5 Freight Bottlenecks and Mobility Issues

5.1 HIGHWAY

5.1.1 Truck Bottlenecks

For the purposes of this analysis, a bottleneck is defined as part of the transportation system that imposes disproportionately high costs in the movement of freight. A specific approach was followed to identify truck freight bottlenecks on the Oklahoma NHS. Some of the adopted bottleneck identification concepts were based on guidance recently published by FHWA.[33] This guidance stresses the importance of thinking about bottlenecks from the perspective of system users, leading to indicators that approximate user impacts and costs. The analysis used findings from National Cooperative Highway Research Program (NCHRP) Report 925[34] to estimate the costs that congestion generates for trucking companies and businesses that use trucking services. This represents an improvement over analyses that estimate costs only to trucking companies and ignore broader supply chain impacts.

The FHWA guidance also highlights the importance of delving into additional data sources to investigate potential causes of performance issues. Therefore, in addition to the performance measures highlighted here in Chapter 5, the analysis included consideration of other indicators such as crashes, pavement conditions, curves, grades, and congestion. The results of these analyses were utilized in the Plan efforts to identify potential solutions and investment priorities (see Chapter 6).

In addition to evaluating performance based on measures estimated from data, it is also important to consider experience of, and comments from, stakeholders who use the roadway network. System users can identify issues not captured by the data.

5.1.2 Mobility/System Performance

The congestion metrics used to identify bottlenecks were developed by NCHRP Report 925, which outlines an approach for quantifying recurring and non-recurring congestion using travel time data and estimating associated user costs. Distinguishing between recurring and non-recurring congestion is important because research shows that freight users are much more concerned about non-recurring congestion. Trucking companies account for recurring congestion—typical slowdowns during peak time of the day—in their delivery schedules; however, they have difficulty anticipating and managing non-recurring congestion. Moreover, most shippers and receivers place a premium on delivery schedules being met, because late shipments can disrupt production, cause stock-outs at stores, or lead to a missed intermodal transfer at an airport, seaport, or rail terminal. On-time performance, which is one of the most

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33 Federal Highway Administration. August 2015. *Freight Performance Measure Approaches for Bottlenecks, Arterial, and Linking Volumes to Congestion*. U.S. Department of Transportation, Washington, D.C.

34 National Academies of Sciences, Engineering, and Medicine 2019. Estimating the Value of Truck Travel Time Reliability. Washington, DC: The National Academies Press.

important factors in modern-day supply chains, becomes much more difficult to achieve with high levels of non-recurring congestion.

Quantifying recurring and non-recurring congestion separately enables the full costs of congestion to be estimated. Other congestion metrics that rely on travel time indices or ratios do not distinguish between these two separate phenomena, which means that they cannot be used to estimate the costs of congestion. Many studies that seek to estimate the costs of congestion in freight transportation consider only the impacts of delays on vehicle operating costs (e.g., driver wages, fuel consumption) and do not consider the broader supply chain implications of increasing uncertainty in travel times. These broader implications, which research shows are critical for costing the full impacts of congestion, are considered by the congestion metrics used in this study.

Recurring Congestion (Delay)

Delay is a planning measure for talking about recurring congestion. Delay is calculated as the difference between travel time in average conditions and travel time under free-flow conditions. This indicator measures the additional hours that a truck spends traversing a roadway segment. This delay directly translates into additional costs such as additional driver wages, vehicle operations, and fuel consumption.

Average delay was calculated for the NHS from the National Performance Management Research Data Set (NPMRDS) for the calendar year 2021 and average annual daily truck traffic data from traffic counts in Oklahoma's federal Highway Performance Monitoring System.[35] The NPMRDS provides actual truck travel times across individual segments of the network continuously throughout the year. In NPMRDS each segment is defined by a unique Traffic Message Channel.

Non-Recurring Congestion (Reliability Index)

The reliability measure demonstrates how bad travel conditions can be on a given highway segment. Reliability is a measure of unpredictable or non-recurring congestion. It is calculated by the ratio of the worst-case travel time (95th percentile travel time) to the average travel time. This measure sums the hours of uncertainty that trucks face while traveling throughout the day. This way of measuring unreliability is superior to the often-used travel time indices or ratios because it is additive and focuses on non-recurring congestion. As the index gets higher, it indicates greater reliability problems on that segment. Thus, a larger number of trucks need to plan more time into their schedules to guarantee on-time delivery. The analysis found the worst delay and reliability problems for trucks in and around the major metropolitan areas of Oklahoma City and Tulsa, as well as on the stretch of I-35 between Oklahoma City and Dallas.

