# 5. NEEDS, RISKS, AND STRATEGIES

The prior chapters have helped lay the foundation of what issues face Iowa's multimodal transportation system and the vision for its future. Data on the existing system, input from the public and stakeholders, various planning considerations, and key issues must all be considered as the Iowa Transportation Commission (Commission) and Iowa Department of Transportation (DOT) determine what investment actions to take to help shape the transportation system needed over the coming decades. This chapter outlines needs, risks, strategies, and policies the Iowa DOT can address and pursue to help achieve that vision.

The chapter is divided into five main components.

- **Modal needs** are highlighted for aviation, bicycle/pedestrian, public transit, rail, and waterway. The needs are a high-level summary of information contained in the relevant system or modal plans.
- **Highway needs and risks** analysis for the Primary Highway System is discussed for nine different analysis layers that make use of various tools and planning processes.
- A **highway needs and risks matrix** provides a comprehensive summary of needs and risks across the entire Primary Highway System by dividing the highway network into 464 analysis corridors.
- **Strategies** are provided to help implement the State Long Range Transportation Plan (SLRTP), address important planning considerations, and target investments to address highway needs and risks identified within the SLRTP.
- The **rightsizing policy** helps begin implementation of the rightsizing strategy by outlining how the Iowa DOT defines rightsizing and ten specific topics where the department will work to incorporate rightsizing principles and practices.

# 5.1 Modal Needs

## Aviation

Needs for the aviation system in Iowa are outlined in the 2020 Iowa Aviation System Plan (IASP), which provides a detailed overview of the Iowa aviation system. It evaluates existing conditions and makes recommendations for future development of the air transportation system to meet the needs of users. The IASP can be used by federal, state, and local decision-makers as a guide for future investment and activity decisions to maintain and develop, as necessary, airports in the state of Iowa.

In order for the aviation system to effectively support the needs of users, it is necessary for airports to have adequate infrastructure and services. As part of the IASP, facility and service objectives are assigned based on airport system roles. Each system role has associated facility and service objectives that represent ideal conditions for an airport to effectively meet the needs of users and fulfill its role in the system. Objectives for each role vary based on the facilities and services an airport of that role would typically be expected to offer. For example, the enhanced service airports have more objectives because they need to meet the service and facility needs of a wide range of aviation users, including larger business aircraft and corporate jets. There are fewer objectives for local service airports because they serve users with fewer operational requirements.

Table 5.1 shows the percentage of airports meeting objectives by airport role. There are four broad categories of objectives.

- **Airside facility objectives**: focus on infrastructure components that are critical to safe and efficient aircraft operations. Facilities in this grouping largely influence available services at airports, in part because the physical infrastructure determines the type of aircraft capable of using the facility.
- **Landside facility objectives**: focus on aircraft storage capabilities, terminals, and parking and entryway conditions.
- **Service objectives**: help support operations and users at system airports. Examples of key services include fueling and fixed-base operators (FBOs), pilot and visitor amenities, and other components such as snow removal and weather reporting.
- **Planning objectives**: include multiple actions at the local government level to protect and preserve airports and aviation users.

In addition to the needs identified by the IASP, future airport needs also include preventative pavement maintenance and rehabilitation and projects identified in each airport's approved Airport Capital Improvement Program (ACIP). The IASP identified over $1 billion in ACIP costs in Iowa from 2021-2030, including a wide variety of improvements. The largest categories based on costs included in ACIPs are listed below.

- Terminal building
- Runway reconstruction/rehab
- Taxiway/taxilane improvements
- Apron improvements
- Landside roadways
- Hangars
- New airport
- Runway lighting
- Runway extension
- Land acquisition
- Building improvements
- Pavement maintenance/preservation
- Snow removal equipment

Table 5.1: Percent of airports meeting facility and service objectives by airport role

| | | Commercial Service (8 airports) | Enhanced Service (16 airports) | General Service (31 airports) | Basic Service (19 airports) | Local Service (40 airports) |
|---|---|---|---|---|---|---|
| **Airside Facility Objectives** | Airport Reference Code | 100% | 88% | 97% | 100% | 100% |
| | Primary Runway Length | 100% | 100% | 100% | 100% | * |
| | Primary Runway Width | 100% | 100% | 97% | 79% | 95% |
| | Type of Parallel Taxiway | 100% | 100% | 81% | 100% | * |
| | Type of Runway Approach | 100% | 100% | 100% | 100% | 100% |
| | Runway Lighting | 100% | 100% | 100% | 89% | * |
| | Taxiway Lighting | 100% | 100% | 100% | * | * |
| | Visual Guide Slope Indicator | 100% | 100% | 97% | * | * |
| | Runway End Identifier Lights | 100% | 100% | 100% | * | * |
| | Rotating Beacon | 100% | 100% | 100% | 95% | * |
| | Lighted Wind Indicator | 100% | 100% | 100% | 100% | * |
| **Landside Facility Objectives** | Covered Storage | 100% | 94% | 97% | 95% | * |
| | Overnight storage for business aircraft | 88% | 88% | 52% | * | * |
| | Terminal building | 100% | 100% | 100% | 95% | * |
| | Paved entry/terminal parking | 100% | 100% | 94% | * | * |
| | Security | 100% | 31% | 74% | 53% | 90% |
| **Service Objectives** | Fixed Base Operator | 100% | 100% | 100% | * | * |
| | Fuel | 100% | 88% | 100% | 100% | * |
| | Attendance | 100% | 100% | 97% | 58% | * |
| | Ground transportation | 100% | 100% | 100% | * | * |
| | Wi-Fi | 100% | 100% | 100% | * | * |
| | Restrooms (24/7 / key code) | 88% | 88% | 94% | 84% | * |
| | Snow removal | 100% | 88% | 100% | 100% | * |
| | Aircraft Maintenance/Repair | 100% | 88% | 90% | * | * |
| | Flight Instruction | 100% | 100% | 87% | 47% | * |
| | Aircraft Rental | 88% | 100% | 61% | * | * |
| | Aircraft Charter | 63% | 81% | 19% | * | * |
| | Weather Reporting | 100% | 100% | 100% | * | * |
| **Planning Objectives** | Land Use Plan | 100% | 100% | 77% | 63% | 33% |
| | Height Zoning | 100% | 100% | 100% | 100% | 50% |
| | Airport Layout Plan | 100% | 88% | 77% | 100% | * |

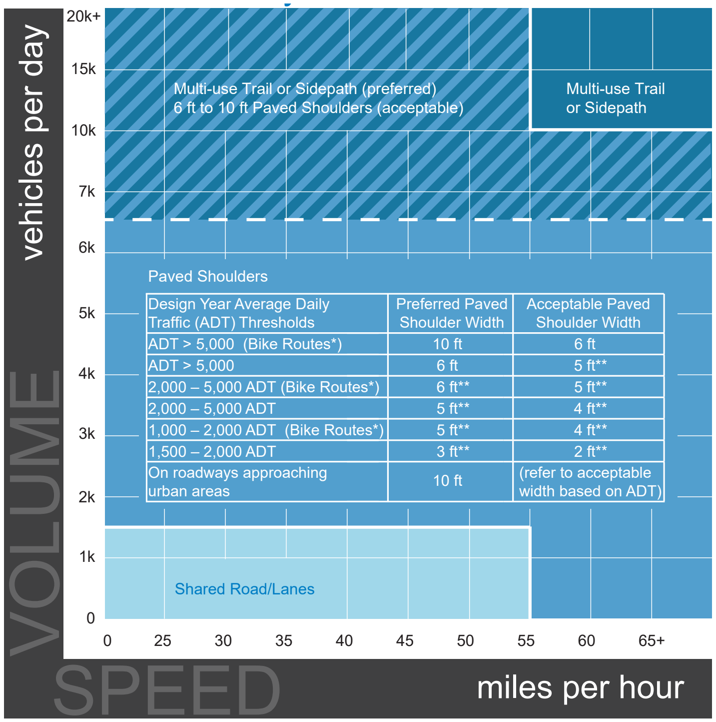
*The percentage shown is the percentage of airports of that role meeting that objective.*
*Cells marked with an asterisk mean no specific objective has been identified for that airport role.*

*Source: 2020 Iowa Aviation System Plan*

## Bicycle and Pedestrian

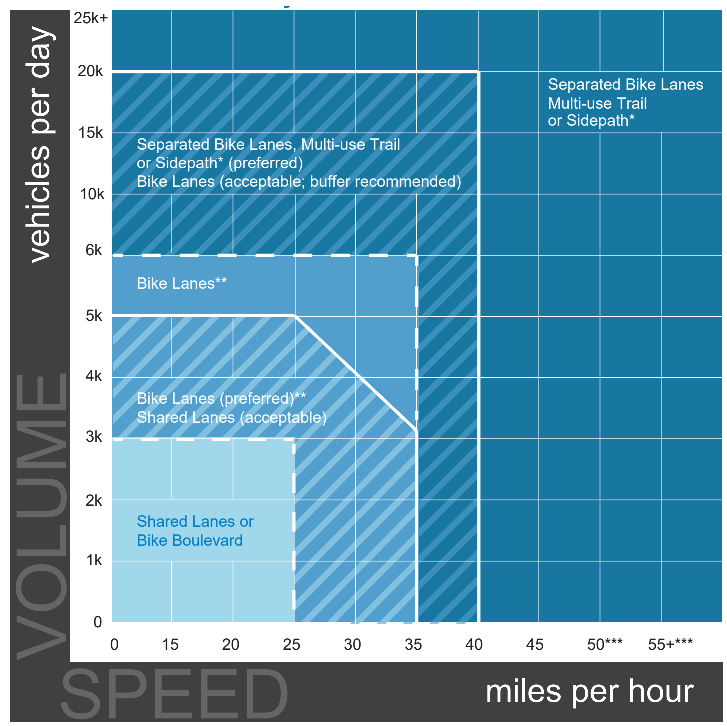
The Iowa DOT's Bicycle and Pedestrian Long Range Plan was adopted in 2018. As part of plan development, a needs assessment was conducted for the entire Primary Highway System, excluding Interstates. Segment ratings of good, moderate, or poor for bicycling were determined based on factors such as total annual average daily traffic (AADT), percent truck traffic, total pavement width, and percent where passing is not allowed. Treatment types were recommended based on these factors and the needs of a typical bicyclist who would have experience and confidence riding with traffic. Figures 5.1 and 5.2 show the facility selection matrix for rural and urban routes based on traffic volumes and speeds. In conjunction with the Complete Streets Policy, these would be utilized by designers to incorporate appropriate elements into projects on highways identified as having a poor or moderate bicycle compatibility rating (BCR). Figure 5.3 shows highway segments based on whether they were rated good, moderate, or poor for bicycling through the analysis. This analysis complements the development of the network proposed in the statewide trails vision (see Figure 3.4).

**Figure 5.1: Rural facility selection matrix**




*On roadways where a higher level of bicycle traffic is expected (e.g., bike routes identified by cities, counties, RPAs, and MPOs, as well as official US Bicycle Routes and national trails).
**Paved width exclusive of rumble strips.

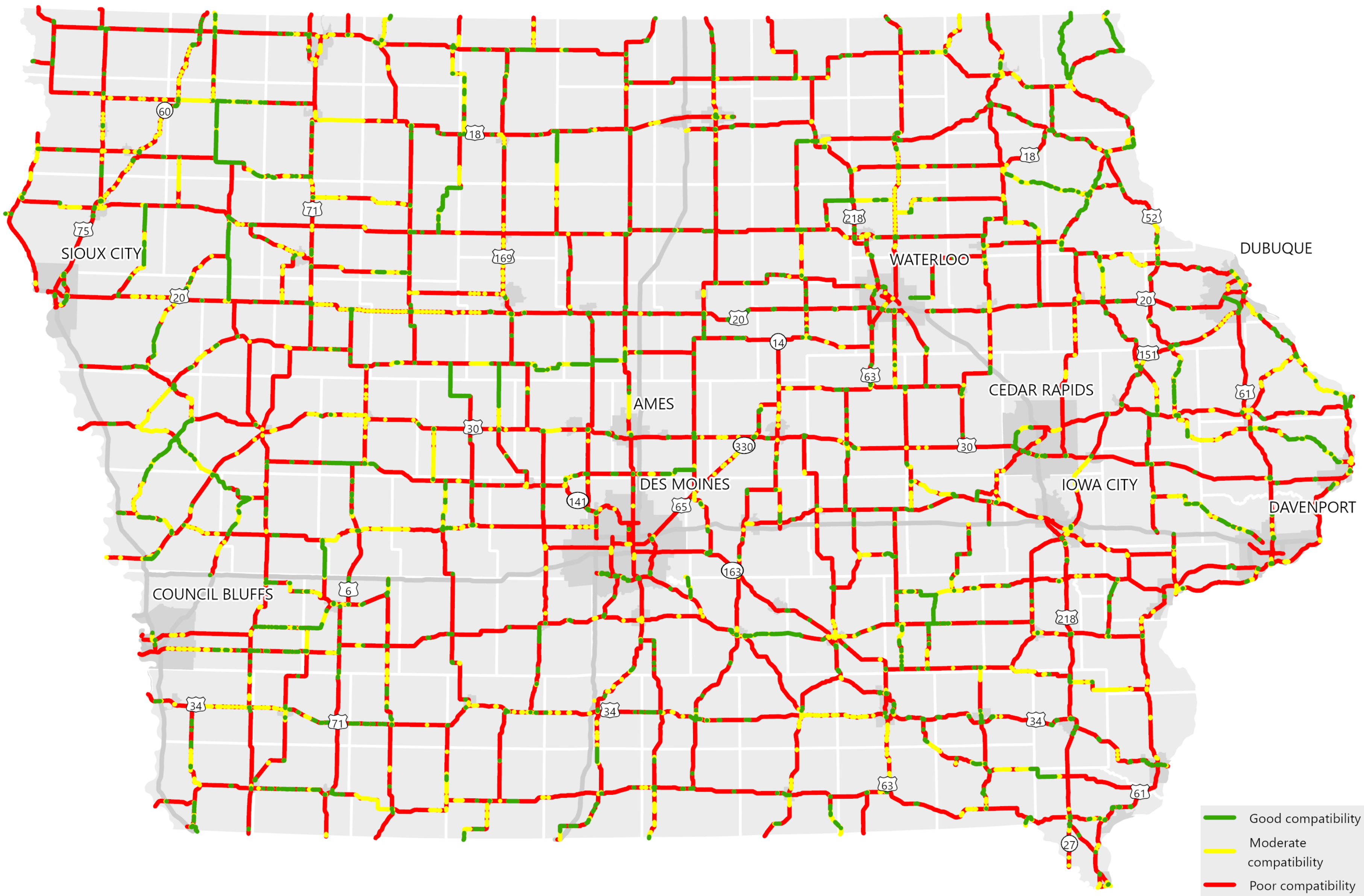
**Figure 5.2: Urban and suburban facility selection matrix**




*To determine whether to provide a multi-use trail/sidepath or separated bike lane, consider pedestrian and bicycle volumes or, in the absence of volume, consider land use.
**Advisory bike lanes may be an option where traffic volume < 4,000 ADT
***Speeds 50 mph or greater in urban areas are typically found in urban/rural transition areas.

*Source: Iowa Bicycle and Pedestrian Long Range Plan*

**Figure 5.3: Bicycle compatibility rating (BCR) of the Primary Highway System**



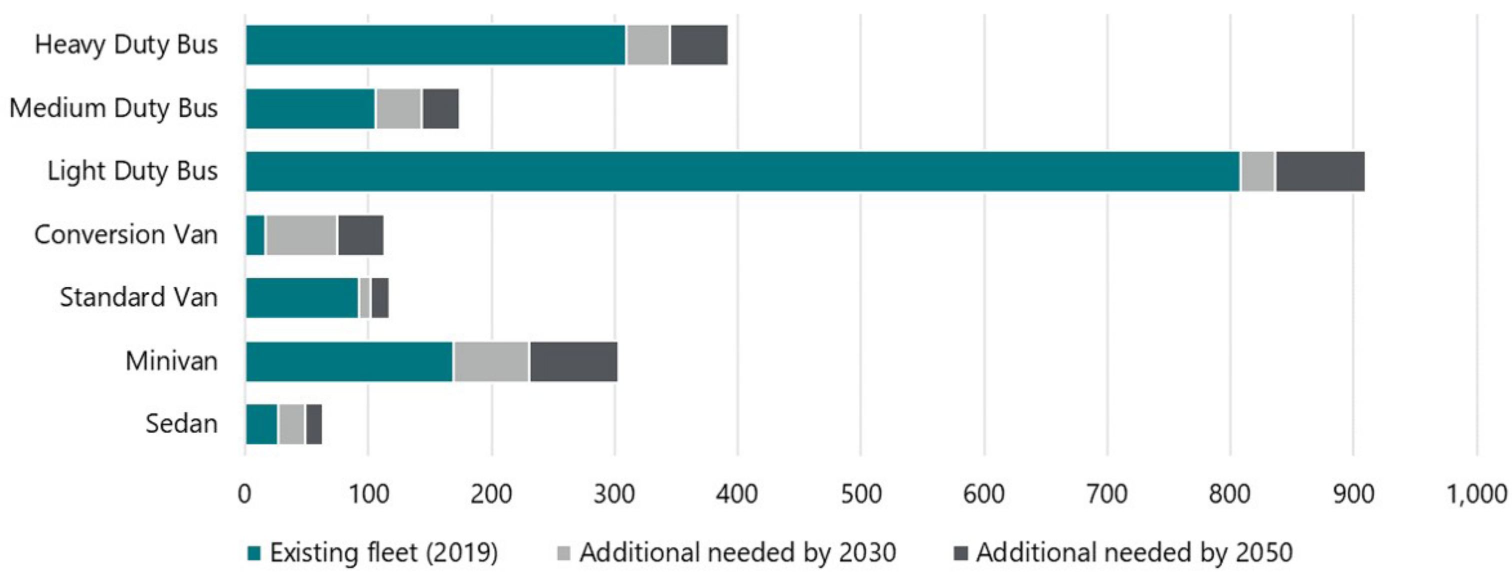

*Source: Toole Design Group*

## Public Transit

Needs for the public transit system in Iowa are expected to grow substantially between now and 2050 and fall under several categories. The needs were calculated based on feedback from Iowa transit agencies as part of the development of the 2020 Public Transit Long Range Plan. Agencies forecasted a steady increase in ridership, anticipating it to grow from 24.9 million in 2019 to 33.7 million in 2050, an increase of 35.6%. To be able to accommodate this increased ridership, there are a variety of fleet, facility, and personnel needs that would need to be addressed.

**Fleet needs** relate to revenue vehicles, which are a transit agency's bus and van fleet that is utilized to transport riders. This does not include needs for vehicles used by office personnel or for non-public transportation purposes such as maintenance trucks. Vehicle fleet needs represent a constant challenge as this includes replacing existing vehicles that are beyond their useful lives, as well as projecting future needs for additional vehicles, called expansion vehicles since they increase the overall fleet size. In general, transit agencies are exploring the "rightsizing" of their fleet in order to have appropriately sized vehicles for the likely number of riders, and a higher percentage of future expansion vehicles are expected to be vans rather than buses. Figure 5.4 shows the vehicle fleet needs across transit agencies by showing 2019 fleet numbers and the estimated additional vehicles needed by 2030 and by 2050.

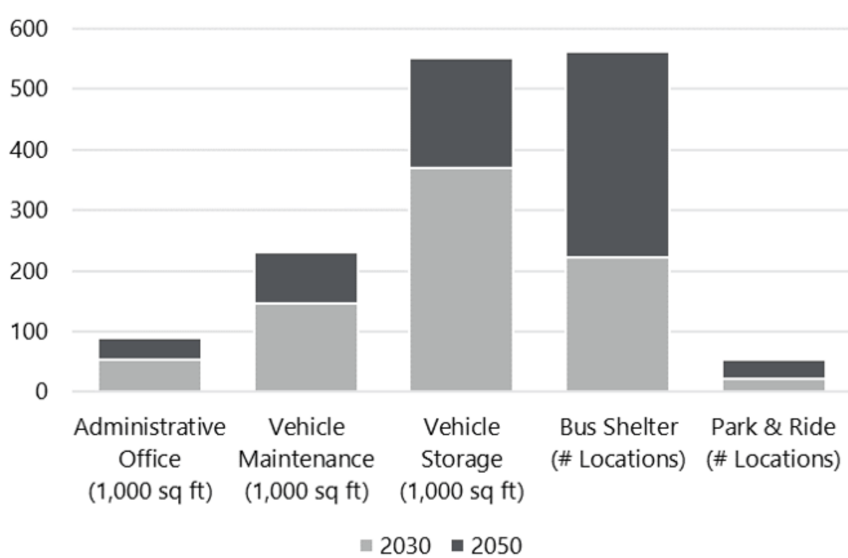
**Figure 5.4: Transit agency existing vehicle fleets in 2019 and additional vehicles needed by 2030 and 2050**




*Source: Transit agency surveys; Iowa DOT*

**Facility needs** relate to several types of infrastructure, including maintenance areas (including wash racks and wash bays), revenue vehicle storage areas, administrative/offices (including building needs such as offices/storage space and site needs such as parking spaces and walkways), bus shelters, and park and ride facilities. Vehicle storage needs were the most often cited infrastructure need – in order to extend the lives of the expensive transit vehicles, it is best to protect them to reduce maintenance costs and wear-and-tear of the buses. Figure 5.5 displays the survey results for facility needs. Besides demonstrating the need for particular types of facilities, the time period in which they are needed showed that nearly two thirds of facility needs were identified for the short-term planning horizon of 2030, with additional facility needs significantly lower in the long-term horizon of 2050. This shows that additional facilities, particularly for vehicle storage, are a high priority and a more immediate need.

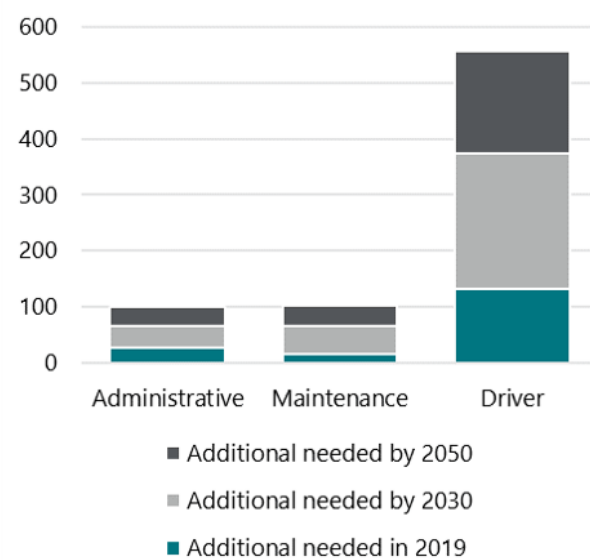
**Figure 5.5: Transit agency additional facility needs by 2030 and 2050**




*Source: Transit agency surveys; Iowa DOT*

**Personnel needs** relate to the workforce of the transit agency. This includes drivers, maintenance, and administrative staff. Transit agencies noted current personnel shortages as well as ongoing needs for additional staff (see Figure 5.6). The need for more bus drivers represents the single greatest personnel need across the state. A lack of drivers will have the effect of limiting the level of transit service that is available in a given region. It does not matter how many buses or vans are available if there are not enough qualified and licensed drivers to operate them. Likewise, a lack of maintenance employees may impact the ability to service and sustain the fleet of vehicles available for transit service, while a lack of office staff could constrain the agency's ability to schedule trips and dispatch vehicles, conduct public outreach, market its services, or perform strategic planning or analyses.

**Figure 5.6: Additional personnel needed for transit agencies in 2019, by 2030, and by 2050**




*Source: Transit agency surveys; Iowa DOT*

## Rail

The Iowa State Rail Plan (ISRP) was updated in 2021 and outlines specific potential future projects and initiatives Iowa might consider proposing to improve existing services in the state. This includes possible future railroad improvements and investments that could address passenger rail, freight rail, and rail safety needs of Iowa, as identified through railroad company and stakeholder outreach and internal Iowa DOT coordination during development of the ISRP.

The ISRP identifies, describes, and prioritizes specific potential future rail projects for short-term and long-term implementation. Types of freight rail projects identified include the following.

- Enhancement of existing transload facilities or construction of new transload facilities – 16 projects
- Enhancement of existing rail access or development of new rail access for shippers/receivers – 9 projects
- Improvements to track infrastructure – 9 projects
- Enhancements to the capacity of the state's rail network – 7 projects
- Improvements to bridge infrastructure – 6 projects
- Development of a new intermodal facility – 4 projects
- Address operating bottleneck – 3 projects
- Mitigation measures in flood prone areas – 3 projects
- Grade separation of highway/rail grade crossings – 2 projects

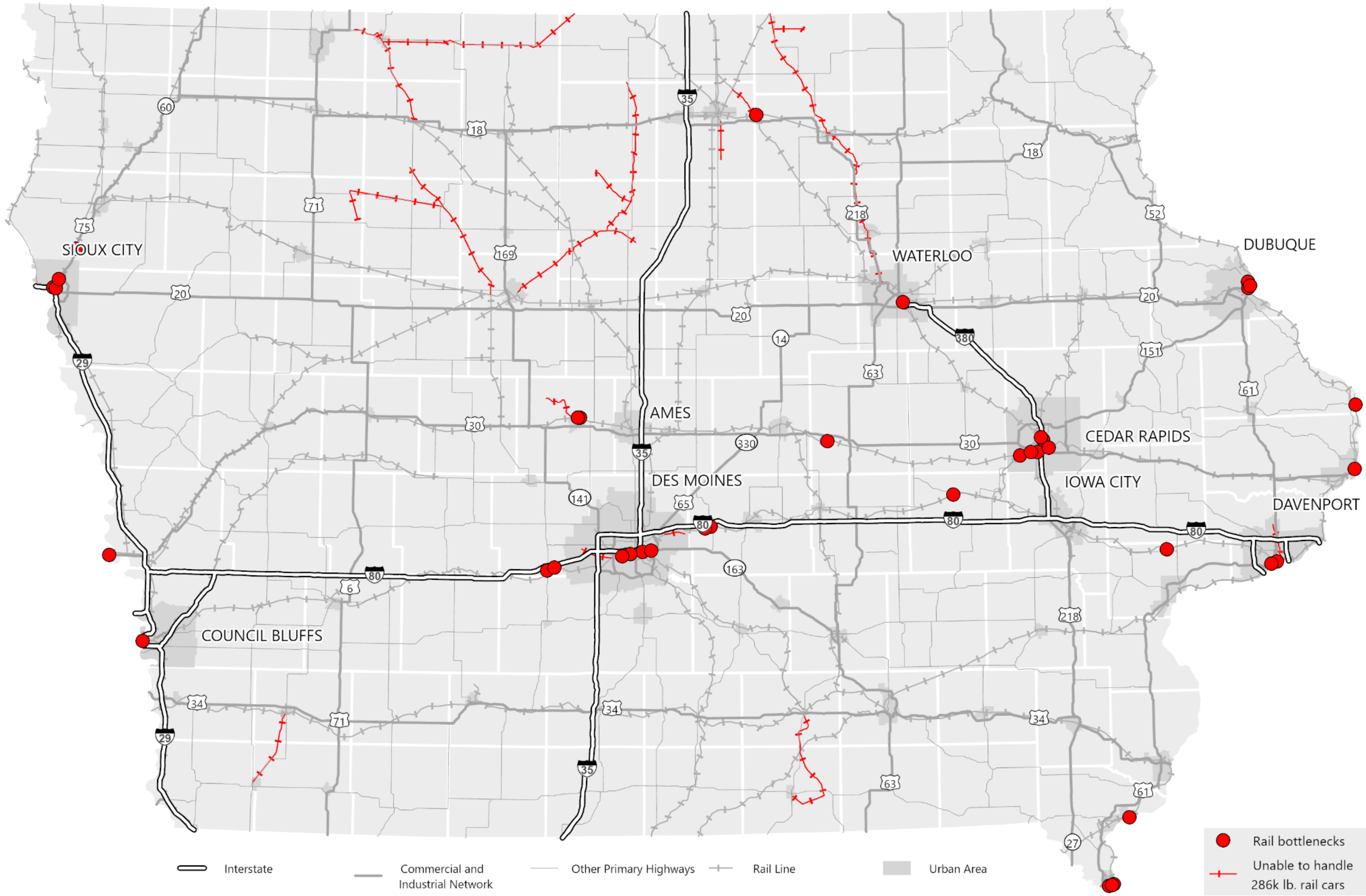
For passenger rail, projects identified include the following.

- Implementation of a bus service connecting the Chicago-Quad Cities intercity passenger rail service to Iowa City once the State of Illinois fully implements the Chicago-Quad Cities service.
- Implementation of intercity passenger rail service between the Quad Cities and Iowa City.
- Advancement of the proposed phased implementation of intercity passenger rail service in the Chicago-Omaha corridor from Iowa City west to Des Moines and Council Bluffs.
- Implementation of intercity passenger rail service between Council Bluffs and Omaha.
- Improvements to stations and facilities at Amtrak stations in Iowa, including Ottumwa, Fort Madison, and Osceola.
- Implementation of intercity passenger rail services in the Chicago-Dubuque and the Minneapolis/St. Paul-Des Moines- Kansas City corridors.
- Implementation of commuter rail services in the Des Moines area and in the Iowa City-Cedar Rapids area.

