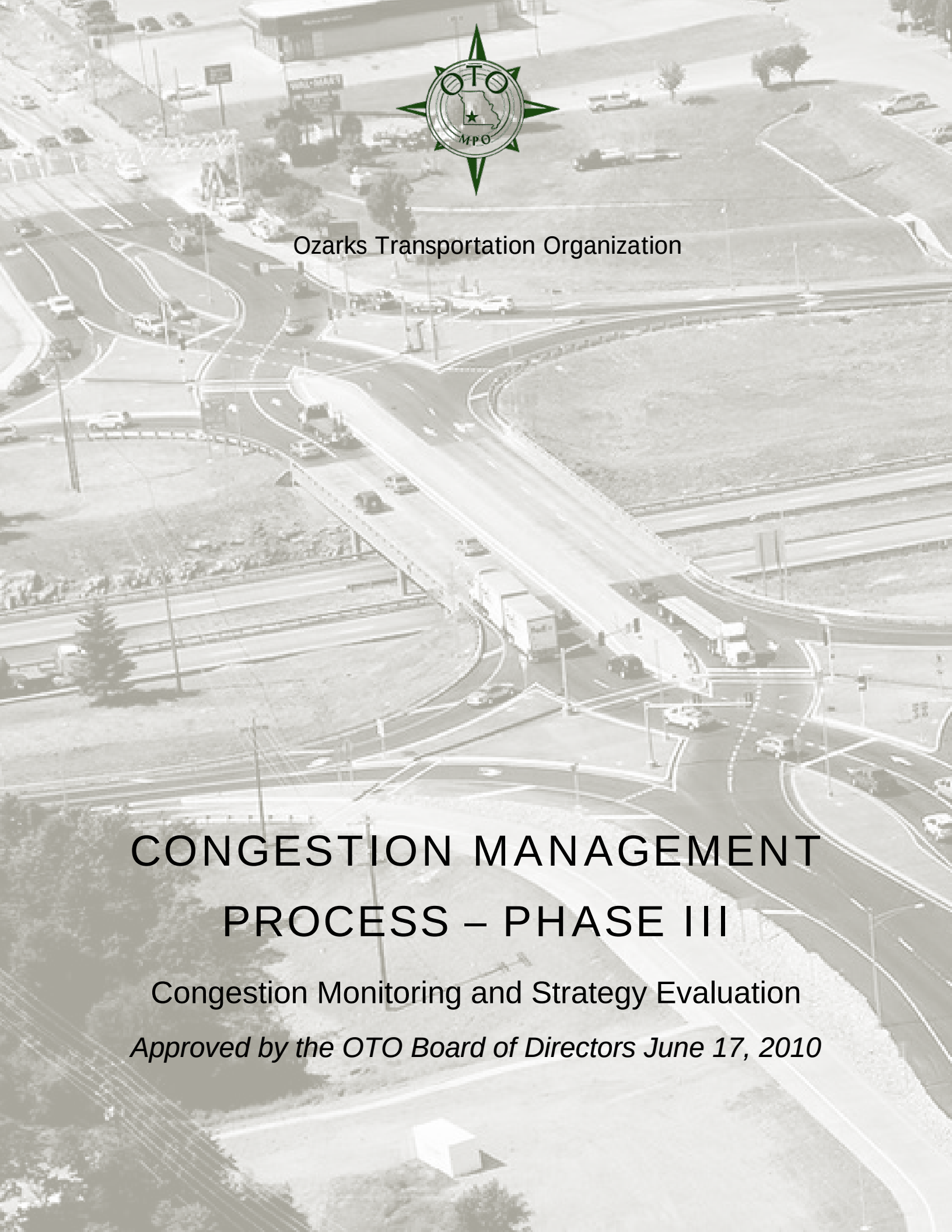


Ozarks Transportation Organization

CONGESTION MANAGEMENT PROCESS – PHASE III

Congestion Monitoring and Strategy Evaluation

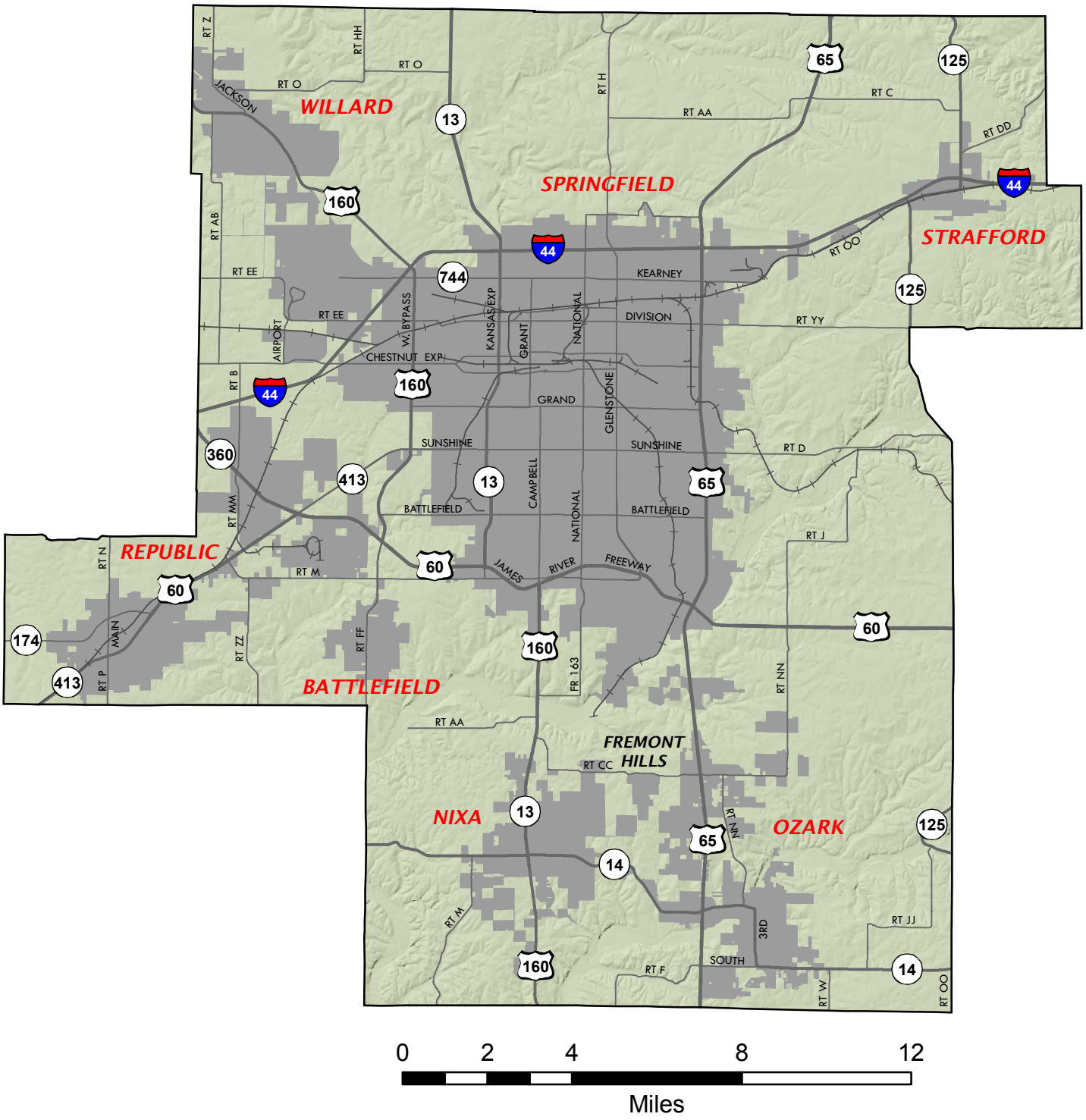
Approved by the OTO Board of Directors June 17, 2010

Table of Contents

Maps

Map 1

MPO Boundary



Map 2

Congestion Management System Definition

Introduction

The Congestion Management Process (CMP) is a systematic approach to addressing congestion within the Ozarks Transportation Organization's (OTO) planning area. The process was developed through a collaborative effort involving area jurisdictions and technical experts. The intent of the CMP is to improve the efficiency and effectiveness of both the existing and future transportation system through the implementation of Transportation System Management (TSM), which includes Intelligent Transportation Systems (ITS) and Travel Demand Management (TDM) techniques.

Overview of Previous Phases

The CMP consists of three main parts. Phase I is a methodology to identify congestion and designate specific strategies to address congestion. Phase II is the identification of where congestion is occurring or is expected to occur during the 20-year plan horizon and the implementation of identified strategies. Phase III is the development of a monitoring program to determine if selected strategies are effective in dealing with congestion at identified locations, and if not, identify other strategies to alleviate congestion.

Network Redefined

Phase I and II of the CMP identified the CMP network as OTO-area roadways that are part of the National Highway System (NHS). In Phase III the network is redefined to add several arterial roads that are not part of the NHS. Please see **Map 2** for identification of the CMP network.

Congestion Monitoring

The following four measures are the indicators that the Ozarks Transportation Organization has elected to monitor in order to determine where congestion is occurring.

1. Volume-to-Capacity Ratio

The first factor OTO utilizes to monitor congestion is volume-to-capacity ratio. Traffic volumes that are used in the ratios can be found on **Map 13**. **Map 13** indicates that much of the freeway system is experiencing a decrease in traffic volume. This is likely due to rising unemployment and a nationwide decrease in vehicle miles traveled (VMT). **Map 13** also indicates that traffic moving between Christian County and Greene County is decreasing. However, much of the expressway and arterial system, including West Bypass (Route 160), Kansas Expressway (Route 13), Glenstone Avenue (Route H, Loop 44, Bus. 65), Kearney Street (Route 744), Route 60 from Springfield to Republic, and Route 13 north of Springfield are seeing an increase in traffic. Traffic volumes on National Avenue and Chestnut Expressway (Loop 44, Bus. 65) are decreasing.

Map 3 interprets the volumes into a ratio comparing what percentage of available capacity is being utilized. Any roadway in which traffic is utilizing 86% or more of available capacity is shown in red and considered to be over a desired capacity. Major areas to note changes include the following:

- West Bypass (Route 160) was expanded to four lanes from two lanes north of Chestnut Expressway (Loop 44). Therefore, it is no longer considered over capacity.
- Several areas along Route 13 (Kansas Expressway) experienced increases in volumes. Accordingly, the entire length of Route 13 (Kansas Expressway) from I-44 to James River Freeway (Route 60) is now considered over capacity during the peak hour of travel.
- Route 160 from James River Freeway (Route 60) to Route 14 is no longer considered over capacity. However, it is important to note, the portion of Route 160 in Greene County is very close to being considered over a desired capacity and that the actual capacity of this segment of road is reduced below its standard capacity due to the presence of more signalized intersections and access points along this corridor than are desired, thereby causing an overall congested condition.
- Route 65 north of I-44 was expanded to four lanes from two lanes and therefore is no longer considered over capacity.

In addition to identifying the facilities that were congested during the peak hour of travel, the times in which each facility had a traffic volume that exceeded capacity is noted on **Map 3**. Several roadways experienced high traffic volumes for a duration longer than the typical rush hour

2. Accident Rates

Accident rates are indicated on **Map 4**. A segment of road is considered to have a high accident rate if the three-year average accident rate for that segment exceeds 150% of the area's average accident rate. A road segment is considered to have a medium accident rate if the three-year average accident rate for that segment is between 50.1% and 150.0% of the area's average accident rate.

Accident rates increased from medium to high in several locations. These locations include:

- Chestnut Expressway (Loop 44) from Kansas Expressway (Route 13) to National Avenue
- Kansas Expressway (Route 13) from Sunshine Street (Route 413) to Chestnut Expressway (Loop 44)
- James River Freeway (Route 60) from Kansas Expressway (Route 13) to Campbell Avenue (Route 160)
- Glenstone Avenue (Bus. 65) from Sunshine Street (Route D) to Battlefield Road
- Route CC west of Route 65
- Route 14 west of Route 65
- Route 65 from I-44 to Kearney Street (Route 744)- likely due to the reconstructed interchange at and I-44 and Route 65

Accident Rates decreased from high to medium at the following locations:

- Kearney Street (Route 744) from Glenstone Avenue (Loop 44) to National Avenue
- Glenstone Avenue (Loop 44) from Division Street to Chestnut Expressway (Loop 44, Bus. 65)
- Sunshine Street (Route D) from Glenstone Avenue (Bus. 65) to Route 65
- James River Freeway (Route 60) from National Avenue to Glenstone Avenue (Bus. 65)

3. Average Travel Speed

Travel time runs were conducted on all roadways comprising the CMP network utilizing Global Positioning System (GPS) units. These units collected data to determine the average time it takes to travel a corridor. These data were used to determine segments in which the average speed was at least 20 mph below the posted speed limit. These segments are identified in red on **Maps 5.1, 5.2, 6.1 and 6.2**. There were not any significant delay points identified along the freeway system. However, every expressway and arterial roadway within the CMP network did experience at least one point of significant delay, in which the average speed was at least 20 mph below the posted speed limit. Generally, the same was true for travel time runs conducted in 2005.

4. Intersection Level of Service (LOS)

Intersection level of service is a function of delay. Accordingly, an intersection with LOS A would have a shorter delay than an intersection with LOS F. The longer traffic is delayed at a particular intersection, the lower/worse the level of service for that intersection. We were able to collect much more intersection LOS data for this report than for previous reports. Please see **Maps 9.1, 9.2, 10.1 and 10.2** to identify intersection LOS. The lack of historical data makes it difficult to establish a trend in intersection LOS.

Congested Facilities

Maps 11 and 12 identify facilities in which three of the four congestion indicators listed above were met. These facilities are considered to be "congested" and are listed below. There are more congested facilities listed for 2008 than for 2005 due primarily to the collection of additional data.

2008 Congested Roadways

Kansas Expressway (Route 13) from I-44 to Kearney Street (Route 744)
Kansas Expressway (Route 13) from Chestnut Expressway (Loop 44) to College Street
Kansas Expressway (Route 13) from Bennett Street to Sunshine Street (Route 413)
Kansas Expressway (Route 13) and Battlefield Road
Kansas Expressway (Route 13) and James River Freeway (Route 60)
Sunshine Street and Fort Avenue
Campbell Avenue and James River Freeway (Route 60)

National Avenue and James River Freeway (Route 60)
Glenstone Avenue (Bus. 65) and James River Freeway (Route 60)
14th Street from 25th Street to Route 65
Route CC from 23rd Street to Route 65
Route 14 and Route 160
Campbell Avenue and Battlefield Road
Campbell Avenue and Walnut Lawn Street
Campbell Avenue and Primrose Street
National Avenue and Battlefield Road
National Avenue and Montclair Street
Glenstone Avenue (Loop 44, Bus. 65) from I-44 to Battlefield Road
Sunshine Street and National Avenue
Sunshine Street (Route D) and Route 65
Chestnut Expressway (Bus. 65) and Route 65

Implemented Strategies

Phase I of the adopted Congestion Management Process outlined five main strategies on which to focus the OTO Congestion Management Process. Strategies which have been implemented are listed below along with system improvements, policy changes and encouragements to reduce demand at peak travel times.

Strategy #1: Improve Roadway Operations

- **Intersection Geometric Improvements:** The following interchange and intersection improvements were made to improve overall efficiency and operation.

  Interchange Improvements
  - Chestnut Expressway (Route 266/Loop 44) and I-44: reconfigured westbound on- and off-ramps
  - Glenstone Avenue (Route H/Loop 44) and I-44: converted cloverleaf interchange to diamond interchange, added signals at ramps
  - Kansas Expressway (Route 13) and I-44: reconfigured diamond interchange to diverging diamond
  - Glenstone Avenue (Bus. 65) and James River Freeway (Route 60): improved interchange, reconfigured eastbound on- and off-ramps
  - I-44 and Route 65: partially converted cloverleaf interchange to full directional interchange
  - Route 65 and Route 14: improved interchange, expanded Route 14 from three lanes to six lanes, reconfigured outer road (not accounted for in map data)
  - Route 125 and I-44: restriped both off-ramps to include separate left- and right-turn lanes
  - Route 65 and Route CC: added slip ramp onto northbound Route 65, extended northbound acceleration lane

- Route 65 and Kearney Street (Route 744): removed median to reconfigure Kearney Street (Route 744) from four lanes to five lanes
- Glenstone Avenue (Bus. 65) and James River Freeway (Route 60): reconfigured interchange, increased signal spacing, constructed new ramping scheme; added new signal at Republic Road and Harvard Avenue, widened Republic Road to arterial standards

Intersection Improvements

- Route 60 and Route 174 (Republic): removed ramp from westbound Route 60 to westbound Route 174 and replaced with right-turn lane
- Route 60 and Hamilton Street (Republic): added new signal (Hamilton Street now connects to Oakwood Street and is also the main entrance to the Lowe's store in Republic)
- Kearney Street (Route 744) and Cresthaven Avenue: added new signal
- Route 160 and Jackson Street (Willard): added new signal and turn lanes
- Fremont Road and Route CC (Fremont Hills): added new signal and turn lanes
- Route EE and Alliance Drive: added new signal and turn lanes
- Route ZZ and Route M: added new signal; created turn lanes for new Republic High School
- Kansas Expressway (Route 13) and Evergreen Street: relocated signal to improve spacing from the new diverging diamond interchange at Route 13 and I-44
- Kansas Expressway (Route 13) and Kearney Street (Route 744): improved intersection
- Kansas Expressway (Route 13) and Chestnut Expressway (Loop 44): improved intersection
- Kansas Expressway (Route 13) and Sunshine Street (Route 413): improved intersection
- Kansas Expressway (Route 13) and Battlefield Road: improved intersection
- Glenstone Avenue (Loop 44) and Kearney Street (Route 744): improved intersection
- Glenstone Avenue (Loop 44) and Division Street: improved intersection
- Glenstone Avenue (Loop 44, Bus. 65) and Chestnut Expressway (Loop 44, Bus. 65): improved intersection
- Glenstone Avenue (Bus. 65) and Sunshine Street (Route D): improved intersection
- Glenstone Avenue (Bus. 65) and Primrose Street: improved intersection
- Chestnut Expressway (Loop 44) and West Avenue: added new signal
- Chestnut Expressway (Loop 44) and National Avenue: improved intersection
- Route 14 and Truman Boulevard (Nixa): added new signal and turn lanes
- Route 14 and Ridgecrest (Nixa): added new signal and turn lanes
- South Street (Bus. 65) in Ozark: expanded road to four- and five-lane roadway, added signal at 17th Street
- Route 14 in Ozark: added signal and left- and right-turn signal at Ozark Town & Country Shopping Center; this signal is currently operating as a flasher since this site has not yet been developed
- Route NN and Bluff Drive (Ozark): added signal and left-turn lane for new Ozark High School
- James River Freeway (Route 60) and West Bypass (Route 160): added new signals
- National Avenue and Grand Street: improved intersection capacity
- National Avenue and Montclair Street: improved intersection

- National Avenue and Primrose Street: added dual left-turn lanes and improved right-turn lanes
- National Avenue and Lakewood Street: added new signal
- Sunshine Street (Route 413) and Marion Avenue: added new signal
- Sunshine Street and Fort Avenue: improved intersection
- Sunshine Street and Fremont Avenue: improved intersection
- Sunshine Street (Route D) and Bedford Avenue: relocated intersection to align with Eastgate Avenue
- Campbell Avenue and Olive Street: improved intersection
- Campbell Avenue and College Street: improved intersection
- Campbell Avenue and McDaniel Street: added new signal
- Division Street and Packer Road: added new signal
- Republic Road and Charleston Avenue: improved intersection
- Primrose Street and Delaware Avenue: added new signal
- Walnut Lawn Street and Kansas Avenue: added new signal
- Jefferson Avenue and St. Agnes Cathedral (between Elm and Cherry): removed signal
- Commercial Street and Campbell Avenue: removed signal
- Benton Avenue/Kimbrough Avenue from Chestnut Expressway (Loop 44) to Grand Street: restriped from four lanes to three lanes
- Grant Avenue from Chestnut Expressway (Loop 44) to Grand Street: restriped from four lanes to three lanes
- Walnut Street and South Avenue: removed signal flasher

<u>Turn Lanes</u>

- Route MM (Republic): added left-turn lane by Brookline Business Park
- Route P (Republic): added right-turn lane between Route 60 and Grace Street
- Route 160 (Willard): added turn lanes at Farm Road 94, Farm Road 123, and Hunt Road
- Route 125 (Rogersville): added center turn lane at new Rogersville High School
- Route M (Battlefield): added turn lanes for new Price Cutter entrance, improved sight distance
- Route YY and Farm Road 193: added right- and left-turn lanes
- Route YY and Farm Road 199: added turn lanes and improved sight distance
- Sunshine Street (Route 413) and Scenic Avenue: extended turn lanes
- Route M (Republic): added turn lanes south of Route 60
- Route CC (Ozark): added turn lanes between 22nd Street and 25th Street
- Route CC and Old Castle Road (Nixa): added turn lanes
- Route 14 and Ozarks Technical Community College's (OTC) Richwood Valley Campus (between Ozark and Nixa): added turn lanes
- Route 14 and Tiffany/Majestic Oaks (Nixa): added turn lanes
- Glenstone Avenue (Bus. 65) from Independence Street to James River Freeway (Route 60): added lane westbound ramp lane

- National Avenue (Farm Road 163) from Plainview Road (Farm Road 182) to Farm Road 192: added turn lanes

Passenger Loading Lanes

- Jefferson Avenue next to Central High School (near the intersection of Jefferson Avenue and Central Street)
- Luster Avenue next to Field Elementary School (near the intersection of Luster Avenue and Barataria Street)
- Cherry Street near Bingham Elementary School (near the intersection of Cherry Street and Barnes Avenue)

- **Intersection Signalization Improvements:** Improving signal operations through re-timing signal phases, adding signal actuation, etc.

