

Section 9 – MoDOT Operations & Maintenance Plan

MoDOT Operations and Maintenance Plan

MoDOT spends approximately \$530 million annually for operations. As shown in the table below, this includes Maintenance, Fleet, Facilities and Information Systems. The majority of these expenditures, approximately \$450 million, are in Maintenance. This section will discuss the composition of the maintenance expenditures, their outcomes and what is planned for state calendar years 2022, 2023 and 2024.

Expenditures (Operations)	2017	2018	2019	2020	2021
Maintenance ¹	\$449	\$463	\$466	\$472	\$448
Fleet, Facilities and Information Systems ¹	\$75	\$79	\$78	\$76	\$80

¹ Includes personal services and fringe benefits of MoDOT employees and expense and equipment costs. Costs are in millions.

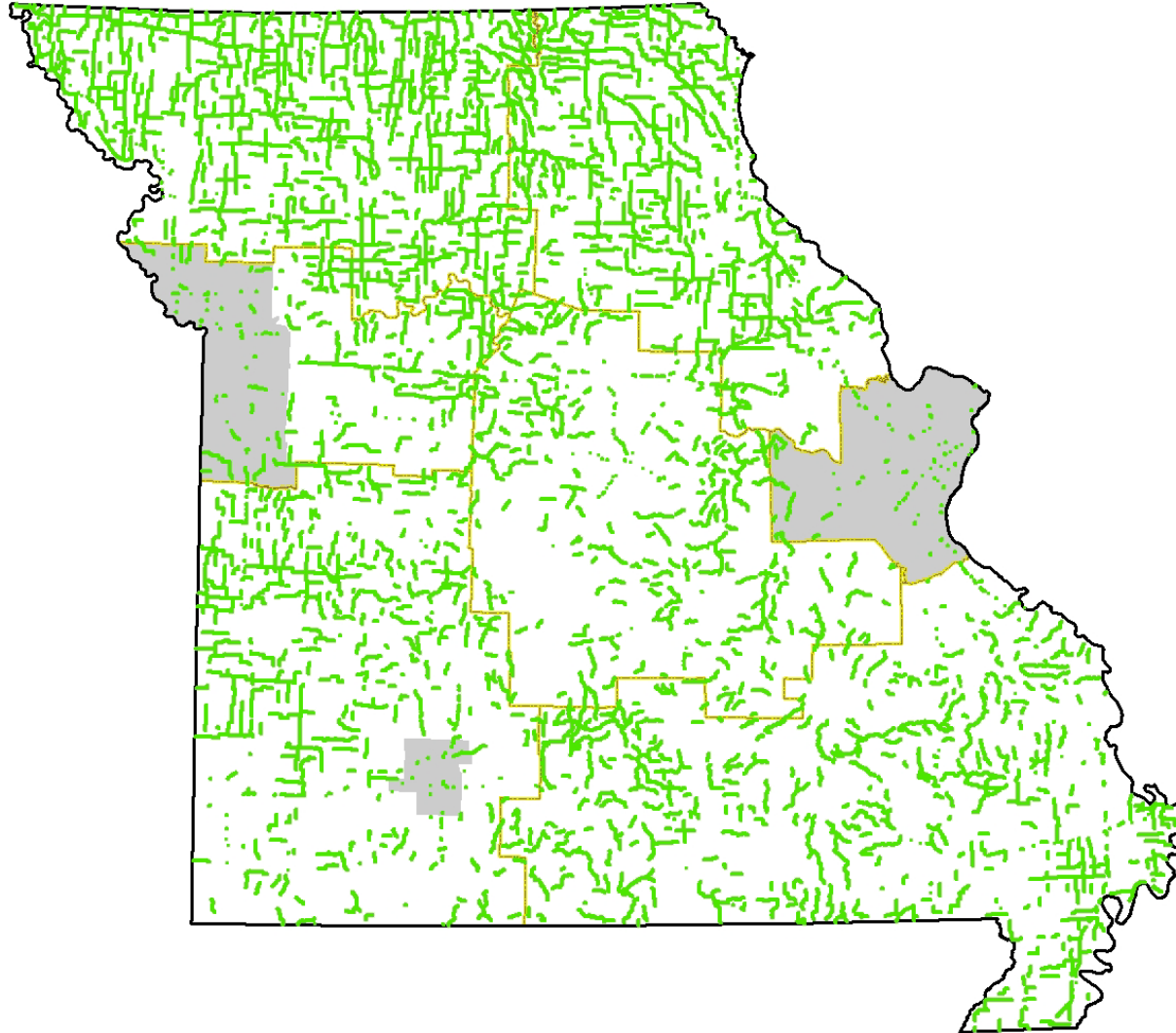
Maintenance Composition

Major components of maintenance efforts are pavements, bridges, emergency operations such as flooding, roadsides, traffic operations and winter operations. The most erratic of these components is winter operations. Expenditures in winter operations can range from \$18 million to \$75 million in a winter season. In order to ensure that Missouri's transportation system is resilient during winter events, MoDOT has more than 3,000 employees who operate over 1,500 heavy-duty trucks from over 170 facilities statewide. When needed, all those trucks can be operated 24 hours a day for extended periods until operational goals have been met. Many MoDOT employees who are not in Maintenance, as well as seasonal hires, assist in plowing snow. The expectation of a rapid and widespread response to statewide winter events is the driver for the staffing, facilities and equipment levels in MoDOT's Maintenance Division.

Maintenance efforts on MoDOT's more than 34,000 highway miles are the single largest component of the maintenance expenditures. Typically, around \$210 million is spent on pavements for various activities such as asphalt pavement repair, chip sealing, pothole patching, full-depth concrete pavement replacement and striping. Many of these activities (e.g., chip sealing, asphalt pavement repair and full-depth concrete pavement replacement) are planned and submitted for federal reimbursement. Planning for these activities can be challenging because of the variance in winter operations expenditures.