In addition to projects identified in the ISRP, two specific types of issues to be addressed across the rail system include railroad bottlenecks and rail lines with weight limitations (see Figure 5.7). Railroad bottleneck locations are usually referred to as "choke points" to avoid confusion with the more conventional railroad sector use of "bottleneck" to describe locations served by only one rail carrier (i.e., the "bottleneck carrier"). A total of 38 rail choke points were identified in the Iowa State Freight Plan by surveying the rail companies operating trackage in the state. Locations submitted primarily include structural choke points (e.g., low clearance areas, and bridges with size restrictions), congested choke points (e.g., locations with operational issues), and low-lying areas at risk of flooding during heavy rains or high-water levels.

Additionally, railroads continue to focus their attention on heavier axle-load freight equipment and longer, heavier trains to lower costs. Using larger rail cars in 100-plus car unit trains allows the greatest savings and economic benefits, as well as keeping would-be truck traffic off the highways. The industry standard for rail car weight, which includes the weight of commodities and the rail car combined, is 286,000 pounds. Iowa has rail lines that are unable to carry the sizes and weights of railroad equipment that meet this threshold.

**Figure 5.7: Rail choke points and lines incapable of handling 286,000-pound rail car weights**

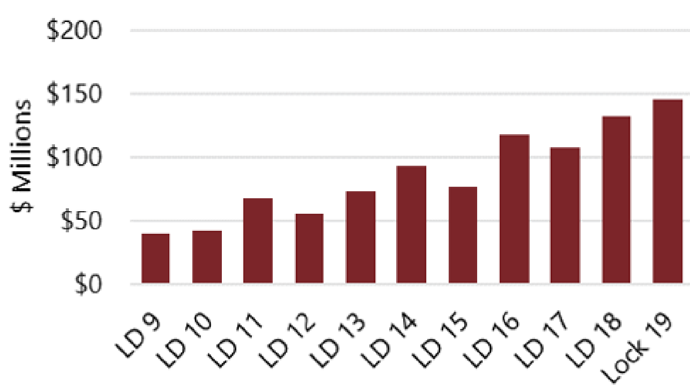



*Source: Railroad companies*

## Water

Regarding the Missouri River, with growing barge traffic it will be important for the U.S. Army Corps of Engineers (USACE) to continue focusing on the Bank Stabilization and Navigation Project (BSNP) with the authorized purpose of providing a reliable, self-scouring navigation channel from St. Louis, Missouri, to Sioux City, Iowa, that is 9 feet deep and not less than 300 feet wide. However, most water-related needs for Iowa are associated with the infrastructure in and along the Mississippi River. Given the condition, size, and average delay of the 11 locks bordering Iowa, all are considered freight bottlenecks. It is clear that a lack of repairs, maintenance, and modernization will continue to have a negative impact on the efficiency and condition of the infrastructure. Failure or closure of a lock could be catastrophic for the region. The USACE has identified over $948 million in deferred/backlog maintenance and major rehabilitation and repair costs for the 11 locks and dams bordering Iowa, shown in Figure 5.8 and Table 5.2. Addressing these needs is essential to ensure continued viability of the Mississippi River for transporting freight to and from Iowa.

**Figure 5.8: Deferred/backlog maintenance and major rehabilitation and repair costs for Iowa locks and dams**




*Source: U.S. Army Corps of Engineers*

**Table 5.2: Prioritized maintenance projects for Iowa locks and dams**

| | |
|---|---|
| 1 | Lock 18 Miter Gate Anchorage Replacement |
| 2 | Lock 17 Miter Gate Anchorage Replacement |
| 3 | Lock 19 PLC System Replacement |
| 4 | Lock 17 Upstream Guidewall Sheetpile Transition Wall Repair |
| 5 | Lock 13 Filling and Emptying System Replacement |
| 6 | Lock 19 Hydraulic Cylinder Rod Replacement |
| 7 | Dam 13 Spillway Seepage Cutoff Wall Repairs |
| 8 | Lock 14 - Auxiliary Lock/MRPO Guidewall |
| 9 | Lock 18 Access Road Repairs |
| 10 | 6 Sites Dam Gate Trunnion Repairs |
| 11 | Lock 16 Filling and Emptying System (Drums and Wire Ropes) |
| 12 | Lock & Dam 14 Replace Bridge Crane & Bulkhead Lifter (Prototype) |
| 13 | Replace Bridge Crane & Bulkhead Lifter 10 Sites |
| 14 | Lock 11 & 12 Replace Miter Gate Anchorages Including A-Frame |
| 15 | Lock 13 & 14 Replace Miter Gate Anchorages Including A-Frame |
| 16 | Lock 15 & 16 Replace Miter Gate Anchorages Including A-Frame |
| 17 | 12 Sites Lock & Dam Safety Hand Rail Replacement |
| 18 | 12 Sites Lock & Dam Safety Signage - Restricted, etc. |
| 19 | Lock 13 Pressure Relief Wells |
| 20 | Lock 16 Floor Stability "Relief Wells" |
| 21 | Lock & Dam 11 - 19 Gates (Various maintenance/replacement) |
| 22 | Lock & Dam 12 - 10 Gates (Various maintenance/replacement) |
| 23 | Lock & Dam 13 - 13 Gates (Various maintenance/replacement) |
| 24 | Lock & Dam 14 - 17 Gates (Various maintenance/replacement) |
| 25 | Lock & Dam 15 - 11 Gates (Various maintenance/replacement) |
| 26 | Lock & Dam 16 - 19 Gates (Various maintenance/replacement) |
| 27 | Lock & Dam 17 - 11 Gates (Various maintenance/replacement) |
| 28 | Lock & Dam 18 - 17 Gates (Various maintenance/replacement) |
| 29 | Wingdam Repairs Pool 11-22 |
| 30 | Fairlead Replacement at 6 Lock Sites |
| 31 | Lock & Dam 15 Checkposts |

*Source: U.S. Army Corps of Engineers*

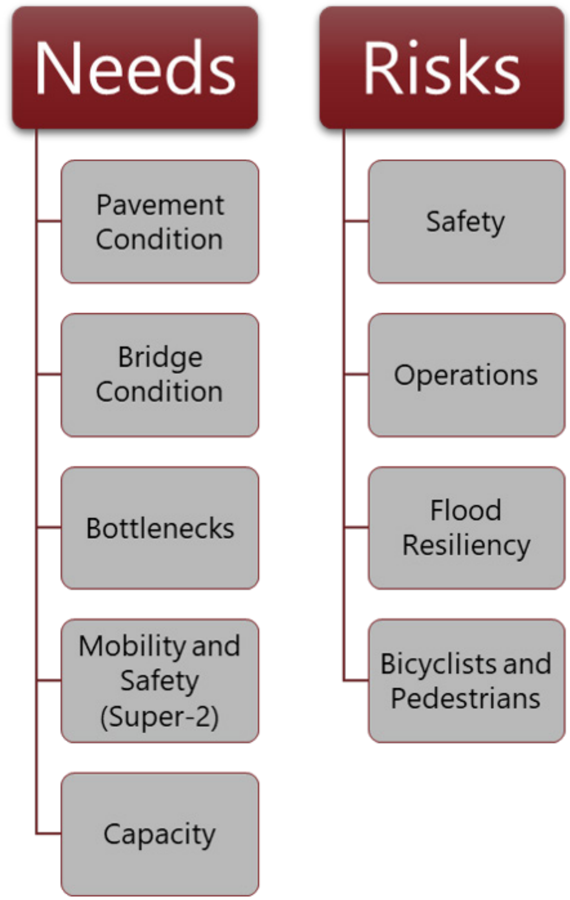
## 5.2 Highway Needs and Risks

Several layers of needs and risks were examined as part of the analysis conducted for the Primary Highway System for the SLRTP. These are shown in Figure 5.9. Needs are based on measured or estimated data and represent a possible gap. Risks are based on there being the potential for greater risk relative to that area of analysis, and thus greater potential benefit for improvements to address that risk. Each layer used various Iowa DOT data, plans, and tools to analyze different types of needs and risks from a systemwide perspective. In order to make the output more cohesive and usable, data is analyzed at or aggregated to a corridor level. For these purposes, the Primary Highway System is divided into 464 corridors with termini based on features such as major highway crossings and where roadways change from undivided 2-lane routes to multilane divided highways. Most analysis layers identified needs or risks at the corridor level, with only bottleneck and bridge improvement needs being identified for specific locations.

This analysis was conducted to build a comprehensive understanding of various types of needs and risks across the Primary Highway System. While specific corridors or locations have been identified as having needs or risks for each layer of analysis, this process does not define the types of treatments to be implemented or identify specific projects or alternatives. It also does not mean that needs and risks identified in this SLRTP will subsequently become funded projects, as additional factors help determine when and how a project proceeds. Likewise, corridors without any needs or significant risks noted may still have projects or improvements occur, particularly to address stewardship needs, which exist across the system.

Overall, this comprehensive analysis of the Primary Highway System provides a corridor-level perspective that will be an important consideration as individual projects are developed, and will help ensure identified needs and risks are taken into account during the project scoping process. When the analysis layers are combined, an awareness of the overall needs and risks of individual highway corridors can be developed.

**Figure 5.9: Needs and risks analyzed for the Primary Highway System**




*Source: Iowa DOT*

## Pavement Condition

The pavement condition analysis utilized the Infrastructure Condition Evaluation (ICE) tool, which was developed to aid in the evaluation of the state's Primary Highway System by calculating a composite rating based on the most recent infrastructure condition and performance data. The ICE tool uses seven different criteria and offers the ability to evaluate the overall structural and service condition of roadway segments with a single composite rating. The following criteria are used in the composite rating; the percentage shown is the weighting that is applied to each factor.

- Pavement Condition Index (PCI) rating (25 percent)
- Bridge Condition Index (BCI) rating (25 percent)
- International Roughness Index (IRI) value (15 percent)
- Annual Average Daily Traffic (AADT), combination truck count (15 percent)
- AADT, single-unit truck count (5 percent)
- AADT, passenger count (5 percent)
- Congestion Index value (10 percent)

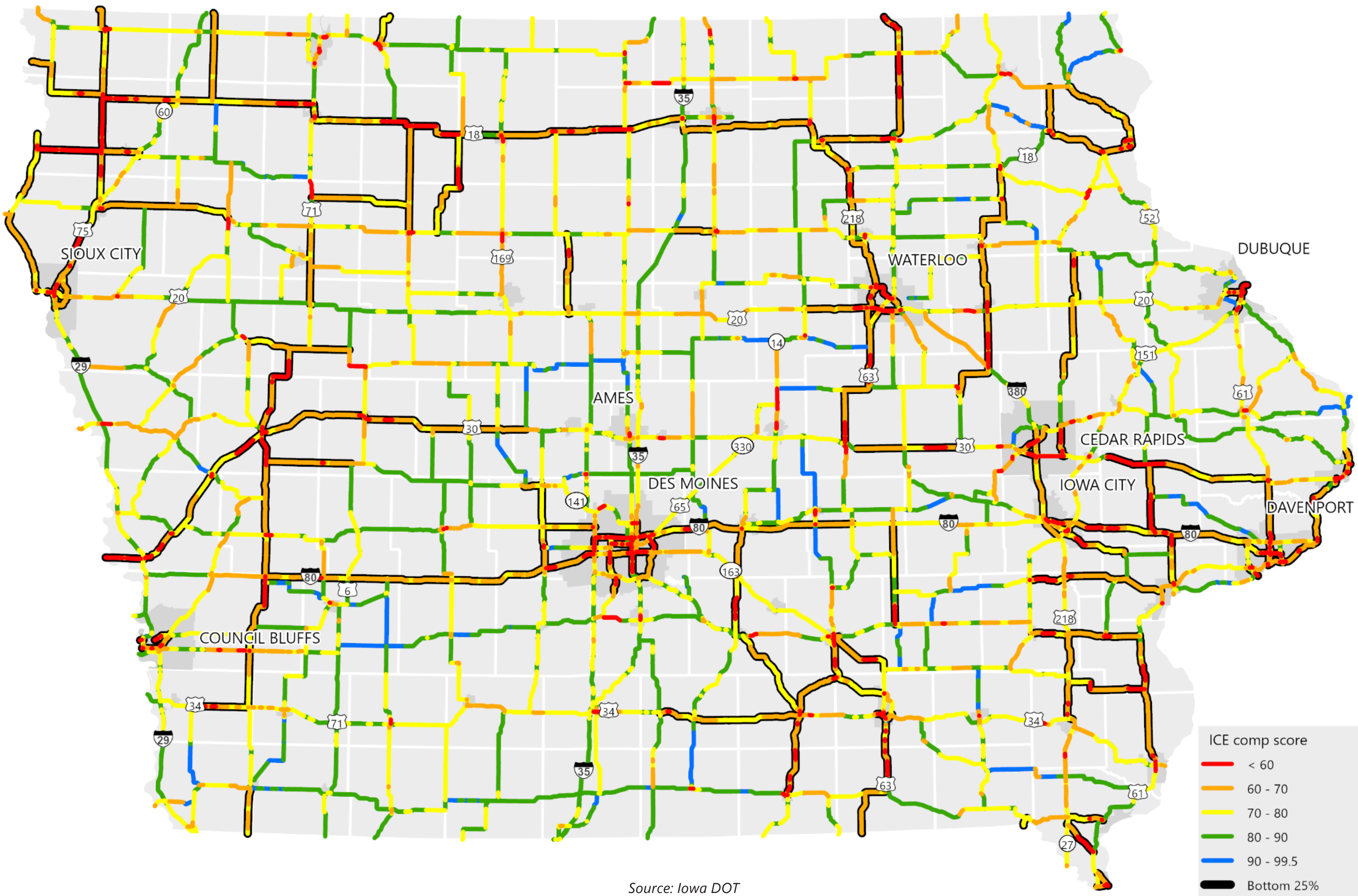
The seven data layers are combined through a linear overlay process, which breaks the highway network into discrete segments at every location where any of the seven data values change. This results in over 40,000 segments for analysis. For each segment, the value for each criterion was normalized on a 1 (worst) to 10 (best) scale. Then the seven normalized values were weighted based on the percentages noted above and added together to determine a composite rating for the segment. The composite score had a maximum value of 100, which would mean the highest possible score was assigned for each factor. The normalization and weighting values and process were determined by input from internal stakeholders when the ICE tool was developed.

The thousands of segments were then aggregated into the 464 analysis corridors. Each corridor was assigned a composite ICE rating based on a weighted average of the composite ratings for the individual segments within it. To identify a subset of corridors to target as condition needs in this SLRTP, the 464 corridors were sorted based on their overall composite rating. Corridors making up the lowest-rated 25 percent of the system by mileage were selected. This threshold was based on an assumed pavement design life of 20-40 years, depending on the surface material. Using 20 years as a conservative basis means approximately 5 percent of the system's surface would need to be improved in some fashion each year to keep up with deterioration. Since this SLRTP is updated every five years, applying this annual 5 percent figure to the five-year life of the SLRTP results in the 25 percent calculation.

Since condition information is aggregated, there may be corridors identified in the bottom 25 percent of the system that have segments in good condition within them, and vice versa. Identification of these corridors also does not mean they will automatically be targeted for improvement, as asset management strategies and other elements factor into when projects proceed. Figures 5.10 and 5.11 show the segment-level ICE output and highlight the bottom 25 percent of primary highway corridors based on the ICE analysis.

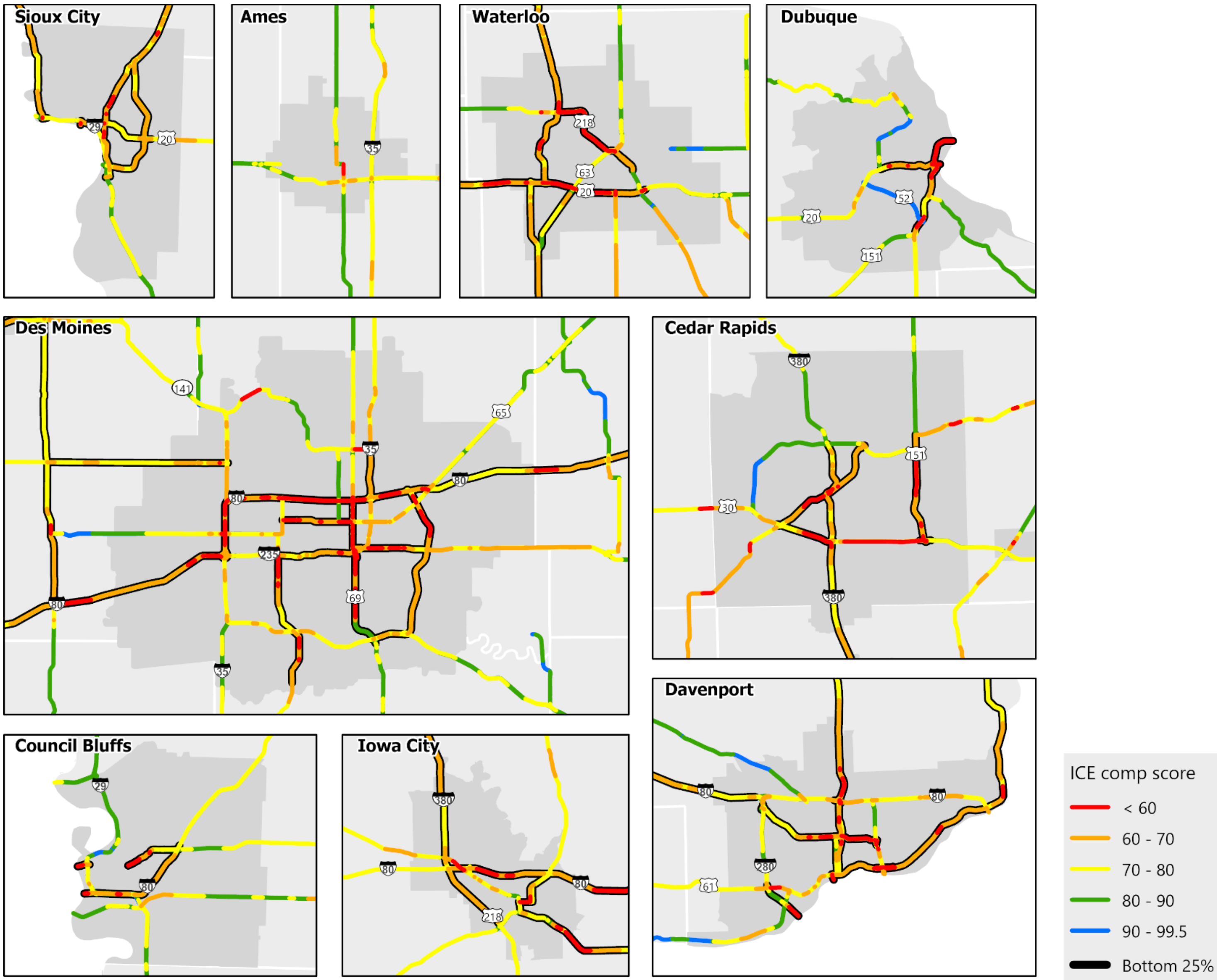
The overall distribution of segment-level ICE composite ratings ranged from a low of 29.5 to 100, with a system-wide average of 76.3. When segments are aggregated to the corridor level, the corridor composite scores range from 43.1 to 92.6, with an average corridor-level composite score of 75.5. The bottom 25 percent of corridors were those that had a score of 71.4 or less.

Figure 5.10: ICE composite ratings and bottom 25 percent of Primary Highway System corridors – statewide view




*Source: Iowa DOT*

Figure 5.11: ICE composite ratings and bottom 25 percent of Primary Highway System corridors – urban insets




*Source: Iowa DOT*

## Bridge Condition

Bridge condition was measured based on the bridge condition index (BCI). The BCI provides a method of evaluating roadway bridge structures by combining multiple factors to obtain a value that is indicative of a structure's overall condition/sufficiency. These factors include structural condition, load carrying capacity, horizontal and vertical clearances, width, traffic levels, type of roadway served, and the length of out-of-distance travel if the bridge were closed. Reductions for specific vulnerabilities are also factored into the rating. The BCI is measured on a 0-100 scale, with 100 being the best possible rating.

For this analysis, the BCI for the more than 4,000 structures owned and maintained by the Iowa DOT was reviewed, and bridges comprising the lowest-rated 5 percent of the system's bridges were identified. This threshold was based on an assumed bridge design life of 100 years, which would mean that approximately 1 percent of the system's bridges would need to be improved each year to keep up with deterioration. Since this SLRTP is updated every five years, applying this annual figure to the five-year life of the SLRTP results in the 5 percent calculation. The data reviewed for this SLRTP showed the BCI of Iowa DOT bridges ranged from 11.0 to 99.9, with a per-bridge average of 75.1. The bottom 5 percent included bridges with a BCI of 52.5 or less.

Figures 5.12 and 5.13 show the bridges identified as the bottom 5 percent, including two specific sub-categories.

- Structures with an estimated replacement cost of more than $5 million. Multiple projects of this magnitude can quickly use up the funding available for bridge replacements in a given year.
- Structures on routes of over versus under 5,000 annual average daily traffic (AADT). While any individual project's scope will be determined based on its specific circumstances, this visualization is used to represent a higher versus lower traffic threshold, as bridge replacement tends to be a more viable treatment option on higher AADT roadways than a lesser treatment, such as a deck overlay.

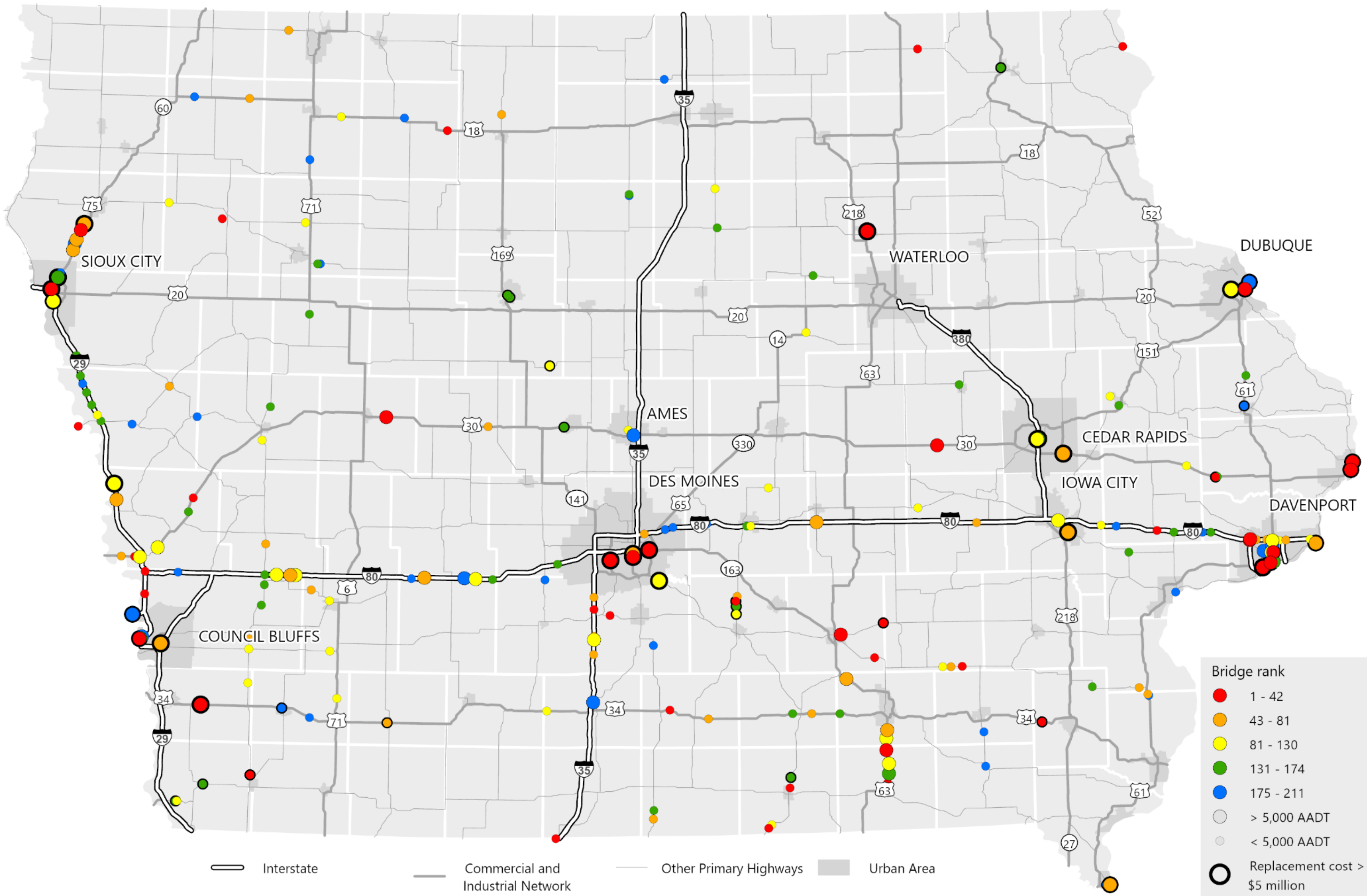
Bridge needs are also shown in the highway needs/risks matrix (see Tables 5.4-5.6). The matrix identifies a bridge's rank (with ties allowed) out of the 216 bridges in the bottom 5 percent, and also notes those bridges that are owned and maintained by the Iowa DOT but are not on the Primary Highway System. A total of 39 of the 216 bridges are located off primary highways, the majority of which are county or municipal roadways that cross an Interstate.

Being included in the bottom 5 percent does not necessarily mean a bridge is in poor condition or will be prioritized for programming, as asset management strategies and many other factors help determine when bridge projects are programmed. However, identifying these structures along with other system-level needs and risks through this SLRTP helps build an awareness of the overall needs and risks a particular highway corridor has.

The Iowa DOT is also responsible for many major bridges, such as border river crossings and large urban viaducts. The ten structures listed below are all likely to need the noted work within the next 20 years; most of them are also in the bottom 5 percent. These projects require special planning due to their financial impact, which can be tens to hundreds of millions of dollars, and their advanced coordination needs, particularly those that are shared with another state.

