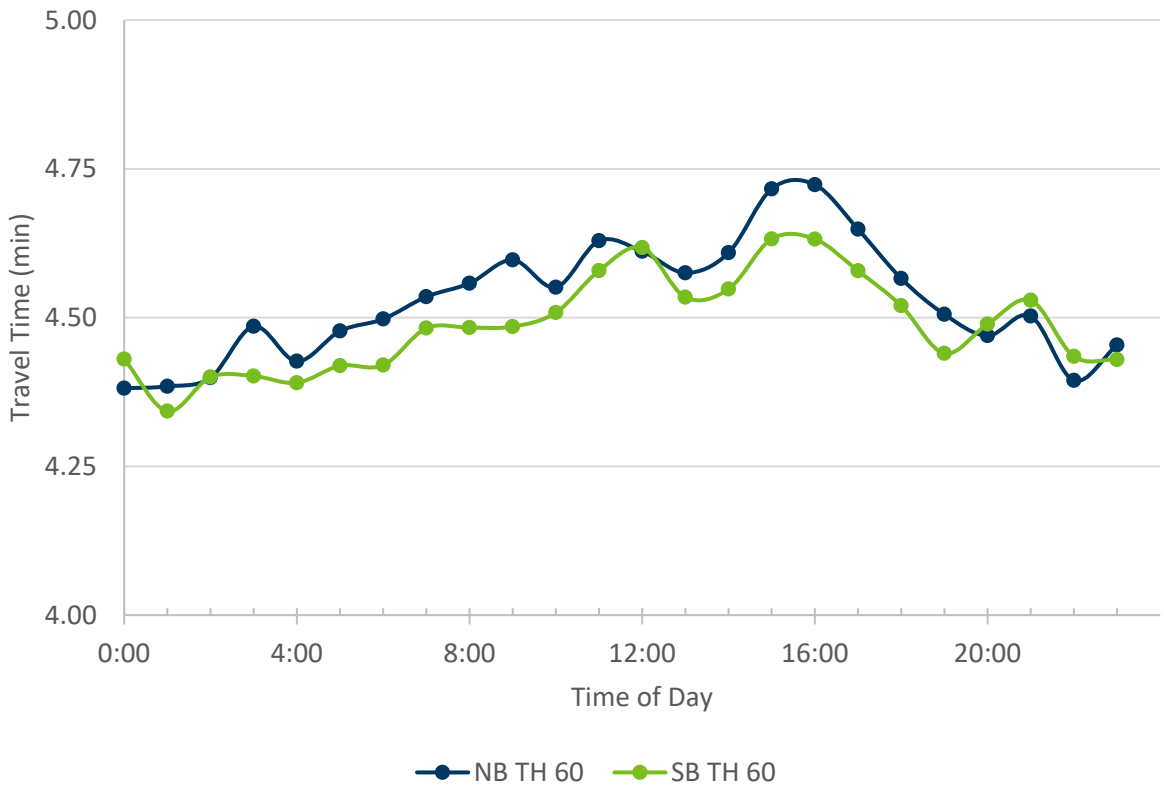
- Northbound TH 60 from 6th Avenue S to John Caldwell Drive
- Southbound TH 60 from John Caldwell Drive to 6th Avenue S
- Southbound US 71 from Opportunity Drive to CSAH 26 (including TH 60)
- Northbound US 71 from CSAH 26 to Opportunity Drive (including TH 60)

Over the course of a regular day, travel times are very consistent.

- Along TH 60, the longest travel times averaged just under 4.75 minutes and the shortest travel times just over 4.3 minutes, for a difference of around 20 seconds. Travel time reliability was 1.03 for both directions along this segment.
- Along US 71, the longest travel times averaged around 5.8 minutes and the shortest travel times around 5 minutes, for a difference of around 50 seconds. Travel time reliability was 1.05 for the northbound direction and 1.06 for the southbound direction.

Both routes in both directions have very good travel time reliability, indicating consistent daily operations.

Figure 31: Daily Travel Times on TH 60



Network Operations

Each day, thousands of vehicles use TH 60, TH 62, and US 71, along with the local streets in Windom. Based on these trip making characteristics, the network details for peak hour operations can be calculated for the study corridors and intersection roadways. These details are summarized in Table 11 and will be used to compare future conditions as well as alternatives developed later in this study.

During the AM peak, the average travel time and distance traveled are slightly longer, but vehicles experience less delay and travel at higher speeds than during the PM peak. The higher than posted speeds reflect the varying speed limits across the corridor, including the high speed segments of TH 60, US 71 N, and US 71 S.

Table 11: 2019 Daily Network Operations

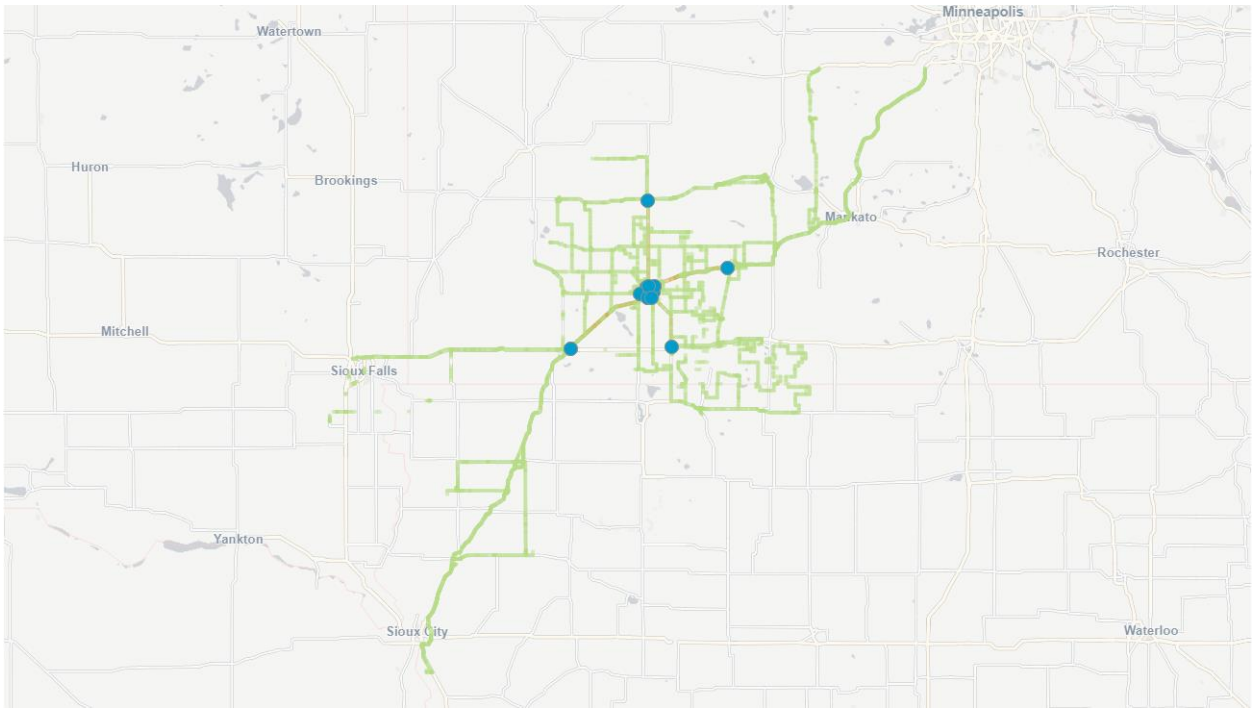
Metrics	2019 AM Peak Operations	2019 PM Peak Operations
Average Travel Time	2.8 Minutes	2.7 Minutes
Average Delay	17.6 Seconds	22.5 Seconds
Average Speed	38.8 Miles per Hour	36.9 Miles per Hour

Freight Conditions

TH 60 is an important freight route connecting to Minneapolis, Omaha, and Denver. TH 60 and US 71 also connect to I-90, which extends from Seattle, Washington to Boston, Massachusetts. These freight connections support some of the largest employers and freight generators in Windom, including Comfrey Farm Prime Pork, Toro, and Fortune Transportation. Maintaining freight mobility to, through, and around Windom is important to continue to sustain the economy of Windom.

Figure 32 shows routes for continuous truck trips through Windom based on StreetLight data. These continuous trips include any segment without a five-minute or longer stop.

Figure 32: Origins and Destinations for Truck Trips Through Windom



Generators

Freight generators are businesses and services that create large amounts of truck traffic. Typical freight generators include agriculture (New Vision Co-op), construction (Cemstone Ready Mix), manufacturing (Toro and Comfrey Farm Prime Pork), and Transportation and Warehousing (Fortune Transportation). Some commercial retail businesses, like HyVee, may generate regular truck traffic. Figure 33 shows the freight traffic generators.

Truck Routes

In Minnesota, any road that receives state funding must be available for trucks, including County State Aid Highways (CSAH 13, 17, 25, and 26). Figure 34 shows the currently identified freight routes through and around Windom.

Figure 33: Freight Generators and Truck Routes

Existing Truck Traffic

TH 60 is the primary freight route through the City of Windom, carrying between 1,150 and 2,000 trucks each day (14.8 to 20.3 percent). US 71 carries fewer trucks with 620 on the US 71 N segment (14.9 percent) and 455 on the US 71 S segment (20.7 percent). TH 62 carries around 390 trucks per day (11.6 percent). These truck percentages are common for state highways throughout District 7.

Freight Level of Service

Freight haulers rely on travel time reliability so they can make their deliveries on-time and minimize delays. Travel time reliability measures the extent of unexpected delay, as measured from day-to-day and across different times of the day. While the overall travel time reliability uses a ratio of the 85th percentile travel time to the average travel time, the freight level of service uses the 95th percentile travel time for trucks only. Freight level of service thresholds are shown in Table 12.