In 2021, more than \$60 million in federal reimbursement was secured due to properly planned, executed and tracked in-house maintenance efforts. Other pavement maintenance efforts are simply reactive such as pothole patching, the bulk of which occurs after the winter season in March. The one asset that MoDOT's maintenance forces are typically responsible for managing without any roadway contract assistance is the low volume route pavements which are roads with generally less than 400 vehicles per day.

Low Volume Routes





Typical asphalt pavement repair

MoDOT's bridges are a critical component of the transportation system. A failure in a structure can result in a long-term interruption to the traveling public and highway-based commerce. MoDOT's over 10,000 bridges include approximately 3,000 large culvert structures. Bridges are inspected every two years. They may be inspected more frequently if they are major bridges or if damage occurs or is identified. Bridge conditions are determined from these inspections and preventive and major maintenance efforts are planned. Preventive maintenance efforts include bridge flushing, bridge deck sealing, erosion prevention and channel clearing. Bridge flushing is the application of fresh water to the bridge surface and its supporting structure. This ensures the chemicals and other materials applied for winter operations are removed from the bridge structure and will not promote deterioration of the bridge. Typical spanning structure bridges are flushed at least annually. Over ten percent of the bridges also have their decks sealed annually to help preserve the bridge. MoDOT's large culverts do not require flushing or sealing.

MoDOT's emergency operations have a large impact on Missouri's transportation system availability. This work includes incidents ranging from a single-vehicle accident response to a major earthquake or flood response and recovery. Many of these events and severe weather events such as tornados that impact Missouri's transportation system require a coordinated effort between MoDOT's emergency operations and the State Emergency Management Agency (SEMA). These coordinated efforts are led from MoDOT's central and regional emergency operations centers and the State Emergency Operations Center. Incidents like a major flood usually have state and federal disaster declarations which allow the opportunity to recover some costs related to the response and recovery efforts. Maintenance staff members coordinate, track and report the activities that qualify for federal reimbursement during these events and during the recovery efforts following them. The most common role of emergency operations is the response to vehicle incidents that occur every day on Missouri's roads. MoDOT emergency response vehicles in Missouri's urban areas respond to lane-blocking incidents to keep traffic moving and reduce secondary crashes. These emergency response vehicles assist stranded or stalled motorists when they are not responding to a lane-blocking incident. They usually set up the initial traffic control for incidents. For larger impact incidents, additional maintenance crews help establish traffic control.

Roadside maintenance includes vegetation management such as mowing, herbicide applications, plant growth regulator applications and brush clearing. MoDOT mows over 400,000 acres of right of way annually. MoDOT's mowing policy is driven by safety concerns. To ensure sight distance requirements are not impeded by vegetation growth, a 15-foot pass of mowing outside the shoulder is performed every year. To ensure trees do not grow in the recovery zone for run-off vehicles, a 30-foot wide pass is mowed outside the shoulder every other year. This occurs only during the last mowing of the season to minimize impacts to species such as pollinators. Trash collection through volunteer efforts from MoDOT's Adopt a Highway program and maintenance staff, results in the disposal of over a half of a million bags of trash per year. This partnership with over 5,300 adopting groups provides MoDOT a value of \$1 million to \$1.5 million per year in litter collection efforts. Safety is MoDOT's top priority. Work on state right of ways may encounter homeless encampments, such as areas under bridges, overpasses and near busy highways. This is not a safe place for the homeless to gather, as roadway construction and maintenance work can pose dangers. MoDOT strives to be sensitive to people

seeking shelter on state right of way and works closely with local law enforcement and social services providers to cleanup encampments when an encampment becomes a fire hazard or other threat to the traveling public or infrastructure.



Typical bridge deck seal



MoDOT emergency response vehicle assisting a major vehicular incident

Traffic operations manages approximately 2,600 traffic signals, 260 dynamic message signs, 600 traffic cameras and traffic management centers in Kansas City, Springfield and St. Louis. They also manage all of MoDOT's roadway striping and signing. Over 70,000 miles of striping is performed annually. All of the signs on MoDOT's transportation system are inventoried and inspected biennially. Sign maintenance and replacement costs over \$10 million per year. In addition, signals regularly undergo preventive maintenance checks and over \$10 million in maintenance efforts are performed annually on signals.

Maintenance Outcomes

Many of the results from Maintenance efforts can be found in MoDOT's performance measure publication known as TRACKER. Winter operations are measured by the time it takes from the completion of precipitation from a winter event to meeting the operational goals of clearing the roads. Pavement maintenance is measured by the percent of good pavements on the minor route system. MoDOT's goal is to maintain the percent of pavements in good condition. Similarly, bridge maintenance is also measured by the percent of bridges in good condition. Both of these are pursued mostly with preventive maintenance treatments and occasionally heavy maintenance efforts.

Emergency and Traffic operations have several measures driving their outcomes such as clearance times for incidents, freeway travel times and costs due to congestion. Roadside maintenance has Maintenance Division measures determining their efficiency and effectiveness. Unit prices of mowing and vegetation control are measured and compared to previous years as are overall roadside costs. The proper use of herbicides to reduce mowing and brush cutting costs are constantly reviewed and measured to ensure the most cost-effective total vegetation management practices are implemented at MoDOT.

