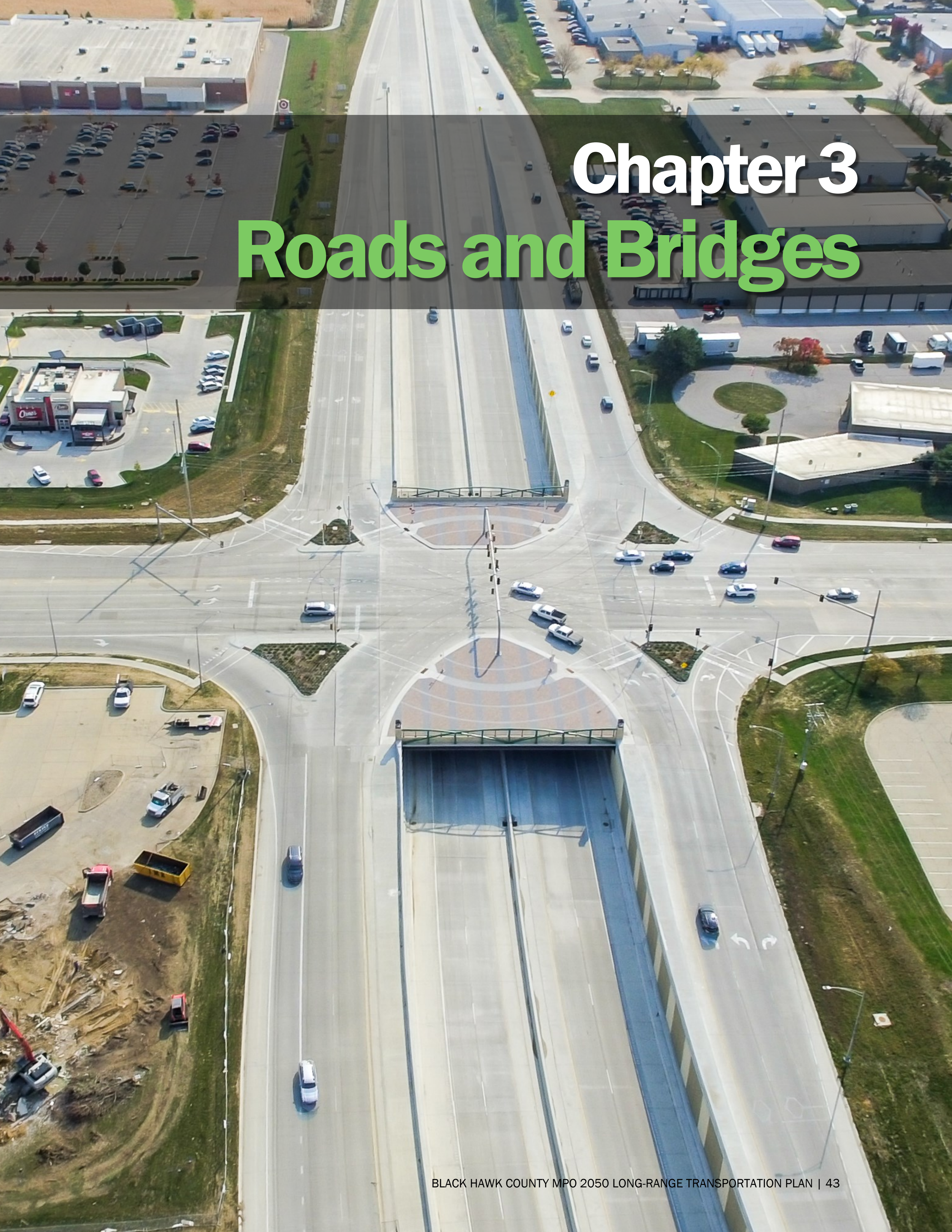


Chapter 3
Roads and Bridges

Chapter 3 – Roads and Bridges

The MPO's overall goal is to provide for the safe, reliable, and efficient movement of persons and goods in the region. The road network is the most readily available and used public transportation infrastructure that can be utilized to help reach this goal, stressing the importance of maintaining a viable road network. The MPO's objectives are to maintain the metropolitan road network for existing and planned traffic and maintain a balance of connectivity and accessibility while ensuring user safety for all modes.

History

Past transportation planning efforts in the MPO have significantly impacted the development of the transportation network. Since the 1960s, transportation planning efforts have focused on creating a local transportation network that connects neighboring cities to each other and to other Iowa metropolitan areas. This has been embodied in past transportation studies for the metropolitan area, and more recently in Long-Range Transportation Plan updates. This ongoing planning process has included documents with horizon years of 1990, 2000, 2020, 2025, 2035, 2040, 2045, and the current effort of 2050. A summary of previous planning efforts helps illustrate how the transportation system developed into what it is today.

Waterloo Metropolitan Area Transportation Study: 1990 Plan

In 1965, the Iowa development Commission, the Metropolitan Planning Commission of Black Hawk County, and the Iowa State Highway Commission hired a consultant to develop a transportation plan for the year 1990. The plan used origin and destination data gathered from a 1964 survey of the metropolitan area to develop traffic forecasts for the horizon year. The MPO reviewed the analysis and adopted the 1990 network in August 1967. Major construction projects identified include the following:

- U.S. Highway 20 from Evansdale eastward as a two-lane expressway with right-of-way for four lanes
- The "Cedar Valley Freeway" to connect the Waterloo and Cedar Falls central business districts
- Hackett Road from Old U.S. Highway 218 (University Avenue) to Ridgeway Avenue as two lanes with right-of-way for four lanes
- U.S. Highway 20 west of U.S. Highway 63 as a two-lane expressway with right-of-way for four lanes
- Extension of Orchard Drive as two lanes with right-of-way for four lanes

Other projects, smaller in scope and mostly involving upgrades to existing streets, were also included in the document. The total cost estimate for all projects identified in this plan, which was to be implemented over 25 years, was $100 million.

Metro Stats

1,100
Lane miles of roads[1]

207
Miles of locally owned roads in poor condition[2]

257
Bridges[3]

10
Structurally deficient bridges[4]

41 years
Average age of bridge structures[4]

89.3
Average bridge sufficiency rating[4]

Sources:
[1] Iowa DOT, Roadway Asset Management System (RAMS)

[2] Iowa Pavement Management Program, 2022

[3] Iowa DOT, Data Portal, Bridge Point

[4] FHWA, National Bridge Inventory, 2022

Interstate Substitution and the Waterloo Metropolitan Transportation Study: 2000 Plan

In 1968, amid a nationwide push to increase the mileage of the U.S. Interstate Highway System, an Interstate connecting I-80 across southern Iowa to the southeast corner of Waterloo was designated. This highway was labeled I-380. In 1974, state and local officials petitioned heavily to have Interstate 380 extended through Waterloo to downtown Cedar Falls. This highway would follow the right-of-way planned for the “Cedar Valley Freeway” during the 1990 Plan and complete the area’s “Golden Triangle” of highways.

In Washington, D.C., a new anti-highway sentiment was beginning to affect the drafting of amendments to the Interstate Highway Bill. In 1973, the United States Congress passed legislation that allowed municipalities to “withdraw” planned Interstate highway projects and replace them with transit projects. This amendment was modified in 1976 to include non-Interstate highway projects. The funding for these projects was to be equal to that which had been allocated for the Interstate segment being withdrawn and would be available at an 85/15 federal match. Withdrawals were to be allowed until 1983, while substitute projects were to be initiated by 1986.

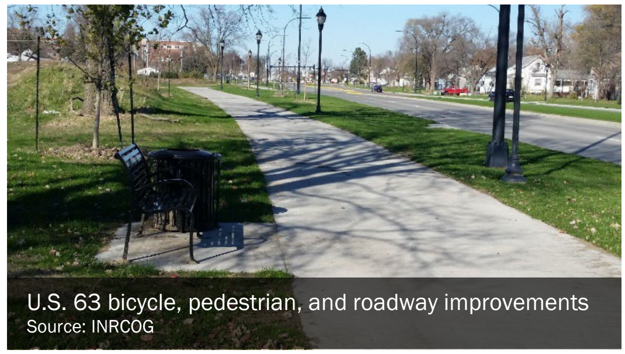
The program, known as Interstate Substitution, drew the interest of local officials. In March of 1981, a delegation of elected officials from the metropolitan area met with the Iowa Transportation Commission to discuss the possibility of withdrawing the proposed extension of I-380. This withdrawal would result in approximately $370 million that could be substituted for several smaller-scale transportation projects.

Downtown Waterloo in the 1960s prior to Interstate Substitution and today
Source: Iowa DNR Historic Photo Interactive Mapping Site

At issue was the question of whether smaller-scale projects would adequately serve the area's future traffic demands. Thus, the summer of 1981 was spent developing a transportation plan for the year 2000. This undertaking, conducted by the Iowa DOT and the MPO, involved an update of the 1965 traffic model. Using year 2000 socioeconomic forecasts, state and local planners worked to develop an updated street and highway network reflecting the proposed projects. It was concluded that it would be feasible to substitute the I-380 extension with a less expensive, partially access-controlled, arterial street. It was also determined that when combined with several other local street and highway projects, using Interstate Substitution funds in this manner would better serve the area's projected transportation deficiencies than one interstate freeway through the center of the cities.

2020 and 2025 Long-Range Transportation Plans

The 2020 Plan (adopted in 1997) addressed automotive congestion, connectivity, and accessibility. The 2020 Plan included a couple of major construction projects for the first time, including an interchange at U.S. Highway 20 and Ansborough Avenue which was completed in 2006.



U.S. 63 bicycle, pedestrian, and roadway improvements
Source: INRCOG

In 2002, MPO staff developed a Travel Demand Model (TDM) to simulate traffic in a base-planning year. This model, which was adjusted to reflect Iowa DOT ground counts, simulated the traffic patterns of the MPO in 2001. Local planning officials anticipated the MPO population to increase by 11 percent and total employment by 37 percent by the plan year 2025. Applying the forecasted 2025 socioeconomic data to the base year network resulted in some capacity-related issues. Utilizing the TDM, a list of projects was developed for the 2025 Plan. This document also identified two illustrative projects which were beyond the funds projected to be available over the life of the Plan. These were a northeast arterial to provide access to the northeast industrial area of Waterloo and serve as a route for through traffic, and U.S. Highway 63 urban corridor improvements which would involve the corridor from U.S. Highway 218 to Airline Highway in Waterloo. The U.S. Highway 63 project eventually received a substantial earmark under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.

2035 Long-Range Transportation Plan

Approved in 2008, this document updated the TDM to a base year of 2005 with traffic projected to a horizon year of 2035. The population and employment of the MPO were projected to increase substantially. With updated socioeconomic forecasts, several capacity issues were shown in the 2035 model run, primarily in the southern area of Waterloo along segments of U.S. Highway 218, Hammond Avenue, Shaulis Road, Ansborough Avenue, and La Porte Road. Future capacity issues led to the projects included in the 2035 LRTP. Major construction projects included the following:

University Avenue
Source: Foth

- University Avenue from U.S. Highway 63 in Waterloo to Iowa Highway 58 in Cedar Falls
- Kimball Avenue from Ridgeway Avenue to San Marnan Drive, Waterloo
- U.S. Highway 63 from Newell Street to U.S. Highway 218, Waterloo

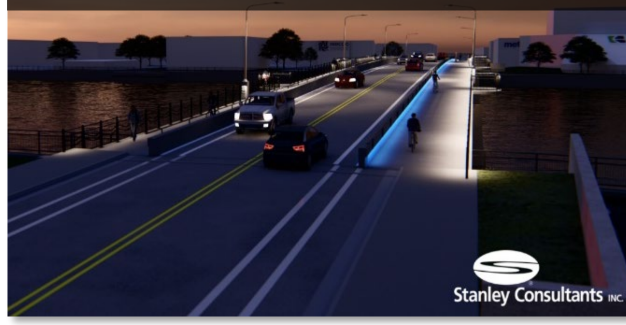
In addition, the following large initiatives were included as illustrative projects:

- Northeast arterial to improve access to Waterloo's northeast industrial area as well as provide an alternate route around the city for through traffic, connecting U.S. Highway 63 to Interstate 380
- Upgrading U.S. Highway 218 to fully access-controlled through Waterloo from Mitchell Avenue to West 9th Street by implementing interchanges and/or grade separation
- Corridor preservation and/or access control on Iowa Highway 58 between U.S. Highway 20 and University Avenue in Cedar Falls

2040 Long-Range Transportation Plan

This Plan was approved in 2013 and updated the TDM to a base year of 2010. The population of the MPO was projected to increase by 30,000 by the horizon year, and employment was projected to increase by 24,000. With these socioeconomic forecasts, a handful of areas were shown to have capacity issues. Major construction and reconstruction projects included the following:

Rendering of the Park Avenue Bridge
Source: City of Waterloo



- La Porte Road from Shaulis Road to Hawthorne Avenue, Waterloo
- Cedar Heights Drive from Viking Road to Greenhill Road, Cedar Falls
- Park Avenue Bridge replacement, Waterloo
- Grade separation of the intersection of Iowa Highway 58 and Greenhill Road, Cedar Falls

Several illustrative projects of various scales were identified, including the following:

- 11th Street Bridge replacement, Waterloo
- Pedestrian Crossing over the CN Railyard on East 4th Street, Waterloo
- Northeast Industrial Access and Access-Controlled U.S. 218 from I-380 to U.S. Highway 63

2045 Long-Range Transportation Plan

The most recent LRTP was approved in 2018 and updated the TDM to a base year of 2014. Population and employment projections were calculated using more recent data from 2001 to 2015 which provided a more up-to-date picture of the area's growth. From 2014 to 2045, the population of the MPO was conservatively projected to increase by 14,000, and employment was projected to increase by 12,500. With these socioeconomic forecasts, a couple of areas were shown to have capacity issues, predominately on the Primary Highway System. Future capacity issues, along with connectivity, accessibility, economic development, and safety, led to the projects included in the LRTP. Table 3.1 shows the projects that were included as well as their status.

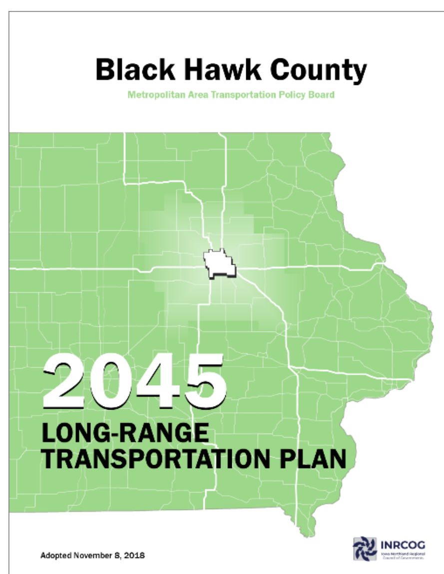


Table 3.1: 2045 Long-Range Transportation Plan Projects

Timeframe	Jurisdiction	Project	Termini	Description	Status
2019	Black Hawk	V49 (Raymond Rd)	600' N of Indian Creek Rd to 0.25 mi. S of Young Rd	Resurfacing	Complete
2019	Hudson	U.S. 63 Pedestrian Underpass	Pedestrian underpass of U.S. 63	Bike/Ped Structures	Complete
2019	Hudson	Butterfield Rd	Ranchero Rd to 500' S of U.S. 20	Reconstruction	Complete
2019	Waterloo	U.S. 63 Enhancements	Parker St to U.S. 218	Landscaping, Lighting, Bike/Ped	Complete
2019	Waterloo	W Ridgeway Ave	U.S. 63 to Kimball Ave	Engineering	Complete
2019	Waterloo	Downtown Traffic Signals Retiming	Bound by Walnut St, Washington St, 6th St, Mullan Ave	Intelligent Transportation Systems	Complete
2019	Waterloo	Ansborough Ave	Black Hawk Rd to Downing Ave	Capacity Improvements	Complete
2019	Cedar Falls	W 1st St (IA 57)	Hudson Rd to Franklin St	Reconstruction, Lane Reconfiguration	Complete
2020	Black Hawk	V43 (Elk Run Rd)	Independence Ave (IA 281) to Elk Run Heights city limits	Resurfacing, Shoulder Widening	Complete
2020	Evansdale	Lafayette Rd	Evans Rd to east city limits	Engineering	Complete
2021	Waterloo	Traffic Signal Fiber Optics & Traffic Monitoring Cameras	Bound by Walnut St, Washington St, 6th St, Mullan Ave	Intelligent Transportation Systems	Complete
2021	Raymond	Lafayette Rd	1000' E of Dubuque Rd to 5th St	Reconstruction, Bike/Ped	FY 2024 Letting
2021	Elk Run Heights	Lafayette Rd/Gilbertville Rd	West city limits to Amber Ln	Reconstruction, Bike/Ped	FY 2024 Letting
2019-2021	Cedar Falls	Cedar Heights Dr	Greenhill Rd to Viking Rd	Reconstruction, Additional Turn Lanes, Bike/Ped	Complete
2019-2020	Waterloo	La Porte Rd	Hawthorne Ave to E Shaulis Rd	Engineering	Complete
2022	Waterloo	La Porte Rd	Hawthorne Ave to San Marnan Dr	Reconstruction, Bike/Ped, Capacity Improvements	Three-phase project funded; completion anticipated by FY 2027
2023-2025	Black Hawk	Donald St (D16)	Waterloo city limits to Raymond Rd	Resurfacing, Intersection Improvements	Included in 2050 LRTP
2023-2025	Black Hawk	Orange Rd	Waterloo city limits to U.S. 218	Resurfacing	Unmet Need
2023-2025	Cedar Falls	Olive St Bridge	S of W 20th St, over University Branch of Dry Run Creek	Bridge Replacement	Unmet Need
2023-2025	Cedar Falls	Tremont St Bridge	N of W 21st St, over University Branch of Dry Run Creek	Bridge Replacement	Unmet Need
2023-2025	Cedar Falls	Walnut St Bridge	S of W 20th St, over University Branch of Dry Run Creek	Bridge Replacement	Complete
2023-2025	Cedar Falls	W Ridgeway Ave Bridge	0.15 mi. W of Hudson Rd, over S Branch of Dry Run Creek	Bridge Replacement	Included in 2050 LRTP
2023-2025	Evansdale	Lafayette Rd	Evans Rd to east city limits	Reconstruction, Bike/Ped	FY 2024 Letting
2023-2025	Waterloo	5th St/6th St	Kimball Ave to S Barclay St	Study on conversion to two-way streets	Complete; included 4th St
2023-2025	Waterloo	W Ridgeway Ave	U.S. 63 to Kimball Ave	Reconstruction, Bike/Ped	Unmet Need
2026-2035	Black Hawk	Elk Run Rd (V43)	Dubuque Rd to Independence Ave (IA 281)	Resurfacing, Shoulder Widening	Included in 2050 LRTP
2026-2035	Black Hawk	Raymond Rd (V49)	Gilbertville NCL to Raymond SCL	Resurfacing	Included in 2050 LRTP
2026-2035	Black Hawk	W Ridgeway Ave (D19)	University Ave to Cedar Falls city limits	Resurfacing	Included in 2050 LRTP
2026-2035	Black Hawk	Union Rd (T75) Bridge	0.25 mi. S of Beaver Valley Rd, over Beaver Creek	Bridge Replacement	Included in 2050 LRTP
2026-2035	Black Hawk	Washburn Rd (D38)	IA 21 to U.S. 218	Resurfacing	Included in 2050 LRTP
2026-2035	Cedar Falls	Cedar Heights Dr	Viking Rd to south city limits	Reconstruction, Additional Turn Lanes, Capacity Improvements	Included in 2050 LRTP
2026-2035	Cedar Falls	Greenhill Rd	Hudson Rd to east city limits	Reconstruction, Safety Improvements, Additional Turn Lanes	Included in 2050 LRTP
2026-2035	Cedar Falls	Leversee Rd	Lone Tree Rd to north city limits	Reconstruction	Included in 2050 LRTP

Timeframe	Jurisdiction	Project	Termini	Description	Status
2026-2035	Cedar Falls	Main St	W 6th St to University Ave	Reconstruction, Intersection Improvements, Lane Reconfiguration	Under construction
2026-2035	Evansdale/ Elk Run Heights	Plaza Dr/Elk Run Rd	I-380 EB ramp to N of Gilbertville Rd	Capacity Improvements, New Signal, Additional Turn Lanes	Included in 2050 LRTP
2026-2035	Raymond	S Raymond Rd Bridge	0.2 mi. S of Dubuque Rd, over Poyner Creek	Bridge Replacement	Unmet Need
2026-2035	Waterloo	11th St Bridge	SW of Sycamore St, over Cedar River	Bridge Replacement	Under construction, awarded federal Competitive Highway Bridge Program funds
2026-2035	Waterloo	Park Ave Bridge	SW of Sycamore St, over Cedar River	Bridge Replacement	Under construction, awarded federal Competitive Highway Bridge Program funds
2026-2035	Waterloo	Franklin St	1st St to Nevada St	Reconstruction, Bike/Ped	Unmet Need
2026-2035	Waterloo	Hammond Ave/ San Marnan Access Dr	Hammond Ave and San Marnan Access Dr intersection	Intersection Improvements	Included in 2050 LRTP (One Complete Project)
2026-2035	Waterloo	N Elk Run Rd	Independence Ave (IA 281) to E Donald St	Additional Thru Lanes, Additional Turn Lanes, Intersection Improvements	Included in 2050 LRTP
2036-2045	Black Hawk	Elk Run Rd (V43) Bridge	0.15 mi. N of Dubuque Rd, over Elk Run Creek	Bridge Replacement	Included in 2050 LRTP
2036-2045	Black Hawk	Union Rd (T75) Bridge	0.4 mi. S of Beaver Valley Rd, over Beaver Creek	Bridge Replacement	Included in 2050 LRTP
2036-2045	Black Hawk	University Ave (D18)	U.S. 20 to Cedar Falls city limits	Resurfacing	Unmet Need
2036-2045	Black Hawk	Washburn Rd (D38) Bridge	W of city of Gilbertville, over Cedar River	Bridge Replacement	Included in 2050 LRTP
2036-2045	Black Hawk	Washburn Rd (D38)	U.S. 218 to Gilbertville city limits	Resurfacing	Included in 2050 LRTP
2036-2045	Cedar Falls	Hudson Rd	W 1st St to University Ave	Reconstruction, Safety Improvements, Additional Turn Lanes, Intersection Improvements	Included in 2050 LRTP
2036-2045	Cedar Falls	Prairie Pkwy/Viking Rd	Prairie Pkwy and Viking Rd intersection	Intersection Improvements	Included in 2050 LRTP
2036-2045	Cedar Falls	W Ridgeway Ave	East city limits to IA 58	Reconstruction	Included in 2050 LRTP
2036-2045	Cedar Falls	W Ridgeway Ave	Hudson Rd to west city limits	Reconstruction, Additional Turn Lanes	Included in 2050 LRTP
2036-2045	Hudson	Washington St	IA 58 to Waterloo Rd	Reconstruction	FY 2026 Letting
2036-2045	Waterloo	Donald St	E 4th St to Sage Rd	Reconstruction	Unmet Need
2036-2045	Waterloo	E Shaulis Rd	Isle of Capri Blvd to U.S. 218	Reconstruction, Realignment	Complete
2036-2045	Waterloo	La Porte Rd	San Marnan Dr to E Shaulis Rd	Reconstruction, Bike/Ped	Three-phase project funded; completion anticipated by FY 2027
2036-2045	Waterloo	Orange Rd	Hawkeye Community College intersections	Additional Turn Lanes	Included in 2050 LRTP
2036-2045	Waterloo	San Marnan Dr/Flammang Dr	San Marnan Dr and Flammang Dr intersection	Realignment	Included in 2050 LRTP (One Complete Project)
2036-2045	Waterloo	W 9th St/E Ridgeway Ave	W 9th St and E Ridgeway Ave intersection	Safety Improvements, Additional Turn Lanes, Intersection Improvements	Unmet Need
2036-2045	Waterloo	W Ridgeway Ave	Deere Rd to U.S. 63	Reconstruction	Unmet Need

State Road and Bridge Plans

The Iowa DOT has adopted several plans to address federal requirements and guide transportation investments to maintain and improve Iowa's roads and bridges.