Preliminary Identification of Bottlenecks

The congestion metrics above were translated into user costs using monetization factors from NCHRP Report 925. This study conducted a stated-preference survey in the United States to

[35] The NPMRDS data was from 2021 and average annual daily traffic data was from the 2017 Highway Performance Monitoring System.

quantify how motor carriers and shippers value travel time unreliability relative to expected travel times and shipment costs. Thresholds were set for user congestion costs in order to identify areas with the worst performance in the state for trucks. These thresholds were set at the 95th percentile of user congestion costs per mile (i.e., if a segment was in the worst 5 percent in terms of user cost per mile, it was identified as a truck bottleneck location that merited further analysis).

Roads were classified as being Urban or Rural based on the distinction made in NPMRDS (originally derived from the U.S. Census Bureau). Different thresholds for the user cost metric were used to identify bottlenecks in rural areas versus urban areas. Bottlenecks in urban areas typically have different magnitude and characteristics than bottlenecks in rural areas. If the same threshold was used throughout the state, the highly congested roads in metropolitan areas would dominate the results. Further, roadway segments in the greater Oklahoma City region were grouped together due to their higher expected user costs. All other urban roadway segments in the state were grouped under the separate category of Tulsa Urban.[36]

In Urban Oklahoma City, 37 roadway segments experienced user costs higher than the threshold, totaling 14 centerline miles of roadway. In Tulsa Urban, 44 roadway segments were above the threshold, combining for 19 centerline miles of roadway. In Rural, 127 roadway segments were above the threshold, combining for 83 miles of roadway. In total, roughly 70 percent of the bottleneck distance was identified in rural areas (primarily I-35 in locations classified as rural in NPMRDS) and 30 percent in urban areas (Table 5-1).

Table 5-1. Truck Bottleneck Thresholds and Totals

Bottleneck Type	User Cost Threshold ($/mile-day)	Number of Bottleneck Segments (Traffic Message Channels)	Bottleneck Centerline Roadway Miles
Urban Oklahoma City	17,325	37	14
Tulsa Urban	7,335	44	19
Rural	7,557	127	83
TOTAL	**N/A**	**208**	**116**

Source: National Performance Management Research Data Set data and *NCHRP Report 925 – Estimating the Value of Truck Travel Time Reliability*

Stakeholder Input

Stakeholder perspective on system problems and needs was solicited early in this planning effort. This input provided insight as to the location and severity of problems from the perspective of system users. Stakeholder perceptions are useful in identifying and prioritizing system needs. At the first FAC meeting in the summer of 2022, committee members identified congestion in metropolitan areas as one of the biggest challenges for freight. This reinforces the data analysis which shows the high cost of congestion on truck travel in Oklahoma City and Tulsa.

[36] Tulsa Urban was derived by including all urban areas besides those associated with Oklahoma City. Tulsa was the only city that contained urban areas other than Oklahoma City.

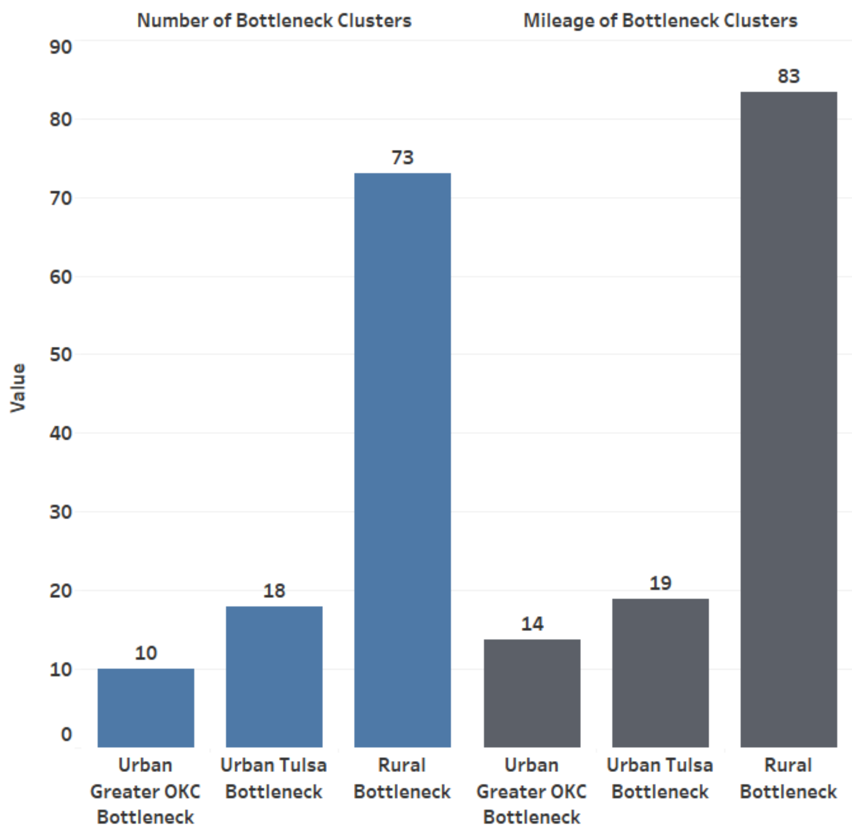
ODOT also solicited comments from the general public via a web-based survey in June and July 2022. Many respondents emphasized the large number and range of freight issues in rural areas, including congestion. This result is consistent with the data analysis that found a larger number of individual bottlenecks in rural than urban areas. One specific comment called for the widening of I-35 as it crosses the Red River.