Maintenance Plans

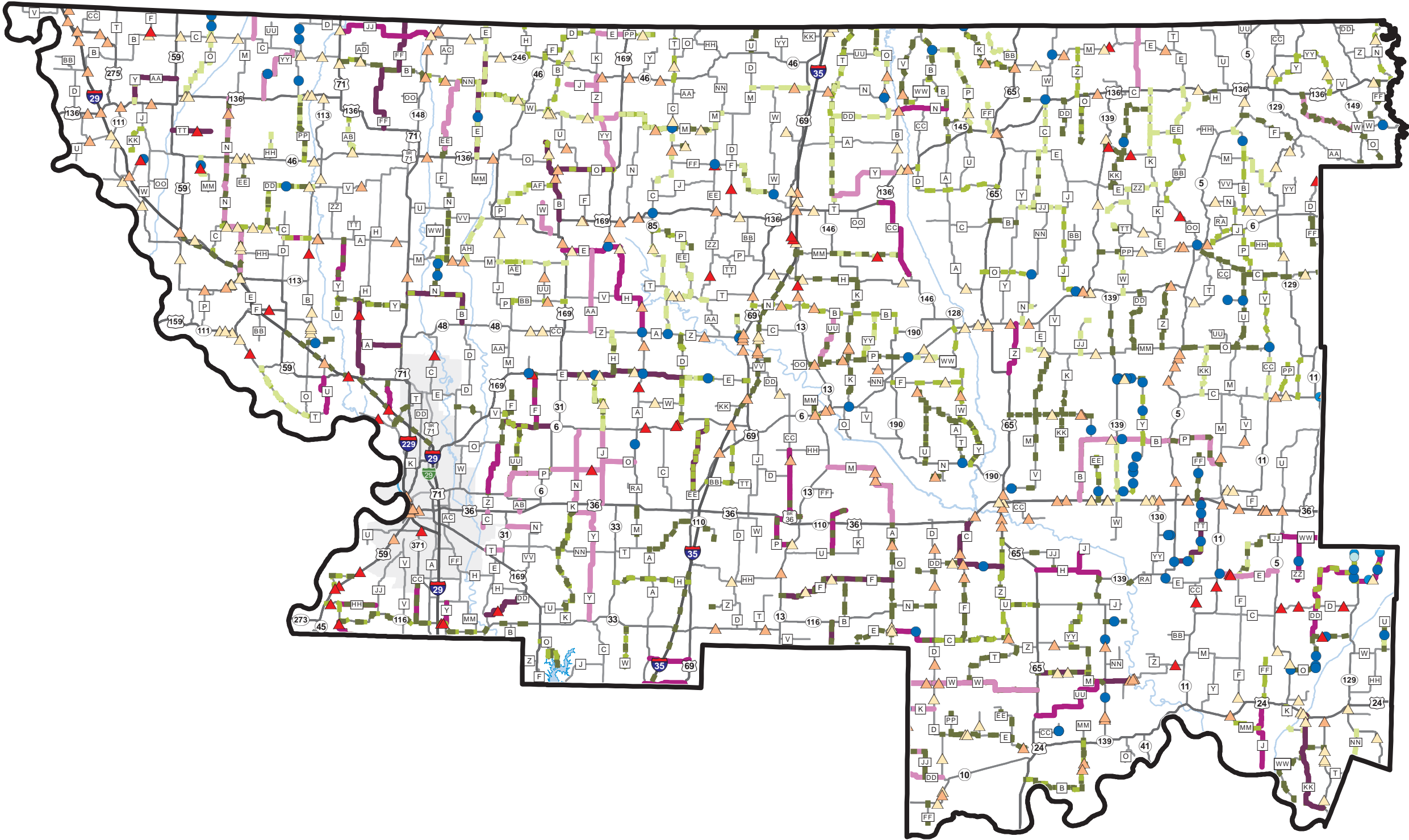
Some maintenance activities are reactive and unpredictable such as pothole patching and winter operations, but the majority of maintenance work is planned, executed and tracked. These planned activities include chip seals, crack seals, asphalt pavement repairs, bridge deck seals, bridge flushing, striping, pipe culvert repairs and full-depth concrete pavement replacements. Maps depicting several of these planned activities for the calendar years 2022, 2023 and 2024 seasons for each district are on the following pages. Several of the expenditure categories from state fiscal year 2021 are shown on the maps as well. Due to the high availability of contract resources in the urban areas of Kansas City and St. Louis, and the high traffic volumes, the work plans vary greatly from the rural districts. More maintenance and system operations activities in the urban areas are focused on emergency response, traffic signal operations, sweeping, mowing and incident management rather than the typical roadway work in the rural districts. Traffic management centers are staffed 24 hours a day, seven days a week, to meet the vast system operation needs. A great deal of the urban operations is focused on emergency response compared to roadway work. The urban operations in Kansas City and St. Louis respond

to over 50,000 incidents annually. Some urban roadway work is handled with contracted projects. Planned preventive maintenance work plans or preservation work performed by MoDOT forces are submitted annually for federal participation through the federal Preservation Program.

Maintenance Asset Management Deficit Program

The Maintenance Asset Management Deficit program will address low-volume routes in poor condition maintained by MoDOT's operating budget. The allocation is \$15 million in FY2023 and FY2024 and is for districts with low-volume route conditions less than the statewide average.