Iowa in Motion 2050

Adopted in 2022, the state transportation plan is a long-range document that addresses federal requirements and serves as a transportation investment guide for each transportation mode. This document is updated every five years to stay current with trends, forecasts, and factors that influence decision making.

The 2050 State Transportation Plan is the third in the current series of long-range plans. In 2012, a policy level plan was adopted. In 2017, the plan was expanded to identify primary investment areas, categorize future needs across modes, and provide strategies to achieve the system vision. The 2022 plan builds on these past plans by making enhancements that include:

- Additional focus on emerging planning considerations
- Establishment of system objectives
- Expanded analysis of highway system needs and risks
- Updated strategies to implement the plan
- Development of Iowa DOT's rightsizing policy

A multi-pronged approach was used to determine improvement needs across the multimodal system. For highways and bridges, a nine-layer analysis was conducted to analyze various needs and risks. The Primary Highway System was divided into 464 corridors for analysis and needs and risks were identified at the corridor level. A comprehensive matrix covering the entire Primary Highway System is included in the Plan. The matrix shows which need(s) and/or risk(s) were identified in each corridor.

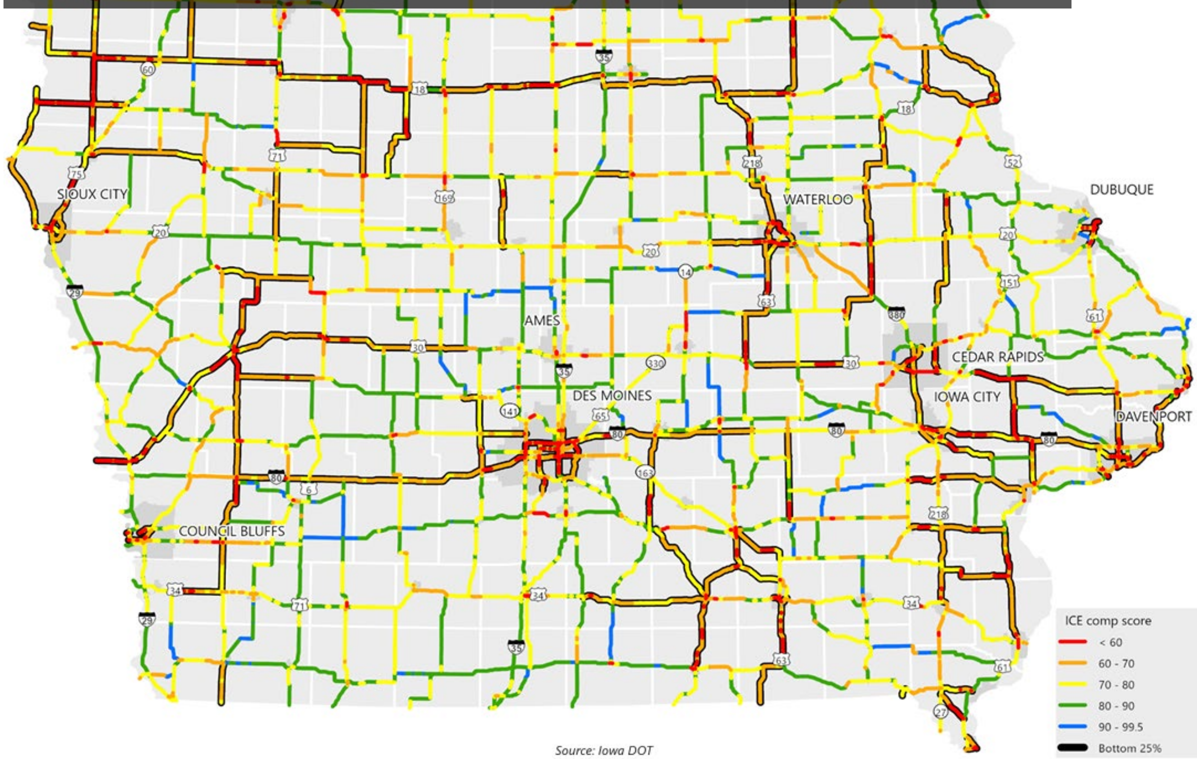
			Networks		Needs					Risks				
Route	Corridor	County	IMFN	CIN	Pavement Condition	Bridge Condition	Bottlenecks	Super-2	Capacity	Safety	Operations	Flood Resiliency	Bicyclists	Pedestrians
US 6	I-80 to US 59	Pottawattamie					99						0.0%	5.9%
	US 59 to US 71	Pottawattamie, Cass											7.8%	7.8%
	US 169 to I-35/80	Dallas, Polk					20, 46		Partial				1.9%	1.9%
	I-35/80 to IA 28	Polk		Partial			1, 11, 37, 102						35.1%	56.9%
	IA 28 to US 69	Polk					15, 37, 43						98.1%	98.1%
	US 69 to I-235	Polk											99.7%	99.7%
	I-235 to I-80	Polk					75, 78						25.6%	39.6%
	I-80 to IA 146	Jasper, Poweshiek					36						9.8%	10.1%
	IA 146 to US 151	Poweshiek, Iowa				111	36						6.7%	4.1%
	US 151 to IA 965	Iowa, Johnson					81		Partial				0.1%	0.1%
	IA 965 to IA 1	Johnson					2, 30, 81						49.3%	56.8%
	IA 1 to IA 70	Johnson, Muscatine		Partial		75	26, 30		Partial				8.8%	7.5%
	IA 70 to IA 38	Muscatine				132							0.1%	0.1%
	IA 38 to I-80	Muscatine, Cedar				147							2.7%	1.5%
	I-280 to IA 461	Scott				191	73						32.9%	34.1%
	IA 461 to I-74	Scott					73						0.8%	2.6%

Highway Needs and Risks Matrix
Source: Iowa DOT, Iowa in Motion 2050

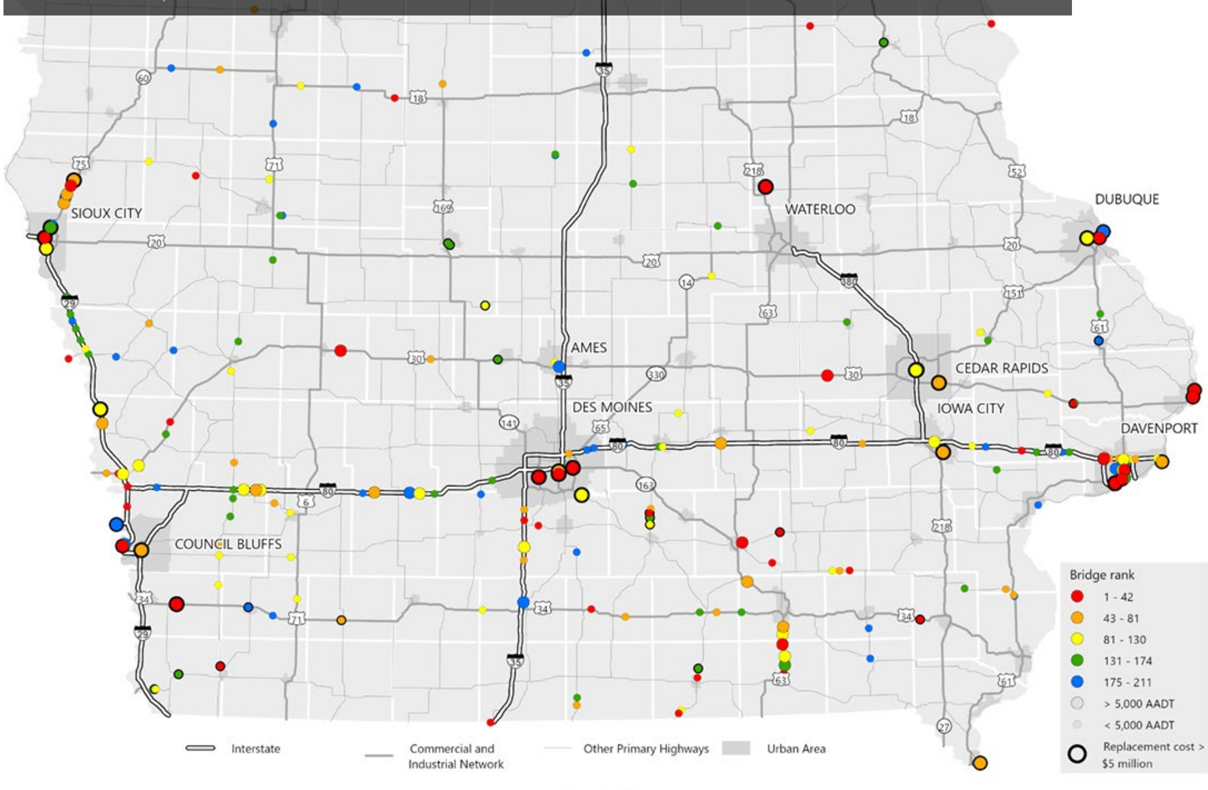
Excerpts from the *Highway Needs and Risks* section of the 2050 State Transportation Plan are provided on the following pages.

www.iowadot.gov/iowainmotion/

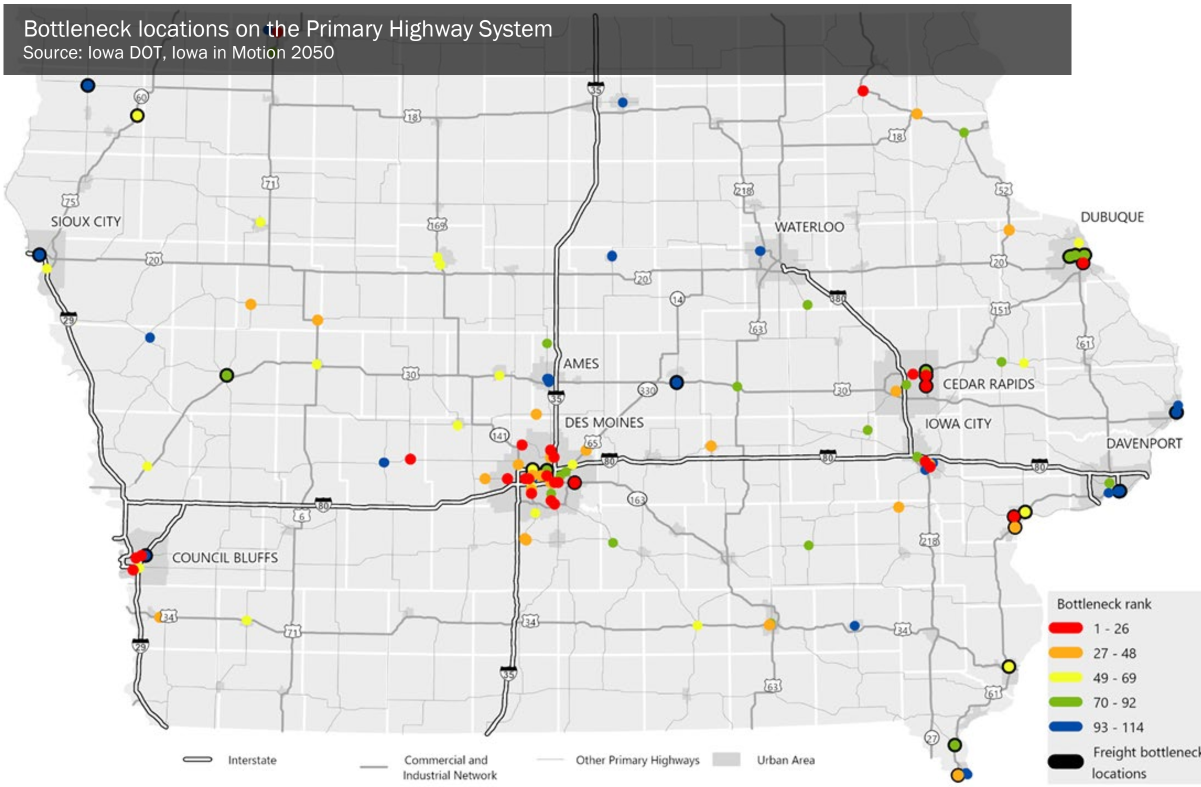
ICE composite ratings and bottom 25 percent of Primary Highway System corridors
Source: Iowa DOT, Iowa in Motion 2050



Bottom 5 percent of Primary Highway System bridges
Source: Iowa DOT, Iowa in Motion 2050

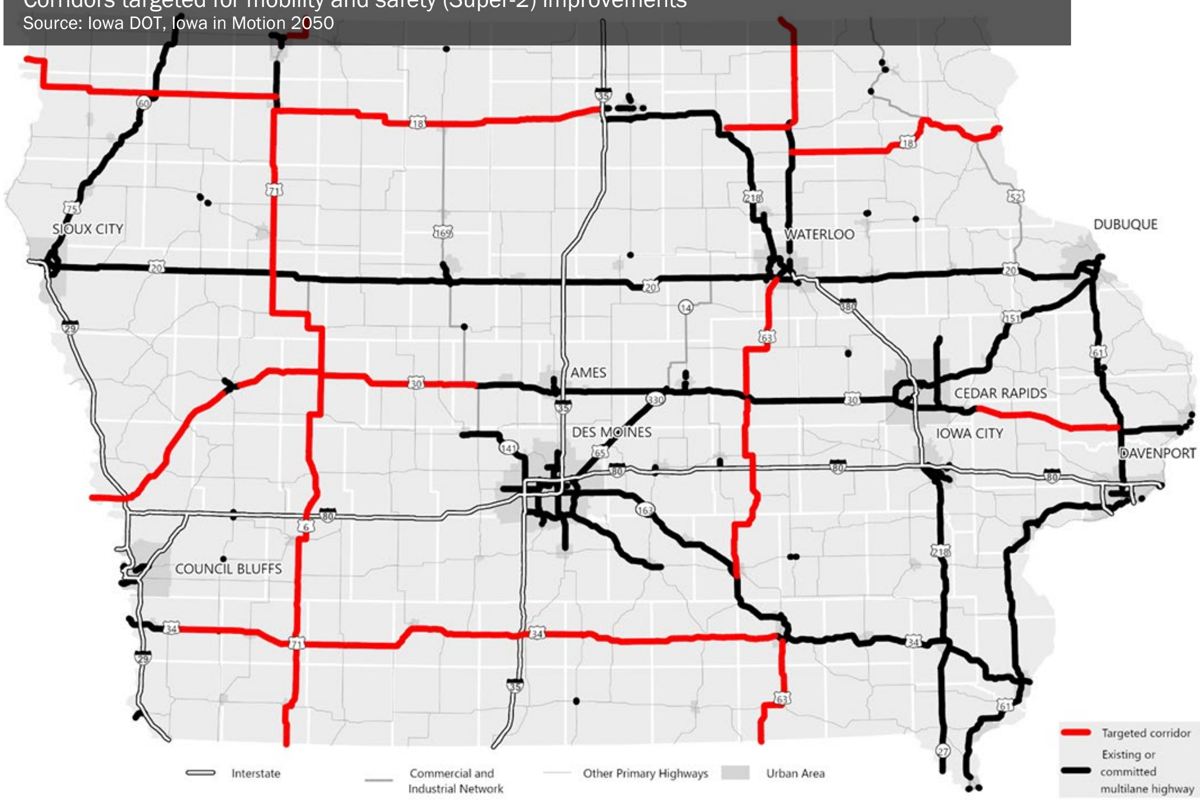


Bottleneck locations on the Primary Highway System
Source: Iowa DOT, Iowa in Motion 2050



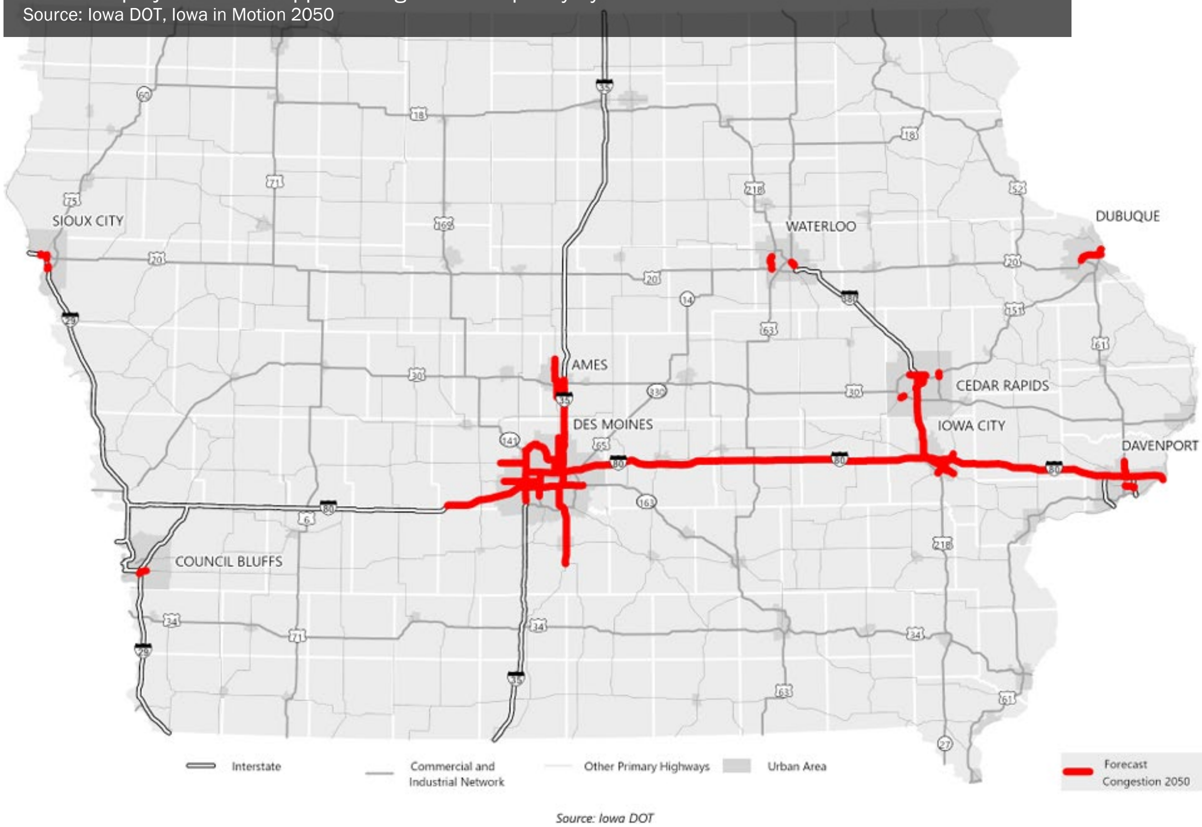
Source: Iowa DOT

Corridors targeted for mobility and safety (Super-2) improvements
Source: Iowa DOT, Iowa in Motion 2050

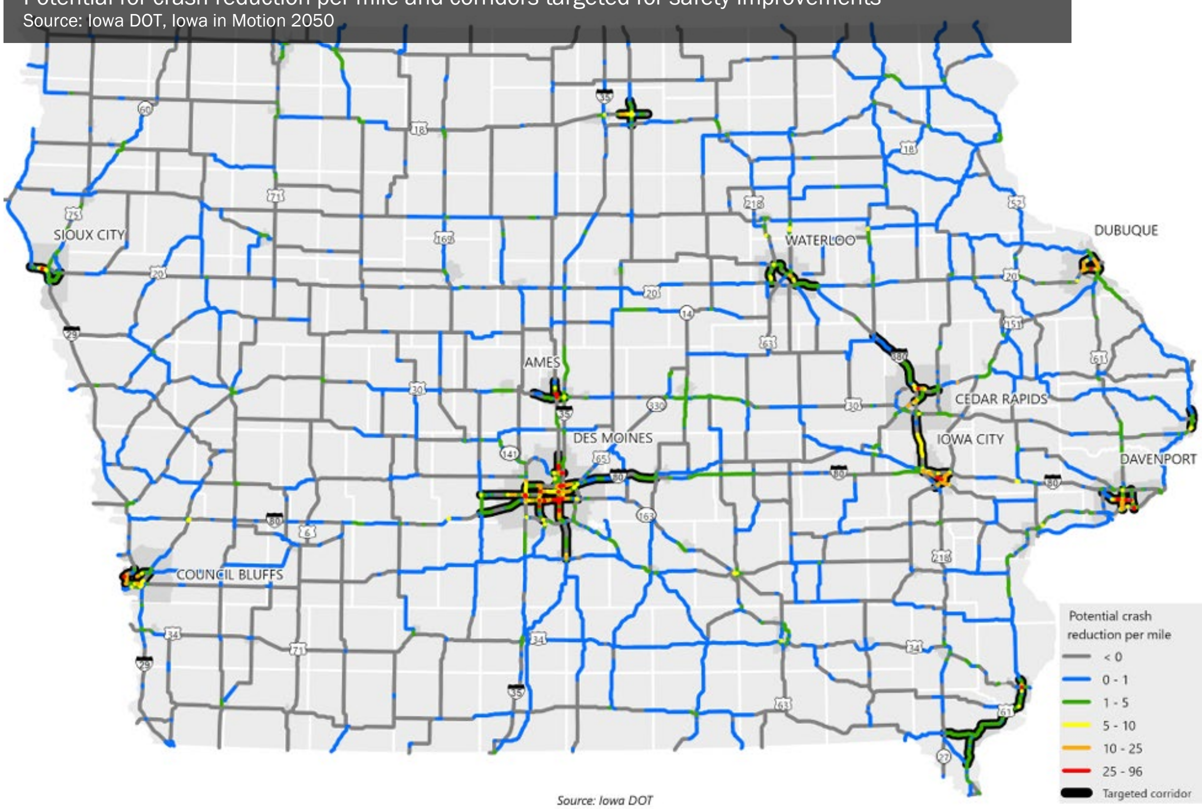


Source: Iowa DOT

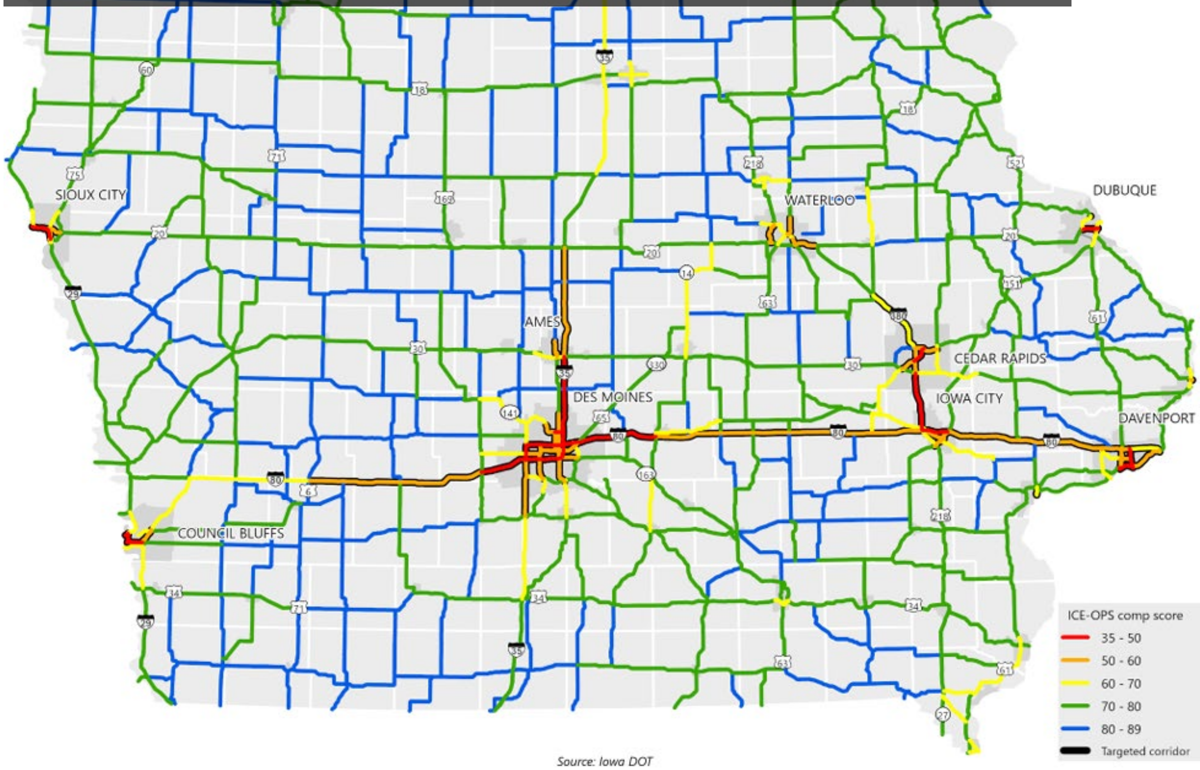
Corridors projected to be approaching or over capacity by 2050
Source: Iowa DOT, Iowa in Motion 2050



