Freight, Innovation and Safety for the Ozarks

FY 2020 INFRA GRANT APPLICATION

# FIX I-44: FREIGHT, INNOVATION AND SAFETY FOR THE OZARKS

MoDOT

**U.S. Department of Transportation Nationally Significant Freight and Highway Projects (INFRA Grants) for Fiscal Year 2020**

*Submitted by: Missouri Department of Transportation*

**February 25, 2020**

# Cover Page

**Basic Project Information:**

| | |
|---|---|
| • What is the Project Name? | FIX I-44: Freight, Innovation and Safety for the Ozarks |
| • Who is the Project Sponsor? | Missouri Department of Transportation |
| • Prior INFRA Application | No |

**Project Costs:**

| | |
|---|---|
| • INFRA Request Amount | $39,845,000 |
| • Estimated federal funding (excl. INFRA) | $14,696,000 |
| • Estimated non-federal funding | $13,775,000 |
| • Future Eligible Project Cost (Sum of previous three rows) | $68,316,000 |
| • Previously incurred project costs (if applicable) | $0 |
| • Total Project Cost (Sum of 'previous incurred' and 'future eligible') | $68,316,000 |
| • Are matching funds restricted to a specific project component? If so, which one? | No |

**Project Eligibility:**

| | |
|---|---|
| • Approximately how much of the estimated future eligible project costs will be spent on components of the project currently located on National Highway Freight Network (NHFN)? | $68,316,000 |
| • Approximately how much of the estimated future eligible project costs will be spent on components of the project currently located on the National Highway System (NHS)? | $68,316,000 |
| • Approximately how much of the estimated future eligible project costs will be spent on components constituting railway-highway grade crossing or grade separation projects? | $0 |
| • Approximately how much of the estimated future eligible project costs will be spent on components constituting intermodal or freight rail projects, or freight projects within the boundaries of a public or private freight rail, water (including ports), or intermodal facility? | $0 |

**Project Location:**

| | |
|---|---|
| • State(s) in which project is located | Missouri |
| • Small or large project | Small |
| • Urbanized Area in which project is located, if applicable | Springfield |
| • Population of Urbanized Area | 273,724 |
| • Is project located (entirely or partially) in an Opportunity Zone? **(Census Tracts: 29077004302, 29077005600, 29077003600, 29077004400, and 29077002200)** | Yes |
| • Is the project currently programmed in the: | |
| ○ TIP | No |
| ○ STIP | No |
| ○ MPO Long Range Transportation Plan | Yes |
| ○ State Long Range Transportation Plan | Yes |
| ○ State Freight Plan? | No |

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# 1.0 Project Description/Summary

**Project Summary.** The Missouri Department of Transportation (MoDOT) requests $39.845 million in INFRA funds to offset the cost of improving approximately 14 miles of Interstate 44 (I-44) through Springfield, Missouri between State Highway 360 (Mile Marker 68) and US 65 (Mile Marker 82). The **FIX I-44: Freight, Innovation and Safety for the Ozarks** project includes: 1) widening 7 miles of the existing roadway (from 2 to 3 lanes in each direction), 2) improving the existing pavement, 3) replacing 6 bridges, 4) adding a box culvert under the interstate to accommodate active transportation modes, and 5) Transportation Systems Management and Operations Strategies. INFRA funding represents 58 percent of the $68.316 million total project cost. All project elements are located on I-44, which is a route on the USDOT National Highway Freight Network.

**Significance of Missouri to the U.S. Freight Transportation System.** As the transportation crossroads for the entire nation, Missouri's strategic location puts it within 500 miles of 43 percent of the U.S. population, 44 percent of all U.S. manufacturing plants and seven of the top 25 international cargo hubs in the United States. Missouri is also home to the country's 2nd and 3rd largest rail hubs in Kansas City and St. Louis, respectively, and the 3rd and 8th largest inland ports in St. Louis. Missouri's interstates provide connectivity to the south and west via I-35 in Oklahoma to points in Texas and on to Mexico, and I-40 west to California; and to the entire eastern U.S. at St. Louis via I-44, I-55, I-64 and I-70. In total, St. Louis has 35 urban interstates, freeways and expressways that support freight movements. I-70 and its national connectors I-270 and I-170 are the top three freight-carrying roadways ranked by average combination AADT per mile.

**Significance of Missouri's I-44 Freight Corridor**

- Over 50% of freight moving on I-44 in Missouri is through-traffic.
- Agricultural products from rural counties comprise about 25% of freight leaving Missouri via I-44.
- Springfield's 30+ stainless steel and other advanced manufacturing companies rely on I-44 for goods movement.
- 41% of the vehicles moving through the project limits are over-the-road freight haulers.
- Trucks share I-44 with significant tourist traffic headed to Branson and the Ozarks.
- Springfield is the 3rd largest city in Missouri, but the hub for 27 farm-to-market rural counties[1].

**Significance of I-44 in Missouri.** Annually, I-44 in Missouri carries more than 46 million tons of freight worth over $100 billion,[2] the greatest freight tonnage and value in the state. Over 50 percent of freight moving on I-44 in Missouri is through-traffic. The Mid-America Freight Coalition classifies I-44 in Missouri as a Tier 1 (i.e., priority) corridor because of its high truck volumes and its links to the southwest United States and to St. Louis, the multi-model crossroads of American commerce. I-44's significance to rural commerce in Missouri cannot be overstated. Nearly 25 percent of freight leaving Missouri on I-44 are agricultural products grown or produced in rural counties. In Springfield, I-44 forms the north leg of a freeway belt that circles the City, providing access for through-traffic to St. Louis 215 miles to the east, Joplin 71 miles to the west and Branson—mid-America's entertainment capital hosting 9 million visitors annually—50 miles to the south. I-44 is crucially important to Springfield's advanced manufacturing industry which is growing because of the relatively low cost of doing business in

[1] U.S. Department of Commerce, Bureau of Economic Analysis, 2018.
[2] MoDOT, Missouri State Freight Plan, Chapter 3, 2017.



southwest Missouri, and a strong and stable workforce. The manufacturing industry employs 23,000, and one in five of those jobs is in stainless steel. Springfield is known as the 'Stainless Steel Capital of the U.S.' because of its 30+ stainless steel production and manufacturing companies who support a wide array of businesses throughout the U.S. and the world including food and beverages, pharmaceutical, agriculture and dairy, biotech, chemical and more. These stainless-steel companies transport their goods across the globe on a trip that starts on I-44. The Springfield region is home to many other national and international companies that depend on the I-44 corridor to transport their goods nationally and internationally. Most recently, Kraft Heinz announced plans to add new production lines and create 109 new jobs as part of a $44 million expansion project at the Springfield facility, the third major capital investment in this particular operation over the past four years. Another company, security and alarm manufacturer Digital Monitoring Products (DMP), recently began construction on a $7 million expansion at their Springfield facility with plans to create 65 new jobs. I-44 is also critically important for Southwest Missouri's $1B+ tourism industry. For visitors traveling by vehicle from the north, east or west, I-44 is the gateway to Branson and the Ozarks. Branson is a family vacation destination that was once a local and regional spot, and is now a world-class destination appearing on lists of top places to visit in the U.S. Branson offers numerous live performance theaters and country music shows, the Silver Dollar City amusement park, world-class golf courses, and many other indoor/outdoor attractions. The Ozarks is home to mountains, rivers, lakes, caves, and forests offering boating, fishing, hiking, mountain biking, exploring, and more. The Ozarks draw visitors from across the U.S. for its pristine natural beauty and outdoor adventures.

Project Description.

**Widening and Improving the Roadway**. The core of the project is widening and improving approximately 7 miles of I-44 between US 160 ("West Bypass" at Mile Marker 75) and US 65 (Mile Marker 82). At this location, I-44 is currently two lanes in each direction (eastbound and westbound). Annual average daily traffic (AADT) on the targeted section is 51,185 representing peak Monday-Friday commuter and freight traffic (with a 22.6 percent increase anticipated by 2045). Nearly 30 percent of these vehicles (n=13,895) are freight vehicles. A new third lane will be added in the existing grassy interior median to create a continuous three-lane section in each direction. The current four lanes will be improved by cold milling the existing pavement and replacing with a new asphalt overlay. The existing guard cables will be replaced with concrete median barriers, which are preferred in areas with high truck traffic like I-44. We will evaluate where sound walls are necessary based on MoDOT Noise Standards Policy and FHWA Noise Standards Policy. W here necessary, we will construct sound walls to address noise issues identified in the study and community concerns regarding highway noise.

- **Bridge Replacements.** The project will replace six, 2-lane bridges on I-44 in each direction over Broadway Avenue, Grant Avenue and National Avenue. These voided slab bridges are approximately 134 feet in length and 44 feet wide and were constructed in 1960. All 6 bridges are currently on the state's 'weight-restricted' list. These bridges are located in the 7-mile project limit for the road widening element. It is expected that the new bridges will be constructed in the current footprint but will be higher and wider.
- **Transportation Systems Management and Operations Strategies (TSMO).** Multiple TSMO elements will be installed/initiated along a 14-mile corridor that includes the 7-mile



segment that will be widened (described above), with some extending an additional 7 miles to the west to MO-360 (Mile Marker 68). These include:

*1) Intelligent Transportation System (ITS) elements* including: **a) upgrading two aging Dynamic Message Boards** (DMS) at eastbound Mile Marker 78.2 and westbound Mile Marker 81.5, **replacing one DMS** at eastbound Mile Marker 73.80, and **adding one new DMS** at eastbound Mile Marker 69; **b) six new closed circuit television (CCTV) cameras** between MO-360 and US-65 (14 miles) to fill gaps where MoDOT currently has no visual access (Mile Markers 69.0, 70.2, 72.5 73.8, and between US-160 and MO-13 and MO-13 and Glenstone Avenue); **c) wrong-way driver notification** on the ramps at three interchanges in the 14-mile segment (Chestnut Expressway, US-160 and Glenstone); and **d) upgrade broadband fiber** currently in the median along 7 miles to support the new and upgraded ITS elements and to support additional future ITS improvements. Moving the fiber for the road widening project will be required, and the upgrade will occur as part of this activity.