Maintenance Operations
Pavement and Bridge
Work Plan
Calendar Year 2022-2024
NORTHWEST
District



- ▲ 2022 Bridge Deck Sealing
- 2022 Pipe Replacement
- 2022 Pavement Repair
- 2022 Pavement Treatments
- ▲ 2023 Bridge Deck Sealing
- 2023 Pipe Replacement
- 2023 Pavement Repair
- 2023 Pavement Treatments
- ▲ 2024 Bridge Deck Sealing
- 2024 Pipe Replacement
- 2024 Pavement Repair
- 2024 Pavement Treatments

SFY 2021 Expenditures on all
Transportation System Operations

Roadway:	\$27,800,000
Utilities and Tools:	\$13,800,000
Roadside:	\$1,900,000
Winter:	\$7,800,000
Incident Management:	\$200,000
Bridge:	\$2,700,000
Other ¹ :	\$600,000

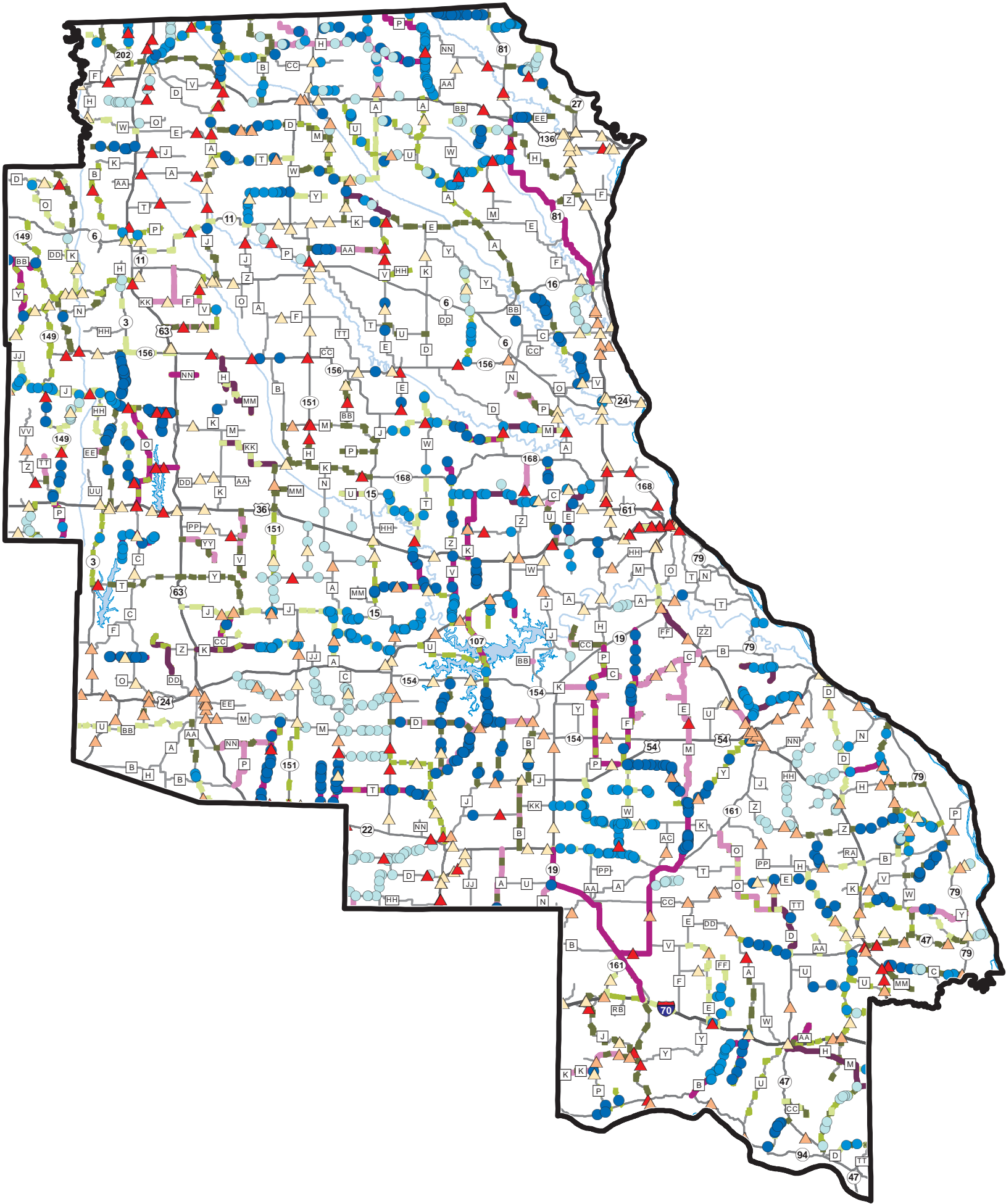
¹ Includes insurance for general liability, vehicle liability and workers compensation.

- MoDOT Annually (Statewide):
- Mows about 400,000 acres
 - Manages over 2,600 traffic signals, 260 dynamic message signs and 600 traffic cameras
 - Stripes over 70,000 line miles
 - Repairs over 15,000 miles of edge ruts
 - Sweeps over 40,000 lane miles
 - Replace over 100,000 linear feet of culvert pipes
 - Flush over 7,000 bridges at least once

Work depicted on this map may change due to winter weather impacts or various impacts such as flooding, disasters or other immediate priorities that may occur or may be identified prior to the implementation of the various work plans.



Maintenance Operations
Pavement and Bridge
Work Plan
Calendar Year 2022-2024
NORTHEAST
District



- ▲ 2022 Bridge Deck Sealing
- 2022 Pipe Replacement
- 2022 Pavement Repair
- 2022 Pavement Treatments
- ▲ 2023 Bridge Deck Sealing
- 2023 Pipe Replacement
- 2023 Pavement Repair
- 2023 Pavement Treatments
- ▲ 2024 Bridge Deck Sealing
- 2024 Pipe Replacement
- 2024 Pavement Repair
- 2024 Pavement Treatments

SFY 2021 Expenditures on all
Transportation System Operations

Roadway:	\$21,500,000
Utilities and Tools:	\$16,500,000
Roadside:	\$2,200,000
Winter:	\$7,100,000
Incident Management:	\$300,000
Bridge:	\$2,300,000
Other ¹ :	\$700,000