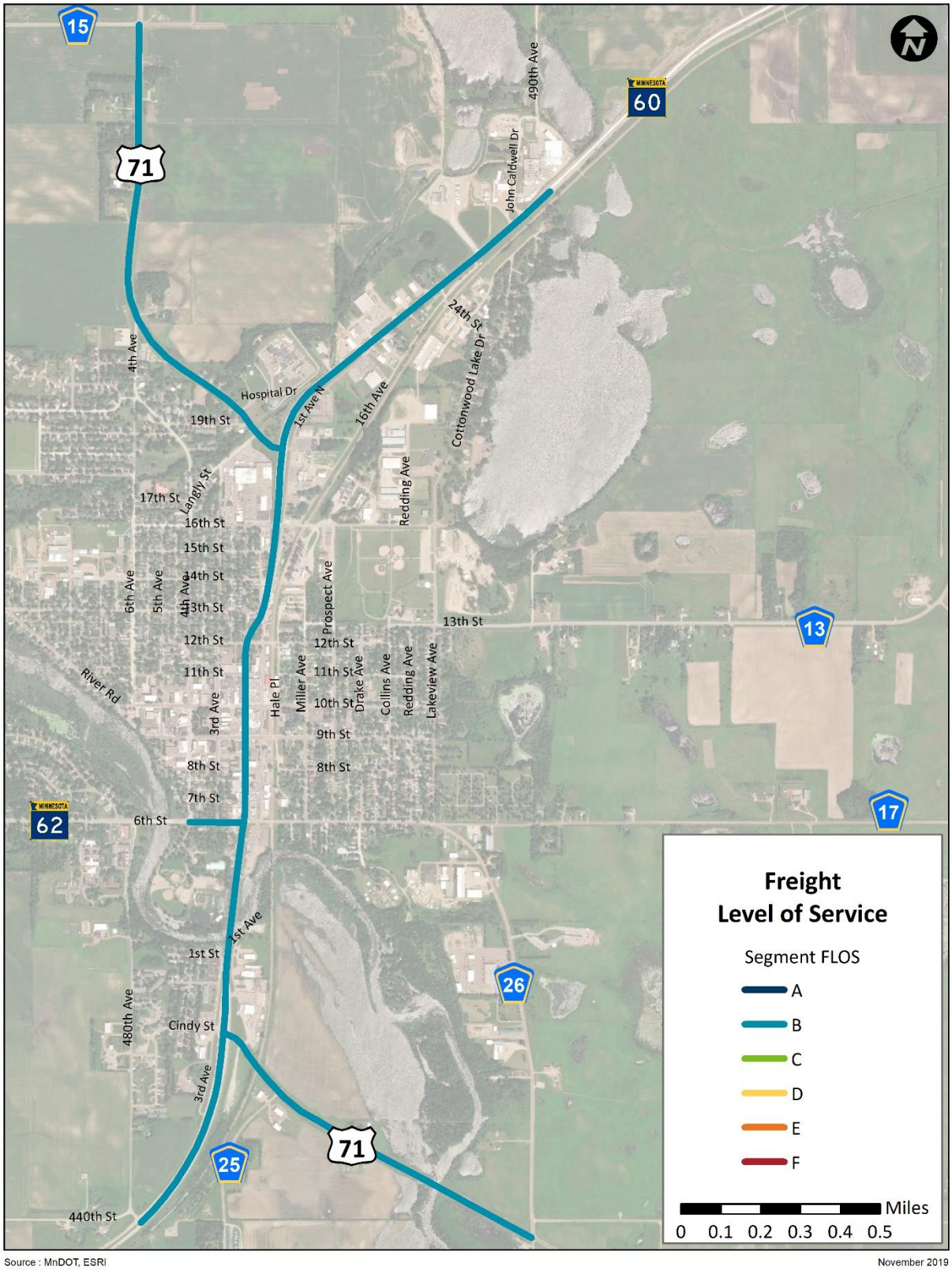
Table 12: Freight Level of Service

LOTTR 95th Percentile	Level of Service
1.0	A
1.0 – 1.25	B
1.25 – 1.60	C
1.60 – 2.0	D
2.0 – 2.5	E
> 2.5	F

DAILY FREIGHT OPERATIONS

Along TH 60, the travel time reliability for trucks is 1.06 for northbound and 1.05 for southbound movements, both level of service “B”. Along US 71, the travel time reliability for trucks is 1.12 for southbound trucks. The model was unable to calculate travel time reliability for northbound US 71 movements due to the low numbers of trucks making that entire movement. Figure 34 shows the freight level of service.

Figure 34: Freight Level of Service



Pedestrian Conditions

Enhancing the ability of people to walk and bike involves providing adequate infrastructure and linking urban design, streetscapes, and land use to encourage walking and biking. Designing roadways to accommodate all types of users is commonly termed “complete streets” which come with many benefits:

- Streets designed with sidewalks, raised medians, traffic-calming measures and treatments for travelers with disabilities improves pedestrian safety. Research has shown that sidewalks alone reduce vehicle-pedestrian crashes by 88 percent.
- Multiple studies have found a direct correlation between the availability of walking and biking options and obesity rates. The Centers for Disease Control and Prevention recently named adoption of complete streets policies as a recommended strategy to prevent obesity.
- Complete streets offer inexpensive transportation alternatives to roadways. A recent study found that most families spend far more on transportation than food.
- Research has found that people who live in walkable communities are more likely to be socially engaged and trusting than residents living in less walkable communities.

Pedestrian Amenities and Facilities

Windom has an extensive network of pedestrian facilities. However, the provision of sidewalks is often not enough to ensure a safe and comfortable pedestrian experience. Factors that may impact walking include sidewalk presence, quality, and width, and the natural and built environment. Broken concrete, lack of curb ramps, and sidewalk obstructions can often decrease people’s willingness to walk along a corridor.

Figure 35: Examples of Challenging Pedestrian Amenities in Windom

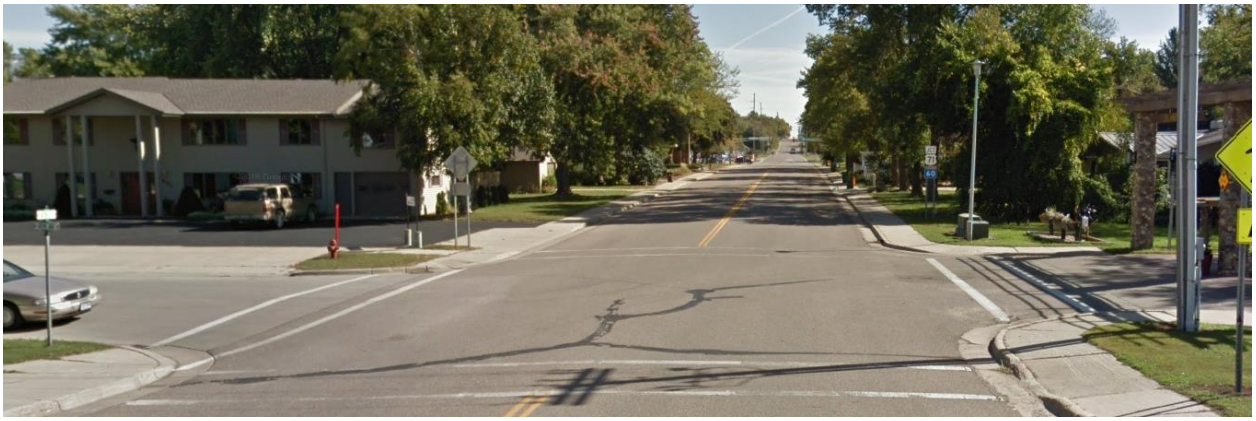
FACILITY GAPS

The 2018 Windom Comprehensive Plan identified multiple gaps in the sidewalk network. While these are primarily along local streets, they parallel the study corridors. The existing pedestrian facilities are shown in Figure 37.

GENERATORS

Pedestrian and bicycle generators are types of land uses or attractions that people are inclined to walk or bike to like a school, park, coffee shop, or restaurant. Providing safe and efficient access to these generators can improve connectivity and encourage people to walk or bike to them. Generators are shown in Figure 37.

Figure 36: TH 62 and 4th Avenue Intersection



Pedestrian Level of Service

Pedestrian Level of Service (PLOS) incorporates a metric for segments (roadways between two intersections) and intersections. The *Highway Capacity Manual* provides a pedestrian level of service calculation for intersections that incorporates traffic volumes, speed, and the physical characteristics of the intersection. For segments, PLOS incorporates the number of travel lanes, traffic volumes, traffic speeds, truck traffic, and buffer width.

- TH 60 ranges from segment PLOS “C” on the northern end where there are wide shoulders and low volumes, and the urban core where there are sidewalks, to PLOS “E” south of TH 62 where there are no facilities or shoulders.
- US 71 N and US 71 S has a segment PLOS “D” due to lack of facilities.
- TH 62 has a segment PLOS “C” with narrow sidewalks adjacent to the roadway.
- Many of the intersections have PLOS “F” because they are uncontrolled.

Based on these calculations, the PLOS is shown in Figure 38.