*2) Predictive Analytics*. MoDOT uses Waycare's platform to harness in-vehicle and city data, and analyze these to provide traffic management and safety information in real-time. The platform is capable of using complex algorithms to analyze traffic, weather and incident data to better inform deployment of costly and limited resources (for example, traffic incident management and emergency response) and to inform the driving public about incidents and blockages. The new ITS elements described above will support robust Predictive Analytics along this busy and congested stretch of I-44.

Active Transportation Element. A box culvert will be installed under I-44 between Grant and National Avenues to accommodate a future multi-use trail that will bridge an active transportation connectivity gap created by I-44. The new connection will link Doling Park and Family Center, located just south of I-44, to the Hillcrest neighborhood to the north. The trail will provide connectivity to multiple high-value destinations beyond Hillcrest including Dickerson Park Zoo, Ozark Empire Fairgrounds and the Fulbright Springs Greenway; to the south, it will provide connectivity to The Link, an 8-mile greenway that stretches from Doling Park and connects to downtown, several parks and Class I and II trails. The Link is the only city-wide north-south bicycle/pedestrian connection.

The regional Ozarks Transportation Organization (OTO) identifies I-44 capacity expansion as a high-priority project in their fiscally-constrained project list in *Transportation Plan 2040*[3] (regional long-range transportation plan). The proposed project will complement MoDOT's other significant improvements that are planned, underway, or recently completed for I-44 in Missouri including: I-44 Bridge Renovation Project that will include replacement and/or rehabilitation of 19 I-44 bridges (rural bridges west of Springfield - cost est. $36M); I-44 Meramec River Bridges Replacement (St. Louis area - cost est. $51M); I-44 Resurfacing and Bridge Repair (central Missouri – cost est. $13M; Phase 2 of the I-44 bridge renovations is already programmed in the STIP); and I-44 Diverging Diamond Interchange in Springfield (the first such interchange in the U.S. in 2010, cost est. $3M). Along with the proposed project, these improvements significantly improve safety, reduce congestion and enable more efficient movement of people and goods across Missouri. Together, these projects illustrate MoDOT's commitment to the long-term sustainability of I-44.

[3] https://media.ozarkstransportation.org/documents/Combined12192019.pdf



**Partnerships.** Recognizing the economic importance of the project, several partners are contributing financially (2 percent of total project costs - $1.4 million), including the City of Springfield and Greene County. Immediately after INFRA award and during ramp-up, MoDOT will explore providing STEM opportunities within the local community and create partnerships that may include the University of Missouri-Columbia (MU), Missouri University of Science and Technology in Rolla, MO (S&T), and institutions of higher education in the Springfield region including Missouri State University and Ozarks Technical Community College. The USDOT provides over $1 million annually to fund the University Transportation Center at S&T. MoDOT has a strong history of partnering on similar major projects - including the US-54 Champ Clark River Bridge project, in which partnerships were developed between the local high schools and contractor (with respect to engineering trades), and the US-60 Rogersville Freeway Project, in which partnerships were developed with local female and minority STEM students from the surrounding communities.

**Missouri's Roadway System**

- 7th largest state highway system in America (33,838 miles)
- Ranks 48th in nation in revenue raised per highway mile

* https://www.modot.org/fast-facts

The proposed project elements are "project ready" with the following tasks already completed or in progress: the project was scoped and costed based on similar prior projects and general estimates of the types and quantities of materials needed for progressive design-build (for small projects, preliminary engineering is not required), costing has been completed following MoDOT's rigorous estimating process (discussed in-depth later in proposal), a Categorical Exclusion has been identified as the probable NEPA outcome by MoDOT (based on experience with projects of similar scope), schedules have been developed, permits have been identified, and the local match has been secured. MoDOT proposes to complete procurement and select a progressive design-build team by October 1, 2022, (assuming awards are announced by July 1, 2020) as part of the INFRA grant accountability metric.

**Project's History and Broader Context.** The I-44 corridor in Springfield was constructed in the 1950s and 1960s. Springfield and the I-44 project limits are unique in that they are critically important to both the urban and rural environments in Southwest Missouri. Key industries in the Springfield region include advanced manufacturing (including the area's stainless steel companies described earlier) which employs nearly 13,000 people,[4] and freight distribution and logistics. Multiple high-value industries are located within one mile of the corridor including: the Brookline Industrial Park, Partnership Industrial Center (West and East), Stafford Business and Rail Park and Bass Pro Shops Headquarters. Multiple truck terminals are located near the corridor including FedEx, UPS, Prime Trucking, IWX Freight, YRC freight, Saia Freight, Christensen Transportation, RBX, TransLand and two highly secure, underground goods movement trucking complexes. Numerous trucking support services are also located along the corridor including truck stops and truck and trailer service centers. These businesses rely on I-44 to move their products across the nation and globe. The improved corridor will also support other businesses and their commuters, including the 42,000 students who attend college in Springfield, many who commute using I-44. The health industry

[4] Missouri Partnership. https://www.missouripartnership.com/regions-sites-incentives/regions/the-springfield-region/



employs more than 31,000 people and the manufacturing sector in Springfield is home to more than 50 million square feet of industrial real estate market space, and 800 acres of master-planned industrial parks. The I-44 project will improve access and connectivity to the Springfield-Branson National Airport—located just over one mile from I-44—where more than one million annual passengers connect directly to 12 different cities with more than 25 daily flights, and where annual airfreight exceeds 33 million pounds, and has increased 5.5 and 7.8 percent in 2018 and 2019, respectively. I-44 is on the Strategic Highway Network (STRAHNET) which is critical to the Department of Defense's (DoD's) domestic operations, and is deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support U.S. military operations. The U.S. Army's Fort Leonard Wood is located 90 miles northeast on I-44; the post provides training in combat engineering, chemical (detection and protection), military police and transportation to Soldiers, Marines, Airmen, Sailors and students from allied nations. The trainee population is transient with frequent turnover every 6-12 months. Because of the length of the training, most trainees have their own vehicle. I-44 is the primary route to and from the post; the airports in Springfield (90 miles) and St. Louis (142 miles) also provide connectivity.

At the same time, the project supports the significant "rubber tire" tourism destinations in the Ozarks and Branson (just 50 miles south), where the vast majority of the region's 9 million annual visitors[5] arrive by vehicles, recreational vehicles and tour buses (an estimated 4,000 motor coaches arrive annually), pumping $1.5B into the regional economy. For comparison, Disneyland and the Statue of Liberty welcome 18 million and 4.5 million visitors annually, respectively. The Branson area is within a day's drive of 50 percent of the U.S. population, leading the National Motor Coach Network to name the area the "top motor coach destination" of the decade. Forbes Magazine declared the Ozarks region one of the top 25 U.S. destinations in 2020.

Lastly, while Springfield is the state's 3rd largest city, it is the economic hub for 27 **rural counties,** including portions of Arkansas. I-44 plays a significant role in the farm-to-market and natural resource-to-market (e.g., iron, zinc, stone, etc.) network, and the project is consistent with the Department's ROUTES Initiative which seeks to address the unique challenges of rural transportation networks. More than 50 percent of the land in Greene County is agriculture with cropland and pastureland being the primary land commodities and cattle (68,000 head in 2017) being the largest livestock inventory. These agriculture products feed America and the heartland and the supply chain is a vital component to the more than 1,800 farms in Greene County alone. There are an additional 26 counties with similar farmland and natural resource statistics that would benefit firsthand by the proposed I-44 improvements.

**Transportation Challenges**: The proposed I-44 freight and highway improvements will benefit not only Missouri and the Midwest region, but the entire nation by enhancing the safety and reliability of this critical national freight corridor. The challenges that will be addressed include:

**1. Roadway capacity is inadequate creating congestion and traffic delays.** Traffic on I-44 has experienced substantial growth. In Springfield, I-44 has the highest vehicle count outside of St. Louis with weekday volume increasing by up to 55 percent in some locations creating weaving movement

[5] Springfield News-Leader. https://www.news-leader.com/story/news/local/ozarks/2017/02/26/branson-record-growth-and-discontent/96961970/



issues. Also, the four-lane section is prone to significant delays and shut-downs following weather incidents (e.g., ice, heavy rain, snow and wind, all of which are common in Southwest Missouri), and traffic incidents and crashes which tend to spread across all two lanes and the shoulder, creating delays for emergency responders, freight carriers, interstate travelers and commuters. The City's two Level I Trauma Centers are 5-7 miles south of the corridor; accidents on the corridor that block access to either MO-13 or US-65 can significantly increase the drive-time by forcing responders on to surface streets. Public input consistently includes complaints about congestion and travel delays on this section of I-44.

Locals think of '**trucks and tourists**' when picturing I-44 in Springfield. Trucks share this four-lane roadway with tourists and farm-to-market traffic that significantly contribute to congestion and potential vehicle conflicts. Tourists (in cars, recreational vehicles, and pick-up trucks hauling campers and boats) use I-44 to access Branson and the Ozarks. Tourists are often unfamiliar with the roadway, move slower, move back and forth across the roadway, and are distracted by the hundreds of tourist-targeted billboards on the corridor. Farm-to-market traffic heading to points east and west on I-44 also tend to be in large-profile vehicles (e.g., hauling farm equipment for repair or 40-foot trailers full of livestock headed to processing centers). The "resiliency" opportunities created by adding lanes will be important for **all** the vehicles that share the roadway. In addition, OTO estimates that I-44 in Springfield will be congested by 2040 with a volume/capacity ratio higher than 86 percent. Between 2005 and 2035, nearly every portion of I-44 is expected to experience a doubling of the number of vehicles it handles. In some instances, the increases are expected to be as high as 45,000 vehicles per day.