New Signals (Off CMP Network)

- Route EE at Alliance Drive (Springfield)
- National Avenue at Lakewood Street (Springfield)
- National Avenue at Plainview Road (Farm Road 182) (Springfield)
- Campbell Avenue at McDaniel Street (Springfield)
- Route M at Route FF (Battlefield)
- Route M at Route ZZ (Republic)
- Route 266 at Airport Boulevard (Springfield)
- South Street (Bus. 65) at 17th Street (Ozark)

New Signals (On CMP Network)

- Kearney Street (Route 744) at Cresthaven Avenue (Springfield)
- West Bypass (Route 160) at Nichols Street (Springfield)
- Route 160 at Jackson Street (Willard)
- Route 60 at Hamilton Street (Republic)
- Route 14 at Ridgecrest (Nixa)
- Route 14 at Truman Road (Nixa)
- Route CC at Fremont Road (Ozark)
- Sunshine Street (Route 413) at Marion Avenue (Springfield)
- Chestnut Expressway (Loop 44) at West Avenue (Springfield)
- Chestnut Expressway (Route 266, Loop 44) at I-44 westbound ramps (Springfield)
- Chestnut Expressway (Route 266, Loop 44) at I-44 eastbound ramps (Springfield)
- Glenstone Avenue (Route H, Loop 44) at I-44 eastbound ramps (Springfield)
- Glenstone Avenue (Route H, Loop 44) at I-44 westbound ramps (Springfield)

Signal Phasing/Actuation Changes

- Route 160 and Route CC (Nixa): removed pre-timed operation during coordination
- Route 160 and Tracker Road (Nixa): removed pre-timed operation during coordination
- Route 160 and Tracker Road (Nixa): removed split phasing on Tracker Road
- Route 160 and Northview Road (Nixa): removed split phasing on Northview Road
- Route 60 and Route P/Main Street, Route 60 and Elm Street, Route 60 and Hines Street (all in Republic): added video detection
- Glenstone Avenue (Bus. 65) and Peele Street: removed split phasing on Peele Street
- Norton Road and Grant Avenue, Norton Road and National Avenue: adjusted hours of operation to accommodate increased traffic traveling to and from the annual Ozark Empire Fair
- National Avenue and Grand Street: retimed signal following intersection reconstruction
- National Avenue and Primrose Street: adjusted signal timing to allow for better progression and to accommodate construction of a diverging diamond interchange at National Avenue and James River Freeway (Route 60)
- National Avenue from Republic Road to Weaver Road: created plan for evening progression
- Sunshine Street and Fort Avenue: retimed signal following intersection reconstruction
- Battlefield Road from Luster Avenue to Moulder Avenue: adjusted Sunday morning timing to allow for better progression
- Campbell Avenue from Olive Street to Walnut Street: retimed signals following completion of streetscape project and signal addition at McDaniel Street
- Division Street and Cedarbrook Avenue: implemented new signal timing
- Grant Avenue from College Street to Walnut Street: retimed signals following restriping of Grant Avenue from four lanes to three lanes
- Grand Street from Fort Avenue to Kings Avenue: retimed signals following restriping of Grant Avenue and Benton Avenue/Kimbrough Avenue from four lanes to three lanes
- Fremont Avenue from Primrose Street to Republic Road: retimed signals to accommodate construction projects on Republic Road and National Avenue
- Kimbrough Avenue from Trafficway Street to Madison Street: retimed signals following restriping of Benton Avenue/Kimbrough Avenue from four lanes to three lanes
- Jefferson Avenue from Olive Street to Walnut Street: retimed signals with a shorter cycle length
- Primrose Street and Kings Avenue: changed signal timing following phasing changes
- Kansas Avenue and Walnut Lawn Street: adjusted signal timing
- Springfield annual, special event, and city-wide signal retiming:
    - Christmas/holiday season timing adjustments: Campbell Avenue, National Avenue, Battlefield Road, Fremont Avenue, Sunset Street, Primrose Street, and Republic Road
    - Missouri State University football and basketball game timing adjustments (Missouri State University's campus is northwest of the intersection of National Avenue and Grand Street): National Avenue from Trafficway Street to Grand Street, Grand Street from Campbell Avenue to National Avenue, and Kimbrough Avenue from Cherry Street to Grand Street

- Springfield Cardinals baseball game timing adjustments (Hammons Field, home of the Springfield Cardinals, is northeast of the intersection of Trafficway Street and Sherman Parkway): National Avenue from Trafficway Street to Grand Street, Kimbrough Avenue from Trafficway Street to McDaniel Street, and John Q. Hammons Parkway from Trafficway Street to St. Louis Street
- Special event timing adjustments: Eagles concert at JQH Arena on the campus of Missouri State University, Sarah Palin's visit to a bookstore located near the intersection of Glenstone Avenue (Bus. 65) and Battlefield Road, Barack Obama's visit to JFK Stadium (Grant Avenue and Meadowmere Street) at Parkview High School, parades, etc.
- Flashing signal operation was changed or adjusted on all city signals. South of Chestnut Expressway (Loop 44, Bus. 65), city signals flash from 12:00 am to 6:00 am except at schools, the Battlefield Mall (located northwest of the intersection of Glenstone Avenue (Bus. 65) and Battlefield Road), hospitals, and other special areas. North of Chestnut Expressway (Loop 44, Bus. 65), city signals flash from 10:00 pm to 6:00 am, except at schools and at the intersections of Norton Road and Grant Avenue and Norton Road and National Avenue, which both flash from 12:00 am to 6:00 am.
- Adjusted all AM peak plans to begin later to allow for a shorter cycle length in the early hours of the morning after flash operation ends at 6:00 am.
- Implementation of a city-wide, trial 130-second cycle length.

- Missouri Department of Transportation three-year corridor signal timing implementation plan:
  - 2007: Kearney Street (Route 744), Chestnut Expressway (Loop 44, Bus. 65), Sunshine Street (Route 413, Route D), South Campbell Avenue (Route 160), James River Freeway (Route 60) and National Avenue interchange
  - 2008: Glenstone (Route H, Loop 44, Bus. 65), West Bypass (Route 160), Route 60 (signals in Republic), Route 160 (signals in Willard), Route 65 and Division Street (Route YY) interchange
  - 2009: Kansas Expressway (Route 13), East Sunshine Street (Route D), Route 65 and Battlefield Road interchange
  - 2010: South Campbell Avenue (Route 160), Chestnut Expressway (Loop 44, Bus. 65), Kearney Street (Route 744)

- **Coordinated Intersection Signals:** Improve traffic signal progression along identified corridors. The following signalized corridors were improved by installing new fiber optic connections between signal controllers to obtain better progression along the arterial system.

  <u>Signal Retiming</u>
  - Republic: Route 60 at Route P/Main Street, Route 60 at Elm Street, Route 60 at Hines Street, Route 60 at Route 174, Route 60 at Hamilton Street , Route 60 at Route M/Route MM.
  - Rogersville: Route 60 at Route 125
  - Willard: Route 160 at Route Z/Route AB
  - Battlefield: Route M/Republic Road at Route FF
  - Greene County: Route 13 at Route O
  - Strafford: Route 125 at I-44 north outer road

Fiber Optic Connections

- Route 266 from Airport Boulevard to I-44
- Glenstone Avenue (Route H/Loop 44) from Valley Water Mill Road to Evergreen Street
- Glenstone Avenue (Bus. 65) from Peele Street to James River Freeway (Route 60) eastbound on-ramp/Harvard Avenue
- Sunshine Street (Route 413) from Scenic Avenue to Kansas Expressway (Route 13)

- **Incident Management - Detection, Response & Clearance**: Utilize traveler radio, travel alert notification (via e-mail, fax, etc.), and general public outreach to enhance incident-related information dissemination. MoDOT has provided the list below of their incident management activities:

  - Provide assistance to the motoring public with vehicle breakdowns.
  - Keep the roadways clear of any objects that may interfere with traffic flow.
  - Respond to all incidents and emergencies on the I-44 corridor and other routes as instructed by the Incident Coordinator for District 8.
  - Help in traffic control operations during emergency situations and keep traffic flowing as smoothly as possible during periods of non-emergency.
  - Assist in opening roadways for traffic flow with as few delays as possible.
  - Monitor traffic flows, volumes, and tendencies to assure a safe driving experience.
  - Repair guard cable hits along the I-44 corridor and outer roads.
  - Utilize our equipment to repair guardrail hits where there is only minor damage, thereby avoiding the need for complete guardrail replacement.
  - Repair and replace delineators along the I-44 corridor and various routes in the Springfield Metropolitan area.
  - Repair and replace mile marker signs along the I-44 corridor.
  - Trim grass and weeds around both permanent and movable message boards so good visibility is maintained for the motoring public.
  - Repair and replace signs on the I-44 corridor at emergency turnaround points.
  - Inspect end terminal guardrail heads for damage, visibility and post attachment. Notify the proper inspector for replacement if necessary.
  - Monitor all routes everyday for any situations that could interfere with a smooth motoring experience.
  - Assist with snow removal operations.
  - Help with emergency situations such as flooding, tornadoes, and other emergencies where the Incident Coordinator needs our assistance.

- **Bus Turnout Construction:** Approximately 70 bus turnouts have been constructed along major arterials to improve traffic flow and roadway operations.

Strategy #2: Reduce Vehicle Miles Traveled (VMT) At Peak Travel Times

- **Land Use Policies/Regulations:** The following land use policies and regulations are in place in order to encourage more efficient patterns of commercial and residential development and to decrease both the total number of trips and overall trip lengths, as well as making transit use, bicycling and walking more viable:

  - All OTO jurisdictions have implemented future land use plans to encourage more efficient growth patterns.
  - The City of Springfield has developed regulations that allow for and encourage higher density infill developments including Planned Unit Development Ordinances and Zoning Overlay Districts.
  - The City of Nixa has decreased the minimum lot size for residential development.
  - The City of Ozark has decreased the minimum lot size for residential development.
  - OTO jurisdictions utilize developer incentives to encourage infill development.
  - All OTO jurisdictions have implemented regulations that require the construction of sidewalks in new subdivisions.
  - Greene County has adopted a new zoning district that allows for lots as small as 6,000 square feet. Previously the smallest lot size was 10,000 square feet.
  - The Republic School District has built a new high school in a location that discourages traffic within the City of Republic.

- **Employer Flextime Benefits/Compressed Work Week:** Encouraging employers to consider allowing employees to maintain a flexible schedule- thus allowing the employee the option to commute during non-peak hours.

  - MoDOT allows flextime.
  - OTO allows flextime.
  - Greene County allows for a compressed work week.
  - City of Springfield allows for a compressed work week.
  - City Utilities allows flextime.
  - Area school districts offset starting times in order to utilize the same buses for different schools.

Strategy #3: Shift Trips from Automobile to Other Modes

This strategy includes improvements beyond those made adjacent to roadways that are included in the Congestion Management Process network. Improvements made anywhere in the OTO study area that encourage people to use alternative modes may lessen the impacts of traffic system wide.

- **Fleet Expansion/Bus Service Expansion:**
  - Bus service expansions and modifications include the following:

    February 28, 2005: Changed Line 4 to travel Division Street instead of Commercial Street, except on Saturdays.

    January 2, 2006: Implemented 20-minute headways on Line 7 between 2:05 and 5:05 pm on weekdays.

    January 2, 2006: Added one additional hour of service (one more trip beginning at 6:35 pm) on Line 9 on weekdays.

    January 7, 2006: Added one additional trip (with service beginning at 6:00 am) on the Cedarbrook Avenue portion of Line 10 on Saturdays.

    April 3, 2006: Added one afternoon trip on Line 3 and one afternoon trip on Line 13 (each line begins afternoon service one hour earlier).

    January 8, 2007: Added two afternoon trips on Line 9 and deleted the 6:35 pm trip on weekdays.

    April 2007: Changed Lines 22 and 26 to incorporate bus service on Cedarbrook Avenue.

    January 2009: A fourth night/Sunday/holiday route was added and many daytime fixed route changes were implemented, including: Combining Lines 3 and 6 into one route, revising Line 11 to include service on South Scenic Avenue, extending Line 7 to service the Library Center on South Campbell Avenue (Route 160) south of James River Freeway (Route 60), extending Line 5 to service the Wal-Mart Supercenter on Independence Street west of Glenstone Avenue (Bus. 65), and extending Line 8 to service Partnership Industrial Center West located between Kearney Street (Route 744) and Route EE west of West Bypass (US 160). Service to the Springfield-Branson National Airport (located at the western terminus of Kearney Street (Route 744)) on Line 8 was eliminated and Line 13 was changed to all-day hourly service.

    February 2009: Extended Line 11 as follows from the intersection of Battlefield Road and Scenic Avenue: west on Battlefield Road to Golden Avenue, north to Seminole Street, east to Scenic Avenue.

    February 2009: Extended Line 27 as follows from the intersection of Kansas Expressway (Route 13) and Chesterfield Boulevard: west on Chesterfield Boulevard to Scenic Avenue, south to Republic Road, east to Kansas Expressway.

    December 14, 2009: Modified Line 6 to provide in-line transfers at the intersection of Mt. Vernon Street and Scenic Avenue. Increased service on Line 5 to provide 20-minute headways between 2:25 and 5:45 pm.

    January 18, 2010: Extended Line 9 as follows from the intersection of Kansas Expressway and Republic Road: west on Republic Road to Scenic Avenue, north to Chesterfield Boulevard, east to Kansas Expressway (Route 13). Purchased two additional 2005 Gillig fixed route buses, increasing the fixed route fleet to a total of 25 30-foot buses.

- **Improved/Expanded Bicycle Network:** The following improvements have been made to the bicycle network:
  - Greene County has added “Share the Road” signage to 26 miles of roadway.
  - The City of Springfield has added bicycle lanes on Central Street and East Trafficway Street.

- MoDOT has added “Share the Road” signage to West Bypass (Route 160) from Chestnut Expressway (Loop 44) to Battlefield Road and also constructed a wider travel lane from Kearney Street (Route 744) to Chestnut Expressway (Loop 44).
- The following streets were restriped with wider outside lanes to accommodate bicycles: Grant Avenue, Benton Avenue, Kimbrough Avenue, Cherry Street, and John Q. Hammons Parkway.

- **Bicycle Storage Systems:** The following improvements have been made with regard to bicycle storage systems:
  - The City of Springfield has adopted a bicycle parking ordinance that requires new development to include bicycle parking racks.
  - The City of Springfield has placed bicycle parking racks in downtown parking garages.
  - City Utilities has placed bicycle racks on the front of all buses.
  - City Utilities has placed bicycle storage lockers at the downtown bus transfer facility.
  - Many area jurisdictions have installed bicycle parking racks at community centers.

- **Improved/Expanded Pedestrian Network:** The following sidewalk and greenway trail improvements have been made:

  <u>Greenway Trails</u>
  - South Dry Sac Greenway II: greenway trail expansion
  - South Dry Sac Greenway I: greenway trail expansion
  - Frisco Highline Trail: trail paving project from Willard to Springfield

  <u>Sidewalks</u>
  - Nixa: school zone flashers installed at area schools
  - Greene County: new sidewalk built along the west side of Scenic Avenue between Farm Road 164 and Swan Street
  - Greene County: new sidewalk built along Plainview Road (Farm Road 182) between Farm Road 131 and Golden Avenue (Farm Road 135)
  - Greene County: new sidewalk built along Golden Avenue (Farm Road 135) between Battlefield Road and Plainview Road (Farm Road 182)
  - Greene County: new sidewalk built along Grant Avenue (Farm Road 151) between Farm Road 96 and Springfield city limits
  - Greene County: new sidewalk built along both sides of National Avenue (Farm Road 163) between Plainview Road (Farm Road 182) and Gaslight Drive and along the east side of National Avenue (Farm Road 163) between Gaslight Drive and Farm Road 192
  - Greene County: new sidewalk built along Blackman Road between Sunshine Street (Route D) and Farm Road 156
  - Ozark: new sidewalks built near school properties
  - Springfield: Boonville Avenue Phase I North (sidewalk reconstruction)

- Ozark: OTC's Richwood Creek Trails Project (new sidewalk to OTC Richwood Valley campus on Route 14 between Nixa and Ozark)
- Republic: Elm Street Sidewalks Phase I (new sidewalk construction)
- Republic: Elm Street Sidewalks Phase II (new sidewalk construction)
- Willard: North-South Pedestrian Link: sidewalks to school
- Willard: new sidewalk built near school properties
- Ozark: new sidewalk connections to new Community Center
- Republic: new sidewalk built along Hampton Avenue
- Republic: new sidewalk built along Main Street
- Greene County: new sidewalk built along Route ZZ and Route M near new Republic High School located southeast of the intersection of Route ZZ and Route M
- Springfield: approximately 3.2 miles of sidewalks constructed in the downtown area over the past five years
- Springfield: Commercial Street Streetscape (includes sidewalks)
- Springfield: the City constructs three miles of sidewalk per year near school properties
- Springfield: the new Route 13 and I-44 diverging diamond interchange was built with separated pedestrian accommodations (none existed before)
- Many area school children participate in pedestrian education programs and are provided walking maps
- All dual left-turn lane intersection improvements in Springfield have included sidewalk improvements:
    - Chestnut Expressway (Loop 44, Bus. 65) and Glenstone Avenue (Loop 44, Bus. 65)
    - Chestnut Expressway (Loop 44) and National Avenue
    - Glenstone Avenue (Bus. 65) and Primrose Street
    - Glenstone Avenue (Bus. 65) and Sunshine Street (Route D)
    - Glenstone Avenue (Loop 44) and Division Street
    - Glenstone Avenue (Loop 44) and Kearney Street (Route 744)
    - Kansas Expressway (Route 13) and Battlefield Road
    - Kansas Expressway (Route 13) and Sunshine Street (Route 413)
- Springfield: new sidewalk constructed along Glenstone Avenue (Route H) between Valley Water Mill Road and McClernon Street
- Springfield: sidewalk improvements along Sunshine Street (Route 413) and Scenic Avenue
- Springfield: new sidewalk constructed along both sides of Republic Road between Harvard Avenue and the YMCA located northeast of the intersection of Republic Road and Charleston Avenue
- Springfield: new sidewalk built along the west side of South Campbell Avenue (Route 160) near El Camino Street
- Springfield: pedestrian signals and a median refuge were added at the intersection of National Avenue and Grand Street
- City Utilities: has utilized federal funds to construct sidewalks near bus stop locations

Safety

- Springfield: crosswalk on Jefferson Avenue near Central Street
- Springfield: installed 300 reflective sign post panels
- Springfield: installed 56 new and nine upgraded school zone beacons
- Greene County: installed four new and 10 upgraded school zone beacons and reflective sign post panels on school crossing signs

Strategy #4: Shift Trips from SOV to HOV Auto/Van

- **Rideshare Matching Services:** The Ozarks Transportation Organization has implemented a web-based rideshare matching program (www.ozarkscommute.com) where commuters can find a ride to share.

- **Vanpool/Employer Shuttle Programs:** Several area employers and multifamily housing complexes have implemented vanpool or shuttle programs. Examples include: St. Johns Medical Center, TLC Properties, Missouri State University, and Prime Trucking.

- **Improved/Increased Park-and-Ride Facilities & Capital Improvements:** There are existing park-and-ride lots within the OTO area which are currently underutilized. Accordingly, expansion is not planned at this time.