Figure 37: Existing Pedestrian Facilities and Generators

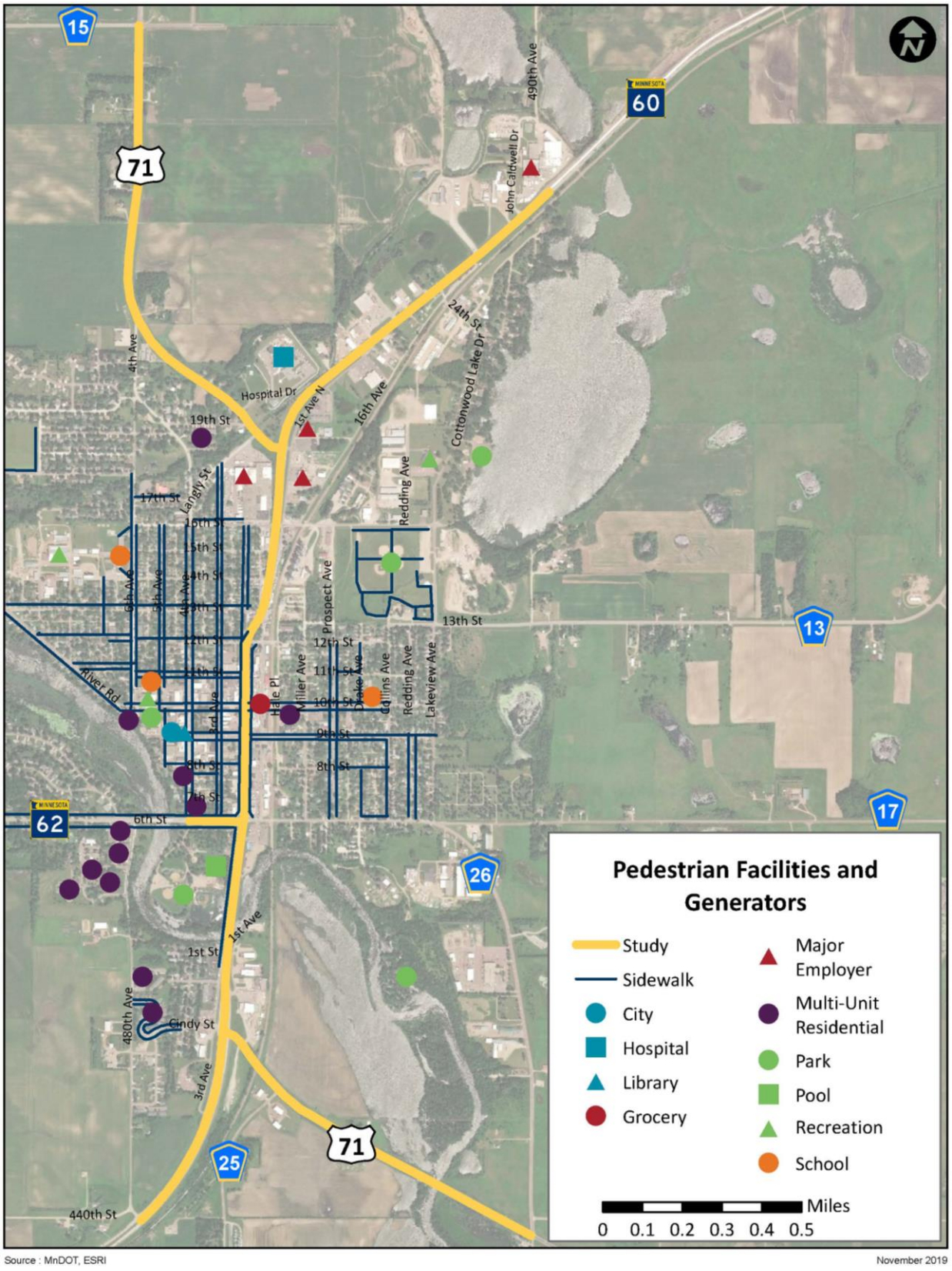
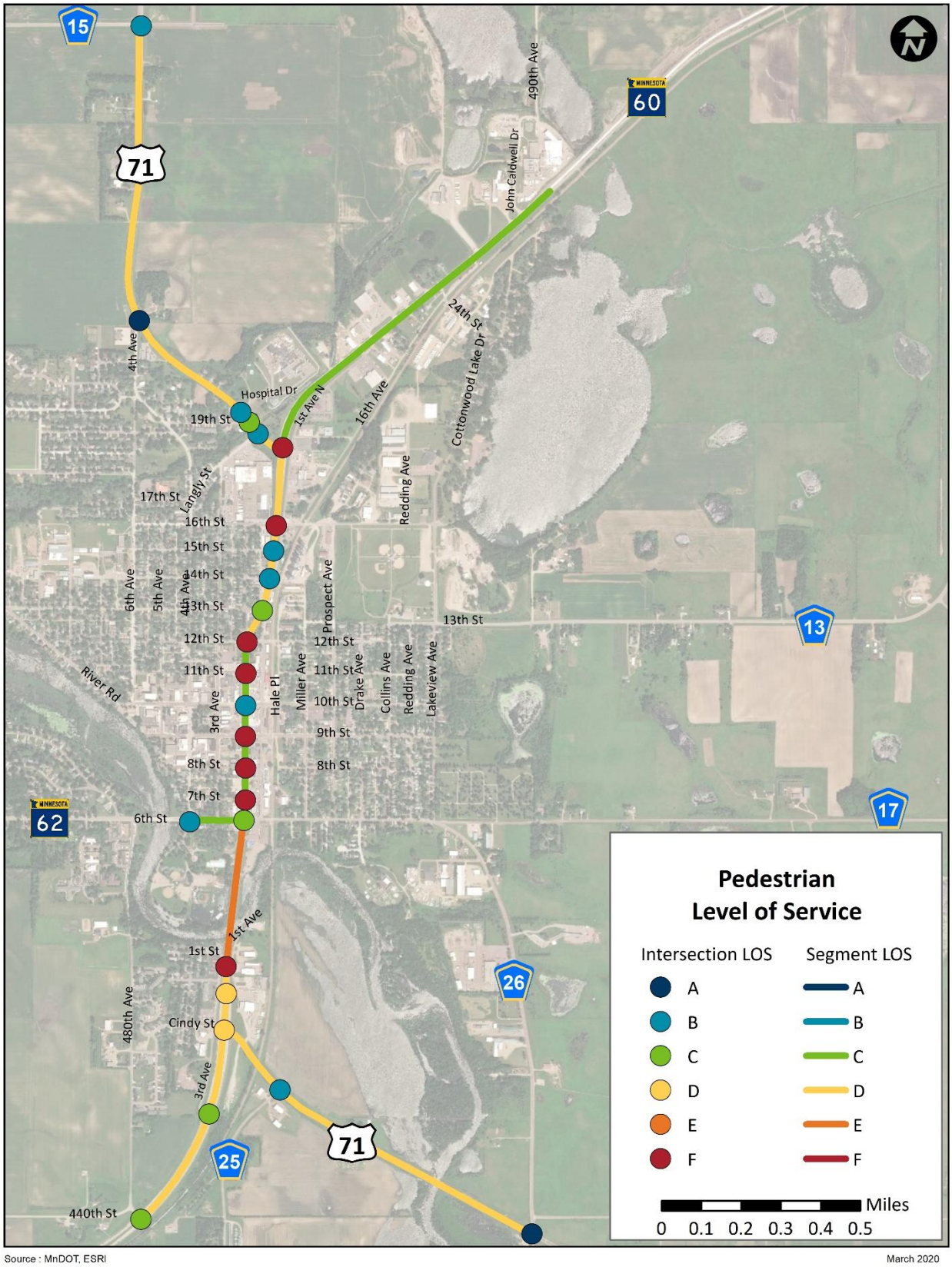


Figure 38: Pedestrian Level of Service

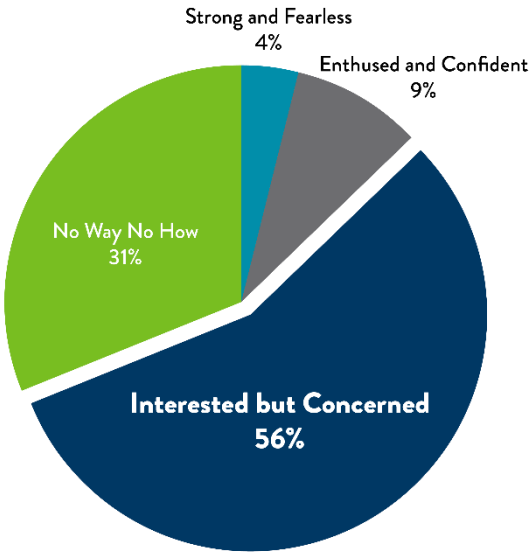


Bicycle Conditions

National research has found that there are generally four levels of interests/abilities when it comes to cycling.

- Strong and Fearless riders are those that are very comfortable without bike lanes. They will ride under most roadway and traffic conditions.
- Enthused and Confident riders will ride their bikes with appropriate infrastructure.
- Interested but Concerned riders are interested in biking more but are not comfortable with the infrastructure or have other barriers to biking.
- No Way No How are unable or uninterested in bicycling and no change to the environment or infrastructure is likely to encourage them to cycle more.

Figure 39: Cyclist Types and Their Behavior



Nearly three-quarters of Strong and Fearless, Enthused and Confident, and Interested but Concerned cyclists had ridden at least once in the last 30 days for transportation or recreation. Improving infrastructure and the environment can help encourage these three types of cyclists to choose bicycling more.

Bicycle Amenities and Facilities

Bicycles are generally permitted to ride on sidewalks or in the roadway, excluding the business district, as shown in the land use map in Figure 6 . There are no dedicated bicycle facilities throughout the study area.

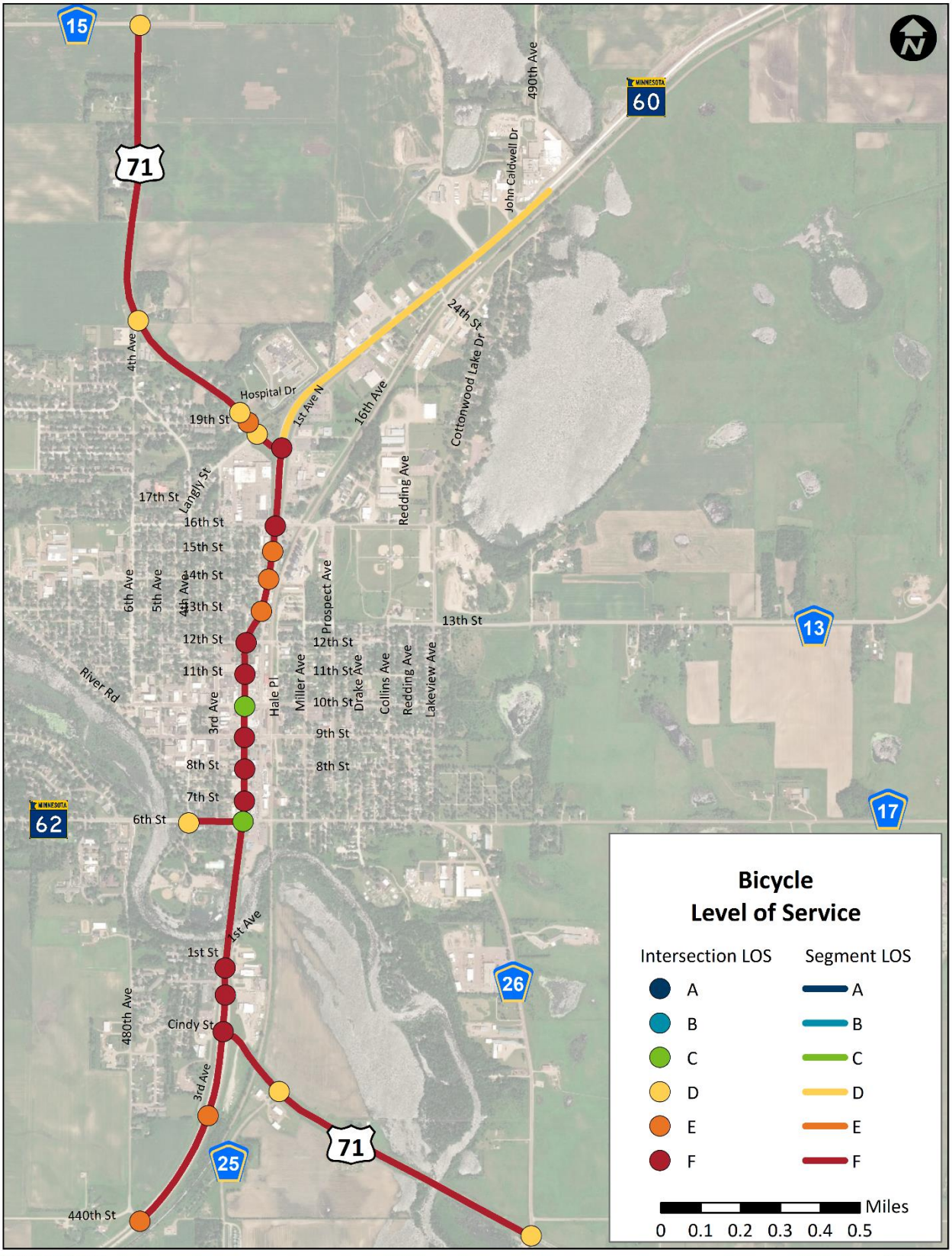
Bicycle Level of Service

Bicycle Level of Service (BLOS) incorporates a metric for segments (roadways between two intersections) and intersections. The *Highway Capacity Manual* provides a BLOS calculation for intersections that incorporates traffic volumes, speed, and the physical characteristics of the intersection. For segments, BLOS incorporates traffic volumes, roadway width, speed, truck traffic, pavement condition, on-street parking, and shoulder width.