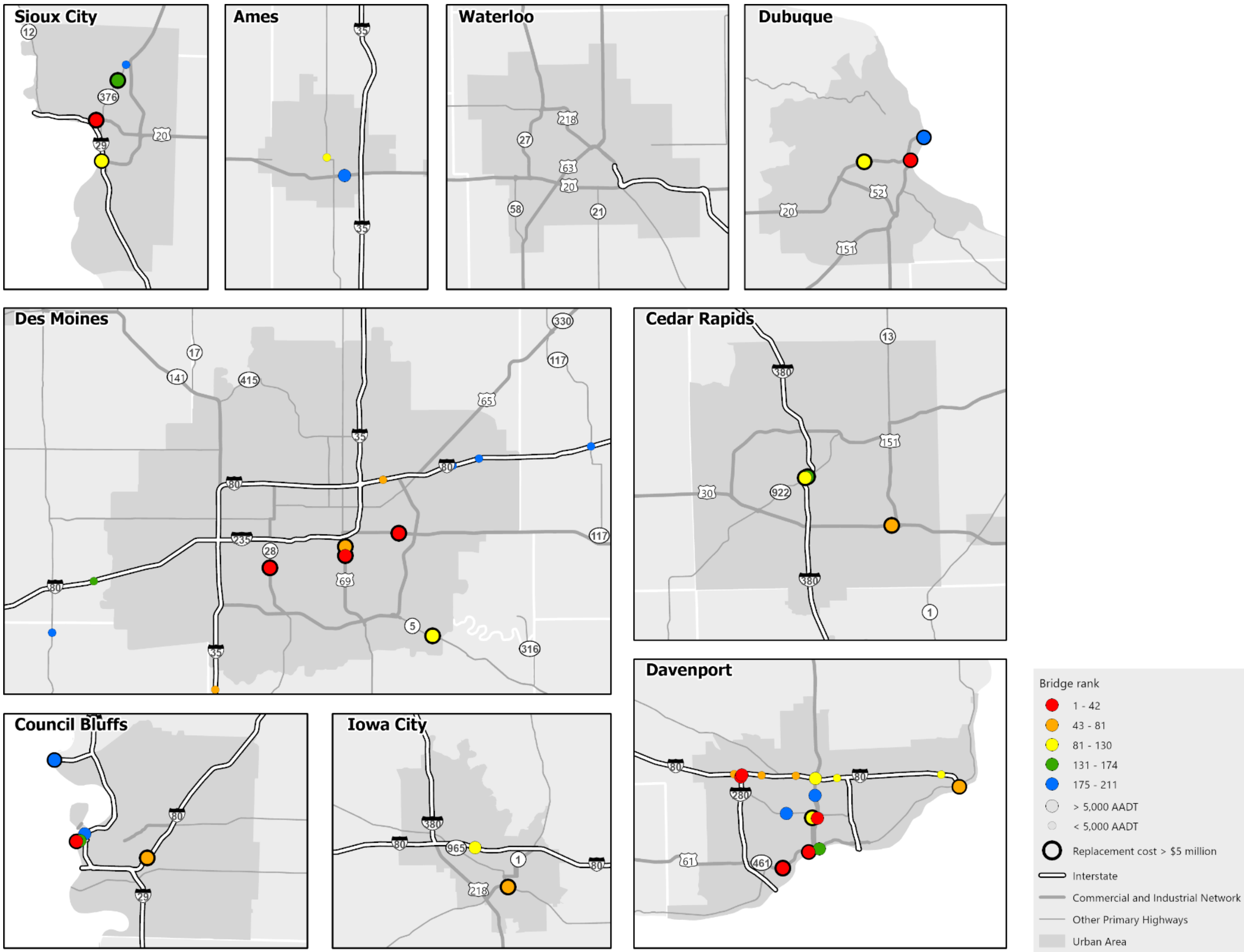
- I-280: Rock Island over the Mississippi River – deck replacement
- I-129: Sioux City over the Missouri River – deck overlay
- IA 9: Lansing over the Mississippi River – replacement
- I-80: Le Claire over the Mississippi River – replacement
- IA 12: Sioux City Gordon Drive Viaduct – replacement
- US 67: Davenport over the Mississippi River – replacement
- IA 175: Decatur over the Missouri River – replacement
- US 20: Dubuque over the Mississippi River – replacement
- US 30: Clinton over the Mississippi River – replacement
- US 63: Ottumwa Viaduct – replacement

Figure 5.12: Bottom 5 percent of Primary Highway System bridges – statewide view




*Source: Iowa DOT*

Figure 5.13: Bottom 5 percent of Primary Highway System bridges – urban insets




*Source: Iowa DOT*

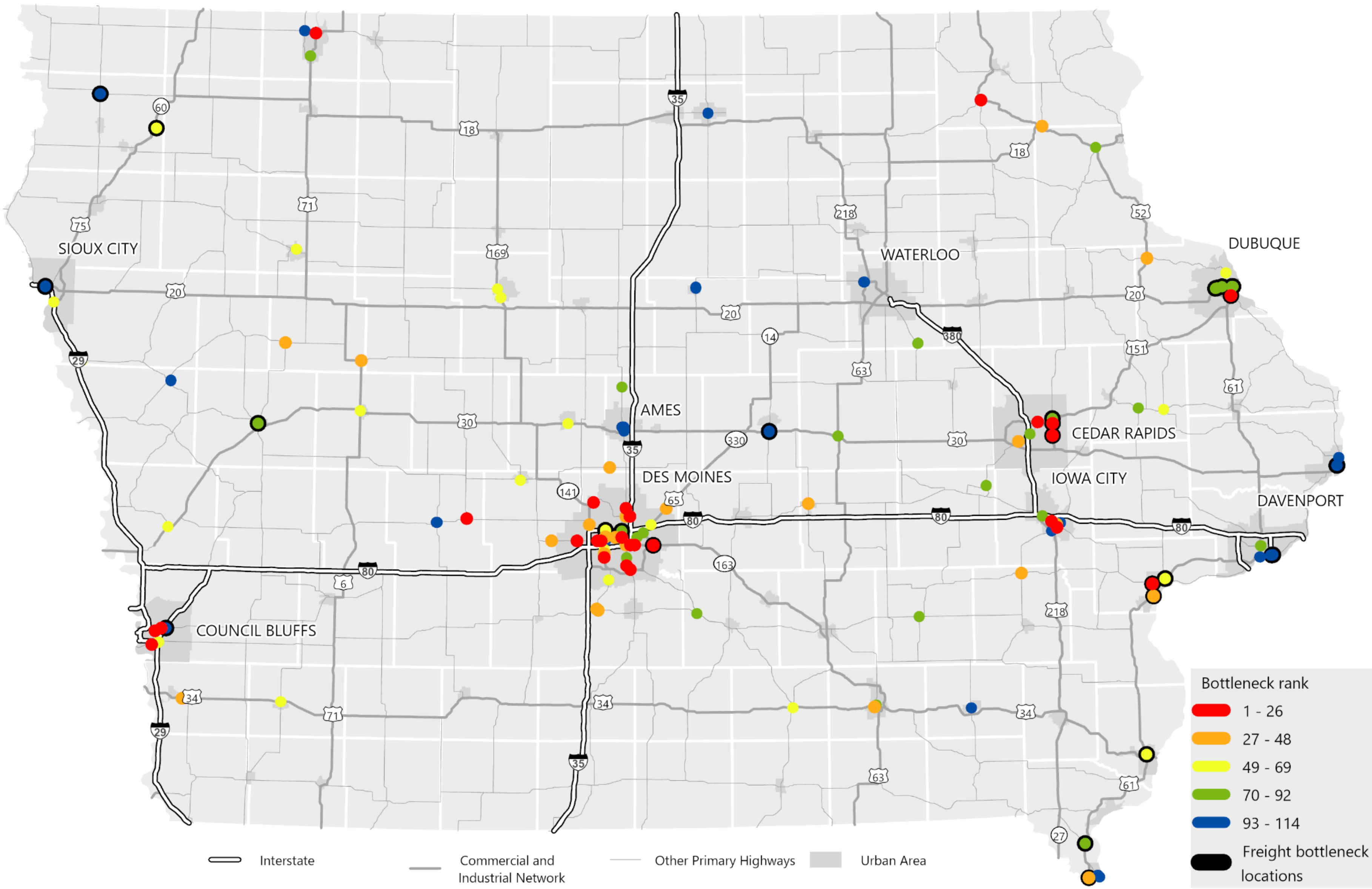
## Bottlenecks

Another analysis layer involved reviewing what locations on the Primary Highway System had recurring slow-downs, or bottlenecks. INRIX travel speed data, derived from cellphone and global positioning systems data, was used to identify bottlenecks. Bottleneck conditions were determined by comparing reported speeds to reference speeds for each segment of road. Reference speed values are provided for each segment and represent the 85th percentile observed speed for all time periods, with a maximum value of 65 mph. A bottleneck occurrence is defined in this analysis as a time interval where the average traffic speed is less than or equal to 60 percent of the reference speed. The annual total bottleneck duration per mile was calculated for each segment to represent recurring congestion, and the worst five percent of the overall network was identified. Of those locations among the worst five percent by duration per mile, locations where the duration was one standard deviation or higher than the statewide average were identified as bottleneck needs for the SLRTP.

A total of 114 bottlenecks were identified, shown on Figures 5.14 and 5.15. Bottleneck needs are also shown in the highway needs/risks matrix (see Tables 5.4-5.6). The matrix identifies a bottleneck's rank out of the 114 bottlenecks noted in the plan. A total of 24 bottlenecks are on the Iowa Multimodal Freight Network and of particular concern for freight traffic. These bottlenecks are further analyzed in the State Freight Plan, which prioritizes them based not only on amount of delay but also on condition and value for network efficiency.

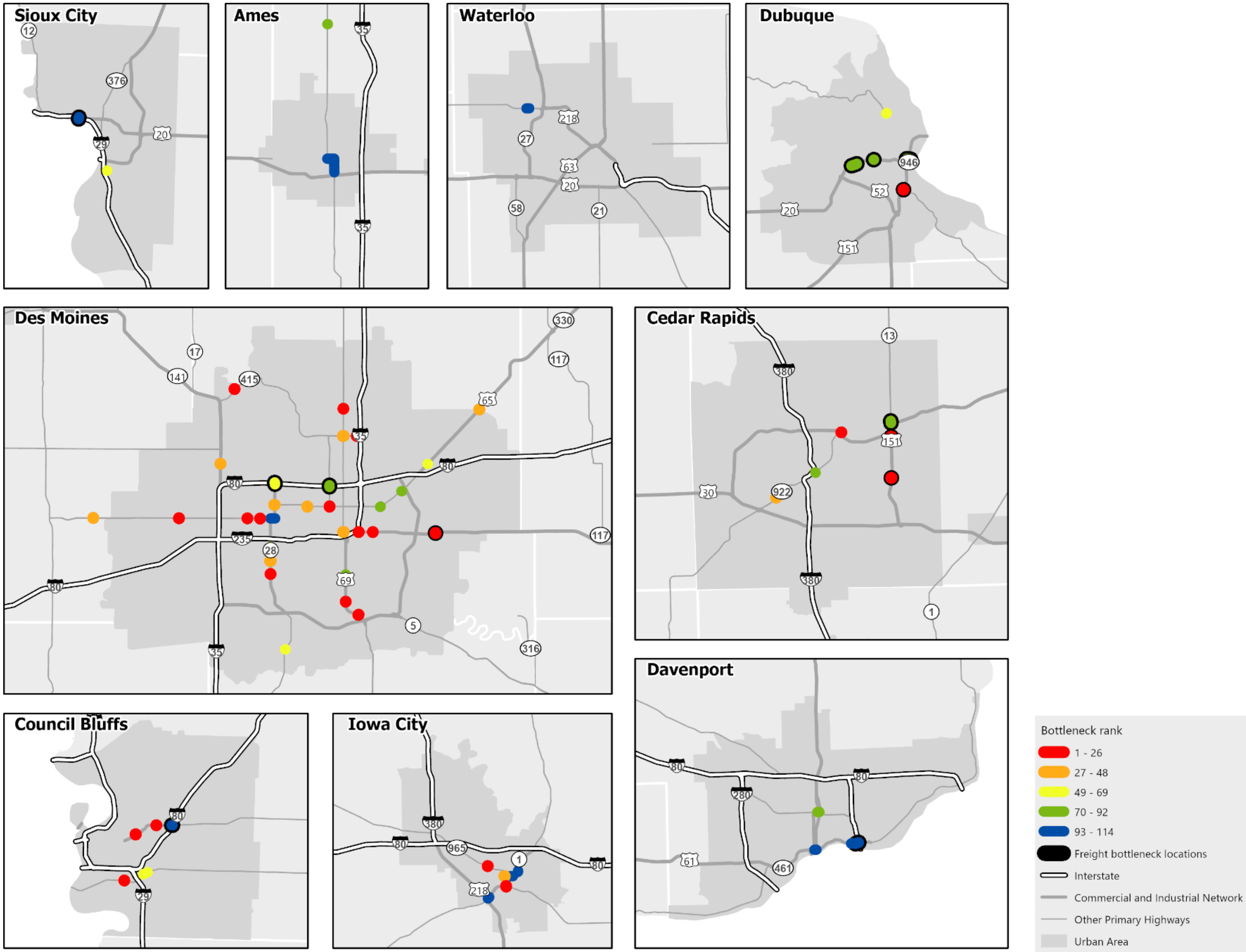
Since this is a very granular segment-level analysis, most bottlenecks occur at intersections, which is to be expected. However, to diagnose the specific issue and best treatment, a broader look at the surrounding network will likely be needed. Bottlenecks may have solutions as simple as retiming stoplights or as complex as access changes or new construction.

Figure 5.14: Bottleneck locations on the Primary Highway System – statewide view




*Source: Iowa DOT*

Figure 5.15: Bottleneck locations on the Primary Highway System – urban insets




*Source: Iowa DOT*

## Mobility and Safety (Super-2)

As part of the 2017 SLRTP, analysis was conducted to provide a data-driven recommendation for mobility and safety improvements to Primary Highway System corridors. The aim was for these improvements to enhance the operation of the network in particular corridors where capacity expansion needs were not identified, but improvements would help the corridors compliment the state's multilane highway network.

The mobility and safety improvements are realized through the Super-2 concept. As part of the 1997 State Transportation Plan, the Iowa DOT introduced Super-2 style roadways with the basic goals of maximizing the benefits of two-lane roadways through improved roadway safety, capacity, and mobility, while reinforcing the growing importance of lowering right-of-way needs and construction and maintenance costs. Super-2 improvements serve as alternatives to four-lane capacity expansion projects and can aid in uninterrupted flow of traffic and the accommodation for slower traffic when necessary. A defining feature of Super-2 improvements is the addition of passing lanes, which improve roadway operation by providing opportunities to pass slower-moving vehicles. Other examples of Super-2 design elements include wider paved shoulders, left and right turn lanes, acceleration lanes, limited access, and geometric improvements.

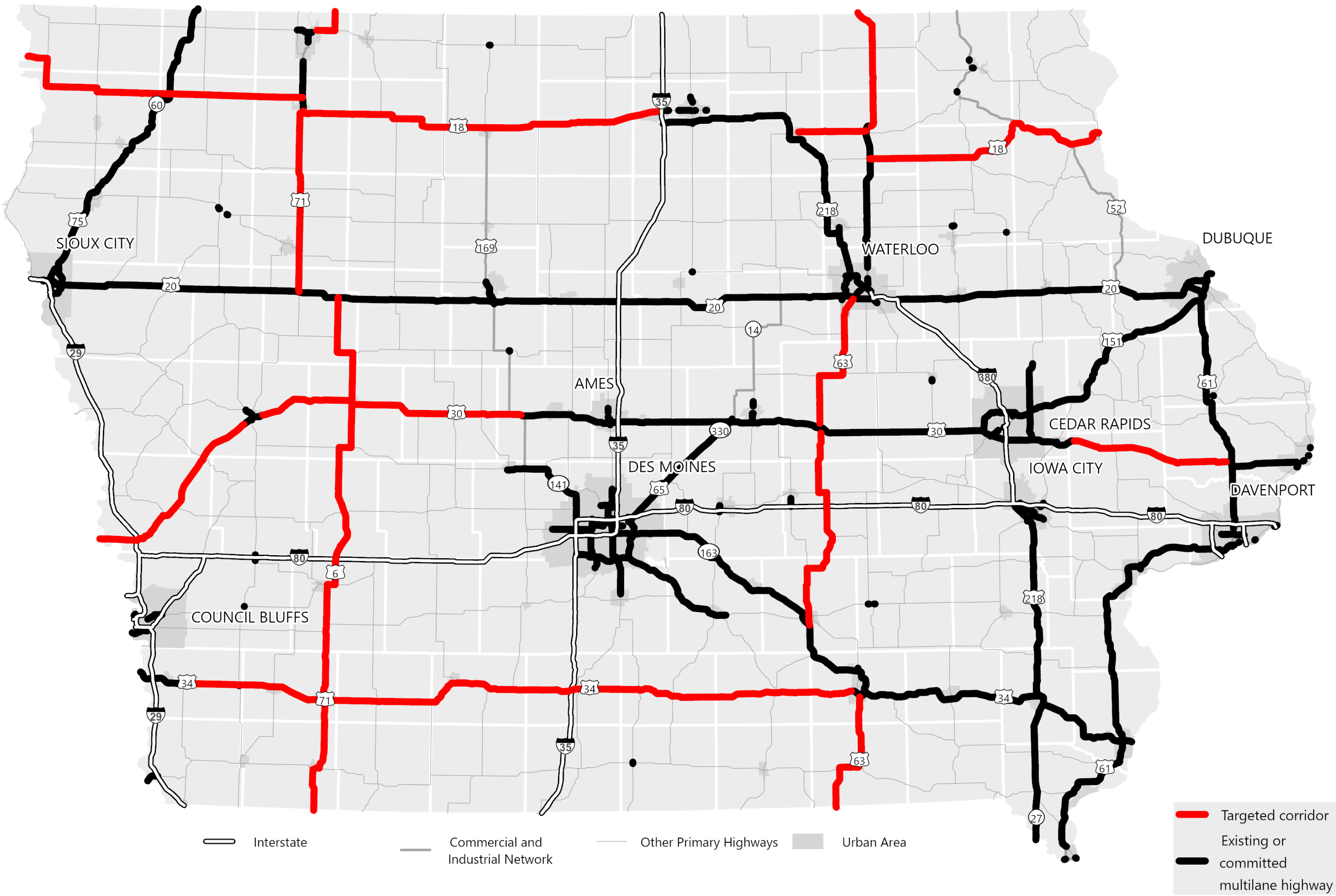
An analysis of two corridors where Super-2 style improvements were constructed during 2008-2011 showed significant safety benefits. The types of improvements included wider paved shoulders, the addition of turn lanes and passing lanes, and access and geometric modifications. The analysis reviewed crashes in the several years prior to construction and after construction. With animal crashes excluded, the analysis showed a 67 percent reduction in crashes on US Highway 169 from Fort Dodge to Humboldt, and a 49 percent reduction in crashes on US Highway 63 from Oskaloosa to New Sharon.

To help determine which corridors to target for Super-2 improvements, several attributes were evaluated, including crash statistics, roadway grades, traffic volumes, average trip lengths, statewide connectivity, and existing network designations. This led to a proposed network for corridor-level Super-2 improvements being adopted as part of the 2017 SLRTP. Over time, these corridors will effectively serve as an enhanced network of two-lane highways providing improved statewide mobility and safety while complementing the existing and committed multilane network. Figure 5.16 shows the corridors targeted for Super-2 improvements, which are the 2-lane portions of US Highways 18, 30, 34, 63, and 71.

The improvements targeted through this effort are a more relaxed application of the Super-2 design, with the appropriate mix of passing lanes and other Super-2 elements being implemented in a targeted and opportunistic fashion when work is being planned for a targeted corridor to address needs such as safety or condition improvements. Implementation of the Super-2 concept began following the 2017 SLRTP's approval. This included the development of design guidelines for the placement, length, and spacing of passing lanes; a high-level analysis of locations suitable to passing lane additions along the five corridors; Planning and Environmental Linkages (PEL) studies for portions of the Super-2 corridors, which have reaffirmed Super-2 as the preferred option rather than multilane capacity expansion; and the programming of initial Super-2 projects on multiple targeted corridors.

Efforts to implement Super-2 improvements should continue on these five corridors as opportunities arise. Also, while these five statewide highways are targeted for Super-2 improvements across their 2-lane portions, this does not preclude the use of these types of treatments in other spot locations to address mobility and safety needs.

**Figure 5.16: Corridors targeted for mobility and safety (Super-2) improvements**




*Source: Iowa DOT*

## Capacity

Capacity needs were analyzed by using the detailed capacity analysis conducted as part of the development of the last long-range plan in 2017 as a starting point. That analysis included several steps.

- A review of statewide volume-to-capacity (V/C) conditions from the Infrastructure Condition Evaluation (ICE) tool. This provided a congestion index of roadways based on the most recent traffic counts and showed where there were primary highway segments with high V/C ratios, meaning the traffic volumes were approaching the roadway's overall capacity.
- A forecast of future statewide V/C conditions utilizing the Iowa Travel Analysis Model (iTRAM), which is a statewide travel demand model that uses employment, household, and transportation network information to model existing traffic volumes, then forecasts future traffic volumes based on where employment and household growth or decline are anticipated.
- A review of forecasts for future traffic based on Iowa's nine metropolitan planning organization (MPO) travel demand models, which are similar to iTRAM but contain more granularity for the metropolitan areas.

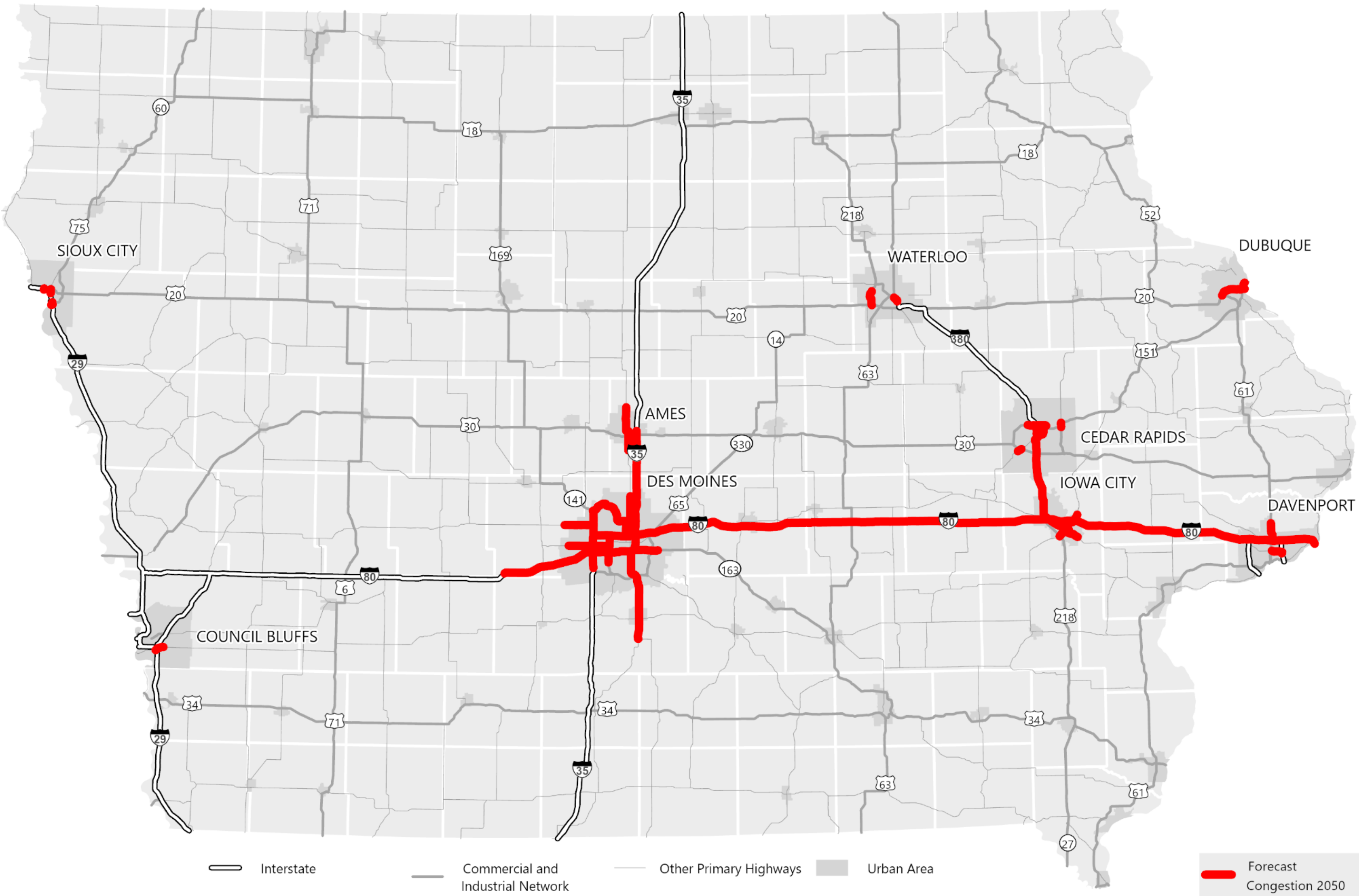
Overall, the base analysis conducted for the 2017 SLRTP showed some primary highway segments with existing V/C ratios that would be approaching, at, or over capacity, most of which were located in metropolitan areas. In rural areas, the higher V/C ratios were on Interstates or near urban areas. In addition to the prevalence of urban corridors, interurban commuter corridors such as I-35 from Des Moines to Ames and I-380 from Iowa City to Cedar Rapids showed higher than average V/C ratios, as did much of I-80 east of Des Moines. Work has already begun to address some of these Interstate corridors, with significant projects being programmed since the 2017 SLRTP.

The forecast analysis showed that the majority of congestion is forecast to worsen in metropolitan areas including Des Moines, Iowa City, Cedar Rapids, and Davenport, with more isolated congestion occurring in some of the state's other urban areas. The forecast also suggested capacity issues would worsen for the three previously mentioned Interstate corridors if no changes were made. Overall, the results from both analyses were consistent in showing there is limited congestion on Iowa's primary network as a whole.

The analysis conducted for the 2017 SLRTP was used as the baseline for determining capacity needs for this SLRTP. In addition to reviewing the past analysis, several tools and resources were used to evaluate whether any corridors should be added or removed as capacity needs. These included output from an updated version of iTRAM which forecasts traffic to 2050, a review of updated MPO models, and a review of traffic forecasts conducted for corridors or specific locations. This review showed that current tools are very consistent with prior output in terms of what should be identified as a capacity need, and only a small number of changes were made from the 2017 capacity needs.

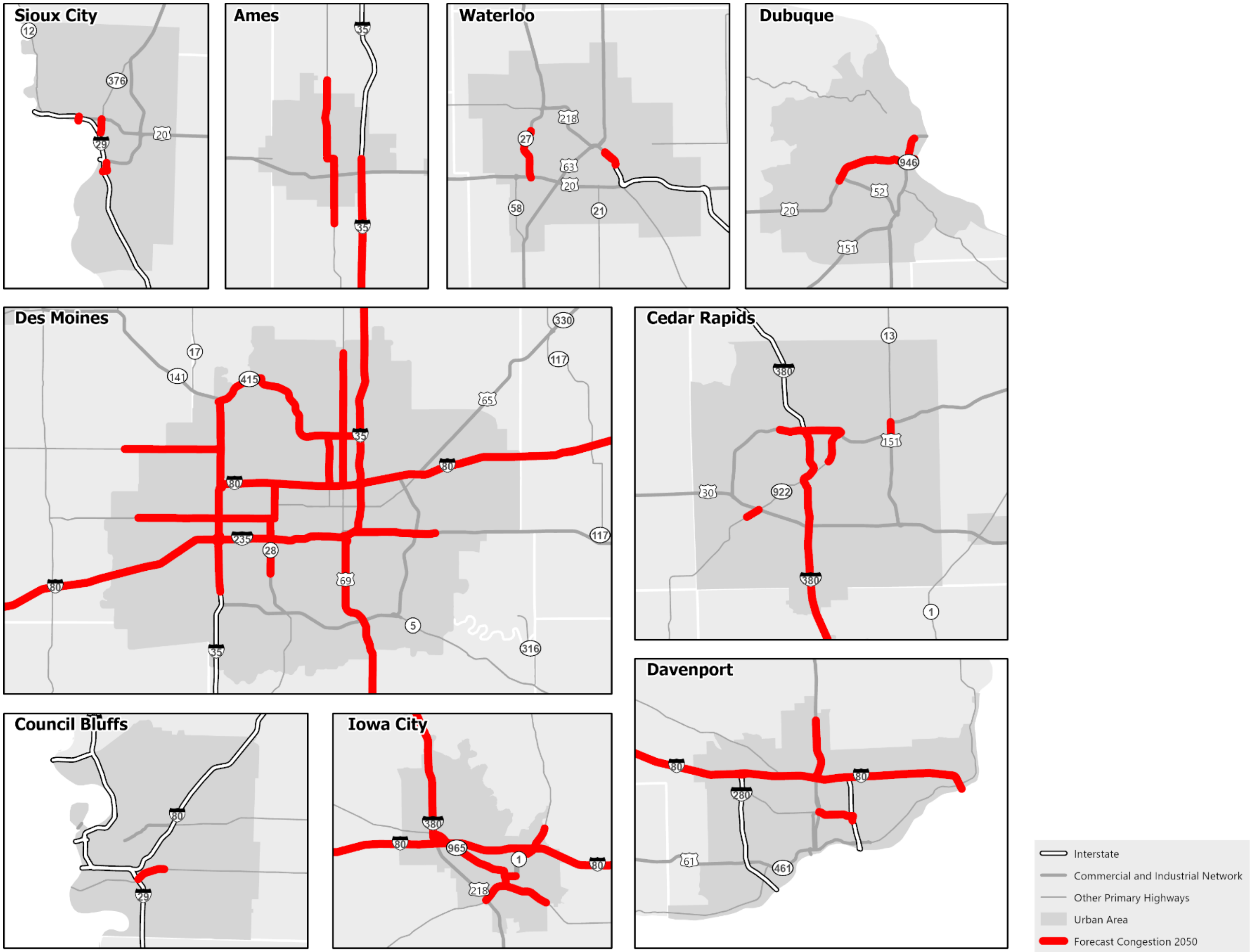
Capacity needs are shown on Figures 5.17 and 5.18. It should be noted that identifying capacity needs at a corridor level involves professional judgment, as the existing or forecasted V/C ratio throughout a corridor may vary substantially. Thus, a corridor being identified as a capacity need does not necessarily mean that it is forecasted to be approaching or over capacity for its entire length; likewise, corridors that have not been identified may have spot locations that are forecast to have congestion issues. Being identified as a capacity need also does not necessarily mean additional lanes will need to be constructed. There are many other strategies and project types that may be appropriate for corridors other than capacity expansion, such as operational strategies, demand management, and intersection/interchange improvements.

Figure 5.17: Corridors projected to be approaching or over capacity by 2050 – statewide view




*Source: Iowa DOT*

Figure 5.18: Corridors projected to be approaching or over capacity by 2050 – urban insets




*Source: Iowa DOT*

## Safety

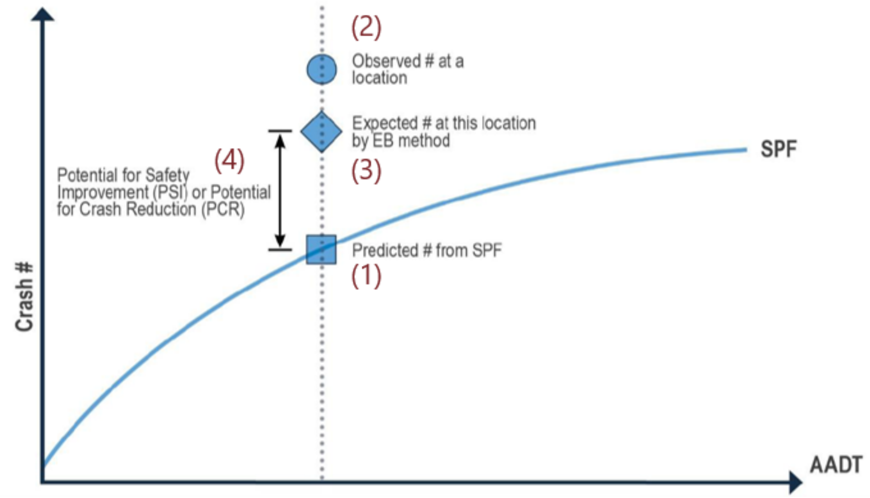
The objective of this analysis was to screen the Primary Highway System for the greatest potential for crash reduction (PCR) on highway segments. The analysis uses a safety performance function (SPF), which is an equation used to predict the average number of crashes per year at a location as a function of exposure and, in some cases, roadway characteristics. SPFs are regression equations that estimate crash frequency as a function of traffic volume and more realistically demonstrate the relationship between crashes and traffic volume.