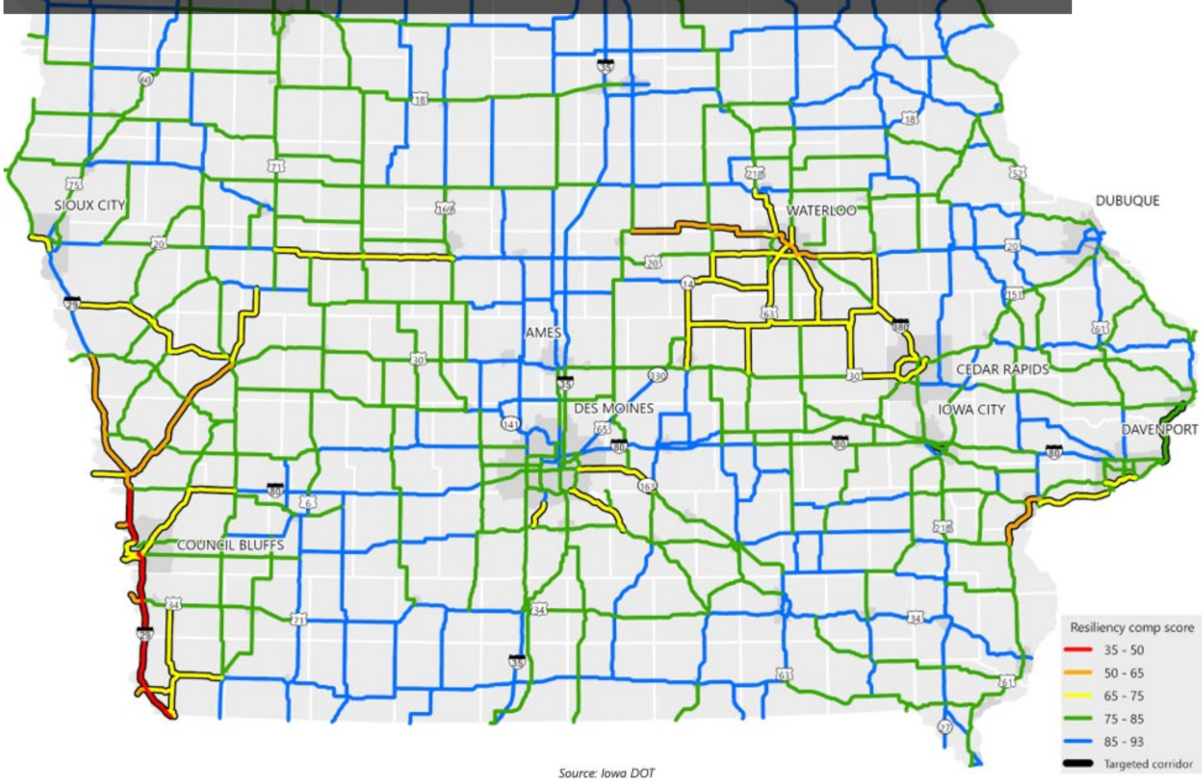
Potential for crash reduction per mile and corridors targeted for safety improvements
Source: Iowa DOT, Iowa in Motion 2050



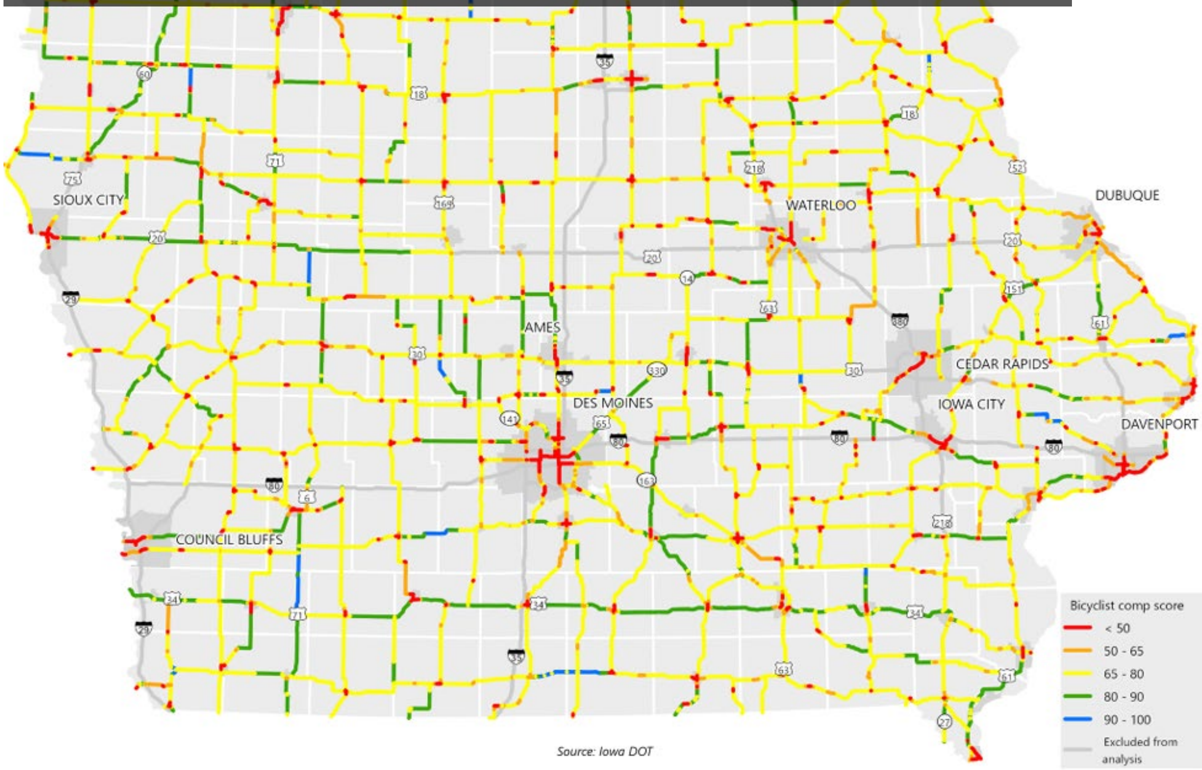
ICE-OPS composite scores and corridors targeted for operations improvements
Source: Iowa DOT, Iowa in Motion 2050



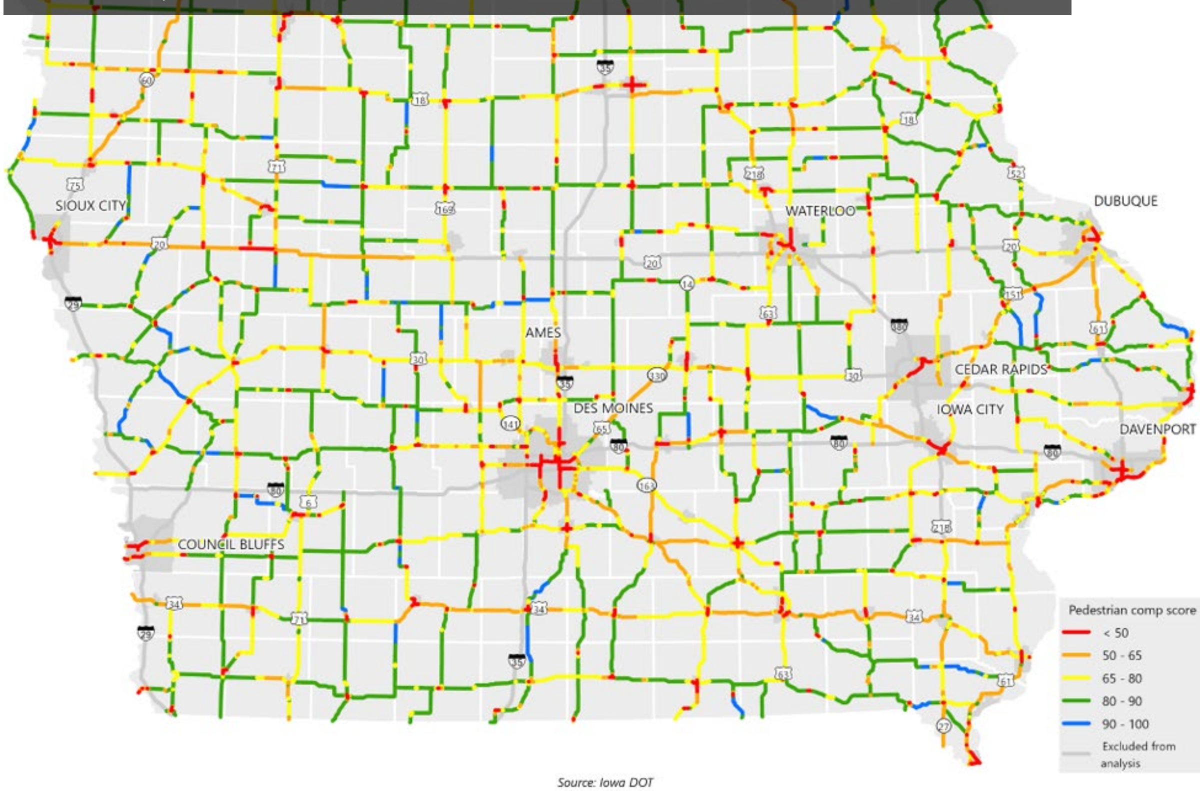
Flood resiliency analysis composite scores and corridors targeted for resiliency improvements
Source: Iowa DOT, Iowa in Motion 2050



Composite scores for Primary Highway System segments for bicyclist systemic safety analysis
Source: Iowa DOT, Iowa in Motion 2050



Composite scores for Primary Highway System segments for pedestrian systemic safety analysis
Source: Iowa DOT, Iowa in Motion 2050



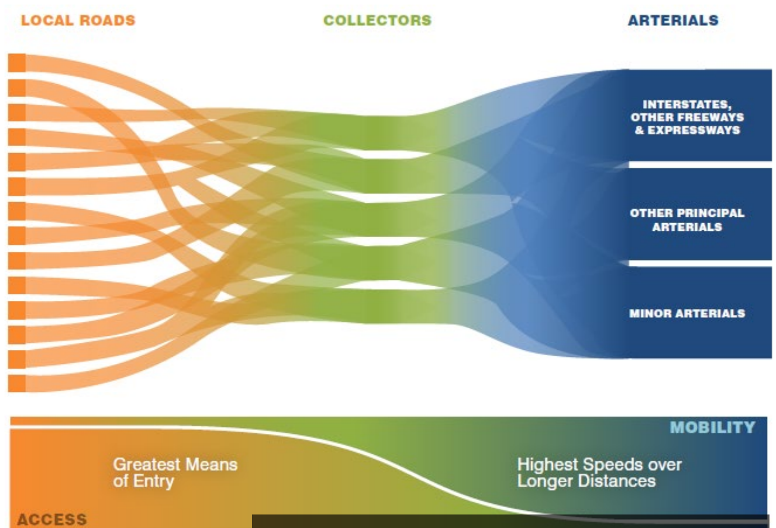
Iowa Transportation Asset Management Plan 2023

Transportation asset management is a strategic approach to managing transportation infrastructure. It embodies a philosophy that is comprehensive, proactive, and long-term. The overall goals of asset management are to minimize long-term costs, extend the life of the transportation system, and improve the performance of the transportation system. Transportation Asset Management Plans (TAMP) act as a focal point for information about the state's assets, management strategies, long-term expenditure forecasts, and business management processes. The Iowa DOT's TAMP describes how the agency manages its bridges and pavements throughout their lives. The TAMP also connects *Iowa in Motion* and system and modal plans to the Iowa DOT's five-year Transportation Improvement Program.

www.iowadot.gov/systems_planning/Planning/Federal-Performance-Management-and-Asset-Management

Road Inventory

The current street network of the MPO is comprised of 1,100 miles of road. The Federal Functional Classification (FFC) system groups highways and streets into classes according to the service they provide. Classifications are as follows:

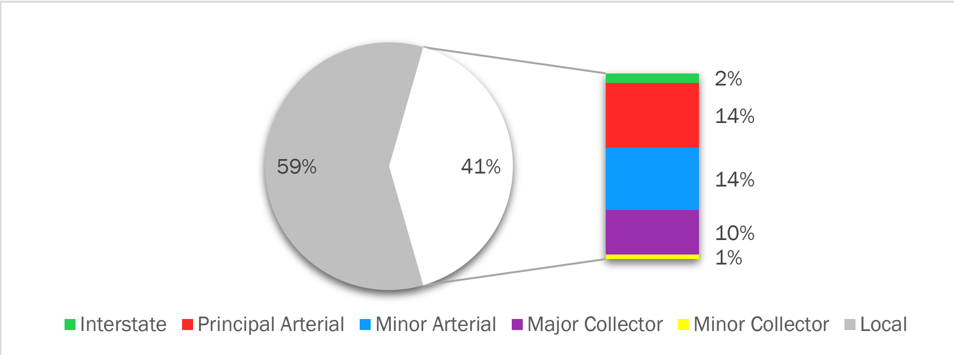


Source: FHWA

- **Arterials** provide the highest level of mobility at the greatest vehicular speeds for the longest uninterrupted distances. These roadways have higher design standards and feature multiple lanes with some degree of access control. The rural arterial network provides connections between metropolitan areas, cities, and bordering states. Arterials are divided into principal and minor, with principal arterials maintaining the highest speeds and longest uninterrupted distances.
- **Collectors** provide a mixture of mobility and land access. Collector streets provide an intraregional level of mobility by connecting the arterial network to local roadways. In non-metropolitan areas, collectors are divided into major and minor.
- **Local Streets** represent the largest element of the road network in terms of mileage. Local streets provide the lowest level of mobility by accessing adjacent land use, serving local trip purposes, and connecting to higher order roadways. Vehicular speeds are slower than on arterial or collector streets.

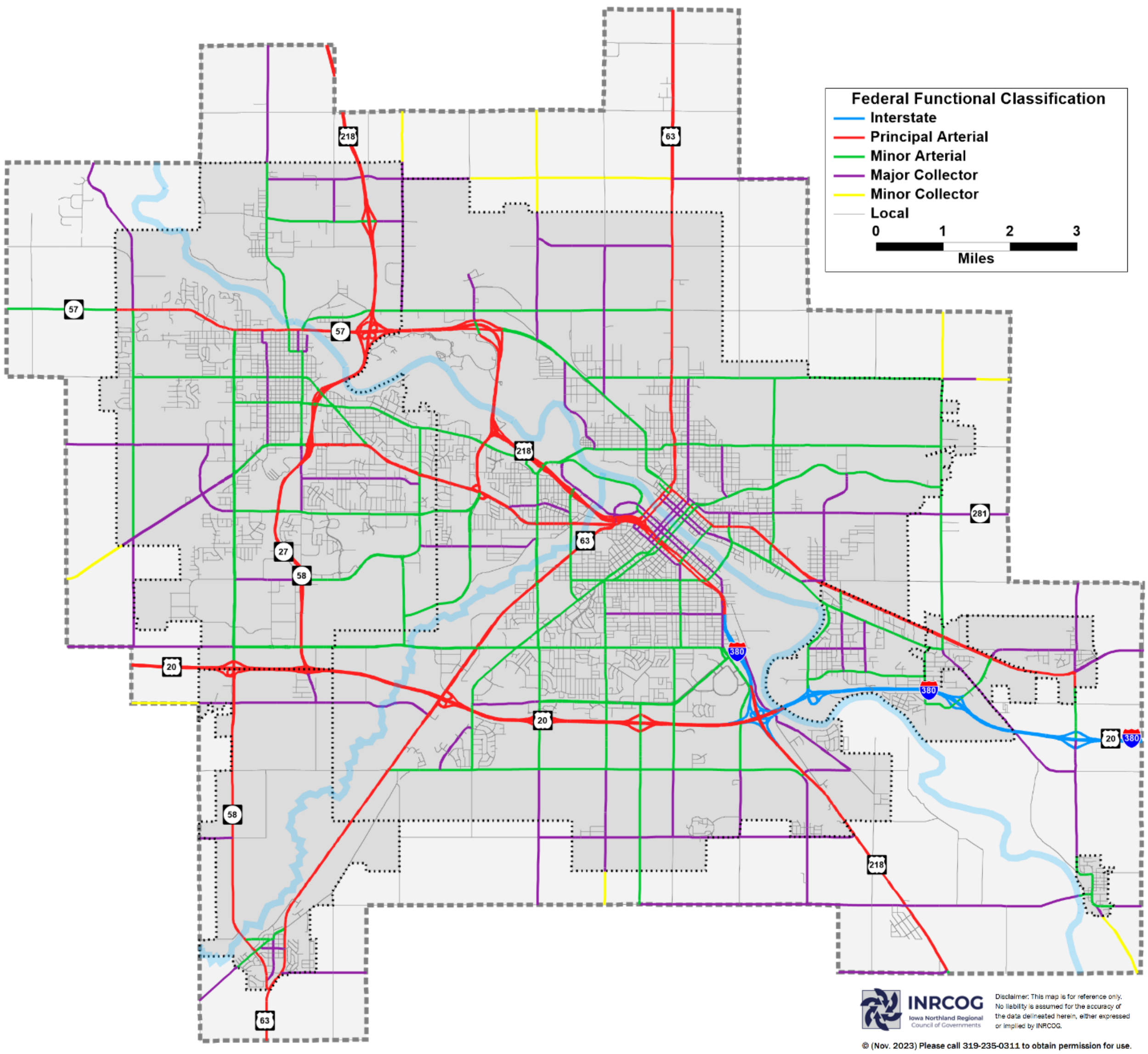
To be eligible for federal funding for road projects, streets must be classified as collector or above; local streets are ineligible for federal funding for street construction or reconstruction. Federal funds can be utilized for pedestrian and bicycle accommodations along any roadway. In total, approximately 40 percent of the MPO's roadway mileage is eligible for federal aid.

Figure 3.1: Distribution of Roads, by Federal Functional Classification



Map 3.1: Federal Functional Classification

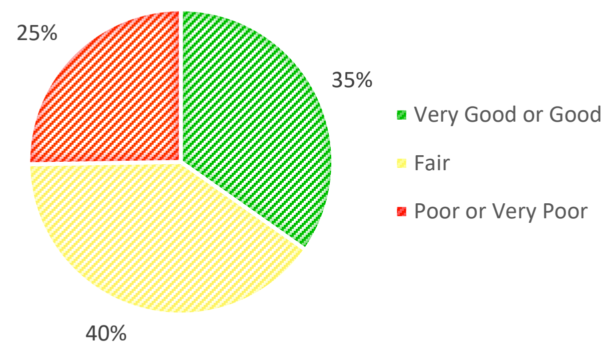
Source: Iowa DOT, Roadway Asset Management System (RAMS)



www.iowadot.gov/maps/Digital-maps/pdfview/blackhawk

Roadway Conditions

The condition of the road network is critical to the operating efficiency of the system. Roadway conditions within the region are assessed based on the Pavement Condition Index, International Roughness Index, and Average Annual Daily Traffic.

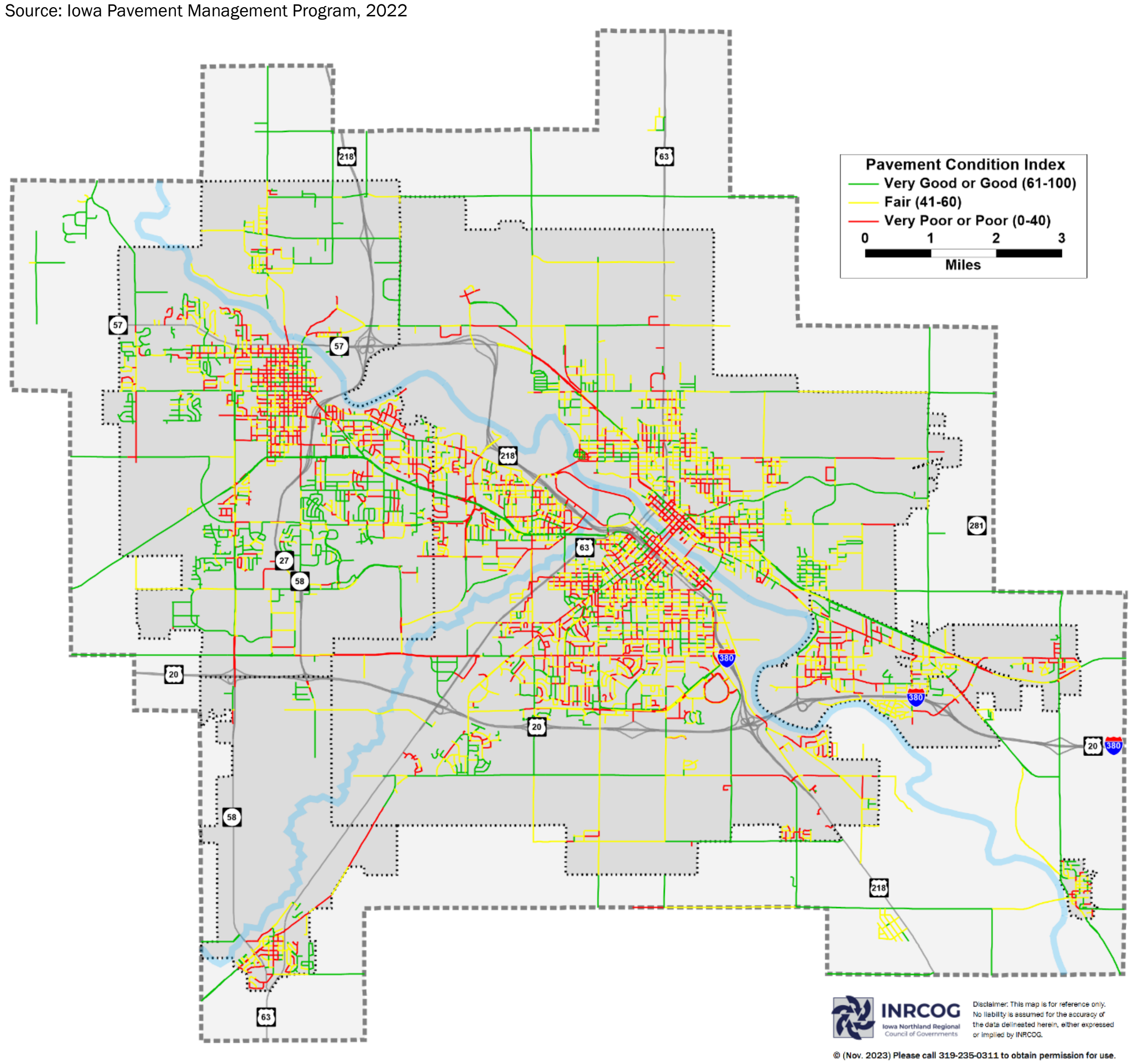


Pavement Condition Index (PCI)

PCI is a numerical index between 0 and 100 used to indicate the general condition of a pavement. This method is based on a visual survey of the number and types of distresses in a pavement. The result of the analysis is a numerical value with 100 representing the best possible condition and 0 representing the worst. PCI data from 2022 was available for the evaluation of 822 centerline miles of locally owned roads. From 2016 to 2022, the percentage of centerline miles of roads in poor or very poor condition increased from 21% to 25% while the percentage of roads in fair condition decreased from 44% to 40%.

