Appendix C- STRENGTHS AND CHALLENGES TECHNICAL MEMO

Strengths and Challenges

This Strengths and Challenges of the State's Freight System Technical Memorandum discusses the strengths of Missouri's freight system and its most important challenges to solve. In addition, it discusses the Missouri State Freight Plan goals and objectives and how they are or are not currently being met.

The Strengths and Challenges for Missouri's freight system are discussed by the same four categories that the key freight needs were categorized by in **Appendix B**.

Introduction

This technical memorandum was prepared for the Missouri State Freight Plan to identify the State's competitive advantages and the most important challenges to solve. In addition, it discusses components of the freight system that do not meet State goals and objectives as defined in Appendix E.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) requires that a state freight plan include an analysis of the strengths of the State's freight system that should be maintained and the challenges to be solved. This analysis shows the strengths of the State's freight system that Missouri wishes to build upon; it also shows the State's freight system components that do not meet the State's goals, and identifies which challenges are most important for the State to address. Some of these might include challenges that the State expects to face in the future as a result of increasing demand for freight transportation, lack of funding, or other trends that the State is anticipating.

The strengths and challenges of the State's freight system are discussed within four categories: System Capacity, System Operations, Safety, and Connectivity.

It should be noted that the Missouri Department of Transportation's (MoDOT's) freight system strengths cannot be maintained without adequate funding. In addition, those items identified as challenges will likely worsen as funding decreases.

Strengths and Significant Challenges of the Freight System

System Capacity

Appendix C: Strengths and Challenges

This section discusses the strengths and challenges to the State's freight system. These strengths and challenges are addressed in the context of congestion, bottlenecks, and other capacity-related issues on the system.

Strengths

- Missouri has the seventh largest State highway system in the country, but is only the 21st largest state by size and the 18th largest by population, with 33,700 centerline miles of roadway, 5,500 of which are classified as heavily traveled "major highways" and 28,200 miles of which are defined as lesser traveled "minor highways". Missouri's major highways or principal arterials encompass just 20 percent of the State highway miles but carry 80 percent of the system's traffic. There are 18 Interstate Highways within Missouri, including nine main routes and nine auxiliary routes. Freight stakeholders believe Missouri generally has a well-connected and functioning road network, which is a strength for the State that needs to be maintained and built upon.
- Since 2009, the U.S. Department of Transportation has designated several marine highways for transporting cargo on water, reducing pollution, and limiting congestion on roads. Maritime highways serving Missouri include M-29 covering the Upper Missouri River from Kansas City to Sioux City, Iowa; M-70 covering the Missouri River from Kansas City to St. Louis; M-55 covering the Mississippi River from St. Louis to the Gulf of Mexico; and M-35 covering the Mississippi River from St. Louis to the Twin Cities. This is important to Missouri because designated marine highways receive preferential treatment for federal assistance from the U.S. Maritime Administration, which Missouri can take advantage of.
- Missouri is home to three of the top 106 cargo airports in North America in terms of 2013 total tonnage; Kansas City International (MCI), Lambert-St. Louis International (STL), and Springfield-Branson National (SGF). This indicates that Missouri's airports are an important asset in the U.S. airport system, and they have the ability to handle large amounts of freight tonnage. Missouri should continue to build upon its air freight potential.
- The National Transportation Atlas Data through the Bureau of Transportation Statistics identified 114 intermodal facilities in Missouri that provide a variety of intermodal interactions. The majority of the intermodal facilities (71 percent) accommodate the rail – truck commodity transfers, followed by modal transfers at ports (16 percent) and airports (8 percent), indicating well connected truck and rail modes, which Missouri should build upon and extend connections for other modes.
- Missouri has significant freight rail infrastructure with six Class I freight railroads operating 4,218 miles of main track rail lines within the State. There are also five short line railroads that serve Missouri. These railroads provide important connections to businesses, water ports, and intermodal terminals. This is a competitive advantage in terms of rail service for Missouri to build upon.

Challenges

- Missouri has more State highway miles than Kansas and Illinois combined, but with only one-third of Illinois' revenue. This lack of funding creates a challenge for maintaining or upgrading the highway system.
- Annual hours of truck delay for CY2014 and the annual cost of delay for the trucking industry on interstate highways in Missouri is shown in **Table C-1**. Annual hours of truck delay quantifies the extra time spent by commercial motor vehicles on an interstate corridor based upon a state-determined threshold. Missouri's threshold is set at five mph below the speed limit. Speeds below that rate indicate congestion and/or other delay factors for trucks.[2] Time delays and additional costs affect trucking companies and can cause them to make changes to avoid these areas. This can also have an ill effect on Missouri businesses in terms of increased costs and being able to deliver in a timely manner.