**Figure 1: I-44's users include freight haulers, tourists, farm-to-market vehicles, and commuters**

**2. A degrading safety environment exists on I-44.** MoDOT has determined that the crash environment has intensified in conjunction with the urbanization of the areas adjacent to I-44 (leading to more local traffic on the corridor). Weaving movements also lead to increased potential for vehicle conflicts. MoDOT analyzed crashes from the three most recent calendar years (2016-2018) and compared the crashes in urbanized areas on I-44 to the project limits. The rate of crashes (crashes per mile) in the project limits is 31 percent higher than other urbanized areas of I-44. The rate for serious injury crashes is also higher at 12 percent. Commercial motor vehicle-involved (CMV) crashes were also at a higher rate in the project limits (47 percent higher for serious injury crashes) and 52 percent higher for minor injury crashes with CMV involvement. MoDOT also



analyzed crashes on a comparable corridor in Greene County (US-60) and found CMVs are involved in about 29 percent of all crashes on I-44 in the project limits whereas CMVs were involved in only 7 percent of crashes on US-60. The severity of crashes on I-44 are also more severe than on US-60; higher speed of traffic and higher volume of tractor trailers on I-44 are believed to contribute to the increased severity. Along the I-44 corridor, the most common crash type is out-of-control crashes followed closely by rear-end crashes. The rear-end crashes are likely attributable to traffic slowdowns. Out-of-control crashes can be caused by a number of things but could include driver over-correction due to roadway curvature, excessive speed, inattentiveness and cargo securement.[6]

**3. Interchanges along I-44 have safety and operational issues and are inconsistent with current design standards.** The I-44 interchanges have been evaluated based on safety, traffic operations and geometric design. A MoDOT *I-44 Purpose and Need Study* found that the majority of the interchanges exceed statewide average crash rates. In addition, a significant number of interchanges do not meet current design standards. MoDOT has already improved three of the interchanges. More funding will continue the good work that has already been made along the corridor.

**4. Increases in freight are altering operations on I-44.** Freight trucking is a vital element of Missouri's economy and comprises 27 percent of the I-44 traffic stream in Springfield. Due to their physical and operational characteristics, trucks disproportionally affect traffic congestion, safety and the travel experience of non-truck drivers. Freight haulers report that oversized loads are not well-supported by I-44. The percentage of disabling injury crashes and fatal crashes approximately doubles when trucks are involved.

**5. Evolving engineering standards result in a roadway that is inconsistent with current design standards.** As a highway built more than 60 years ago, there are design elements of I-44 that no longer meet current design standards. These standards apply to the "geometry" of the road, that is, dimensions such as lane and shoulder widths, median width, vertical clearances, horizontal curvature and clear zones.

**How Project Addresses Transportation Challenges.**
The proposed project elements will improve travel reliability and improve economic competitiveness. Additional lanes will enhance safety of the corridor by improving resiliency, access to emergency services/incident management personnel after incidents, and will reduce the chances of secondary accidents. Increased capacity will lead to fewer vehicle conflicts and improve travel time for through-traffic and regional goods movement. The TSMO elements improve safety by increasing driver awareness through real-time messaging. Bridge reconstructions ensure the viability of the supply chain network by ensuring the entire freight corridor can accommodate all types of loads and sizes. Section 5.0, "Merit Criteria" significantly expands on these themes.

**INFRA funding is critical** to successfully deliver each element of this project; absent INFRA assistance, it will take decades to complete the work which will be fragmented.

[6] United World Transportation, https://unitedworldtransportation.com/prevent-loss-control-crashes-pop-quiz/



**Champion for Rural Missouri.** While major metropolitan areas within Missouri enjoy strong political will and strong MPO coordination, there is no "major champion" for the 27 rural communities that rely on Springfield as their "economic hub." MoDOT proposes to be that champion. While Springfield has global recognition, the community remains rural-focused. The City is home to major corporations including Bass Pro Shops and O'Reilly Auto Parts. But, 27 rural counties rely on I-44 to move their agriculture and natural resource products within Missouri and around the world. The Springfield UZA (urbanized area) is just under 275,000 but the 27 "economic hub" counties total 1 million people – averaging just 37,000 people per county. INFRA funding will enable the state to mobilize construction crews and generate multiple benefits that align with the USDOT and INFRA priorities – most notably safety and investment in infrastructure that enables American workers and businesses (especially those in rural areas) to thrive and be competitive, innovative and accountable.

"While major metropolitan areas within Missouri enjoy strong political will and strong MPO coordination, there is no "major champion" for the 27 rural communities that rely on Springfield as their "economic hub." MoDOT proposes to be that champion."

Patrick K. McKenna
*MoDOT Director*

## 2.0 Project Location

The proposed project limits are directly on I-44 and begin at MO-360 (to the west) and continue east to US-65 (~14 miles). Approximately 80 percent of the work will occur within the northern most portion of Springfield proper, where this segment of I-44 forms the north leg of the freeway belt that encircles Springfield. Seventy-four percent (74 percent) of the project limits are within or border five contiguous Opportunity Zones (U.S. Census Tracts: 29077004302, 29077005600, 29077003600, 29077004400, and 29077002200). The terrain surrounding the project area is mostly flat with generous grassy medians separating the eastbound and westbound lanes where the new lanes will be constructed. The adjacent land uses are primarily commercial, industrial, light manufacturing, residential and open space. The project is located in the Springfield, Missouri Urbanized Area with a total population of 273,724, but the regional economic hub is estimated at 1 million. Nationally, I-44 is a 633-mile major east-west corridor beginning in Wichita Falls, Texas, traverses Texas and Oklahoma, and terminates at St. Louis. The project is located within 600 miles of major cities, including St. Louis, Chicago, Dallas and Baton Rouge. I-44 in Springfield provides critical connectivity to: 1) Springfield-Branson National Airport – Missouri's fastest growing airport by tonnage, with an 8 percent increase from 2018 to 2019; 2) the South and West U.S. via Joplin; and 3) the eastern U.S. via St. Louis.

**Table 1: Geospatial Coordinates**

| Location | Urban/Rural | Latitude | Longitude |
|---|---|---|---|
| **Springfield, Missouri** | Urban | 37°12'47.52'' N | 93°17'12.48''W |