Stakeholders were also interviewed to obtain their perspectives. Road congestion and conditions were repeated as constraints on performance, with US-69, I-35, and US-412 being mentioned as examples. These facilities also emerge in the analysis of data as further described in the next section.

Final Bottleneck Identification

A manual process was conducted to combine consecutive bottlenecks into bottleneck clusters. Especially in urban areas, where the network is segmented more finely, numerous consecutive segments were designated as bottlenecks. For simplicity and ease of interpreting the results, consecutive and near consecutive segments were combined into bottleneck clusters. In some cases, nearby roads that are not consecutive were combined into the same cluster if the underlying cause of the bottleneck was judged to be the same. As shown in Figure 5-1, this resulted in 73 bottleneck clusters in Rural, 10 in Urban Greater Oklahoma City, and 18 in Tulsa Urban areas, for a total of 101 bottleneck clusters.

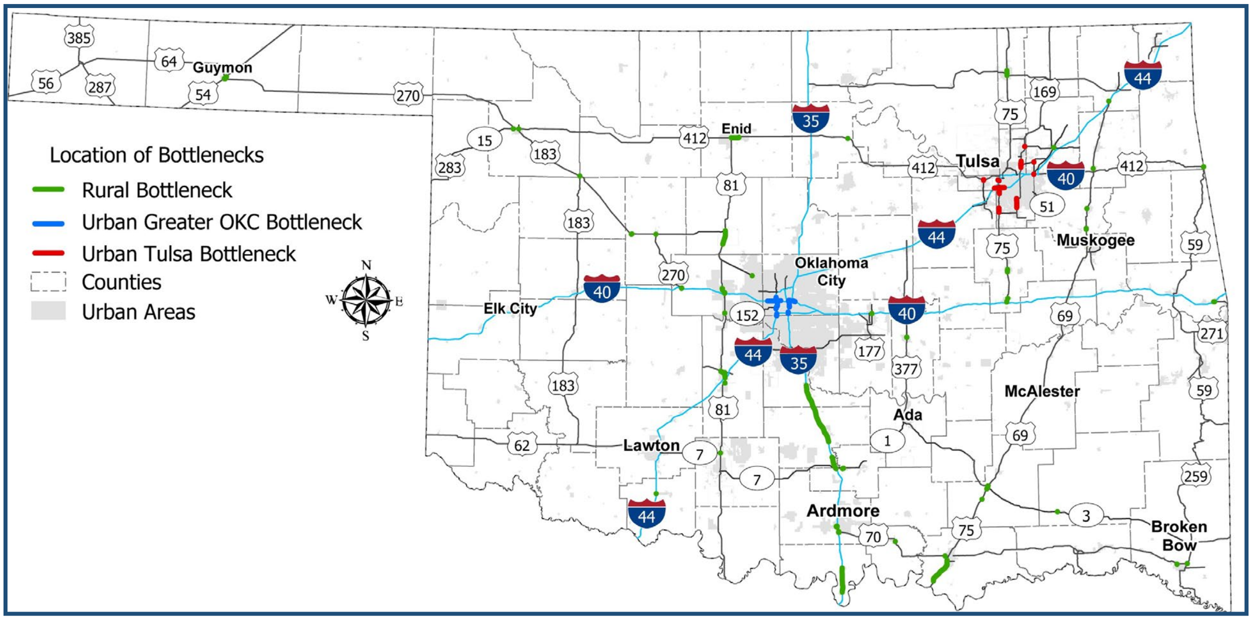
Figure 5-1. Number and Mileage of Bottleneck Clusters