Figure 5.19 demonstrates how the PCR is calculated. The predicted number of crashes for a given traffic volume is found on the SPF curve (1). For any specific location, the observed number of crashes (2) is likely to be above or below the predicted number calculated by the SPF. The observed crash count is corrected using the Empirical Bayes (EB) method resulting in the expected number of crashes (3) at that location. The difference between the expected number and the predicted number is the PCR (4).

Highway segments were divided into eight classes of roadways for the analysis.

- Divided high speed
- Divided low speed
- Freeway high speed
- Freeway low speed
- Undivided high speed
- Undivided low speed
- Undivided multilane high speed
- Undivided multilane low speed

**Figure 5.19: Potential for crash reduction (PCR) calculation**

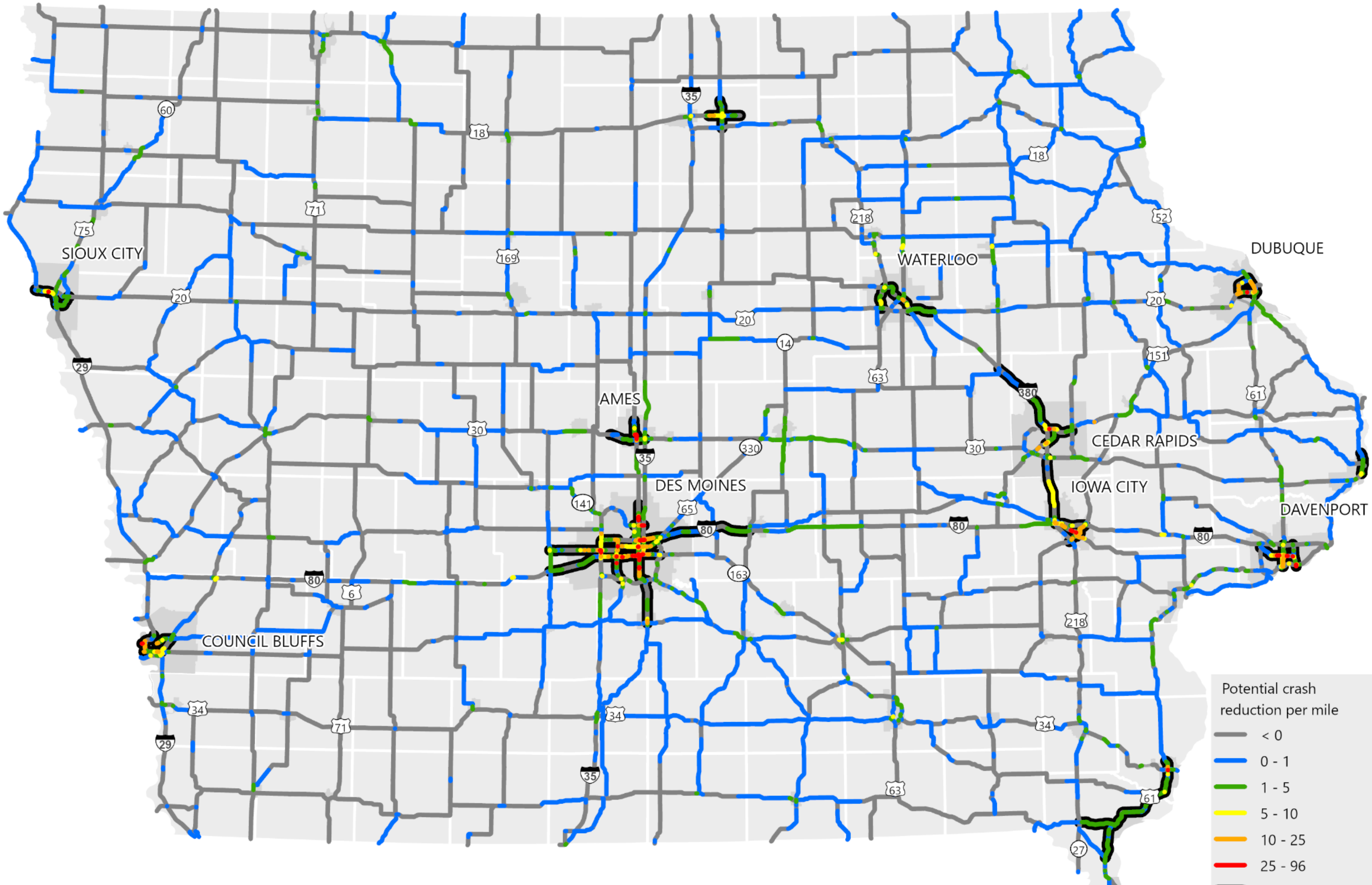



*Source: Iowa DOT Safety Analysis Guide*

A model was developed for each class of roadway to develop individual SPFs in order to identify the PCR based on the roadway and traffic environment. A high PCR indicates a poorly performing roadway and more potential room for improvement. Segments can have negative PCRs, which suggests that they are performing better than predicted. For the purposes of the plan, positive PCR per mile was used to gauge risk, with higher values equating to higher risks and thus more potential for improvements that could help reduce future crashes.

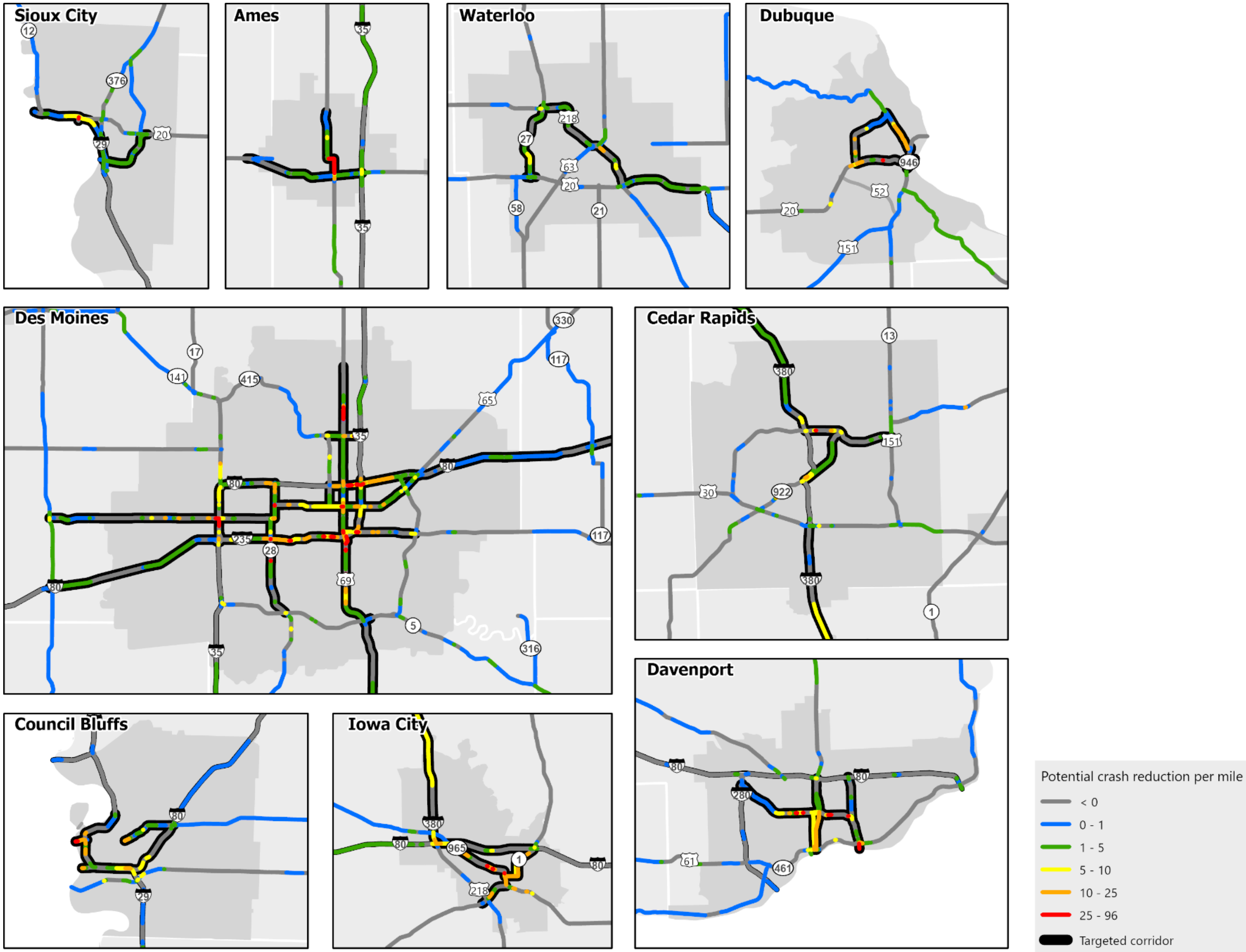
The segment-level PCR output is shown on Figures 5.20 and 5.21. The overall distribution of corridor-level positive PCR per mile ranged from 0.0 to 27.7, with a corridor-level average of 0.7. To identify corridors of most concern from a long-range planning standpoint, corridors that had 1.0 PCR per mile or more were identified, which would mean there is the potential to reduce crashes by at least one per mile throughout the corridor. There are 61 such corridors which are highlighted on Figures 5.20 and 5.21.

Figure 5.20: Potential for crash reduction per mile and corridors targeted for safety improvements – statewide view




*Source: Iowa DOT*

Figure 5.21: Potential for crash reduction per mile and corridors targeted for safety improvements – urban insets




*Source: Iowa DOT*

## Operations

The operations analysis for the highway system was conducted with the Infrastructure Condition Evaluation-Operations (ICE-OPS) tool. ICE-OPS is a system screening that quantifies the relative risk to the safe and reliable operation of the Primary Highway System. The purpose of this screening was to determine which roadways should be considered priorities for operational enhancements.

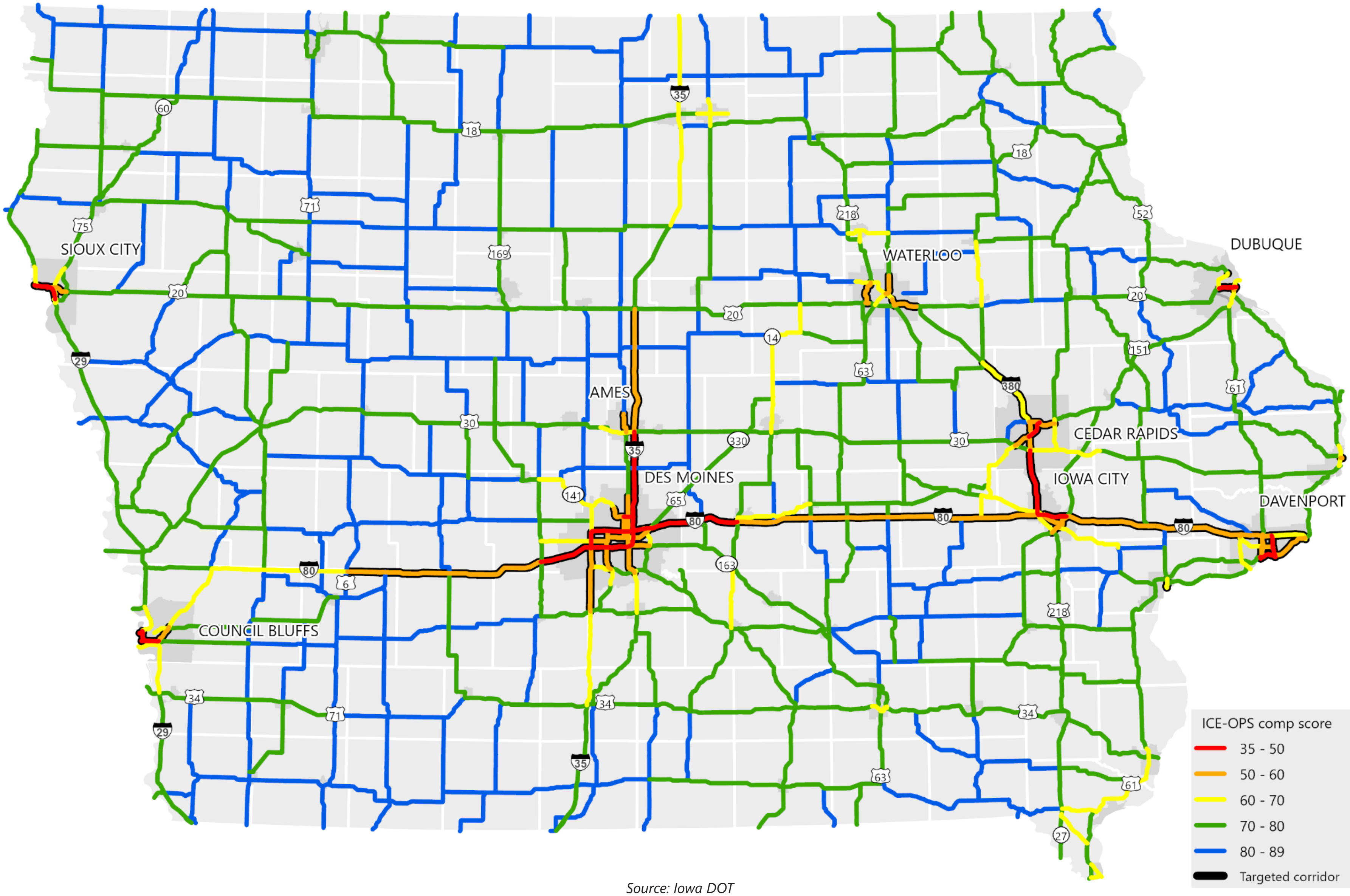
The ICE-OPS tool has a similar structure as the original ICE tool, but with an operations focus. It uses the following ten operations-oriented criteria to rank highway segments.

- Annual average daily traffic (AADT) (20 percent)
- Annual bottleneck duration (15 percent)
- Incident density (15 percent)
- Crash rate (15 percent)
- Buffer time index (10 percent)
- Event center proximity (5 percent)
- Flood event density (5 percent)
- Winter weather sensitive mileage (5 percent)
- Freight network mileage (5 percent)
- ICE infrastructure score (5 percent)

For each segment, the value for each criterion was normalized on a 1 (worst) to 10 (best) scale. Then the ten normalized values were weighted based on the percentages noted above and added together to determine a composite rating for the segment. The composite score had a maximum value of 100, which would mean the highest possible score was assigned for each factor. The normalization and weighting values and process were determined by input from internal stakeholders during the development of the ICE-OPS tool.

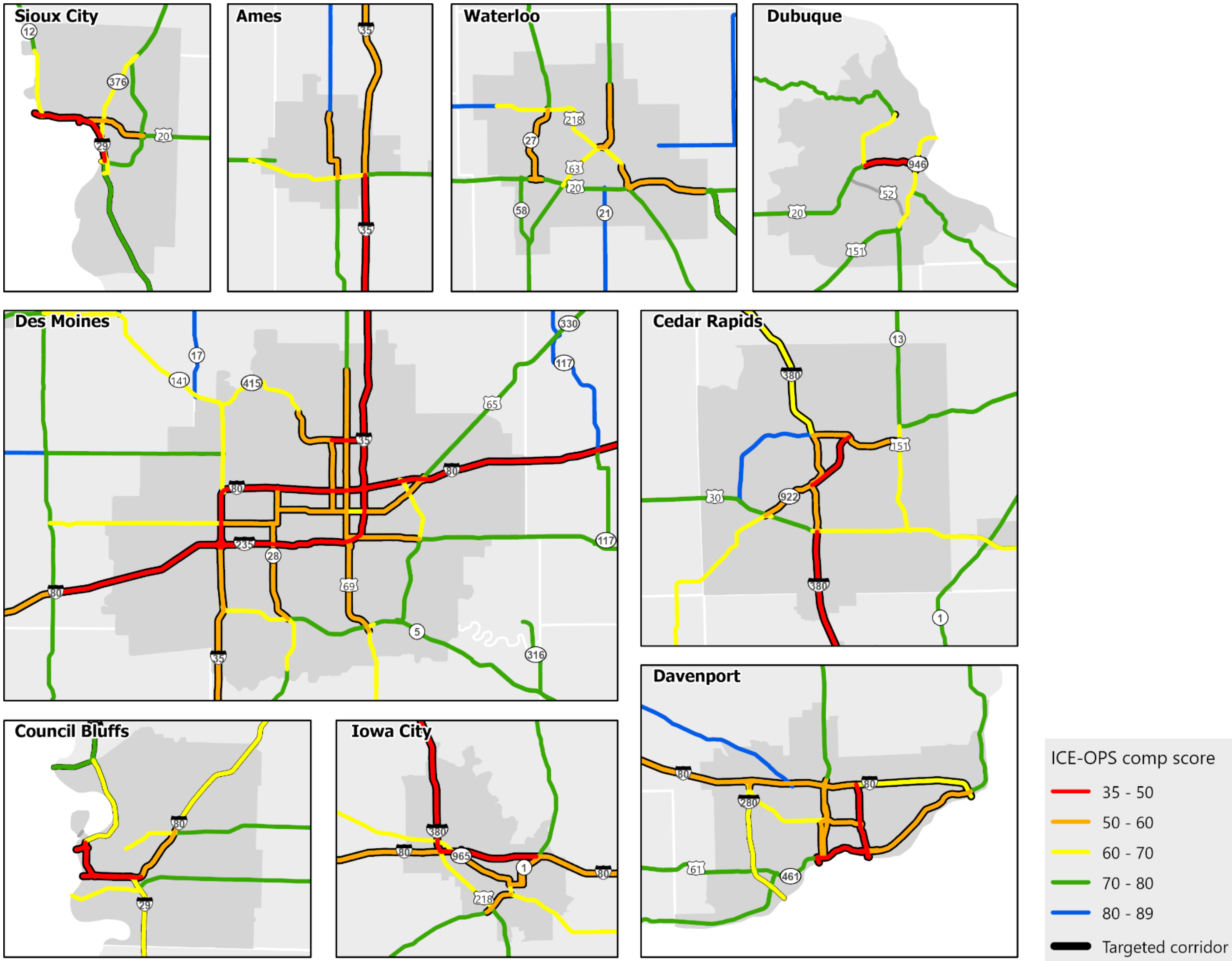
Overall, corridors ranking higher (lower scores) through this analysis are generally in metropolitan areas and along Interstate corridors. The analysis helps identify corridors where there is a greater risk of operational issues and where strategies related to improving the operation of the system may be most beneficial. Figures 5.22 and 5.23 show the results of the ICE-OPS analysis. The overall distribution of corridor-level ICE-OPS composite ratings ranged from 35.6 to 88.2, with a corridor-level average of 73.4. To identify corridors of most concern from a long-range planning standpoint, corridors that had a composite score that was one or more standard deviation below the statewide average were identified. There are 33 such corridors which have a composite score of 51.7 or less and are highlighted on Figures 5.22 and 5.23.

**Figure 5.22: ICE-OPS composite scores and corridors targeted for operations improvements – statewide view**




*Source: Iowa DOT*

Figure 5.23: ICE-OPS composite scores and corridors targeted for operations improvements – urban insets




*Source: Iowa DOT*

## Flood Resiliency

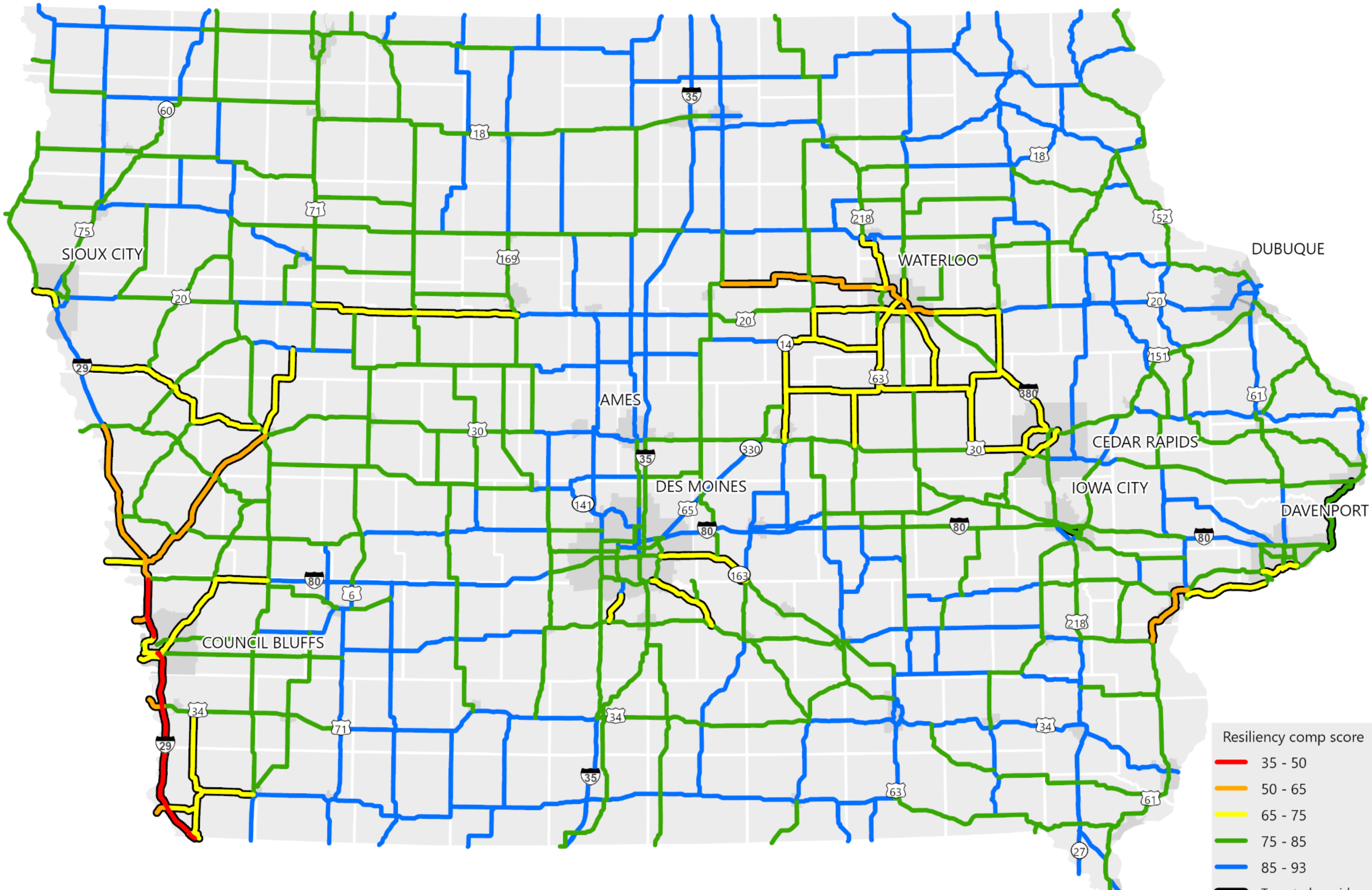
The resiliency analysis focused on screening the Primary Highway System to identify locations vulnerable to a 100-year flood event. The analysis was comprised of three broad components under which seven individual factors were considered, with the goal of developing a composite metric to assess Iowa's vulnerability to flooding.

- **Robustness component**: analyzes the vulnerability of the highway network to a 100-year flood event based on the 100-year floodplain boundary, whether past flooding events have occurred, and roadway shoulder data to estimate how sensitive a specific location may be to flooding.
    - 100-year flood exposure and bridge scour (45 percent)
    - Evaluation of past flood events (15 percent)
    - Roadway resistance (10 percent)
- **Redundancy component**: reviews the extent of alternative routes that can be employed in the event that elements of the system lose function.
    - System availability (20 percent)
- **Criticality component**: identifies the most operationally important assets within the system.
    - Federal functional classification (4 percent)
    - Annual average daily truck traffic (4 percent)
    - Social vulnerability index (2 percent)

The data for each attribute were normalized on a 1 (worst) to 10 (best) scale, then combined based on the weighting identified above. This weighting was determined by the Iowa DOT's Resiliency Working Group. The maximum composite score is 100; higher scores indicate greater resiliency towards a 100-year flood event, whereas lower scores indicate greater vulnerability to those events.

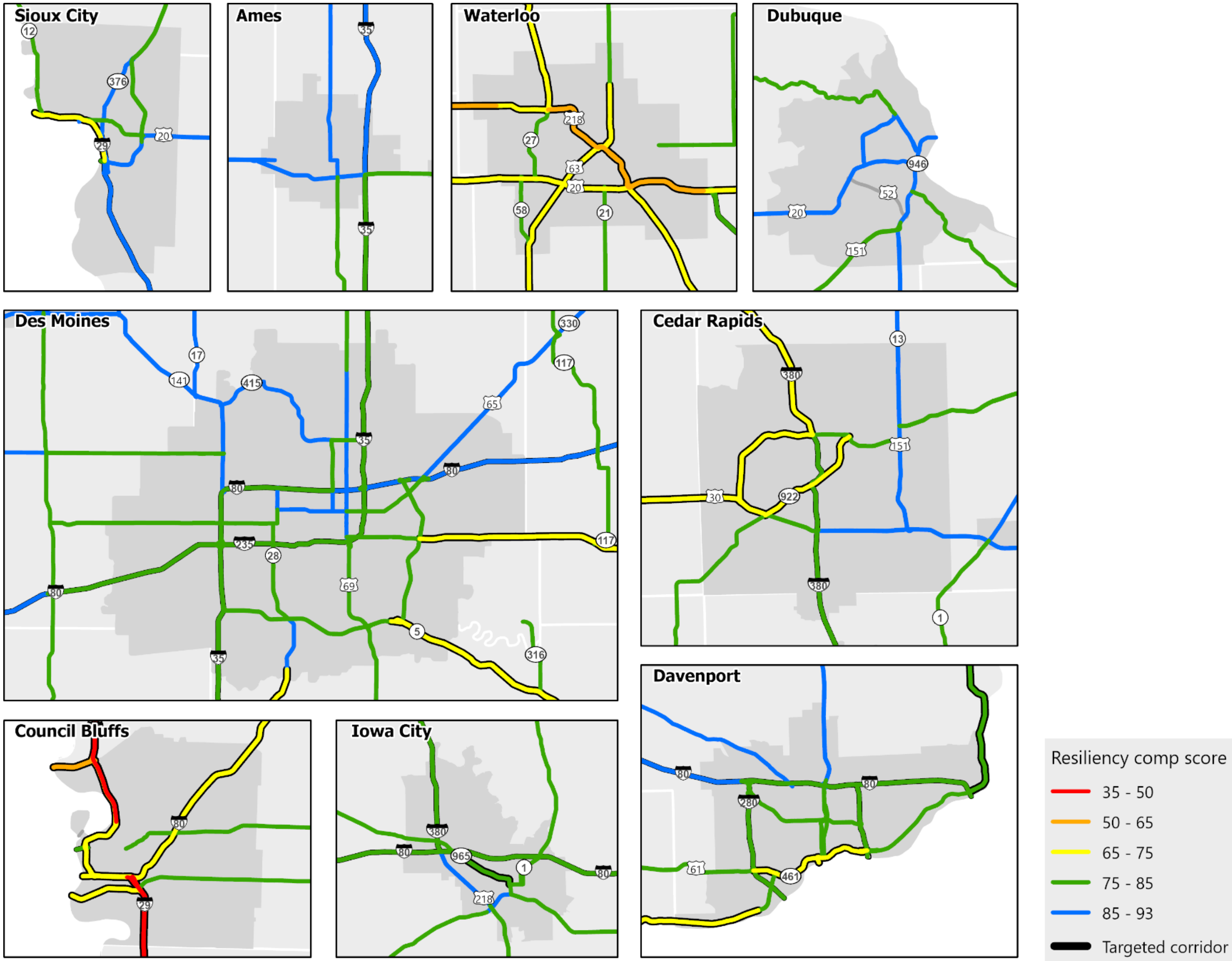
The analysis helps identify corridors where there is a greater risk of flood events and where strategies related to preparedness for possible flooding events and infrastructure improvements to enhance the resiliency of the system may be most beneficial. Figures 5.24 and 5.25 show the results of the flood resiliency analysis. The overall distribution of corridor-level composite ratings ranged from 36.6 to 93.4, with a corridor-level average of 82.4. To identify corridors of most concern from a long-range planning standpoint, corridors that had a composite score that was one or more standard deviation below the statewide average were identified. There are 72 such corridors which have a composite score of 75.1 or less and are highlighted on Figures 5.24 and 5.25.

**Figure 5.24: Flood resiliency analysis composite scores and corridors targeted for resiliency improvements – statewide view**




*Source: Iowa DOT*

Figure 5.25: Flood resiliency analysis composite scores and corridors targeted for resiliency improvements – urban insets




*Source: Iowa DOT*

## Bicyclists and Pedestrians

Another safety-oriented analysis focused specifically on bicyclists and pedestrians utilizing the Primary Highway System. The objective of this analysis was to estimate the relative risk to bicyclists and pedestrians associated with roadway features of the Primary Highway System. In contrast to traditional safety analysis, which focuses on identifying locations of high crash frequency, this systemic safety analysis focuses on roadway characteristics that are associated with higher risk of crashes involving a pedestrian or bicyclist. The main reason for this is the underlying assumption that crashes involving pedestrians and bicyclists are infrequent and broadly spread across the network. Therefore, high concentrations of these crashes are very rare, and relying solely on a traditional safety analysis framework would be ineffective.