Strategy #5: Add Capacity

- **Capacity Expansion:** The following capacity improvements have been completed:

  On CMP Network Capacity Improvements

  - West Bypass (Route 160): expanded to four lanes from Kearney Street (Route 744) to Chestnut Expressway (Loop 44), new signal added at Nichols Street
  - National Avenue: expanded to six lanes from Primrose Street to James River Freeway (Route 60) and three lanes from Norton Road to Jean Street
  - Glenstone Avenue (Bus. 65): expanded to three lanes on northbound Glenstone Avenue (Bus. 65) from James River Freeway (Route 60) westbound off-ramp to Peele Street and to three lanes on southbound Glenstone Avenue (Bus. 65) from Independence Street to James River Freeway (Route 60) westbound on-ramp
  - Route 65: upgraded to four-lane expressway from north of I-44 to the northern limit of the OTO study area
  - Kearney Street (Route 744): widened to five lanes from Route 65 to Le Compte Avenue
  - Division Street: expanded to three lanes between Glenstone Avenue (Loop 44) and Cedarbrook Avenue

- South Campbell Avenue (US 160): changes in street network near new Sam's Club location south of James River Freeway (Route 60)- El Camino Alto Street extended west of South Campbell Avenue (Route 160), closure of median at the intersection of South Campbell Avenue (Route 160) and Cardinal Street, new signal at the intersection of South Campbell Avenue (Route 160) and El Camino Alto Street
- Route 14 (Ozark): widened to four lanes from 22nd Street to 18th Street with relocated signal

Off CMP Network Capacity Improvements

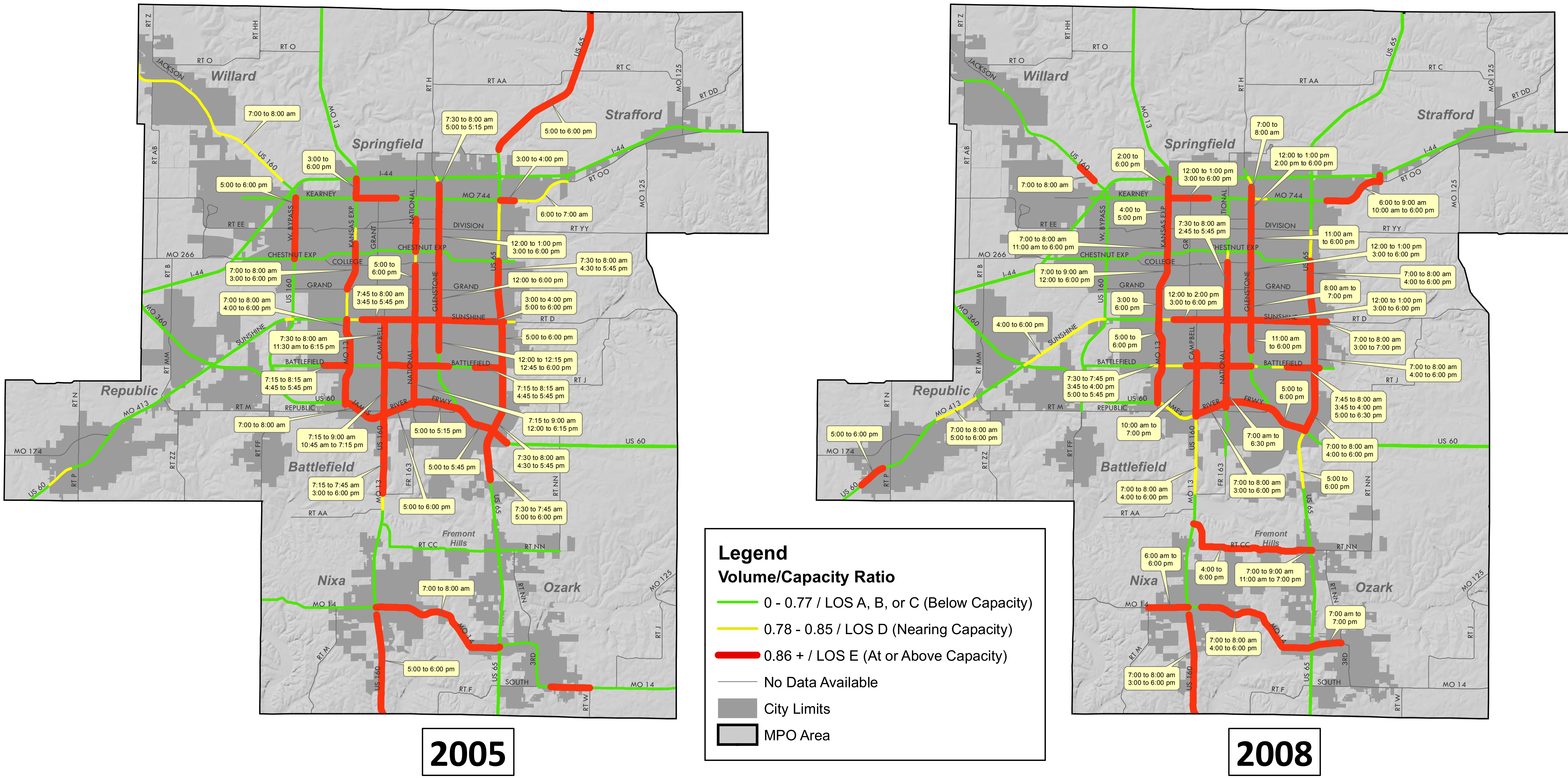
- Route 266: expanded to four lanes between Airport Boulevard and I-44
- Glenstone Avenue (Route H): widened to three lanes from Stoneridge Street to McClernon Street
- Grant Avenue (Farm Road 151): expanded to three lanes north to Farm Road 96
- Blackman Road: expanded to three lanes between Sunshine Street (Route D) and Sunset Street
- Golden Avenue (Farm Road 135): widened to three lanes from Battlefield Road to Plainview Road (Farm Road 182)
- Plainview Road (Farm Road 182): new segment of road constructed between Farm Road 131 and Golden Avenue (Farm Road 135)
- National Avenue (Farm Road 163): expanded to five lanes from Plainview Road (Farm Road 182) to Gaslight Drive and to three lanes from Gaslight Drive to Farm Road 192
- Cherry Street: widened to three lanes from Glenstone Avenue (Bus. 65) to Barnes Avenue
- Walnut Lawn Street: widened to four lanes between Parkhill Avenue to Kansas Expressway (Route 13)
- Republic Road: expanded to five lanes from Charleston Avenue to Harvard Avenue
- Jefferson Avenue: widened to three lanes between Sunshine Street and Seminole Street
- Truman Extended to Norton
- Grant Avenue: restriped to three lanes (from four lanes) between Chestnut Expressway (Loop 44) and Grand Street
- Benton Avenue/Kimbrough Avenue: restriped to three lanes (from four lanes) between Chestnut Expressway (Loop 44) and Grand Street
- Packer Road: widened to three lanes between Kearney Street (Route 744) and Division Street
- Airport Boulevard: new roadway constructed between Route 266 and the Springfield-Branson National Airport
- Farm Road 193: widened to three lanes from Route YY to East Fox Run Drive
- Farm Road 146: expanded to three lanes between Waco Avenue and Eastland Avenue
- Farm Road 140: widened to three lanes between Brecklyn Road and Tanner Avenue

Conclusion

The preceding 15 pages list the strategies that are being utilized within the OTO area to mitigate congestion. This is an extensive and ongoing effort in our region to continue to provide for the mobility of people and goods. Overall, congestion on the arterial network has moderately increased. This is due to increasing volumes and accidents on the arterial network. As the region has continued to experience fast-paced population growth of approximately 2 percent per year, it is reasonable to expect that congestion will continue to increase as well. While the OTO area has seen the implementation of many strategies to mitigate the impending congestion, it is clear that over time operational improvements to the system will be insufficient and an increased focus will need to be made on the strategies which decrease the demand on the system. These strategies are regional in nature and include: 1) the reduction of vehicle miles traveled, or VMT, at peak travel times, and 2) the shifting of trips to other modes of transportation and to HOV, or high-occupancy vehicles.

We will continue to focus on those strategies that are listed in Phase I of the Congestion Management Process to place an emphasis on the reduction of peak demand.

Volume to Capacity Ratio

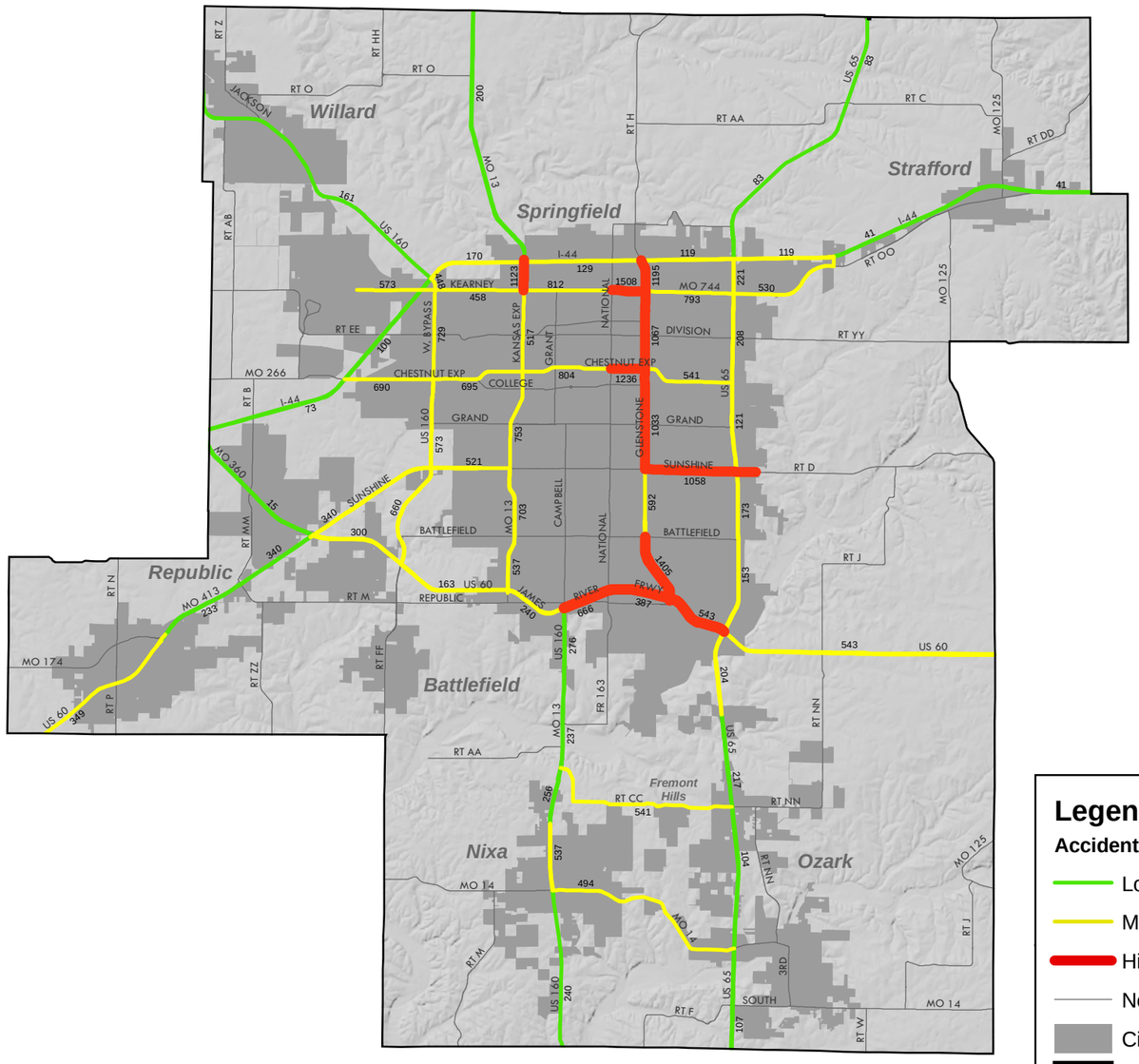


Map 3

0 1 2 4 6 8
Miles

What facilities are congested during the peak hour?

Accident Rates

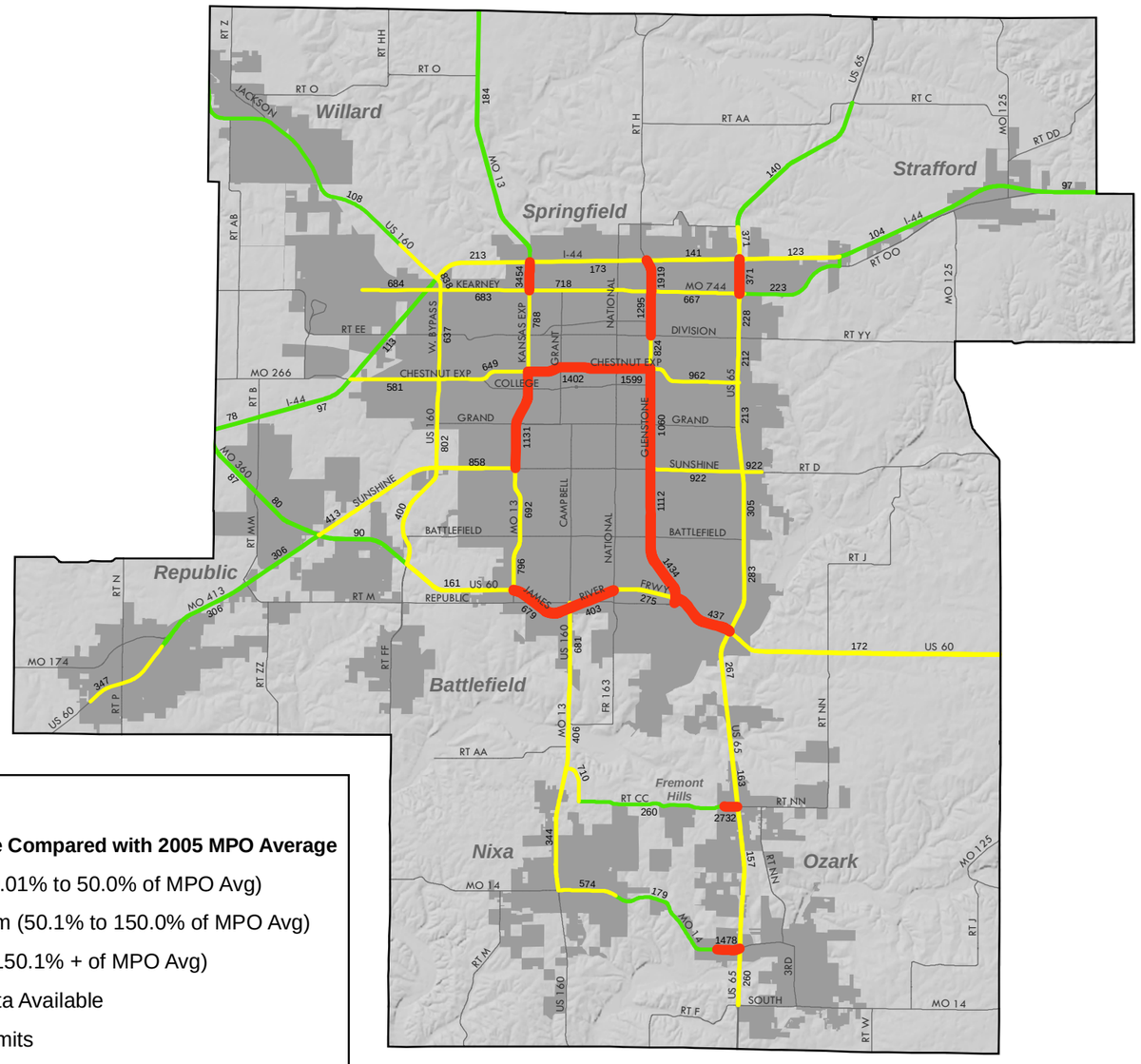


2005

Legend

Accident Rate Compared with 2005 MPO Average

- Low (0.01% to 50.0% of MPO Avg)
- Medium (50.1% to 150.0% of MPO Avg)
- High (150.1% + of MPO Avg)
- No Data Available
- City Limits
- MPO Area



2008

0 1 2 4 6 8

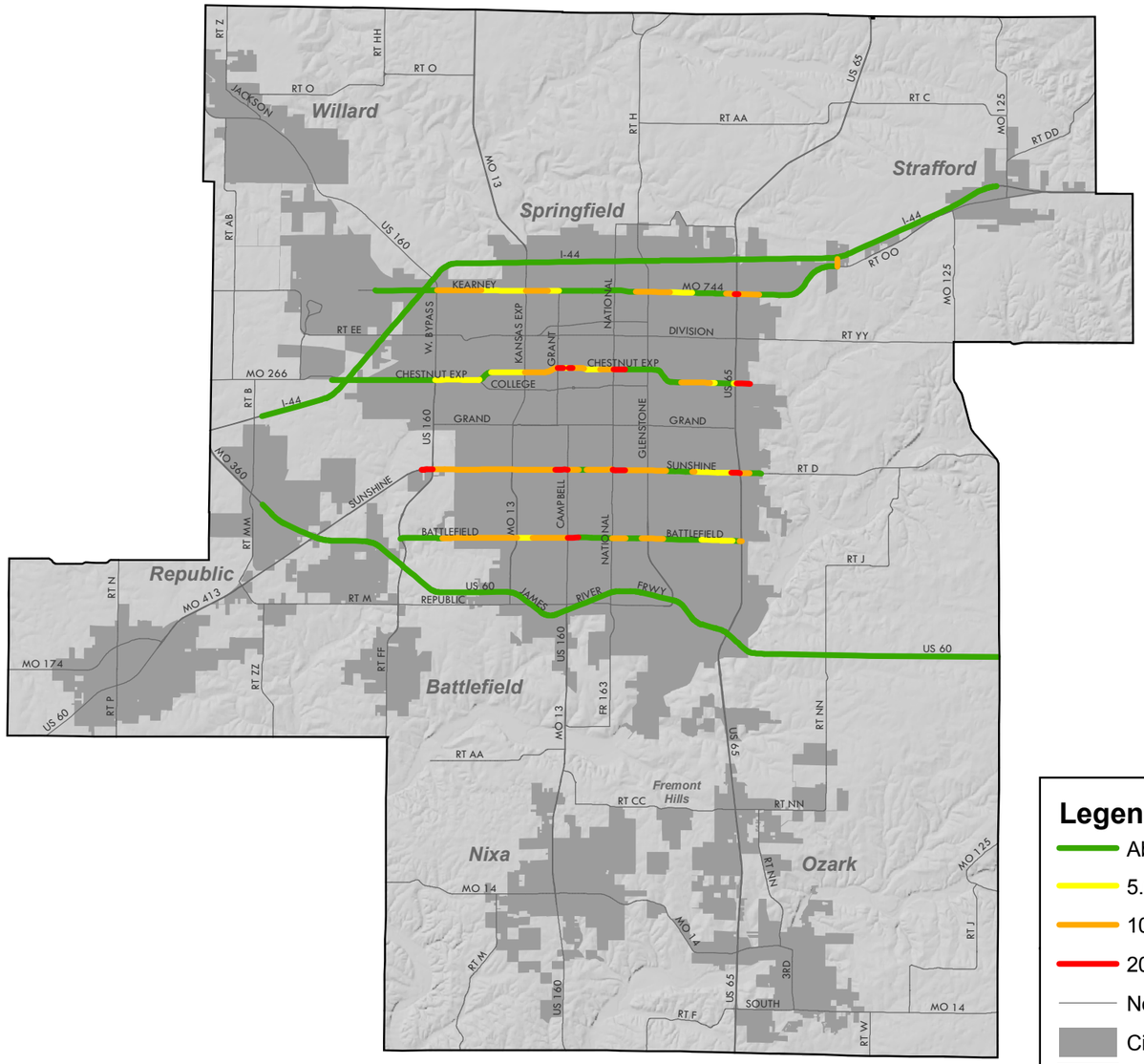
Miles

Map 4

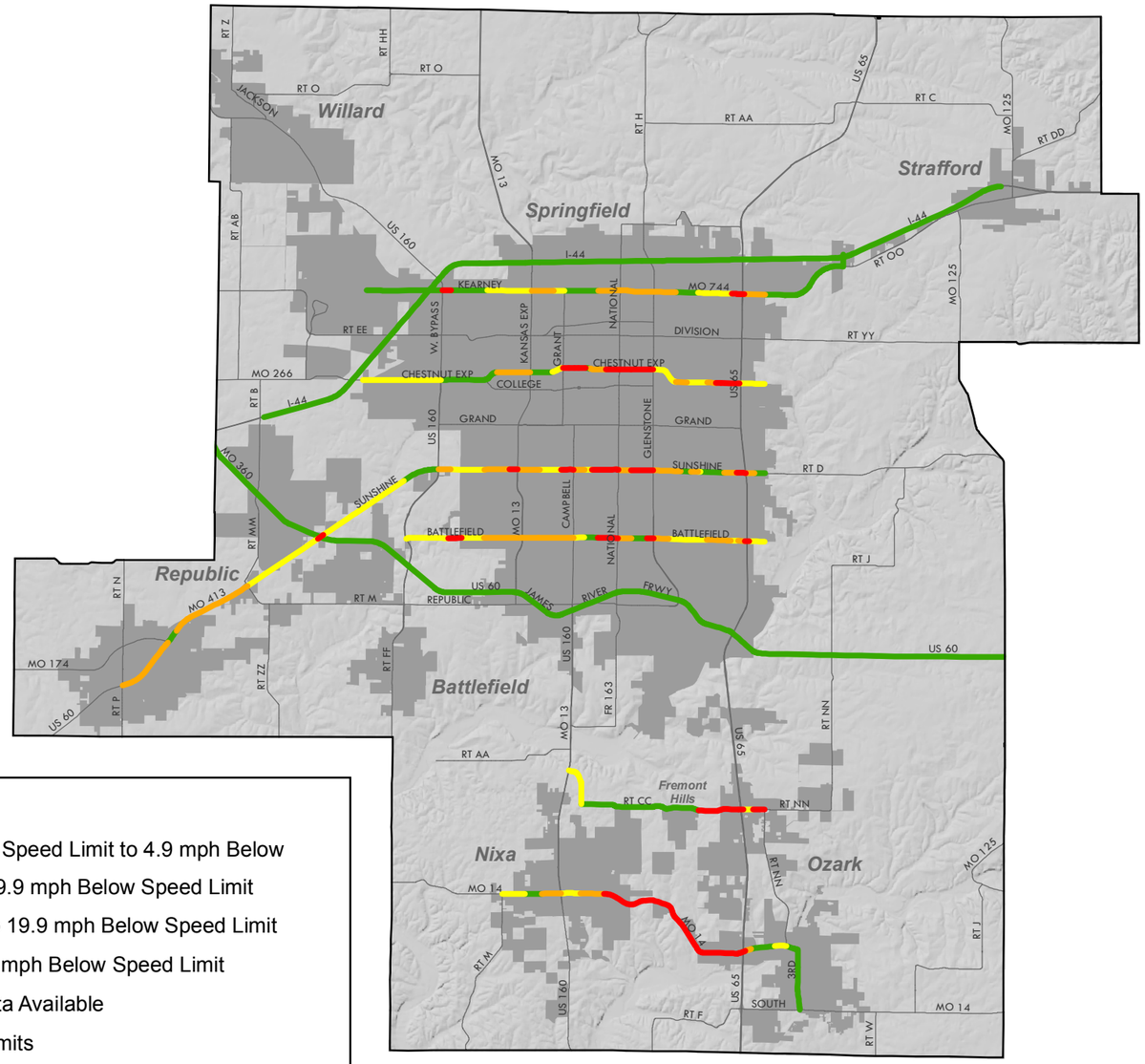
What is the impact of accidents on congestion?