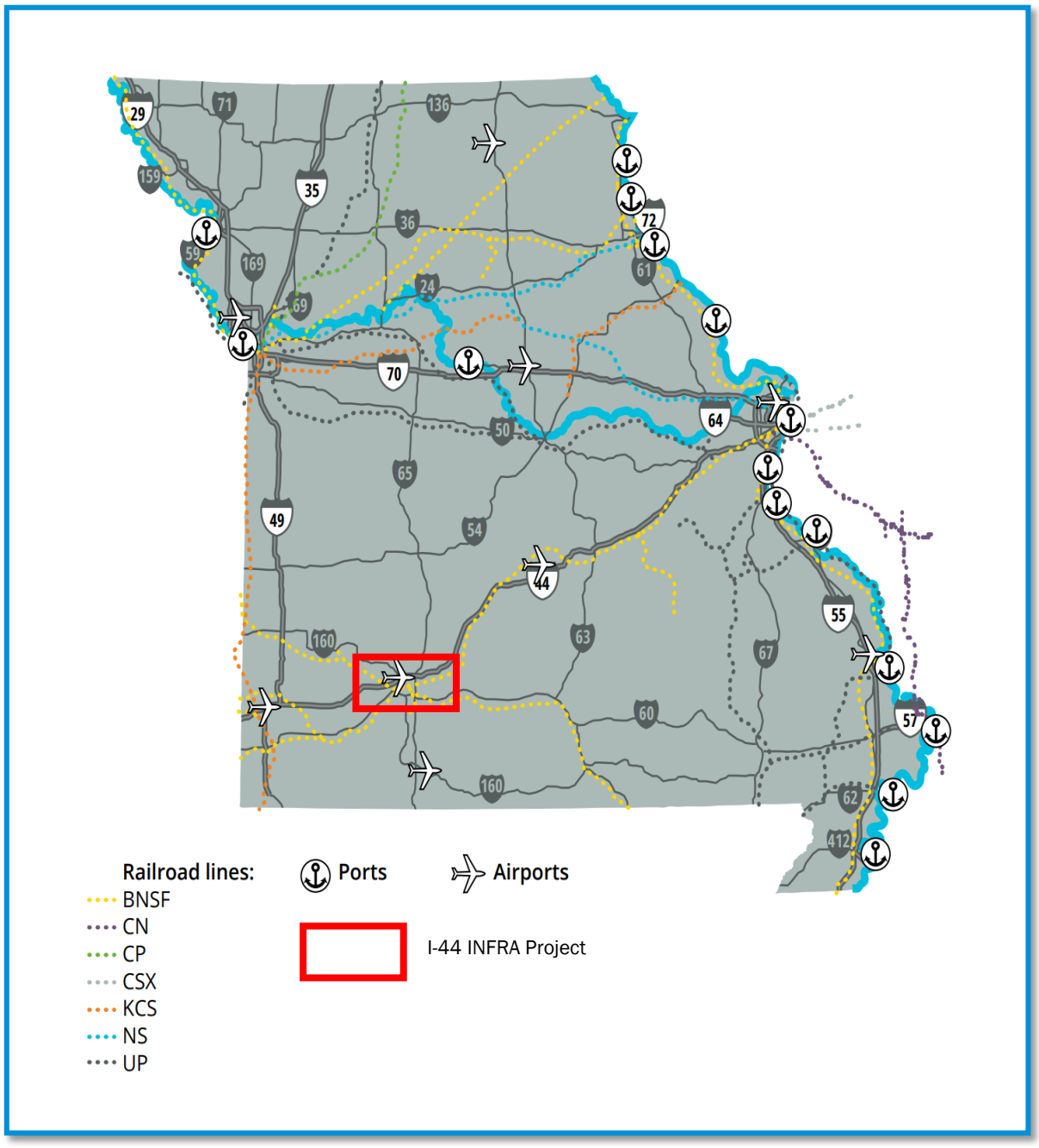



**Figure 2: Location of I-44 corridor improvements in relation to existing transportation infrastructure.**

*Image credit: Missouri Partnership®*

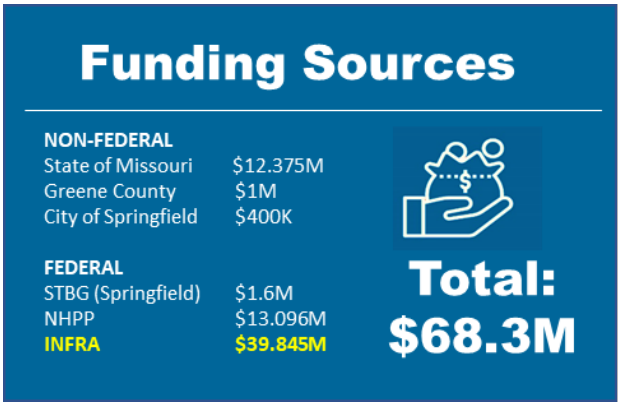


## 3.0 Project Parties

MoDOT owns all facilities where proposed improvements are located; therefore, no additional public or private entities are required to *deliver* this project.

## 4.0 Grant Funds, Sources and Use of Project Funds

**INFRA funding is critical** to successfully deliver each project element; absent INFRA assistance, it will take decades to complete the work which will be fragmented. The availability of other revenue sources, as articulated in Merit Criteria #2, is extremely constrained in Missouri. The match contributions represent maximums MoDOT can contribute while ensuring fiscal health. The local match contributions from the City of Springfield and Greene County are a testament to the critical need for this project and are pledged on the condition of receiving INFRA funds. The required project budget details are summarized below:




- The **total INFRA request** represents **58 percent** of the total project cost.
- **Non-federal funds.** City of Springfield ($400 thousand), Greene County ($1 million) and State of Missouri ($12.375 million). Evidence of these contributions is provided in the Appendix.
- The project provides for a **20 percent non-federal match.**
- All **non-federal funds are immediately** available and are **not** subject to a fixed time period.
- **Other Federal funds** include $14.7 million from the National Highway Performance Program ($13.1 million) and the Surface Transportation Block Grant Program ($1.6 million).
- Total federal funding (including INFRA) contributed to the total project cost is **80 percent**.
- **All proposed funding is future eligible** project costs.
- **INFRA funds will be used for progressive design-build activities** and result in the completion of all project elements.
- The project budget, including **funding sources for major activities**, is provided in **Table 2**.
- **There are no previously incurred** costs counting toward the minimum project size.
- The project is **not a phased project** and therefore no phasing is illustrated.
- **Contingency** amounts (2 percent) have been included to cover unanticipated cost increases. Also, progressive design-build and lump-sum bidding is proposed, which protects MoDOT and taxpayers by sharing the risk with the successful contractor(s).
- The proposed project components will not count toward the **$500 million INFRA cap** for port, rail and intermodal projects.

**$81 Million Complementary Rural Bridge Project.** As evidence of MoDOT's commitment to improving infrastructure on I-44, over $81 million is being invested on I-44 to improve Missouri's rural bridge network. These rural bridge projects are all within Southwest Missouri and complement the proposed INFRA project. Phase 1, costing $36 million, is already under construction and includes replacing 13 bridges and rehabilitating an additional 6 along a 30-mile stretch of I-44 west of



Springfield and the project limits. These bridges were all constructed in the early 1960's and have outlived their useful life. This design-build effort is in its second year of a two-year project and will be completed in December 2020. These 19 bridges over the past three years cost MoDOT over $800,000 in maintenance costs. Plans are underway for a $45 million Phase 2 project for an additional 30-40 bridges. This bundle of bridges will be on main line I-44 or in proximity to I-44 alternate routes. The bridges will be within five Southwest counties including Webster, Greene, Lawrence, Jasper and Newton.

## Project Budget

### Table 2: Scope of Work and Detailed Project Budget

| No. | Description | INFRA Funds | Other Federal | Non-Federal | Total Cost | % of Total |
|---|---|---|---|---|---|---|
| **I-44 6 Laning** | | | | | | |
| 0.10 | Engineering and Design: Admin and Oversight | $ - | $ 545,508 | $ 136,377 | $ 681,885 | |
| 0.20 | Pre-Construction Cost | **$ -** | **$ 545,508** | **$ 136,377** | **$ 681,885** | **1%** |
| 1.10 | Grading and Drainage | $ 5,103,074 | $ 1,600,000 | $ 400,000 | $ 7,103,074 | |
| 1.20 | Base and Surface | $ 5,934,779 | $ 2,000,000 | $ 3,802,541 | $ 11,737,320 | |
| 1.30 | Bridge | $ - | $ 866,600 | $ 7,000,000 | $ 7,866,600 | |
| 1.40 | Miscellaneous | $ 7,842,000 | $ - | $ - | $ 7,842,000 | |
| 1.41 | Soundwalls | $ 8,723,870 | $ 1,736,817 | $ 449,313 | $ 10,910,000 | |
| 1.42 | ITS Devices, TSMO | $ 630,000 | | | $ 630,000 | |
| 1.50 | Estimated Contract Total | $ 28,233,723 | $ 6,203,417 | $ 11,651,854 | $ 46,088,994 | |
| 1.60 | Engineering and Design: Design-Build | $ 3,645,355 | $ 1,993,285 | $ 498,321 | $ 6,136,961 | |
| 1.70 | Construction Contingency | $ 547,537 | $ 299,394 | $ 74,849 | $ 921,780 | |
| 1.80 | Estimated Design-Build Contract base year FY20 | $ 32,426,616 | $ 8,496,096 | $ 12,225,024 | $ 53,147,735 | |
| 1.90 | Utilities | $ - | $ 1,898,560 | $ 474,640 | $ 2,373,200 | |
| 1.10 | Other (Design-Build Stipends) | $ 550,000 | $ - | $ - | $ 550,000 | |
| 1.11 | Inflation to FY 23 for Utilities and DB contract | $ 3,088,372 | $ 1,688,726 | $ 422,182 | $ 5,199,280 | |
| 1.12 | Subtotal Construction Cost | **$ 36,064,988** | **$ 12,083,382** | **$ 13,121,845** | **$ 61,270,215** | **90%** |
| 1.13 | R/W Acquisition | $ - | $ - | $ - | $ - | |
| 1.14 | R/W Incidentals | $ - | $ - | $ - | $ - | |
| 1.15 | Construction Engineering | $ 3,780,368 | $ 2,067,110 | $ 516,778 | $ 6,364,256 | |
| 1.16 | Subtotal Incidentals | **$ 3,780,368** | **$ 2,067,110** | **$ 516,778** | **$ 6,364,256** | **9%** |
| 1.17 | ***Total I-44 6 Laning 160-65*** | **$ 39,845,356** | **$ 14,696,000** | **$ 13,775,000** | **$ 68,316,356** | |
| | **Total Project Cost** | **$ 39,845,000** | **$ 14,696,000** | **$ 13,775,000** | **$ 68,316,000** | **100%** |

# 5.0 Merit Criteria

## Criterion #1: Support for National or Regional Economic Vitality

**Outcomes and Benefits of the Project.** At a broader level, the proposed project improves and strengthens a heavily traveled, urban freight corridor of regional and national significance, deploys innovative technologies, and supports the interests of the surrounding rural communities consistent with the USDOT's ROUTES Initiative. These broad outcomes are aligned with the goals and objectives of INFRA program. The project will have a number of benefits including:

*Support for the Regional and National Economies.* In its first 20 years, this project will generate **a total of $142.0 million** in benefits, discounted at 7 percent, mostly due to travel time savings, vehicle operating cost savings and reduced crashes. Each year, more than $700 billion worth of freight (almost 4 percent of all freight transported throughout the United States) travels through, to, from, or within Missouri using an interconnected transportation system that includes: Highway: I-44 and



other interstate highways traversing the state (59 percent of $700 billion); Rail: The nation's second and third largest rail hubs – Kansas City and St. Louis (38.5 percent); Water: The Missouri and Mississippi Rivers (1 percent); Air: Three of the nation's top cargo airports – Kansas City, St. Louis, and Springfield (1 percent); and Pipelines: 0.5 percent. Missouri's central location and diverse infrastructure has made the state a logistics hub for the nation. Companies looking to serve 80 percent of America's population in two days' transit time call Missouri home or are located within the Midwest region and depend on the reliability of I-44 in Missouri to move goods throughout the nation and the world. Missouri's transportation network carries ***double the national average of freight per square mile***,[7] and its roads link to ***the nation's second largest east-west interstate connection hub just*** east of St. Louis. Missouri's strategic location puts it within 500 miles of 43 percent of the U.S. population and 44 percent of all U.S. manufacturing plants. The American Transportation Research Institute (ATRI) analyzed the I-44 corridor data in Springfield for this application and found that the corridor supports commercial truck traffic (pick up, delivery, and pass-through) that radiates in all directions across the U.S. within 48 hours (see **Figure 3,** top). This corridor is also closely aligned with the heaviest density and highest activity of trucks in the Springfield area (Fig. 3, bottom). In 2018, *Supply Chain Digest* and Ball State University's Center for Business and Economic Research, released their *2018 Manufacturing and Logistics Report Card,* which rated Missouri as one of the top-five states for manufacturing.