Table C-1: Annual Hours and Cost of Delay on Missouri Interstates

Interstate Highway	Annual Hours Delay	Annual Cost of Delay (Millions)
I-70	399,986	34.7
I-44	421,739	38.6
I-55	221,325	19.2
I-35	125,608	10.9

Source: Missouri Department of Transportation, Tracker Report, April, 2014

- Truck freight density growth projections for the Missouri road network indicate the greatest future volume increases will occur on I-44 and I-55. Capacity upgrades on I-70 from Kansas City to St. Louis are needed to maintain network reliability. The ability to maintain or upgrade to meet these needs is limited as transportation revenues decrease. Several other interstate routes, including I-44, were also identified as key corridors for continued investment, which is a challenge as funding is limited.
- There are bottlenecks throughout the State at a number of locations on the highway network. These bottlenecks can be caused by capacity issues, as well as geometric issues. Improvements are needed to eliminate these bottlenecks. These bottlenecks cause congestion and hinder freight. Mobility in these areas may be difficult.
- The St. Louis and Kansas City metro areas account for more than 80 percent of the State's 100 worst truck bottlenecks. The St. Louis region contained 59 out of the worst 100 bottlenecks. The most severe bottlenecks appear to be concentrated near the confluence of Interstates 70, 64, 55, and 44 near downtown St. Louis (evaluation completed prior to the completion of the new I-70 bridge). In Kansas City, 22 of the worst 100 bottlenecks were identified. The complex

intersection with I-70, I-670, I-35, and State Route 9 generated a truck bottleneck along all of those routes near downtown Kansas City. Springfield contained seven of the worst 100 bottlenecks. The most severe bottleneck was in the area was located on State Route 744 (E. Kearney Street) between U.S. 65 and N. Glenstone Avenue.

- Missouri has a significant freight rail infrastructure and is uniquely positioned to the Mississippi and Missouri Rivers for providing rail access to ship and barge traffic. However, Missouri's rail lines are at or near capacity in many locations. Capacity and operational improvements to the Class 1 rail lines are needed. Freight density growth projections across the Missouri rail network indicate the greatest future volume increases will occur on the BNSF line connecting Kansas City and Chicago. This line is currently approaching its capacity and will require improvements to accommodate increasing future volumes.
- A bottleneck at the intersection of rail lines in the West Bottoms area of Kansas City currently exists. This bottleneck creates significant delays in freight rail movements. Coordination with the rail companies that own these rail lines and a solution to eliminate this bottleneck is needed.
- There are two rail bridges across the Mississippi River in St. Louis, owned by Terminal Railroad Association (TRRA), which serve all Class 1 railroads. The Merchants Bridge and the McArthur Bridge were built in 1890 and 1912, respectively. While there is redundancy in the rail system, the condition of these bridges is a concern. In addition, these are both National Freight Corridors, so their impact on the transportation system stretches beyond Missouri.
- Missouri contains 1,050 miles of navigable rivers, including 500 miles of the Mississippi River and 550 miles of the Missouri River. Three public port authorities and over 50 private ports operate along the Missouri River, while 14 public and more than 200 private ports operate on the Mississippi River.
- There is capacity to expand waterborne traffic on the Missouri and Mississippi Rivers. However, the frequency of dredging, lack of improvements to the locks and dams, and inconsistent water levels hinder an increase in traffic.
- There is an opportunity for transloading containers onto barges. However, potential obstacles to greater use of Container on Vessel (COV) in Missouri include readiness of ports, delivery requirements for ports to sustain service, and inefficiencies in backhauling empty containers.
- Initiation of COV service depends on the development of partnerships between key port operators and shipping stakeholders. According to "Missouri Public Port Authorities: Assessment of Importance and Needs" – all current port facilities, with limited capital investments, could operate as a COV facility.
- The cargo facilities at the St. Louis Airport (STL) need to be updated and expanded in order to allow for changes in technology and efficiency and also need to include aircraft capable of handling larger cargo.
- A wide range of freight stakeholders, including trucking companies, railroads, and port authorities surveyed indicate that reliability and funding are the greatest challenges facing Missouri's freight system. Concerns about reliability stem from congestion and capacity issues

for these modes which slow down freight movements. The inability to move forward in these areas can often be linked back to a lack of funding to make improvements.