N

Average Travel Speeds
AM Peak Hour - Eastbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

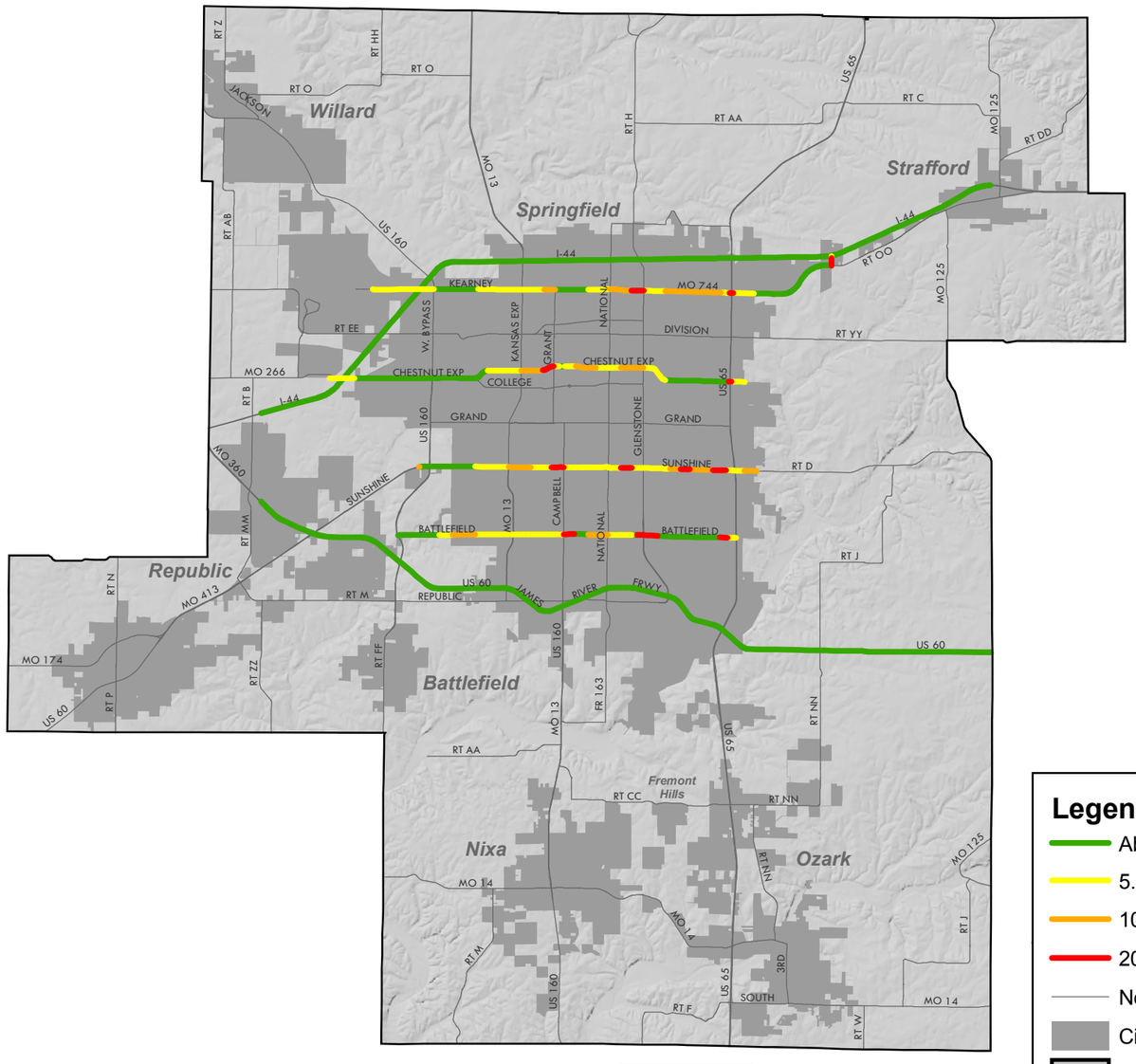
Miles

Map 5.1

How badly are travelers delayed?

N

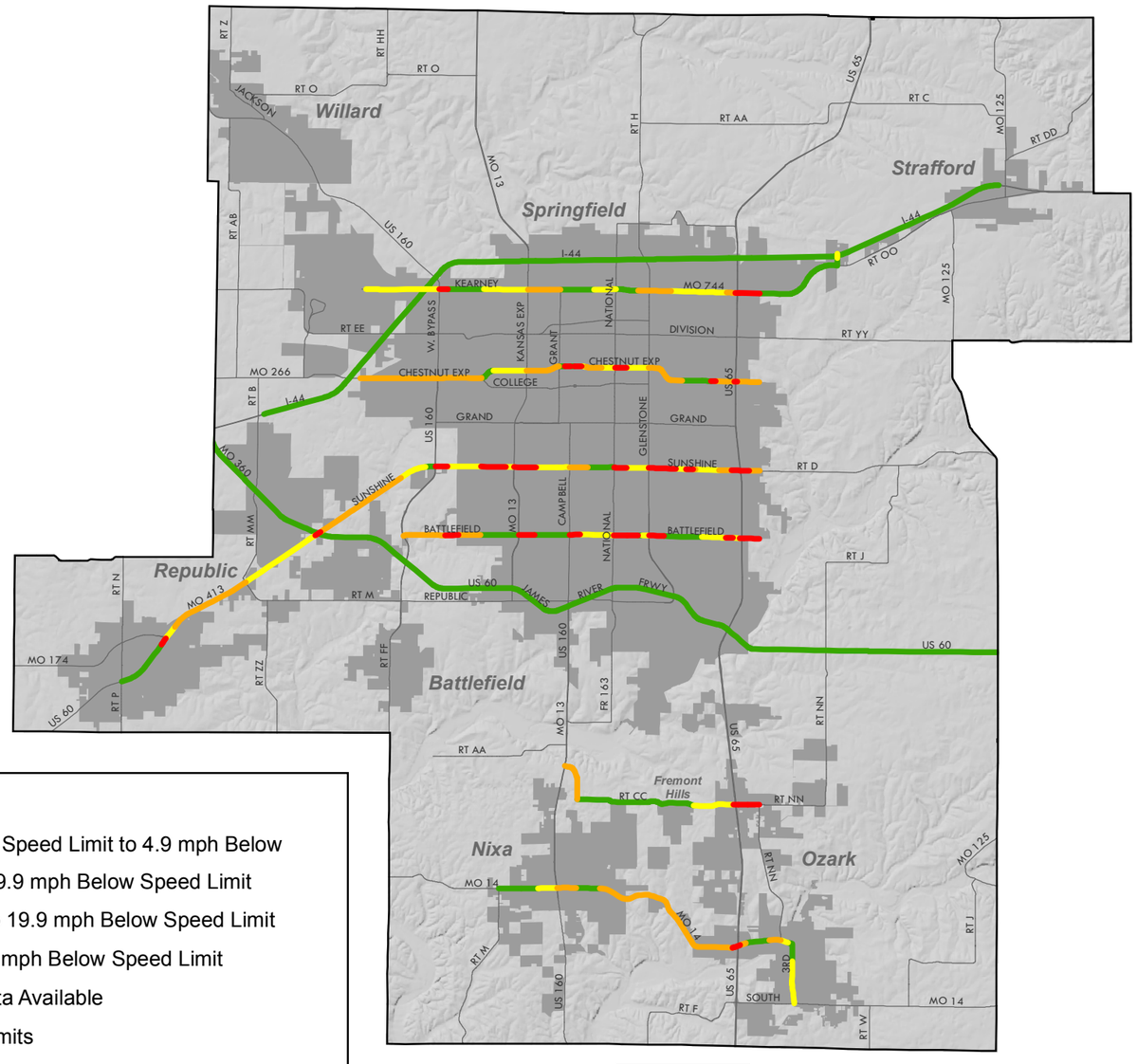
Average Travel Speeds
AM Peak Hour - Westbound Lanes



2005

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area



2008

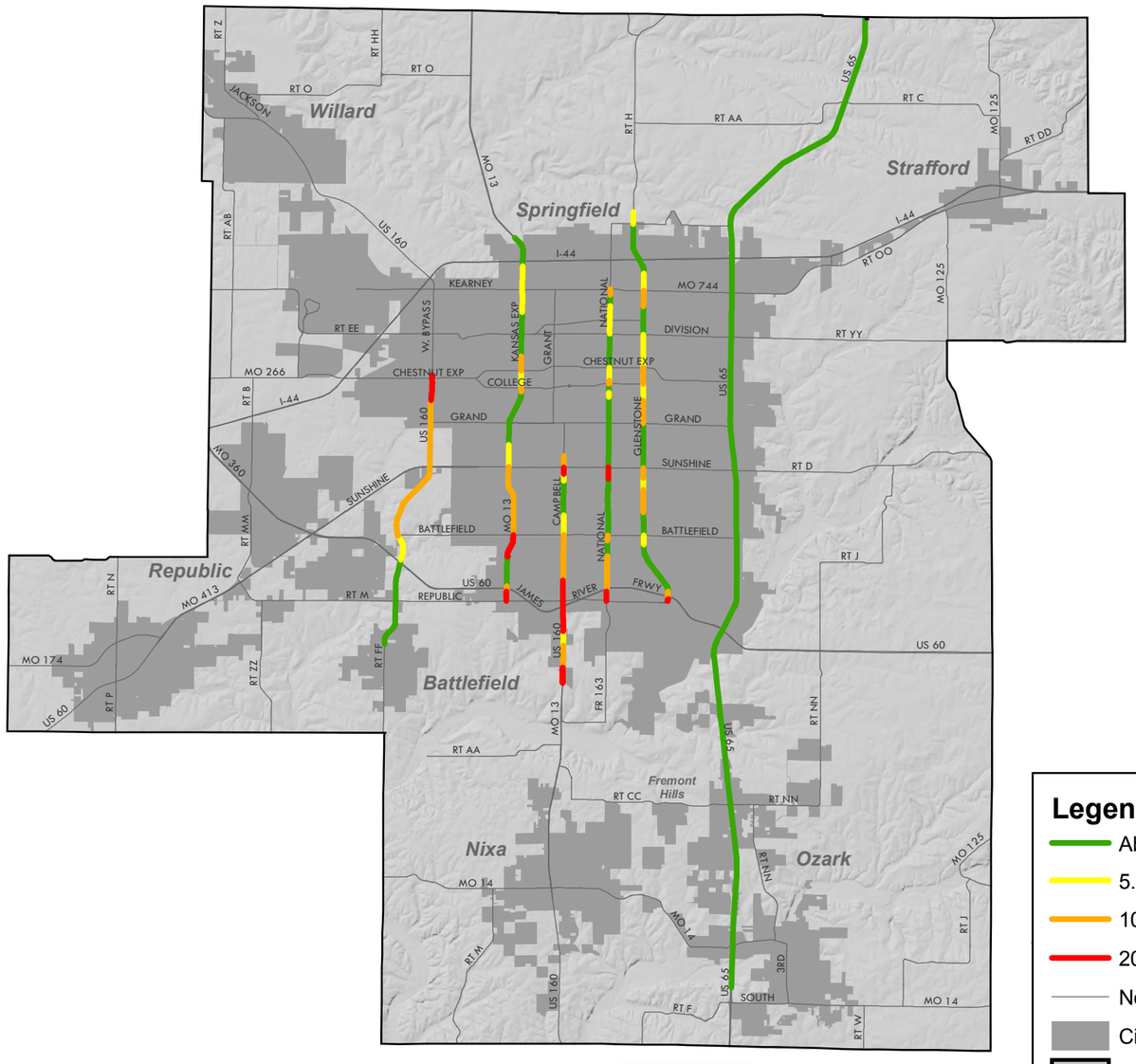
0 1 2 4 6 8
Miles

Map 5.2

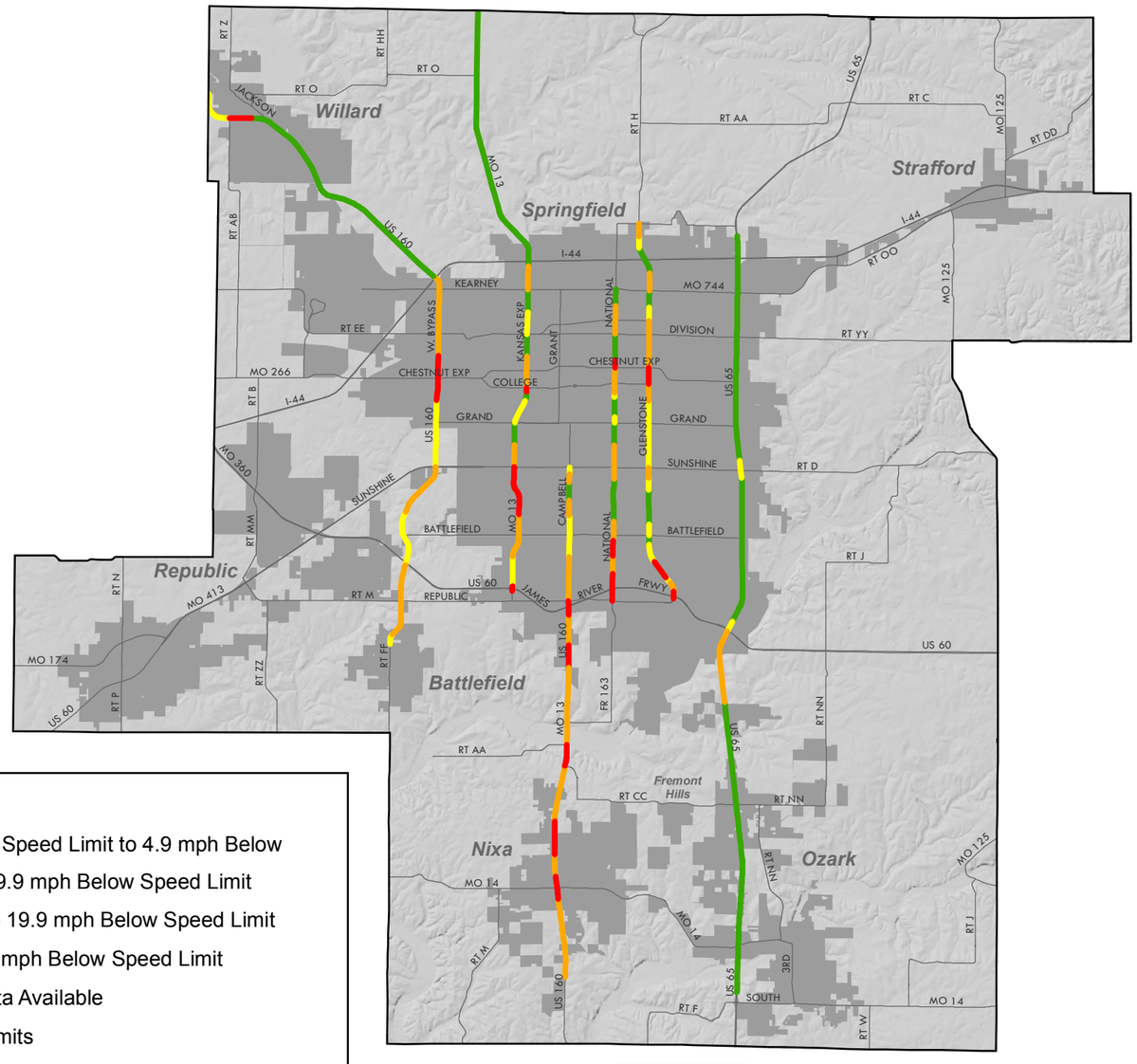
How badly are travelers delayed?

N

Average Travel Speeds
AM Peak Hour - Northbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

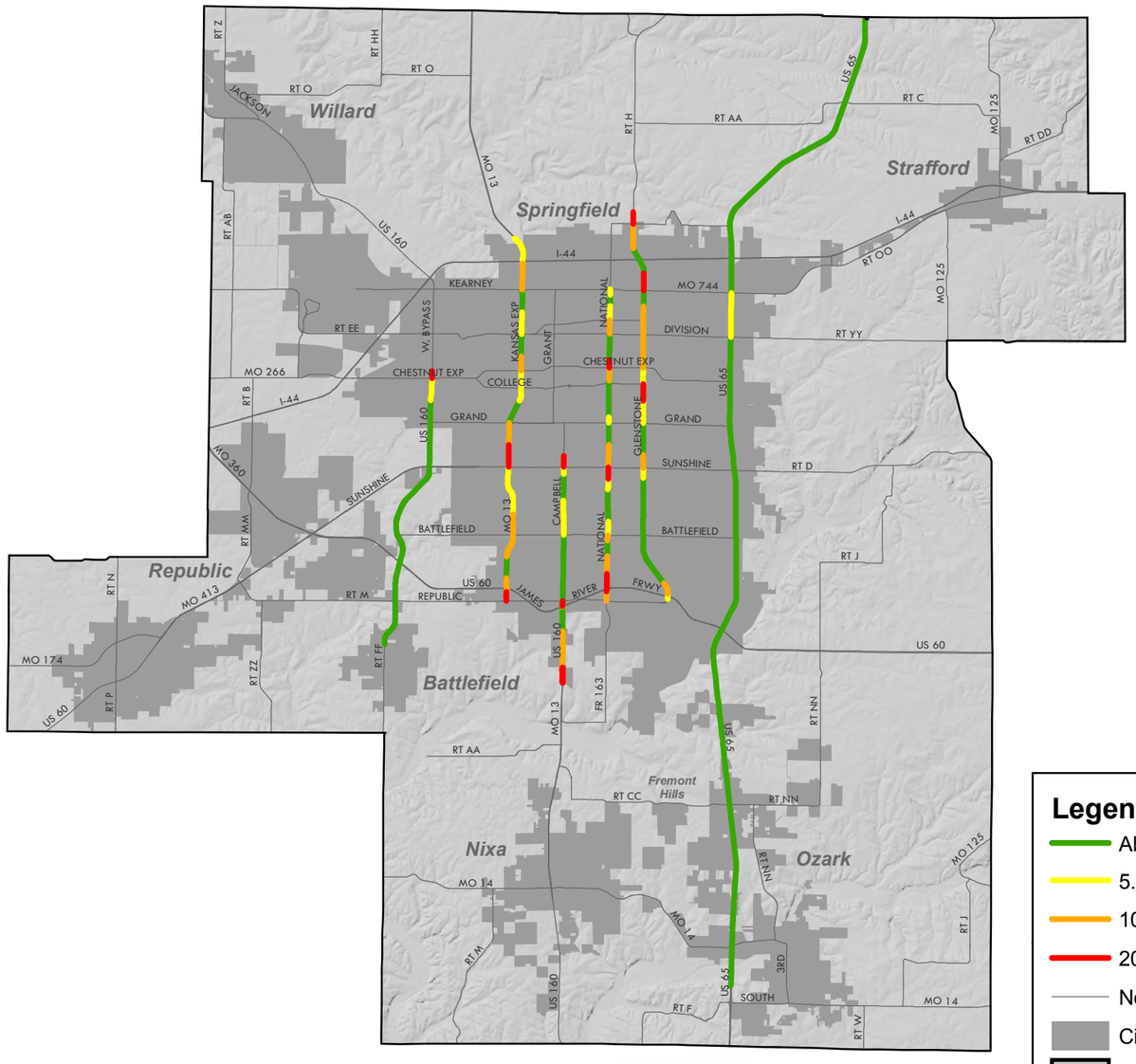
Miles

Map 6.1

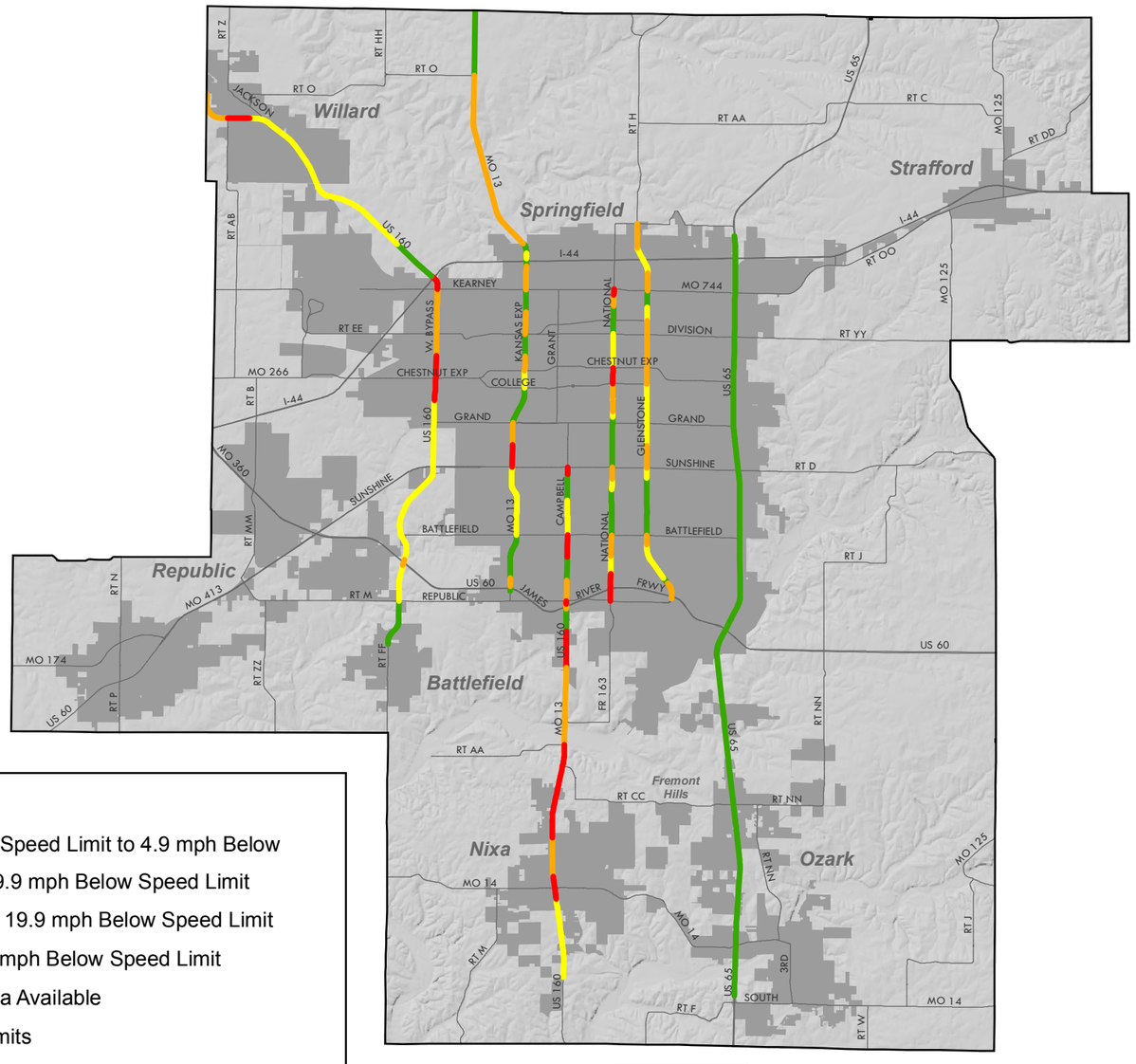
How badly are travelers delayed?