To conduct the analysis, past crashes involving bicyclists or pedestrians were analyzed to review various roadway characteristics associated with the crash locations. This helped identify attributes that are correlated with a high frequency or rate of that crash type; these risk factors can then be used to identify and prioritize similar roadway locations that have the greatest risk for these types of crashes, whether or not they have a history of bicyclist or pedestrian crashes.

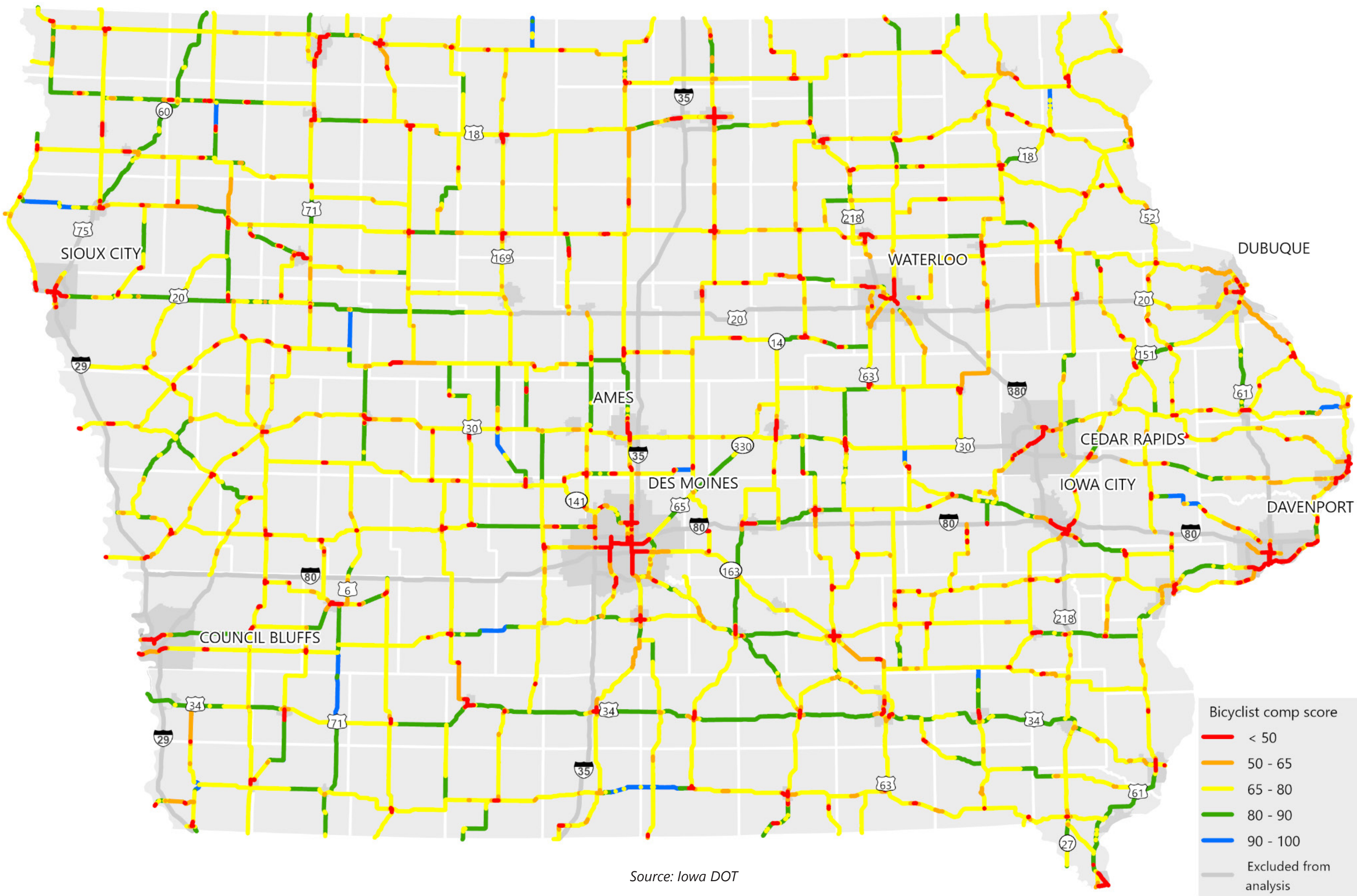
A total of eight attributes were analyzed.

- Annual average daily traffic (AADT)
- Median type
- Number of lanes
- Parking type (only urban)
- Shoulder type
- Shoulder rumble
- Shoulder width
- Speed limit

For each roadway segment, the value for each criterion was normalized on a 1 (worst) to 10 (best) scale. To translate the normalized values to a composite scale, each of the normalized values were weighted equally such that they could be added together to determine a composite rating for the segment. The composite score was designed to have a maximum value of 100, which would mean the highest possible score was assigned for each factor. The lower the composite score, the higher the risk.

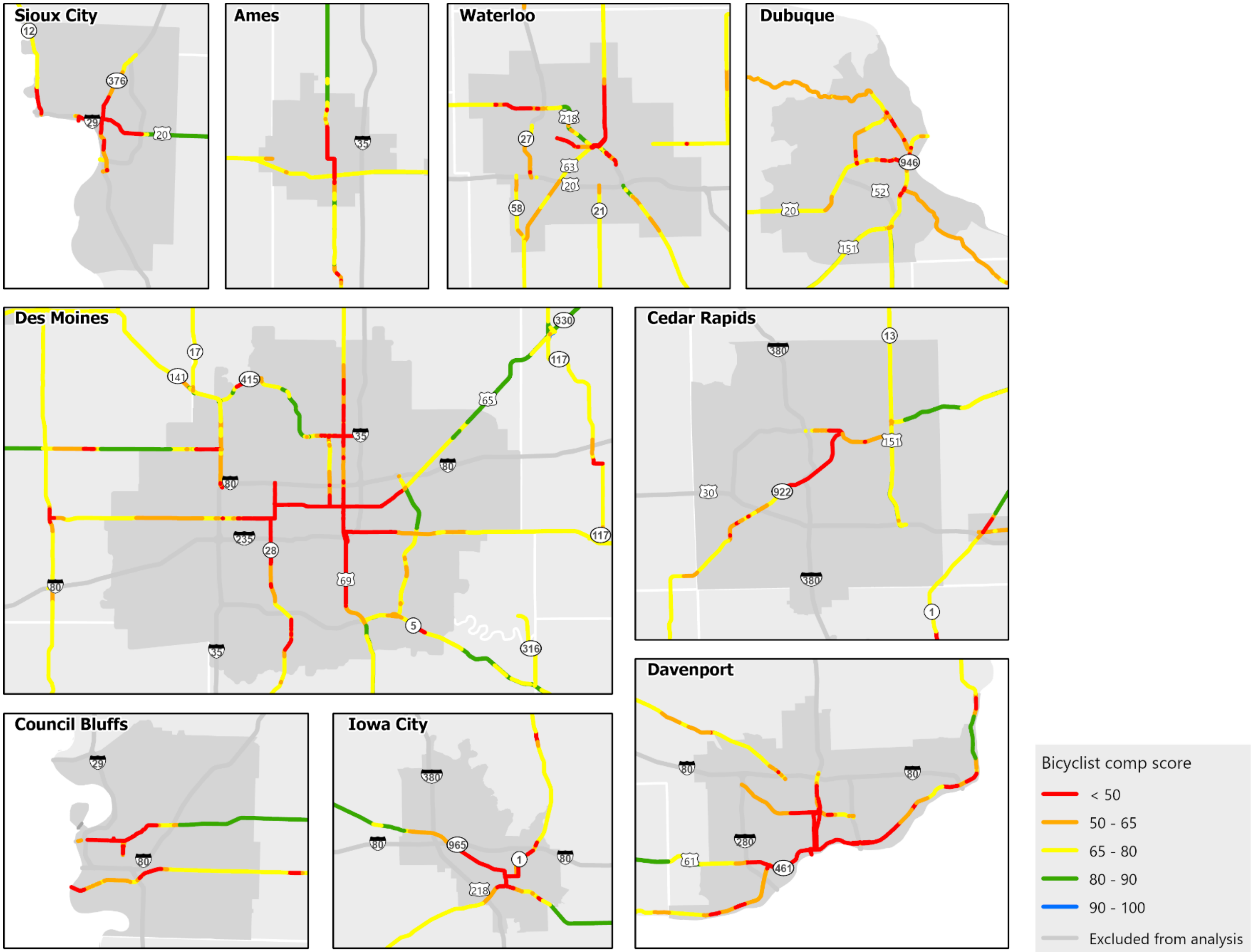
Segment-level output showing composite scores for the bicyclist and pedestrian analysis is shown on Figures 5.26 – 5.29. Interstate highways and minimum-speed corridors are excluded from the analysis. To help provide a sense of corridor-level risk, the segments were also aggregated into the 464 analysis corridors. The matrix shown in Tables 5.4-5.6 identifies the percentage of each corridor's length that is one or more standard deviation below the statewide average for composite scores, calculated separately for bicyclists and pedestrians. For bicyclists, corridor percentages range from 0.0 to 99.7 percent, with an average of 10.0 percent. For pedestrians, corridor percentages also ranged from 0.0 to 99.7 percent, with an average of 12.0 percent. Corridors with higher percentages have more relative length that would be considered higher risk for bicyclists or pedestrians and where improvements may be beneficial in mitigating potential risk.

**Figure 5.26: Composite scores for Primary Highway System segments for bicyclist systemic safety analysis – statewide view**



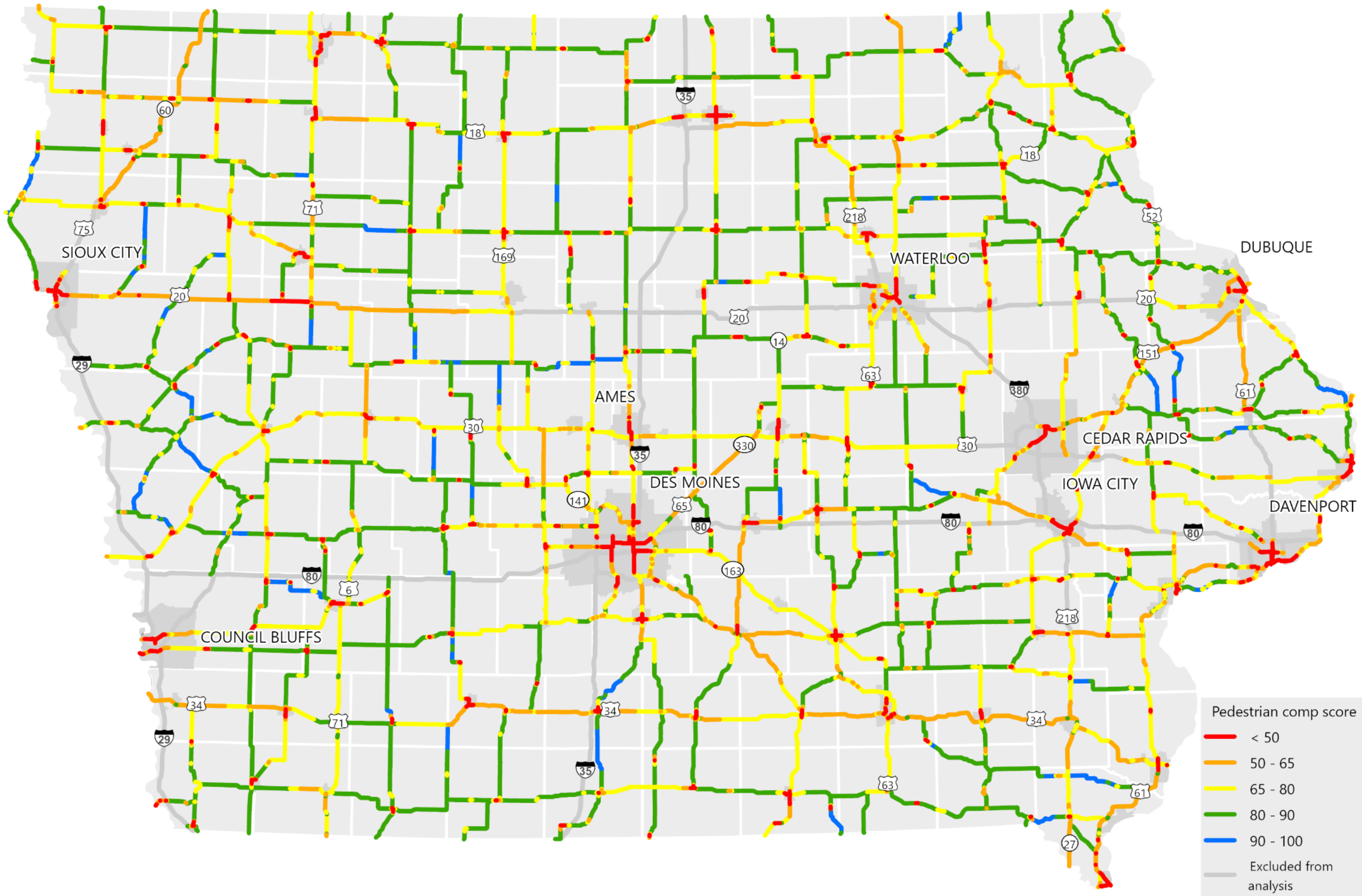

*Source: Iowa DOT*

Figure 5.27: Composite scores for Primary Highway System segments for bicyclist systemic safety analysis – urban insets



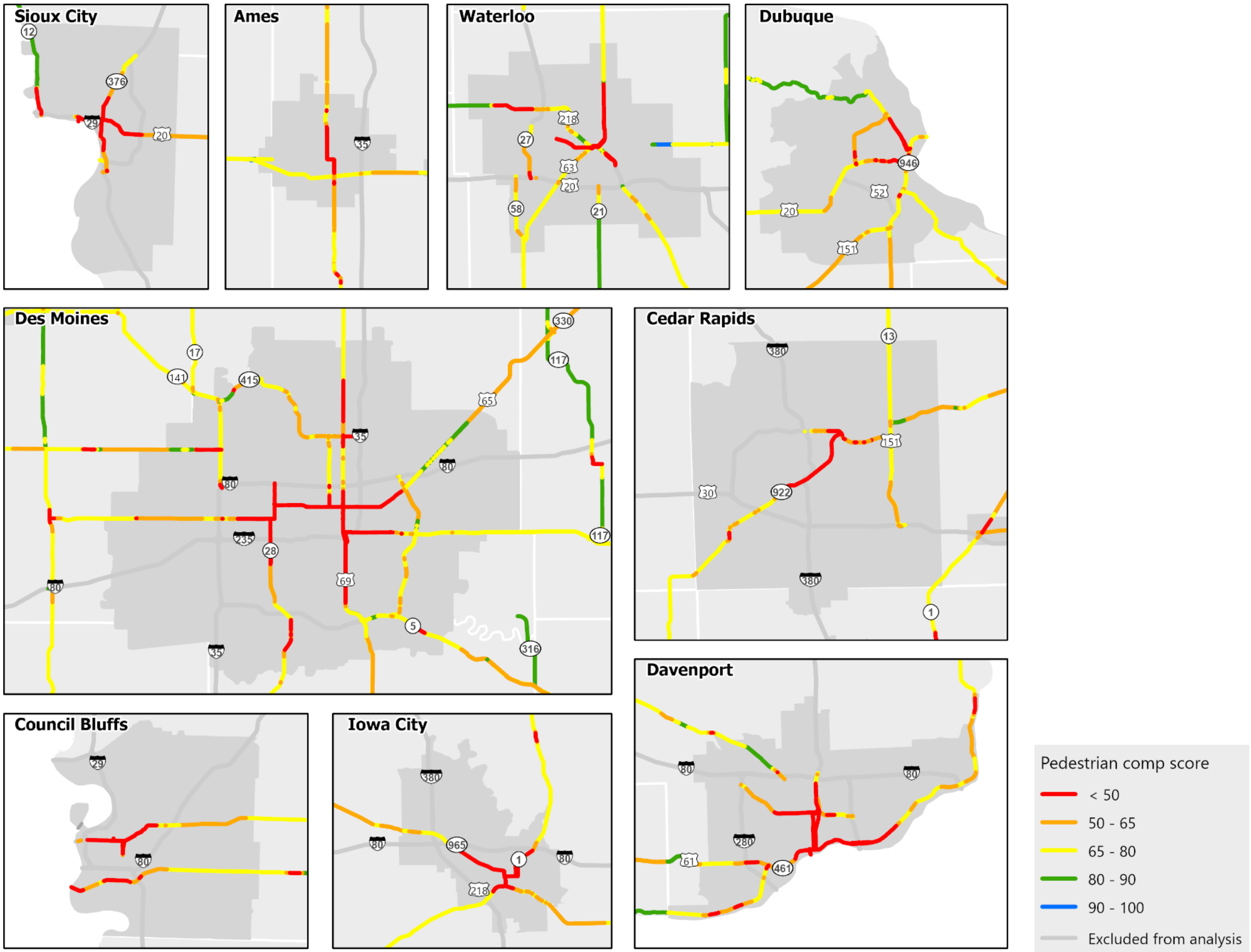

Source: Iowa DOT

Figure 5.28: Composite scores for Primary Highway System segments for pedestrian systemic safety analysis – statewide view




*Source: Iowa DOT*

Figure 5.29: Composite scores for Primary Highway System segments for pedestrian systemic safety analysis – urban insets




*Source: Iowa DOT*

# 5.3 Highway Needs and Risks Matrix

In order to provide a comprehensive view of all analysis layers for the entire Primary Highway System, a highway needs and risks matrix was developed. Highways are categorized by Interstate, US, and Iowa routes. Table 5.3 provides a key to help explain what is shown on the matrix.

Table 5.3: Key to highway needs and risks matrix (Tables 5.4 – 5.6)

| Column heading | Description |
|---|---|
| Route | The highway being referenced. Duplicate routes are represented once in the analysis and matrix. Generally, they are in the grouping for the highest route classification (Interstates > US Highways > Iowa Highways) or for the lowest highway number if classifications are the same. |
| Corridor | The termini for the specific analysis corridor. Corridors are shown from west-to-east or south-to-north for each route. |
| County | The county or counties the corridor travels through, listed west-to-east or south-to-north. |
| IMFN | IMFN = Iowa Multimodal Freight Network. The cell is gray if the corridor is on the network. "Partial" is noted if only a portion is on the network. |
| CIN | CIN = Commercial and Industrial Network. The cell is gray if the corridor is on the network. "Partial" is noted if only a portion is on the network. |
| **Pavement Condition** | The cell is red if the corridor is the bottom 25% of corridors for ICE composite score. |
| **Bridge Condition** | The cell is teal if the corridor has one or more bridge in the bottom 5% of bridges by BCI. The numbers are the ranks out of the 216 bridges in the bottom 5%. Numbers appearing in parentheses mean that the two structures are at the same location (e.g., the eastbound and westbound lanes of an Interstate). Numbers followed by "L" mean the structure is owned and maintained by the Iowa DOT but on a local (county or municipal) route. Bridges with the same BCI have the same ranking, meaning some rankings appear multiple times in the matrix. |
| **Bottlenecks** | The cell is green if the corridor has one or more bottleneck identified. The numbers are the ranks out of the 114 bottlenecks. |
| **Super-2** | The cell is orange if the corridor is on a targeted mobility and safety (Super-2) route. A note of "4LC" means that particular corridor is a 4-lane corridor and would not be targeted for Super-2 improvements. |
| **Capacity** | The cell is yellow if the corridor has been identified as a capacity need. "Partial" is noted if only a portion of the corridor was identified as a need. |
| **Safety** | The cell is red if the corridor has been identified as a corridor to target for safety improvements, meaning it had a potential for crash reduction (PCR) of at least one crash per mile. |
| **Operations** | The cell is teal if the corridor has been identified as a corridor to target for operations improvements, meaning it is one or more standard deviation below the statewide average composite score based on the ICE-OPS tool. |
| **Flood Resiliency** | The cell is green if the corridor has been identified as a corridor to target for flood resiliency improvements, meaning it is one or more standard deviation below the statewide average composite score based on the flood resiliency analysis. |
| **Bicyclists** | The cell has a percentage in it if the corridor was included in the systemic analysis; the percentage indicates the percent of the corridor that is one or more standard deviation below the statewide average composite score for bicyclists. The orange data bars are proportional to the percentages. "N/A" means the corridor was partially or fully excluded from the analysis (typically Interstates and minimum-speed facilities). |
| **Pedestrians** | The cell has a percentage in it if the corridor was included in the systemic analysis; the percentage indicates the percent of the corridor that is one or more standard deviation below the statewide average composite score for pedestrians. The yellow data bars are proportional to the percentages. "N/A" means the corridor was partially or fully excluded from the analysis (typically Interstates and minimum-speed facilities). |

**Table 5.4: Highway needs and risks matrix, Interstates**
*(section 1 of 2)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I-29 | MO border to IA 2 | Fremont | | | | | | | | | | | N/A | N/A |
| | IA 2 to US 34 | Fremont, Mills | | | | | | | | | | | N/A | N/A |
| | US 34 to I-80 | Mills, Pottawattamie | | | | | | | | | | | N/A | N/A |
| | I-80 to I-480/US 6 | Pottawattamie | | | | | | | | | | | N/A | N/A |
| | I-480/US 6 to I-680 | Pottawattamie | | | | 211 | | | | | | | N/A | N/A |
| | I-680 to I-880 | Pottawattamie | | | | 21L | | | | | | | N/A | N/A |
| | I-880 to IA 175 | Pottawattamie, Harrison, Monona | | | | 14L, 94, (60, 136) | | | | | | | N/A | N/A |
| | IA 175 to US 20/I-129 | Monona, Woodbury | | | | 96L, 144L, 149L, 151L, 174L, 176L | | | | | | | N/A | N/A |
| | US 20/I-129 to SD border | Woodbury | | | | | 109 | | | | | | N/A | N/A |
| I-35 | MO border to US 34 | Decatur, Clarke | | | | | | | | | | | N/A | N/A |
| | US 34 to IA 92 | Clarke, Warren | | | | 66L, 70L, 100, 211 | | | | | | | N/A | N/A |
| | IA 92 to IA 5 | Warren, Polk | | | | 7L, 68L | | | | | | | N/A | N/A |
| | IA 5 to W mixmaster | Polk | | | | | | | Partial | | | | N/A | N/A |
| | E mixmaster to IA 160 | Polk | | | | | | | | | | | N/A | N/A |
| | IA 160 to US 30 | Polk, Story | | | | | | | | | | | N/A | N/A |
| | US 30 to US 20 | Story, Hamilton | | | | | | | Partial | | | | N/A | N/A |
| | US 20 to IA 3 | Hamilton, Wright, Franklin | | | | | | | | | | | N/A | N/A |
| | IA 3 to US 18 | Franklin, Cerro Gordo | | | | | | | | | | | N/A | N/A |
| | US 18 to MN border | Cerro Gordo, Worth | | | | | | | | | | | N/A | N/A |
| I-74 | IL border to I-80 | Scott | | | | | 110 | | | | | | N/A | N/A |

**Table 5.4: Highway needs and risks matrix,**
Interstates
*(section 2 of 2)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I-80 | NE border to E jct I-29 | Pottawattamie | ■ | | ■ | | | | | ■ | ■ | ■ | N/A | N/A |
| | E jct I-29 to US 6 | Pottawattamie | ■ | | ■ | 55 | 99 | | | ■ | ■ | ■ | N/A | N/A |
| | US 6 to US 59 | Pottawattamie | ■ | | | | 99 | | | | | ■ | N/A | N/A |
| | US 59 to US 6/US 71 | Pottawattamie, Cass | ■ | | ■ | 55, 96, 104 | | | | | | | N/A | N/A |
| | US 6/US 71 to US 169 | Cass, Adair, Madison, Dallas | ■ | | ■ | 81, 116, 171L, 182, 211L | | | Partial | | ■ | | N/A | N/A |
| | US 169 to W mixmaster | Dallas, Polk | ■ | | ■ | 167L | | | ■ | ■ | ■ | | N/A | N/A |
| | W mixmaster to US 6 | Polk | ■ | | ■ | | | | ■ | ■ | ■ | | N/A | N/A |
| | US 6 to IA 141 | Polk | ■ | | ■ | | | | ■ | ■ | ■ | | N/A | N/A |
| | IA 141 to IA 28 | Polk | ■ | | ■ | | 68 | | ■ | ■ | ■ | | N/A | N/A |
| | IA 28 to IA 415 | Polk | ■ | | ■ | | 68, 89 | | ■ | | ■ | | N/A | N/A |
| | IA 415 to E mixmaster | Polk | ■ | | ■ | | 89 | | ■ | ■ | ■ | | N/A | N/A |
| | E mixmaster to IA 14 | Polk, Jasper | ■ | | ■ | (81, 191), 81L, 108L, 154L, 188L, 199L | | | ■ | ■ | ■ | | N/A | N/A |
| | IA 14 to US 63 | Jasper, Poweshiek | ■ | | ■ | | | | ■ | | ■ | | N/A | N/A |
| | US 63 to US 151 | Poweshiek, Iowa | ■ | | | 52L | | | ■ | | ■ | | N/A | N/A |
| | US 151 to I-380 | Iowa, Johnson | ■ | | | | | | ■ | | ■ | | N/A | N/A |
| | I-380 to IA 1 | Johnson | ■ | | ■ | 93L | | | ■ | ■ | ■ | | N/A | N/A |
| | IA 1 to US 6 | Johnson, Cedar | ■ | | ■ | 90L, 179L | | | ■ | | ■ | | N/A | N/A |
| | US 6 to I-280 | Cedar, Scott | ■ | | ■ | 47L, 159L, 191L | | | ■ | | ■ | | N/A | N/A |
| | I-280 to I-74 | Scott | ■ | | | 52L, 75L, 92L | | | ■ | | ■ | | N/A | N/A |
| | I-74 to IL border | Scott | ■ | | | 45, 80L, 118L | | | ■ | | ■ | | N/A | N/A |
| I-129 | NE border to I-29 | Woodbury | ■ | | | 120 | | | | | | | N/A | N/A |
| I-235 | W mixmaster to IA 28 | Polk | | | | | | | ■ | ■ | ■ | | N/A | N/A |
| | IA 28 to US 69 | Polk | | | ■ | | | | ■ | ■ | ■ | | N/A | N/A |
| | US 69 to E mixmaster | Polk | | | | | | | ■ | ■ | ■ | | N/A | N/A |
| I-280 | IL border to US 61/IA 146 | Scott | ■ | | ■ | | | | | | | | N/A | N/A |
| | US 61/IA 146 to I-80 | Scott | ■ | | | 33, 39, 68 | | | | | | | N/A | N/A |
| I-380 | I-80 to US 30 | Johnson, Linn | ■ | | ■ | | | | ■ | ■ | ■ | | N/A | N/A |
| | US 30 to IA 100 | Linn | ■ | | ■ | 120, 147 | | | ■ | | ■ | | N/A | N/A |
| | IA 100 to IA 150 | Linn, Benton | ■ | | | | | | | ■ | ■ | ■ | N/A | N/A |
| | IA 150 to E jct US 20 | Benton, Buchanan, Black Hawk | ■ | | | | | | | | | | N/A | N/A |
| | E jct US 20 to Mitchell Ave | Black Hawk | ■ | | | | | | | ■ | ■ | ■ | N/A | N/A |
| I-480 | NE border to I-29 | Pottawattamie | ■ | | ■ | 8, 154 | | | | ■ | ■ | | N/A | N/A |
| I-680 | NE border to I-29 | Pottawattamie | ■ | | | 199 | | | | | | ■ | N/A | N/A |
| I-880 | I-29 to I-80 | Pottawattamie | ■ | | | 179 | | | | | | | N/A | N/A |

**Table 5.5: Highway needs and risks matrix,**
US routes
*(section 1 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: 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% |
| US 18 | SD border to US 75 | Lyon, Sioux | | | | | 101 | | | | | | 1.5% | 2.4% |
| | US 75 to IA 60 | Sioux, O'Brien | | | | | 101 | | | | | | 4.6% | 9.8% |
| | IA 60 to US 71 | O'Brien, Clay | | | | 62, 211 | | | | | | | 4.6% | 38.7% |
| | US 71 to US 169 | Clay, Palo Alto, Kossuth | | | | 32, 130, 201 | | | | | | | 6.8% | 23.8% |
| | US 169 to I-35 | Kossuth, Hancock, Cerro Gordo | | | | | | | | | | | 0.2% | 3.5% |
| | I-35 to US 65 | Cerro Gordo | | | | | | 4LC | | | | | N/A | N/A |
| | US 65 to US 218 | Cerro Gordo, Floyd | | | | | | 4LC | | | | | 0.3% | 53.7% |
| | US 218 to US 63 | Floyd, Chickasaw | | | | | | | | | | | 11.9% | 7.2% |
| | US 63 to IA 150 | Chickasaw, Fayette | | | | | | | | | | | 1.4% | 31.5% |
| | IA 150 to US 52 | Fayette, Clayton, Allamakee | | | | | | | | | | | 3.2% | 3.2% |
| | US 52 to IA 76 | Allamakee, Clayton | | | | | 27, 85 | | | | | | 0.3% | 2.9% |