Source: National Performance Management Research Data Set data and *NCHRP Report 925 – Estimating the Value of Truck Travel Time Reliability*

Figure 5-2 shows the results statewide. As can be seen, the bottlenecks tend to congregate in and around the urban areas of Oklahoma City and Tulsa, although there are many rural bottleneck locations in the southern part of the state, along I-35.

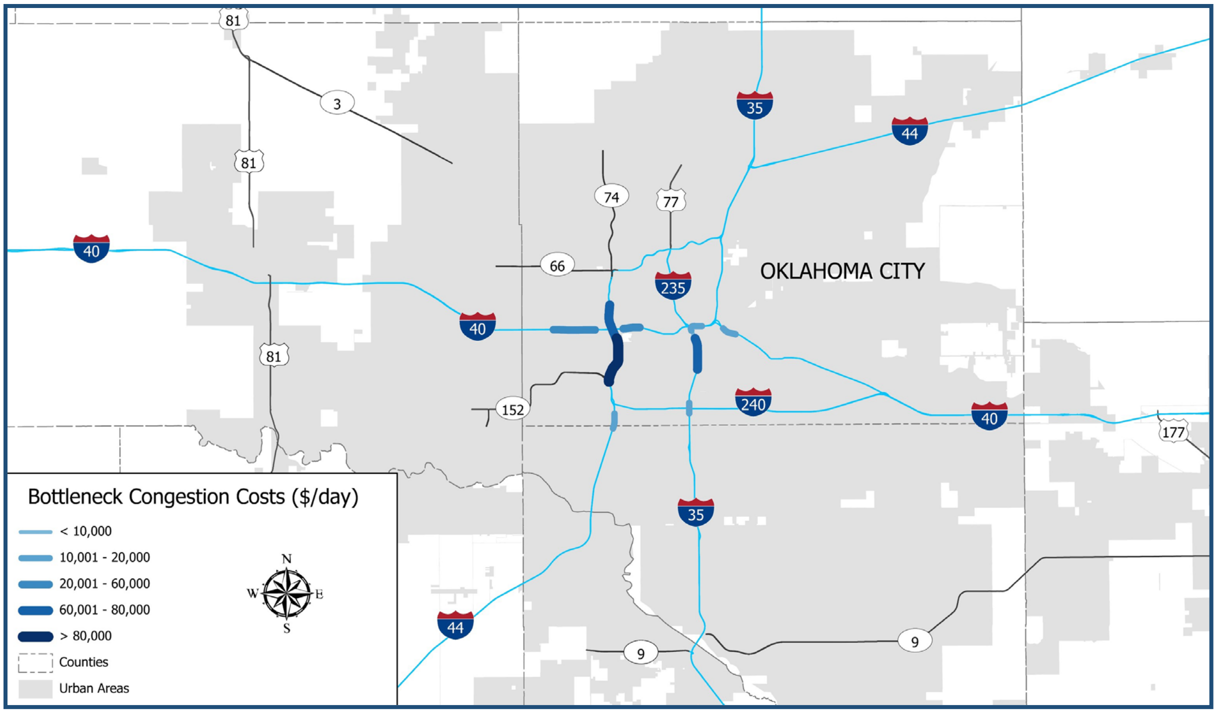
Figure 5-2. Final Bottleneck Locations – Top 5 Percent



Source: WSP analysis of Highway Performance Monitoring System and National Performance Management Research Data Set data

Figure 5-3 and Figure 5-4 show these results in more detail for Oklahoma City and Tulsa, respectively. As can be seen on Figure 5-3, in Oklahoma City much of the highway system has bottlenecks, including stretches of I-35, I-44, I-40, and US-77, especially around interchanges.