N

Average Travel Speeds
AM Peak Hour - Southbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

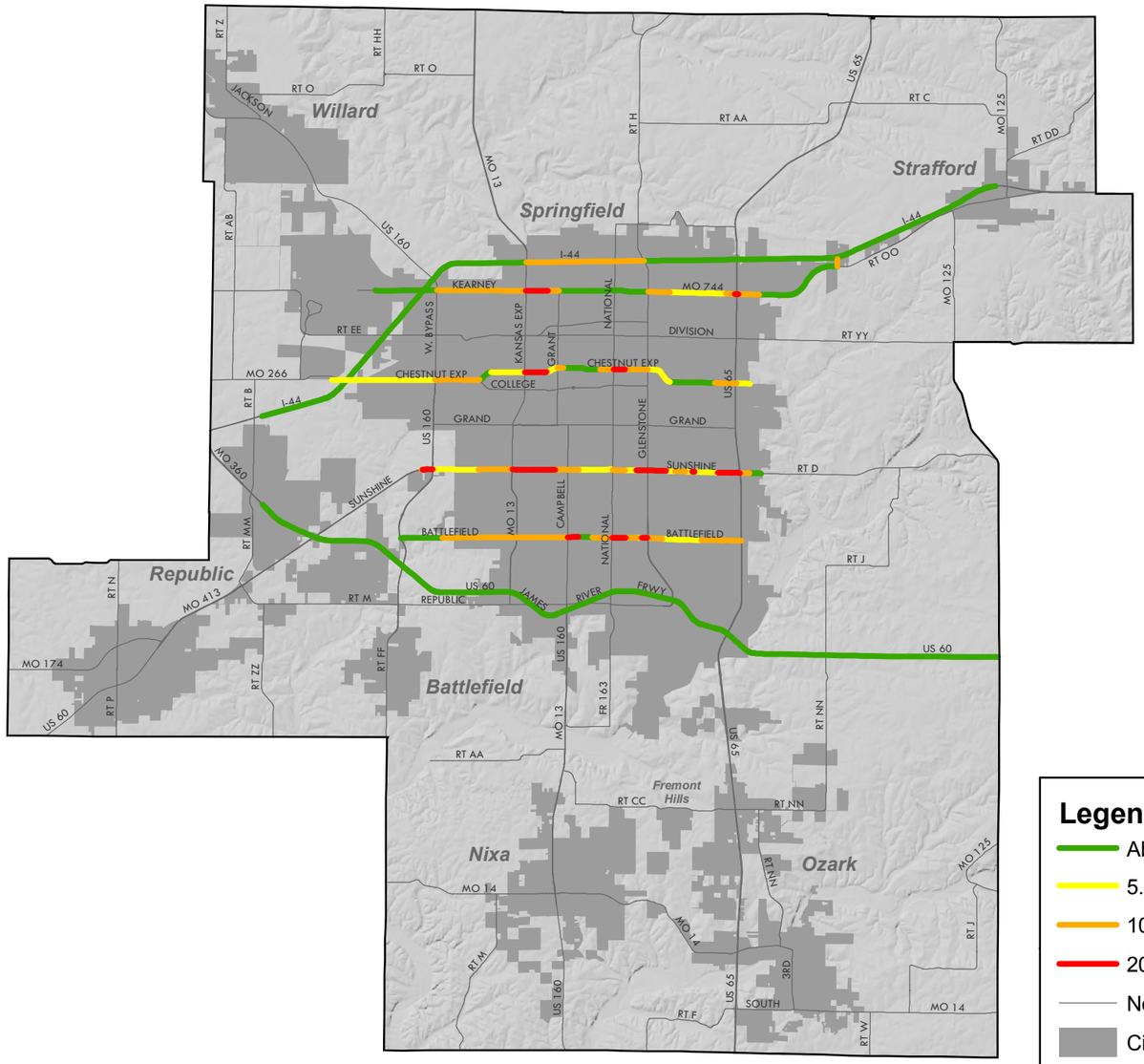
Miles

Map 6.2

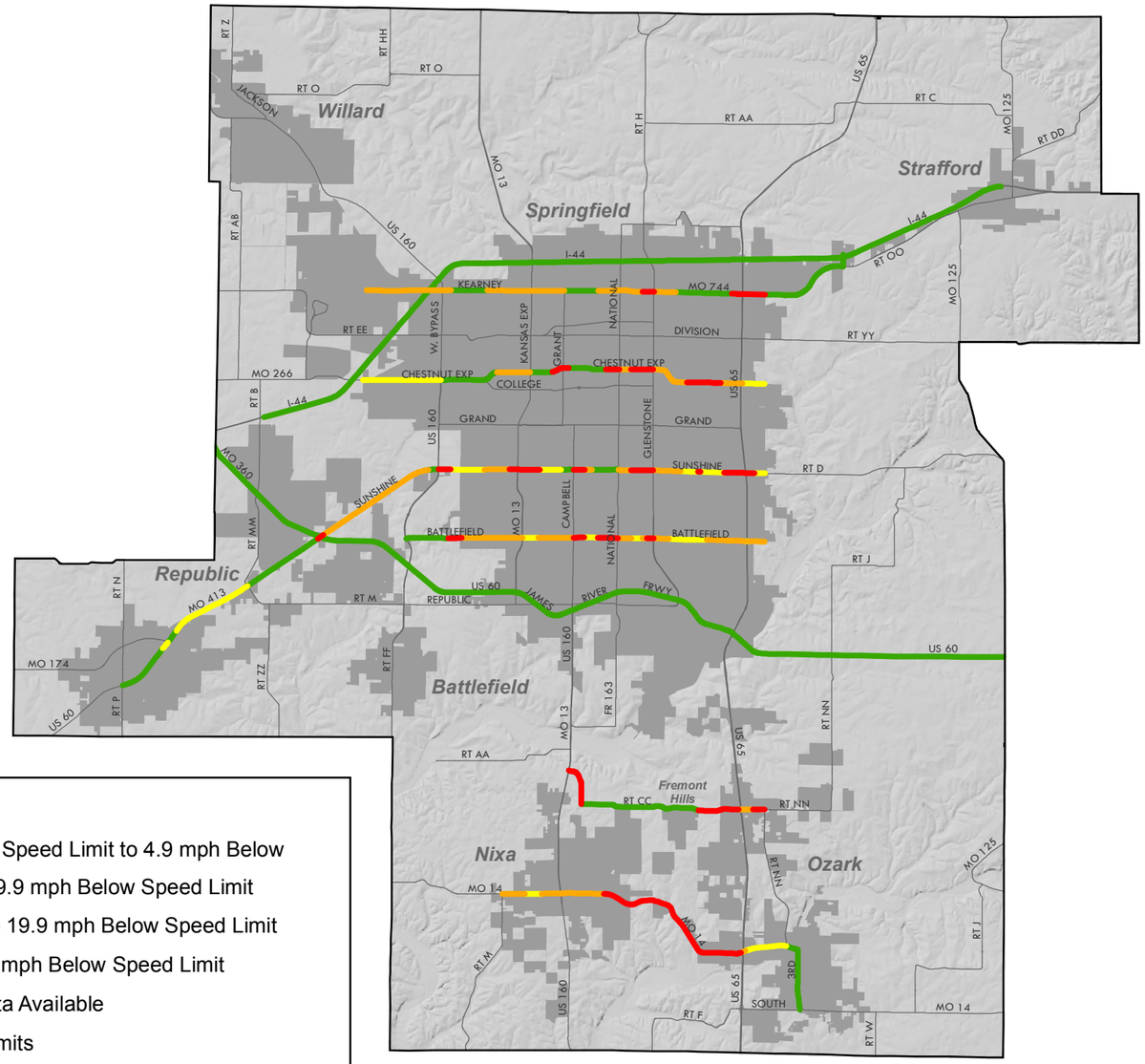
How badly are travelers delayed?

N

Average Travel Speeds
PM Peak Hour - Eastbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

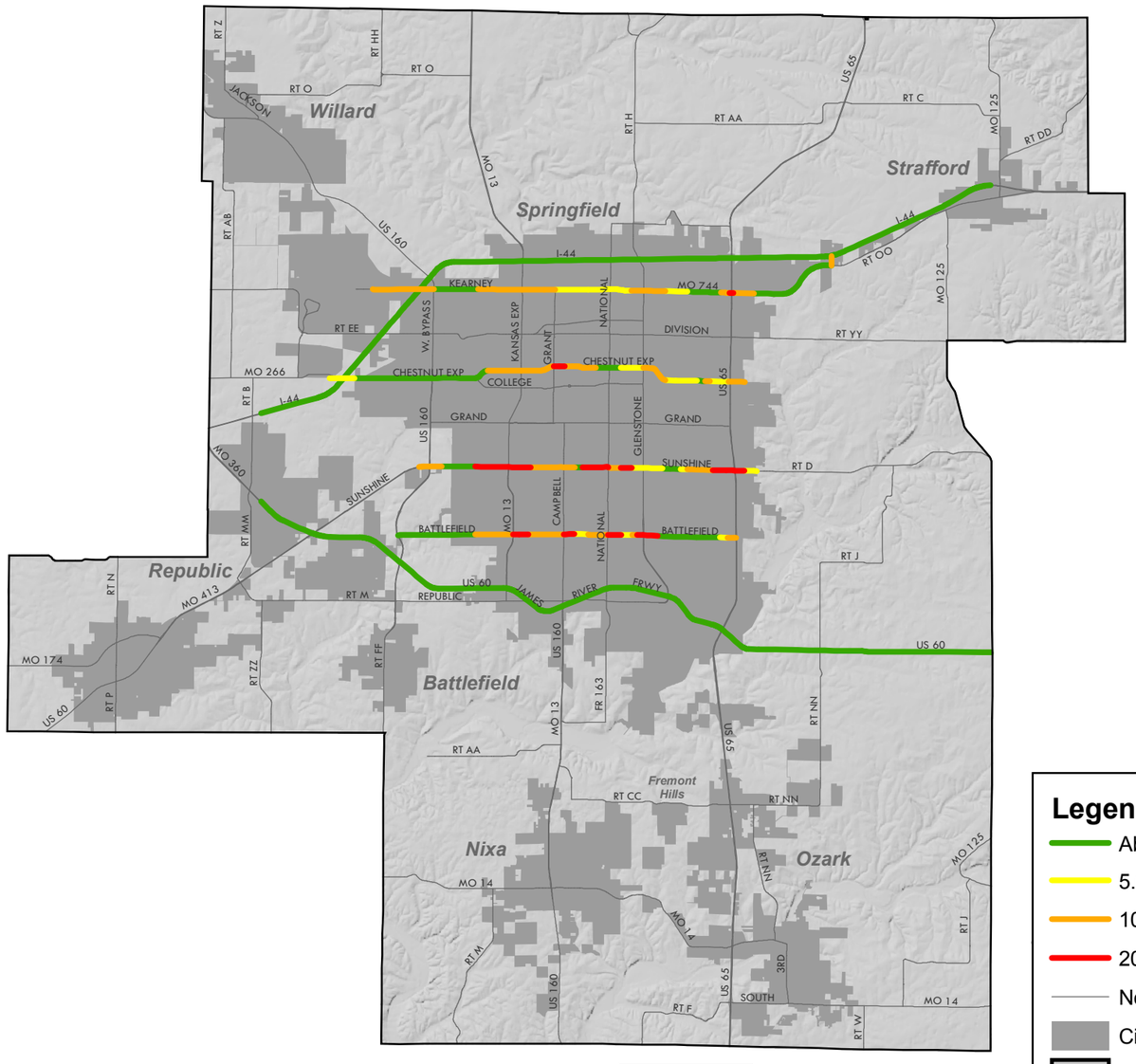
Miles

Map 7.1

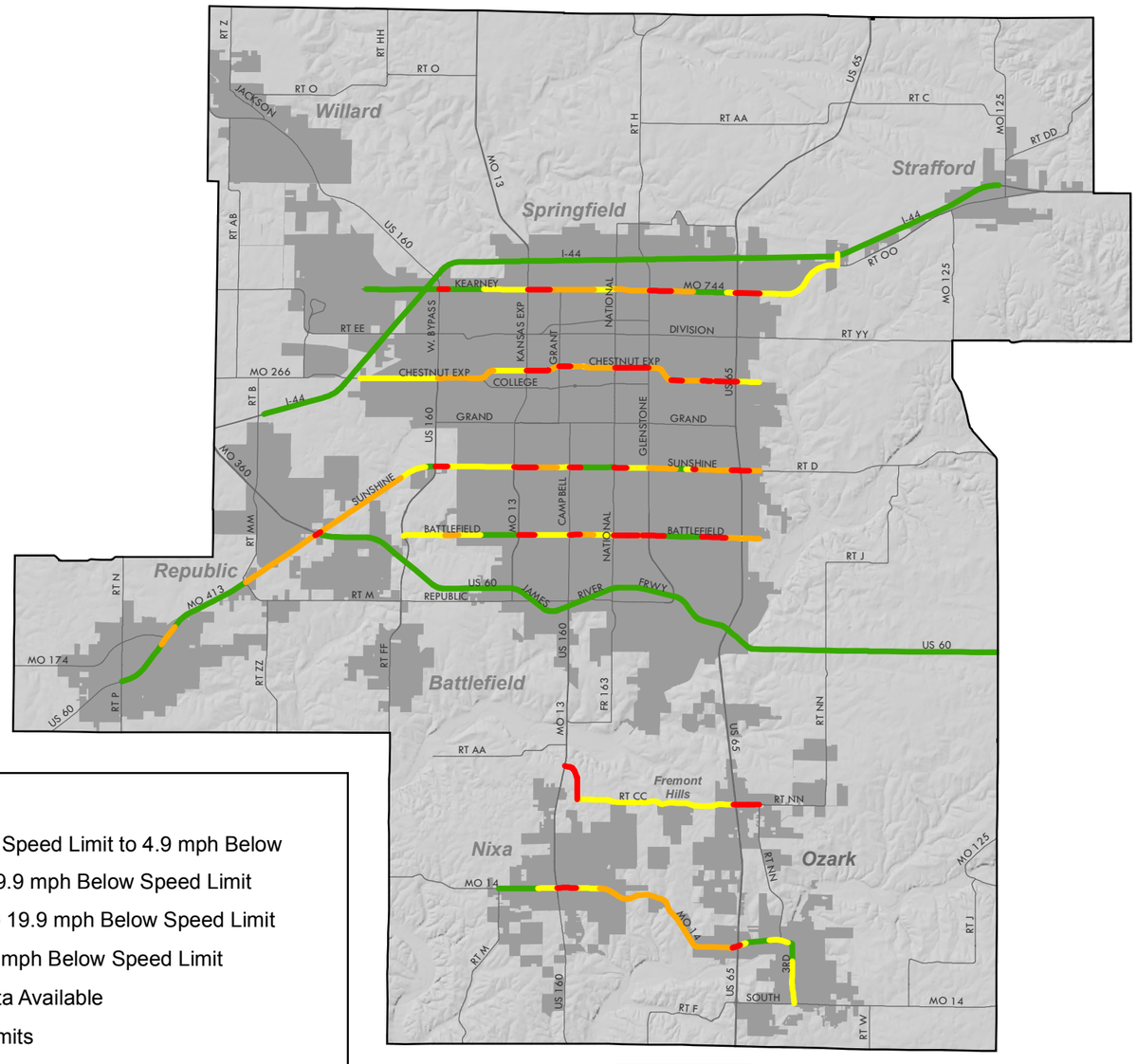
How badly are travelers delayed?

N

Average Travel Speeds
PM Peak Hour - Westbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

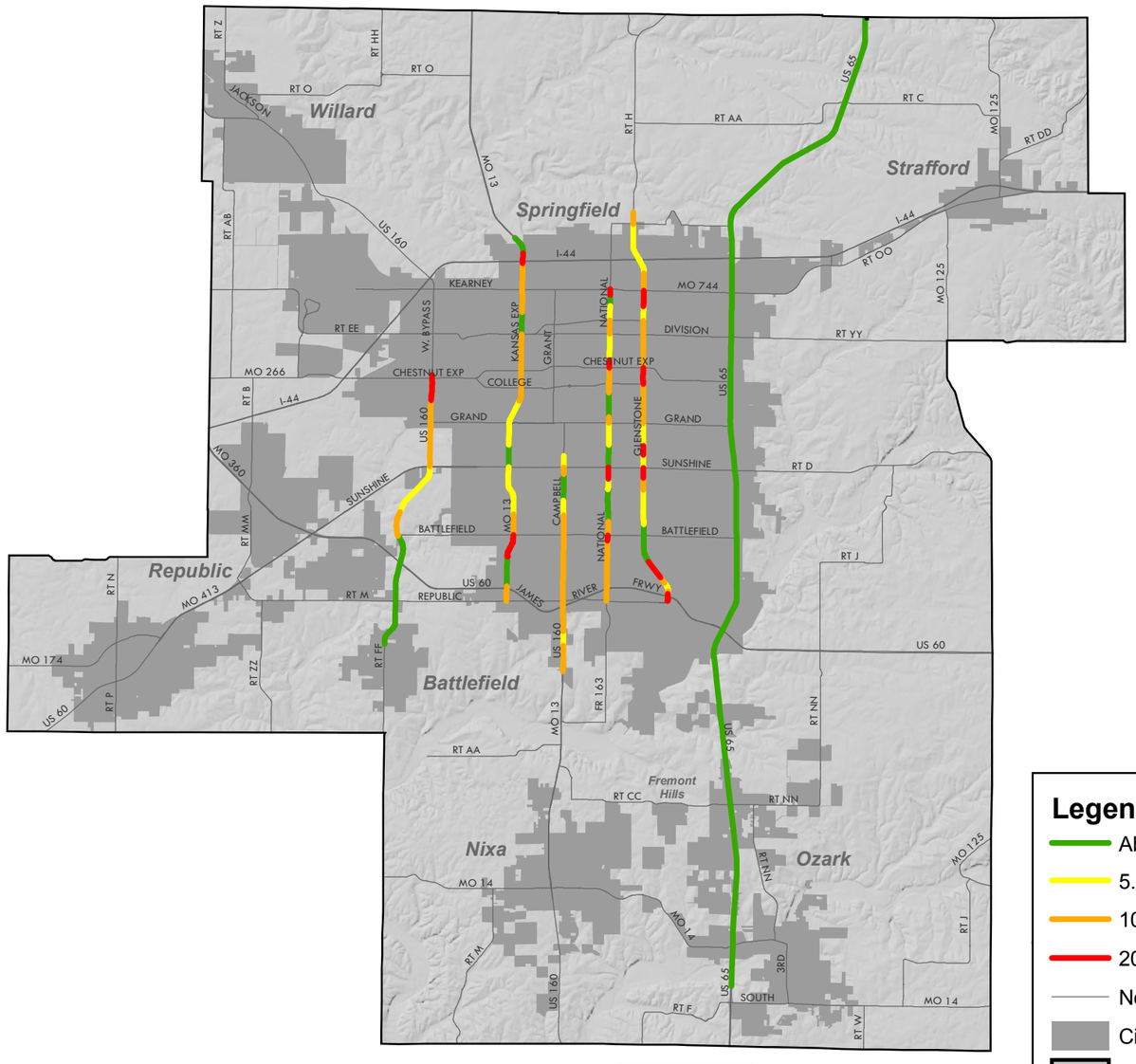
0 1 2 4 6 8
Miles

Map 7.2

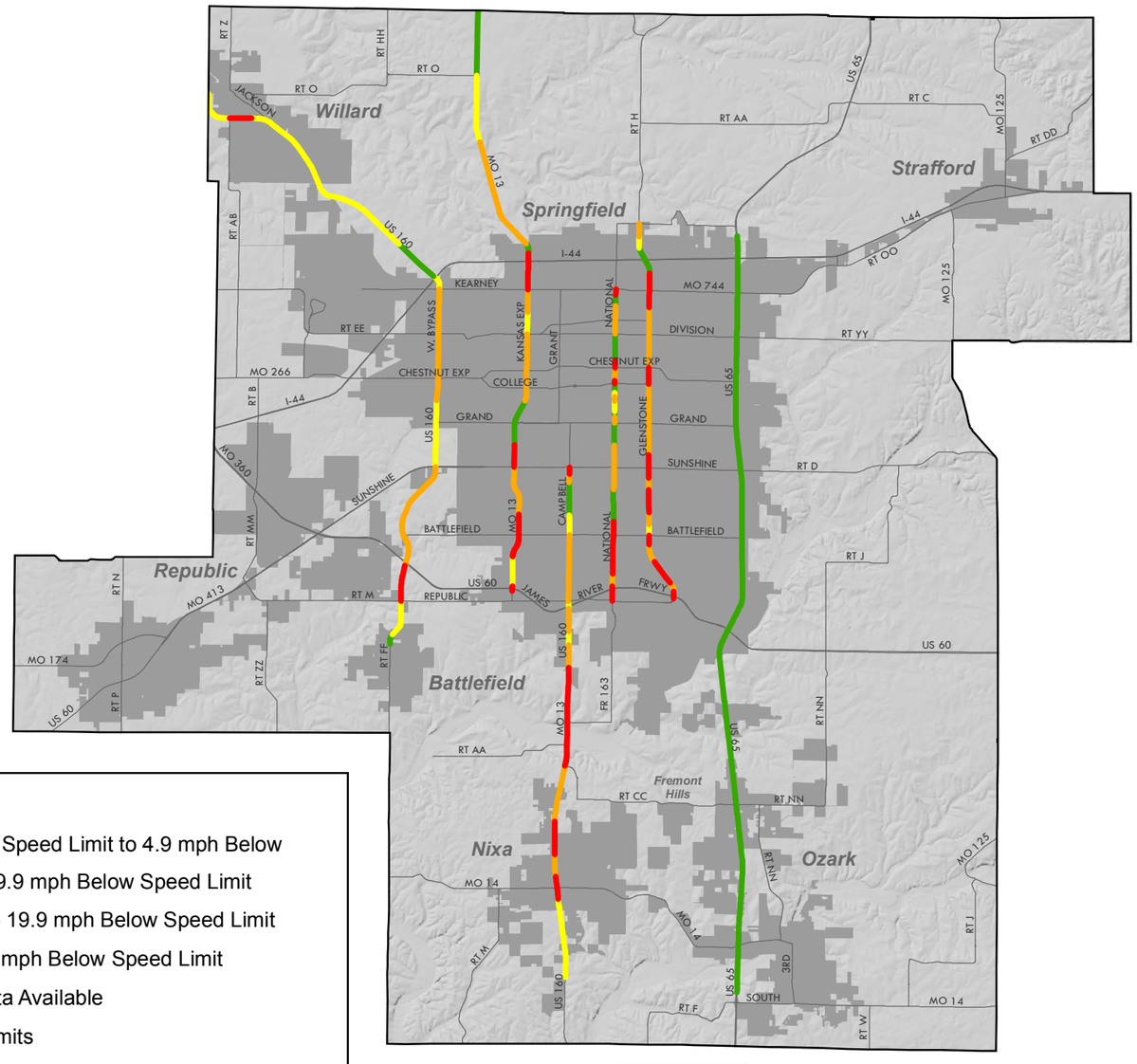
How badly are travelers delayed?