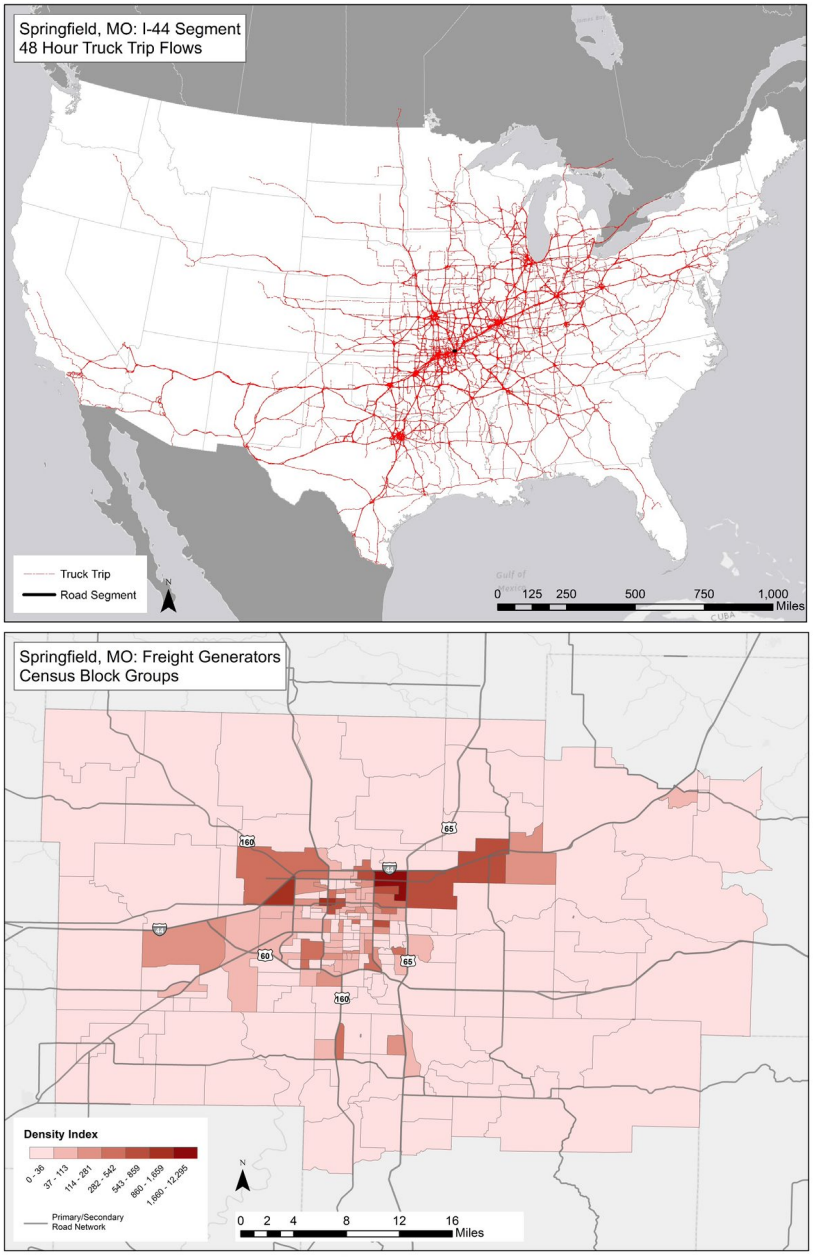



**Figure 3: I-44 Truck Trip Flows and Freight Generators**

***Image credit: ATRI***

[7] Freight within Missouri makes up 3.65% of the national freight value, while the State comprises only 1.85% of the United States (69,715 square miles in Missouri compared to 3,797,000 square miles in the United States); per square mile, Missouri averages $10 million of freight annually, compared to $5 million of freight in the United States.



> *"As a company that has been a mainstay of the Ozarks for so long, we are excited about additional growth opportunities that would be supported by additional lanes on I-44. We are a growing community and we feel this is long overdue."*
>
> Christine Daues, Marketing Strategy Manager
> Paul Mueller Steel Company

All told, more than 1.1 million jobs nationwide, and $133 billion of the nation's GDP, depend on the interstate infrastructure in Missouri. The project will also support national efforts to retain and grow automobile manufacturing in the United States, a high priority for the Federal Administration. Missouri is the 7th largest auto manufacturing state in the nation, with 225 auto manufacturing establishments (15 motor vehicle manufacturing, 74 body and trailer and 136 parts).[8] Missouri builds more than 776,000 trucks and vans each year,[9] and production facilities are strategically located on the North American Automotive Alley that stretches from Toronto to Mexico City. The Ford Motor Company's Kansas City Assembly Plant is the largest car manufacturing plant in the United States (based on units produced), employing 7,000 workers. In the last decade, Ford made a $1.1 billion investment in the facility, adding a second manufacturing line. On the other side of the state near St. Louis, General Motors employs approximately 4,600 employees at its GM Wentzville, Missouri Assembly Plant, just 20 miles north of I-44. In December 2019, General Motors committed to investing $1.5 billion and retaining over 4,000 jobs at its Wentzville Assembly Plant. The agreement marks one of the largest single project investments from the private sector in Missouri. Critical to ensuring continued operation of these facilities is the flow of parts from Mexico delivered just in time to assembly lines. Those parts use I-44 to get to Kansas City and St. Louis. Not only does I-44 bring the materials required to assemble Ford trucks and GM's full-size vans, the Chevrolet Express and GMC Savana, and countless other types of equipment, it also helps bring assembled products and agricultural goods from other manufacturers and producers to retailers and distribution hubs. Missouri is poised for additional growth in automotive manufacturing. In 2019, Missouri Senate Bill 68 was signed which establishes significant investment into the manufacturing workforce, and $25 million in new tax credits to automotive manufacturers. The proposed I-44 project will help provide long-term reliability and resiliency for a growing freight network that reaches all corners of the United States with both regional and national impact.

***Significant Reduction in Traffic Fatalities/Serious Injuries.*** From 2026 through 2045, this project will lead to 431 fewer crashes, including 6 avoided fatal crashes. **The monetary value of these safety impacts is estimated to total $27.5 million**, discounted by 7 percent. The enhanced capacity provided by adding a third lane in each direction will minimize weaving movements, leading to fewer vehicle conflicts and fewer crashes. Improved capacity will also reduce congestion, which is a major cause of the rear-end crashes that plague the section. The proposed TSMO strategies - including additional CCTV cameras, additional dynamic message signs (DMS), wrong-way driver detection, predictive analytics, etc., will address safety and capacity deficiencies that currently disrupt the flow of national traffic by providing valuable real-time traffic information to MoDOT and to drivers to alert to current conditions. Implementation of these improvements is the first step in making significant gains in safety and reliability on the corridor.

[8] https://www.mlive.com/auto/index.ssf/2015/03/these_are_the_top_10_states_fo.html. March 24, 2015.
[9] MO Partnership (https://www.missouripartnership.com/missouri-best-state-for-automotive-manufacturing/



***Eliminate Bottlenecks in the Freight Supply Chain***. Travel time savings and improved reliability arising due to the project are **estimated to reach $78.7 and $4.4 million**, respectively (discounted by 7 percent) during the project's first 20 years.

Improved Travel Reliability. The additional lane will provide the ability for freight carriers, interstate travelers and commuters to safely bypass crashes or incidents in a new third lane. The current four-lane road can close in one direction for even minor accidents, as both lanes are taken up by the incident vehicles and emergency responders. Crashes can shut down I-44 for many hours having ripple effects on the ability to move freight through the city and to points within the city (such as the Springfield-Branson National Airport located at the western end of the project location). Unfortunately, there have been numerous crashes on I-44 in Springfield that have resulted in deaths and significant travel delays. In 2019, three children ages 6, 7 and 8, were killed when their van collided with a semi-trailer entering the interstate in the westbound lane. The crash left both westbound lanes closed for several hours, and additional secondary crashes in the same timespan closed traffic in the eastbound lanes, snarling both local and through-traffic. In January 2020, a three-semi-trailer crash closed I-44 westbound for several hours, forcing through-traffic freight haulers and those headed to the airport to find alternate routes. During the three-month period from October to December 2019, 72.3 hours of lane closures were logged in the project limits (see Fig. 4) with the longest closure clocked at nearly 13 hours. The proposed ITS elements will allow MoDOT to share real-time delay/shut-down information, as well as preferred alternate routes, allowing freight haulers and others to adjust their plans and schedules and, ideally, avoid getting stuck in a shut-down situation that affects the ability to meet deadlines.

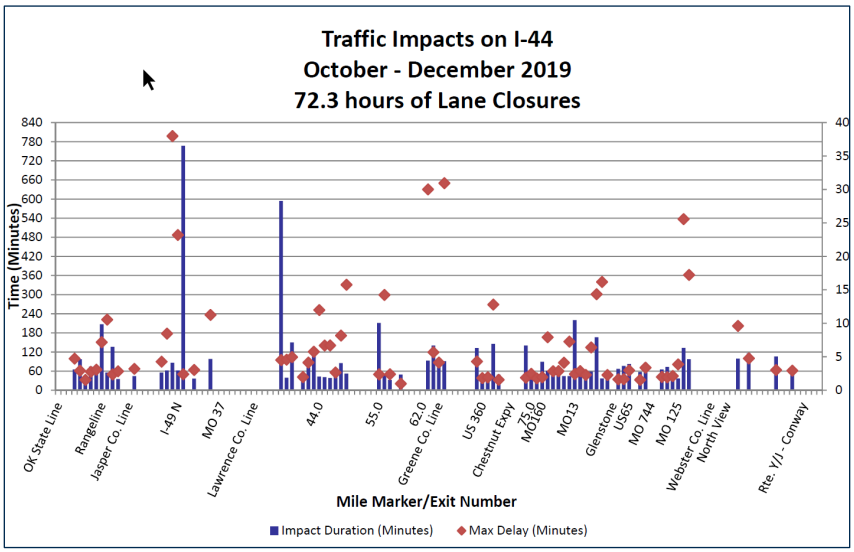



**Figure 4: Hours of Lane Closures, October-December 2019**

Sustained Economic Vitality. The primary goal of the project is to enable the safe and swift movement of freight, workers, residents and tourists to keep the regional and national economy strong. The costs of congestion and delays are significant. The American Transportation Research Institute estimates the average cost of congestion per truck in the U.S. is $6,478 (based on added operational costs).[10] Delays on I-44 account for an estimated 422,000 hours each year, costing the economy $38.6 million annually.[11]

***Any*** delay at this corridor negatively impacts the regional and national economy. Uninterrupted supplies are crucial for the continued operation advanced manufacturers in the Springfield region and the automotive manufacturers across the state.