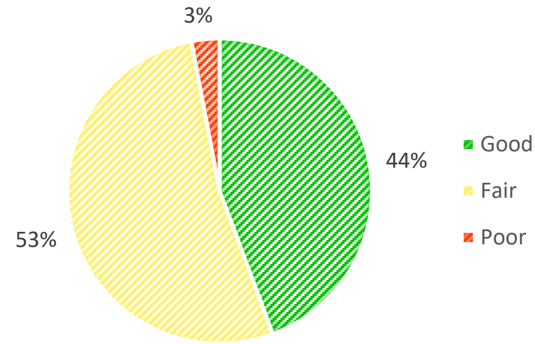
Map 3.2: Pavement Condition Index

Source: Iowa Pavement Management Program, 2022



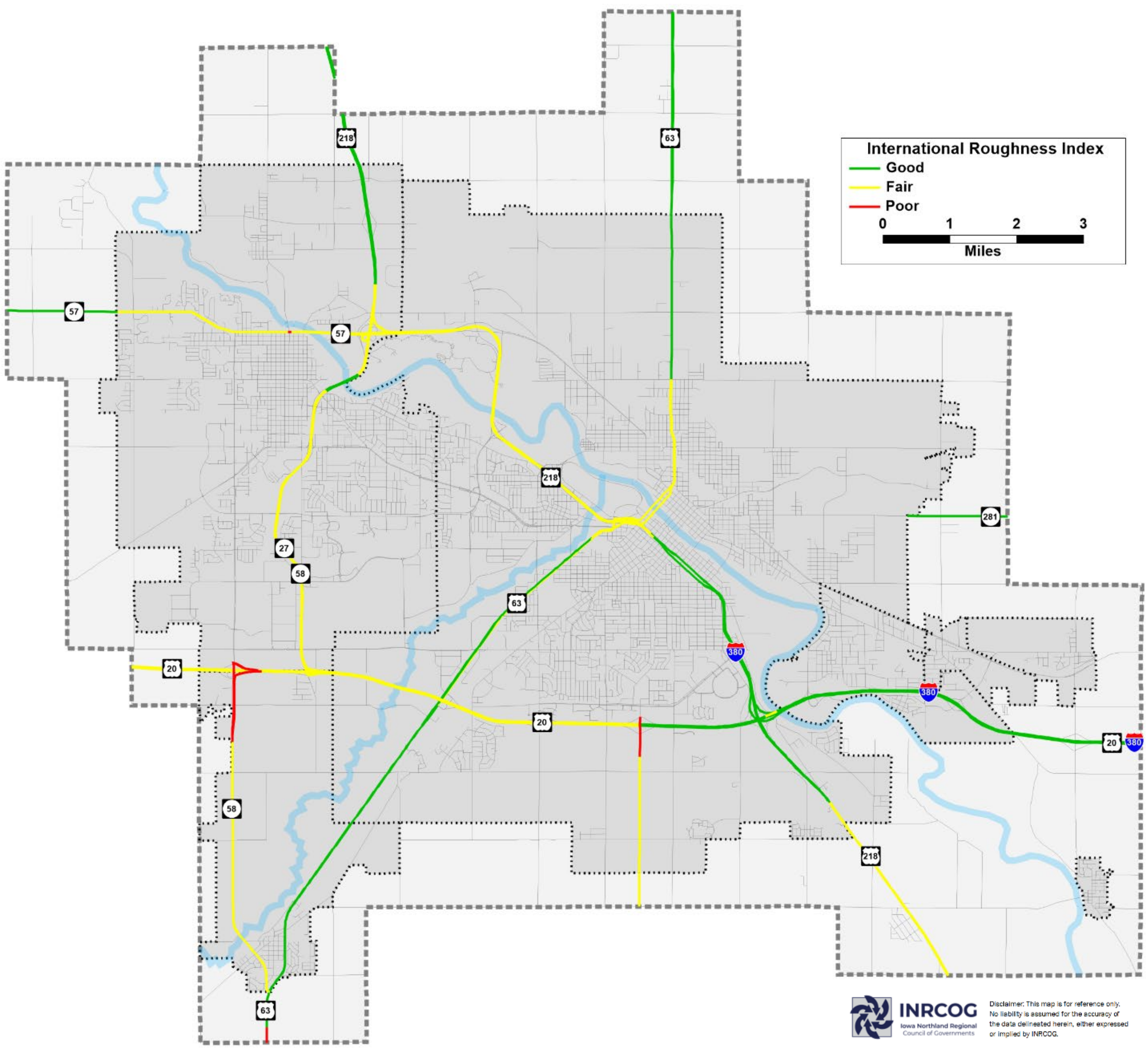
International Roughness Index (IRI)

One indicator of pavement condition is the smoothness of the ride. This measure gets to the subjective "feel" of the road that most users notice when riding on it. Although this can vary by season due to Iowa's various climates, the measure of smoothness is one indicator of overall pavement health. All states use a federally mandated standard measure of pavement smoothness, the International Roughness Index (IRI), to measure the smoothness of the primary highway system. IRI data from 2021 was available for the evaluation of 125 centerline miles of primary highways in the metropolitan area. From 2017 to 2021, the percentage of centerline miles of roads in poor condition decreased from 13% to 3% while the percentage of roads in good condition increased from 33% to 44%.



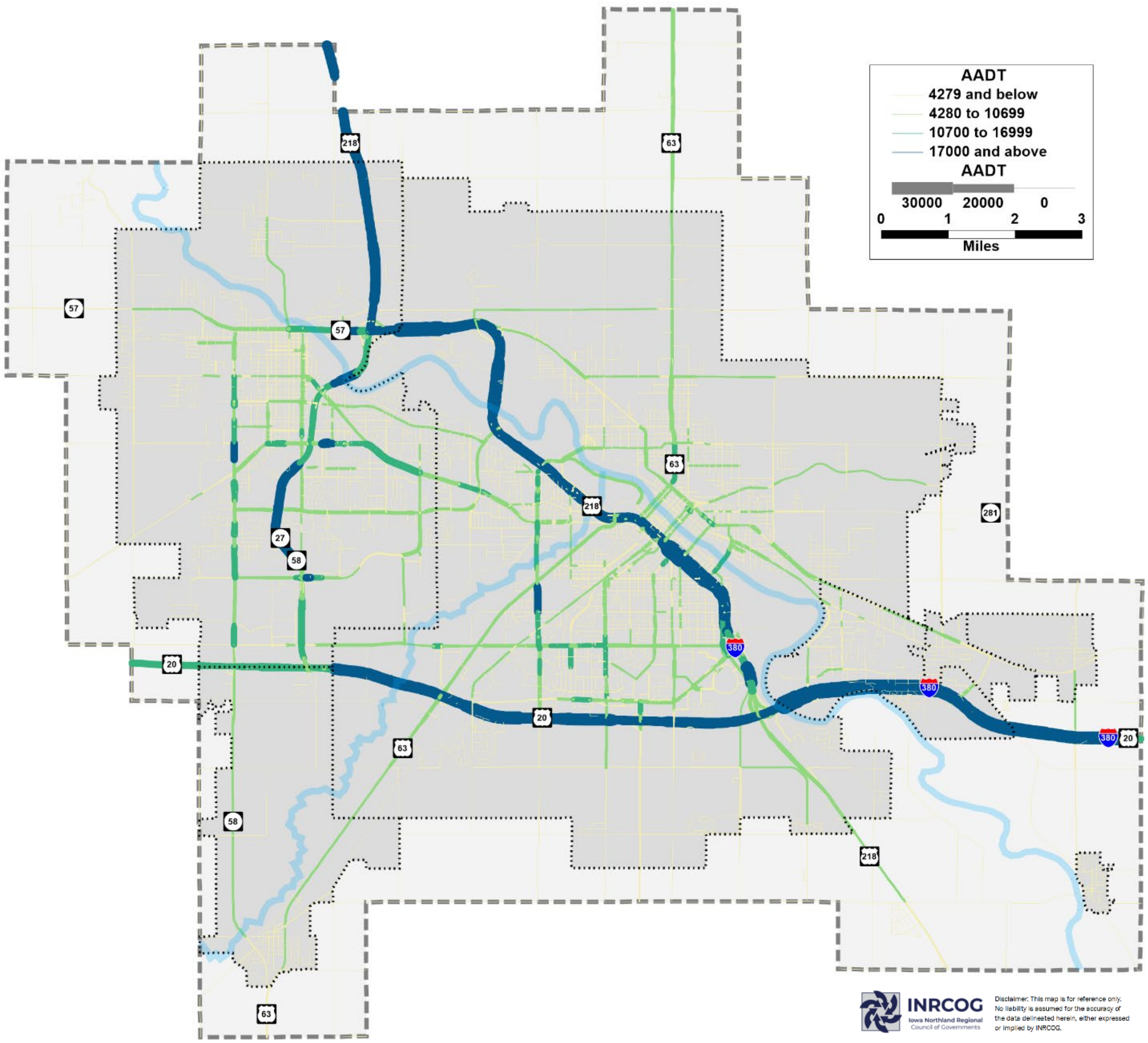
Map 3.3: International Roughness Index

Source: Iowa DOT, Data Portal, Pavement, 2021



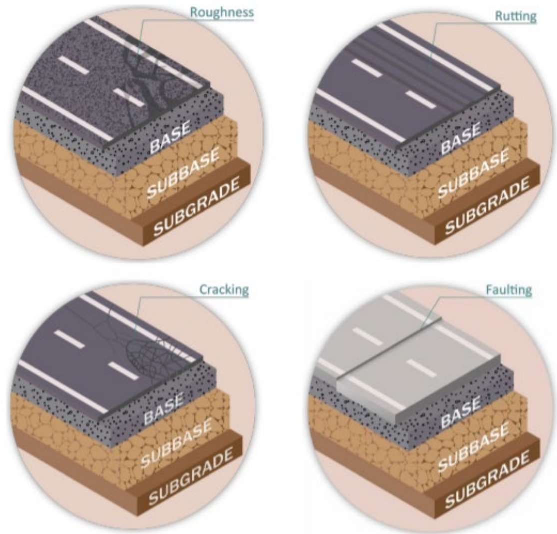
Average Annual Daily Traffic (AADT)
The Average Annual Daily Traffic is an indicator of the actual use of a road. To measure AADT on individual road segments, traffic data is collected either by an automated traffic counter or hiring an observer to record traffic. Data is recorded and adjusted to account for the season, time of day, and other variables that would correct the primary data to reflect actual traffic volumes. Map 3.4 shows AADT for the metropolitan area.

Map 3.4: Average Annual Daily Traffic
Source: Iowa DOT, Roadway Asset Management System (RAMS)



Pavement Condition Performance

In 2018, FHWA established four performance measures for National Highway System (NHS) pavement conditions, each of which is calculated based on data reported by the Iowa DOT to the Highway Performance Management System (HPMS). The following metrics are used to calculate the pavement condition performance measures:



- Pavement roughness is an indicator of discomfort experienced by road users traveling over the pavement and is measured using the International Roughness Index (IRI).
- Rutting is quantified for asphalt pavement by measuring the depth of ruts along the wheel path.
- Cracking is measured in terms of the percentage of cracked pavement surfaces.
- Faulting is quantified only for concrete pavements.

For each metric, FHWA has established thresholds for good, fair, and poor conditions. Road sections are rated as being in good condition if all the metrics are rated as good, and poor when two or more are rated as poor. All other combinations are rated as fair.

Metric	Good	Fair	Poor
IRI (inches/mile)	<95	95-170	>170
Rutting (inches)	<0.20	0.20-0.40	>0.40
Cracking (%)			
- Asphalt	<5	5-20	>20
- Jointed Concrete	<5	5-15	>15
- Continuously Reinforced Concrete	<5	5-10	>10
Faulting (inches)	<0.10	0.10-0.15	>0.15

Bridge Inventory

The metropolitan area has many bridges with a wide range of structure age, length, and design. There are a total of 257 bridges located within the metropolitan area. Most bridges provide service for vehicular traffic, though there are a few structures that service non-motorized traffic only. Table 3.2 provides further details of the bridge inventory.

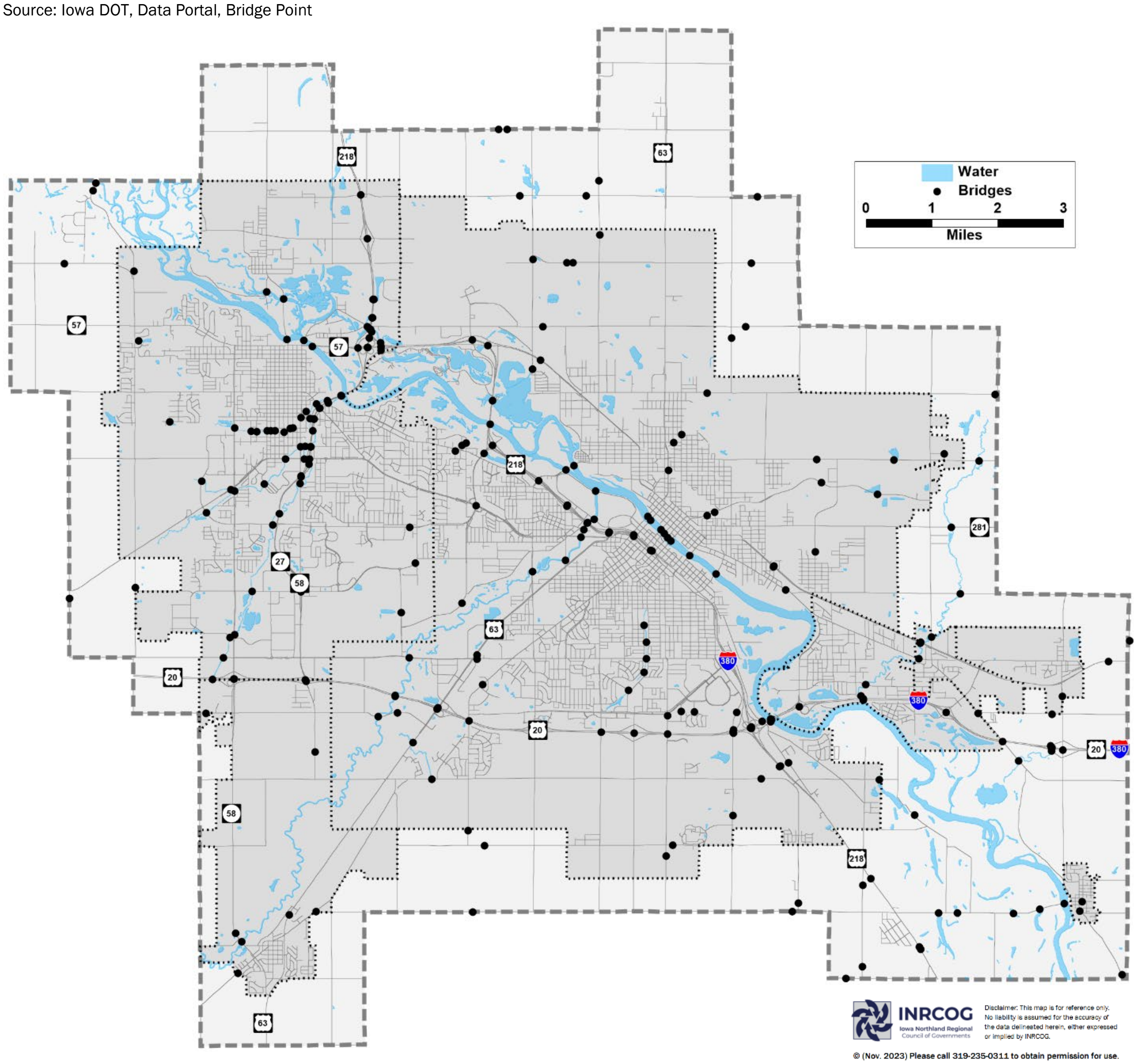
Table 3.2: Bridge Inventory

	2018	2022
Number of Bridges	249	257
Average Age of Structures (Years)	37	41
Posted or Closed Bridges	13	11
Structurally Deficient Bridges	12	10
Average Bridge Sufficiency Rating	88.3	89.3

Source: FHWA, National Bridge Inventory, 2018 & 2022

Map 3.5: Bridge Inventory

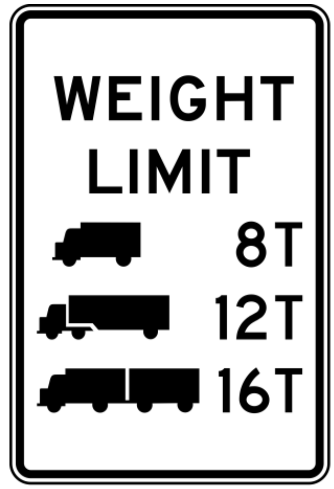
Source: Iowa DOT, Data Portal, Bridge Point



Bridge Conditions

Bridge performance can be measured by various conditions and the percentage of all bridges affected. Three of the most common measures of bridge performance are as follows:

- **Load Capacity Challenged (Posted or Closed)** – Posted bridges have weight restrictions to prohibit heavy loads, while closed bridges prohibit all traffic. Bridges may also be posted for other load-capacity restrictions including speed and number of vehicles permitted on the bridge. Posted and closed bridges can negatively impact the movement of people and goods as well as emergency response times.
- **Substandard Bridges (Structurally Deficient or Functionally Obsolete)** – Structurally deficient bridges are structures unable to carry vehicle loads or tolerate the speeds that would normally be expected for that bridge in its designated system. Functional obsolescence refers to a bridge with inadequate width or vertical clearance for its associated highway system.
- **Sufficiency Ratings** – Ratings of individual bridge elements, such as the deck substructure and superstructure, and levels of traffic, are factors utilized in the determination of bridge sufficiency ratings.



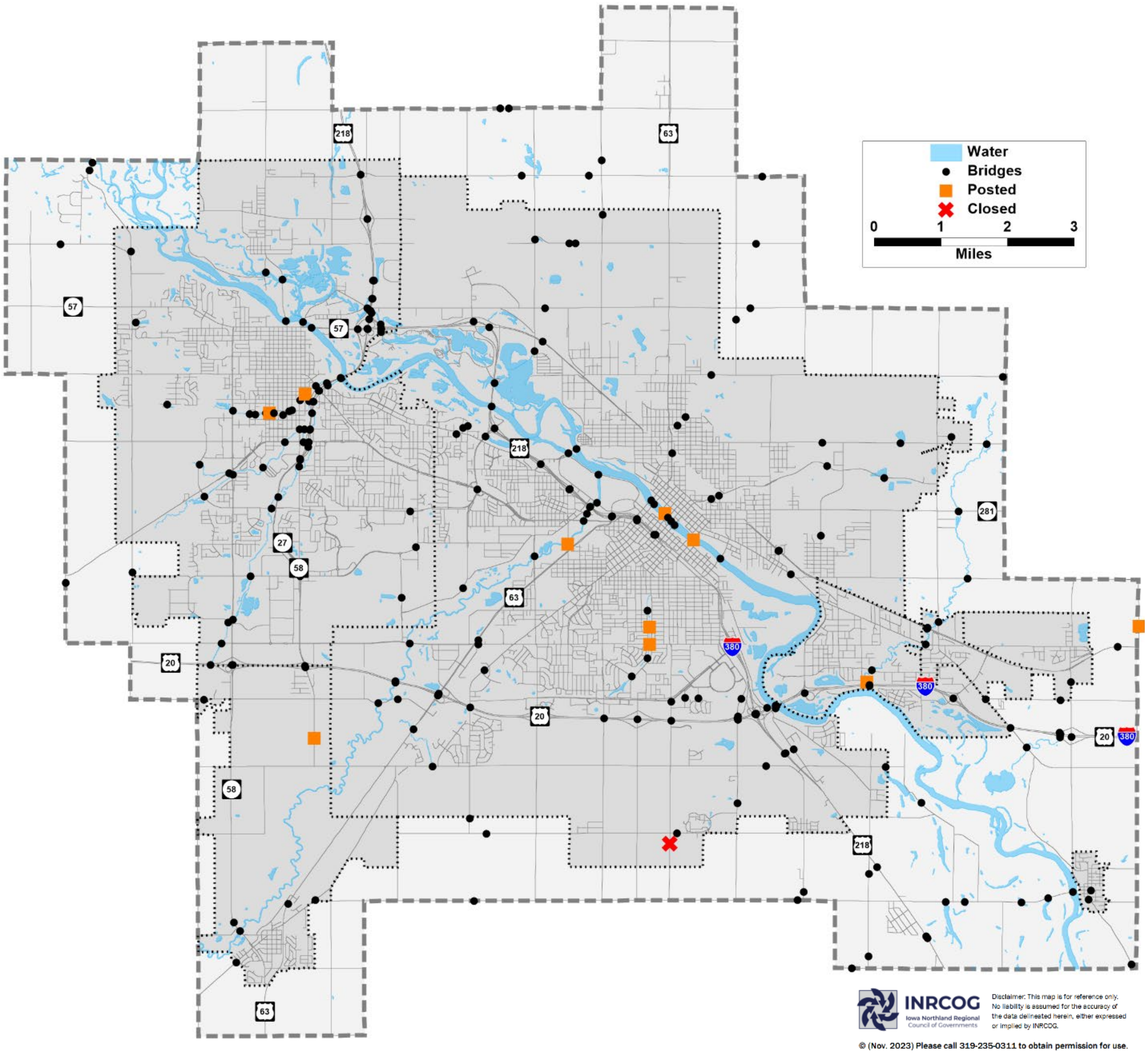
Posted and Closed Bridges

Bridge posting is part of a load rating process that determines the safe load carrying capacity of a structure. Load posting to a bridge is required by the National Bridge Inspection Standards when a bridge is not capable of safely carrying a legal load. If a structure is deemed deficient, officials will post a maximum load for the bridge. Bridges may also be posted for other load-capacity restrictions including speed and number of vehicles permitted on the bridge. Bridges closed to traffic are those structures deemed unsafe to carry any type of traffic. Map 3.6 identifies bridges that are posted and closed as of 2022.

A planning concern for county engineers in Iowa has been the permitting of large haulers on county-owned bridges. Senate File 629, passed in 2019, allows forestry haulers greater leeway to move heavy loads on local roadways, further straining road and bridge conditions and increasing the number of bridges needing posting.