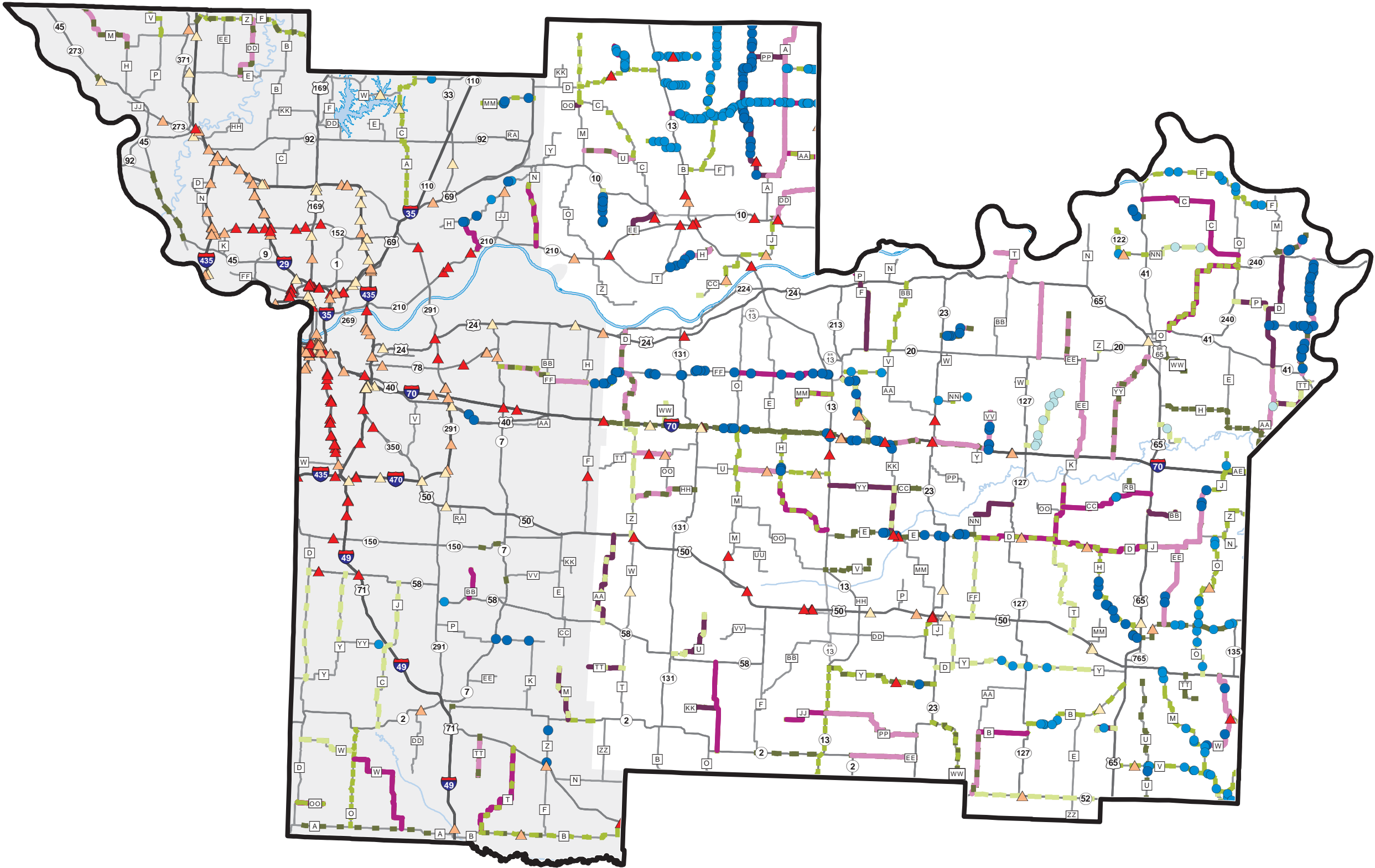
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Maintenance Operations
Pavement and Bridge
Work Plan
Calendar Year 2022-2024
KANSAS CITY
District



- ▲ 2022 Bridge Deck Sealing
- 2022 Pipe Replacement
- 2022 Pavement Repair
- 2022 Pavement Treatments
- ▲ 2023 Bridge Deck Sealing
- 2023 Pipe Replacement
- 2023 Pavement Repair
- 2023 Pavement Treatments
- ▲ 2024 Bridge Deck Sealing
- 2024 Pipe Replacement
- 2024 Pavement Repair
- 2024 Pavement Treatments

SFY 2021 Expenditures on all
Transportation System Operations

Roadway:	\$23,400,000
Utilities and Tools:	\$13,900,000
Roadside:	\$3,100,000
Winter:	\$7,200,000
Incident Management:	\$200,000
Bridge:	\$1,400,000
Other ¹ :	\$1,700,000