[10] ATRI, *Cost of Congestion to the Trucking Industry, 2018 Update* (as reported by the National Academies of Sciences, Engineering, and Medicine), https://trid.trb.org/view/1564122
[11] MoDOT, *Missouri State Freight Plan*, 2017.



And finally, in the face of growing and pervasive congestion, not only does the trucking industry lose billions annually but ultimately the consumer pays the price through higher prices on the shelf. MoDOT is committed to improving conditions on I-44 in Springfield to support our nation's infrastructure and remove impediments to the growth of the local and national economy.

***Restore to Good Condition the Infrastructure that Supports Commerce and Economic Growth.*** The corridor improvements will reduce vehicle hours traveled, and improvements to the pavements as part of the project will reduce the International Roughness Index (IRI) rating from an average of 57 to 50. Together, these will benefit businesses and residents by helping to **reduce vehicle operating costs by $30.7 million** over 20 years. The main line corridor was constructed in the 1950s and 1960s and has undergone routine maintenance repairs approximately every 8 years. All six bridges proposed for reconstruction are rated "fair" and were built in 1960 in a reinforced concrete voided slab style structure with an expected design life of 50 years. The bridges were last rehabilitated in 2010, which included extensive concrete deck repair and installation of a new concrete wearing surface. Voided slabs tend to form deck potholes quickly once water fills the voids and causes further corrosion in the reinforcing steel. If the current bridges were widened to accommodate the additional lane on I-44 in each direction, then it would widen joints of the voided slabs. Experience throughout Missouri of widening voided slab bridges, is that the widening joints begin to leak after a few years. This quickly produces corrosion and delamination of the reinforcing steel and concrete at these widening joints on the bottom of the bridge. During freeze / thaw cycles especially, the delaminations become loose resulting in chunks of concrete falling onto the roads underneath. Falling large concrete chunks are potentially catastrophic to the travelling public under the bridge. The expectation is that each of the six bridges will require repair at least 1-2 times per year. This requires nighttime lane closures to limit the amount traffic inconvenience on I-44 in Springfield. This takes time away from repair crews to address bridges on other routes that are in worse condition. MoDOT's Southwest District has more than 1,800 bridges to maintain in 21 counties, with more than 300 of them with high priority work items at any point in time.

MoDOT has made significant investment in restoring other segments of I-44 to good condition (described earlier including a massive rural bridge rehabilitation and replacement program, repaving projects, etc.), and seeks INFRA funding to address deficiencies on I-44 in Southwest Missouri.

***Reduce Barriers Separating Workers from Employment Centers.*** Approximately 50,000 vehicles use this part of I-44 every day; almost 58,000 are projected to do so in 2040 without the improvements, and 69,000 if the project is completed. The proposed project will support uninterrupted access for workers reaching employment centers surrounding the corridor, including the urban population of 273,724, and the suburban and rural populations that are estimated at another 725,000 (1 million total in the region). The project will support regional agriculture by strengthening farm-to-market infrastructure (which includes I-44), allowing farmers, cattlemen and others to easily access distributors and processors. The project will benefit disadvantaged communities for whom access to employment centers can be disproportionately burdensome. In Missouri, the poverty rate remains above the national average (14 percent of the population live below the federal poverty level (compared to 12.7 percent nationwide), but the rate is significantly higher in Springfield's Greene County with a rate of 18.5 percent. The proposed project will ensure that residents along the corridor can reach employment centers without lengthy and costly delays.



### Benefit-Cost Summary

Overall, the project's **net present value is estimated to be $81.4 million** over 20 years, when discounted by 7 percent, with a **benefit-cost ratio of 2.34.** The largest benefits are due to travel time savings ($78.7 million) followed by vehicle operating cost savings ($30.7 million) and safety benefits ($27.5 million). Reliability benefits ($4.4 million) and reduced emissions ($0.7 million) are also expected. The full benefit-cost analysis is provided in Appendix C.

Table 3: Benefit-Cost Analysis Details

| | 7% discount rate ($millions) | Undiscounted ($millions) |
|---|---|---|
| **Benefits** | | |
| Savings in Vehicle Operating Costs | $30.70 | $113.90 |
| Value of Travel Time Savings | $78.70 | $292.50 |
| Value of Improve Reliability | $4.40 | $16.30 |
| Savings in Safety Costs | $27.50 | $96.00 |
| Reduced Damages from Vehicle Emissions: Non-CO2 | $0.70 | $2.70 |
| **Total Benefits** | **$142.00** | **$521.40** |
| **Costs** | | |
| Capital Investment Costs | $56.20 | $67.10 |
| Preservation Costs | $4.10 | $6.70 |
| Operation and Maintenance Costs | $0.30 | $0.50 |
| **Total Costs** | **$60.60** | **$74.40** |
| **Summary Metrics** | | |
| **Net Present Value** | **$81.40** | **$447.10** |
| **Benefit/Cost Ratio** | **2.34** | **7.01** |

## Criterion #2: Leveraging of Federal Funding

**Large/Small Project Designation.** Small (INFRA grant request = $39.845 million)

**Private Funding Evaluations.** As standard practice, MoDOT evaluates all transportation projects to ensure that private-sector funding is maximized. The following summarizes these efforts and outcomes for the project, and all but one are considered project constraints:

- **Tolls.** There are currently no toll-roads in Missouri, and the state has no legislative authority to implement tolls. Historically, Missouri has funded transportation projects on a "pay-as-you-go" basis, paying for construction, maintenance and administration as money became available from user fees such as gas tax revenues and registration fees, and important grants like INFRA.
- **Partnership Development.** MoDOT has a sophisticated and organized "Partnership Development" program that coordinates a variety of private sector participation options, including Transportation Development Districts, Transportation Corporations, Statewide Transportation Assistance Revolving Fund, Community Improvement Districts, Tax Increment



Financing and Economic Development Sales Tax. These options were explored and deemed not viable or appropriate for the proposed project.

- **Private-Sector Development.** Large "signature" projects can be candidates for private-sector development funding - especially in urban areas; however, due to the smaller urban size of the region, this source of funding is not an option.

**Broader Fiscal Constraints.** Many of the constraints listed above apply to any transportation project in Missouri and severely limit completing large-scale infrastructure projects. The FHWA has recognized this and selected Missouri as one of seven states to receive a Surface Transportation System Funding Alternatives (STSFA) grant to explore innovative ways to help pay for infrastructure and maintenance. If any new funding strategy was implemented today, it would take several years to raise sufficient funds to complete the proposed projects. **Today, INFRA funding represents the most viable and immediate solution.**

### Table 4: Leveraging the INFRA Grant

| Source | | Total | % of Total |
|---|---|---|---|
| State | $ | 12,375,000 | 18% |
| Local (city/county) | $ | 1,400,000 | 2% |
| INFRA Grant | $ | 39,845,000 | 58% |
| Other Federal | $ | 14,696,000 | 22% |
| **Total** | **$** | **68,316,000** | **100%** |

| Federal vs. Non-Federal | | Total | % of Total |
|---|---|---|---|
| Total Federal Share | $ | 54,541,000 | 80% |
| Total Non-Federal Share | $ | 13,775,000 | 20% |
| **Total** | **$** | **68,316,000** | **100%** |

| Leveraging INFRA Grant | | | | | |
|---|---|---|---|---|---|
| Description | Non-Federal Funds | | Federal Funds | | % of Total Cost |
| | State | Local | INFRA Grant | Other Federal | |
| State of Missouri | $ 12,375,000 | | | | 18% |
| City of Springfield (other federal Surface Transportation Block Grant) | | $ 400,000 | | $ 1,600,000 | 4% |
| Greene County | | $ 1,000,000 | | | 1% |
| | | | | | |
| INFRA Grant | | | $39,845,000 | | 58% |
| | | | | | |
| Other Federal: National Highway Performance Program | | | | $ 13,096,000 | 19% |
| **TOTALS:** | **$12,375,000** | **$1,400,000** | **$39,845,000** | **$14,696,000** | **100%** |
| **% of Total** | **18%** | **2%** | **58%** | **22%** | |

## Criterion #3: Potential for Innovation

The project will address all three Innovation areas – Technology, Project Delivery, and Financing.