## Table 5.5: Highway needs and risks matrix, US routes
*(section 2 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 20 | I-29 to US 75 | Woodbury | | | | | | | | | | | N/A | N/A |
| | US 75 to IA 140 | Woodbury | | | | | | | | | | | 0.0% | 63.8% |
| | IA 140 to US 59 | Ida, Woodbury | | | | | | | | | | | 0.1% | 34.0% |
| | US 59 to US 71 | Ida, Sac | | | | | | | | | | | 0.0% | 73.4% |
| | US 71 to US 169 | Sac, Calhoun, Webster | | | | | | | | | | | 0.0% | 77.2% |
| | US 169 to I-35 | Webster, Hamilton | | | | | | | | | | | N/A | N/A |
| | I-35 to US 65 | Hamilton, Hardin | | | | | | | | | | | N/A | N/A |
| | US 65 to IA 14 | Hardin, Grundy | | | | | | | | | | | N/A | N/A |
| | IA 14 to IA 27 | Grundy, Black Hawk | | | | | | | | | | | N/A | N/A |
| | IA 27 to US 218 | Black Hawk | | | | | | | | | | | N/A | N/A |
| | I-380 to IA 150 | Black Hawk, Buchanan | | | | | | | | | | | N/A | N/A |
| | IA 150 to IA 13 | Buchanan, Delaware | | | | | | | | | | | N/A | N/A |
| | IA 13 to IA 136 | Delaware, Dubuque | | | | | | | | | | | N/A | N/A |
| | IA 136 to Northwest Arterial | Dubuque | | | | | 90 | | Partial | | | | 5.3% | 8.6% |
| | Northwest Arterial to IL border | Dubuque | | | | 13, 104 | 70, 84, 90 | | | | | | 10.4% | 12.1% |
| US 30 | NE border to I-29 | Harrison | | | | 25, 67, 125 | | | | | | | 8.1% | 1.8% |
| | I-29 to US 59 | Harrison, Crawford | | | | 10, 114, 169 | 52 | | | | | | 5.1% | 1.6% |
| | US 59 to US 71 | Crawford, Carroll | | | | | 61 | | | | | | 3.2% | 4.3% |
| | US 71 to US 169 | Carroll, Greene, Boone | | | | 36, 72, 89 | 61 | | | | | | 9.6% | 3.8% |
| | US 169 to IA 930 | Boone | | | | (133, 165) | 57 | 4LC | | | | | 0.9% | 0.4% |
| | IA 930 to I-35 | Boone, Story | | | | (176, 184) | | 4LC | | | | | 0.4% | 0.0% |
| | I-35 to IA 14 | Story, Marshall | | | | | 95 | 4LC | | | | | 0.1% | 5.2% |
| | IA 14 to 3.3 mi E of US 63 | Marshall, Tama | | | | | 95 | 4LC | | | | | 0.1% | 5.2% |
| | 3.3 mi E of US 63 to US 218 | Tama, Benton | | | | 11 | | 4LC | | | | | 0.0% | 0.0% |
| | US 218 to IA 922 | Benton, Linn | | | | | | 4LC | | | | | N/A | N/A |
| | IA 922 to I-380 | Linn | | | | | | 4LC | | | | | N/A | N/A |
| | I-380 to 5.2 mi E of IA 1 | Linn, Cedar | Partial | | | 45 | | 4LC | | | | | N/A | N/A |
| | 5.2 mi E of IA 1 to US 61 | Cedar, Clinton | | | | 15, 122, 171 | | | | | | | 0.8% | 1.6% |
| | US 61 to IL border | Clinton | | | | 4 | 105 | 4LC | | | | | 2.8% | 3.5% |

## Table 5.5: Highway needs and risks matrix, US routes *(section 3 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 34 | NE border to I-29 | Mills | | ■ | | | | 4LC | | | | ■ | 0.0% | 52.3% |
| US 34 | I-29 to 0.8 mi W of US 275 | Mills | | ■ | | | 41 | 4LC | | | | | 0.0% | 86.6% |
| US 34 | 0.8 mi W of US 275 to US 59 | Mills | | ■ | ■ | 15 | | ■ | | | | | 0.0% | 27.6% |
| US 34 | US 59 to US 71 | Mills, Montgomery | | ■ | | 184, 206, 206 | 63 | ■ | | | | | 2.7% | 18.6% |
| US 34 | US 71 to IA 25 | Montgomery, Adams, Union | | ■ | | 77 | | ■ | | | | | 2.3% | 2.9% |
| US 34 | IA 25 to I-35 | Union, Clarke | | ■ | | 100 | | ■ | | | | | 3.8% | 18.3% |
| US 34 | I-35 to US 65 | Clarke, Lucas | | ■ | | | | ■ | | | | | 6.9% | 7.1% |
| US 34 | US 65 to IA 5 | Lucas, Monroe | | ■ | ■ | 38, 81, 159 | 62 | ■ | | | | | 1.5% | 4.5% |
| US 34 | IA 5 to Ottumwa W CL | Monroe, Wapello | | ■ | | 59, 139 | 62 | ■ | | | | | 0.1% | 37.7% |
| US 34 | Ottumwa W CL to US 63 | Wapello | | ■ | ■ | | 44 | 4LC | | | | | 26.7% | 10.8% |
| US 34 | US 63 to IA 1 | Wapello, Jefferson | ■ | ■ | | | | 4LC | | | | | 1.0% | 16.1% |
| US 34 | IA 1 to US 218 | Jefferson, Henry | ■ | ■ | | 22 | | 4LC | | | | | 0.0% | 11.7% |
| US 34 | US 218 to US 61 | Henry, Des Moines | ■ | ■ | | | | 4LC | | | | | 0.7% | 4.6% |
| US 34 | US 61 to IL border | Des Moines | ■ | ■ | | | | 4LC | | | | | 0.0% | 0.3% |
| US 52 | IL border to US 61 | Jackson, Dubuque | | | | | 9 | | | | | | 43.0% | 0.9% |
| US 52 | Jct US 52/61/151 to US 20* | Dubuque | | ■ | | | | | | | | | | |
| US 52 | US 20 to IA 3/IA 136 | Dubuque | | ■ | | | 48 | | | | | | 6.5% | 0.8% |
| US 52 | IA 3/IA 136 to E jct US 18 | Dubuque, Clayton | | ■ | | | 48, 85 | | | | | | 9.0% | 4.9% |
| US 52 | W jct US 18 to IA 9 | Allamakee, Winneshiek | | ■ | | | 8 | | | | | | 2.7% | 0.3% |
| US 52 | IA 9 to MN border | Winneshiek | | ■ | | 159 | | | | | | | 0.0% | 0.0% |
| US 59 | MO border to IA 2 | Fremont, Page | | | ■ | | | | | | | | 0.0% | 0.0% |
| US 59 | IA 2 to US 34 | Fremont, Page, Mills | | | | 27 | | | | | | | 7.9% | 4.9% |
| US 59 | US 34 to I-80 | Mills, Pottawattamie | | | ■ | 79, 96, 104, 154, 159, (174, 206) | | | | | | | 3.7% | 4.2% |
| US 59 | I-80 to US 30 | Pottawattamie, Shelby, Crawford | ■ | | ■ | 77, 129, (174, 206) | | | | | | | 0.0% | 0.0% |
| US 59 | US 30 to US 20 | Crawford, Ida | ■ | | | | 82 | | | | | | 3.5% | 2.1% |
| US 59 | US 20 to IA 3 | Ida, Cherokee | ■ | | | | | | | | | | 11.6% | 15.3% |
| US 59 | IA 3 to US 18 | Cherokee, O'Brien | ■ | | | | | | | | | | 22.0% | 1.3% |
| US 59 | US 18 to MN border | O'Brien, Osceola | | | ■ | | | | | | | | 0.0% | 0.0% |

*Due to its recent construction, data was not available to analyze for this corridor.

**Table 5.5: Highway needs and risks matrix, US routes**
*(section 4 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 61 | MO border to US 218 | Lee | | | | | 40, 71 | | | | | | 2.0% | 51.8% |
| US 61 | US 218 to IA 2 | Lee | | | | | 71 | | | | | | 0.0% | 86.5% |
| US 61 | IA 2 to Burlington N CL | Lee, Des Moines | | | | | 60 | | | | | | 0.2% | 84.3% |
| US 61 | Burlington N CL to IA 92 | Des Moines, Louisa | | | | 72, 191 | | | | | | | 0.8% | 0.8% |
| US 61 | IA 92 to IA 38 | Louisa, Muscatine | | | | | 4, 29, 55 | | | | | | 0.0% | 22.4% |
| US 61 | IA 38 to I-280 | Muscatine, Scott | | | | | 55 | | | | | | 3.1% | 64.4% |
| US 61 | I-80 to US 30 | Scott, Clinton | | | | 124 | | | Partial | | | | N/A | N/A |
| US 61 | US 30 to IA 64 | Clinton, Jackson | | | | | | | | | | | N/A | N/A |
| US 61 | IA 64 to US 151 | Jackson, Dubuque | | | | 149, 182 | | | | | | | 0.0% | 74.4% |
| US 61 | US 151 to US 20 | Dubuque | | | | | 9 | | | | | | 10.5% | 6.9% |
| US 61 | US 20 to WI border | Dubuque | | | | 201 | | | Partial | | | | 11.6% | 11.6% |
| US 63 | MO border to US 34 | Davis, Wapello | | | | 23, 24, 60, 100, 104, 151 | | | | | | | 2.6% | 1.6% |
| US 63 | US 34 to IA 149 | Wapello | | | | | | 4LC | | | | | 0.2% | 0.2% |
| US 63 | IA 149 to IA 92 | Wapello, Mahaska | Partial | | | 81 | | 4LC | | | | | 3.5% | 6.0% |
| US 63 | IA 92 to I-80 | Mahaska, Poweshiek | | | | | | | | | | | 6.3% | 5.6% |
| US 63 | I-80 to US 30 | Poweshiek, Tama | | | | | | | | | | | 6.2% | 5.8% |
| US 63 | US 30 to US 20 | Tama, Black Hawk | | | | | 74 | | | | | | 4.3% | 4.8% |
| US 63 | US 20 to US 218 | Black Hawk | | | | | | 4LC | | | | | 7.8% | 12.2% |
| US 63 | US 218 to Waterloo N CL | Black Hawk | | | | | | 4LC | | | | | 72.1% | 68.4% |
| US 63 | Waterloo N CL to IA 3 | Black Hawk, Bremer | | | | | | 4LC | | | | | 1.5% | 0.0% |
| US 63 | IA 3 to US 18 | Bremer, Chickasaw | | | | | | 4LC | | | | | 0.2% | 5.8% |
| US 63 | US 18 to MN border | Chickasaw, Howard | | | | | | | | | | | 0.6% | 6.0% |
| US 65 | MO border to US 34 | Wayne, Lucas | | | | 50, 140 | | | | | | | 0.0% | 0.0% |
| US 65 | US 34 to IA 92 | Lucas, Warren | | | | 211 | | | Partial | | | | 2.3% | 2.3% |
| US 65 | IA 92 to IA 5 | Warren | | | | | | | | | | | 5.3% | 42.9% |
| US 65 | IA 5 to IA 163 | Warren, Polk | | | | | | | | | | | 11.6% | 7.9% |
| US 65 | IA 163 to I-80 | Polk | | | | | | | | | | | 0.3% | 57.7% |
| US 65 | I-80 to IA 330 | Polk, Jasper | | | | | 33, 56 | | | | | | 0.0% | 55.6% |
| US 65 | IA 330 to US 30 | Jasper, Story | | | | | | | | | | | 0.0% | 1.0% |
| US 65 | US 30 to US 20 | Story, Hardin | | | | | | | | | | | 0.0% | 0.0% |
| US 65 | US 20 to IA 3 | Hardin, Franklin | | | | | 112 | | | | | | 12.6% | 5.6% |
| US 65 | IA 3 to US 18 | Franklin, Cerro Gordo | | | | 116 | | | | | | | 6.9% | 5.0% |
| US 65 | US 18 to Mason City N CL | Cerro Gordo | | | | | 96 | | | | | | 21.2% | 22.1% |
| US 65 | Mason City N CL to MN border | Cerro Gordo, Worth | | | | | | | | | | | 3.5% | 0.0% |

**Table 5.5: Highway needs and risks matrix,**
US routes
*(section 5 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 67 | IL border to I-74 | Scott | | | | 2, 136L | 93, 107, 110 | | | | | | 58.9% | 58.9% |
| | I-74 to I-80 | Scott | | Partial | | | 110 | | | | | | 30.8% | 14.6% |
| | I-80 to US 30 | Scott, Clinton | | | | | | | | | | | 7.1% | 4.3% |
| | US 30 to Clinton N CL | Clinton | | | | | 98, 105 | | | | | | 33.7% | 33.7% |
| | Clinton N CL to US 52 | Clinton, Jackson | | | | | | | | | | | 0.0% | 0.0% |
| US 69 | MO border to US 34 | Decatur, Clarke | | | | 18 | | | | | | | 4.1% | 0.3% |
| | US 34 to US 65 | Clarke, Warren | | | | | | | | | | | 36.6% | 0.6% |
| | IA 5 to I-235 | Warren, Polk | | | | 42, 48 | 6, 25, 91 | | | | | | 19.1% | 64.9% |
| | I-235 to I-35/80 | Polk | | | | | 31 | | | | | | 91.6% | 85.6% |
| | I-35/80 to Ankeny N CL | Polk | | | | | 3, 38 | | | | | | 41.6% | 22.0% |
| | Ankeny N CL to US 30 | Polk, Story | | | | | | | Partial | | | | 1.9% | 4.5% |
| | US 30 to Ames N CL | Story | | | | 110L | 114 | | | | | | 61.1% | 66.2% |
| | Ames N CL to US 20 | Story, Hamilton | | | | | 86 | | Partial | | | | 0.3% | 20.8% |
| | US 20 to IA 3 | Hamilton, Wright | | | | | | | | | | | 0.5% | 0.0% |
| | IA 3 to US 18 | Wright, Hancock | | | | 133, 184 | | | | | | | 44.1% | 3.2% |
| | US 18 to MN border | Hancock, Winnebago, Worth | | | | | | | | | | | 2.2% | 2.1% |
| US 71 | MO border to US 34 | Page, Montgomery | | | | | | | | | | | 0.0% | 0.0% |
| | US 34 to I-80 | Montgomery, Cass | | | | 96 | | | | | | | 8.9% | 1.7% |
| | I-80 to US 30 | Cass, Audubon, Carroll | | | | | 61 | | | | | | 0.0% | 0.5% |
| | US 30 to US 20 | Carroll, Sac | | | | | 32, 61 | | | | | | 0.0% | 0.9% |
| | US 20 to IA 3 | Sac, Buena Vista | | | | | | | | | | | 13.5% | 0.3% |
| | IA 3 to US 18 | Buena Vista, Clay | | | | 206 | | | | | | | 2.1% | 3.8% |
| | US 18 to IA 86 | Clay, Dickinson | | | | | 87 | 4LC | | | | | 4.3% | 4.3% |
| | IA 86 to MN border | Dickinson | | | | | 22, 87 | | | | | | 29.2% | 26.1% |
| US 75 | US 20 to IA 60 | Woodbury, Plymouth | | | | 30, 57, 64, 74, 188 | | | | | | | N/A | N/A |
| | IA 60 to US 18 | Plymouth, Sioux | | | | | 101 | | | | | | 8.8% | 8.4% |
| | US 18 to MN border | Sioux, Lyon | | | | | | | | | | | 0.0% | 0.0% |
| US 77 | NE border to I-29 | Woodbury | | | | | 109 | | | | | | 45.1% | 84.5% |
| US 136 | US 61 to IL border | Lee | | | | 81, 201 | 40, 113 | | | | | | 39.8% | 54.8% |
| US 151 | I-80 to US 30 | Iowa, Benton, Linn | | | | | 83 | | Partial | | | | 10.0% | 6.9% |
| | US 30 to IA 13 | Linn | | | | | 10, 19, 76 | | Partial | | | | 1.6% | 18.4% |
| | IA 13 to US 61 | Linn, Jones, Dubuque | | | | | 76 | | | | | | 0.1% | 32.0% |

**Table 5.5: Highway needs and risks matrix,**
US routes
*(section 6 of 6)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 169 | MO border to US 34 | Ringgold, Union | | | | | | | | | | | 1.3% | 0.0% |
| | US 34 to IA 92 | Union, Madison | | | | | | | | | | | 0.0% | 0.0% |
| | IA 92 to I-80 | Madison, Dallas | | | | 211 | | | | | | | 0.0% | 0.0% |
| | I-80 to IA 141 | Dallas | | | ■ | | | | | | | | 1.8% | 1.1% |
| | IA 141 to US 30 | Dallas, Boone | | ■ | | | | | | | | | 0.9% | 0.0% |
| | US 30 to US 20 | Boone, Webster | | ■ | | | | | | | | | 1.1% | 0.4% |
| | US 20 to IA 3 | Webster, Humboldt | | ■ | | | 65, 67 | | | | | | 1.8% | 0.3% |
| | IA 3 to US 18 | Humboldt, Kossuth | | ■ | | | | | | | | | 9.6% | 6.7% |
| | US 18 to MN border | Kossuth | | | | 52 | | | | | | | 1.6% | 0.0% |
| US 218 | US 136 to IA 27 | Lee | | | ■ | | 71, 113 | | | | | | 12.1% | 12.2% |
| | IA 27 to US 34 | Lee, Henry | ■ | ■ | | | | | | | | | 0.1% | 27.2% |
| | US 34 to IA 92 | Henry, Washington | ■ | ■ | ■ | | | | | | | | 0.0% | 10.5% |
| | IA 92 to IA 1 | Washington, Johnson | ■ | ■ | | | 103 | | | | | | N/A | N/A |
| | IA 1 to I-80 | Johnson | ■ | ■ | ■ | | 103 | | | | | | N/A | N/A |
| | US 30 to IA 150 | Benton | | | | | | | | | | ■ | 0.1% | 0.0% |
| | IA 150 to S jct I-380 | Benton, Black Hawk | | | | 151 | 92 | | | | | ■ | 4.2% | 1.1% |
| | Mitchell Ave to IA 27 | Black Hawk | ■ | ■ | ■ | | | | Partial | ■ | | ■ | 2.6% | 6.7% |
| | IA 27 to IA 3 | Black Hawk, Bremer | ■ | ■ | ■ | | | | | | | ■ | 0.5% | 0.0% |
| | IA 3 to US 18 | Bremer, Chickasaw, Floyd | ■ | ■ | ■ | | | | | | | | 0.0% | 0.5% |
| | US 18 to MN border | Floyd, Mitchell | | | | | | | | | | | 4.5% | 2.0% |
| US 275 | MO border to US 34 | Fremont, Mills | | | | | | | | | | ■ | 25.1% | 0.0% |
| | I-29 to NE border | Pottawattamie | | | | | 14 | | | | | ■ | 13.2% | 4.3% |

**Table 5.6: Highway needs and risks matrix,**
IA routes
*(section 1 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 1 | IA 2 to US 34 | Van Buren, Jefferson | | | | 176, 206 | | | | | | | 1.5% | 0.0% |
| | US 34 to IA 92 | Jefferson, Keokuk, Washington | | | | | 100 | | | | | | 3.1% | 2.4% |
| | IA 92 to Iowa City S CL | Washington, Johnson | | | | | 47 | | | | | | 0.0% | 0.8% |
| | Iowa City S CL to US 6 | Johnson | | ■ | | | 26, 103 | | Partial | ■ | ■ | | 19.3% | 21.5% |
| | US 6 to I-80 | Johnson | | ■ | ■ | | 30, 104, 111 | | Partial | ■ | ■ | | 9.6% | 9.7% |
| | I-80 to US 30 | Johnson, Linn | | | | | | | Partial | | | | 3.3% | 1.1% |
| | US 30 to US 151 | Linn, Jones | | | | | | | | | | | 6.7% | 6.3% |
| IA 2 | NE border to I-29 | Fremont | ■ | ■ | | | | | | | | ■ | 15.2% | 29.9% |
| | I-29 to US 59 | Fremont | | | | 122, 154, 159 | | | | | | ■ | 31.3% | 2.1% |
| | US 59 to US 71 | Fremont, Page | | | | | | | | | | | 0.0% | 12.7% |
| | US 71 to US 169 | Page, Taylor, Ringgold | | | | | | | | | | | 0.0% | 0.0% |
| | US 169 to I-35 | Ringgold, Decatur | | | | | | | | | | | 0.5% | 0.0% |
| | I-35 to US 65 | Decatur, Wayne | | | | | | | | | | | 2.7% | 0.0% |
| | US 65 to IA 5 | Wayne, Appanoose | | | | | | | | | | | 9.4% | 4.5% |
| | IA 5 to US 63 | Appanoose, Davis | | | | | | | | | | | 15.5% | 0.0% |
| | US 63 to US 218 | Davis, Van Buren, Lee | | | | | | | | | | | 3.7% | 0.7% |
| | US 218 to US 61 | Lee | | | ■ | | | | | ■ | | | 5.0% | 0.0% |
| IA 3 | NE border to US 75 | Plymouth | | | | | | | | | | | 0.2% | 3.9% |
| | US 75 to US 59 | Plymouth, Cherokee | | | ■ | 100 | | | | | | | 26.1% | 2.5% |
| | US 59 to US 71 | Cherokee, Buena Vista | | | | 125 | | | | | | | 2.3% | 0.0% |
| | US 71 to US 169 | Buena Vista, Pocahontas, Humboldt | | | | | | | | | | | 3.3% | 2.0% |
| | US 169 to I-35 | Humboldt, Wright, Franklin | | | | | | | | | | | 5.5% | 5.5% |
| | I-35 to US 65 | Franklin | | | ■ | | | | | | | | 10.7% | 10.7% |
| | US 65 to US 218 | Franklin, Butler, Bremer | | | | 159 | | | | | | | 2.8% | 0.7% |
| | US 218 to US 63 | Bremer | | | | 12 | | | | | | | 12.8% | 12.8% |
| | US 63 to IA 150 | Bremer, Fayette | | | | | | | | | | | 0.0% | 0.0% |
| | IA 150 to IA 13 | Fayette, Clayton | | | | | | | | | | | 8.2% | 6.0% |
| | IA 13 to IA 136 | Clayton, Delaware, Dubuque | | | | | 48 | | | | | | 0.0% | 0.0% |
| | IA 136 to Northwest Arterial | Dubuque | | | | | 48, 51 | | | | | | 43.7% | 0.0% |

## Table 5.6: Highway needs and risks matrix, IA routes
*(section 2 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks | | Needs | | | | | Risks | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IMFN | CIN | Pavement Condition | Bridge Condition | Bottlenecks | Super-2 | Capacity | Safety | Operations | Flood Resiliency | Bicyclists | Pedestrians |
| IA 4 | IA 44 to IA 141 | Guthrie | | | | | 18 | | | | | | 0.0% | 0.0% |
| | IA 141 to US 30 | Guthrie, Greene | | | | | | | | | | | 12.6% | 12.6% |
| | US 30 to US 20 | Greene, Calhoun | | | | | | | | | | | 9.1% | 0.0% |
| | US 20 to IA 3 | Calhoun, Pocahontas | | | | | | | | | | | 4.5% | 0.1% |
| | IA 3 to US 18 | Pocahontas, Palo Alto | | | | | | | | | | | 3.2% | 1.7% |
| | US 18 to IA 9 | Palo Alto, Emmet | | | | | | | | | | | 19.3% | 2.8% |
| | IA 9 to MN border | Emmet | | | | | | | | | | | 5.8% | 5.8% |
| IA 5 | MO border to IA 2 | Appanoose | | | | 35, 111 | | | | | | | 9.8% | 9.3% |
| | IA 2 to US 34 | Appanoose, Monroe | | | | 36, 154 | 62 | | | | | | 6.3% | 5.6% |
| | US 34 to E jct IA 92 | Monroe, Marion | | | | | 62 | | | | | | 3.5% | 1.2% |
| | E jct IA 92 to W jct IA 92 | Marion | | | | | 80 | | | | | | 2.5% | 32.2% |
| | W jct IA 92 to US 65 | Marion, Warren, Polk | | | | 125 | 80 | | | | | | 7.9% | 39.2% |
| | US 65 to IA 28 | Warren, Polk | | | | | | | | | | | N/A | N/A |
| | IA 28 to I-35 | Polk | | | | | | | | | | | N/A | N/A |
| IA 7 | IA 3 to US 71 | Cherokee, Buena Vista | | | | | 69 | | | | | | 10.6% | 12.2% |
| | US 71 to US 169 | Buena Vista, Pocahontas, Calhoun, Webster | | | | 165, 184 | 65 | | | | | | 2.1% | 0.0% |
| IA 8 | US 63 to US 218 | Tama, Benton | | | | | | | | | | | 0.0% | 0.0% |
| IA 9 | SD border to IA 60 | Lyon, Osceola | | | | | | | | | | | 3.9% | 2.1% |
| | IA 60 to US 71 | Osceola, Dickinson | | | | 62 | 22, 97 | | | | | | 2.4% | 1.3% |
| | US 71 to US 169 | Dickinson, Emmet, Kossuth | | | | | | | | | | | 4.0% | 4.5% |
| | US 169 to I-35 | Kossuth, Winnebago, Worth | | | | 179 | | | | | | | 2.8% | 1.0% |
| | I-35 to US 63 | Worth, Mitchell, Howard | | | | | | | | | | | 2.3% | 0.4% |
| | US 63 to Decorah E CL | Howard, Winneshiek | | | | 27 | | | | | | | 6.5% | 5.1% |
| | Decorah E CL to IL border | Winneshiek, Allamakee | | | | 3 | | | | | | | 5.7% | 3.5% |
| IA 10 | NE border to IA 60 | Sioux | | | | | | | | | | | 2.5% | 2.5% |
| | IA 60 to US 71 | Sioux, O'Brien, Clay | | | | | | | | | | | 1.3% | 0.6% |
| | US 71 to IA 4 | Buena Vista, Pocahontas | | | | | | | | | | | 0.0% | 0.0% |
| IA 12 | US 20/US 75 to I-29 | Woodbury | | | | 1 | | | | | | | 38.2% | 90.7% |
| | I-29 to Sioux City N CL | Woodbury | | | | | | | | | | | 31.5% | 31.5% |
| | Sioux City N CL to IA 10 | Woodbury, Plymouth, Sioux | | | | | | | | | | | 1.1% | 0.0% |
| IA 13 | US 151 to E16 | Linn | | | | | 76 | | | | | | 1.7% | 1.6% |
| | E16 to US 20 | Linn, Delaware | | | | | | | | | | | 0.0% | 4.3% |
| | US 20 to IA 3 | Delaware | | | | | | | | | | | 8.8% | 6.8% |
| | IA 3 to US 52 | Clayton | | | | | | | | | | | 2.0% | 0.0% |

Table 5.6: Highway needs and risks matrix, IA routes
*(section 3 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 14 | IA 2 to US 34 | Wayne, Lucas | | | | | | | | | | | 2.5% | 2.5% |
| | US 34 to IA 5 | Lucas, Marion | | | | | | | | | | | 3.8% | 3.6% |
| | IA 5 to IA 163 | Marion, Jasper | | | | 26, 70, 114, 133 | | | | | | | 12.1% | 12.1% |
| | IA 163 to I-80 | Jasper | | | | | | | | | | | 2.5% | 10.3% |
| | US 6 to US 30 | Jasper, Marshall | | | | 94 | 95 | | | | | | 2.3% | 1.4% |
| | US 30 to US 20 | Marshall, Grundy | | Partial | | 125 | 95 | | | | | | 15.6% | 15.5% |
| | US 20 to IA 3 | Grundy, Butler | | | | | | | | | | | 4.9% | 0.0% |
| | IA 3 to US 18 | Butler, Floyd | | | | | | | | | | | 3.8% | 2.5% |
| IA 15 | IA 3 to US 18 | Pocahontas, Humboldt, Kossuth | | | | | | | | | | | 0.0% | 0.0% |
| | US 18 to MN border | Kossuth, Emmet | | | | | | | | | | | 0.0% | 0.0% |
| IA 16 | US 34 to US 218 | Wapello, Davis, Van Buren, Lee | | | | | | | | | | | 0.3% | 0.0% |
| | US 218 to US 61 | Lee | | | | | | | | | | | 1.7% | 0.0% |
| IA 17 | IA 141 to US 30 | Polk, Boone | | | | | | | | | | | 6.2% | 2.5% |
| | US 30 to US 20 | Boone, Hamilton | | | | | | | | | | | 3.4% | 0.0% |
| | US 20 to IA 3 | Hamilton, Wright | | | | | | | | | | | 7.9% | 4.3% |
| | IA 3 to US 18 | Wright, Hancock | | | | | | | | | | | 2.8% | 0.0% |
| IA 21 | IA 78 to IA 92 | Keokuk | | | | | | | | | | | 0.0% | 0.0% |
| | IA 92 to I-80 | Keokuk, Poweshiek | | | | | | | | | | | 4.3% | 0.2% |
| | I-80 to US 30 | Poweshiek, Iowa, Benton | | | | | | | | | | | 10.2% | 5.5% |
| | US 30 to US 20 | Benton, Tama, Black Hawk | | | | | | | | | | | 1.8% | 0.4% |
| IA 22 | IA 21 to IA 1 | Keokuk, Washington | | | | | 47 | | | | | | 7.5% | 0.0% |
| | IA 1 to US 218 | Washington | | | | | 47 | | | | | | 10.5% | 6.4% |
| | US 218 to IA 70 | Washington, Johnson, Muscatine | | | | | | | | | | | 4.4% | 0.0% |
| | IA 70 to US 61 | Muscatine | | | | | 4 | | | | | | 2.8% | 0.0% |
| | IA 38 to Buffalo E CL | Muscatine, Scott | | | | | | | | | | | 6.5% | 1.0% |
| | Buffalo E CL to IA 461 | Scott | | | | | | | | | | | 0.9% | 0.0% |
| IA 23 | IA 149 to IA 92 | Keokuk, Mahaska | | | | 9 | | | | | | | 74.3% | 0.1% |
| IA 24 | US 63 to US 52 | Chickasaw, Winneshiek | | | | | 8 | | | | | | 6.3% | 3.6% |
| IA 25 | IA 2 to US 34 | Ringgold, Union | | | | | | | | | | | 0.0% | 0.0% |
| | US 34 to I-80 | Union, Adair | | | | | | | | | | | 32.5% | 4.7% |
| | I-80 to US 30 | Adair, Guthrie, Greene | | | | | 108 | | | | | | 1.3% | 0.0% |
| IA 26 | IA 9 to MN border | Allamakee | | | | | | | | | | | 0.3% | 0.3% |
| IA 27 | MO border to US 218 | Lee | | | | | | | | | | | 0.0% | 78.8% |
| | US 20 to US 218 | Black Hawk | | | | | | | Partial | | | | 0.2% | 0.5% |