N

Average Travel Speeds
PM Peak Hour - Northbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

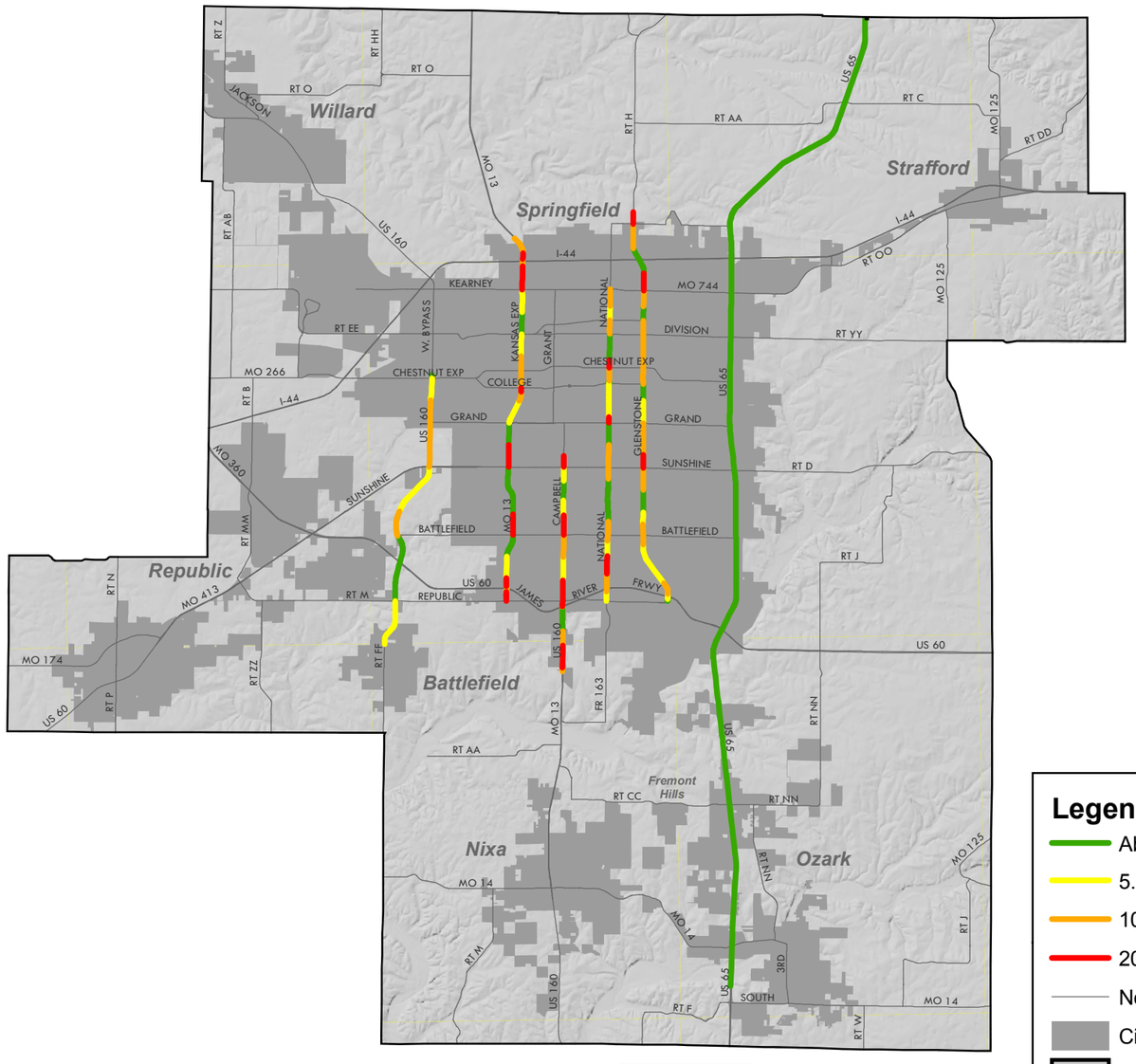
Miles

Map 8.1

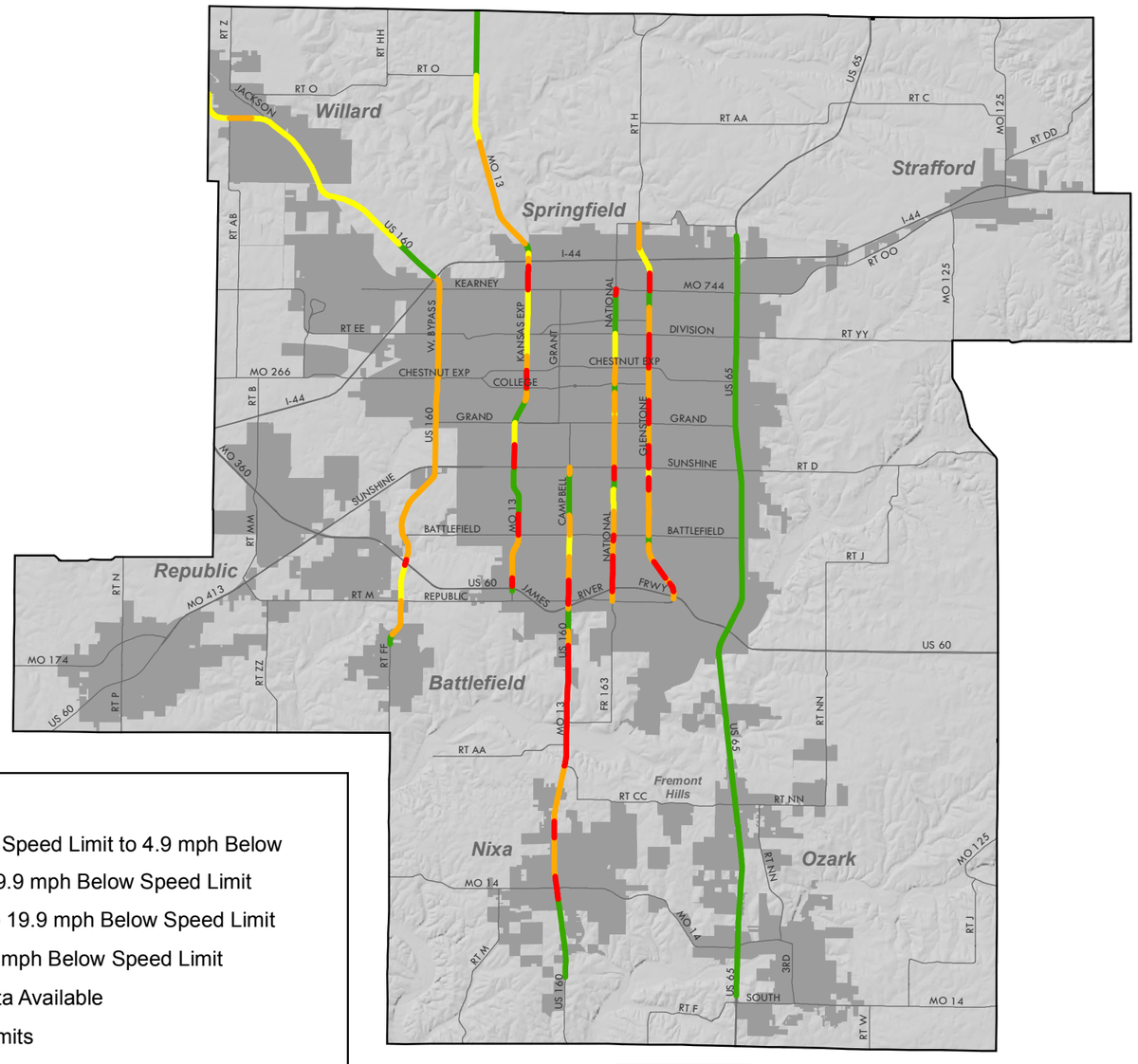
How badly are travelers delayed?

N

Average Travel Speeds
PM Peak Hour - Southbound Lanes



2005



2008

Legend

- Above Speed Limit to 4.9 mph Below
- 5.0 to 9.9 mph Below Speed Limit
- 10.0 to 19.9 mph Below Speed Limit
- 20.0 + mph Below Speed Limit
- No Data Available
- City Limits
- MPO Area

0 1 2 4 6 8

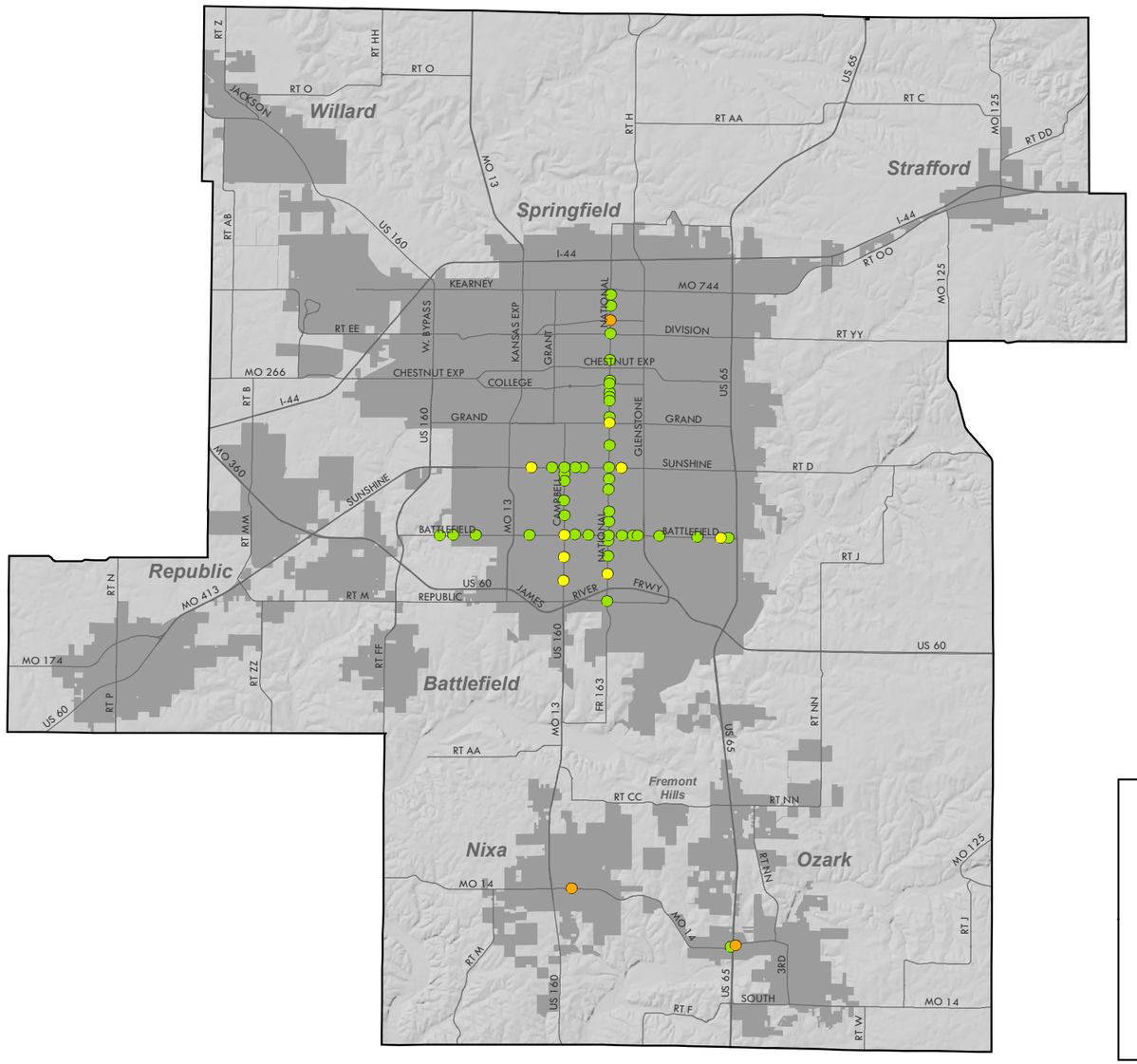
Miles

Map 8.2

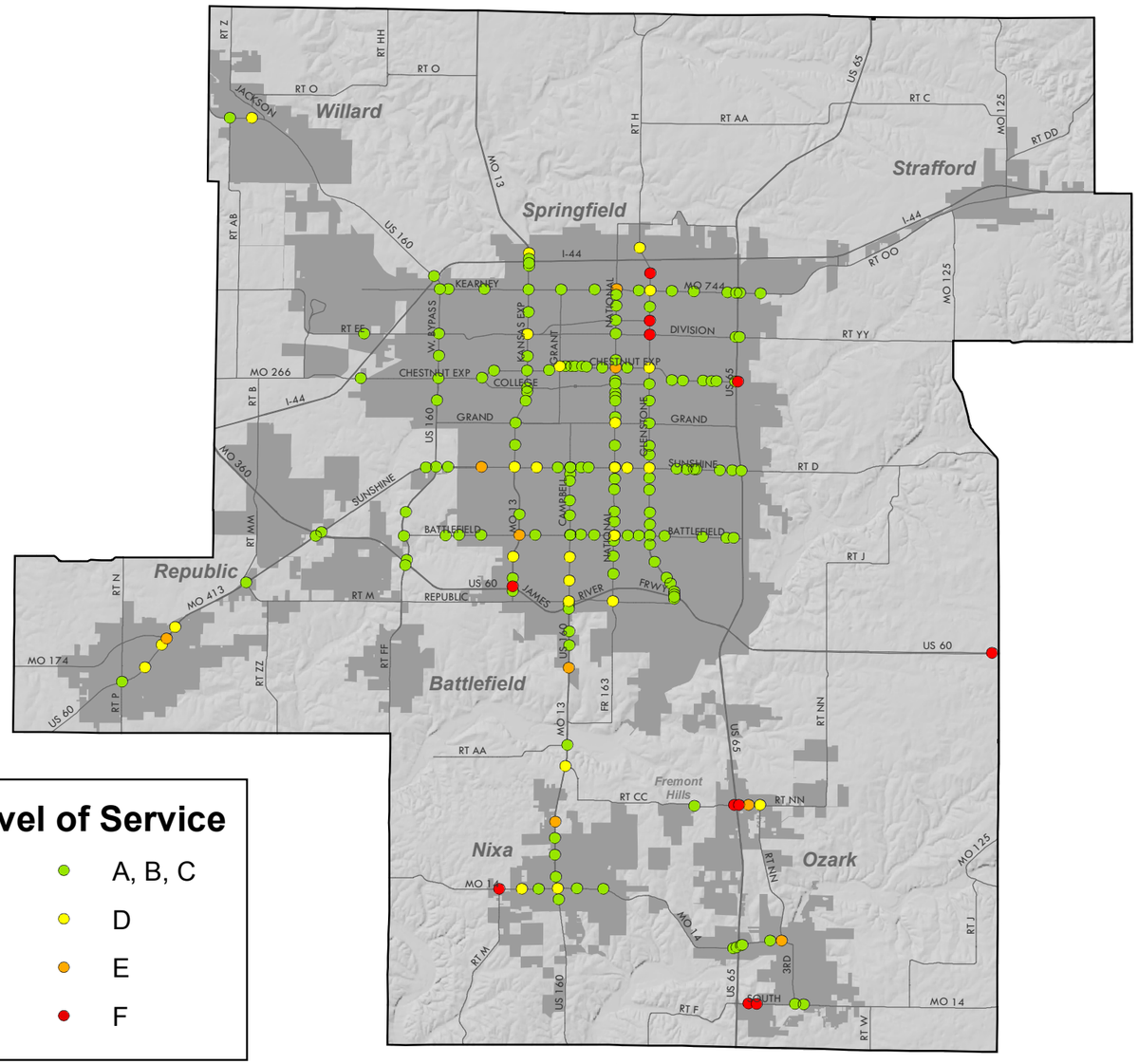
How badly are travelers delayed?

N

Intersection Level of Service
AM Peak



2005



2008

Level of Service

- A, B, C
- D
- E
- F

Map 9.1

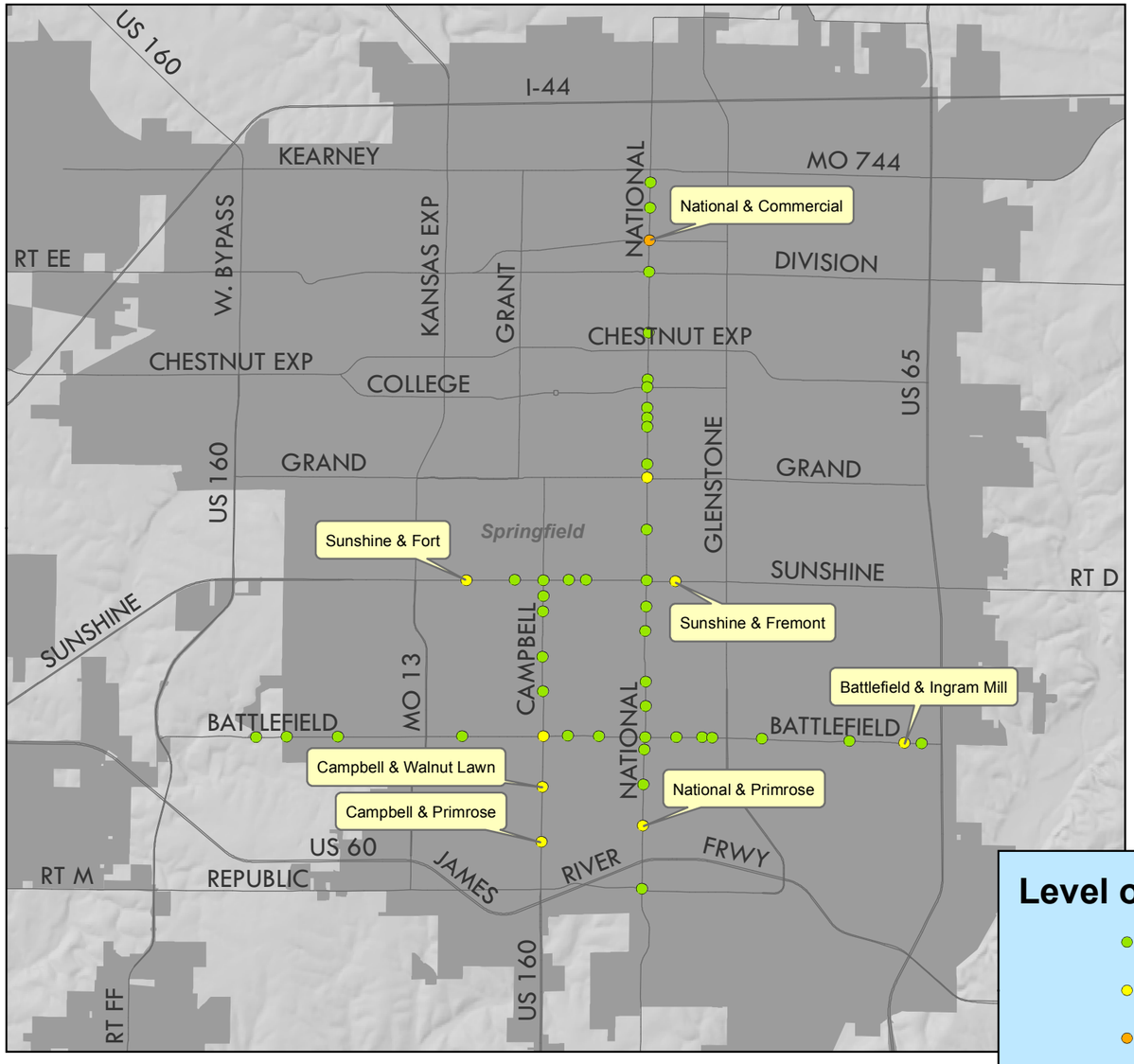
What impact does intersection/interchange level-of-service play in determining regional congestion problems?