System Operations

This section discusses the Strengths and Challenges that were identified in the operations of Missouri's freight system. These Strengths and Challenges are associated to road and bridge conditions, freight reliability issues, and other system operations issues.

Strengths

- MoDOT started a major road improvement program in 2004 called the Smooth Road Initiative. Over the next two years, the program improved 2,200 miles of Missouri's major routes, bringing them from 47 percent in good condition up to 74 percent. The Better Roads, Brighter Future program in 2007 further improved the system, increasing Missouri's major routes in good condition to 85 percent. Currently more than 89 percent of major highways are rated in good condition.[2] Consequently, a majority of Missouri's major routes are currently in good condition, and freight traffic will not be slowed down for this reason. MoDOT needs to maintain this strength, although long-term funding is a challenge.
- Statewide, the number of bridge structures in poor condition dramatically decreased over the last five years and the number of structures in good condition moderately improved up until 2011. These improvements were heavily impacted by the Safe & Sound Bridge Improvement Program that was completed in 2012, and by the increased construction program that resulted from the passage of Amendment 3 in 2004. While the number of poor condition bridges dropped by 713 over this five year period, the number in good condition only increased by 276. The number in fair condition increased by 473 over this period, which is reflective of MoDOT's aging bridge population with many structures at the point where they need minor maintenance or rehabilitation.[2] Bridges in poor condition can slow down traffic including freight traffic in two ways. First, the condition itself makes it so vehicles cannot travel at the most efficient speeds. Second, construction on bridges in poor condition slows down traffic or forces closures, which cause congestion. The fact that the number of bridges in poor condition is decreasing is a strength because freight traffic will not be slowed down for these reasons. For the 208 major bridges (i.e., 1,000 feet or longer) in Missouri, the number of structures in the poor category has dropped over the last five years because of an aggressive focus on these structures. [2]
- There is only a total of 73 low vertical clearance bridges in Missouri, which represents less than one percent of all bridges in the State. In addition, only 135 (three percent) of the 4,849 weight restricted bridges in Missouri cross interstates and 81 (two percent) cross U.S. highways. This is a strength for freight truck traffic because their travel routes are not limited by a high number of low clearance bridges that have to be avoided. This is especially true for oversized loads. MoDOT should build upon this strength by continuing to address low clearance and load restricted bridges over time.
- MAP-21 set a national performance goal to have the Structurally Deficient (SD) deck area of National Highway System (NHS) bridges at less than 10 percent. Missouri's local system has 144 NHS structures (five SD) and MoDOT's system has 3,591 NHS structures (153 SD). MoDOT

currently meets the national performance goal with the total at 6.7 percent, which is attributable to aggressive efforts undertaken with rehabilitation and reconstruction on major bridges over the last 10 years as well as other accelerated construction from MoDOT's bonding program.[2] Roadways in poor condition can slow down traffic including freight traffic in two ways. First, the condition itself makes it where vehicles cannot travel at the most efficient speeds. Second, construction on bridge in poor condition slows down traffic and causes congestion. The fact that Missouri is meeting the national performance goal and its roadways are in good condition is a strength because freight traffic will not be slowed down for these reasons. MoDOT needs to maintain this strength, although long-term funding is a challenge.

- Transportation infrastructure leads to the attraction of new businesses and of employers looking to expand. These actions lead to new jobs, new opportunities and new revenue for states. A robust transportation infrastructure allows manufacturers to distribute their products quickly and inexpensively. Between 2009 and 2011, Missouri's national rank in transportation infrastructure was in the top nine. In 2012 Missouri ranked 20th. Missouri's current ranking of fifth best in the nation will be challenging to maintain as the State's annual transportation infrastructure spending has continued to decrease since 2011 due to a lack of funding.
- The Truck Reliability Index (TRI) is a reliability measure that is proposed to be used as a MAP-21 national freight performance measure. By comparing the TRI for each corridor year by year, MoDOT can determine if the corridor has become less or more reliable. A lower index for a succeeding year means reliability has improved with TRI of 1.0 representing perfect conditions. Calendar year 2013 values for the five major interstate corridors included: I-70(1.07), I-44(1.13), I-55(1.14), and I-35(1.11).[2] All of these values are relatively close to one, indicating a relatively high level of highway reliability based on current conditions, a strength Missouri should work to maintain.