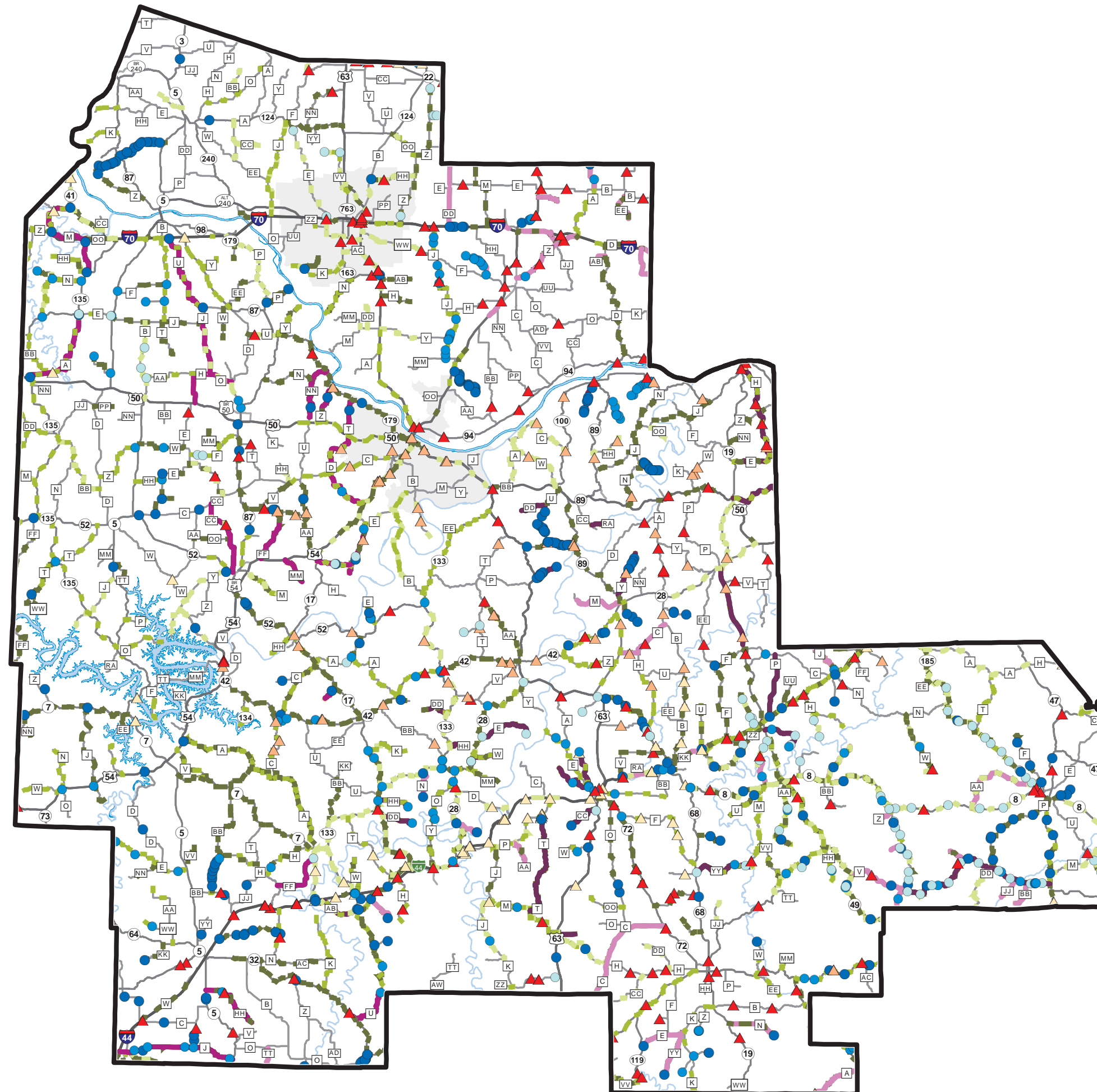
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Maintenance Operations Pavement and Bridge Work Plan Calendar Year 2022-2024 CENTRAL District



- ▲ 2022 Bridge Deck Sealing
- 2022 Pipe Replacement
- 2022 Pavement Repair
- 2022 Pavement Treatments
- ▲ 2023 Bridge Deck Sealing
- 2023 Pipe Replacement
- 2023 Pavement Repair
- 2023 Pavement Treatments
- ▲ 2024 Bridge Deck Sealing
- 2024 Pipe Replacement
- 2024 Pavement Repair
- 2024 Pavement Treatments

SFY 2021 Expenditures on all Transportation System Operations

Roadway:	\$32,400,000
Utilities and Tools:	\$12,300,000
Roadside:	\$3,700,000
Winter:	\$8,800,000
Incident Management:	\$400,000
Bridge:	\$2,400,000
Other ¹ :	\$800,000