0 1 2 4 6 8

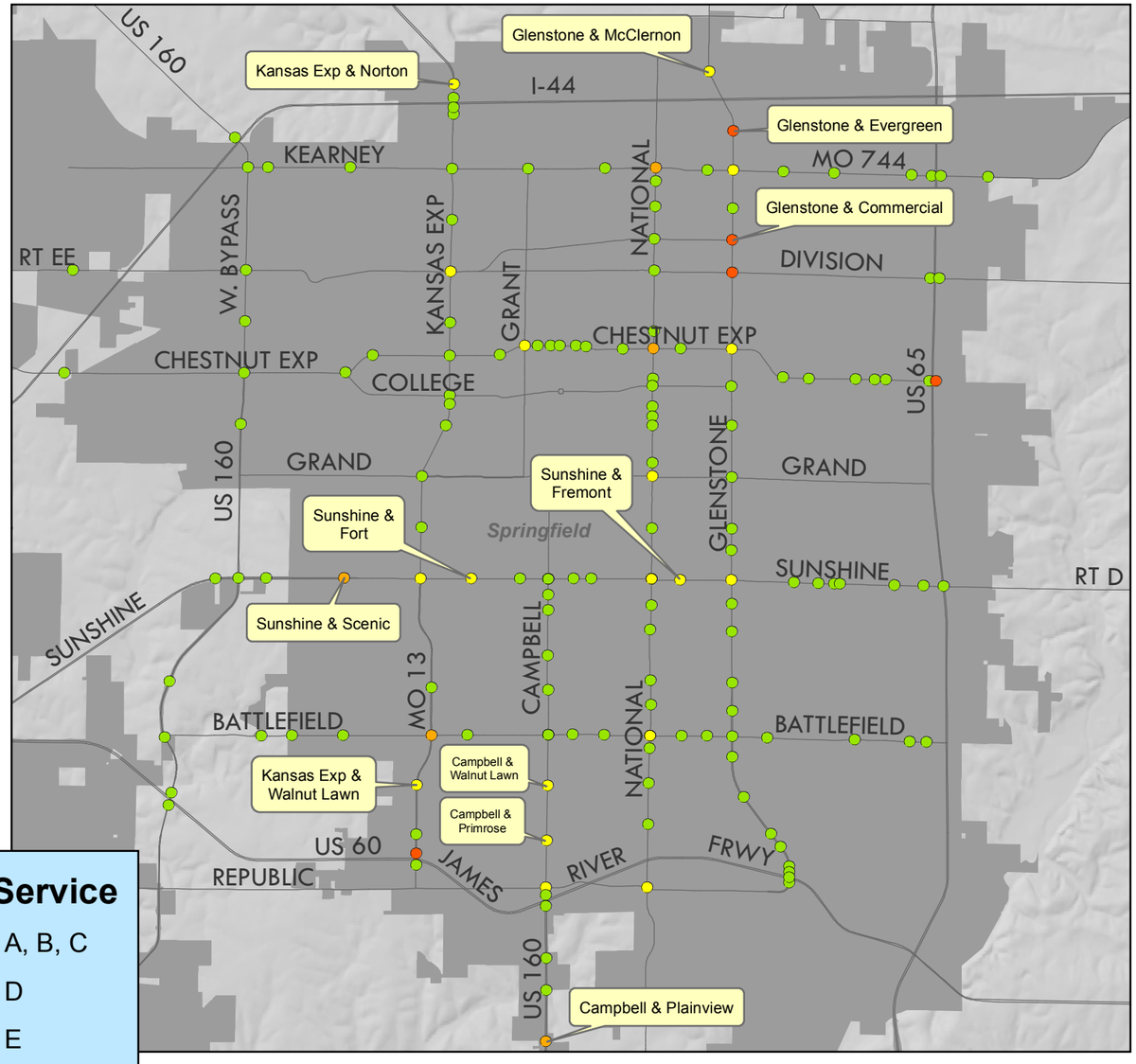
Miles

N

Intersection Level of Service
AM Peak



2005



2008

Level of Service

- A, B, C
- D
- E
- F

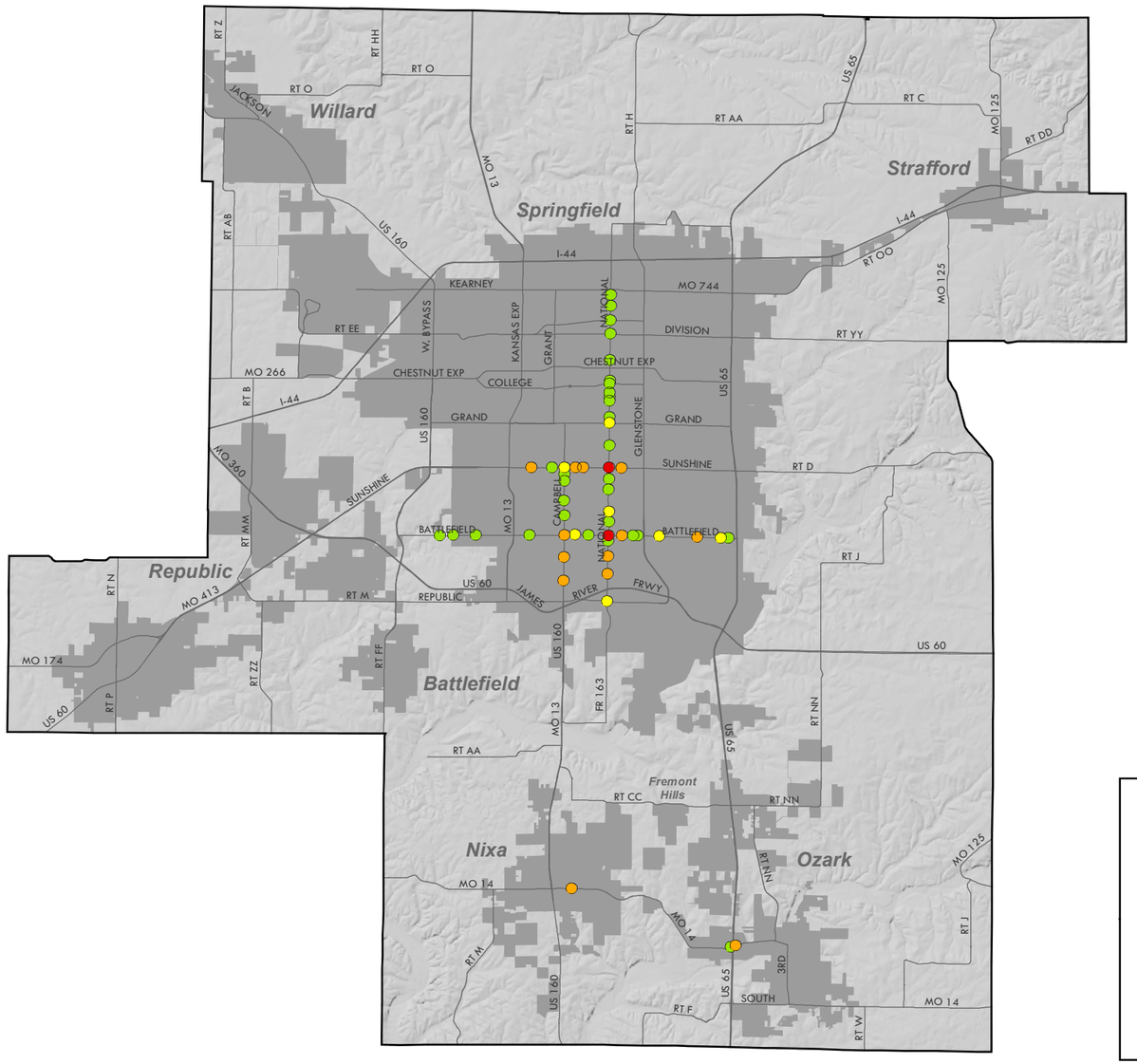
Map 9.2

What impact does intersection/interchange level-of-service play in determining regional congestion problems?

0 0.5 1 2 3 4
Miles

N

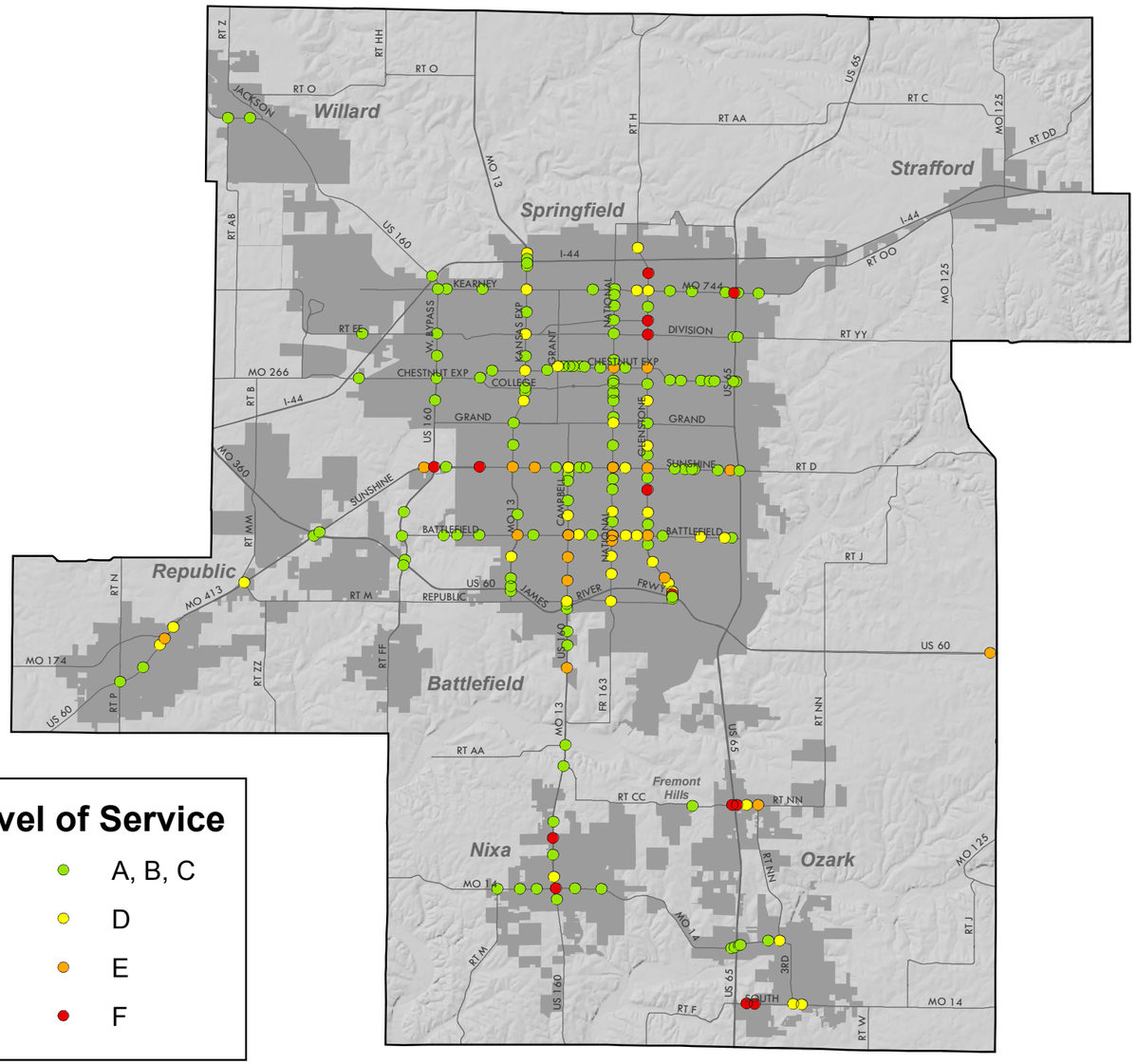
Intersection Level of Service
PM Peak



2005

Level of Service

- A, B, C
- D
- E
- F



2008

0 1 2 4 6 8

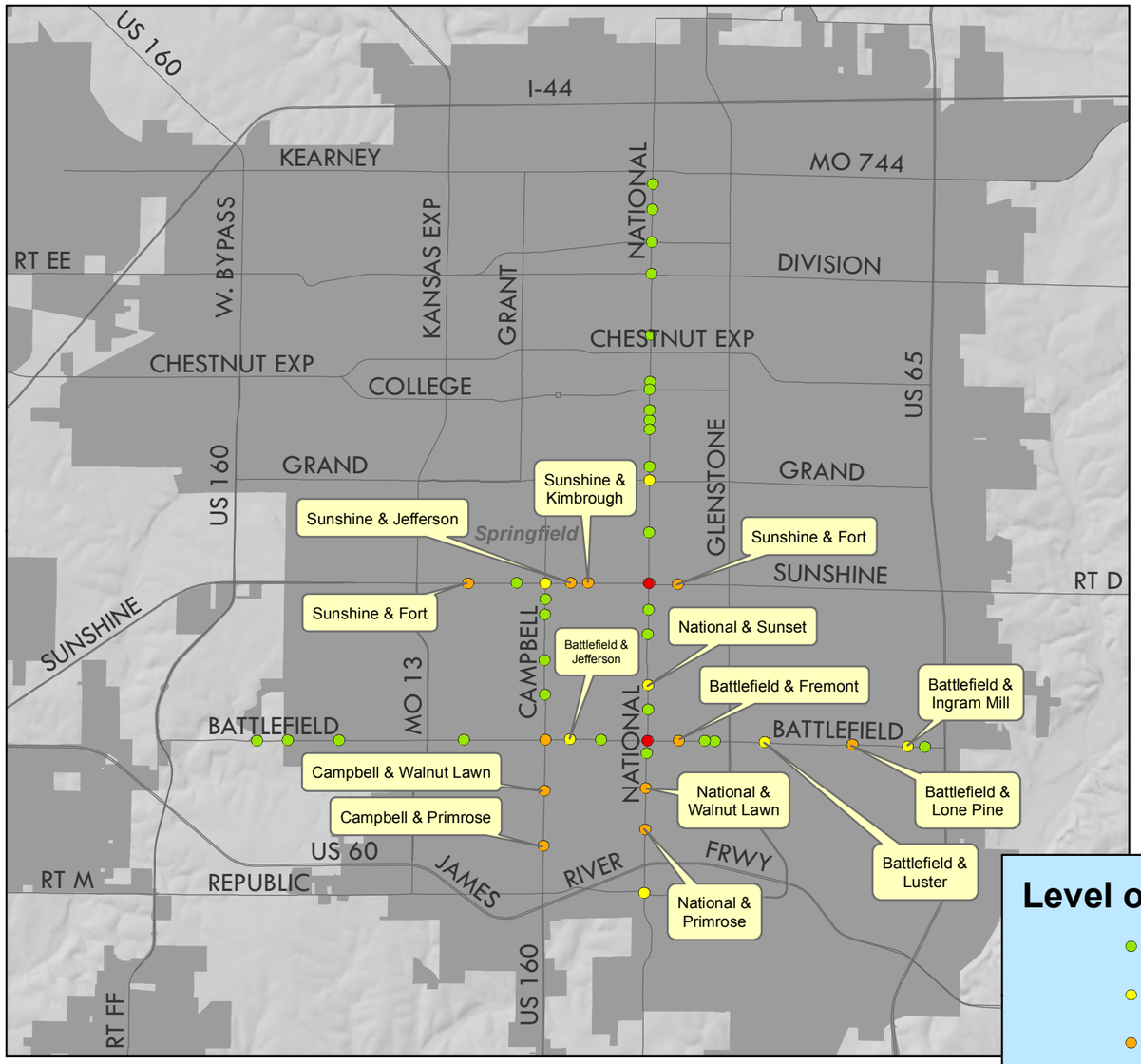
Miles

Map 10.1

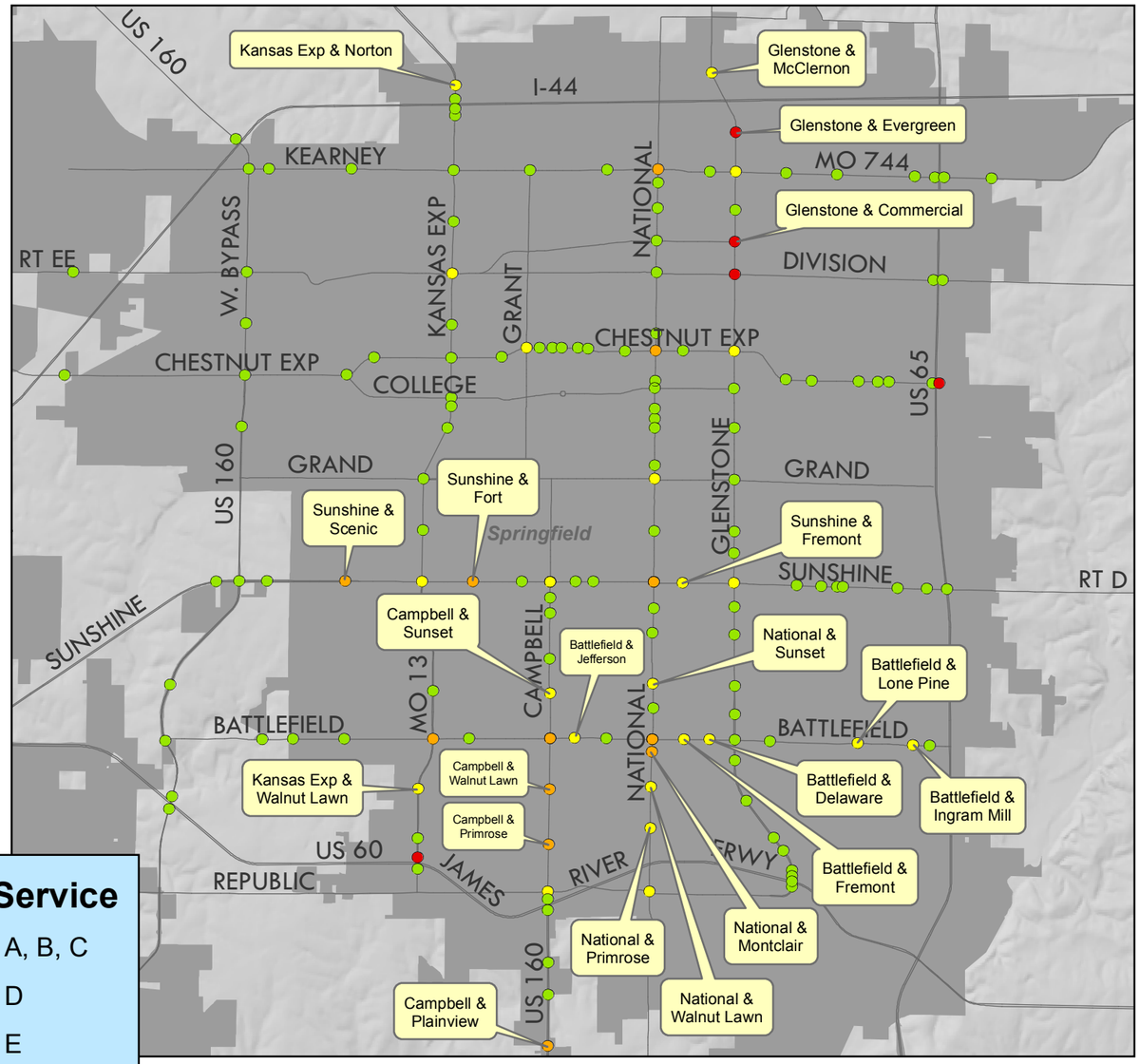
What impact does intersection/interchange level-of-service play in determining regional congestion problems?

N

Intersection Level of Service
PM Peak



2005



2008

Level of Service

- A, B, C
- D
- E
- F

Map 10.2

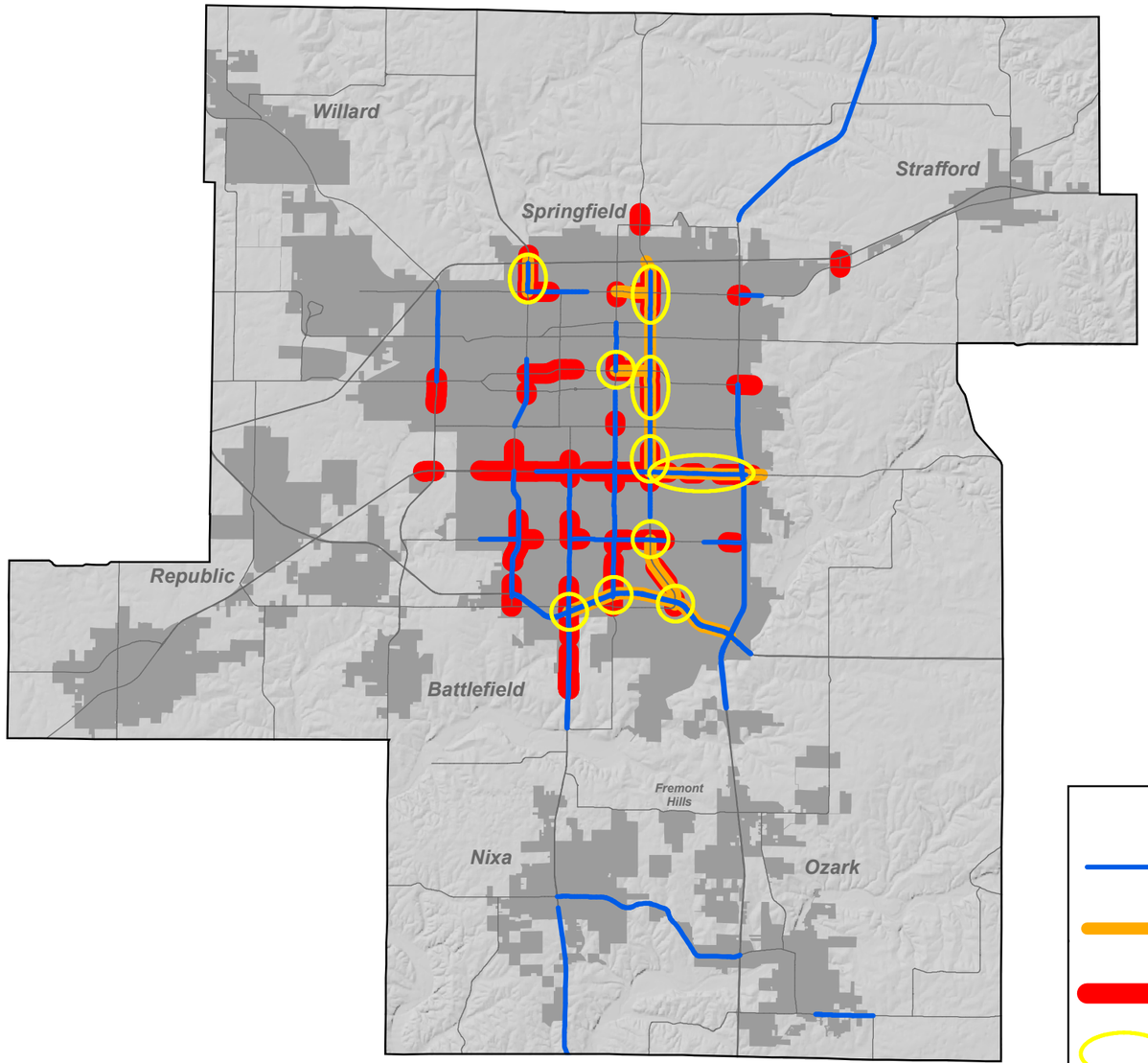
What impact does intersection/interchange level-of-service play in determining regional congestion problems?