Challenges

- Minimizing travel times and delays on the State's most traveled routes are essential to operating a reliable transportation system. The desired outcome for any route is a safe flow of traffic at the posted speed limit. From January to March 2014, it took drivers, on average, 12.75 minutes during the morning rush and 12.99 minutes during the evening rush to travel 10 miles on interstate routes in St. Louis. For interstates in Kansas City, it took drivers, on average, 11.14 minutes during the morning rush and 11.32 minutes during the evening rush to travel 10 miles. This is the equivalent of driving 50 mph.[2]

  Individual roadways within St. Louis and Kansas City, however, experienced longer travel times than the regional averages. In St. Louis, this was true on I-64 and I-170 and in Kansas City on I-35 where average rush hour speeds on these routes were between 35 and 45 mph, respectably. In St. Louis, the heaviest recurring congestion existed on segments of I-64 (a.m. and p.m.) and on I-270 northbound (a.m.), while in Kansas City the heaviest recurring congestion occurred in the downtown region. Significant congestion also occurred in Kansas City on MO 291 north of

the Missouri River (p.m.). In Columbia and Springfield, most traffic delays occurred on signalized arterials. For arterials, the most significant congestion occurred on Stadium Boulevard near I-70 in Columbia and on MO 13 (Kansas Expressway) near I-44 in Springfield during both the a.m. and p.m. rush hours. Travel time delays costs money for vehicles and drivers stuck in traffic and planning time so loads arrive on time.

- Recurring congestion occurs at regular times, although the traffic jams are not necessarily consistent day-to-day. Nonrecurring congestion is an unexpected traffic crash or natural disaster that affects traffic flow. When either occurs, the time required for a given trip becomes unpredictable. This unreliability is costly for commuters and truck drivers moving goods which results in higher prices to consumers.

  The Kansas City and St. Louis metro regions both fall within the definition of larger urban areas where annual congestion cost totals are calculated. The annual congestion cost totals for commuters and freight in Kansas City show a slight decrease from 2007 ($677M) to 2009 ($578M) and a slight increase from 2010 ($636M) to 2011 ($640M). In St. Louis the measure shows a slight increase in 2008 ($1,184M) and a slight decrease through 2010 ($1,115M). The costs in Kansas City from 2007-11 were 21-30 percent below the national average for large cities, St. Louis was 20-32 percent above the national average.[2] Although these costs area below the national average, they still represent issues to address.
- St. Louis and Kansas City have demonstrated quick clearance of traffic-delaying incidents with yearly averages of 28.3 minutes and 27.3 minutes, respectively. However, average clearance times for St. Louis and Kansas City have generally increased since 2010.[2] Increased clearance time of traffic incidents increases congestion and slows freight movements.
- Interstates are the arteries that connect the country and keep commerce flowing. When interstates shut down in Missouri, the country is also disconnected. Sometimes nature and vehicle crashes affect MoDOT's ability to keep the interstates moving. Twenty-six complete closures or blockages occurred on I-70 in 2013, with 22 complete closures on I-44 in 2013. The length of closure and location of these closures varied with the majority being attributed to vehicle crashes.[2]
- Despite a significant investment in major bridges longer than 1,000 feet, the number of structures in good condition generally dropped over the five-year period while the number in fair condition significantly increased. This is reflective of MoDOT's aging bridge population with many structures at the point where they need minor maintenance or rehabilitation. In addition, there are 4,849 load restricted bridges in Missouri or approximately 20 percent of all bridges in the State.[2] This indicates that Missouri's infrastructure is aging and will require additional investment for repairs in the future with limited funds available.
- Stakeholders believe it is a challenge to monitor and focus rail operation upgrades when this asset is owned and operated by private entities that have to consider impacts on profits.

- In the Northwest and Northeast districts rail lines were removed, which hinders economic development in these areas. Coordination with the rail companies is needed and a different solution than removal of rail lines is needed.
- The majority of the locks and dams on the Mississippi River were constructed in the 1930s and are showing their age. The seven locks and dams in or near Missouri are a part of the Upper Mississippi River, starting just north of St. Louis and extending to the Iowa border. The locks and dams are in need of major rehabilitation or replacement which is an expensive undertaking.