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-  2022 Bridge Deck Sealing
-  2022 Pipe Replacement
-  2022 Pavement Repair
-  2022 Pavement Treatments
-  2023 Bridge Deck Sealing
-  2023 Pipe Replacement
-  2023 Pavement Repair
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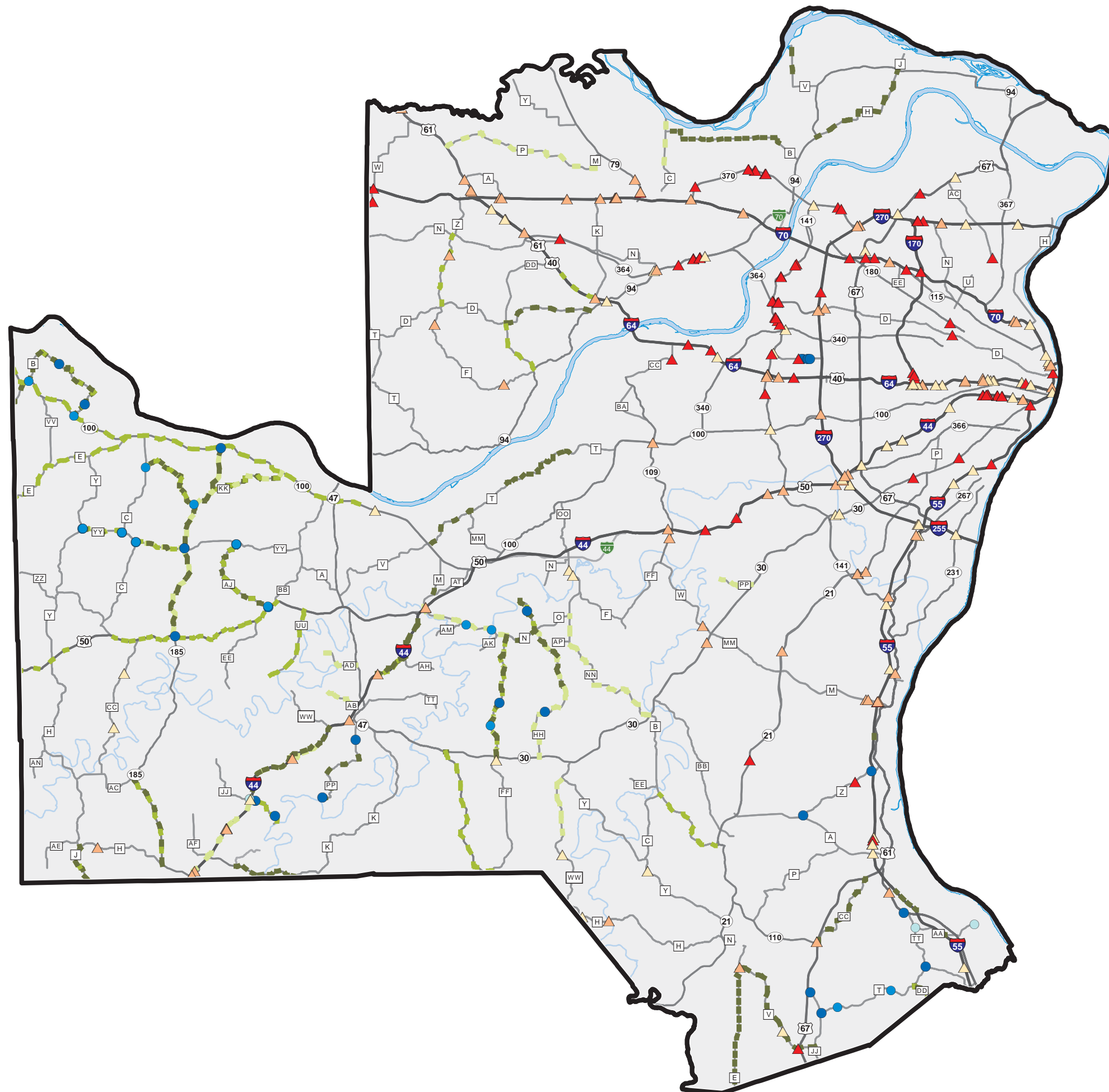
Roadway:	\$27,600,000
Utilities and Tools:	\$11,700,000
Roadside:	\$5,800,000
Winter:	\$7,200,000
Incident Management:	\$600,000
Bridge:	\$2,400,000
Other ¹ :	\$1,500,000

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-  2022 Pipe Replacement
-  2022 Pavement Repair
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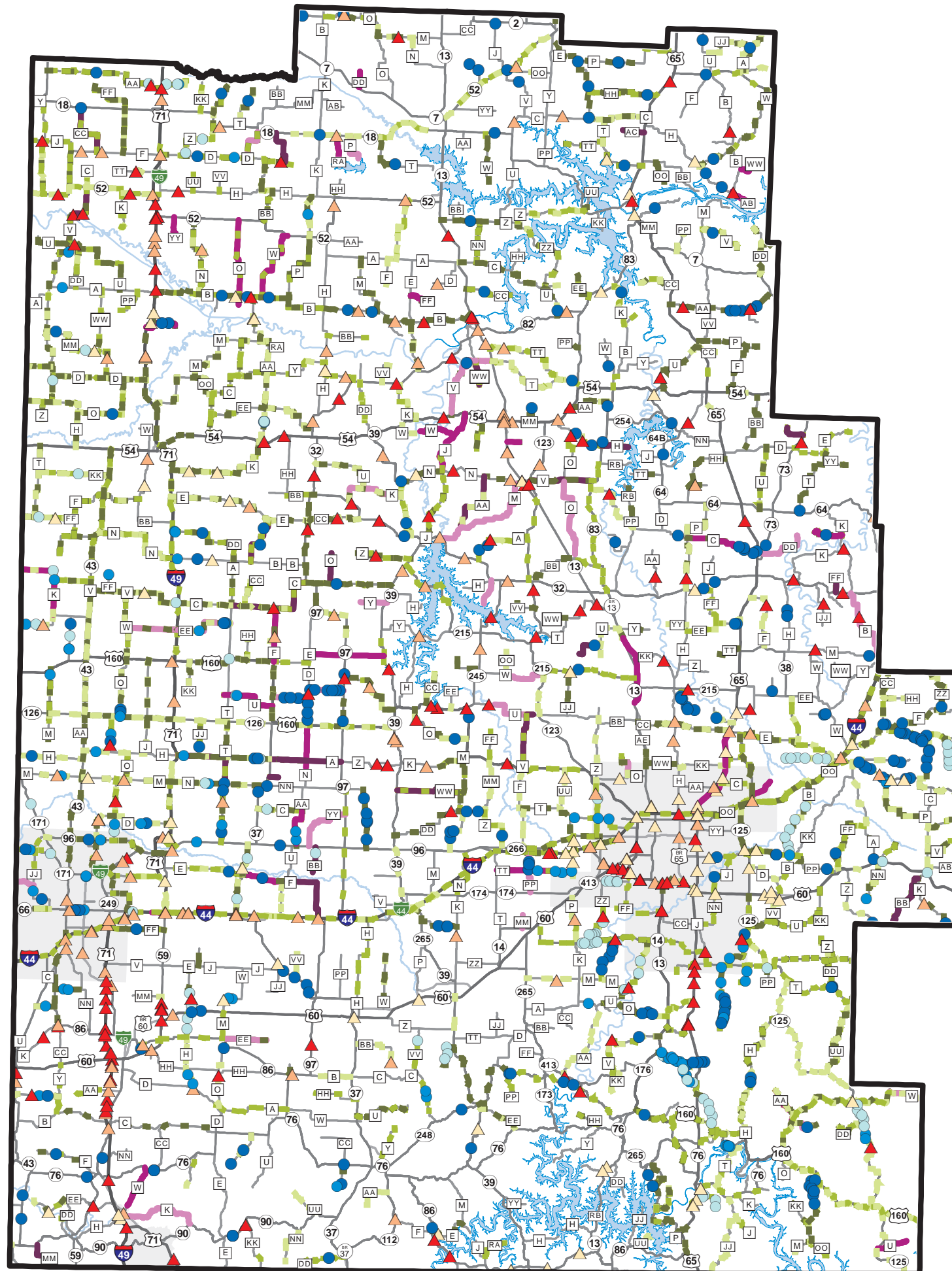
Roadway:	\$38,100,000
Utilities and Tools:	\$13,600,000
Roadside:	\$7,300,000
Winter:	\$9,500,000
Incident Management:	\$1,400,000
Bridge:	\$3,800,000
Other ¹ :	\$1,000,000