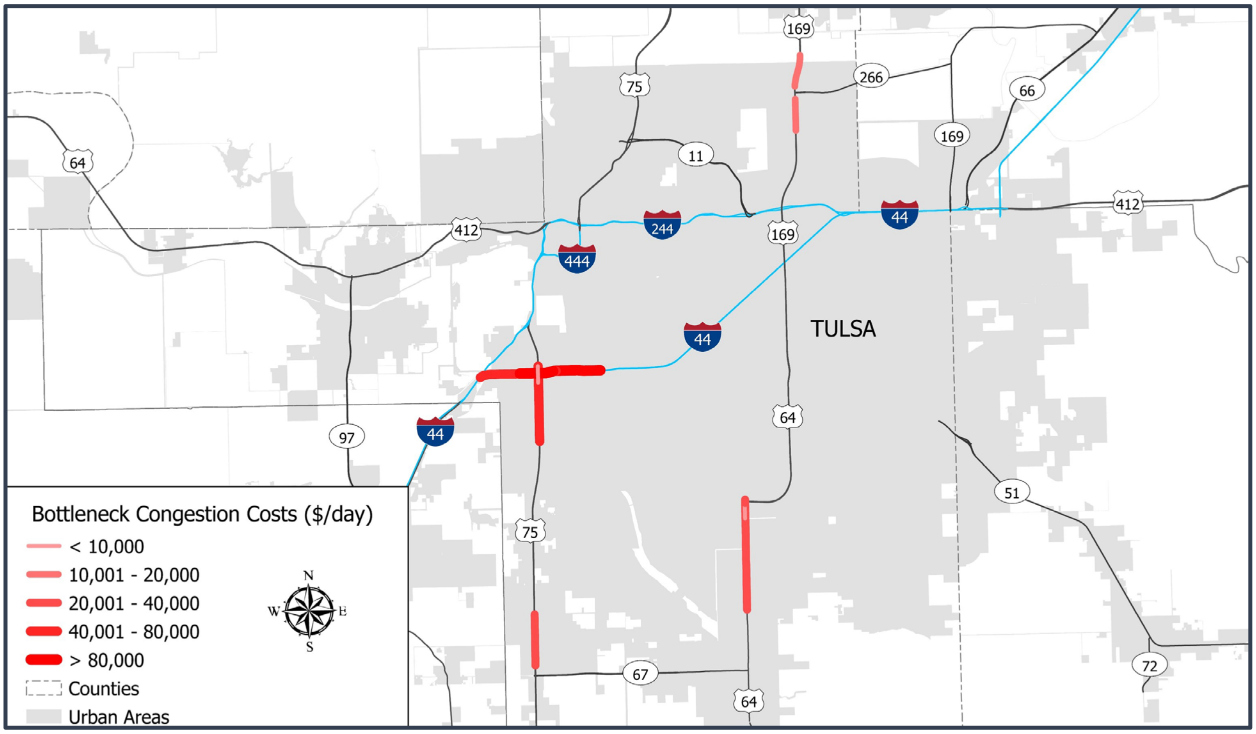
Figure 5-3. Final Bottleneck Locations, Top 5 Percent – Oklahoma City Area



Source: WSP analysis of Highway Performance Monitoring System and National Performance Management Research Data Set data

In the Tulsa area (Figure 5-4), there are several bottlenecks on I-44, US-75, US-64, US-169, and they tend to be located near interchanges as well.

Figure 5-4. Final Bottleneck Locations, Top 5 Percent – Tulsa Area



Source: WSP analysis of Highway Performance Monitoring System and National Performance Management Research Data Set data

5.1.3 Safety

In addition to presenting a safety risk, crashes on a facility can cause slowing and backups that affect all traffic. Locations of frequent crashes affect reliability, a key issue for trucks. To identify areas of safety issues, crashes were evaluated for the entire NHS network. ODOT-recorded crash incidents occurring in 2019 on the NHS were assigned to the relevant segment on the network, and the most impacted 10 percent of mileage in the state (Table 5-2) in terms of crash density (total crashes per mile) and crash rate per million VMT were identified. This amounts to approximately 390 miles of roadways, which recorded 13 crashes per mile or more and 2.1 crashes per 1M VMT or more in 2019.