  The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system, which adversely affects reliability of the system. Long-established programs for preventive maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.
- Stakeholders believe that the failure to dredge and maintain navigable channels on both the Missouri and Mississippi Rivers is a problem. From the 1930's to the 1960's, six dams were constructed on the Missouri River, creating the largest reservoir system in the U.S. Missouri has an interest in the river as a source of drinking water as well as recreation, power generation, water supply, river commerce, and fish and wildlife.[3] Regulations determine how much water is stored, mainly in the upper three reservoirs in Montana, North Dakota, and South Dakota. This then determines what water flows exist for the Missouri River and often creates drastic fluctuations in water levels that prevent reliable navigation. Missouri's position is that water flows should be maintained at levels that allow for reliable navigation.
- At ports throughout the State, increased maintenance activities are needed on both the land and water sides of the operations.
- Numerous emerging ports have been identified throughout the State. Support for their development is needed.
- The Springfield Airport (SGF) has been identified by the Federal Aviation Administration as an airport that may have its tower hours reduced. Having reduced hours would reduce the number of flights in and out of SGF, which would affect the amount of freight that could come through the airport as well.

Safety

This section discusses the safety strengths and challenges on the State's freight system. These strengths and challenges are associated with the numbers of Commercial Motor Vehicle (CMV) crashes, rail crossing issues, and other safety-related issues.

Strengths

- Roadway safety improvements helped reduce overall roadway fatalities from 1,200 in 2005 to less than 800 in 2013, the lowest since the 1940s.[4] This in turn limits back-ups and congestion

caused by crashes, resulting in less delay to freight truck traffic, as well as reducing the cost of crashes and fatalities.

- The number of CMV fatal crashes through the fourth quarter of 2013 was 82. Even with reduced resources, this is 22 fewer than reported in 2012, a 21.1 percent decrease. Between 2009 and 2013, fatal crashes involving a CMV decreased by 8.9 percent.[2] A reduction of fatal crashes limits back-ups and congestion, with less delay for freight truck traffic.
- The number of CMV serious injury crashes reported through the fourth quarter of 2013 was 311. This number is 17 more than reported in 2012, an increase of six percent. However, between 2009 and 2013, CMV serious injury crashes decreased by 18 percent.[2] Missouri needs to continue with efforts that help further reduce CMV crashes.

Challenges

- Diminished funding will hamper MoDOT's ability to make significant safety improvements in the future.[2]
- Key safety issues include the lack of safe truck parking, numerous at-grade rail crossings, and roadway design and geometric improvements to facilitate safety. A lack of truck parking can discourage companies from doing business in the area.
- At-grade rail crossings can be a problem, and crashes at these locations can cause back-ups and congestion that delay both rail and truck traffic.
- The top three interstate and US/MO routes with the highest three-year CMV crash rates are listed in **Table C-2**. This is a challenge because crashes can cause back-ups and congestion that delay freight truck traffic and potentially cause loss of life and property.

Table C-2: Top Interstate and US/MO Route CMV Crash Rate Locations

Interstate Segment	Direction	To	From
I-55	North	I-44	I-70
I-55	South	I-70	I-44
I-29	South	I-435 (north)	I-35 split
US/MO Route Segment	**Direction**	**To**	**From**
MO 13	South	I-44	US 60
MO 210	East	I-435	MO 291
MO 13	North	US 60	I-44

Source: MoDOT crash data

- Stakeholders indicated that at-grade rail crossings throughout the State present a safety issue and that improvements at all at-grade rail crossings with safety issues are needed. In 2011 and 2012 Missouri had 50 highway-rail incidents each year, while in 2013 the number of highway-rail incidents was 53.[5]

Appendix C: Strengths and Challenges

Connectivity

This section discusses the strengths and challenges of connectivity across the Missouri freight system. These strengths and challenges are in relation to both connectivity between modes, as well as connectivity across the State.