**Table 5.6: Highway needs and risks matrix, IA routes**
*(section 4 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 28 | IA 92 to Norwalk S CL | Warren | | | | | 45 | | | | | | 0.9% | 0.0% |
| | Norwalk S CL to IA 5 | Warren, Polk | | | | | 53 | | | | | | 14.1% | 30.6% |
| | IA 5 to I-235 | Polk | | | | 41 | 12, 35, 59 | | Partial | | | | 30.0% | 30.0% |
| | I-235 to US 6 | Polk | | | | | 102 | | | | | | 98.6% | 99.0% |
| | US 6 to I-35/80 | Polk | | | | | 37, 68 | | | | | | 49.0% | 84.8% |
| IA 31 | IA 141 to US 20 | Woodbury | | | | | | | | | | | 1.0% | 0.0% |
| | US 20 to US 59 | Woodbury, Ida, Cherokee | | | | | | | | | | | 0.0% | 0.0% |
| IA 37 | IA 175 to US 30 | Monona, Crawford, Harrison | | | | | | | | | | | 0.0% | 0.0% |
| | US 30 to US 59 | Harrison, Shelby | | | | | | | | | | | 0.0% | 0.0% |
| IA 38 | US 61 to US 6 | Muscatine | | | | | 55 | | | | | | 0.0% | 0.1% |
| | I-80 to US 30 | Cedar | | | | 19 | | | | | | | 4.6% | 4.3% |
| | US 30 to US 151 | Cedar, Jones | | | | | 79 | | | | | | 0.0% | 0.0% |
| | US 151 to US 20 | Jones, Delaware | | | | | | | | | | | 9.6% | 4.4% |
| | US 20 to IA 3 | Delaware | | | | | | | | | | | 3.7% | 0.0% |
| IA 39 | US 59 to IA 175 | Crawford, Sac | | | | 140 | 34, 82 | | | | | | 8.6% | 0.2% |
| IA 44 | US 30 to US 59 | Harrison, Shelby | | | | | | | | | | | 0.0% | 0.0% |
| | US 59 to US 71 | Shelby, Audubon | | | | | | | | | | | 5.6% | 5.1% |
| | US 71 to US 169 | Audubon, Guthrie, Dallas | | | | | 18, 108 | | | | | | 1.4% | 1.4% |
| | US 169 to IA 141 | Dallas, Polk | | | | | | | Partial | | | | 16.6% | 20.2% |
| IA 48 | US 59 to US 34 | Page, Montgomery | | | | | 63 | | | | | | 8.8% | 5.7% |
| | US 34 to US 6 | Montgomery, Cass | | | | | 63 | | | | | | 2.6% | 1.1% |
| IA 51 | US 18 to IA 9 | Allamakee | | | | | 27 | | | | | | 0.3% | 2.1% |
| IA 56 | IA 150 to IA 13 | Fayette, Clayton | | | | | | | | | | | 1.7% | 0.0% |
| IA 57 | US 65 to Cedar Falls W CL | Hardin, Butler, Grundy, Black Hawk | | | | 140 | | | | | | | 12.3% | 0.0% |
| | Cedar Falls W CL to US 218 | Black Hawk | | | | | 94 | | | | | | 33.5% | 33.5% |
| IA 58 | US 63 to US 20 | Black Hawk | | | | | | | | | | | 0.0% | 0.4% |
| IA 60 | US 75 to US 18 | Plymouth, Sioux, O'Brien | | | | | 64 | | | | | | 0.1% | 10.1% |
| | US 18 to MN border | O'Brien, Osceola | | | | | | | | | | | 0.0% | 6.0% |
| IA 62 | IA 64 to US 52 | Jackson | | | | | | | | | | | 0.4% | 0.4% |
| IA 64 | US 151 to US 61 | Jones, Jackson | | | | | 54, 79 | | | | | | 2.8% | 0.0% |
| | US 61 to US 67 | Jackson | | | | | | | | | | | 4.7% | 4.5% |
| IA 70 | IA 92 to IA 22 | Louisa, Muscatine | | | | | | | | | | | 17.4% | 0.0% |
| | IA 22 to US 6 | Muscatine | | | | | | | | | | | 6.5% | 4.6% |
| IA 76 | W jct US 18 to S jct IA 9 | Clayton, Allamakee | | | | | | | | | | | 21.7% | 0.9% |
| | N jct IA 9 to MN border | Allamakee | | | | | | | | | | | 0.0% | 0.0% |

**Table 5.6: Highway needs and risks matrix, IA routes**
*(section 5 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Needs: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 78 | IA 149 to IA 1 | Keokuk | | | | 5, 81, 108 | | | | | | | 3.9% | 0.0% |
| | IA 1 to US 218 | Washington, Jefferson, Henry | | | | | | | | | | | 9.0% | 0.0% |
| | US 218 to US 61 | Henry, Louisa | | | ■ | 48, 144 | | | | | | | 0.0% | 0.0% |
| IA 81 | MO border to IA 2 | Van Buren | | | ■ | | | | | | | | 0.0% | 0.0% |
| IA 83 | US 59 to IA 148 | Pottawattamie, Cass | | | | 64, 118 | | | | | | | 6.1% | 1.8% |
| IA 85 | Montezuma E CL to IA 21 | Poweshiek | | | | | | | | | | | 0.0% | 0.0% |
| IA 86 | US 71 to IA 9 | Dickinson | | | | | 87, 97 | | | | | | 0.0% | 0.0% |
| | IA 9 to MN border | Dickinson | | | | | 97 | | | | | | 0.0% | 0.0% |
| IA 92 | I-29 to US 59 | Pottawattamie | | | | | 50 | | Partial | | | | 13.6% | 10.7% |
| | US 59 to US 71 | Pottawattamie, Cass | | | | 88 | | | | | | | 0.0% | 0.0% |
| | US 71 to US 169 | Cass, Adair, Madison | | | | | | | | | | | 0.0% | 0.0% |
| | US 169 to I-35 | Madison, Warren | | | | | | | | | | | 2.0% | 0.0% |
| | I-35 to US 65 | Warren | | | | 33 | 45 | | | | | | 8.2% | 7.4% |
| | US 65 to IA 5 | Warren, Marion | | | | | 80 | | | | | | 5.4% | 3.5% |
| | IA 5 to US 63 | Marion, Mahaska | | | | | | | | | | | 3.6% | 59.2% |
| | US 63 to IA 1 | Mahaska, Keokuk, Washington | | | | 29, 42 | 77 | | | | | | 3.4% | 2.5% |
| | IA 1 to US 218 | Washington | | | ■ | | | | | | | | 8.0% | 10.0% |
| | US 218 to US 61 | Washington, Louisa | | | ■ | | | | | | | | 1.8% | 3.1% |
| | US 61 to IL border | Muscatine | | | | 191 | 55 | | | | ■ | | 89.1% | 44.2% |
| IA 93 | US 63 to IA 150 | Bremer, Fayette | | | | | | | | | | | 2.1% | 1.3% |
| IA 96 | IA 14 to US 63 | Marshall, Tama | | | | | | | | | | ■ | 1.0% | 0.0% |
| IA 100 | US 30 to I-380 | Linn | | ■ | | | | | Partial | | | ■ | N/A | N/A |
| | I-380 to US 151 | Linn | | ■ | | | 16, 19 | | Partial | ■ | ■ | | 19.4% | 19.4% |
| IA 110 | US 20 to IA 7 | Sac, Buena Vista | | | | | | | | | | | 2.7% | 0.1% |
| IA 116 | US 218 to IA 3 | Bremer | | | | | | | | | | | 14.8% | 16.4% |
| IA 117 | IA 163 to I-80 | Jasper | | | | 191 | | | | | | | 11.6% | 4.2% |
| | I-80 to US 65 | Jasper | | | | 191 | | | | | | | 4.1% | 0.0% |
| IA 122 | I-35 to Mason City W CL | Cerro Gordo | | | | | | | | | | | 3.9% | 0.0% |
| | Mason City W CL to Mason City E CL | Cerro Gordo | | | | | 96 | | | ■ | | | 33.3% | 33.7% |
| IA 127 | I-29 to US 30 | Harrison | | | | | 52 | | | | | | 1.0% | 0.0% |
| IA 128 | IA 13 to US 52 | Clayton | | | | | | | | | | | 6.5% | 0.0% |
| IA 130 | IA 38 to I-80 | Cedar, Scott | | | | | | | | | | | 11.5% | 1.9% |
| IA 136 | IL border to US 67 | Clinton | | | ■ | 17 | 98 | | | | ■ | | 81.4% | 81.4% |
| | US 67 to US 61 | Clinton | | | | | | | | | | | 8.3% | 0.7% |
| | US 61 to US 151 | Clinton, Jones, Dubuque | | | | | 54 | | | | | | 1.3% | 0.8% |
| | US 151 to US 20 | Dubuque | | | | | | | | | | | 17.1% | 0.1% |

**Table 5.6: Highway needs and risks matrix, IA routes**
*(section 6 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 137 | IA 5 to US 63 | Monroe, Wapello | | | | | | | | | | | 10.0% | 0.1% |
| IA 139 | IA 9 to MN border | Winneshiek | | | | | | | | | | | 0.0% | 0.0% |
| IA 140 | US 20 to IA 3 | Woodbury, Plymouth | | | | | | | | | | | 1.5% | 0.0% |
| IA 141 | I-29 to US 59 | Woodbury, Monona, Crawford | | | | 201, 201 | 49, 106 | | | | | | 4.5% | 1.6% |
| | US 59 to US 71 | Crawford, Carroll | | | | | | | | | | | 2.6% | 2.6% |
| | US 71 to IA 4 | Carroll, Guthrie | | | | | | | | | | | 6.0% | 0.0% |
| | IA 4 to IA 144 | Guthrie, Dallas | | | | | | | | | | | 0.0% | 0.0% |
| | IA 144 to US 169 | Dallas | | | | | 58 | | | | | | 7.3% | 0.1% |
| | US 169 to I-35/80 | Dallas, Polk | | | | | 28 | | Partial | | | | 0.5% | 0.2% |
| IA 143 | IA 3 to IA 10 | Cherokee, O'Brien | | | | | | | | | | | 1.3% | 0.0% |
| IA 144 | IA 141 to US 30 | Dallas, Boone, Greene | | | | | 58 | | | | | | 7.2% | 6.4% |
| | US 30 to IA 175 | Greene, Webster | | | | | | | | | | | 2.3% | 0.0% |
| IA 146 | US 63 to I-80 | Mahaska, Poweshiek | | | | | | | | | | | 0.0% | 0.0% |
| | I-80 to US 30 | Poweshiek, Tama, Marshall | | | | | 36 | | | | | | 6.6% | 5.6% |
| IA 148 | MO border to US 34 | Taylor, Adams | | | | | | | | | | | 3.4% | 3.4% |
| | US 34 to I-80 | Adams, Cass | | | | | | | | | | | 3.4% | 2.7% |
| IA 149 | US 34 to US 63 | Wapello | | | | | 44, 72 | | | | | | 0.0% | 11.6% |
| | US 63 to IA 92 | Wapello, Keokuk | | | | | 77 | | | | | | 0.4% | 0.1% |
| | IA 92 to I-80 | Keokuk, Iowa | | | | | | | | | | | 2.2% | 0.0% |
| IA 150 | US 218 to I-380 | Benton | | | | | | | | | | | 72.2% | 5.0% |
| | I-380 to US 20 | Benton, Buchanan | | | | | | | | | | | 6.8% | 17.2% |
| | US 20 to IA 3 | Buchanan, Fayette | | | | | | | | | | | 14.9% | 13.3% |
| | IA 3 to US 18 | Fayette | | | | | | | | | | | 4.1% | 0.3% |
| | US 18 to US 52 | Fayette, Winneshiek | | | | | 8 | | | | | | 6.2% | 0.0% |
| IA 160 | IA 415 to I-35 | Polk | | | | | 13, 38 | | | | | | 15.1% | 19.0% |
| IA 163 | US 69 to US 65 | Polk | | | | (42, 50) | 5, 24, 31 | | | | | | 50.0% | 57.1% |
| | US 65 to IA 14 | Polk, Jasper | | | | | 17 | | Partial | | | | 0.0% | 0.0% |
| | IA 14 to US 63 | Jasper, Marion, Mahaska | | | | | | | | | | | 0.2% | 0.0% |
| IA 173 | IA 83 to IA 44 | Cass, Shelby, Audubon | | | | | | | | | | | 3.4% | 0.0% |
| IA 175 | NE border to US 59 | Monona, Woodbury, Ida | | | | 30, 57, 167, 188 | 106 | | | | | | 3.3% | 1.7% |
| | US 59 to US 71 | Ida, Sac | | | | | 34 | | | | | | 5.6% | 0.0% |
| | US 71 to US 169 | Sac, Calhoun, Webster | | | | | 32 | | | | | | 15.6% | 1.1% |
| | US 169 to I-35 | Webster, Hamilton | | | | 130 | | | | | | | 0.1% | 0.1% |
| | I-35 to IA 14 | Hamilton, Hardin, Grundy | | | | | | | | | | | 3.7% | 3.3% |
| | IA 14 to US 63 | Grundy, Black Hawk | | | | | | | | | | | 8.6% | 3.1% |

**Table 5.6: Highway needs and risks matrix, IA routes**
*(section 7 of 7)*

*See Table 5.3 for key*

| Route | Corridor | County | Networks: IMFN | Networks: CIN | Needs: Pavement Condition | Needs: Bridge Condition | Needs: Bottlenecks | Needs: Super-2 | Needs: Capacity | Risks: Safety | Risks: Operations | Risks: Flood Resiliency | Risks: Bicyclists | Risks: Pedestrians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA 182 | US 18 to IA 9 | Lyon | | | | | | | | | | | 5.3% | 0.0% |
| IA 183 | IA 127 to IA 141 | Harrison, Monona | | | | | | | | | | | 0.0% | 0.0% |
| IA 187 | US 20 to IA 3 | Buchanan, Fayette | | | | | | | | | | | 60.9% | 0.0% |
| | IA 3 to IA 150 | Fayette | | | | | | | | | | | 0.0% | 0.0% |
| IA 188 | IA 3 to US 218 | Butler, Bremer | | | | | | | | | | | 0.0% | 0.0% |
| | US 218 to US 63 | Bremer | | | | | | | | | | | 0.0% | 0.0% |
| IA 191 | I-880 to IA 37 | Pottawattamie, Harrison, Shelby | | | | | | | | | | | 0.0% | 0.0% |
| IA 202 | MO border to IA 2 | Davis, Appanoose | | | | | | | | | | | 0.0% | 0.0% |
| IA 210 | IA 141 to I-35 | Dallas, Boone,Story | | | | | 39 | | | | | | 7.4% | 1.4% |
| | I-35 to US 65 | Story | | | | | | | | | | | 0.0% | 0.0% |
| IA 212 | IA 21 to US 6 | Iowa | | | | | | | | | | | 0.0% | 0.0% |
| IA 220 | US 6 to US 151 | Iowa | | | | | 83 | | | | | | 18.2% | 0.0% |
| IA 224 | I-80 to IA 14 | Jasper | | | | | | | | | | | 0.0% | 0.1% |
| IA 281 | Waterloo E CL to IA 150 | Black Hawk, Buchanan | | | | | | | | | | | 2.3% | 0.0% |
| IA 316 | Runnells E CL to IA 5 | Polk, Warren, Marion | | | | | | | | | | | 0.0% | 0.0% |
| IA 330 | US 65 to US 30 | Jasper, Story, Marshall | | | | | | | | | | | 0.0% | 82.2% |
| | US 30 to IA 14 | Marshall | | | | | | | | | | | 0.0% | 2.4% |
| IA 346 | US 218 to US 63 | Chickasaw | | | | | | | | | | | 6.1% | 6.1% |
| IA 376 | I-29 to IA 12 | Woodbury | | | | | 66 | | Partial | | | | 4.8% | 37.4% |
| | IA 12 to US 75 | Woodbury | | | | 171, 191 | | | | | | | 18.8% | 22.9% |
| IA 404 | IA 3 to US 75 | Plymouth | | | | | | | | | | | 45.5% | 18.0% |
| IA 415 | US 6 to I-35/80 | Polk | | | | | 15, 89 | | | | | | 87.7% | 39.4% |
| | I-35/80 to IA 160 | Polk | | | | | 89 | | | | | | 29.2% | 0.9% |
| | IA 160 to Ankeny W CL | Polk | | | | | | | | | | | 0.0% | 12.3% |
| | Ankeny W CL to IA 141 | Polk | | | | | 23 | | | | | | 18.0% | 25.4% |
| IA 461 | I-280 to US 67 | Scott | | | | 20 | | | | | | | 9.1% | 13.5% |
| | US 67 to US 6 | Scott | | | | (39, 111) | 73, 107 | | | | | | 74.9% | 74.9% |
| | US 6 to I-80 | Scott | | | | 124, 191 | 73 | | | | | | 5.0% | 15.5% |
| IA 471 | IA 175 to US 20 | Sac | | | | 169 | | | | | | | 9.4% | 0.0% |
| IA 906 | N 6th St to I-80 | Pottawattamie | | | | | 7, 21, 99 | | | | | | 58.6% | 89.1% |
| IA 922 | US 30 to I-380 | Linn | | | | | 42 | | | | | | 35.5% | 38.3% |
| | I-380 to IA 100 | Linn | | | | | 16, 88 | | Partial | | | | 82.1% | 82.1% |
| IA 930 | US 30 to 1.1 mi E of US 30 | Boone | | | | | | | | | | | 18.3% | 0.0% |
| IA 946 | S jct US 61 to N jct US 61 | Dubuque | | | | | 84 | | | | | | 38.8% | 38.8% |
| IA 965 | US 6 to I-80 | Johnson | | | | | 81 | | | | | | 55.4% | 55.4% |

## 5.4 Strategies

In order to achieve the vision for the transportation system, and address the needs and risks identified across the various modes and the Primary Highway System, the Iowa DOT will employ a wide range of strategies. The 30 strategies listed in this section were derived from several sources, including the last long-range plan, stakeholder input, and content developed for this SLRTP update.

Many modal and system plans exist that have more detailed strategies for the areas they cover. Rather than duplicate or only include a selection of those strategies in this SLRTP, they are supported by the first strategy. This allows the SLRTP to highlight strategies that are more unique to this document. Strategies are divided into three broad categories:

- Strategies to support SLRTP implementation
- Strategies to help advance various planning considerations
- Strategies related to highways

Strategies are critical components for the SLRTP. Strategies will guide the implementation of the SLRTP and help relate the broader plan vision and objectives to actions that the department and others can take to achieve them. Each strategy maps back to one or more of the four system objectives (safety, sustainability, accessibility, and flow), and a graphic notes which area(s) the strategy relates to. The strategies consist of an action statement and an explanation of what the strategy entails or how it will be carried out. These strategies will help guide future actions and financial investments across the system.

## State Long-Range Transportation Plan (SLRTP) Implementation

**1. Support the implementation of modal and system plans.**

While the SLRTP is the overarching long-range planning document for the department, there are many other modal and system plans that are routinely developed and updated to examine specific issues, needs, strategies, and in some cases, projects. Rather than duplicate the strategies of those plans as part of the SLRTP, this strategy adopts them by reference and supports the continued implementation of those plans. Strategies from the following plans are included in the Appendix for reference.

- Aviation System Plan
- Bicycle and Pedestrian Long Range Plan
- Public Transit Long Range Plan
- State Freight Plan
- State Rail Plan
- Strategic Highway Safety Plan
- Transportation Asset Management Plan
- Transportation Systems Management and Operations Plan
- Carbon Reduction Strategy
- Resilience Improvement Plan
- Transportation 4.0: Innovative strategies for the transportation revolution

**2. Adopt and integrate system objectives into department decision-making, including for planning, programming, and project development activities.**

The system objectives of safety, sustainability, accessibility, and flow define the mobility outcomes to be achieved and areas to measure to determine whether they are being achieved (reference chapter 4). Integrating these objectives throughout department activities will help align the SLRTP and other Iowa DOT processes and practices, which will help implement the SLRTP and the vision for the transportation system. Integration of these objectives should be pursued for activities such as modal and system plan development, project prioritization, and grant program administration.

**3. Implement the rightsizing policy across planning, programming, and project development activities.**

As part of the SLRTP, the Iowa DOT is adopting a rightsizing policy (reference Section 5.5). Several areas will need enhancement in order to fully apply the principles included in the rightsizing policy. This includes continued improvement and use of analysis tools and benefit/cost evaluation tools; enhanced coordination with stakeholders and interested parties; further integration of system-level needs and policies into project-level decisions; and further integration of the rightsizing principles into project development processes and procedures. Development of a workplan that identifies specific tasks and responsibilities for rightsizing implementation will be a key early step.

**4. Continue enhancing the relationship between the SLRTP and the Iowa DOT business plan.**

The SLRTP has been adopted on a 5-year cycle since 2012, and a new business plan for the Iowa DOT was adopted in 2021. The business plan is seen as the operationalization of the SLRTP. As the business plan and its objectives continue to evolve, the relationship between the two documents will be enhanced.

## Planning Considerations

**5. Enhance accessibility planning.**

The SLRTP includes an accessibility analysis based on factors that may limit a person's mobility, ability to access transportation infrastructure, and/or travel by means of a personal vehicle. There are many other facets of accessibility that merit exploration, including accessibility of infrastructure and service for various modes, as well as accessibility of employment and other key destinations. Additional ways to quantify accessibility at the planning level should be explored in order to support more effective project-level decisions and enhance accessibility of the transportation system.

**6. Continue exploring ways to ensure equity in department policies and investments.**

Different people and populations have varying levels of need when it comes to fully accessing and using the transportation system. Additional consideration may be required to ensure underserved individuals are able to achieve an equitable level of access to affordable and reliable transportation options, and to ensure that the impacts of transportation projects are equitably distributed. The department should advance efforts to study how transportation policies and investments affect equity and adopt tools and strategies to advance equity. The department should also enhance its emphasis on the user, as opposed to the system, and user perspectives on mobility, accessibility, and equity.

**7. Continue to explore sustainable funding sources to increase investment in the transportation system.**

Transportation needs have continually outpaced transportation revenues, and this is anticipated to continue despite some recent revenue increases. New or innovative sources of revenue should continue to be sought to ensure stable transportation funding for stewardship needs. Creative funding solutions and coordination with other entities may be required to address significant projects, such as large border bridges. Where appropriate project needs exist, the Iowa DOT should also work to take advantage of the many discretionary programs that were created or enhanced through the Infrastructure Investment and Jobs Act (IIJA). One way to help achieve this would be to enhance internal capacity for evaluating economic impacts of projects and to develop additional tools to evaluate project costs and benefits, including those that may not fit well into a traditional benefit/cost analysis. Methods to prioritize among competing needs and priorities such as the use of multi-objective decision analysis (MODA) tools should also continue to be advanced.

**8. Continue advancing resiliency planning at the Iowa DOT.**

Resiliency is an increasingly important planning area. Proactive analysis and planning efforts, including the work of the Resiliency Working Group, should continue to be enhanced, as should disaster response planning. Resiliency considerations should also continue to be integrated into project scoping, prioritization, and design, as well as maintenance and operations, to make assets less susceptible to disruptions.

**9. Continue advancing sustainability planning at the Iowa DOT.**

Sustainability is an increasingly important planning area. Analysis and planning efforts, including the work of the Sustainability Working Group, should continue to be enhanced. Sustainability considerations should also continue to be integrated into department activities and project designs to help address economic, social, and environmental effects. This will help in making balanced decisions that meet the needs of today without jeopardizing the ability of future generations to meet the needs of tomorrow.

**10. Ensure that the highest and best use of Iowa DOT right-of-way is considered in planning efforts.**

As Iowa's demographic and economic landscape evolves, there may need to be consideration of system alterations, including contractions. The multimodal transportation system as it exists today has developed over many decades and reflects the progression of population and employment growth, travel patterns, and advances in transportation. The decisions made today regarding transportation investments need to be done with the social, economic, and technological patterns of the future in mind, and that may not necessarily equate to future traffic levels that are equal to or higher than current levels. If system contractions such as lane reductions occur, the highest and best use of Iowa DOT-owned right-of-way should be considered, particularly if there may be opportunities to convert vehicle lanes into conduits for other modes of transportation or utility purposes such as energy production or transport.

**11. Continually evaluate and enhance education and licensing practices for new and existing drivers.**

The Iowa DOT's Motor Vehicle Division (MVD) oversees driver licensing processes that evaluate key skills of drivers to obtain a first license, to retain a license, or to add privileges to an existing license (such as motorcycle or Commercial Driver operation). MVD and its stakeholders need to continually ensure that driver education materials reflect changing state and federal requirements and national guidelines and best practices. Driver education needs to be a life-long activity. Education materials and techniques should prepare new and existing drivers for developments in vehicle technology such as advanced driver assistance systems and the growth of electric vehicles; roadway changes, such as roundabouts or other design elements; and new signs and traffic control features, such as flashing yellow turn signals or active pedestrian beacons. It is equally important to provided targeted education to licensed drivers identified as habitual or serious violators of traffic laws in order to correct risky driving habits, reduce human error, and maximize safety.

**12. Continue to enhance accessibility of Motor Vehicle Division services.**

The Iowa DOT's Motor Vehicle Division (MVD) provides individual users of the roadway system the necessary permissions to use the system, such as drivers' licenses, vehicle registration and ownership records, and travel or fuel permits for motor carriers. The MVD also provides a variety of other direct services to customers and stakeholders, including motor carrier titles, oversize/overweight permits, business licenses, and parking products for persons with disabilities; it is also continuing to develop a system for vehicle dealers to electronically submit title and registration applications on behalf of customers. The MVD is focused on being easily accessible to individual end-users so that services can be obtained without delay. The department should continue to build off recent successes, such as changing to an appointment system for driver's license stations and making more license-related services available online. Ongoing and planned initiatives include enhancements to the driver education program, use of mobile ID, exploring customer feedback opportunities, and creating an Advanced Customer Experience team to address more complex queries in order to improve responses to customers about their individual transportation needs. The department should continually work with stakeholder groups to improve transaction delivery and support businesses and individuals in Iowa. The MVD will also continue to focus on compliance requirements and ensuring customer awareness, which will continue to strengthen its commitment to overall highway safety.

**13. Continue to improve monitoring of financial transactions and ensure ease of collection.**

The MVD balances, clears, and audits vehicle and driver transactions which are ultimately deposited into the state's Road Use Tax Fund (RUTF). This may include fees from driver licensing and identification services, fuel taxes, vehicle titles, first-time vehicle registrations, annual vehicle registrations (individual and commercial), special and personal license plate sales, and electric and plug-in hybrid vehicle registrations. Many of these fees are collected directly by county treasurers and MVD supports this work through a statewide license, title, and registration system as well as by providing ongoing policy support, training, and instruction. It is important to continue to provide this technological and administrative support for the collection of registration fees by counties. MVD staff and county treasurers are well-trained in fraud prevention, but further investigation or legal action is sometimes needed to ensure consistency and to capture all appropriate revenue for the RUTF.

**14. Continue to enhance efforts that improve personal accessibility and mobility options for all users and reduce barriers to using the transportation system.**

Initiatives like Get There Your Way, which helps inform an individual of options for transportation, as well as those that target specific underserved groups of individuals should continue to be developed and enhanced. Community partnerships can help advance driving and transportation options for specific groups of individuals, such as having mobility managers work with correctional facilities to assist offenders with their transportation options prior to their reintroduction to society; partnering with non-profit entities to lend vehicles for driving tests; and having mobile license issuance kits deployable for special events or unplanned circumstances such as natural disasters. These efforts should be continued and enhanced, potentially by adding additional special positions such as the correctional facility mobility manager.