Throughout most of the corridor, the segment and intersection BLOS is LOS “F” due to lack of facilities. The two signalized intersections provide intersection BLOS “A”, while the rest of the study intersections are BLOS “D” or worse.

The BLOS is shown in Figure 40.

Figure 40: Bicycle Level of Service



Source : MnDOT, ESRI

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Transit Conditions

Within Windom and Cottonwood County, Community Transit of United Community Action Partnership, formerly known as Western Community Action, provides dial-a-ride public transit service. Dial-a-ride is a curb to curb service that requires passengers to schedule a ride in advance. United Community Action Partnership (UCAP) provides dial-a-ride service in Cottonwood, Jackson, Lincoln, Lyon, Murray, Pipestone, Redwood, and Rock counties. In 2017, UCAP provided more than 198,000 rides across this service area. Less than one percent of workers use public transportation to get to work within Cottonwood County.

Transit level of service was not included in the multimodal level of service.

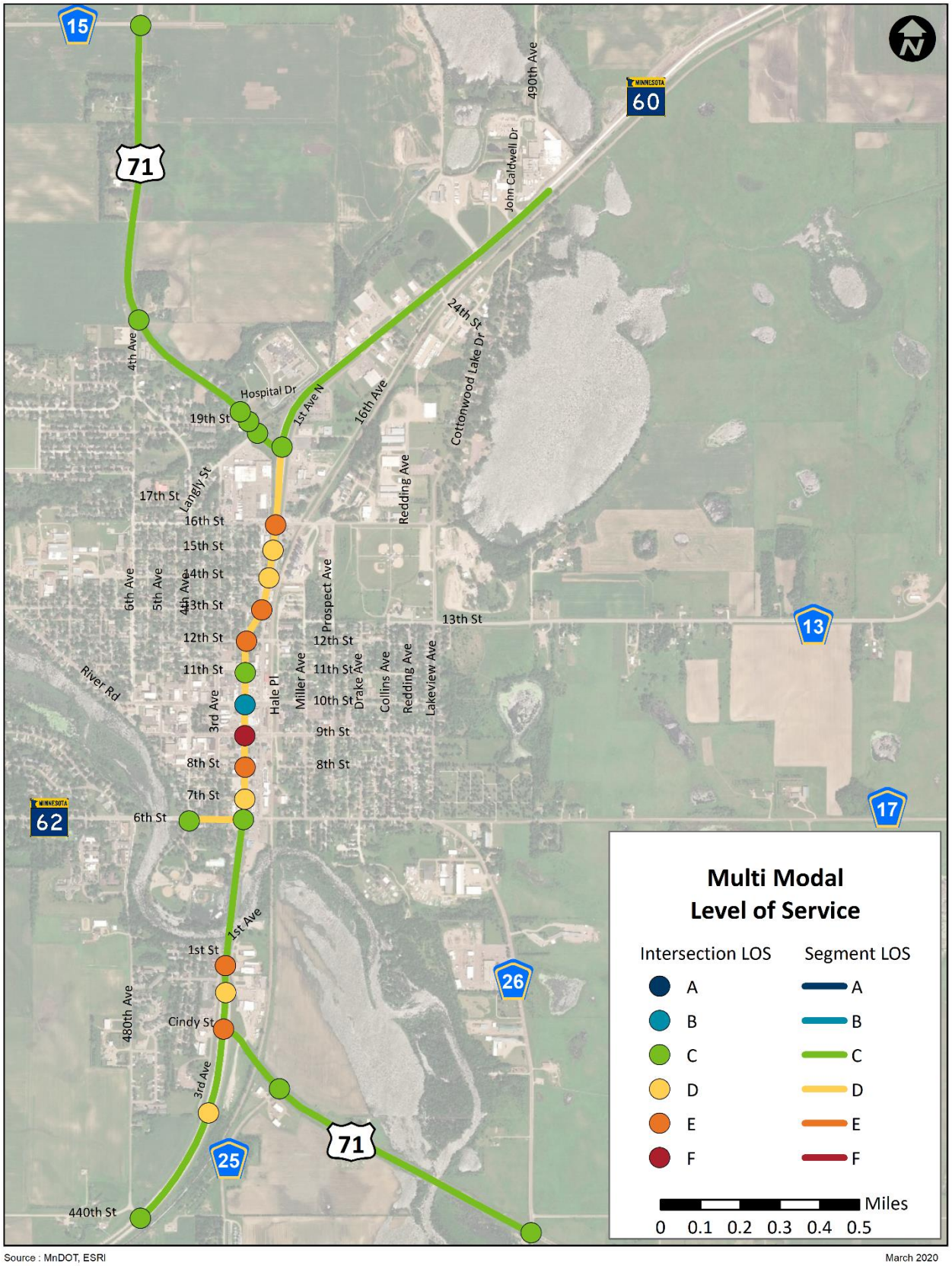
Multimodal Level of Service

Vehicular, freight, pedestrian, and bicycle levels of service were calculated independently throughout the study area. The unweighted multimodal level of service combines each of the four modal levels of service into a single level of service, which is shown by segment and intersection in Figure 41.

- Most segments of TH 60 are acceptable because of very efficient vehicle and freight levels of service. The poor bicycle and pedestrian operations along the corridor are reflected in the intersection levels of service.
  - North of US 71 N, the segment is MMLOS C
  - Between US 71 N and TH 62 has a segment MMLOS D with many deficient intersection levels of service.
  - South of TH 62, the segment is MMLOS C with some deficient intersections.
- US 71 N and US 71 S has segment and intersection MMLOS C.
- TH 62 has a segment MMLOS D.

With Steering Committee and public input, the level of service can be weighted to better reflect the priorities for the study area.

Figure 41: Existing Multimodal Level of Service



FUTURE MULTIMODAL ANALYSIS

Traffic Forecasting

To understand future transportation issues and needs, 2040 traffic projections were developed. Traffic projections were guided by a review of historic traffic growth, anticipated demographic and land use changes, and engineering judgment.

Historic Traffic Growth

MnDOT maintains a traffic volume database that contains existing and historic traffic volumes throughout the state. For the TH 60 study area, historic data is available back to around the year 1998 or 2000, depending on the location. The following traffic growth rates have been observed in the study area:

TH 60

- South of US 71 (South Junction) – 1.9 percent average annual traffic growth
- South of TH 62/CSAH 17 – 0.4 percent average annual traffic growth
- North of CSAH 13 – Flat traffic volumes
- North of US 71 (North Junction) – 1.0 percent average annual traffic growth

US 71

South leg

- East of CSAH 26 – Flat traffic volumes
- East of TH 60 – 0.7 percent average annual traffic ***decrease***

North leg

- West of TH 60 – 1.6 percent average annual traffic growth

OTHER ROADWAYS

TH 62

- West of TH 60 – 0.1 percent annual average traffic growth

CSAH 13

- East of TH 60 – 1.3 percent average annual traffic ***decrease***
- West of TH 60 – 1.4 percent average annual traffic ***decrease***

CSAH 17

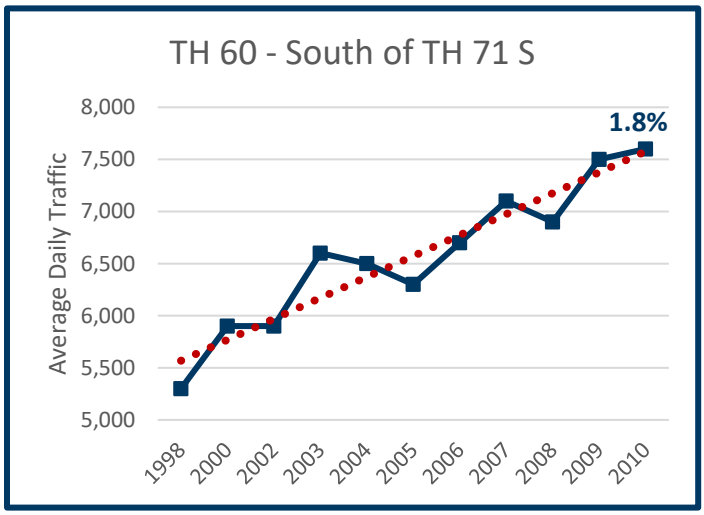
- East of TH 60 – 0.9 percent average annual traffic growth

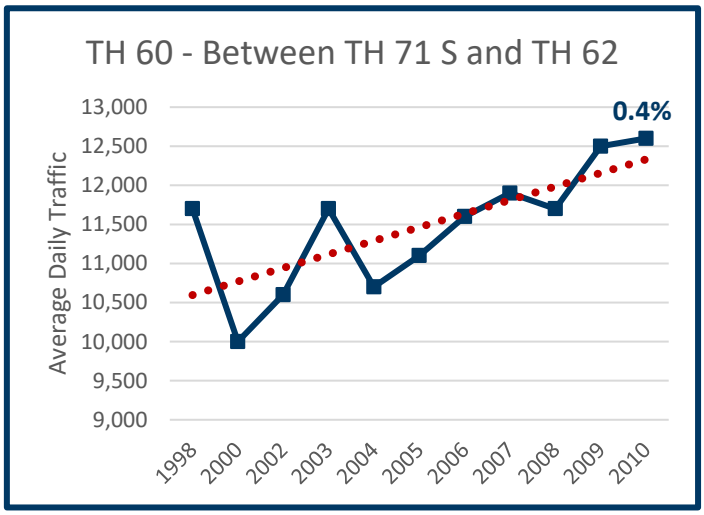
CSAH 26

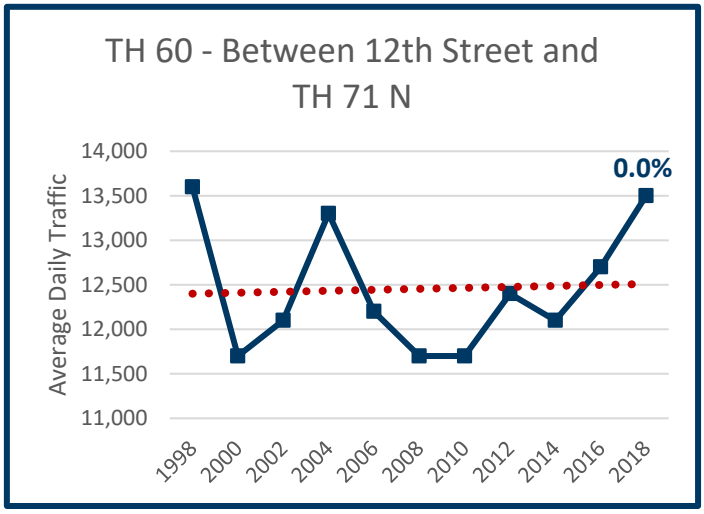
- North of US 71 – 3.6 percent average annual traffic ***decrease***