Strengths

- Missouri is a "crossroads for the continent." Missouri's central location in the U.S. was consistently identified as a top strength of the State's freight system and an asset for attracting new business.
- The Panama Canal is now undergoing a $5.25 billion expansion to be completed in 2015. The completion of the Canal will enhance one of the most important trade links in the world by linking the Atlantic and Pacific Oceans. When the Canal expansion is complete the new locks will allow for deeper, longer and wider vessels, doubling its existing throughput capacity.[1] Reduction of transportation costs due to Canal expansion could affect the movement of goods on inland waterways in two ways. First, a reduction in ocean transportation costs out of Gulf ports due to the use of larger, more efficient ships will reduce aggregate costs of exporting bulk commodities, such as grain, by the Mississippi River route rather than by rail through Pacific Northwest ports. Second, lower transportation costs attributable to expansion of the Canal could increase export volumes as the transportation element of U.S.-produced commodity costs helps to make U.S. exports more competitive in world markets. While the scale and timing of the impacts to Missouri freight flows is unknown at this time, it is anticipated that the expansion will change international trade flows and change the demands on transportation networks, service, and operation.

  All of these growth factors will likely lead to a growth in freight movements within Missouri. The growth in freight movements will result in increasing demands on the highways, rail lines, port facilities and airports handling air cargo freight. The completion of the Panama Canal expansion project may alter some shipping patterns. If shipping costs remain competitive and carriers can be responsive to customer demands, then the markets could foster changes in some supply chains to include increased imports and exports throughout southern and eastern U.S. ports.[6]
- The Missouri River and the Mississippi are key assets to Missouri based on their central location in the U.S. and that the Missouri River and the Lower Mississippi River are lock free.
- The Kansas City metropolitan area is one of the largest rail freight and trucking hubs in the country. These are important resources to build upon.
- Southwest Missouri is experiencing large growth in manufacturing from the KCS, BNSF, and the multiple interstates leading to Mexico and the Gulf.

Challenges

- Not all modes are readily accessible and well connected with other modes (i.e. rail to water ports). A high priority project that will look to fix this issue is the New Bourbon Port connection from the port to I-55 and a rail connection to St. Francois County.
- Major freight generator sites have been identified throughout the State. Connectivity to these sites is a key issue, including the last mile connections to encourage continued use of these sites and future growth
- Future growth is threatened by railroads closing local crossings and spurs, and also removing scales.
- There is no program or funding to provide last mile connections for rail access. Class 1 Railroads invest millions into maintaining the tracks for through traffic, but the spur connections or last mile connections into specific sites are the biggest challenge for both freight movers and public agencies.

Current Freight System Deficiencies Related to Freight Plan Goals

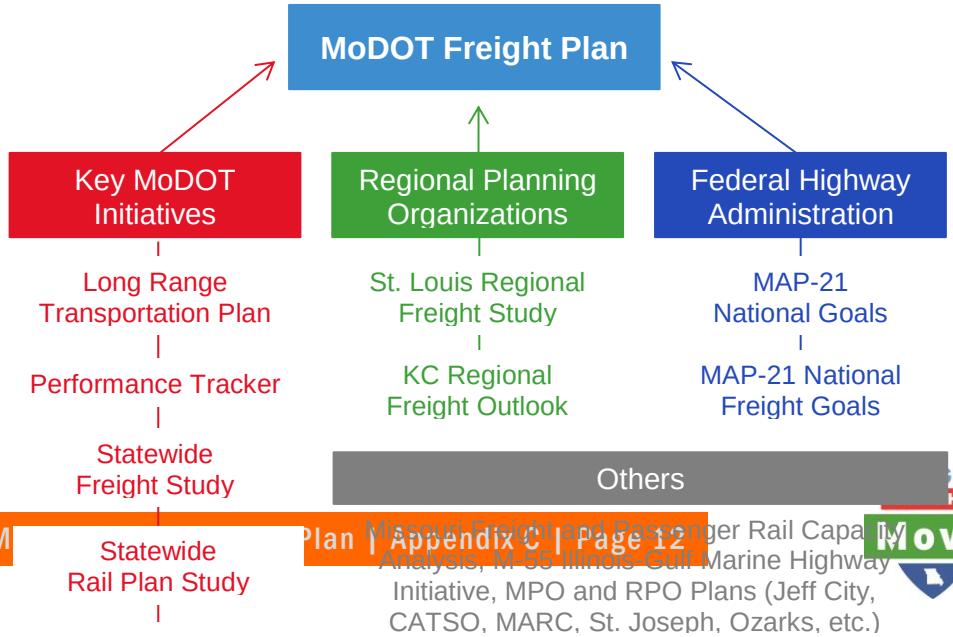
This section provides an assessment of the current state of Missouri's freight system and how the system measures up to the goals and objectives identified for the freight plan.