**15. Incorporate pause points into the project development and programming processes to consider the evolving impacts of disruptive technologies.**

In addition to planning and implementation activities related to various new technologies, particularly connected and automated vehicles, the Iowa DOT should modify its internal project development and programming processes to consider technological disruptions and minimize risk. Pause points can allow more focused and intentional consideration of automated transportation at critical milestones within policies and procedures, and ensure that those policies and procedures can adapt and change along with technology. The incorporation of pause points into this process will allow the Iowa DOT to revisit a project at various points during development to ensure its scope is still appropriate within the context of these evolving technologies.

**16. Seek policies and investments that are dual benefit, supporting today's users with tomorrow's technology needs.**

Infrastructure elements are typically built to address current system needs and assets such as pavements and bridges have an intended lifespan of decades. Many investments are initially scoped or could be modified to address multiple needs and provide a diversity of benefits. Consideration should be given to opportunities to meet current needs for human users while supporting rapidly changing technologies into the future. Along these lines, making investments in infrastructure that can be easily modified, while possibly more expensive in the short term, could have long-term benefits in allowing the existing infrastructure to be "future-proofed." The Iowa DOT should work to navigate this complex landscape of uncertain needs by implementing the emerging technology rightsizing policy statement and other actions necessary to achieve the best possible balance of policies and investments.

**17. Continue to monitor and support research and planning initiatives related to specific automated transportation use cases.**

While widespread cooperative automated transportation (CAT) adoption may be far in the future, there are a number of research studies and deployment pilots underway to examine use cases that may have success with CAT in the near future, such as freight movement, parcel delivery, and small scale transit activities. These efforts should be supported to help ensure CAT advancements can be integrated with Iowa's multimodal transportation system and that the needs of various user groups are considered, so that technology enhancements can benefit system users in an equitable and safe manner.

**18. Continue to leverage the Iowa Advisory Council on Automated Transportation (ATC) and support the Iowa Automated Transportation (AT) Vision to advance AT readiness in Iowa.**

The ATC involves public and private stakeholders and serves as an important venue for engagement, education, and advancement related to CAT in Iowa. As part of the Iowa AT Vision, work should continue to be supported for the strategic objective areas of infrastructure readiness; policy and legislation; economic development; public safety and enforcement; communication, outreach, and education; and research, development, testing, and evaluation.

**19. Continue to work with local governments, state agencies, utilities, and other stakeholders to advance energy-related planning efforts and alternative fuel infrastructure improvements in Iowa.**

Several recent initiatives have related to energy and alternative fuel and electric vehicles, including the Iowa Energy Plan, studies related to infrastructure needs for alternative fuel vehicles, administration of the Volkswagen Settlement, and the I-80 Mid America Alternative Fuel Corridor planning study. As efforts in these areas continue to advance and funding opportunities arise, additional collaboration and coordination will be necessary to help implement the strategies identified through these efforts and support the infrastructure environment for alternative fuel vehicles in Iowa.

**20. Advance workforce adaptation and planning.**

Changes in the technology of how to do business as well as the technology used in transportation itself will require continued evolution. Telework is more common and worker preferences are changing. Amounts of data being collected and processed continue to increase exponentially. The transportation industry faces shortages in the workforce necessary to meet current needs, such as truck drivers and data analysts, and for future needs, such as automated transportation. New programs, recruitment initiatives, and upskilling current workforces will be needed to help address these gaps.

## Highway

**21. Continue to advance highway planning and analysis efforts.**

System level highway planning and analysis has evolved over time, and it is important to continue to advance these efforts. The system's current and forecasted use and performance are measured by multiple highway analysis tools and the outputs of those efforts have increasingly been incorporated into the SLRTP and project scoping tool to guide corridor-level planning. The Iowa Interstate Investment Plan (I3P) was created to help guide programming decisions for that network's stewardship and enhancement. Highway system stratification is being discussed as part of the rightsizing policy framework and could lead to additional planning efforts. These tools and plans need to continue to be advanced and incorporated into the planning, programming, and project development process.

### Strategies Based on Primary Highway System Analysis

The SLRTP includes system level analysis of various needs and risks for the Primary Highway System. The following strategies relate to targeting planning initiatives and investments to address the locations identified as the most critical needs or risks. It should be noted that identifying a specific need or risk does not automatically mean the way to address that need or risk is known or defined or that a project will necessarily be programmed. Planning efforts, asset management strategies, funding, stakeholder priorities, and other issues all factor into if, when, and how projects proceed.

Strategies are included related to:

- Pavement Condition
- Bridge Condition
- Bottlenecks
- Mobility and Safety (Super-2)
- Capacity
- Safety
- Operations
- Flood Resiliency
- Bicyclists and Pedestrians

**22. Target investment to address pavement condition needs at locations with measured structural and service issues.**

Candidate condition improvement locations were identified by using the Infrastructure Condition Evaluation (ICE) tool, which provides a composite rating based on the most recent infrastructure condition and performance data. For the purposes of the SLRTP, the composite rating was used to identify corridors that comprise the lowest-rated 25 percent of the system by mileage. These locations, in conjunction with other pavement and asset management tools, should be used to focus consideration of pavement condition improvements.

**23. Target investment to address bridges with measured condition needs.**

Candidate condition improvement locations were identified using the bridge condition index (BCI). The BCI is calculated based on structural adequacy and safety; serviceability and functional obsolescence; essentiality for public use; and special vulnerabilities. For the purposes of the SLRTP, the BCI was used to identify bridges that comprise the lowest-rated five percent of the system's structures. These locations, in conjunction with other bridge and asset management tools, should be used to focus consideration of bridge condition improvements.

**24. Target investment to address needs at locations with measured bottlenecks.**

Candidate bottleneck improvement locations were identified by a system screening that used traffic speed data to identify segments categorized as bottlenecks due to recurring traffic slow-downs. For the purposes of the SLRTP, the worst five percent of bottlenecks were considered most severe; of those, bottlenecks that were one or more standard deviation above the mean for total delay were identified as needs. These locations should be used to help focus consideration of spot operational improvements. Bottlenecks on the Iowa Multimodal Freight Network are of particular importance from a freight perspective.

**25. Target investment to address mobility and safety needs on Super-2 routes.**

No congestion is forecast for the majority of the Primary Highway System. However, overall operation of the system can be improved by addressing mobility and safety needs on critical two-lane routes through application of the Super-2 concept. Elements of this concept that should continue to be applied in a targeted and opportunistic fashion include passing lanes, wider paved shoulders, left- and right-turn lanes, acceleration lanes, limited access, and geometric improvements. The Iowa DOT is focusing its consideration of such corridor-level enhancements on US Highways 18, 30, 34, 63, and 71, which serve as a compliment to the multilane highway network. While these corridors are being specifically targeted, these types of treatments should also be considered in other locations when appropriate to address mobility and safety needs.

**26. Target investment to address capacity needs.**

Candidate capacity improvement locations were identified through a statewide volume-to-capacity (V/C) analysis. Future statewide V/C conditions were analyzed based on past and current versions of the statewide travel demand model, MPO travel demand models, and traffic forecasts completed for studies and projects. The analyses showed congestion is primarily forecast to occur on routes in metropolitan areas and three key Interstate corridors. These locations should be used to help focus consideration of capacity improvements.

**27. Target investment to address locations with the most potential to improve safety through crash reduction.**

Locations with the greatest potential for crash reduction (PCR) were identified based on a statewide analysis that calculated the PCR by examining the predicted numbers of crashes based on the roadway and traffic environment. For the purposes of the SLRTP, corridors that had an average of one or more PCR per mile were identified as the highest priority corridors from a safety perspective. These locations should be used to help focus consideration of safety improvements.

**28. Target investment to address corridors with higher risks from an operations perspective.**

Corridors considered to be higher risk from an operations perspective were identified by using the Infrastructure Condition Evaluation for Operations (ICE-OPS) tool, which is a system screening tool that quantifies the relative risk to the safe and reliable operation of the system. For the purposes of the SLRTP, corridors that were one or more standard deviation below the ICE-OPS statewide average composite score were identified as the highest priority corridors from an operations perspective. These locations should be used to help focus consideration of corridor operational improvements.

**29. Target investment to address corridors with higher risks from a flood resiliency perspective.**

Locations vulnerable to a 100-year flood event were identified by using a resiliency metric that includes robustness, redundancy, and criticality components. For the purposes of the SLRTP, corridors that were one or more standard deviation below the statewide average score were identified as the highest priority corridors from a flood resiliency perspective. These locations should be used to help focus consideration of flood resiliency improvements.

**30. Target investment to address locations with higher risks for bicyclists and/or pedestrians.**

Locations considered to be higher risk for bicyclists and pedestrians were identified based on a statewide analysis that developed composite scores for locations by considering several roadway factors related to the likelihood for risks to bicyclists and pedestrians. For the purposes of the SLRTP, the percentage of a corridor's mileage that was one or more standard deviation below the average composite score was identified for both bicyclists and pedestrians; corridors with higher percentages have more relative length that may need improvement. These locations should be used to help focus consideration of bicyclist and pedestrian improvements.

# 5.5 Rightsizing Policy

## Background

The purpose of this policy is to clarify Iowa DOT's definition of rightsizing and to document policy statements in several topical areas to help further formalize and institutionalize rightsizing practices. The context of this discussion is primarily the state-owned highway network, and the rightsizing philosophy applies to Iowa DOT projects. While the highway network may typically be thought of in terms of vehicular traffic, it is also an important conduit for other modes of transportation such as public transit users, bicyclists, and pedestrians, and most rightsizing concepts can be applied across transportation modes.

While this is the first adoption of a rightsizing definition and policy statements as part of the long-range plan, rightsizing is not new. Rightsizing aligns with other planning frameworks such as context sensitive solutions and performance-based practical design, and many of the concepts discussed in this policy are already being implemented.

At its essence, rightsizing is about trying to make the best choices for the overall transportation system when developing individual projects.

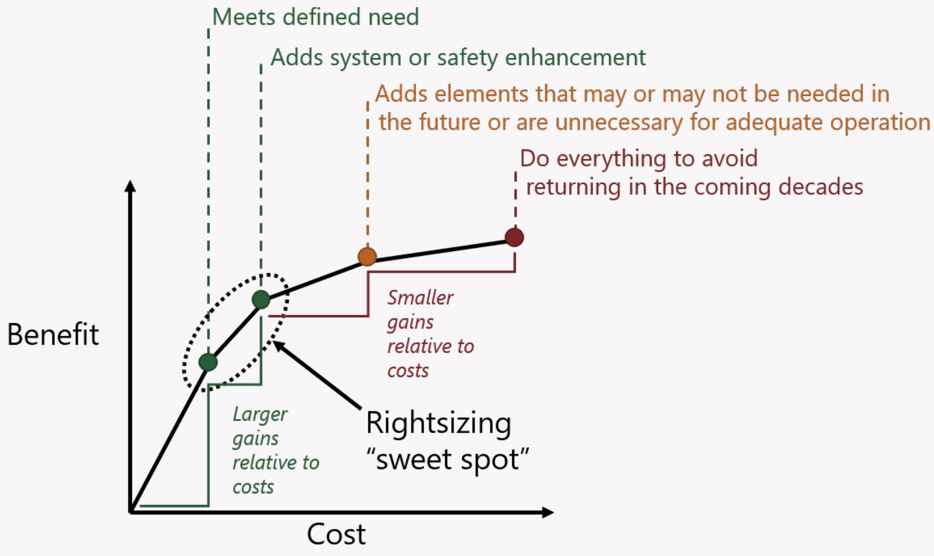
- Rightsizing is about ensuring **individual projects** are appropriately scoped. When a project is being developed, there is always something else that can be added to it, but it is neither practical nor feasible to add elements indefinitely.
- At the **broader program level**, rightsizing ties in with efforts to prioritize among projects in order to select the best projects to carry forward. Given the realities of constrained budgets, competing priorities, and varying preferred outcomes among user groups, there are always more improvements to the transportation system that are needed or desired. Defining transportation needs appropriately is the first step in rightsizing and can help ensure that well-scoped projects rise to the top.

These concepts are especially important since budgets are limited and we know we do not have enough funding to make all needed improvements to the system. Making a choice to complete a project in one location means not completing a project in another location, so every incremental cost increase means we have less capacity to address needs elsewhere. Also, every addition to the system's infrastructure now is a commitment to increased future maintenance needs. However, rightsizing does not always mean choosing a lower-cost option or eliminating project elements – as discussed in this policy, some rightsizing decisions involve considering context or needs that may broaden a project's scope or cost.

The aim with rightsizing is to find the right balance of addressing an individual project's needs versus the benefit gained to that location and the system overall. This is illustrated in Figure 5.30. The preferred location for a rightsized project on the benefit/cost curve is when the project is meeting the location's defined needs and, if applicable, adding system or safety enhancements that are appropriate for the location. However, if project elements are added beyond this without appropriate justification, the increase in benefit relative to the increase in cost degrades substantially.

It is understandable why some projects start creeping towards the top of the curve. For example, there may be interest in adding any elements that may be needed in the coming decades while work is being done, rather than potentially needing to come back in the relatively near future for additional work. However, given the limited budget for the transportation system, it is not prudent to take this approach for unnecessary enhancements or when future needs are relatively uncertain. Once the defined need for the project is met, designers must weigh the decreasing return on investment that additional project elements would have relative to the benefit that would be gained.

**Figure 5.30: Rightsizing "sweet spot"**




*Source: Iowa DOT*

Rightsizing does not replace the use of engineering judgment; input from the public, user groups, or communities; required guidelines, parameters, or laws; or other important elements of the project selection and development process. The policies are meant to provide guidance on achieving a rightsized transportation system for Iowa, which is defined in the next section.

## Definition

The Iowa DOT defines rightsizing as the following:

> Rightsizing means seeking an appropriate level and type of investment that avoids overinvesting or underinvesting, overbuilding or underbuilding, and overserving or underserving the market based on user and system needs.
>
> The department's role in rightsizing should be viewed as leveraging existing assets and limited resources to maximize the returns for users of the multimodal transportation system, with operating, maintaining, and constructing this system as a means to this end.

Rightsizing is incremental and applies at various points during planning, programming, and project delivery activities, as well as during ongoing operation and maintenance of the transportation system. While the policy statements provide guidance, to be successful the rightsizing concepts need to be integrated through implementable actions across these stages. Decisions made at each level of development should build upon each other to result in the best solutions to support the quality and financial sustainability of the transportation system. It is anticipated that a rightsizing workplan will be developed to outline activities and responsibilities to implement rightsizing. Many of the possible implementation activities discussed for the policy statements throughout this section would likely be addressed through the workplan.

## Policy Statements

To support rightsizing implementation, a number of policy statements have been developed to help guide investment decisions for Iowa DOT projects. Some of these topics are already considered in the planning and project development process, but many of these statements will require further work, such as research, analysis, incorporating new elements or checks into the project development process, and modifications to guidance documents and manuals.

The ten rightsizing topic areas are:

- Project needs
- Comprehensive needs
- Stewardship priority
- Stratification of the system
- Equity
- Resiliency
- Congestion or operational issues
- Emerging technologies
- Speculative development
- New or revised interchange access

## Project Needs

***All improvements shall address a measured transportation need based on current or forecasted conditions. Improvements addressing a current need should be prioritized over improvements addressing a forecasted need.***

### What does this mean?

- Every project requires a clearly defined transportation need or needs. While wholly unneeded projects may not be occurring, the specific need for a project is not always clearly defined. Projects can also suffer from scope creep, where additional enhancements or elements are added that are not directly related to defined needs. These choices can accumulate until many small, seemingly good decisions have resulted in losing sight of the big picture and the specific need(s) the project is addressing.
- Project needs can be adjusted or redefined, but this should be merited based the planning or design process. The benefits and costs of addressing needs may vary depending on project staging and scheduling, particularly in locations with significant needs resulting in large-scale projects.
- Current, known needs are to be prioritized over future, potential needs. This applies both when determining the elements to include in a specific project and when prioritizing among projects. Addressing a future need, or something that is not currently an issue but is expected to become one, involves estimation and judgment related to the likelihood for the future need. Implementing a project to address a future need that is relatively uncertain should be done strategically and carefully.
- The defined need referenced in this statement is not meant to be equivalent to the purpose and need required by NEPA, though they would likely be very similar.

### How might this be implemented?

- Clear definition of need in all project concept statements.
- If new project elements are identified after projects are concepted, reevaluation of those elements relative to the identified needs.
- If elements are incorporated to address future needs, those potential needs are clearly quantified through data-driven evaluation.
- Continue improving analysis tools and benefit/cost evaluation tools and integrating them into the planning, programming, and project development process.
- Consider how the staging or scheduling of projects may impact project benefits/costs.

## Comprehensive Needs

***Broader system, corridor, and modal needs shall be considered as individual projects are developed. To identify such needs, project sponsors should consult the state transportation plan, relevant system and modal plans, and planning studies. Decisions should emphasize maximum benefit to the system, rather than maximum benefit to the project location.***

### What does this mean?

- While an individual project may have a clear extent, it should not be developed in isolation. Individual road segments and bridges are parts of larger highway corridors, multimodal routes, regions, and the overall transportation network. Project development needs to involve consideration of what is planned in the broader corridor and nearby areas; needs and policies that have been documented in statewide system and modal plans, studies, and policies; and systemic and location-specific safety improvements.
- This is an example of rightsizing that may result in a project that is broader in scope than the originally defined need. For example, application of the Complete Streets policy may help identify the need and justification for wider paved shoulders than the original project design included. In another example, consideration of Super-2 strategies on a targeted Super-2 corridor may result in the inclusion of additional passing and/or turn lanes as part of the project's design.

### How might this be implemented?

- Continued development of system, modal, and systemic safety plans, identification of strategies, and adoption of policies to help meet needs.
- Coordination with stakeholders, including local jurisdictions, public transit agencies and modal partners, and other interested parties.
- Continued use of Planning and Environmental Linkages (PEL) feasibility studies to define the vision, goals, and strategies for study areas and analyze engineering and environmental conditions.
- Integration of strategies and policies into the project development process, such as the Complete Streets policy, Super-2 targeted corridors, and SLRTP-identified needs in concept statements.
- Development of tools to evaluate project benefits and costs, as well as benefits and costs of policies or system-level strategies that may not fit well into a traditional benefit/cost analysis.

## Stewardship Priority

***Program-level investment strategies and all improvements shall prioritize maintaining a state of good repair. Decisions should apply appropriate asset management techniques, including life cycle planning, and consider relevant state of good repair targets to maintain transportation infrastructure in sufficient condition.***

### What does this mean?

- This statement is important documentation of our asset management approach for investments. Asset management is about applying the right treatment at the right time to achieve the ideal balance of asset condition and whole-life costs. When planning projects, it can be easy to focus only on up-front costs and choose the option that is cheaper now, even if it is more expensive in the long run. Similarly, it can also be tempting to put off a costlier treatment or rehabilitation in favor for a cheaper one, to save money now at the longer-term detriment of the system. Making investment decisions through an asset management lens helps ensure these tradeoffs are evaluated as part of the project development process.
- The definition of a state of good repair may vary by mode, asset, or other classifications, and may be quantified by a condition target. In general, a state of good repair means that assets are functioning as designed at an acceptable level of performance within their useful service lives and are sustained through regular maintenance, rehabilitation, and replacement programs.

### How might this be implemented?

- Specific policies may be developed that outline state of good repair targets. For example, the Transportation Asset Management Plan (TAMP) identifies system-level state of good repair targets for pavement condition on the Interstate system and non-Interstate National Highway System (NHS), and for bridge condition on the NHS. Another rightsizing policy suggests further stratifying the system for purposes such as these.
- Integrate evaluation of whole life costs into project planning and development.
- Apply appropriate asset management techniques to projects.
- Continue to research and refine asset management systems, practices, and treatments.

## Stratification of the System

***The department shall evaluate and consider implementing an approach to stratify the Primary Highway System for the purpose of defining corresponding state of good repair targets and informing investment decisions. Such stratification should consider existing designations, including the National Highway System and Commercial and Industrial Network, functional classification, current and forecasted use, and network redundancy.***

### What does this mean?

- The state-owned highway system is diverse and complex. It ranges from urban multilane Interstates with over 130,000 vehicles per day to rural two-lane roads with less than 1,000 vehicles per day. Different roadways have different contexts, users, and needs, such as freight routes, commuter corridors, community access, and so on. These purposes may need to be managed differently and to a different level. For example, it may be appropriate to target a higher level of service or condition level on a busy freight route than on a less utilized highway that primarily provides access for local traffic. Stratification could inform condition targets as well as the types of treatments that would be considered for particular roadways.
- While state of good repair targets are identified at the Interstate and non-Interstate primary highway system levels for pavements and bridges, this does not provide adequate delineation given the wide range of characteristics seen on non-Interstate highways. The proposed type of stratification would provide further context to asset management planning and investment decisions.

### How might this be implemented?

- Review existing and potential stratification classifications.
- Consider adoption of unique state of good repair targets based on a preferred system stratification.
- Consider adoption of policies or strategies related to the range of treatment types that will be considered based on stratification.

## Equity

***The department shall evaluate the ways transportation policies and investments impact equity and consider strategies to support an equitable transportation system. Such consideration should include reviewing sociodemographic and socioeconomic disparities and barriers that inhibit underserved communities from fully accessing and utilizing the transportation system.***

### What does this mean?

- Different people and populations have different levels of need when it comes to fully accessing and using the transportation system. In particular, additional consideration may be required to ensure underserved individuals are able to achieve an equitable level of access to affordable and reliable transportation options. This applies to transportation infrastructure and services that already exist along with those that may develop or become common in the future as technology advances.
- This is an example of rightsizing that could result in adding project elements in order to address community-specific needs and/or to ensure the impacts of transportation projects are distributed fairly.
- Examples of underserved groups include, but are not limited to, individuals who are low income, minority, limited English proficient, elderly, children, or persons with disabilities.
- In some cases, legacy highway construction was built in a manner disruptive to communities, particularly low-income communities and communities of color. Enhanced engagement with local communities should be conducted to ensure these types of impacts do not occur due to transportation projects and, where appropriate, to remove or retrofit infrastructure barriers that disrupt community connectivity.

### How might this be implemented?

- Continue to apply environmental justice, Title VI, and nondiscrimination policies in all investment decisions to achieve an equitable distribution of benefits and burdens, including ensuring that there are not disproportionately high and adverse human health or environmental effects on underserved populations.
- Ensure that driver license and identification issuance reflects nondiscrimination and Civil Rights policies and enables all populations to have the same opportunity for mobility.
- Analysis of the transportation needs of underserved populations.
- Consideration of non-drivers in investment decisions.
- Adoption of strategies to ensure equity.
- Development of tools to evaluate projects from an equity perspective, which may not fit well into a traditional benefit/cost analysis.
- Enhanced public involvement efforts.
- Coordination with stakeholders, including local jurisdictions, public transit agencies and modal partners, underserved community representatives, and other interested parties.

## Resiliency

***The department shall assess, plan for, and invest in the resiliency of the multimodal transportation system to mitigate against natural and human-made disruptions. Such activities should consider proactive and reactive measures that are proportional to existing and potential threats.***

**What does this mean?**

- Resiliency is the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and quickly recover from disruptions. Extreme weather and natural disasters have happened with increasing frequency and can lead to devastating consequences for the transportation system, not to mention people's homes, businesses, and lives.
- Flooding is likely Iowa's greatest ongoing threat to resiliency, but climate change and a wide range of natural disasters and human-made disruptions threaten the usability and condition of the highway network. Planning and project development should consider the risk of disruptions to the system and whether proactive steps can be taken to construct more resilient transportation assets.
- Resiliency also means being prepared to react when disruptions or disasters occur, including making continued improvements to activities such as traffic incident management protocols, diversion routes, and preparedness and recovery planning. This is necessary not just for large-scale disaster planning, but also for addressing short-term disruptions to the transportation system or IT infrastructure. These disruptions can be unplanned, such as crashes, a severe storm, or cyberattack, or planned, such as work zones or closures for construction or traffic management for special events.

**How might this be implemented?**

- Conduct resiliency analyses that consider the criticality of the transportation system and its vulnerability to climate change and various natural disasters and human disruptions.
- Enhance disaster mitigation and response planning and coordination.
- Improve department cybersecurity to protect IT assets by addressing vulnerabilities, ensuring critical systems are protected, and incorporating redundancy where needed.
- Consider innovative project design to make assets more resilient to disasters.
- Routinely conduct risk management activities at the planning and project levels.
- Evaluate policies related to transportation system disruptions, such as how traffic is managed during construction projects.

## Congestion or Operational Issues

***Improvements proposed to address current or forecasted congestion shall consider increased use of technology and operational improvements. Decisions should emphasize maximizing the capacity of the existing multimodal transportation network and managing demand for the system, rather than investing in capacity expansion.***

### What does this mean?

- Iowa has a mature and reliable transportation system. There is little congestion or delay on the system as a whole; when these issues are experienced, they are typically confined to specific locations and to peak hours. While there may be instances where building additional capacity is the necessary solution to a congestion issue, this is becoming the exception rather than the rule. Strategies that better utilize existing infrastructure are preferable to adding lanes to the highway system, which results in increased right of way needs, construction costs, and long-term maintenance commitments.
- There is an increasing necessity to consider other options for improving operations, including technological solutions, innovative design, managing peak-hour demand, and use of public transit, carpool/vanpool, or other modes besides single occupant vehicles. Before any capacity expansion project proceeds, alternatives to capacity expansion should be considered first and eliminated as being less prudent options.

### How might this be implemented?

- Continue to implement Integrated Corridor Management (ICM) studies and solutions in areas with congestion or operational issues.
- Continue advancement of Transportation Systems Management and Operations (TSMO) planning and inclusion of feasible TSMO solutions in planning studies and project development.
- For capacity expansion projects, demonstrate that capacity expansion is the only feasible or most practicable option before proceeding.
- Enhance transportation and land use planning coordination with metropolitan and regional planning agencies and communities.
- Conduct comprehensive planning for deployment of operations-focused strategies, including initial implementation costs as well as ongoing operations and maintenance needs.

## Emerging Technologies

***All improvements shall consider the impact of underestimating or overestimating the influence of emerging technologies on the intended benefit of the improvement over its useful life. In considering such impacts, the department should evaluate probable rates of technological deployment/adoption, projected impacts of technologies on the performance of the multimodal transportation system, and the sensitivity of return-on-investment to various deployment/adoption scenarios.***

### What does this mean?

- Change is inevitable. Some of the clearest examples include the increasing use of electric vehicles, growing micromobility options, and advancements in automated transportation and personal delivery devices. Although broader adoption of these types of changes may be on the horizon, we cannot say with certainty how close that horizon is, how widespread adoption of these technologies will be, or whether these changes will be equitably available to all users of the transportation system.
- While we are working to support the advanced driver assistance systems of today and the automated driving systems of tomorrow, projects that include decisions that assume advancements in technology should include thorough evaluation of the likelihood of that technological advancement occurring in the near-term future and the degree to which the project's success or need is tied to that. This should be considered strategically and carefully when:
    - Considering whether to include project elements that have limited current benefits due to the assumption that they will be needed for technological advancements in the future.
    - Considering whether to exclude project elements that have current benefits due to the assumption that they will not be needed in the future.
    - Making choices that are tied to a single future scenario with an uncertain likelihood.
    - Making choices that exacerbate inequities or mobility limitations among various groups.
- Advances in mobile technology will lead to more opportunities for documents and credentials to be held and transacted directly by the individual user. This may include mobile driver license or identification applications and fully electronic vehicle titles. There will be challenges to ensure that such documents are accurate in real-time, secure, legally accepted, and made accessible to all users.

### How might this be implemented?

- Incorporate pause points into the project development and programming processes to consider the evolving impacts of disruptive technologies.
- Monitor technological advancements, likely deployment scenarios, and impacts to various groups.
- Conduct risk analysis relative to the tradeoffs of including or not including project elements due to technological change.
- Strategize how and when to participate in pilot deployments or to act as a lead adopter among states for key advancements in technology.

## Speculative Development

***Improvements proposed primarily in support of speculative development shall not be considered unless a transportation need is also being addressed. This shall not apply to improvements proposed to address transportation needs associated with planned development.***

### What does this mean?

- The department's top priority is stewardship of the transportation system and ensuring that the system Iowa needs is maintained in a condition that enables safe and efficient passenger and freight movements. There is not adequate funding to complete all needed transportation improvements, so we cannot afford projects that do not have a demonstrated transportation need.
- Speculative development means there is no defined or imminent development planned.
- To help address economic development, Iowa DOT administers the Revitalizing Iowa's Sound Economy (RISE) grant program, to which this policy does not apply. That program helps support both immediate needs and speculative development for business and industrial growth.

### How might this be implemented?

- Ensuring that all projects have a defined transportation need.
- Ensuring that associated planned development, which may factor into project decisions, meets conditions that would indicate more certain or imminent progress.

## New or Revised Interchange Access

*The department shall provide for a consistent approach in determining financial participation between the Iowa DOT and local governments for new or revised interchange access. For new or revised service level interchanges proposed primarily in support of local development, or in cases where local development traffic would degrade the performance of a systems interchange, the department should seek a proportional cost sharing agreement with the local government(s).*

### What does this mean?

- Similar to speculative development, building interchanges without a transportation need is not necessarily in the Iowa DOT's interest from a system perspective. Being more consistent in how we approach situations where new or revised interchange access is proposed would be beneficial.
- While some degree of flexibility is always needed at a project level, clear parameters should be established at the department level to help guide conversations related to cost sharing.

### How might this be implemented?

- Develop guidelines for how interchange access projects are typically funded in various scenarios.