Map 3.6: Posted and Closed Bridges

Source: FHWA, National Bridge Inventory, 2022

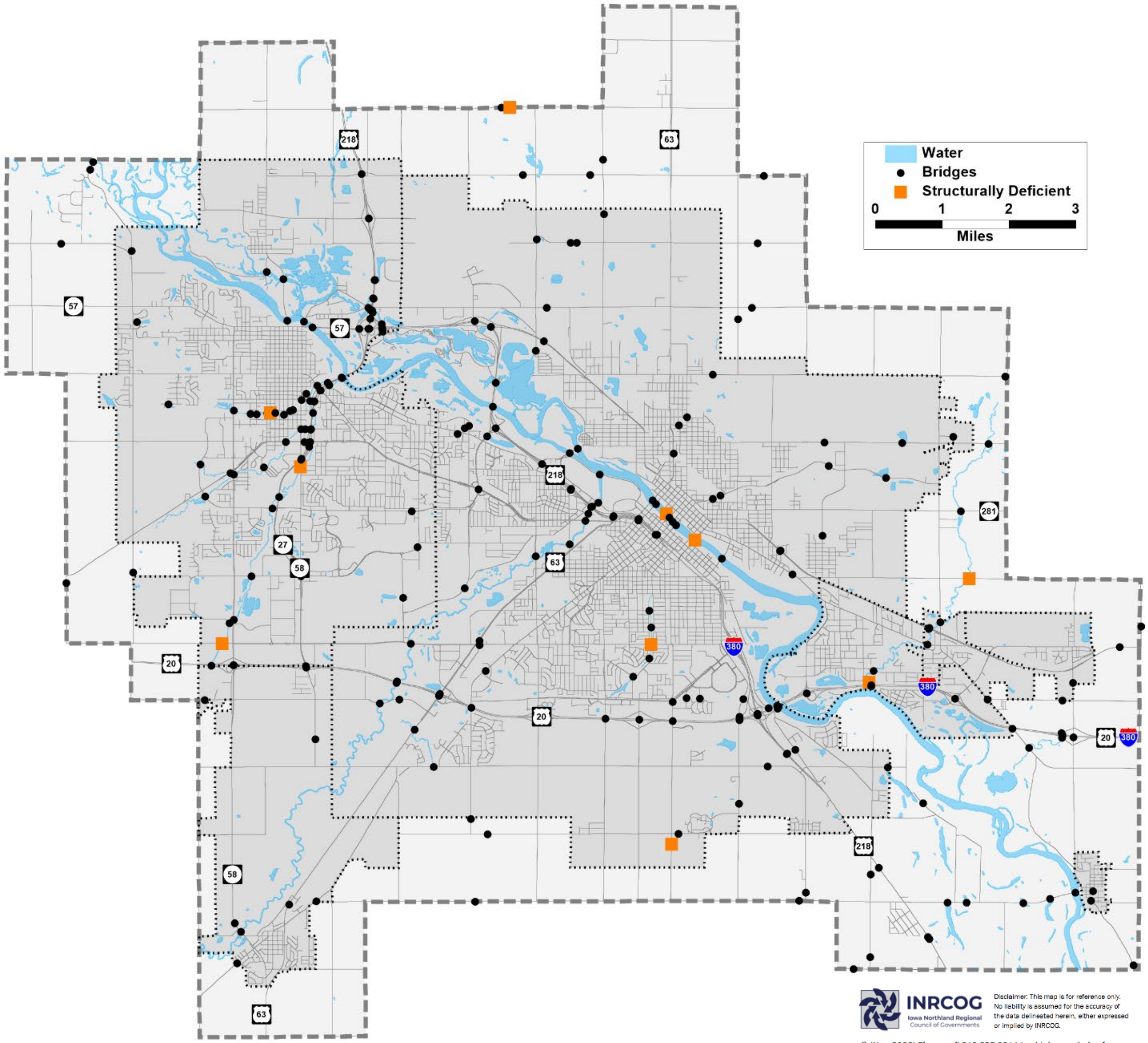


Structurally Deficient Bridges

Structural deficiencies are characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. This may include spalled or cracked concrete, the bridge deck, the support structure, or the entire bridge itself. A "structurally deficient" designation does not imply that a bridge is unsafe. However, such bridges typically require significant maintenance and repair to remain in service and would eventually require major rehabilitation or replacement to address the underlying deficiency. To remain in service, structurally deficient bridges are often posted with weight limits restricting the gross weight of vehicles using the bridge to less than the maximum weight typically allowed by statute. Map 3.7 shows the locations of structurally deficient bridges as of 2022.

Map 3.7: Structurally Deficient Bridges

Source: FHWA, National Bridge Inventory, 2022



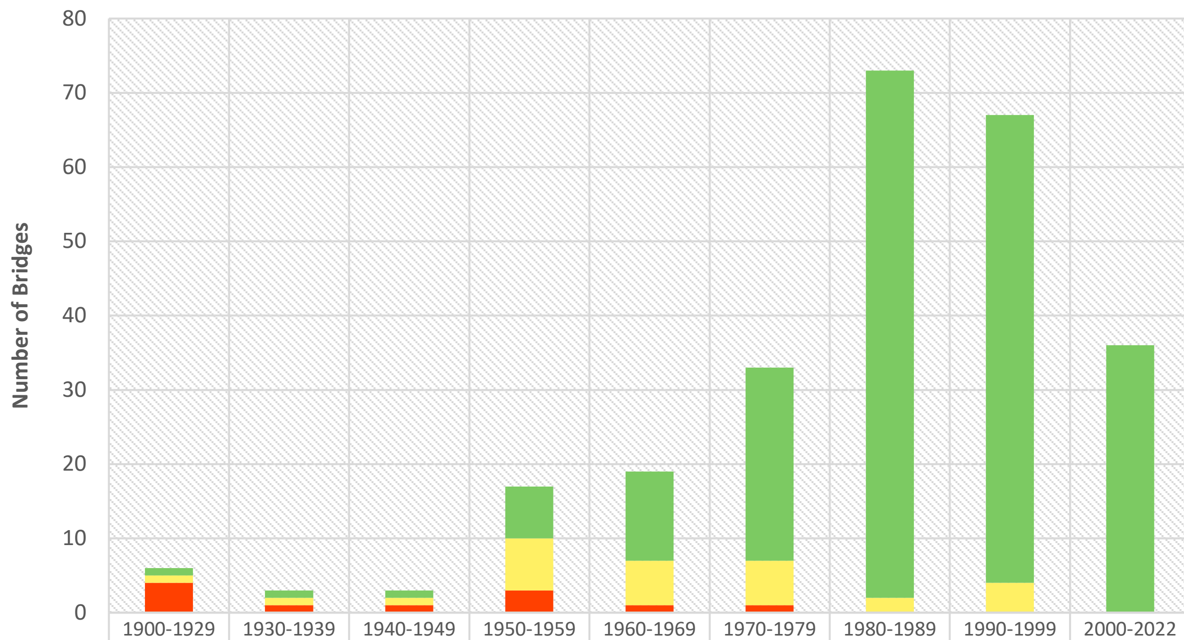
Sufficiency Ratings

The sufficiency rating formula is a method of evaluating a bridge's sufficiency to remain in service based on a combination of several factors. The result of the formula is a percentage in which 100 percent represents an entirely sufficient bridge and zero percent represents an entirely insufficient or deficient bridge. Factors may include inspection results of the structural condition of the bridge, traffic volumes, number of lanes, road widths, clearances, and importance for national security and public use. The sufficiency rating does not necessarily indicate a bridge's ability to carry traffic loads or a potential for collapse. Conversely, it helps determine which bridges may need repair or replacement.

Bridges are inspected every two to four years. States submit information for each bridge annually to FHWA who, in turn, uses the information to determine the sufficiency rating. A bridge's sufficiency rating provides an overall measure of the bridge's condition and is used to determine eligibility for federal funds. For bridges to qualify for federal replacement funds, they must have a rating of 60 or below. To qualify for federal rehabilitation funds, a bridge must have a sufficiency rating of 80 or below. Figure 3.2 and Map 3.8 show the sufficiency ratings of bridges in the metropolitan area.

Figure 3.2: Bridge Sufficiency Ratings, by Year Built

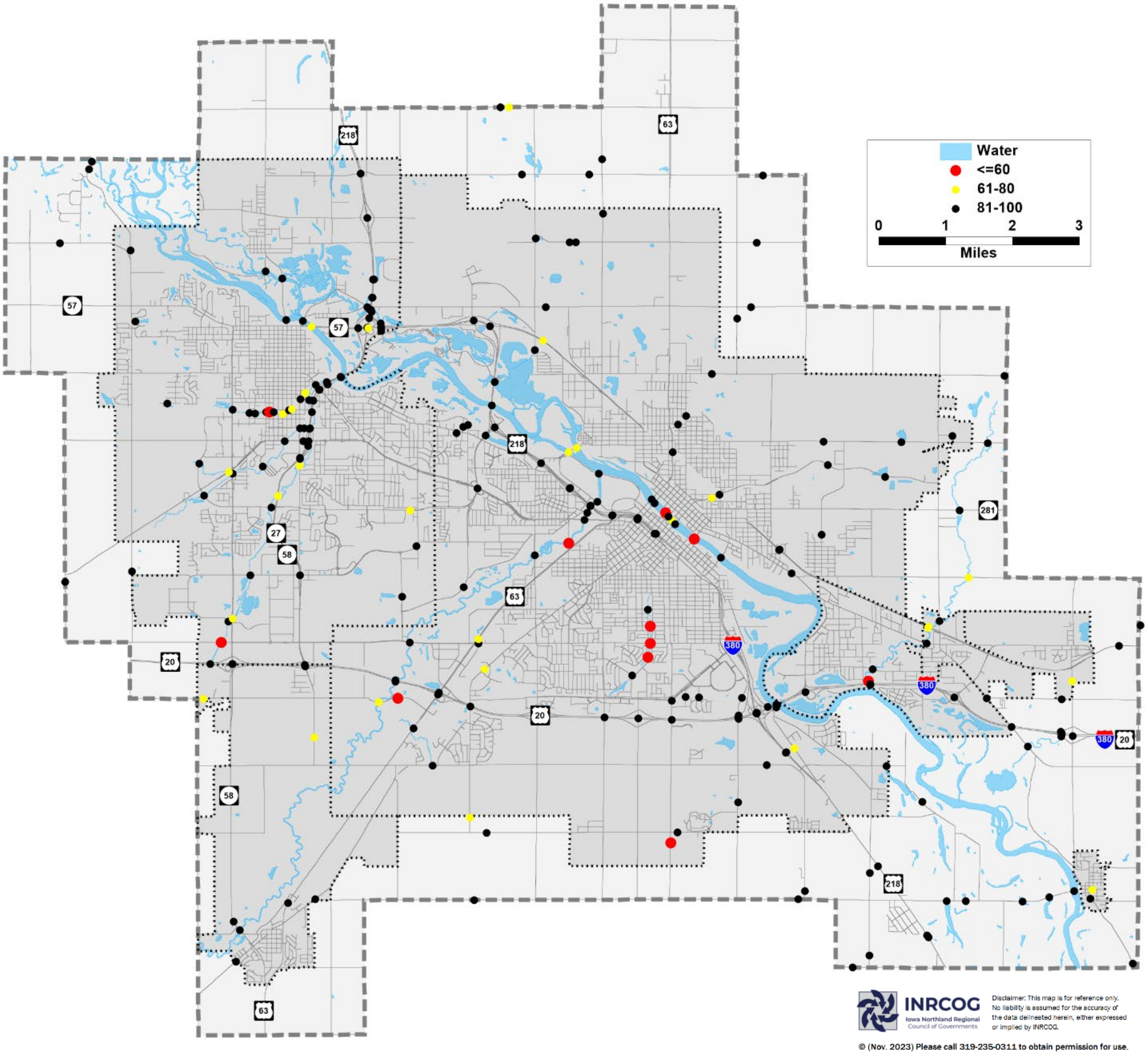
Source: FHWA, National Bridge Inventory, 2022



	1900-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2022
81-100	1	1	1	7	12	26	71	63	36
61-80	1	1	1	7	6	6	2	4	0
≤60	4	1	1	3	1	1	0	0	0

Map 3.8: Bridge Sufficiency Ratings

Source: FHWA, National Bridge Inventory, 2022



Travel Demand Model

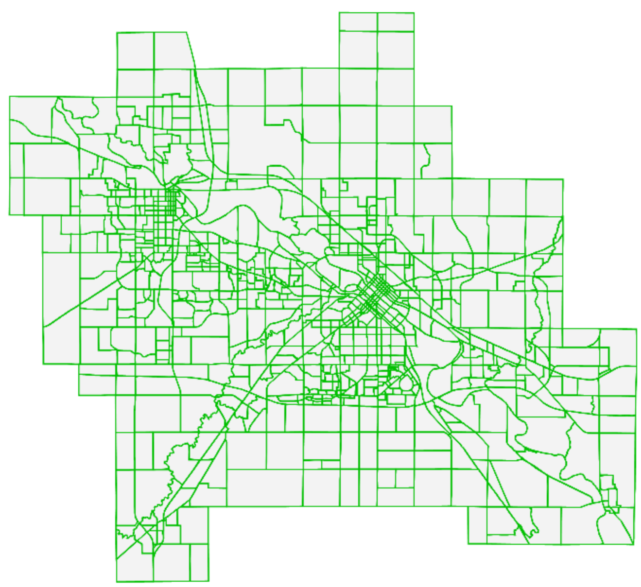
The Travel Demand Model (TDM) is an important tool for transportation planning. The TDM is a computer model that estimates and distributes an area's trips across its street and highway network. The modeling process attempts to replicate existing traffic levels and forecast future traffic levels based on anticipated population and employment growth. The model can be used to identify potential deficiencies in the road network. The model can also be used to estimate the impacts of various scenarios such as adding new roads, changing the capacity of existing roads, changing the type of intersection control, or removing roads from the network.

To estimate existing and potential future congestion on the area's road network, MPO and Iowa DOT staff built a new TDM for the 2050 LRTP. This model has a base year of 2017, interim years of 2030 and 2040, and a horizon year of 2050. The TDM was rebuilt using the Iowa DOT's Iowa Standardized Model Structure (ISMS) which provides a standardized yet scalable travel demand modeling architecture for use by all MPOs across Iowa. The ISMS architecture uses parcel data as a primary input to trip generation for the following reasons:

- Parcel data is generally accurate since it is used to collect property taxes.
- Building use codes are detailed and can be aggregated to land uses that better reflect trip generation potential as opposed to a small number of employment categories.
- Location accuracy is high since coordinates are obtained directly from a GIS file rather than through an address matching process.
- Parcel data is readily available from tax assessment agencies.

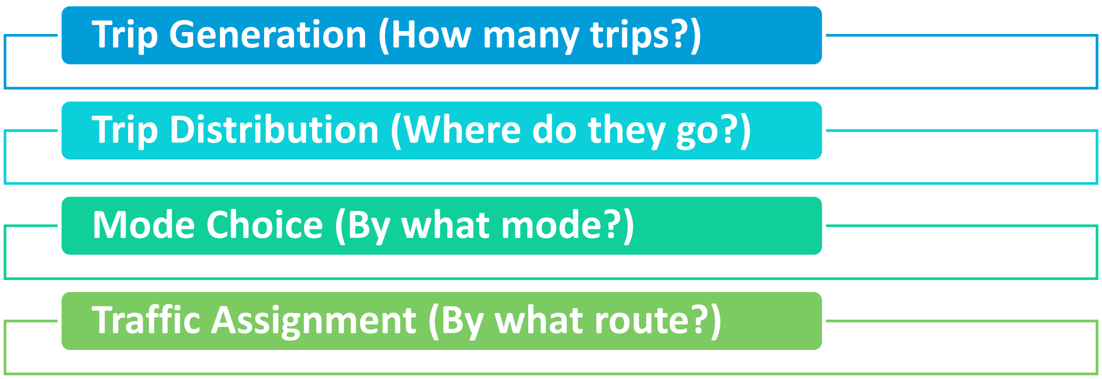
Additional inputs to the 2050 TDM include the following:

- Input from communities on employment and population growth locations
- U.S. Census data
- National Household Travel Survey (NHTS) Add-on data
- Grade school enrollment and projected enrollment data
- City existing and future land use information
- University of Northern Iowa (UNI) on- and off-campus student housing locations
- UNI employment by building
- Traffic signal and stop sign locations
- MET Transit fixed route annual rides
- Iowa statewide travel model data
- Iowa DOT RAMS data



The traffic volumes in the model are based primarily on the area's population and employment activities which are broken into 958 Traffic Analysis Zones (TAZ). Boundaries for TAZs are typically roads included in the network or natural features, such as rivers. Each TAZ includes a centroid, which is usually placed near the center of activity, and centroid connectors, which are links that connect the centroid to the network to replicate local streets. Each TAZ includes base year population and employment data. Local planners then assigned their jurisdiction's anticipated population and employment growth (reference Chapter 2) to the TAZs for years 2030, 2040, and 2050.

The distribution of trips in the TDM is based on a traditional gravity model formula which assumes that the amount of travel between TAZs is based on the relative attractiveness between the origin and destination. The trip-based travel demand model, which is often called a “four-step model”, includes the following steps:



Trips in the TDM are divided into the following three purposes:

- Home-based work: Between one’s home and workplace
- Home-based other: Between one’s home and a location other than work, such as shopping
- Non-home based: Does not begin or end at home, such as a trip from work to shopping

The model assigns trips to segments of the road network using Multi-Modal, Multi-Class Assignment. This process allows for unique trip tables to be assigned to unique sets of links within the network, such as truck trip tables assigned to links that do not restrict truck movements.

Level of Service

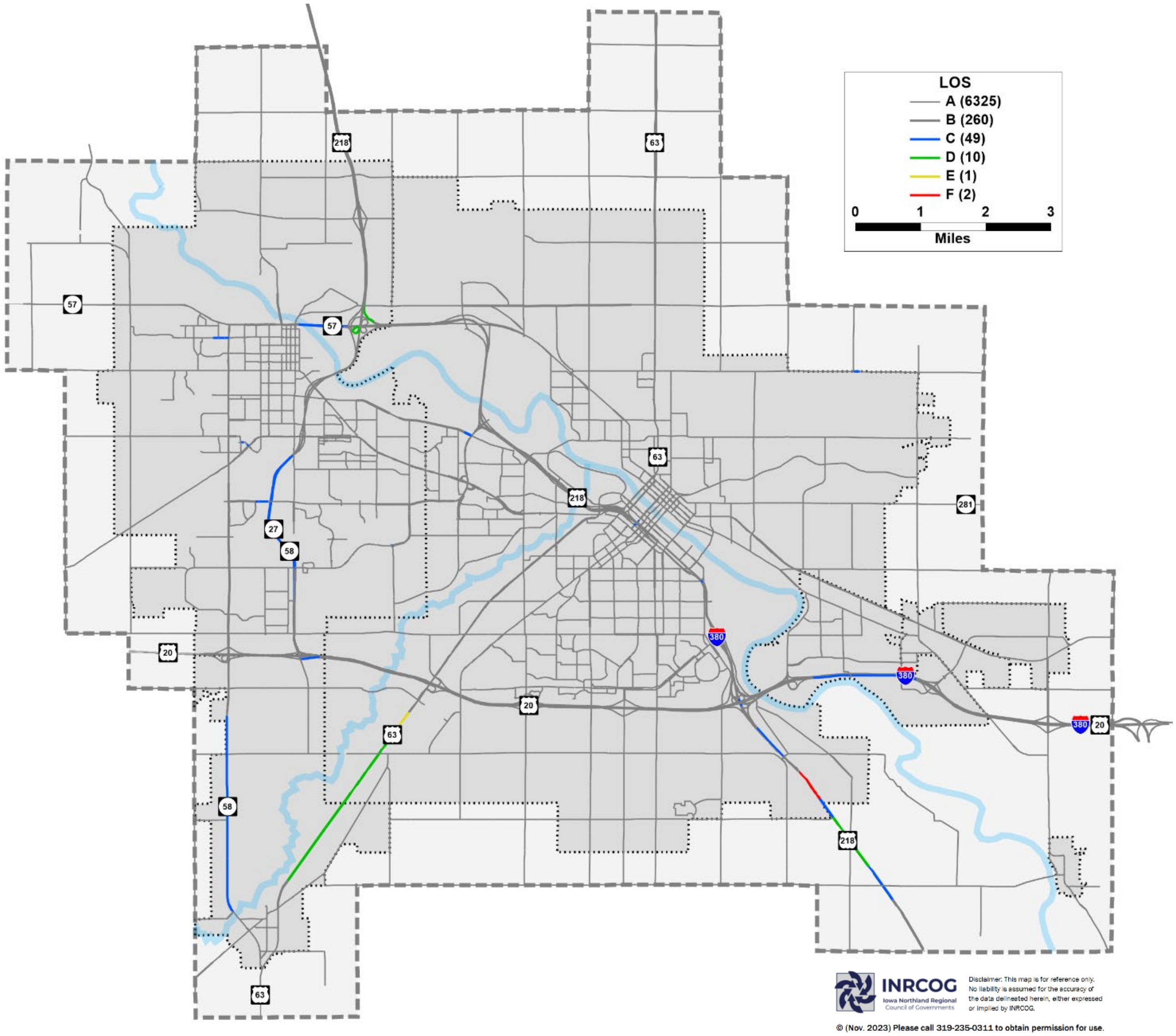
Level of service (LOS) is a commonly used system to describe congestion, or the flow of traffic on a roadway. There are grades of A through F with the following descriptions assigned by the FHWA:

- A – Free flow with low volumes and high speeds
- B – Reasonably free flow, but speeds beginning to be restricted by traffic conditions
- C – In stable flow zone, but most drivers are restricted in the freedom to select their own speeds
- D – Approaching unstable flow; drivers have little freedom to select their own speeds
- E – Unstable flow, may experience short stoppages
- F – Unacceptable congestion; stop-and-go; forced flow

LOS is often used to describe how a road is functioning; a LOS of C or above during peak hour traffic is acceptable. Map 3.9 shows the LOS of the existing road network with base-year socioeconomic data.

Map 3.9: Level of Service, 2017 Existing Network

Source: Black Hawk County MPO 2050 Travel Demand Model



Future Conditions

The transportation modeling process would not be necessary if the MPO's population and employment levels remained static through 2050. Local planning officials anticipate that the MPO will experience growth in population and employment during this time. Accordingly, the transportation modeling and planning process is critical to address this growth and ensure that the transportation system is adequate to manage future traffic levels.

Socioeconomic Forecasts

As outlined in Chapter 2, population and employment projections were used to forecast growth in the area. To better understand forecasted short- and long-term growth in the area, interim years of 2030 and 2040 were used in addition to the forecast year of 2050. Table 3.3 shows the projected population and employment in the MPO, the projected person trips made, vehicle miles traveled (VMT), and congested vehicle hours traveled (VHT) on a weekday evening over this timeframe.

Table 3.3: Socioeconomic Projections

	2017	2030	2040	2050
Population	121,414	125,102	127,889	130,680
Employment	75,818	78,541	82,045	85,549
Person Trips (Weekday)	738,338	748,900	759,218	793,481
VMT (Weekday)	2,712,454	3,067,686	3,337,224	3,676,041
Congested VHT (Weekday)	63,211	69,861	75,033	82,191

Source: Black Hawk County MPO 2050 Travel Demand Model

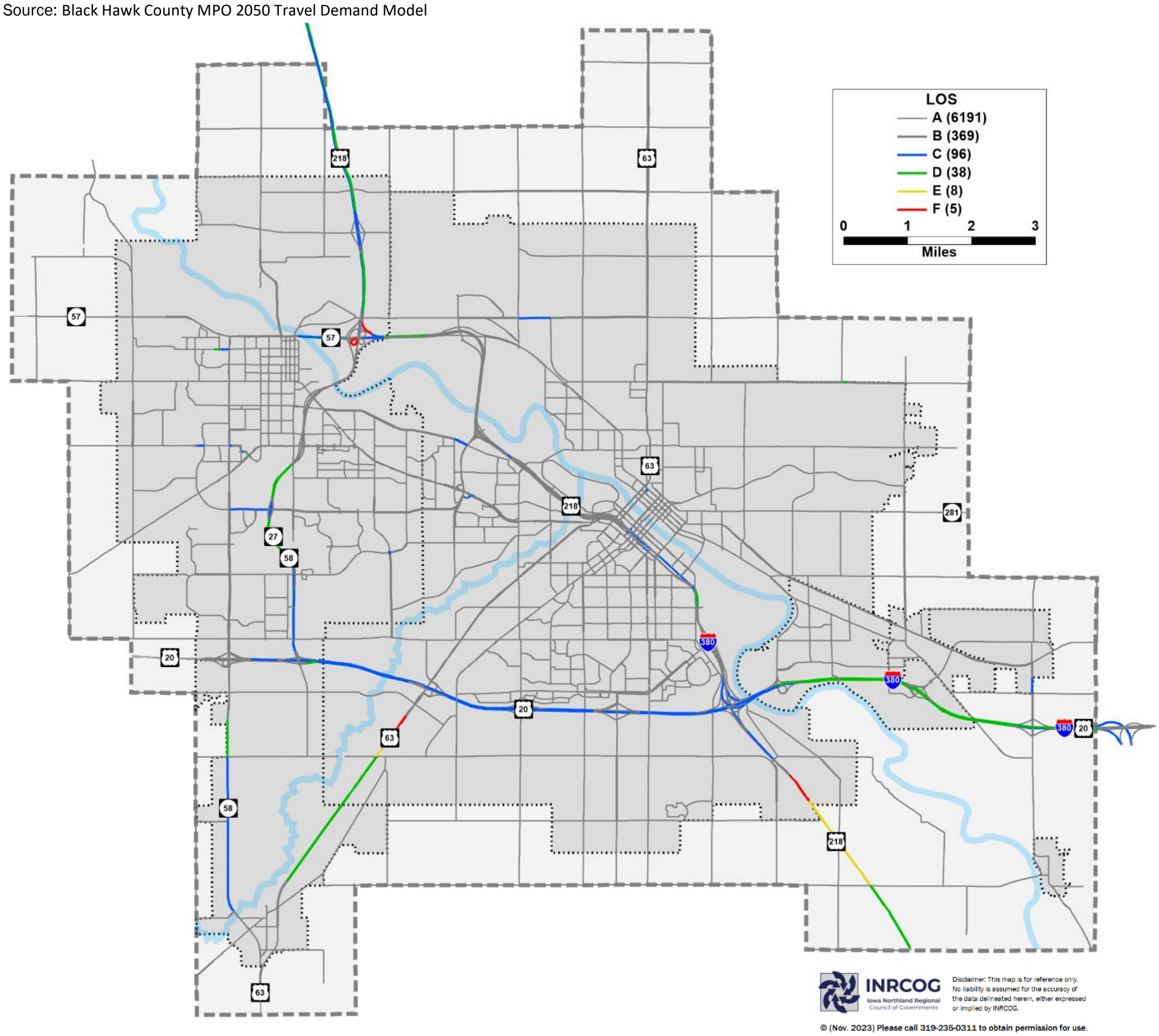
When the forecasted socioeconomic data is applied to the base year network, some capacity-related issues result. One of the goals of the transportation planning process is to address these issues by planning and programming projects that will best serve the public and avert potential traffic issues.