### Innovation Area #1: Technology

Innovative Technology components include:

- **Applications to Automatically Capture and Report Safety-related Issues.** CCTV deployment will fill a five-mile visual gap on the road-widening section (2 cameras between US-



160 and MO-13 and MO-13 and Glenstone Avenue) and on a 7-mile gap from MO-360 to US 160 (4 cameras at mile markers 69.0, 70.2, 72.5, and 73.8). The CCTV component includes pull boxes, conduit, fiber, foundation, poles and CCTV. The cameras will allow MoDOT to identify and quickly respond to issues that delay or shut down the roadway such as traffic incidents, inclement weather, suspicious or criminal activity, etc. Visual information also helps emergency responders assess the best route to and from an incident and help MoDOT assess daily traffic patterns. CCTV feeds are accessible to the public via the Ozarks Traffic website operated by MoDOT and the City of Springfield (https://www.ozarkstraffic.com/). New Dynamic Message Boards at Mile Markers 69.0 EB, 78.2 EB, and 81.5 WB (two in the road widening segment) will be upgraded. DMS Board Replacement at Mile Marker 73.8 EB. Wrong-way driver detection/notification will be installed at the on- and off-ramps to US-160 and Glenstone (within the limits of the road-widening element) and detection on two ramps at Chestnut Expressway (outside the road widening segment). Predictive Analytics. MoDOT uses Waycare's platform to harness in-vehicle (see V2X below) and city data and analyze these to provide traffic management and safety information in real-time. When it identifies an area at high-risk for an incident, Waycare alerts MoDOT who can respond quickly. Predictive analytics will support robust information-sharing to freight carriers, interstate travelers, commuters and emergency responders via DMSs and on the Ozarks Traffic website.

- **V2X Technologies.** MoDOT has a Memorandum of Understanding with Traffic Technology Services (TTS), allowing for the exchange of V2X information statewide, including traveler information mapping. Vehicles that have Dedicated Short-Range Communications (DSRC) for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technology can use open API data-capturing in partnership with MoDOT's technology along the corridor. MoDOT seeks to align these capabilities with the proposed INFRA TSMO improvements and will include this element in the selection of the successful vendor(s) and contractor(s).
- **Cybersecurity Elements.** MoDOT will utilize magnetic keycard locks on new ITS cabinets to prevent unauthorized access to network infrastructure and track who is accessing the cabinets.
- **Work Zone Data Exchanges.** MoDOT participates in local and statewide data exchanges, and coordinates monthly calls with the Southwest region, and this coordination will continue. MoDOT has been participating in regional calls (with other states) and has begun to ramp up that level of coordination to provide information in the standardized format and facilitate sharing between states.
- **Crowdsourced Data for Traffic Operations.** MoDOT is using crowdsourcing to inform operations using third-party data gathered from apps such as Waze™ to alert travelers about delays, active field crews, assist with traffic incident management, and to identify issues such as potholes to help set road maintenance priorities.
- **Other Innovation.** Fiber that is currently in the median will be moved and upgraded as part of the 7-mile road widening element. Fiber at this location will support the new and upgraded ITS elements, and support additional future ITS improvements, such as V2X technologies.

### Innovation Area #2: Project Delivery

Innovative ***Project Delivery*** components include:

- **Progressive Design-Build** – The project will be a progressive design-build project (Missouri will be the first state to use federal funds for a progressive design-build project).



- **No Excuse Bonuses** – MoDOT will motivate efficient construction by offering a No Excuse Bonus to contractors.
- **Lump-Sum Bidding** – By definition, lump-sum bidding, but itemized with a cost-loaded schedule and work elements, will be part of the progressive design-build procurement.
- **Best Value Procurement** – MoDOT will follow a Best Value Procurement process. Seeking quality and expertise will ensure successful and timely completion of the project.

MoDOT has had great success with design-build projects and looks forward to using progressive design-build for the project. Since 2005, MoDOT has completed 15 projects using traditional design-build and three others are under construction. As recent experience has shown, design-build opens the door for innovation, and promotes accelerated construction and added value on projects. Collectively, MoDOT's design-build projects have been completed nearly $280 million under budget and 77 (6+ years) months ahead of schedule. Nationally, design-build projects are completed 33 percent faster and 6 percent cheaper than conventional design-bid-build projects.

- **Every Day Counts (EDC) Initiative** – MoDOT takes great pride in the EDC program in Missouri. From EDC-1 through the current EDC-5 program, MoDOT has enthusiastically researched and adopted all but one of the proposed innovations. One innovation cannot be adopted due to existing Missouri law. MoDOT will strive to incorporate applicable EDC initiatives into every INFRA component. Use of Crowdsourced Data for Traffic Operations noted above as a project innovation is part of the EDC-5 innovations being adopted by MoDOT.
- **Practical Design** – MoDOT is the birthplace of Practical Design, a concept aimed at focusing on core traveler needs and controlling costs during project development. *Tracker* is a public document that not only measures and drives organizational performance, but also provides transparency and accountability to the citizens of Missouri. These processes have produced measurable results and will be used to ensure the proposed INFRA project remains on-schedule and on-budget and meets the intended purpose and need.
- **Data-driven Safety Analysis** – MoDOT has incorporated data-driven safety analysis into four out of the last five design-build procurements. Leveraging industry ideas on how to save lives is a fundamental driver in the design-build process at MoDOT and will be incorporated into the INFRA projects, as applicable.

### Innovation Area #3, Innovative Financing

Progressive design-build is proposed for the project. The successful contractor(s) will accept most or all of the risk of any increase in costs associated with a project's design, eliminating "change orders" that add to the cost of traditional design.

## Criterion #4: Performance and Accountability

### Credible Plan to Address Full Lifecycle Costs

Lifecycle Cost Estimate: The estimated lifecycle cost (discounted by 7 percent) for each element is: initial capital investment costs of $56.2 million (over a 3 year period); ongoing preservation costs of $4.1 million and additional ongoing and maintenance costs of $0.3 million. These costs were estimated during the BCA process and verified.



Operations and Maintenance (O&M) Funding: Road and Bridge Maintenance is a line item in MoDOT's annual budget. The 2019 budget included $466 million dedicated to O&M. The state constitution guarantees funding to operate and maintain state roads and bridges as promulgated in Article IV Sections 30(a)[12] and 30(b).[13]

### Accountability

MoDOT agrees to commit to an obligation of construction funds by October 1, 2022, (assuming grant announcements are made by July 1, 2020) and a construction completion date of October 31, 2025. MoDOT has a successful history of completing construction projects on time and typically 8-10 percent under budget. MoDOT's design-build delivery approach has delivered over $1.6 billion in projects, saving taxpayers $280 million. Collectively, MoDOT's design-build projects have been completed 65 months (5 years) ahead of schedule.

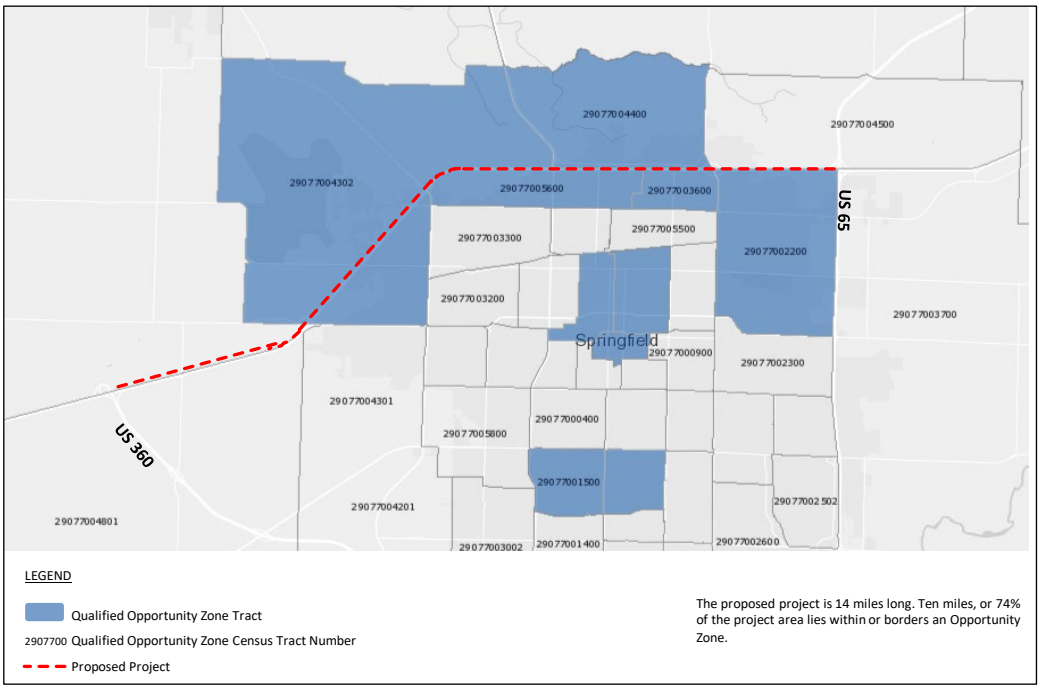



**Figure 5: Project Area and Opportunity Zones**

### Opportunity Zones

The proposed project limits are located in federally recognized Opportunity Zones (See **Figure 5**).

## 6.0 Project Readiness

The readiness of the project is reflected in the implementation schedule. The State of Missouri owns and operates all affected facilities that comprise the project network. Upon notification of grant award, all project elements will need to be added to the regional TIP and programmed into the STIP. MoDOT is the administering agency for the STIP and no hierarchy of approvals is necessary to process amendments. Costing has been completed according to stringent MoDOT costing standards; all project elements are ready or near-ready to let for progressive design-build.

[12] http://www.moga.mo.gov/mostatutes/Consthtml/A04030a1.html
[13] http://www.moga.mo.gov/mostatutes/Consthtml/A04030b1.html



MoDOT has significant experience in the development and implementation of large and complex transportation capital projects. In addition, MoDOT plans, designs, constructs, and maintains 33,838 miles of highways and 10,384 state highway bridges (24,385 bridges statewide)– the nation's seventh largest state highway system, with more miles than Iowa, Nebraska and Kansas' systems combined. Between 2010 and 2019, MoDOT delivered over 4,362 projects collectively, 8 percent under budget and 94 percent on-time.

In addition, MoDOT has an excellent track record of quickly delivering projects once authorized. In fact, MoDOT has regularly accelerated the delivery of projects when additional funding opportunities have been presented. For example, when Congress passed the FAST Act, MoDOT proactively responded by increasing the state's construction program because of the stability in federal funding provided by the legislation. Likewise, when a TIGER grant was awarded for the US 54 Champ Clark Bridge over the Mississippi River in Louisiana, MO, MoDOT moved quickly to procure delivery of the project through the design-build process. Similarly, MoDOT stands ready to deliver the proposed INFRA project upon award.