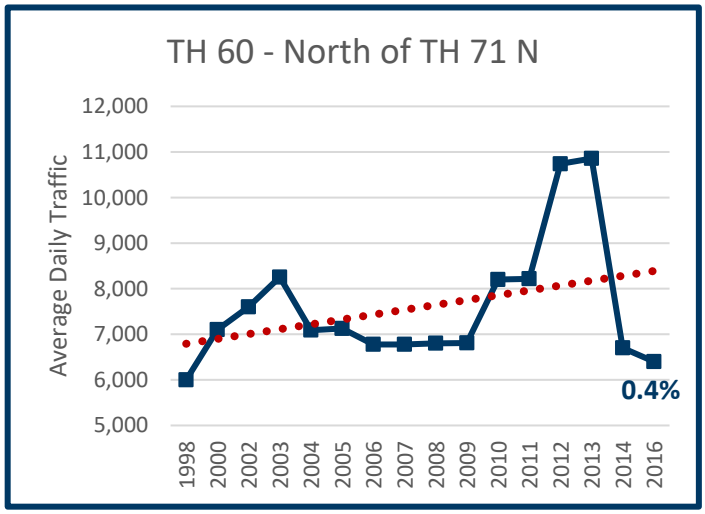
Charts showing historic traffic data throughout the study area can be seen in Figure 42.

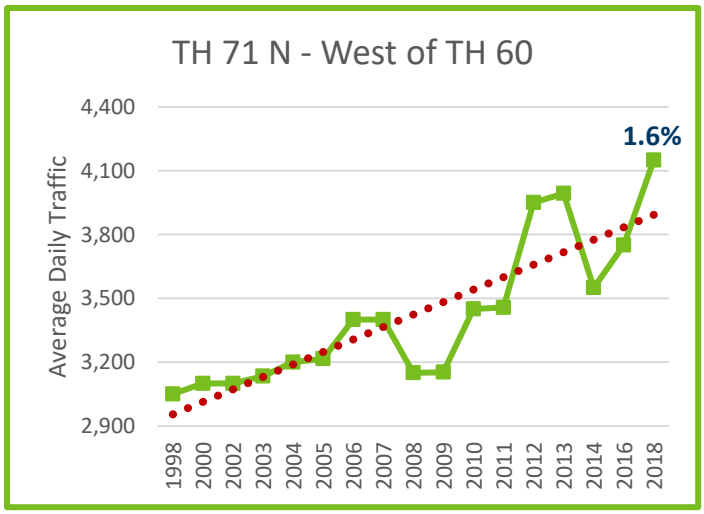
Figure 42: Historic Traffic Data with Average Annual Growth Rates

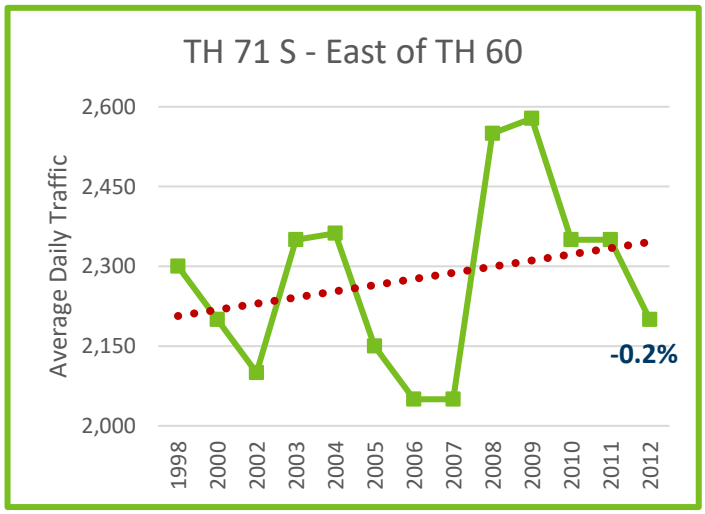


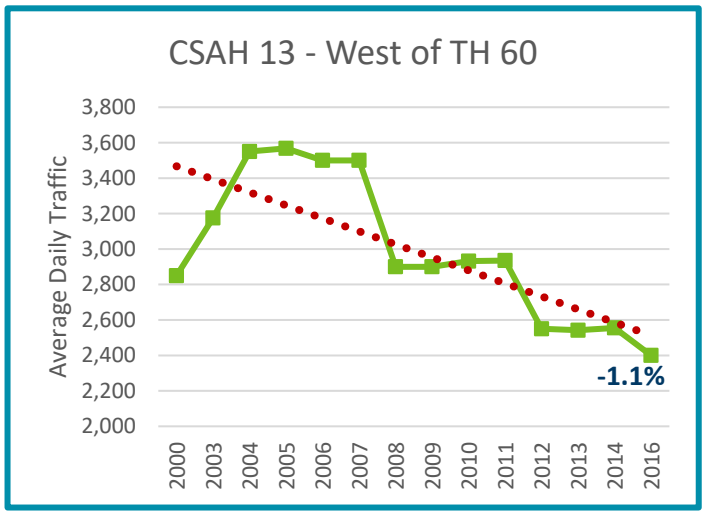


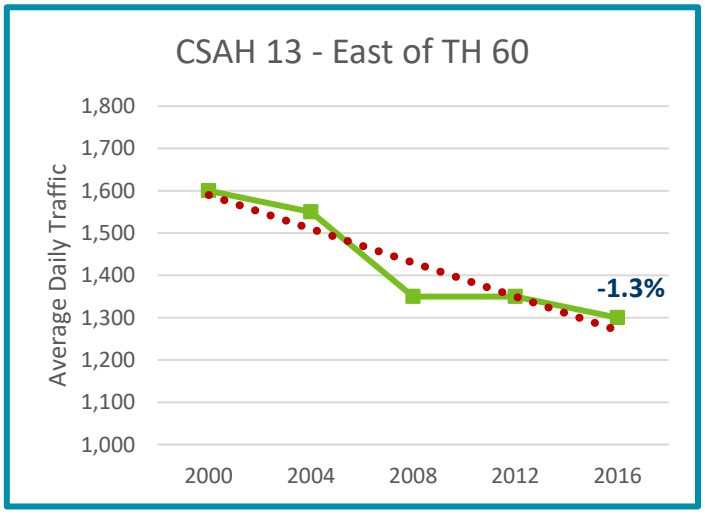


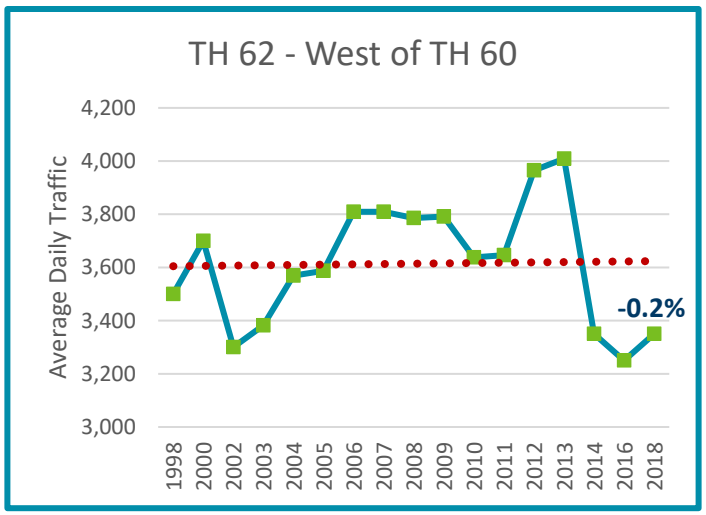


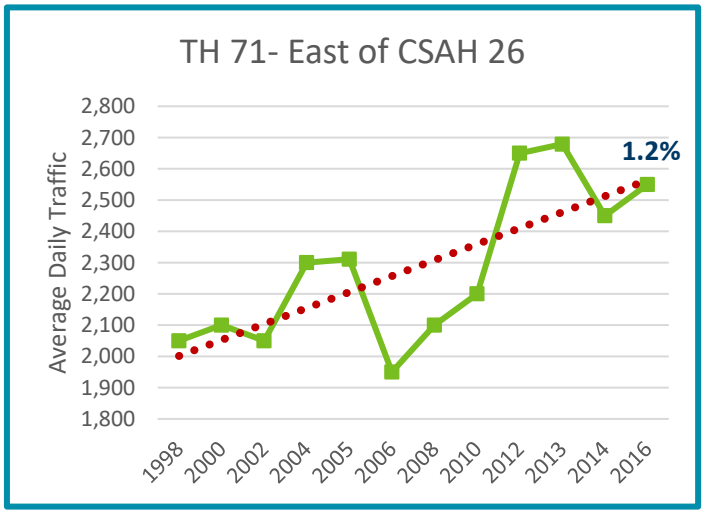


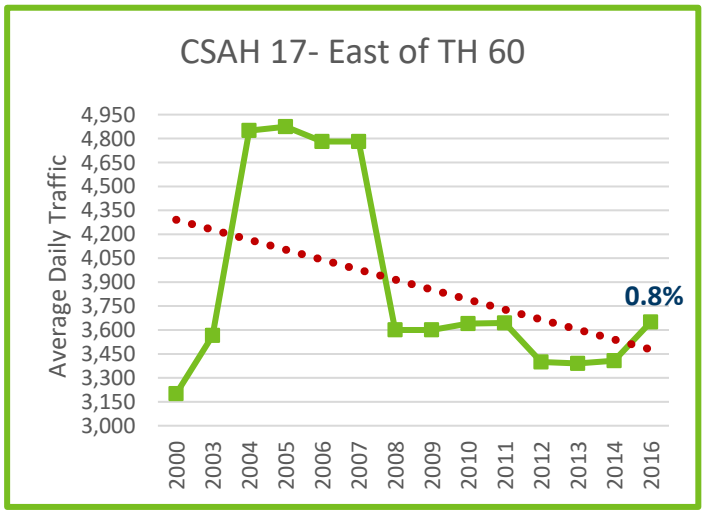


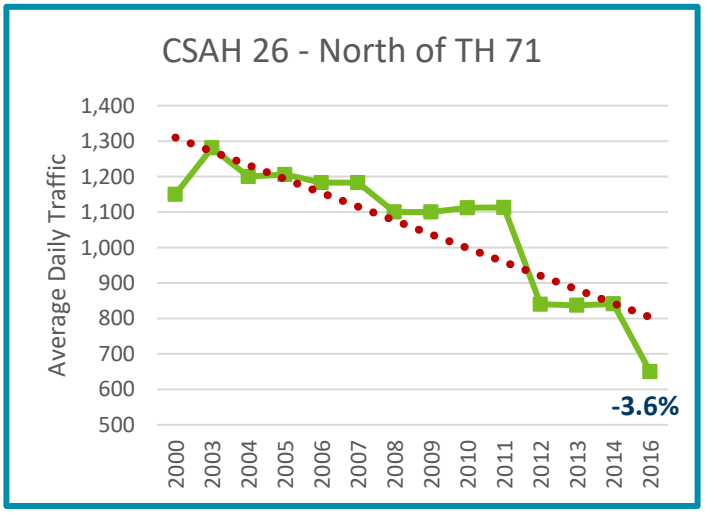

CSAH 13 - West of TH 60
Average Daily Traffic
3,800
3,600
3,400
3,200
3,000
2,800
2,600
2,400
2,200
2,000
2000 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2016
-1.1%