Table 5-2. Mileage in the Worst 10 Percent of Crash Locations Statewide (2019)

	Crashes Per Mile	Crashes Per 1M VMT
Threshold (top 10 percent)	13.0	2.1
Miles over threshold	393	386
Percentage of total miles	10.3	10.2

Source: ODOT Traffic Engineering Division, 2022

Crashes per mile are a good indication of the potential for delays that could occur on a particular stretch of roadway. Crashes per mile tend to cluster in metropolitan areas and near the interchanges where freeways and highways intersect. For safety analysis, crashes are typically normalized by VMT. Crashes per million VMT points to locations where safety conditions exist that might result from roadway configuration or other physical conditions. In addition to urban segments in Oklahoma City and Tulsa, the top 10 percent of crashes per million VMT identified problematic stretches of highways in rural areas including segments of US-60, US-412, US-75, US-81, and State Highway (SH-)3.

5.1.4 State of Good Repair

Locations with deteriorated pavement conditions can present hazards and slow travel. The International Index ratings for 2017 through 2021 were calculated according to the federal standards in the Highway Performance Monitoring System. A small fraction of Oklahoma's NHS mileage is categorized as having "poor" pavement conditions under this federal specification. The pavement quality on these segments affects freight movement and should be considered along with other needs as part of the state's freight investment strategy.

Other factors on the transportation system, including but not limited to roadway geometry or outdated design features, may contribute to freight bottlenecks as well.

5.1.5 Freight-Related Bottlenecks on Highways

Heavy-freight traffic can also create bottlenecks that affect other highway users. To identify potential locations where delay is exacerbated by freight transportation, the study team examined locations on or near the network that are within 0.25 mile of an area with truck bottlenecks. The areas that have both freight generation and truck bottlenecks are locations where freight could be affecting other users.

The following locations are areas where truck bottlenecks are in proximity to identified freight generators:

- US-54/ US-412 (US-64) intersection – Texas County
- US-81 between SH-33 and SH-3 – Kingfisher County
- US-81 just north of the I-40 intersection – Canadian County
- US-81 at SH-33 intersection – Kingfisher County
- I-44 east of US-75 intersection – Tulsa County
- SH-7 and I-35 interchange – Murray County
- I-35 south of I-40 interchange – Oklahoma County

General traffic congestion or delay issues in these areas could be caused by freight. Solutions to these issues should consider resolution of freight conflicts as well.

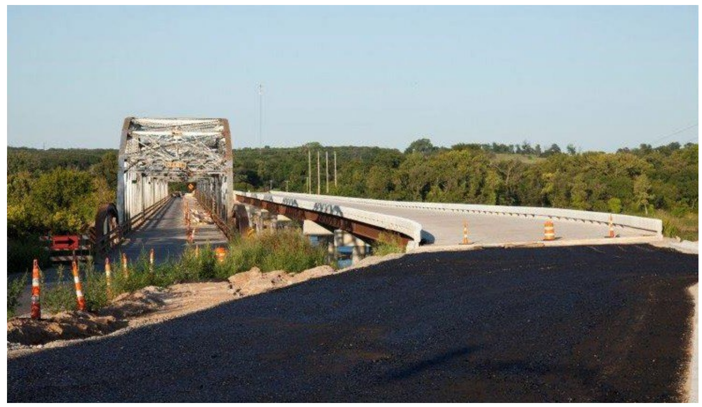
5.1.6 Heavy-Load Route Issues

Heavy-Haul Vehicles In Oklahoma

This OFTP is intended to develop an improved understanding of the impact of heavy-haul vehicles on the highway system and to identify strategies to reduce deterioration. Most heavy-haul traffic moves within established weight limits, but with payloads and gross vehicle weights at the upper limits. In Oklahoma, a vehicle that exceeds the legal statutory dimensions usually requires an OSOW permit, and associated additional fees are required to legally travel on designated highways.[37] An OSOW permit typically includes the conditions related to route specifics, dates of load travel, times of load travel, and escort vehicles. Channeling the heavy loads to fewer routes is one mechanism states use to minimize the impact of heavy loads on the highway system. Another strategy is to direct as much heavy cargo as possible to the rail and water modes. Even in the case of primary transport by rail of water however, trucks often complete the first and last moves for water and rail shipments.

Route Definition For Heavy-Haul Vehicles

Heavy-haul routes, for the purposes of this plan, are highway locations where travel by heavy commercial motor vehicles (including agriculture, energy, mining, or timber cargo) is projected to substantially deteriorate the condition of the roadways. These routes may be traversed by regulation-size vehicles at or near the gross-vehicle-weight limits carrying heavy cargo, or by OSOW vehicles, or superloads.