Existing and Committed Network

To Evaluate the impact of increasing population and employment, the 2050 socioeconomic forecasts were loaded on the existing and committed (construction funded or pending) network.

Map 3.10: Level of Service, 2050 Existing and Committed Network

Source: Black Hawk County MPO 2050 Travel Demand Model



2050 LRTP Projects

Project Selection
To determine what projects to include in the LRTP, each jurisdiction was asked to submit road and bridge projects they felt were likely candidates for federal aid during the horizon of the plan. In addition to considering how projects met the goals, objectives, and performance measures of the LRTP outlined in Chapter 1, staff reviewed projects based on the timeframe, federal functional classifications, and current traffic volumes, level of service, and conditions. The financially constrained list of projects was recommended to the Policy Board for approval.

The projects included in the LRTP must be financially constrained. A financial analysis was conducted to examine available transportation resources and compared to the cost of projects selected through the MPO transportation planning process (see Chapter 9). To account for inflation, project costs were increased by four percent per year to the timeframe they were targeted. Road and bridge projects beyond the FY 2024-2027 Transportation Improvement Program (TIP) are assumed to have a maximum 65 percent state or federal participation which is the average for projects programmed through STBG over the past 10 years.

Planned Projects
The outcome was a recommendation of projects to include in this Plan. Table 3.4 lists the financially constrained road and bridge projects, and they are shown on Map 3.11. Projects have been divided into three time periods: 2024-2030, 2031-2040, and 2041-2050. Projects are not prioritized within time periods. To meet fiscal constraint requirements, project costs have been inflated to year of expenditure (YOE) dollars as follows:

- 2024-2027: Programmed in the FY 2024-2027 TIP in YOE dollars
- 2028-2030: Inflated four percent annually to the year 2029 (multiplying current cost by 1.24)
- 2031-2040: Inflated four percent annually to the year 2035 (multiplying current cost by 1.48)
- 2041-2050: Inflated four percent annually to the year 2045 (multiplying current cost by 1.88)

For projects to be funded through the Surface Transportation Block Grant (STBG) program, they must be included in, or consistent with, the MPO's LRTP. Major projects, including full reconstruction, new construction, and capacity improvements, have been specifically identified in this document. This does not limit the MPO to consider only these projects for funding. Projects that could be funded that are not identified include safety improvements, bus replacements, bicycle and pedestrian accommodations, and other projects that are consistent with the MPO's goals, objectives, and performance measures.

Table 3.4: 2050 Long-Range Transportation Plan Projects

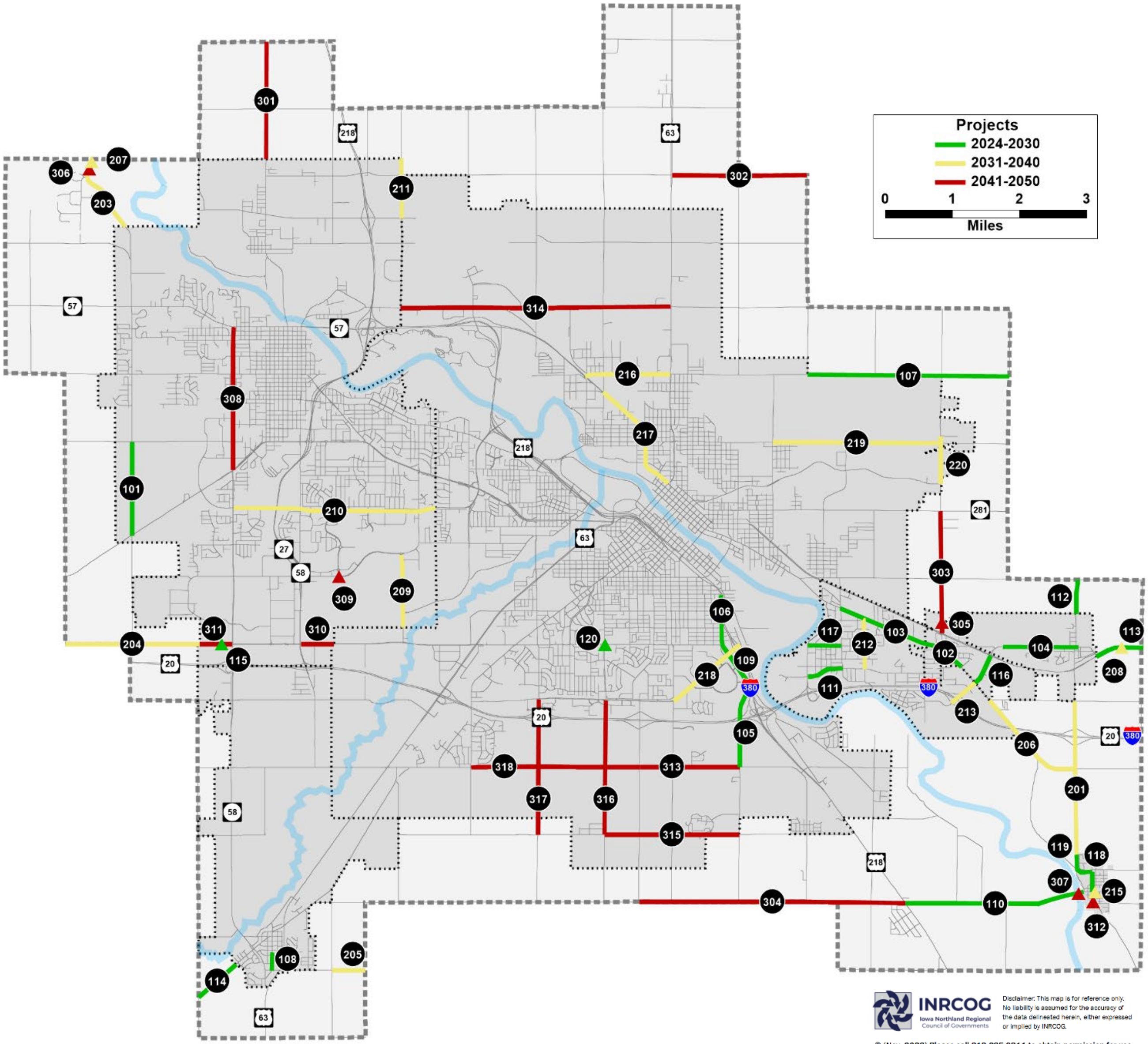
ID	Timeframe	Jurisdiction	Project	Termini	Description	Cost Estimate (YOE)
101	2024	Cedar Falls	Union Rd	W 27th St to University Ave	Reconstruction	6,550,000
102	2024	Elk Run Heights	Gilbertville Rd/Lafayette Rd	Elk Run Creek to Amber Ln	Reconstruction	2,185,500
103	2024	Evansdale	Lafayette Rd	Evans Rd to Elk Run Creek	Reconstruction, Bike/Ped Improvements	6,095,000
104	2024	Raymond	Lafayette Rd	2,750' W of Taylor Ln to 2nd St	Reconstruction	3,913,000
105	2024	Waterloo	La Porte Rd (Ph I)	E Shaulis Rd to Bopp St	Reconstruction, Capacity Improvements, Bike/Ped Improvements	14,196,000
106	2025	Waterloo	La Porte Rd (Ph II)	Plymouth Ave to U.S. 218 slip ramp	Reconstruction, Capacity Improvements, Bike/Ped Improvements	11,160,000
107	2026	Black Hawk Co.	Donald St (D16)	Sage Rd to Raymond Rd (V49)	Pavement Rehab	2,050,000
108	2026	Hudson	Washington St	50' south of Wood St to 240' north of 1st St	Reconstruction	1,067,000
109	2026	Waterloo	La Porte Rd (Ph III)	Bopp St to Plymouth Ave	Reconstruction, Capacity Improvements, Bike/Ped Improvements	7,558,000
110	2027	Black Hawk Co.	Washburn Rd (D39)	U.S. 218 to Gilbertville WCL	Pavement Rehab	2,450,000
111	2027	Evansdale	W. Gilbert Dr	River Forest Rd to Grand Blvd	Reconstruction	3,026,970
112	2028-2030	Black Hawk Co.	Raymond Rd (V49)	Conard Rd to Osage Rd	Pavement Rehab	558,000
113	2028-2030	Black Hawk Co.	Dubuque Rd (D22)	Raymond ECL to Ordway Rd	Pavement Rehab	620,000
114	2028-2030	Black Hawk Co.	Eldora Rd (D35)	Lincoln Rd to Hudson SCL	Pavement Rehab	620,000
115	2028-2030	Cedar Falls	Ridgeway Ave BR	0.15 mi. west of Hudson Road, over South Branch of Dry Run Creek	Bridge Replacement	824,600
116	2028-2030	Elk Run Heights	Plaza Dr	Gilbertville Rd to Dubuque Rd	Reconstruction	806,000
117	2028-2030	Evansdale	Central Ave	River Forest Rd to Evans Rd	Reconstruction	1,240,000
118	2028-2030	Gilbertville	5th St	20th Ave to 14th Ave	Reconstruction, Bike/Ped Improvements, Lane Reconfiguration (4 to 3 Lanes)	620,000
119	2028-2030	Gilbertville	20th Ave	5th St to 25th Ave	Shoulder Paving	93,000
120	2028-2030	Waterloo	E. Ridgeway Ave/Kimball Ave	Immediately north and east of intersection	Capacity Improvements (turn lanes to new developments)	2,480,000

ID	Timeframe	Jurisdiction	Project	Termini	Description	Cost Estimate (YOE)
201	2031-2040	Black Hawk Co.	Raymond Rd (V49)	Gilbertville NCL to Raymond SCL	Pavement Rehab	2,368,000
202	2031-2040	Black Hawk Co.	Washburn Rd (D38)	U.S. 218 to Gilbertville WCL	Pavement Rehab	2,220,000
203	2031-2040	Black Hawk Co.	Union Rd (T75)	Cedar Falls NCL to Beaver Valley Rd (C67)	Pavement Rehab	1,110,000
204	2031-2040	Black Hawk Co.	Ridgeway Ave (D19)	Hearst Rd to Cedar Falls WCL	Pavement Rehab	740,000
205	2031-2040	Black Hawk Co.	Schrock Rd (D35)	Holmes Rd to Acker Rd	Pavement Rehab	740,000
206	2031-2040	Black Hawk Co.	Indian Creek Rd	Evansdale CL to Raymond Rd (V49)	Pavement Rehab	740,000
207	2031-2040	Black Hawk Co.	Union Rd (T75) BR	0.25 mi. south of Beaver Valley Rd, over Beaver Creek	Bridge Replacement	3,552,000
208	2031-2040	Black Hawk Co.	Dubuque Rd (D22) BR	0.4 mi. east of Lafayette Rd, Over Poyner Creek	Bridge Replacement	1,036,000
209	2031-2040	Cedar Falls	Cedar Heights Dr	Viking Rd to SCL	Reconstruction	4,440,000
210	2031-2040	Cedar Falls	Greenhill Rd	Hudson Rd to ECL	Reconstruction	6,660,000
211	2031-2040	Cedar Falls	Leversee Rd	Lone Tree Rd to NCL	Reconstruction	3,700,000
212	2031-2040	Evansdale	Grand Blvd	Lafayette Rd to Gilbert Dr	Reconstruction	8,584,000
213	2031-2040	Evansdale	Evansdale Dr/Plaza Dr	I-380 EB ramp to Gilbertville Rd	Reconstruction	2,960,000
214	2031-2040	Evansdale	Evansdale Dr/Plaza Dr	I-380 EB ramp to Gilbertville Rd	Capacity Improvements, New Signals	3,700,000
215	2031-2040	Gilbertville	14th Ave BR	East of 5th St	Bridge Replacement	481,000
216	2031-2040	Waterloo	W. Donald St	Broadway St to Logan Ave (U.S. 63)	Reconstruction	9,620,000
217	2031-2040	Waterloo	Broadway St	E. Mullan Ave (U.S. 63) to Burton Ave	Reconstruction, Bike/Ped Improvements	14,800,000
218	2031-2040	Waterloo	E. San Marnan Dr	Hammond Ave to Texas St	Reconstruction, Bike/Ped Improvements	13,172,000
219	2031-2040	Waterloo	Newell St	Idaho St to N. Elk Run Rd	Reconstruction, Bike/Ped Improvements	17,760,000
220	2031-2040	Waterloo	N. Elk Run Rd	Martin Luther King Jr Dr to Remington Rd	Capacity Improvements	3,922,000

ID	Timeframe	Jurisdiction	Project	Termini	Description	Cost Estimate (YOE)
301	2041-2050	Black Hawk Co.	Waverly Rd (V14)	Fitkin Rd to Bennington Rd	Pavement Rehab	2,350,000
302	2041-2050	Black Hawk Co.	Dunkerton Rd (C66)	U.S. 63 to Sage Rd	Pavement Rehab	2,350,000
303	2041-2050	Black Hawk Co.	Elk Run Rd (V43)	Dubuque Rd to Independence Ave (IA 281)	Pavement Rehab	1,645,000
304	2041-2050	Black Hawk Co.	Washburn Rd (D38)	IA 21 to U.S. 218	Pavement Rehab	3,760,000
305	2041-2050	Black Hawk Co.	Elk Run Rd (V43) BR	0.2 mi. north of Dubuque Rd, over Elk Run Creek	Bridge Replacement	3,290,000
306	2041-2050	Black Hawk Co.	Union Rd (T75) BR	0.4 mi. south of Beaver Valley Rd, over Beaver Creek	Bridge Replacement	3,384,000
307	2041-2050	Black Hawk Co.	Washburn Rd (D38) BR	West of 3rd St, over Cedar River	Bridge Replacement	15,040,000
308	2041-2050	Cedar Falls	Hudson Rd	W. 1st St to University Ave	Reconstruction	18,800,000
309	2041-2050	Cedar Falls	Prairie Pkwy/Viking Rd	Prairie Pkwy/Viking Rd Intersection	Roundabout Construction	1,880,000
310	2041-2050	Cedar Falls	W. Ridgeway Ave	IA 58 to ECL	Reconstruction	14,100,000
311	2041-2050	Cedar Falls	W. Ridgeway Ave	Hudson Rd to WCL	Reconstruction	10,810,000
312	2041-2050	Gilbertville	5th St BR	South of 12th Ave	Bridge Replacement	282,000
313	2041-2050	Waterloo	E. Shaulis Rd	Hawkeye Rd (IA 21) to La Porte Rd	Reconstruction	12,718,200
314	2041-2050	Waterloo	Airline Hwy	Leversee Rd to U.S. 63	Reconstruction, Bike/Ped Improvements	34,780,000
315	2041-2050	Waterloo	E. Orange Rd	Kimball Ave to Hess Rd	Reconstruction, Bike/Ped Improvements	14,100,000
316	2041-2050	Waterloo	Kimball Ave	Orange Rd to San Marnan Dr	Reconstruction, Bike/Ped Improvements	17,860,000
317	2041-2050	Waterloo	Ansborough Ave	Orange Rd to San Marnan Dr	Reconstruction, Bike/Ped Improvements	17,860,000
318	2041-2050	Waterloo	W. Shaulis Rd	Hoff Rd to Hawkeye Rd (IA 21)	Reconstruction, Bike/Ped Improvements	9,964,000

Map 3.11: 2050 Long-Range Transportation Plan Locally-Sponsored Projects

Source: Black Hawk County MPO 2050 Travel Demand Model



Iowa DOT Projects

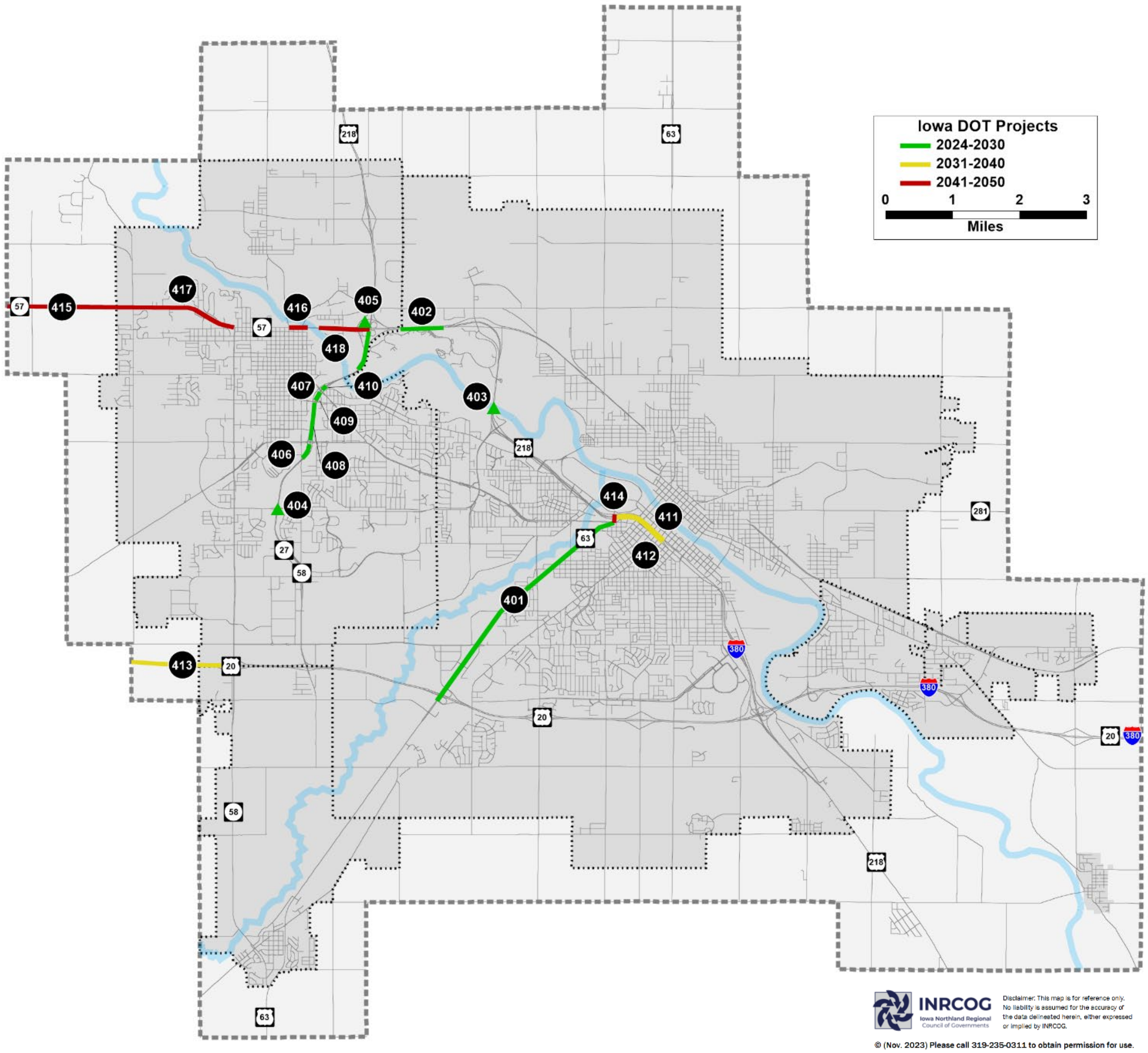
Table 3.5 and Map 3.12 show Iowa DOT-sponsored projects. These projects are not listed with the other roadway projects as they utilize different funding sources and are programmed at the state level. Projects beyond FY 2028 have not been programmed for funding by the Iowa DOT at the time of adoption of this Plan.

Table 3.5: 2050 Iowa DOT Projects

ID	Timeframe	Jurisdiction	Project	Termini	Description	Cost Estimate (YOE)
401	2025	Iowa DOT	U.S. 63 (MPO Share)	U.S. 20 to University Ave	Reconstruction	875,000
402	2027	Iowa DOT	U.S. 218 (SB) (MPO Share)	IA 57/27/58 Interchange to Exit 185	Reconstruction	4,570,000
403	2027	Iowa DOT	US 218	Cedar River Bridge	Bridge Deck Overlay	3,116,000
404	2028	Iowa DOT	IA 58 & Greenhill Rd	Intersection of IA 58 and Greenhill Rd	Grade Separation, Interchange	48,352,000
405	2028	Iowa DOT	IA 58/IA 27 & US 218 Ramp	NB US 218 to SB IA 58/27 (Ramp J)	Bridge Deck Overlay	750,000
406	2028-2030	Iowa DOT	IA 58/IA 27 (SB)	Bridge over Main St to University Ave	Partial Depth Repair	815,000
407	2028-2030	Iowa DOT	IA 58/IA 27 (SB)	Cedar River Bridge to US 218	Partial Depth Repair	815,000
408	2028-2030	Iowa DOT	IA 58/IA 27 (NB)	University Ave to 18th St	Partial Depth Repair	815,000
409	2028-2030	Iowa DOT	IA 58/IA 27 (NB)	18th St to Waterloo Rd	Partial Depth Repair	815,000
410	2028-2030	Iowa DOT	IA 58/IA 27 (NB)	Waterloo Rd to Cedar River Bridge	Partial Depth Repair	815,000
411	2031-2040	Iowa DOT	US 218 (NB)	6th St to Sergeant Rd (US 63)	Partial Depth Repair	1,425,000
412	2031-2040	Iowa DOT	US 218 (SB)	6th St to Sergeant Rd (US 63)	Partial Depth Repair	1,425,000
413	2031-2040	Iowa DOT	US 20	Grundy County Line to Hudson Rd	Partial Depth Repair, Joint Route & Seal	1,069,700
414	2041-2050	Iowa DOT	US 63	Through University Ave/US 218 Interchange	Partial Depth Repair	2,350,000
415	2041-2050	Iowa DOT	IA 57	Butler County Line to Cedar Falls WCL	3” Cold-in-Place w/3” HMA Overlay	1,478,150
416	2041-2050	Iowa DOT	IA 57	Franklin St to Cedar River	3” HMA Overlay	2,183,150
417	2041-2050	Iowa DOT	IA 57	Cedar Falls WCL to Hudson Rd	3” HMA Overlay	2,183,150
418	2041-2050	Iowa DOT	IA 57	Cedar River to US 218/IA 27	3” HMA Overlay	2,183,150

Map 3.12: 2050 Long-Range Transportation Plan Iowa DOT-Sponsored Projects

Source: Black Hawk County MPO 2050 Travel Demand Model



Local Projects

The table below shows local roads included in the 2050 Existing, Committed, and Planned (ECP) Network in addition to the planned federal-aid projects. These roads are included in the Travel Demand Model, as they are anticipated to be constructed as development occurs and will be funded with local or private funds; these roads are not anticipated to be federally functionally classified.