## (A) Technical Feasibility

The proposed project was developed, scoped and costed using MoDOT's policies, which are articulated in a comprehensive Engineering Policy Guide (EPG).[14] Because the project will be delivered using progressive design-build, design plans will be finalized during that process. However, MoDOT is still responsible for conducting extensive planning to advance a project to design-build; **these activities have been conducted and are the basis of design, costs and contingency levels presented herein.** All cost estimates are based on MoDOT's engineer's estimating procedures. The cost estimate used utilized cost base analysis, including historic-based estimates using quantities calculated from similar sized and scoped projects as well as historical data from previous bid openings. The costing also utilized the EPG's Engineering Factors Report (EFP) to calculate future engineering costs, construction engineering and right-of-way incidentals. Engineering costs are based on actual construction costs for projects completed within the last three years. The new eastbound and westbound lanes will be constructed within the median, in MoDOT's existing right-of-way. The bridge reconstruction work will occur within existing MoDOT right-of-way and within each bridge's footprint.

## (B) Project Schedule and Statement of Work

Assuming the grant awards are announced by July 1, 2020, construction will begin by May 1, 2023, and the project fully completed by October 31, 2025. See Table 5, below.

## (C) Required Approvals

**Environmental Permits and Reviews.** All work will be conducted in the median and on the shoulder on previously disturbed ground. The anticipated environmental document will be a Categorical Exclusion.

[14] http://epg.modot.org/index.php/Main_Page



## Table 5: Scope of Work and Project Schedule

| PROJECT NAME: FIX I-44: Freight, Innovation and Safety for the Ozarks | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Tasks | # of Months | Estimated Start Date | Estimated End Date | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | |
| | Mandatory Obligation Date, September 30, 2023 | | | | | | | | | | |
| | Mandatory Construction Start Date, March 30, 2025 | | | | | | | | | | |
| 1 | Submit INFRA grant proposal | N/A | N/A | 2/25/2020 | | | | | | | |
| 2 | INFRA Grant Awards Announced | N/A | N/A | 7/1/2020 | | | | | | | |
| 3 | Project and Grant Management | 64 | 7/1/2020 | 10/31/2025 | | | | | | | |
| 4 | NEPA (partly concurrent with Progressive Design-Build) | 15 | 7/1/2020 | 9/15/2022 | | | | | | | |
| 5 | Programming into STIP | 6 | 7/1/2020 | 12/31/2020 | | | | | | | |
| **6. FIX I-44 Widening Project** | | | | | | | | | | | |
| 6a | Progressive Design-Build risk assessment, approvals | 6 | 1/1/2021 | 6/30/2021 | | | | | | | |
| 6b | RFP/RFQ Preparation | 6 | 7/1/2021 | 12/31/2021 | | | | | | | |
| 6c | Final RFP | 1 | 1/1/2022 | 1/31/2022 | | | | | | | |
| 6d | Advertise Project | 2 | 2/1/2022 | 3/31/2022 | | | | | | | |
| 6e | RFQ and Industry Meetings for Design-Build | 6 | 4/1/2022 | 9/30/2022 | | | | | | | |
| 6f | Award Design-Build Contract (Obligate Construction Funds - 10/1/2022) | 1 | 10/1/2022 | 10/31/2022 | | | | | | | |
| 6g | Design, Permitting (partly concurrent with construction) | 36 | 11/1/2022 | 10/31/2025 | | | | | | | |
| 6h | Construction | 30 | 5/1/2023 | 10/31/2025 | | | | | | | |
| 6i | Notice of Completion/Ribbon Cutting | 1 | N/A | 10/31/2025 | | | | | | | |
| 7 | All Project Elements Completed | N/A | N/A | **10/31/2025** | | | | | | | |
| 8 | Records Retention/Audits | N/A | Ongoing | Ongoing | | | | | | | |



**Reviews, Approvals, Permits by Other Agencies.** Because all facilities are owned by MoDOT, the permitting process and need to obtain reviews and approvals from other agencies is minimal. Permits and coordination that will be required include: EPA 401 and 402 Permits; No-rise Certification Permit from the Missouri State Emergency Management Agency; coordination with U.S. Fish and Wildlife; Missouri Department of Natural Resources; Missouri State Highway Patrol; and Missouri State Historical Preservation Office.

## Public Engagement.

***I-44 Purpose and Need Study.*** MoDOT has conducted extensive public engagement on how to improve I-44 dating back to 2007, when the *I-44 Purpose and Need Study* was initiated. The Purpose and Need Study included conducting eight public meetings throughout the corridor to identify deficiencies and prioritize areas into short- and long-term needs. The analysis focused on crashes in the corridor, capacity, environmental characteristics and demographic history, a detailed analysis of the traffic flow (both on the main line and through interchanges), pavement conditions, roadway characteristics, and to prepare for subsequent NEPA requirements.[15] Several comments were supportive of improvements to make I-44 a six-lane interstate, and to include sound walls to reduce external impacts of road widening to the surrounding communities.


**Figure 6: I-44 community engagement dates back to 2007 when MoDOT conducted eight public meetings to understand needs.**

***Missouri State Freight Plan.*** The Missouri State Freight Plan identifies I-44 as a key corridor for continued investment based on future volume projections and to improve freight movement in Missouri. The Freight Plan pairs freight stakeholder input, obtained from November of 2013 to November of 2014, with detailed analysis. These stakeholders included Metropolitan Planning Organizations (MPO), Regional Planning Commissions (RPC), economic developers, modal operators, business organizations, freight operators/owners and residents. Over 100 stakeholders at three regional forums developed project evaluation criteria and weightings that focused on the safe, efficient movement of goods supporting economic benefits for Missouri. In 2017, MoDOT updated the Freight Plan to comply with FAST Act requirements. The proposed projects herein are a direct result of the planning process and align with several public input recommendations, including: 1) maintain and improve the designated Missouri Freight Network; 2) enhance Missouri's ability to export goods, 3) use technology to improve freight movement, and 4) focus on maintaining a state of good repair.

***"On the Move" Long Range Transportation Plan (LRTP).*** During both the 2014 and 2018 LRTP public engagement processes, approximately 18,700 Missourians strongly articulated the need to preserve the existing system, reduce project costs by minimizing delays, eliminate freight bottlenecks, and use the latest technology to monitor and improve traffic congestion.[16] The prioritization and selection of projects for this INFRA proposal is a direct result of this public input.

[15] https://www.modot.org/i-44-planning-progress
[16] 2018 Long Range Transportation Plan Update: Technical Memorandums, pp. 10-11.



*21st Century Missouri Transportation System Task Force*. In 2017 the state's General Assembly adopted HCR 47 to establish the *21st Century Missouri Transportation System Task Force*, a bi-partisan panel comprised of representation of the state government and the private sector. The Task Force held seven public hearings and three working sessions hearing presentations from national and local participants, learning about the condition and performance of area highways and bridges from MoDOT, and receiving public testimony from concerned Missourians.[17] The Task Force concluded that improvements on Missouri's interstates is long-overdue, and that the entire system needs capacity improvements. The report states that if diversions/delays/shut-downs become so great for such an extended period—that the manufacturers, distributors and others who generate the truck traffic will move to those other corridors to eliminate delay, distance and inconvenience. Those losses—in jobs, local investments and tax revenues—would become permanent, putting Missouri at a competitive disadvantage sustained over years or decades.

## (D) Assessment of Project Risks and Mitigation Strategies

Many risks, and the strategies to mitigate or avoid any crises, were evaluated as follows:

1. ***Weather*** (rain, snow, severe wind delays): The project schedule will anticipate bad weather days;
2. ***Higher costs than originally anticipated***: Value Engineering is a part of the design process and will reduce budget risk. Also, MoDOT has a history of estimating extremely accurately and typically delivers 8-10 percent under budget. The project will be bid as a fixed price variable scope, which means the budget will be what the contract is executed for with no possibility for additional cost;
3. ***Bid protests***: Mitigation will include using procurement best practices and assigning qualified staff to the project during the bidding process; and
4. ***Contractor default/bankruptcy***: Mitigation will be achieved by selecting contractors with extensive experience and track records, and both construction and performance bonding will be required.

[17] Report of the 21st Century Missouri Transportation System Task Force, Submitted to the General Assembly January 1, 2018. (page 50)



# 7.0 Large and Small Projects

| | |
|---|---|
| **Project Determination:** | |
| • Generate national or regional economic, mobility, or safety benefits? | Yes, pp. 11-15 |
| • Is the project cost effective? | Yes, pp. 11-16 |
| • Contribute to one or more of the goals listed under 23 U.S.C 150<br>1. National<br>2. Safety<br>3. Infrastructure Condition<br>4. Congestion Reduction<br>5. System Reliability<br>6. Freight Movement and Economic Vitality<br>7. Environmental Sustainability<br>8. Reduced Project Delivery Costs | Yes, pp. 11-16 |
| • Is the project based on the results of preliminary engineering? | PE will be completed as part of the Progressive Design-Build approach, pp. 18 |
| • Does the project have one or more stable and dependable funding or financing sources to construct, maintain, and operate the project? | Yes, pp. 10, 17 |
| • Are contingency amounts available to cover unanticipated cost increases? | Yes, pp. 11, 19-20 |
| • Is it the case that the project cannot be easily and efficiently completed without other Federal funding or financial assistance available to the project sponsor? | Yes, pp. 7, 10 |
| • Is the project reasonably expected to begin construction no later than 18 months after the date of obligation of funds for the project? | Yes, pp. 21-22 (construction to begin no later than May 2023, mo. 16) |