CSAH 13 - East of TH 60
Average Daily Traffic
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
2000 2004 2008 2012 2016
-1.3%


TH 62 - West of TH 60
Average Daily Traffic
4,200
4,000
3,800
3,600
3,400
3,200
3,000
1998 2000 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2016 2018
-0.2%


TH 71- East of CSAH 26
Average Daily Traffic
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1998 2000 2002 2004 2005 2006 2008 2010 2012 2013 2014 2016
1.2%


CSAH 17- East of TH 60
Average Daily Traffic
4,950
4,800
4,650
4,500
4,350
4,200
4,050
3,900
3,750
3,600
3,450
3,300
3,150
3,000
2000 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2016
0.8%


CSAH 26 - North of TH 71
Average Daily Traffic
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
2000 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2016
-3.6%

Anticipated Demographic and Land Use Changes

After reviewing historic traffic growth, anticipated demographic and land uses changes were evaluated to determine potential traffic demand associated with these changes. More detailed discussion related to demographic and land use changes can be found on Page 8 and Page 9 of this document, however key details will be summarized below.

DEMOGRAPHIC PROJECTIONS

Major population changes are not expected through 2040, with Windom's population expected to grow by three percent between 2020 and 2040, and Cottonwood County's population expected to decrease by around four percent over the same time period.

LAND USE CHANGES

Based on conversations with local Economic Development Authority staff, the most significant opportunities for land use changes are at the following locations:

- The former Shopko property along TH 60
- The East Highway 60 Development Plan that would make around 14 acres of property available for development along TH 60 between Runnings and Windom Wash
- The River Bend Center at the intersection of TH 60 and TH 62/County Road 17 has a three-acre lot with 1.4 acres of buildable space

While these sites have been identified as likely redevelopment sites, specific future build-out and uses for these sites have yet to be determined.

Traffic Projections Methodology

Given the uncertainty related to future land use changes, it is recommended an annual growth rate is applied to estimate future traffic rather than estimating specific traffic volumes generated by new land uses. This approach conservatively spreads growth potential throughout the corridor, as opposed to loading growth to major developments. The following annual growth rates were applied to existing volumes to estimate 2040 traffic conditions based on a review of historic growth rates and planned City and County growth:

- TH 60, US 71, and TH 62: One percent annual traffic growth
- Other roadways: One-half percent annual traffic growth

Daily 2040 traffic projections are shown in Figure 43.

Figure 43: 2040 Daily Traffic Projections

Vehicular Conditions

Level of Service

Segment and intersection level of service were evaluated based on traffic simulation results using projected 2040 volumes.

SEGMENT LEVEL OF SERVICE

All study roadways are expected to operate at segment LOS A throughout 2040.

AM PEAK HOUR

In the 2040 AM peak, all study intersections operate at LOS D or better, meaning no intersection-level deficiencies are expected in this time period. The poorest levels of service are expected to be on stop-controlled approaches at TH 60 and 1st Street, 16th Street, and 1st Avenue N intersections.

AM peak hour vehicle level of service is shown in Figure 44.

PM PEAK HOUR

In the 2040 PM peak, some additional delays are expected compared to the AM peak. Deficient minor approach levels of service are expected on the stop-controlled approaches at:

- TH 60 and 1st Street – LOS E (Existing LOS C)
- TH 60 and 9th Street – LOS F (Existing LOS D)
- TH 60 and 16th Street – LOS F (Existing LOS C)

PM peak hour vehicle level of service is shown in Figure 45.

Table 13: 2040 AM and PM Intersection Operations

	2040 AM	2040 PM		2040 AM	2040 PM
TH 60 and 6th Avenue S	A [A]	A [A]	TH 60 and 15th Street	A [A]	A [B]
TH 60 and 3rd Avenue S	A [A]	A [A]	TH 60 and 16th Street	A [D]	A [F]
TH 60 and US 71 S	A [B]	A [C]	TH 60 and US 71 N	A [B]	A [C]
TH 60 and 1st Avenue S	A [A]	A [A]	TH 60 and 1st Avenue N	A [C]	A [C]
TH 60 and 1st Street	A [D]	A [E]	TH 60 and 24th Street	A [B]	A [B]
TH 60 and 6th Street	B [C]	B [C]	TH 60 and John Caldwell Drive	A [A]	A [B]
TH 60 and 7th Street	A [C]	A [C]	US 71 S and CSAH 26	A [A]	A [A]
TH 60 and 8th Street	A [B]	A [D]	US 71 S and CSAH 25	A [A]	A [A]
TH 60 and 9th Street	A [B]	A [F]	US 71 N and Langley St	A [B]	A [B]
TH 60 and 10th Street	A [C]	B [C]	US 71 N and 19th Street	A [A]	A [B]
TH 60 and 11th Street	A [A]	A [C]	US 71 N and Hospital Drive	A [B]	A [B]
TH 60 and 12th Street	A [C]	A [D]	US 71 N and 4th Avenue	A [C]	A [B]
TH 60 and 13th Street	A [B]	A [C]	US 71 N and CSAH 15	A [B]	A [C]
TH 60 and 14th Street	A [A]	A [B]	TH 62 and 4th Avenue	A [A]	A [C]

**X[X] = overall level of service [worst approach level of service]*

Figure 44: 2040 AM Peak Hour Vehicular LOS

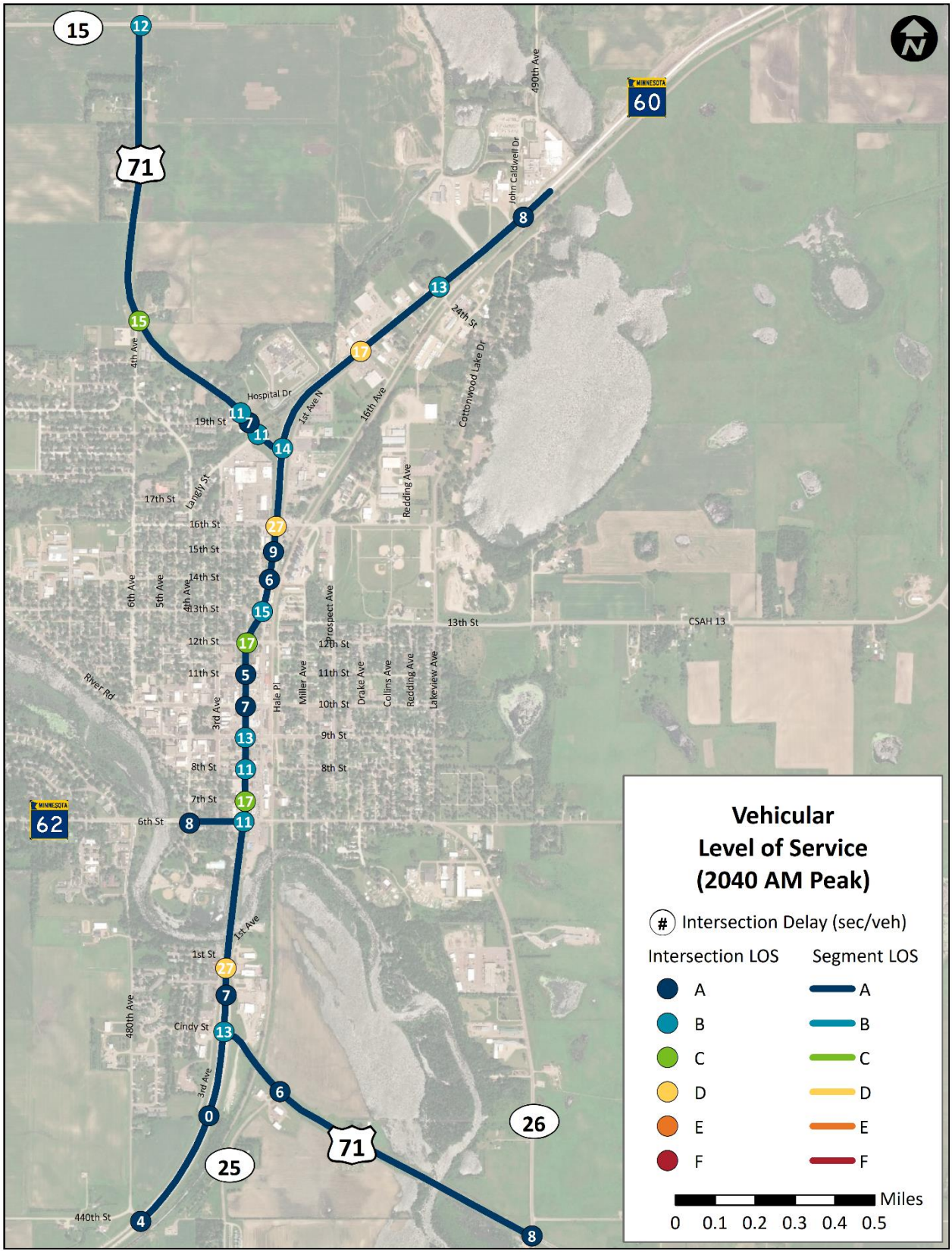
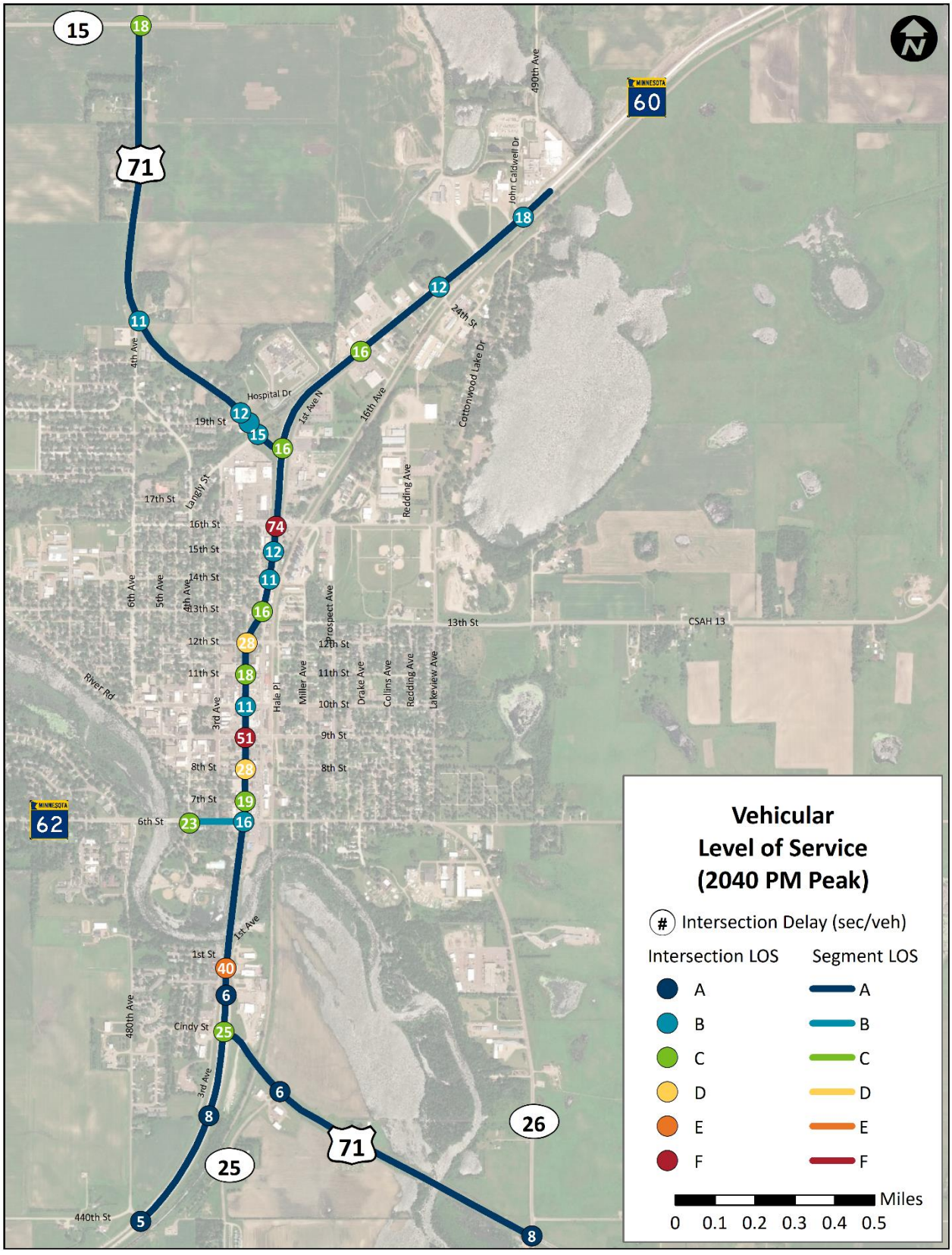