Table 3.6: New Local Roads Included in the 2050 Existing, Committed, and Planned Network

Timeframe	Jurisdiction	Project	Termini/Description
2028-2030	Cedar Falls	Arbors Dr	Red Oak Ln to Erik Rd to Aldrich Elementary
2031-2040	Cedar Falls	Cross Creek Dr	Waterbury Dr to W 27th St
2031-2040	Cedar Falls	Waterbury Dr	Cross Creek Dr to Union Rd
2031-2040	Cedar Falls	Oster Pkwy	Green Creek Rd to Cedar Heights Dr
2031-2040	Cedar Falls	Prairie View Rd	Prairie Pkwy to Oster Pkwy Extension
2031-2040	Cedar Falls	Rownd St	Green Creek Rd to Cedar Heights Dr/Viking Rd Roundabout
2031-2040	Waterloo	Oleson Rd	Bethel St to Existing Terminus
2031-2040	Waterloo	Tower Park Dr	Bankers Blvd to Hurst Dr
2041-2050	Cedar Falls	W 18th St	Quail Run Ln to Existing Terminus
2041-2050	Waterloo	Fisher Dr	Bankers Blvd to Existing Terminus
2041-2050	Waterloo	Hurst Dr	Tower Park Dr to Fisher Dr Extension
2041-2050	Waterloo	Fitzway Dr	Galactic Dr to San Marnan Dr
2041-2050	Waterloo	Ranchero Rd	K Line Dr to Katie Ridge

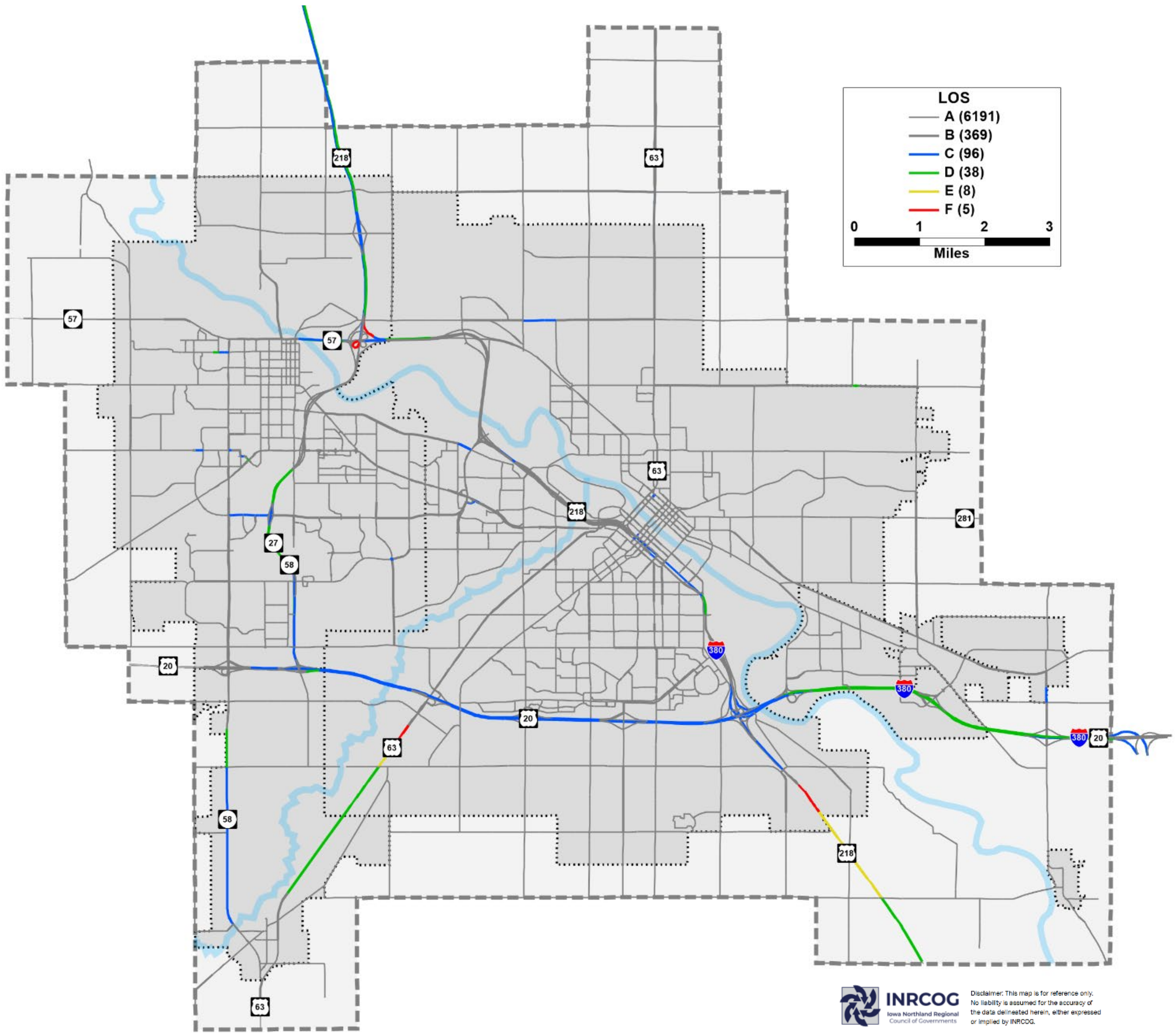
Existing, Committed, and Planned Network

The projects listed under the financially constrained portion of the plan, as well as Iowa DOT and planned local projects, make up the 2050 ECP Network (Map 3.13). This includes new construction projects and major capacity improvements as well as reconstruction of portions of the existing network.

Capacity is not the only issue to be considered in developing future projects. While the TDM is a useful tool for highlighting roads that are forecasted to be near or over capacity, it does not necessarily highlight the connectivity, accessibility, or safety benefits a particular project may offer. There are several projects in this Plan which may not have a visible impact on capacity issues but have a significant impact on other areas. For example, roadway reconfiguration projects that add dedicated bicycle lanes could significantly improve the safety and connectivity of the metropolitan bicycle network while minimally impacting automobile capacity.

Map 3.13: Level of Service, 2050 Existing, Committed, and Planned Network

Source: Black Hawk County MPO 2050 Travel Demand Model



Unmet Needs

Outside the financial constraint of the 2050 LRTP, the MPO has identified several illustrative projects that would require additional funding beyond what is anticipated to be available to the MPO through traditional sources. Should funding become available, or if an illustrative project becomes a higher priority, the MPO could consider amending it into the LRTP so long as fiscal constraint is maintained. This may require the removal of project(s) that are determined to have a lower priority than originally anticipated.

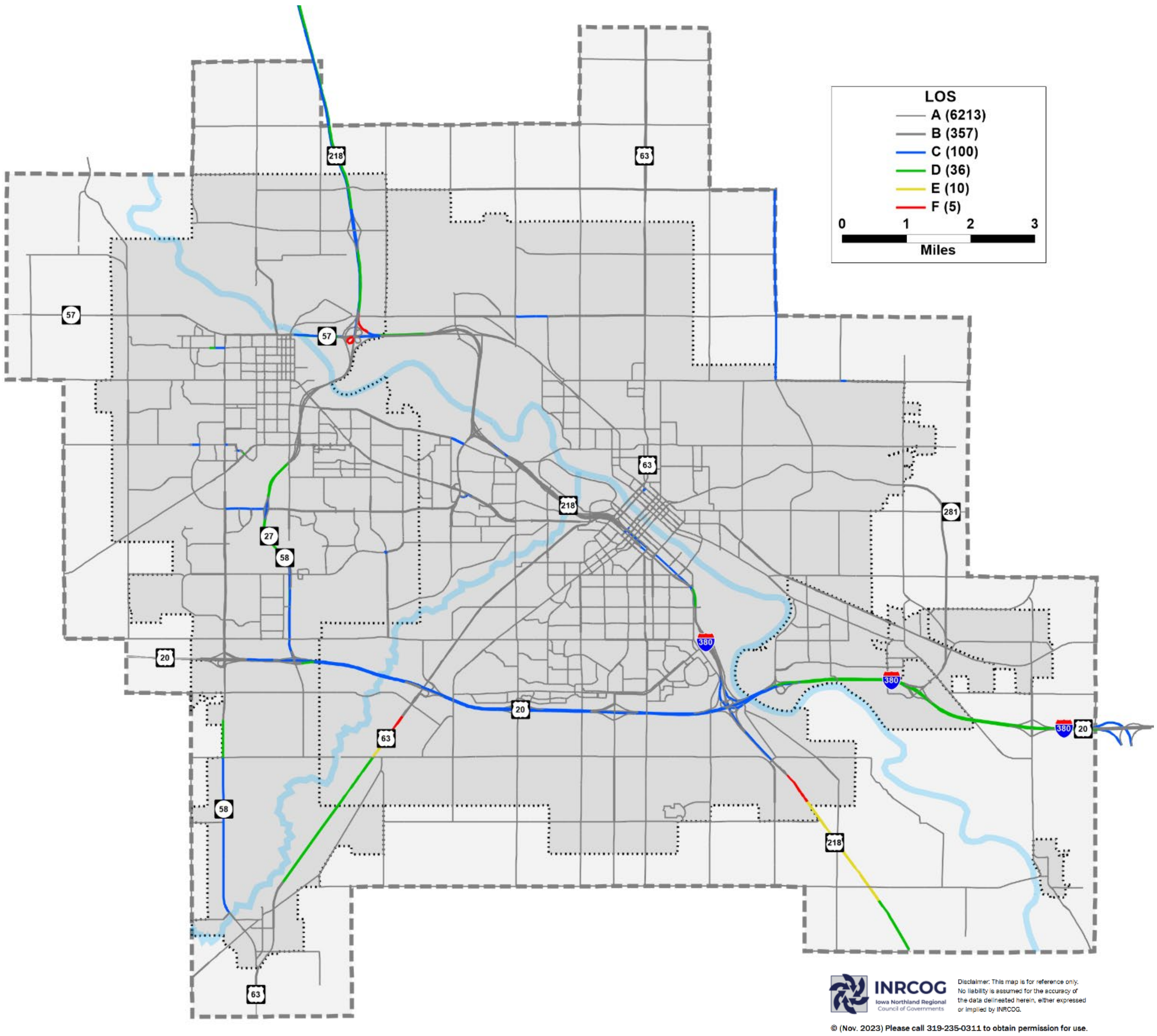
Several projects have been identified as part of the Northeast Industrial Access Planning Study which was completed in 2019. The goal of the study was to identify improvements to increase efficiency and access of freight travel, reduce traffic congestion at major junctions, decrease semi traffic on county roads, and accommodate future growth in Waterloo's Northeast Industrial Area. Alternatives include spot improvements at intersections, capacity improvements, and partial and new roadway alignments. Several of the spot and capacity improvements have been included in the financially constrained list of projects; new roadway and grade separation projects have been included as unmet needs. The next step will involve completion of the NEPA phase of the study where a preferred alternative will be selected.

Table 3.7: 2050 Unmet Needs

Jurisdiction	Project	Termini	Description
TBD	Plaza Dr/Elk Run Rd Extension (NEIA)	Gilbertville Rd to Osage Rd	New Roadway, Grade Separation
TBD	Plaza Dr/MLK Jr Dr Extension (NEIA)	Gilbertville Rd to MLK Jr Dr	New Roadway, Grade Separation
TBD	Conard Rd (NEIA)	S Raymond Rd to Plaza Dr/Elk Run Rd Extension	Reconstruction, Realignment
TBD	Sage Rd (NEIA)	Dunkerton Rd to Newell St	Reconstruction, Realignment, New Roadway
Cedar Falls	Olive St Bridge	S of W 20th St, over University Branch of Dry Run Creek	Bridge Replacement
Cedar Falls	Tremont St Bridge	N of W 21st St, over University Branch of Dry Run Creek	Bridge Replacement
Raymond	S Raymond Rd Bridge	0.2 mi. S of Dubuque Rd, over Poyner Creek	Bridge Replacement
Waterloo	W Ridgeway Ave	U.S. 63 to Kimball Ave	Reconstruction, Bike/Ped
Waterloo	Franklin St	1st St to Nevada St	Reconstruction, Bike/Ped
Waterloo	Donald St	E 4th St to Sage Rd	Reconstruction
Waterloo	W Ridgeway Ave	Deere Rd to U.S. 63	Reconstruction
Waterloo	E Ridgeway Ave/ Hammond Ave	Intersection of E Ridgeway Ave and Hammond Ave	Roundabout Construction

Map 3.14: Level of Service, 2050 Existing, Committed, and Planned Network, and Unmet Needs

Source: Black Hawk County MPO 2050 Travel Demand Model



Technological Advancements

The transportation system is anticipated to undergo momentous changes in the coming decades due to the adoption and utilization of a variety of technologies. Rapid advances in transportation technology are expected to transform how people move around the nation. A few of the most recent high-profile technology changes include connected and automated vehicles (CAV), and the electrification of our transportation system through the increased adoption of electric vehicles (EV). The State of Iowa and the Black Hawk County MPO must be aware of the benefits, needs, and constraints of these technologies, and cognization of how they should be adapted in both urban and rural environments. This section highlights a couple of transportation technologies that could apply to the area. This list is not intended to be all inclusive.

Connected and Automated Vehicles (CAV)

CAV has the potential to transform travel as we know it. CAV combines leading edge technologies – advanced wireless communications, on-board computer processing, advanced vehicle-sensors, GPS navigation, smart infrastructure, and others – to provide the capability for vehicles to identify threats and hazards on the roadway and communicate this information over wireless networks to give drivers alerts and warnings.

Fully automated, autonomous, or "self-driving" vehicles are defined by the U.S. DOT's National Highway Traffic Safety Administration (NHTSA) as "*Those in which operation of the vehicle occurs without direct drive input to control the steering, acceleration, and braking and are designed so that the driver is not expected to constantly monitor the roadway while operating in self-driving mode.*" NHTSA has adopted the SAE International definitions for levels of automation.

SAE INTERNATIONAL

SAE J3016™ LEVELS OF DRIVING AUTOMATION™

Learn more here: sae.org/standards/content/j3016_202104

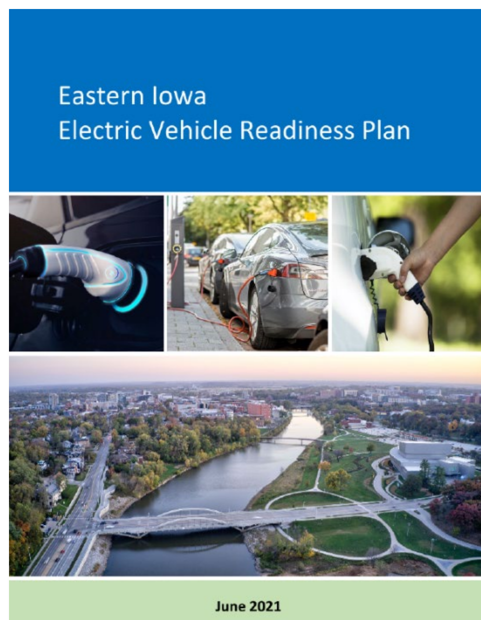
	SAE LEVEL 0™	SAE LEVEL 1™	SAE LEVEL 2™	SAE LEVEL 3™	SAE LEVEL 4™	SAE LEVEL 5™
What does the human in the driver's seat have to do?	**You are driving** whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			**You are not driving** when these automated driving features are engaged – even if you are seated in "the driver's seat"		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	
	These are driver support features			**These are automated driving features**		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering **OR** brake/ acceleration support to the driver	These features provide steering **AND** brake/ acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met		This feature can drive the vehicle under all conditions
Example Features	• automatic emergency braking • blind spot warning • lane departure warning	• lane centering **OR** • adaptive cruise control	• lane centering **AND** • adaptive cruise control at the same time	• traffic jam chauffeur	• local driverless taxi • pedals/ steering wheel may or may not be installed	• same as level 4, but feature can drive everywhere in all conditions

Connected vehicles are those that use any number of different communication technologies to communicate with the driver, other cars on the road, roadside infrastructure, and the "Cloud." This technology can be used to improve vehicle safety and vehicle efficiency, saving lives and reducing fuel consumption and emissions. Market adoption predictions vary, with some predicting 100 percent adoption rates towards 2050.

Connected vehicles can continuously share important safety and mobility information with each other.
Source: U.S. DOT, Intelligent Transportation Systems Joint Program Office

Alternative-Fuel Vehicles
Most vehicles operating within the U.S. (and the Black Hawk County metro area) use fossil fuels. Hybrid electric vehicles have been around since the early 2000s with moderate adoption across the U.S. According to the U.S. Bureau of Transportation Statistics, hybrid electric vehicles made up 5.5 percent of the total U.S. market share in 2021. Plug-in electric vehicle purchases have been on the rise, as increased manufacturers release electric vehicle models. However, the U.S. market share in 2021 was only 3.2 percent, up from 1.9 percent in 2019. An increase in non-gasoline vehicle usage, not only by individuals but also the private sector, will require significant improvement of the electric charging infrastructure. The buildout of electric vehicle charging infrastructure in the region will help ensure a positive experience for the growing market of EV owners.

In 2021, the Black Hawk County MPO participated in the development of the Eastern Iowa Electric Vehicle Readiness Plan (EVRP), a collective effort with Iowa City, Cedar Rapids, Dubuque, Davenport, and the MPOs of Eastern Iowa towards increasing zero-emission vehicle adoption while ensuring the mobility needs of the region and the target carbon reductions are met equitably. As part of the process, the City of Iowa City commissioned the consulting firm ICF to evaluate the existing EV market, charging infrastructure, incentives, and characterized barriers to greater EV adoption as well as the policy and educational opportunities to overcome such barriers. Achieving a greater level of adoption requires a set of coordinated strategies and actions that encompass infrastructure planning and deployment, local policies, consumer education, and partnership creation.



The Steering Committee defined a regional vision statement and a set of specific goals that provide the foundation for the EVRP. The vision statement reflects the Committee's role and intent to support communities across Eastern Iowa to further EV adoption in a way that is equitable, improves air quality, and generates economic benefits.

www.icgov.org/government/departments-and-divisions/climate-action-outreach/climate-plans-and-reports

The Regional Goals of the EVRP are as follows:

- Increase EV use
- Increase EV charger availability
- Increase equitable access to EVs and charging
- Reduce emissions
- Improve air quality
- Generate economic benefits
- Establish regional collaboration to leverage resources and share learnings

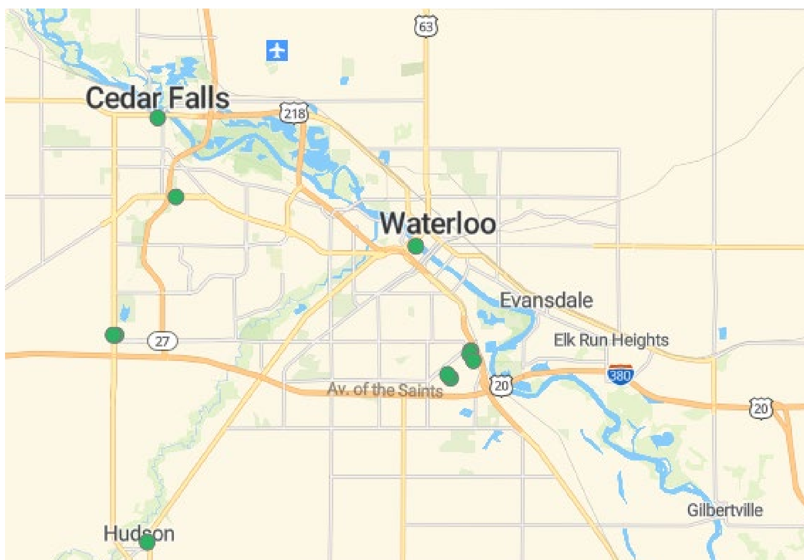
"The communities of Eastern Iowa will be leaders in supporting the increased use of EVs and improving access to charging infrastructure. We will empower our residents, businesses, and visitors through policies, partnerships, and initiatives that encourage adoption of EVs."

Regional Vision Statement, Eastern Iowa EVRP

According to the U.S. Department of Energy's Alternative Fuel Data Center, there were 324 public EV charging stations in Iowa for a total of 703 charging ports as of June of 2023. Most of the EV charging stations are public Level 2. Within the Black Hawk County metropolitan area, there were a total of ten public EV charging stations for a total of 30 charging ports, as shown in the map to the right.

www.afdc.energy.gov/stations#/find/nearest

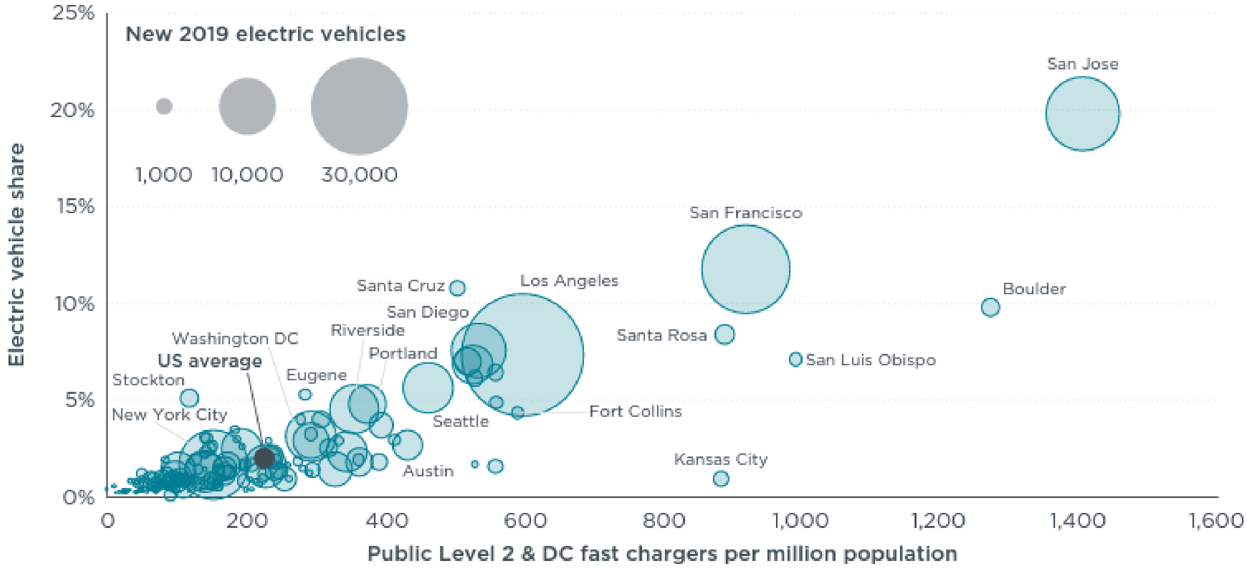
The number of EV charge points per million people is a critical factor influencing EV adoption rates. A robust charging infrastructure is essential to alleviate range anxiety and provide convenient charging options for EV owners. Higher availability and accessibility of charge points make EV ownership more practical and appealing to potential buyers.