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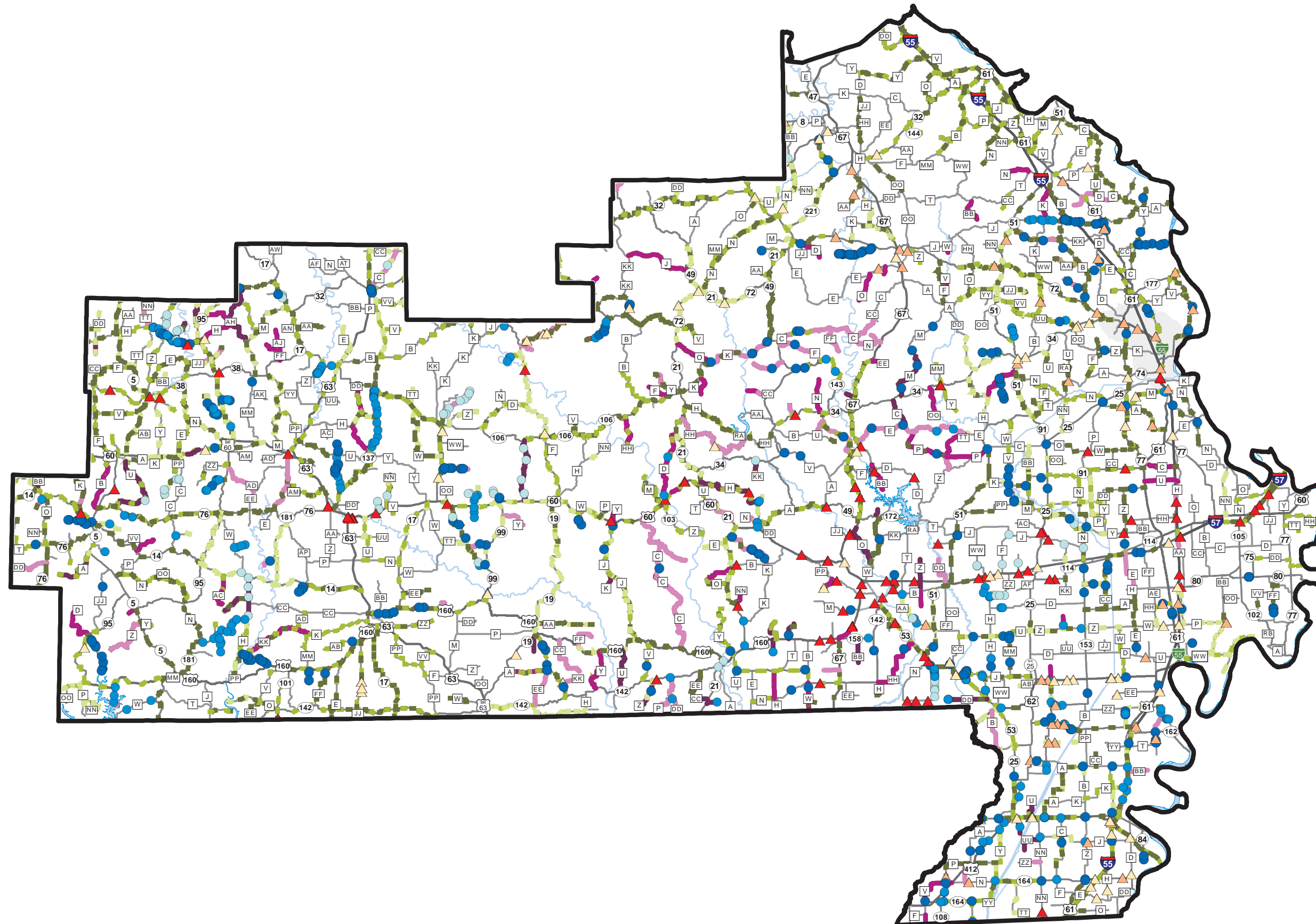
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Maintenance Operations Pavement and Bridge Work Plan Calendar Year 2022-2024 SOUTHEAST District



- ▲ 2022 Bridge Deck Sealing
- 2022 Pipe Replacement
- 2022 Pavement Repair
- 2022 Pavement Treatments
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- 2023 Pipe Replacement
- 2023 Pavement Repair
- 2023 Pavement Treatments
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- 2024 Pavement Treatments

SFY 2021 Expenditures on all Transportation System Operations

Roadway:	\$34,800,000
Utilities and Tools:	\$16,300,000
Roadside:	\$5,500,000
Winter:	\$7,600,000
Incident Management:	\$600,000
Bridge:	\$4,900,000
Other ¹ :	\$1,200,000

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