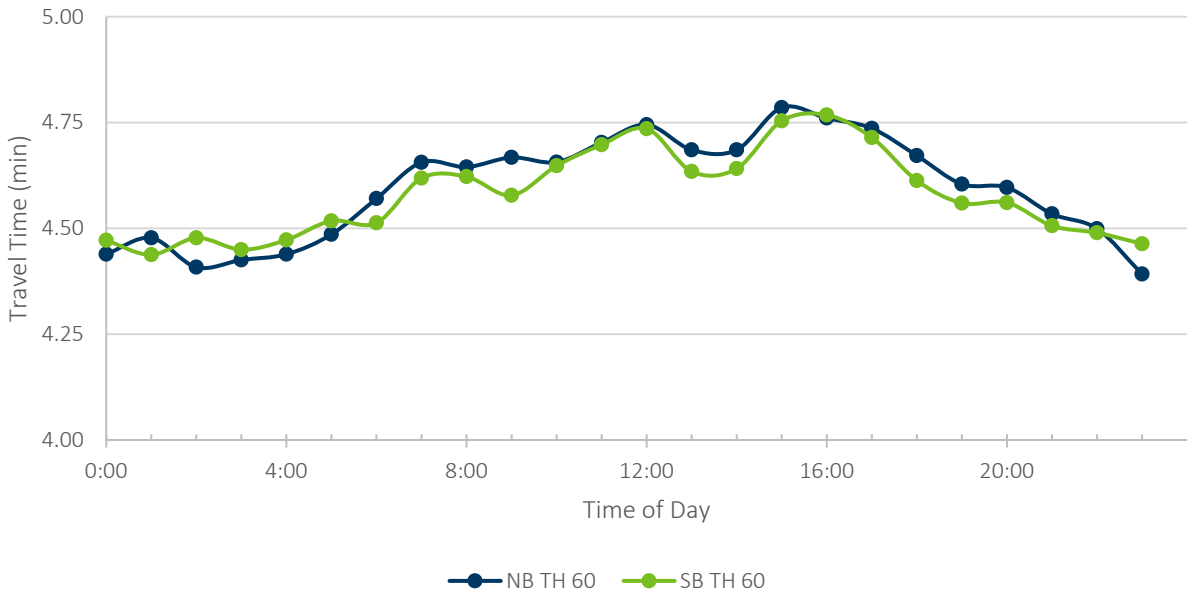
Figure 45: 2040 PM Peak Hour Vehicular LOS



Travel Time Reliability

Travel time reliability is expected to remain acceptable through 2040, with 2040 95th percentile travel times only four percent higher than the 2040 median travel time on TH 60 and seven to eight percent higher than the 2040 median travel time on US 71.

Figure 46: 2040 Daily Travel Times



Network Operations

Network wide delays are expected to increase slightly with increased traffic volumes, however the impacts are not expected to be major. The PM peak average delay is expected to increase by 30 percent, however this only translates to an additional 12 seconds in average travel times.

Table 14: 2019 and 2040 Network Operations

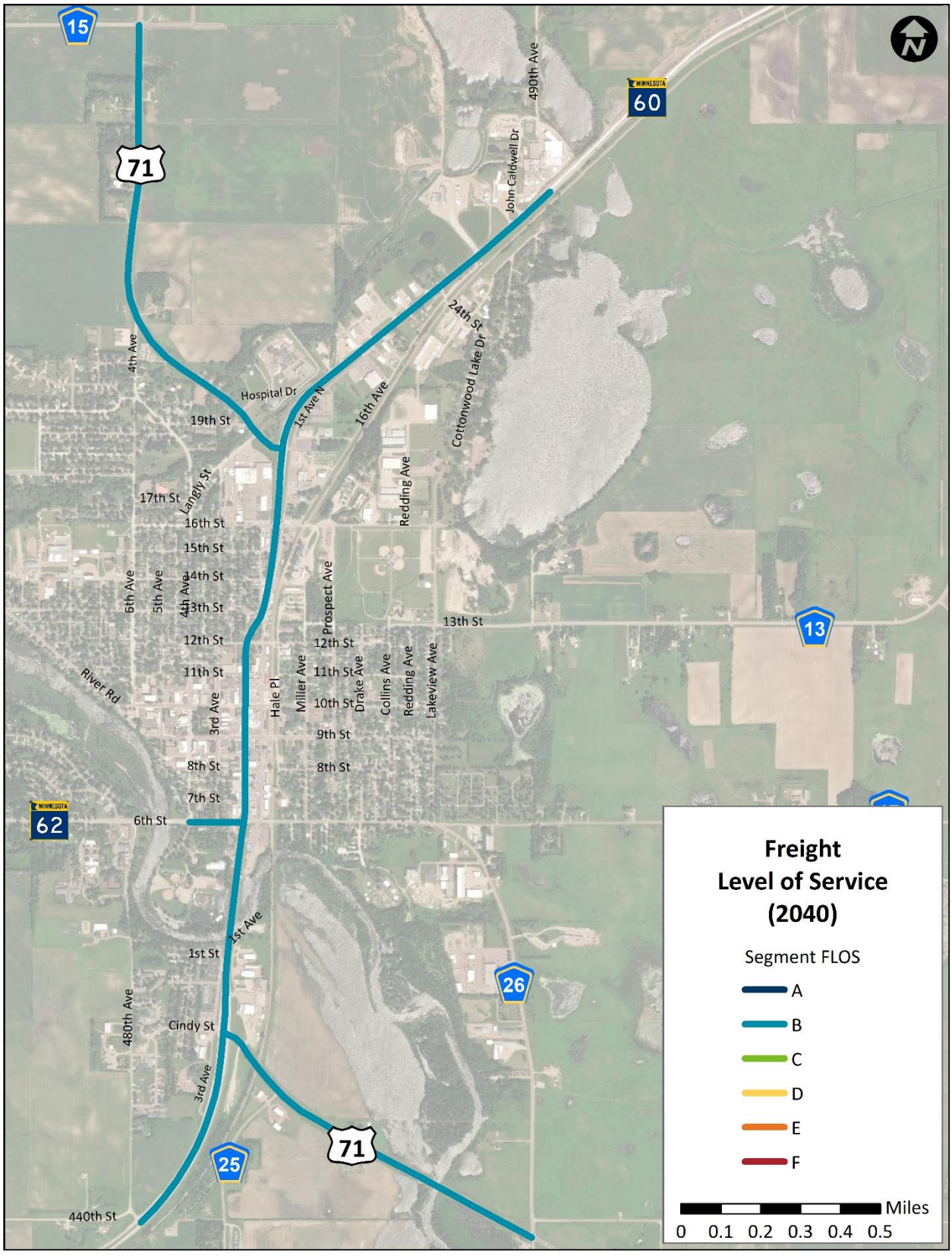
Metric	AM Peak			PM Peak		
	2019	2040	Difference	2019	2040	Difference
Average Travel Time	2.8 min	2.8 min	Negligible	2.7 min	2.9 min	+12 sec
Average Delay	17.6 sec	20.2 sec	+2.6 sec	22.5 sec	29.4 sec	+6.9 sec
Average Speed	38.8 mph	38.4 mph	-0.4 mph	36.9 mph	35.9 mph	-1 mph

Freight Conditions

Level of Service

Given the reliable travel times that are expected, freight level of service is expected to remain at LOS B on all study roadways through 2040.