EV charging station locations as of June of 2023
Source: U.S. DOE, Alternative Fuels Data Center, EV Charging Station Locations

The number of EV charge points per million required to substantially increase EV adoption rates is subject to various factors such as population density, geographic distribution, and driving patterns. While there is no universally applicable threshold, a general guideline suggests that a significant increase in EV adoption rates can be achieved when the number of charge points per million reaches a level that ensures convenient access to charging infrastructure for EV owners. This typically entails a robust and well-distributed charging network, including a mix of fast chargers along highways, workplace chargers, and residential chargers. Ideally, a target range of 400 to 450 charge points per million people is often considered a reasonable benchmark to stimulate widespread EV adoption. As of 2023, the MPO has 247 charge points per million population with limited geographic coverage.

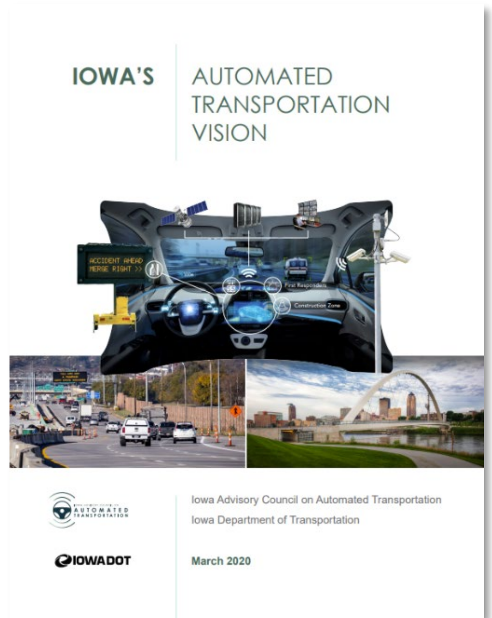
EV share of new vehicles and public chargers per million population for the 200 most populous US metro areas.
Source: International Council on Clean Transportation, August 2020 Briefing



To increase EV adoption rates, it is imperative that the public and private sectors collaborate to enhance the number and coverage of publicly available EV charging stations in the Black Hawk County metro area and surrounding communities. Both sectors have complementary roles to play in achieving this goal. The public sector, including government agencies and utilities, can provide the necessary frameworks, policies, and funding support to incentivize the expansion of charging infrastructure. This includes identifying strategic locations for charging stations, streamlining permitting processes,

and allocating resources to underserved areas. The private sector, including charging station operators and businesses, can invest in the deployment of charging infrastructure and collaborate with public entities to develop sustainable charging solutions. By working together, the public and private sectors can create a robust and accessible charging network that addresses range anxiety, instills confidence in potential EV owners, and accelerates the transition to cleaner and more sustainable transportation solutions.

Iowa Advisory Council on Automated Transportation (AT Council)
The AT Council is intended to increase roadway safety, personal mobility, and freight movement within the state of Iowa by advancing highly automated technologies. The AT Council provides guidance, recommendations, and strategic oversight of automated transportation activities in the state. The vision statement for the AT Council is *"To create an AV-ready driving environment in Iowa for the safe movement of people and freight for a thriving Iowa economy."* The Council – chaired by the Iowa DOT – consists of four subcommittees to provide in-depth resources and insights on topics related to the implementation of automated transportation and technologies. Membership consists of leaders from a variety of organizations across the state, bringing different backgrounds and expertise to discussions. In March of 2020, the AT Council published *Iowa's Automated Transportation Vision* which serves as an automated transportation development roadmap for the AT Council and the Iowa DOT as they work to safely advance automated transportation in Iowa.



www.iowadrivingav.org

Local Transportation Technologies
Waterloo has embraced an array of innovative traffic and transportation technologies with the aim of addressing transportation challenges, improving the overall efficiency of its transportation systems, and minimizing fuel consumption and emissions. Traffic and transportation technologies Waterloo has implemented include the following:

- Routeware, Fleet Management – Provides route optimization, allowing for efficient fleet management, and reducing fuel consumption and emissions.
- Salient, Video Management System – Enhanced video surveillance and analytics, facilitating real-time monitoring and improved safety on roadways.
- Elements XS, GIS-based Asset Management System – Provides advanced traffic signal control capabilities, optimizing signal timings to minimize congestion and enhance traffic flow.
- MaxAdapt, Adaptive Signal Control Technology – Dynamically adjusted signal timings based on real-time traffic conditions, further improving overall traffic efficiency.
- Kinetics, Advanced Traffic Management System – Enabled comprehensive transportation modeling and simulation, facilitating informed decision-making for infrastructure planning and traffic management.
- Precise AVL, Rolling Stock Movement Monitoring – Accurate real-time tracking of vehicles, allowing for better fleet management and response to emergencies.
- Weather Sentry, Accurate Weather Predictions – Provides critical weather information, allowing authorities to proactively respond to adverse weather conditions and ensure safer travel experiences.
- SCADA, Wase Management Supervisory Control – Centralized control and monitoring of transportation systems, enhancing operational efficiency and responsiveness.

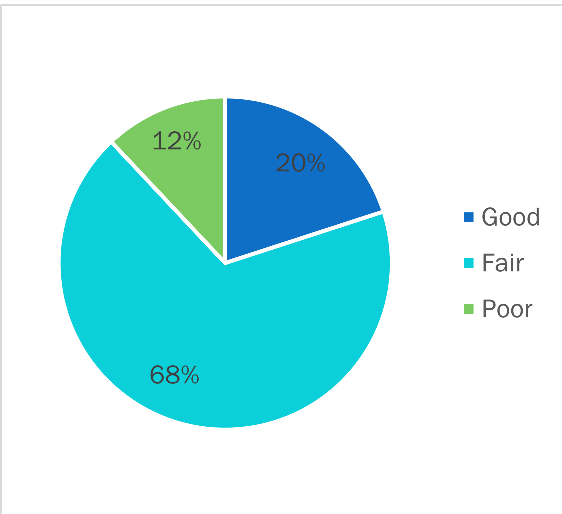
With these advanced technologies working in harmony, Waterloo has significantly improved traffic management, transportation efficiency, and overall road safety, enhancing the quality of life for its residents and visitors.

2022 Public Input Survey

In September 2022, the personnel of the MPO carried out a pair of internet-based surveys. These surveys were aimed at collecting feedback from residents within the jurisdictions of the MPO. The subsequent details provided here highlight survey responses that hold significance within the context of this chapter.

Figure 3.3: Public Input Survey, Rounds One and Two asking respondents how they rate the physical condition of our roads:

Answered: 25



Answered: 86

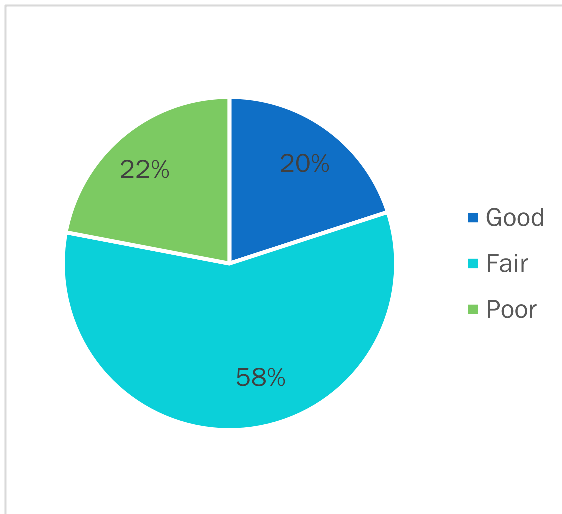
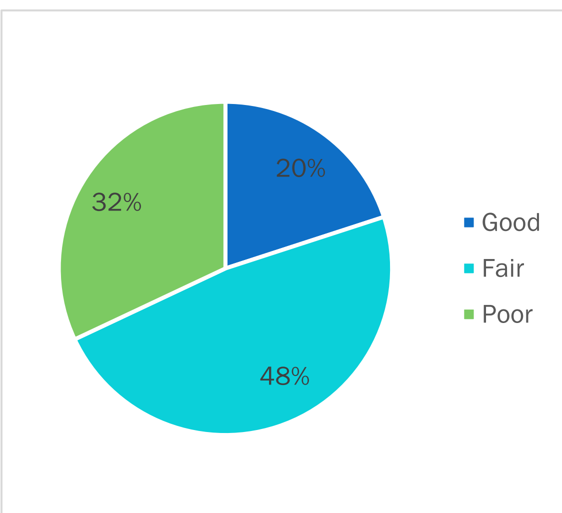


Figure 3.4: Public Input Survey, Rounds One and Two asking respondents how they rate the physical condition of our bridges:

Answered: 25



Answered: 86

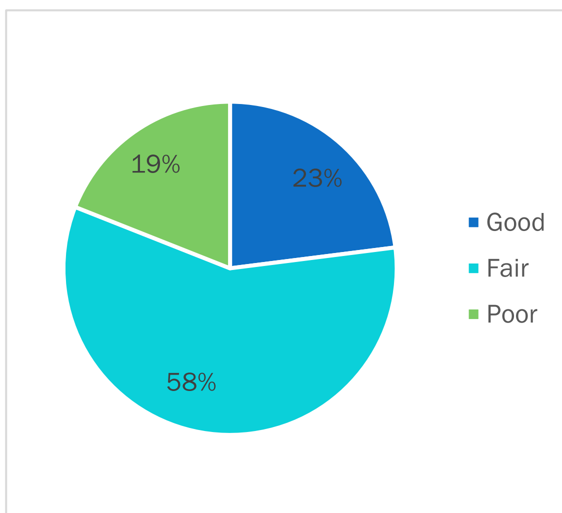
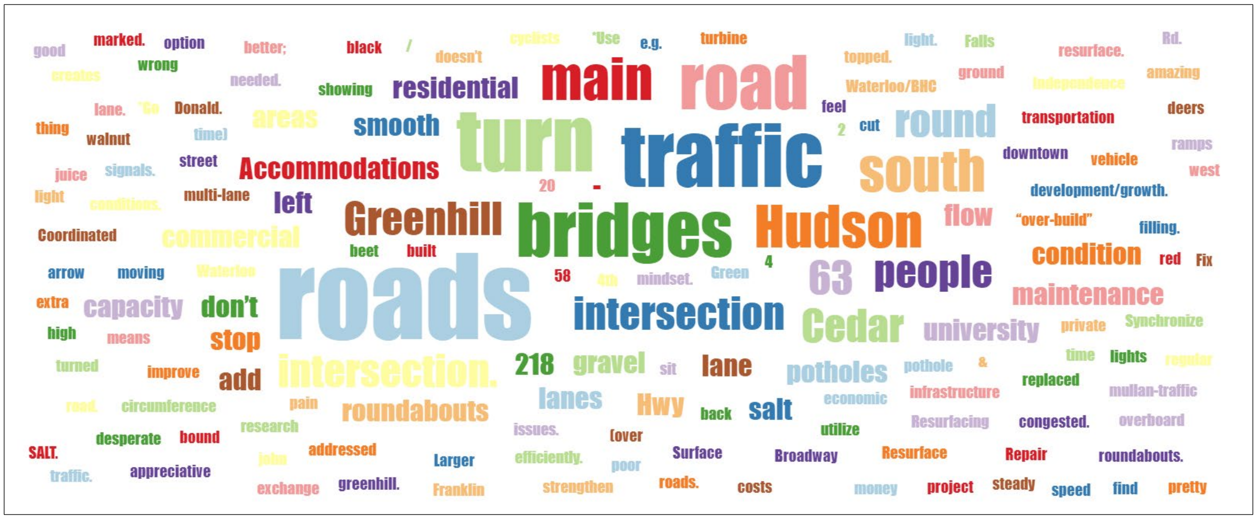


Figure 3.5: Public Input Survey, Rounds One and Two asking respondents how our roads and bridges could be improved (e.g., conditions, connectivity, capacity, etc.):

Answered: 21



Answered: 62

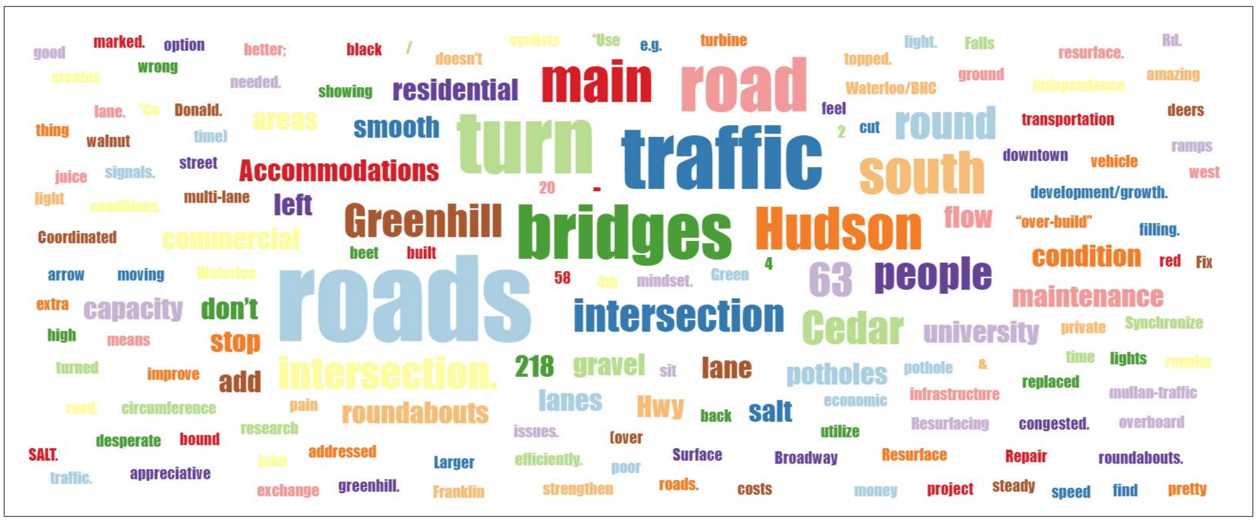
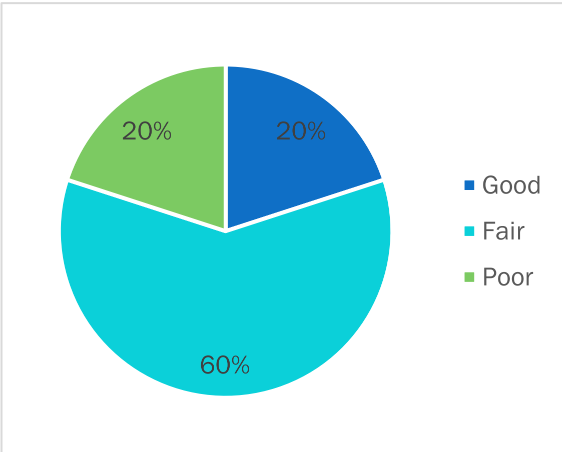


Figure 3.6: Public Input Survey, Rounds One and Two asking respondents how our streets rate regarding "Complete Streets":

Answered: 25



Answered: 86

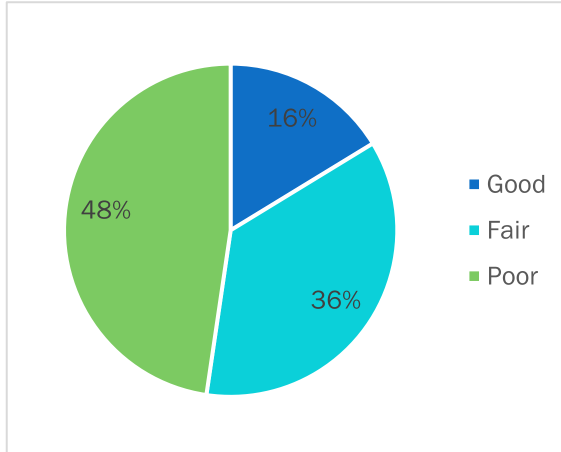


Figure 3.7: Public Input Survey, Rounds One and Two asking respondents which road they would improve to serve ALL road users:

Answered: 22

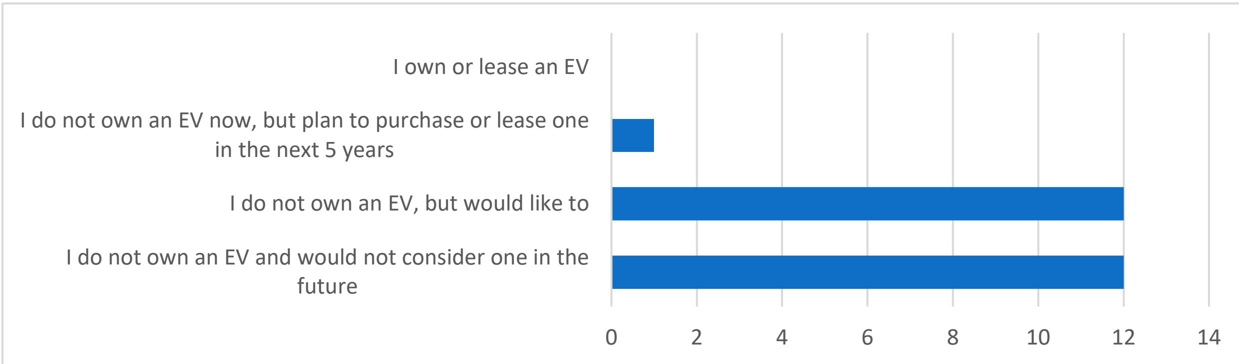
- Main St (3)
- Hudson Rd (2)
- Broadway St (2)
- Washington St
- La Porte Rd
- US 63
- IA 57
- Hawthorne Ave
- Grand Blvd
- Franklin St
- Dubuque Rd

Answered: 73

- Ridgeway Ave (14)
- 4^{th}/5^{th} St (6)
- La Porte Rd (4)
- Lafayette Rd (4)
- Waterloo Rd (4)
- Park Ave (3)
- San Marnan Dr (3)
- Washington St (2)
- University Ave (2)
- Rainbow Dr (2)
- Hamond Ave (2)
- Kimball Ave (2)
- W. Gilbert Dr
- S. Main St
- Mullan/Logan
- Viking Rd
- Hudson Rd
- Franklin St
- E San Marnan Dr
- Broadway St
- Airline Hwy
- W 1^{st} St (IA 57)
- South St

Figure 3.8: Public Input Survey, Rounds One and Two asking respondents about Electric Vehicle ownership:

Answered: 25



Answered: 86

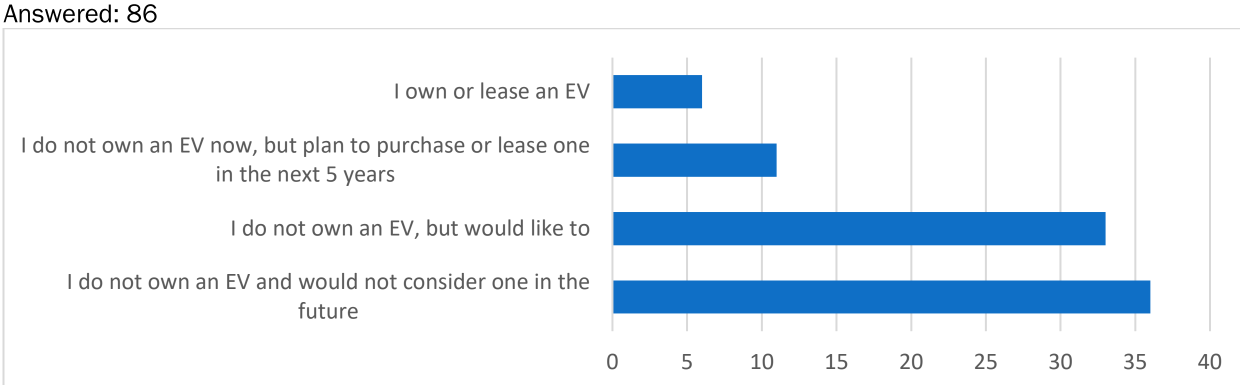
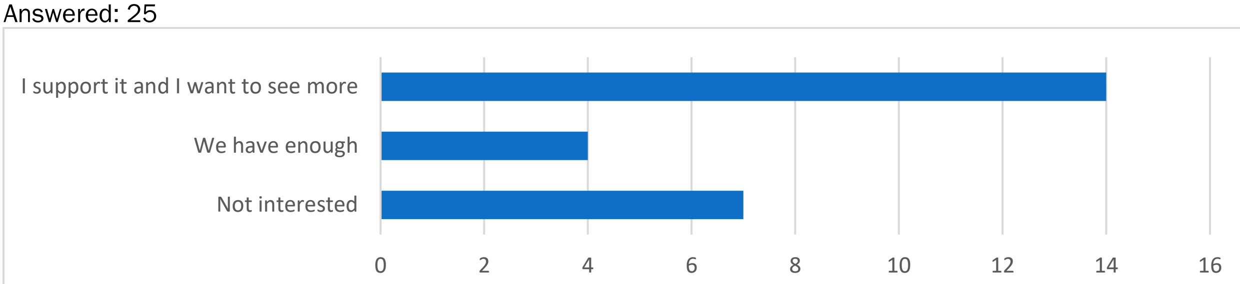


Figure 3.9: Public Input Survey, Rounds One and Two asking respondents about Electric Vehicle ownership:

Answered: 25



Answered: 86

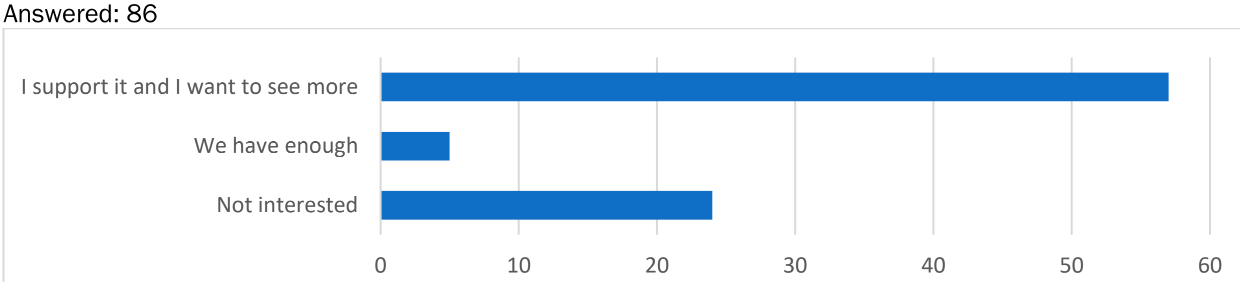


Figure 3.10: Public Input Survey, Rounds One and Two asking respondents what their biggest transportation challenge is in the MPO:

Summary of Worded Responses (Both Rounds):

- Road Conditions and Maintenance
  - Concerns about poor road surfaces, potholes, and rough roads.
  - Frustration with road conditions during winter.
  - Desire for better road maintenance and keeping roads in good condition.
- Traffic and Safety
  - Challenges related to speeding and reckless driving.
  - Issues with people not understanding traffic rules, like four-way stops.
  - Safety concerns at specific intersections, especially high-speed areas.
- Construction and Congestion
  - Frustration over ongoing road construction and its impact on traffic.
  - Desire for better timing of traffic signals and adaptive signal systems.
  - Concerns about traffic congestion in populated areas.
- Infrastructure Improvements
  - Suggestions for roundabouts to improve traffic flow and safety.
  - Calls for elevating highways and adding interchanges for safer intersections.
  - Interest in road improvements to accommodate various modes of transportation.
- Environmental Considerations
  - Consideration of environmental impact, including the preference for hydrogen fuel cell cars over electric vehicles.
  - Feedback on the timing of traffic signals, with suggestions for improvements.
- Public Transit
  - Suggestions for incorporating public transportation considerations into road design.
  - Desire for better connectivity and improved public transit options.
- Driving Behavior and Education
  - Concerns about people driving slowly in the left lane, blocking traffic.
  - Issues with drivers changing lanes abruptly and not understanding traffic patterns.
- General Inconveniences
  - Mention of inconveniences related to dead-end streets and lack of connectivity.
- Specific Locations
  - Concerns and suggestions related to specific intersections, highways, and roads.