0 0.5 1 2 3 4

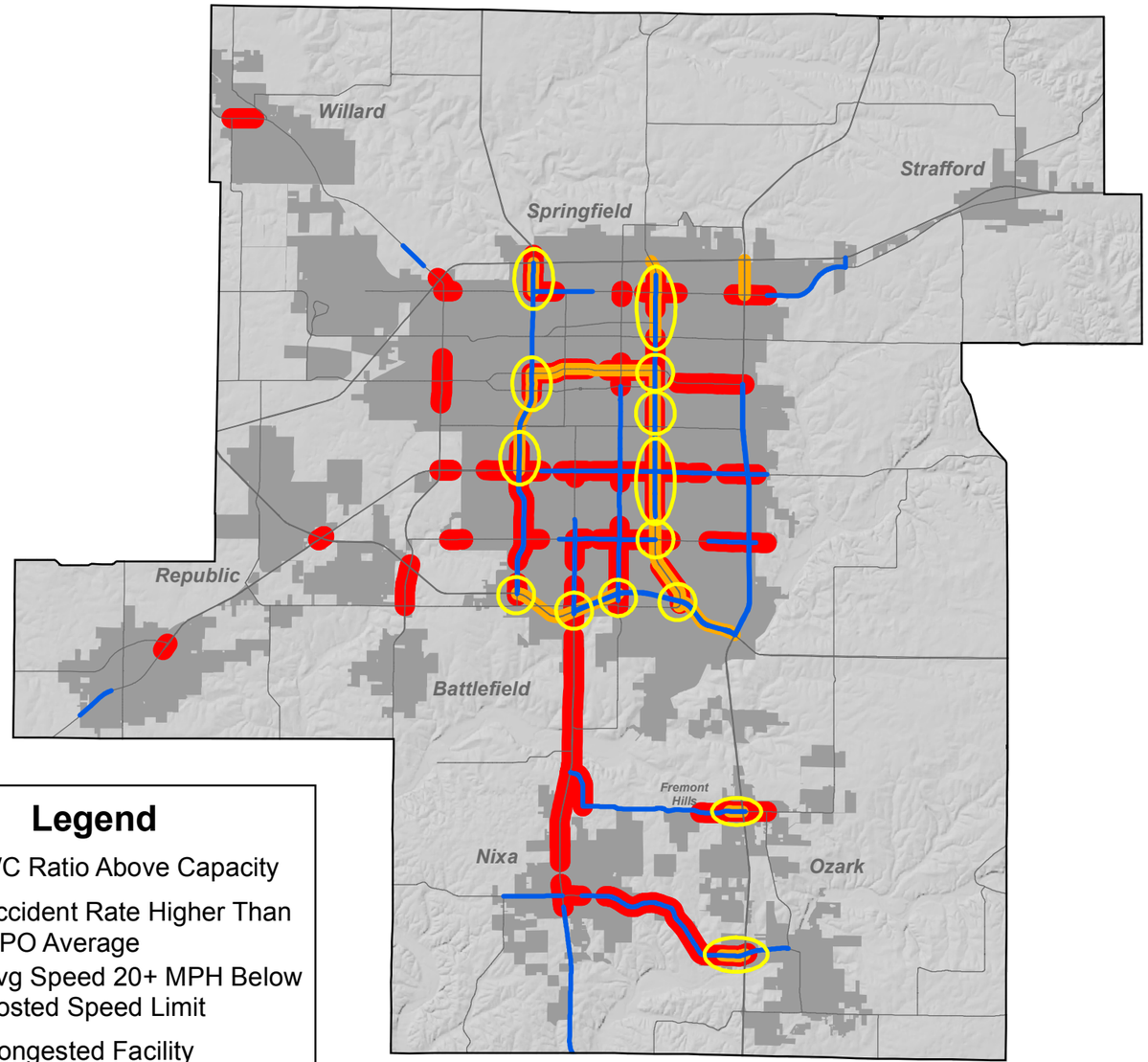
Miles

N

Congested Facilities



2005



2008

Legend

- V/C Ratio Above Capacity
- Accident Rate Higher Than MPO Average
- Avg Speed 20+ MPH Below Posted Speed Limit
- Congested Facility

0 1 2 4 6 8

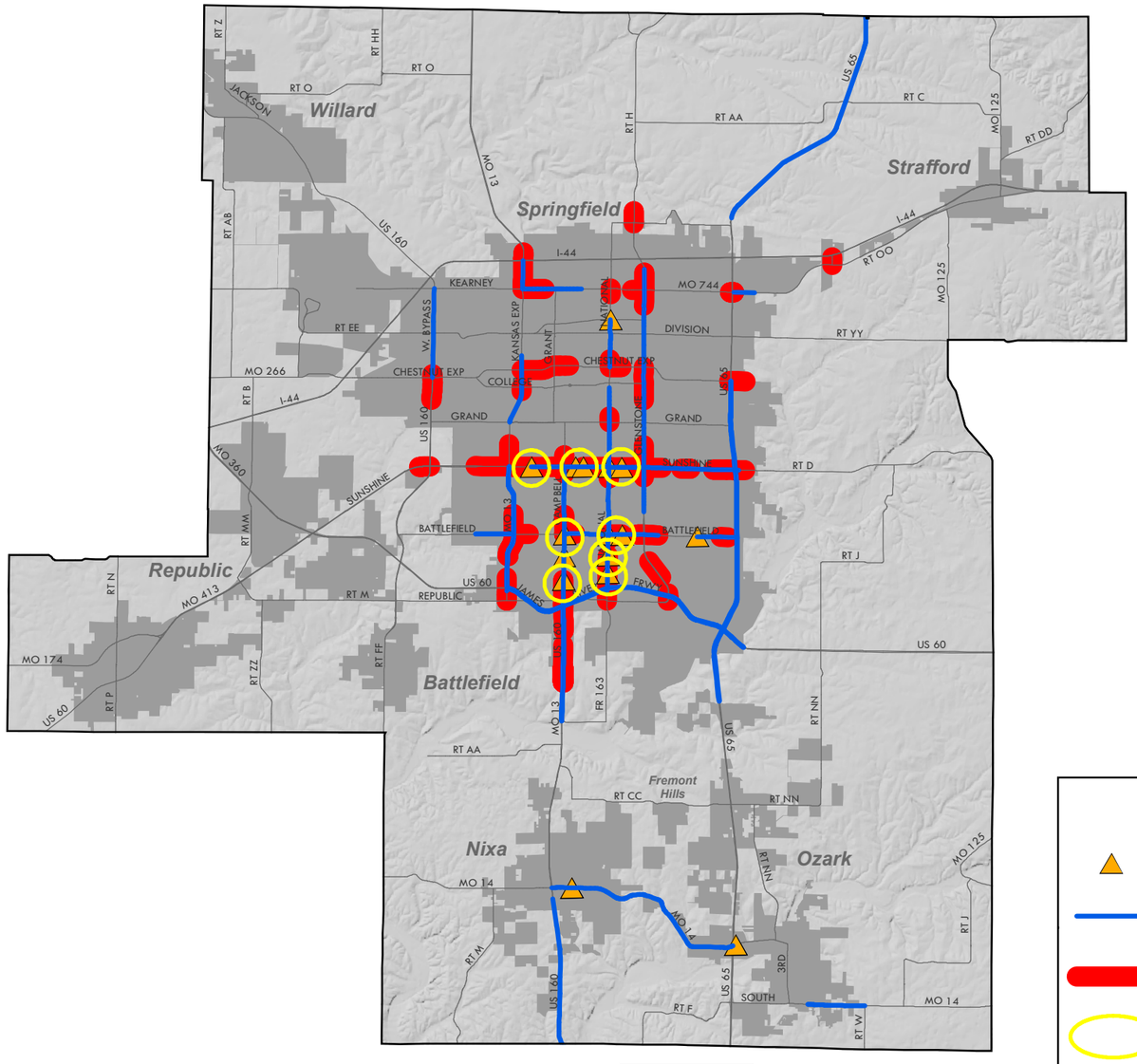
Miles

Map 11

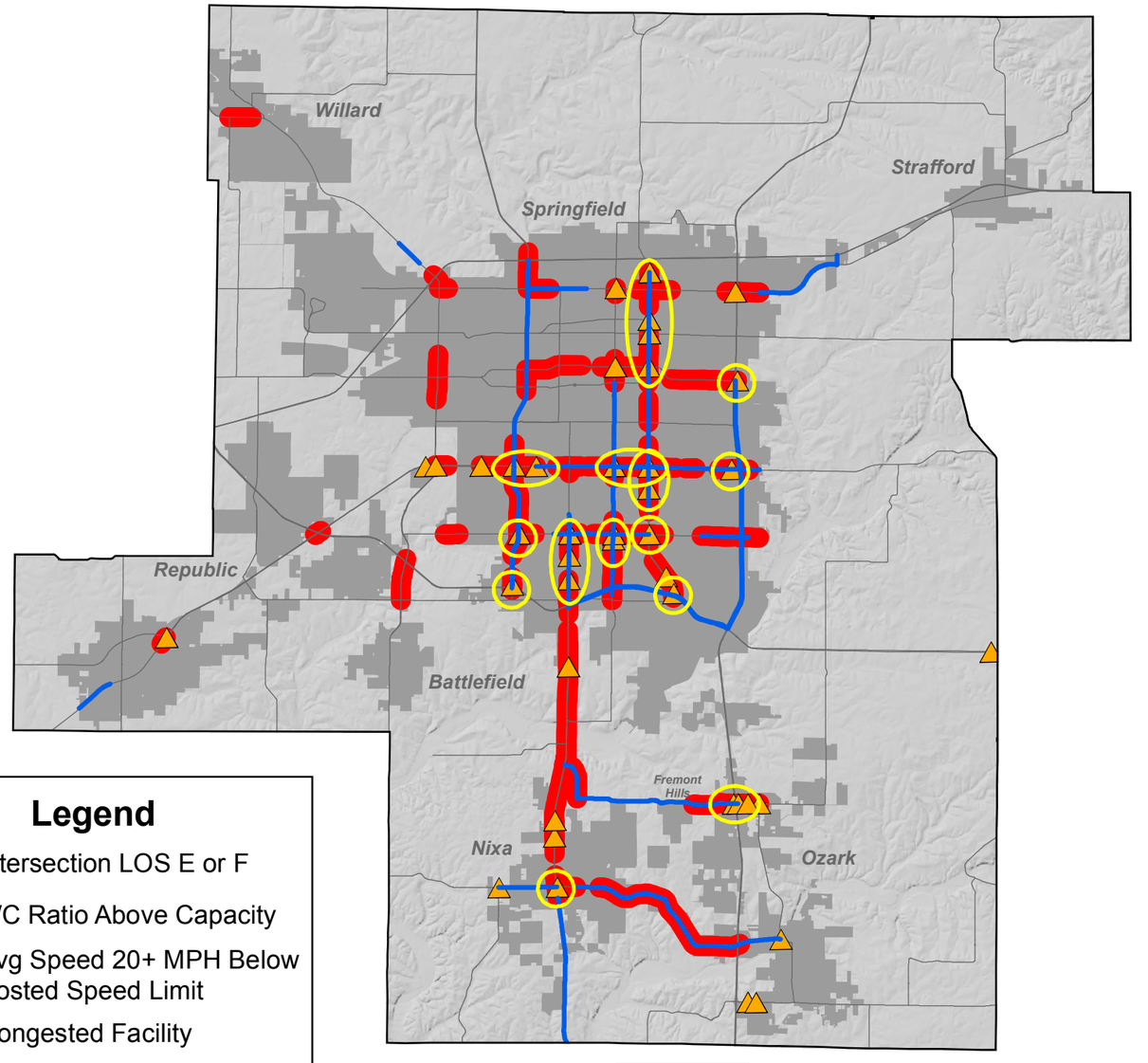
Roadways which have a significant travel delay, level of service E+ and high accident rate

N

Congested Facilities



2005



2008

Legend

- Intersection LOS E or F
- V/C Ratio Above Capacity
- Avg Speed 20+ MPH Below Posted Speed Limit
- Congested Facility

0 1 2 4 6 8

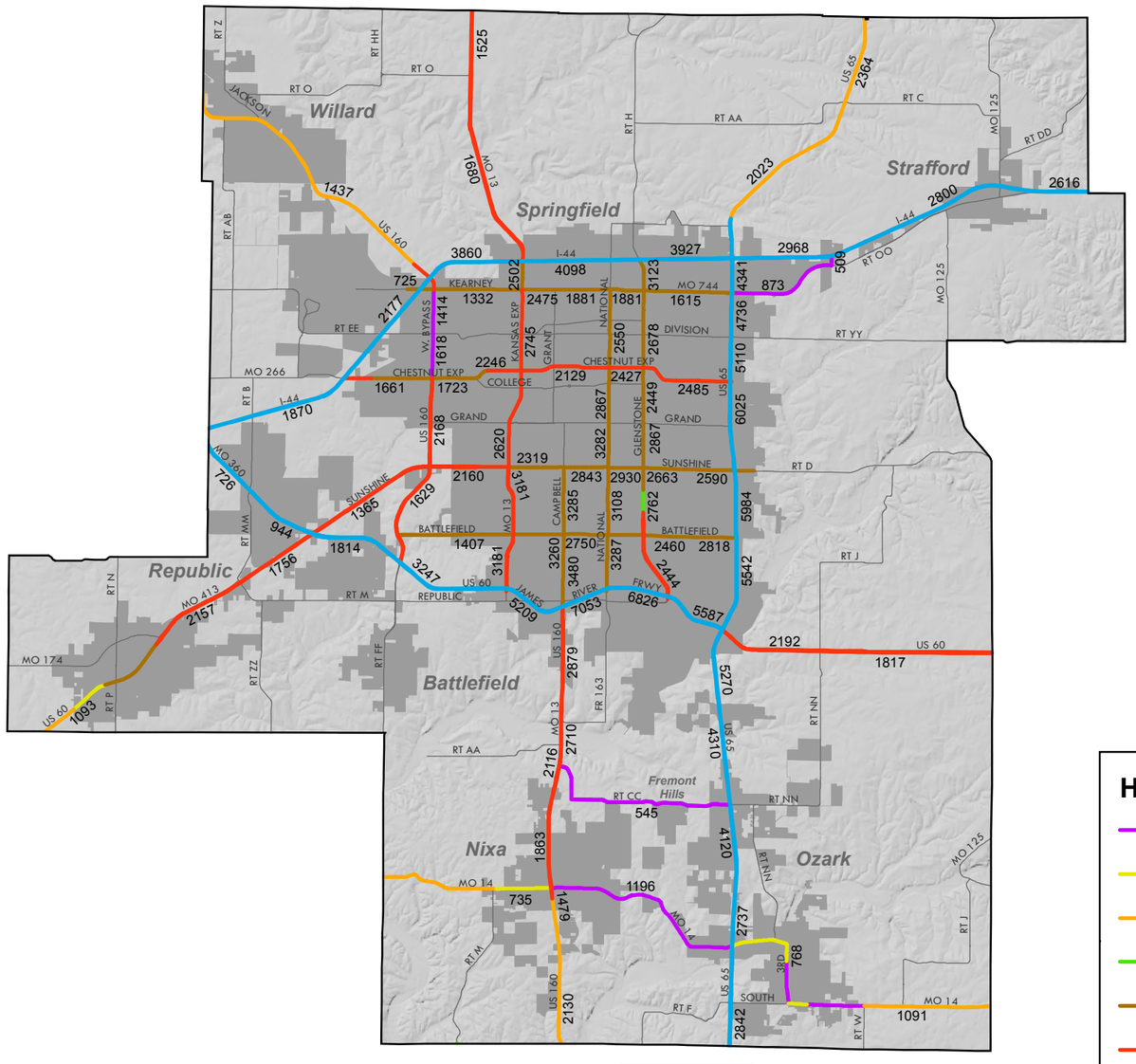
Miles

Map 12

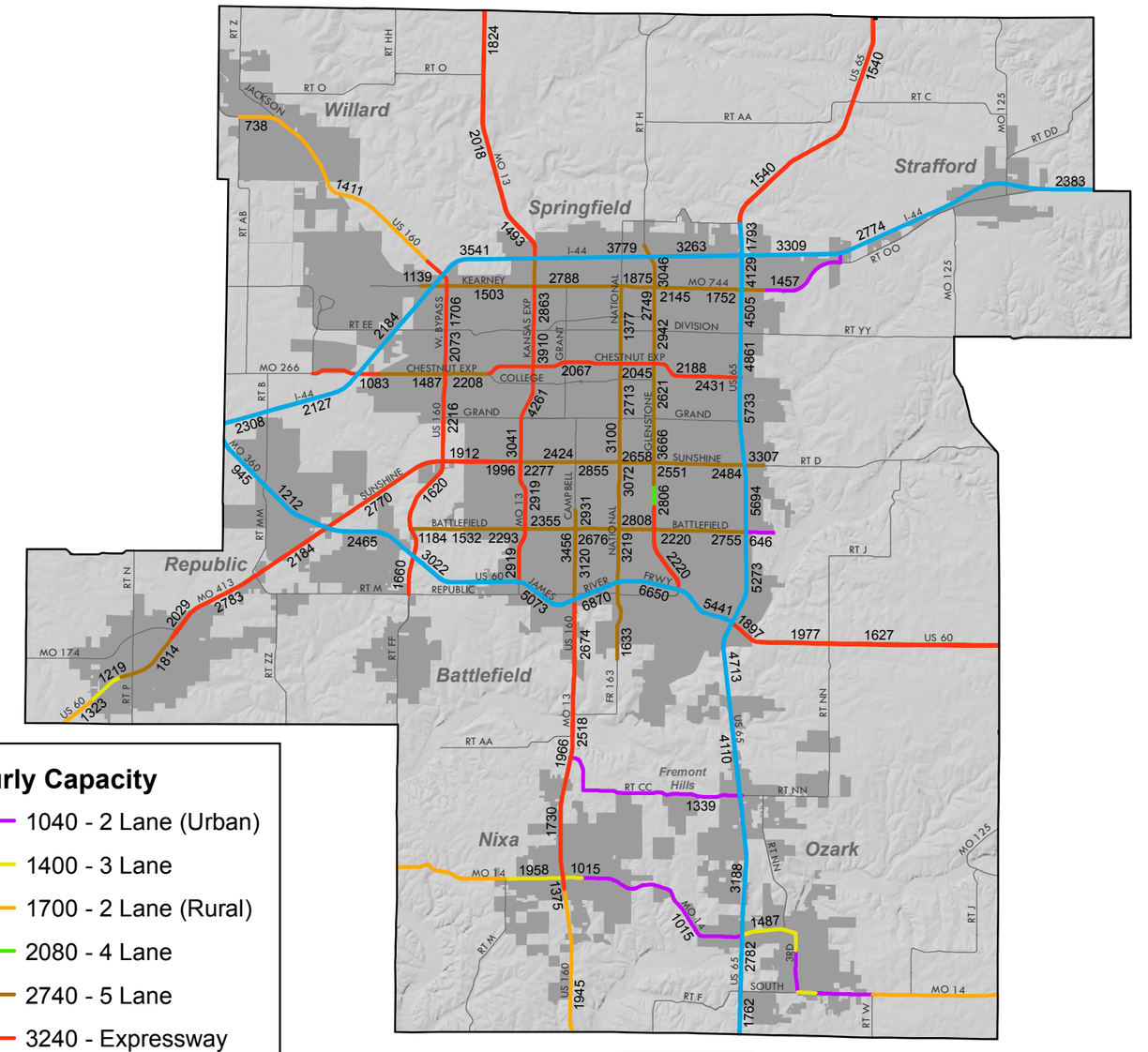
Roadways which have a significant travel delay, level of service E+ and intersection level of service E+

N

Traffic Volumes and Roadway Capacities



2005



2008

Hourly Capacity

- 1040 - 2 Lane (Urban)
- 1400 - 3 Lane
- 1700 - 2 Lane (Rural)
- 2080 - 4 Lane
- 2740 - 5 Lane
- 3240 - Expressway
- 6000 - Freeway

Map 13

Peak hour traffic volumes and roadway capacities

0 1 2 4 6 8

Miles

N