Figure 47: 2040 Freight LOS



Pedestrian Conditions

Level of Service

Many unsignalized locations throughout the study area are difficult to cross on foot today, and this issue is expected to be exacerbated with increased future traffic volumes. Pedestrian intersection level of service is expected to worsen at 15 of 28 study intersections by 2040, but segment pedestrian level of service is expected to remain the same as today except the segment of US 71 north of 4th Avenue.

Intersections that are not currently at pedestrian LOS F but are expected to be by 2040 are:

- TH 60 and 13th Street
- TH 60 and 14th Street
- TH 60 and 15th Street
- TH 60 and 1st Avenue North
- TH 60 and 24th Street
- TH 60 John Caldwell Drive

Pedestrian LOS is shown in Figure 48.

Bicycle Conditions

Level of Service

Like pedestrian conditions, cycling conditions are difficult today with segment LOS F throughout most of the study area, and this condition will be exacerbated by increased traffic volumes. Bicycle intersection level of service is expected to be lowered at 9 of 28 study intersections.

Intersections that are not currently at bicycle LOS F but are expected to be by 2040 are:

- TH 60 and 13th Street
- TH 60 and 14th Street
- TH 60 and 15th Street
- TH 60 and 1st Avenue North
- TH 60 and 24th Street
- TH 60 John Caldwell Drive
- US 71 and 19th Street

Bicycle LOS is shown in Figure 49.

Figure 48: 2040 Pedestrian LOS

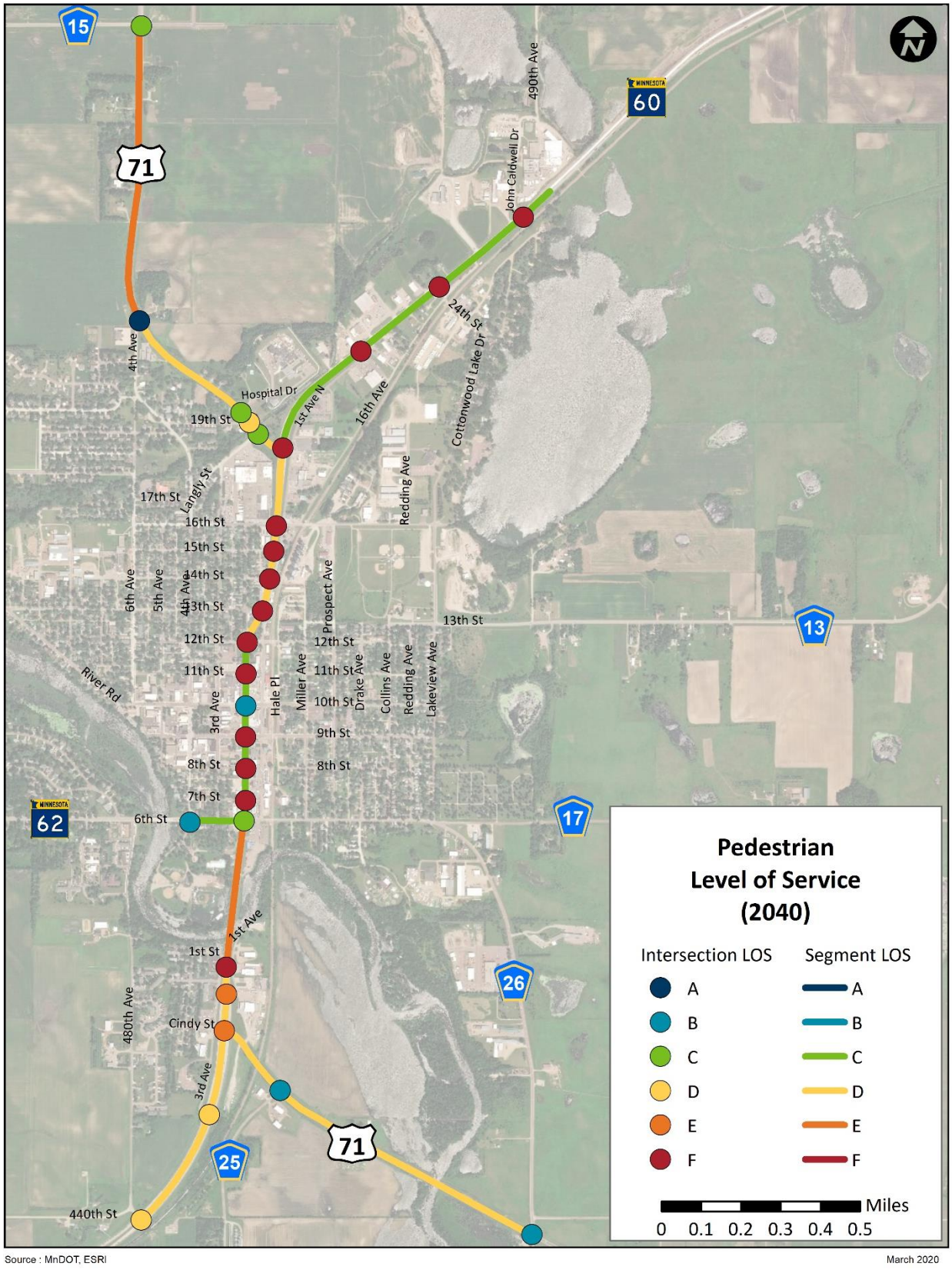
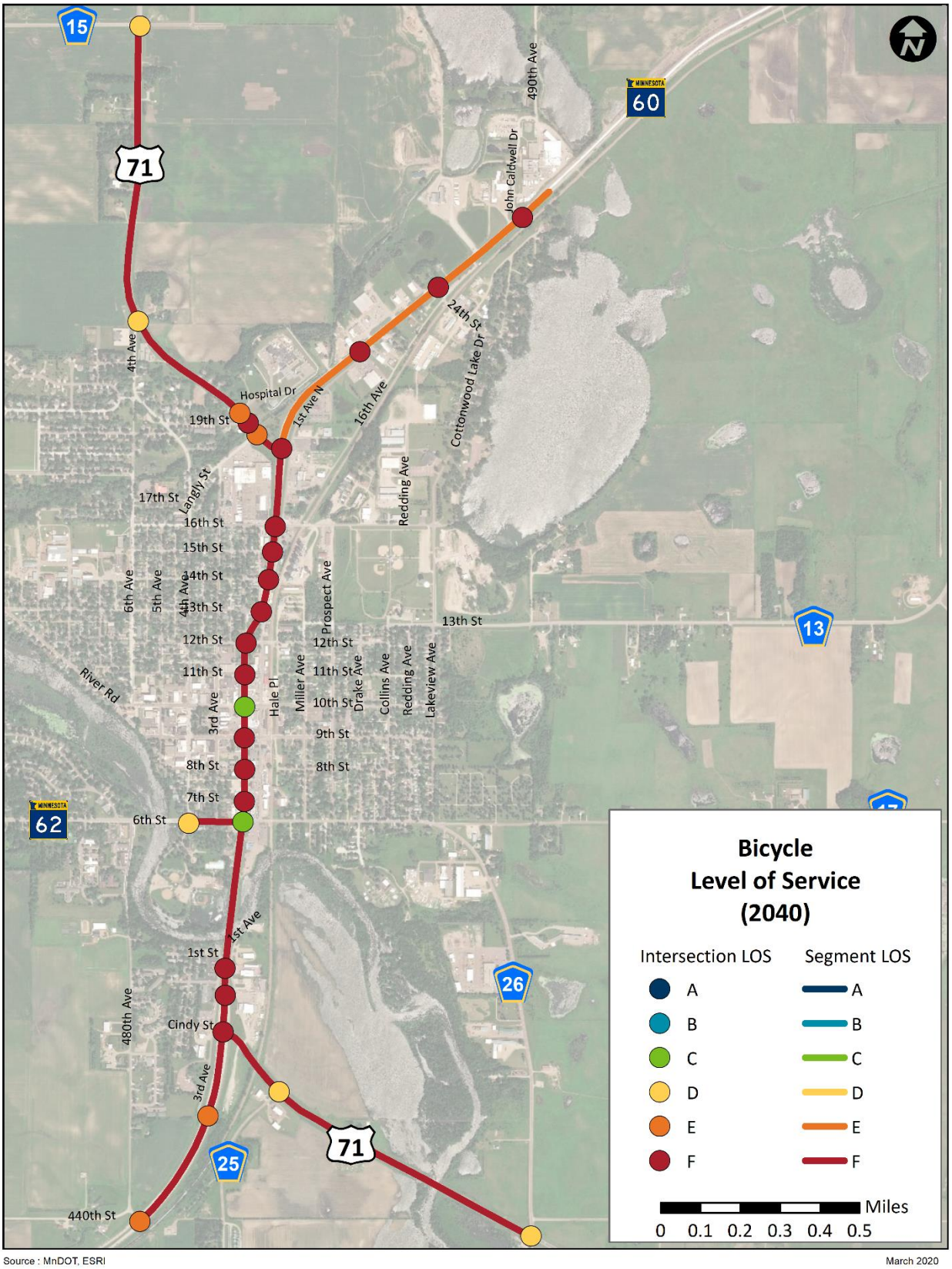


Figure 49: 2040 Bicycle LOS



Source : MnDOT, ESRI

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Multimodal Conditions

Level of Service

While automobile and freight levels of service are expected to remain generally good through 2040, existing multimodal issues will be exacerbated with increased traffic volumes. At the segment level, the following multimodal level of service changes are expected by 2040:

- TH 60 – South of 6th Street: LOS C today → LOS D by 2040
- US 71 – East of TH 60: LOS C today → LOS D by 2040
- US 71 – West of TH 60: LOS C today → LOS D by 2040

At the intersection level, 17 of 28 study intersections are expected to have a decreased level of service, and the following intersections are expected to operate with multimodal LOS E or LOS F by 2040:

- **TH 60 and 1st Street – LOS F**
- **TH 60 and 9th Street – LOS F**
- **TH 60 and 12th Street – LOS F**
- **TH 60 and 1st Avenue North – LOS F**
- TH 60 and US 71 S – LOS E
- TH 60 and 7th Street – LOS E
- TH 60 and 8th Street – LOS E
- TH 60 and 11th Street – LOS E
- TH 60 and 13th Street – LOS E
- TH 60 and 14th Street – LOS E
- TH 60 and 15th Street – LOS E
- TH 60 and 16th Street – LOS E
- TH 60 and US 71 N – LOS E
- TH 60 and 24th Street – LOS E
- TH 60 and John Caldwell Drive – LOS E

Multimodal LOS is shown in Figure 50.

Figure 50: 2040 Multimodal LOS