A critical component of creating the freight plan is the development of goals and objectives that will help MoDOT prioritize projects and guide investment decisions. The freight plan goals were not created in isolation; but their development was informed by, and aligned with, other state plans and national policies that already exist or are in development. Specifically, the freight plan goals are consistent with:

- Moving Ahead for Progress in the 21st Century Act (MAP-21)
- Key MoDOT Initiatives
- Other Regional and Statewide Plans with a Freight Component

While these plans and policies provide the basis for establishing the freight plan goals, stakeholder input was also integrated into their development. Additionally, **Figure C-1** illustrates some of the considerations used in establishing the freight plan goals.

Figure C-1: Considerations into the MoDOT Freight Plan Goals



After examining the strategic frameworks from relevant State plans including *Vision for Missouri's Transportation Future*, other State and regional plans, and the new federal requirements as defined by MAP-21, MoDOT determined that the goal areas developed for the Long Range Transportation Plan should also be adopted as the freight plan goals. The resulting four pillars driving transportation decisions are maintenance, safety, economy and, connectivity/mobility. There are three strategic areas that build upon these four pillars from *Vision for Missouri's Transportation Future* that are also being considered, including environmental, organizational and process, and customers and partners.

The objectives listed below by goal were developed in order to meet the needs identified from stakeholder input and a review of other plans with a freight component.

Maintenance

The maintenance goal aims to ensure that the freight system is maintained in good condition by:

- Keeping the highways and bridges in good condition
- Supporting and encouraging the maintenance of railways, waterways, airports, and multimodal connections

While MoDOT is currently exceeding their goals for highway and bridge maintenance, the number of awards to contractors has dropped due to a lack of funding. Without enough funding it will be increasingly difficult to maintain the current condition for not only highways and bridges, but all freight modes. The number of highway miles that Missouri must maintain and the age of some of the facilities from highway and rail bridges to outdated airport facilities and lock and dams are a challenge to meeting this goal.

Safety

The safety goal looks to improve safety on the freight system by:

- Decreasing the number and severity of crashes involving CMVs
- Improving safety at railroad crossings

While the instance of CMV crashes has trended downward, highway-rail crossing incidents have slightly increased over the last several years. MoDOT continually strives to decrease the numbers and severity of these incidents across all modes. However, diminished funding will hamper MoDOT's ability to make

significant safety improvements in the future. Key challenges to the safety goal include lack of safe truck parking, numerous at-grade rail crossings and roadway design and geometrics that are in need of improvement.

Economy

The economy goal supports economic growth and competitiveness and job growth in Missouri by:

- Improving the economic competitiveness in Missouri through improvements to the freight system
- Enhancing and supporting opportunities for economic development and job growth through improvements to the freight system

While the cost to ship several of Missouri's major export commodities (e.g., soybeans, automobiles and chemicals) is relatively low compared to competing states, MoDOT has only recently begun quantifying and calculating this measurement of goods movement and competitiveness. The bulleted items above have been identified as performance measures in the freight plan and will continue to be monitored in relation to meeting economic goals. Challenges to economic growth and competitiveness, as it relates to freight, include the need to upgrade aging facilities, travel delays that cost shippers time and money, and the need to support growth beyond truck and rail, including areas such as air cargo and waterways and port development.

Connectivity and Mobility

The connectivity and mobility goal seeks to improve the connectivity and mobility of the freight system throughout the State by:

- Improving the multi-modal connectivity of the freight system
- Reducing congestion and increasing reliability on roadways
- Supporting and encouraging improved efficiency of rails, waterways, and airports
- Improving connections to freight generators

While the amount of total freight tonnage in Missouri has increased over the last several years, MoDOT has only recently begun measuring annual hours of truck delay and calculating the truck reliability index. These parameters have been identified as performance measures in the freight plan and will continue to be monitored in relation to meeting the connectivity and mobility goal. Key issues in meeting the connectivity and mobility goal include cutting down on the number of accidents and congestion that can cause delays or stop movement altogether, the lack of accessibility and connection between modes, the need to maintain or improve last mile connections to major freight generator sites and the threat of closures of local rail crossings and spurs.

Next Steps

Identifying the strengths and challenges, as well as which goals are not being met, are a vital part of the overall MoDOT freight plan development effort. This information will be used as input in project

identification, selection, and prioritization. The strategies and implementation plan for the freight plan were developed to address the strengths and challenges in collaboration with stakeholders and other Missourians.

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