SH-18 at the Arkansas Red River in Pawnee/Osage Counties

Structurally deficient bridges are problematic across the country, and Oklahoma is no exception. In rural areas, the challenge of travel on inadequate bridges goes beyond truck travel and extends to agricultural equipment transport where the axle ratios are different from trucks and therefore create special needs. Fields on large farms and ranches can be separated by restricted bridges, creating additional miles to move from field to field. Slurry wagons associated with confinement livestock can be extremely heavy and present a similar challenge in rural areas.

ODOT tracks vehicle volumes by route for trucks with OSOW permits or with special superload permits. Tallies of OSOW permits have been 209,000 or more annually for the past six years.

Heavy-Haul Concerns

OSOW shipments present difficulties in managing physical infrastructure, operational processes, and policy. For shipments crossing state lines, the problems are compounded by the need to interact with neighboring states, and/or several states along an extended route.

Physical Infrastructure

OSOW shipments have an impact on physical infrastructure, increasing the need for maintenance and repair to maintain good condition. Bridge conditions are particularly

[37] ODOT has an extensive system of designated Overweight Truck permit "green" routes for approved heavy-haul and long-combination vehicle routes. See ODOT website and http://www.swpermitsok.com/ for more details. 2019 version available at https://www.odot.org/bridge/lpb/pdfs/2019_overweight_permit_truck_map.pdf

problematic given the need for out-of-route miles to work around restricted bridge locations, although ODOT has steadily expanded the system of unrestricted facilities. Superloads by their nature add clearance considerations to physical design for vertical clearance, turning radius, and other dimensional characteristics.

A related physical aspect has to do with the choice of suitable routes and interaction with other traffic. OSOW freight can impede traffic flow on high-volume corridors and create disruptions in cities and towns. This is particularly true for superloads, which move slowly and require special considerations for clearance such as navigating under power lines and traffic signals.

Policy and Operations Practice

Oklahoma carriers report concerns with the permit system as one particular barrier to efficient operations. Although much of this pertains to regular OSOW shipments, the superload operations are especially affected. While concerns include issues such as the need for individual permits for repetitive loads and for empty returns from the same two locations, the OKiePROS system cited earlier in fact has substantially simplified and expedited the permitting process for carriers.

5.2 RAIL MOBILITY ISSUES/CONCERNS IDENTIFIED

Railroad-related concerns and mobility issues can be attributed to several factors. Inadequate track and a rail yard's physical capacity can produce railroad bottlenecks, as can the crossing of two tracks. Rail bottlenecks in turn impact rail velocity. Deficient structures such as bridges can introduce speed restrictions that affect freight mobility.

These factors not only affect the mobility of rail freight but can also have an impact on highway traffic. Slow or stopped trains can interfere with motor vehicle traffic at grade crossings. Even fast-moving trains in high-frequency railroad corridors impact intersecting motor vehicular traffic.

ODOT recently updated its statewide rail plan. The 2022 SRP identified stakeholder concerns, which generally fell into the following three categories:

- Conflict with motor vehicle traffic
- Increased volumes and train lengths
- Infrastructure (bridges or track structure) unable to support current generation railcars
    - This issue generally affects short-line (Class III) railroads.
    - This issue restricts customers to using cars with 263,000-pound loading capacity, as opposed to cars with 286,000-pound capacity. This puts the customers at a commercial disadvantage.

ODOT developed a State Rail Investment Program (SRIP) to address rail investment needs, which are generally summarized in this section. Short-range projects (2022-2025) include funding sources and are listed in Table 5-2 of 2022 SRP. Long-range rail study and project needs and costs, if known, are listed in Table 5-3 at the end of this section. Long-range projects are not expected to be implemented until after 2025 due to the need for funding and/or additional assessment and planning.

5.2.1 Conflict with Motor Vehicle Traffic

The most public impact of rail movements to the general public is at highway/rail grade crossings. Crossings where vehicular traffic and rail traffic intersect creates potential for safety issues, public safety access issues, and congestion issues. Additionally, as noted in the SRIP, in some cases, rail bridges spanning roadway or highways result in clearance issues or highway traffic congestion points.

5.2.2 Increased Volumes, Capacity, and Train Lengths

Over the last several decades the rail industry has utilized many technological advances to improve efficiency. Advances in locomotive technology, more reliance on electronic communication and telemetric devices, use of distributed power, advances in braking technology, and PTC have allowed the railroads to move more freight with, more fuel efficiency than ever before. Two direct outgrowths of this improved platform are the ability to move longer unit trains, and in the PSR modelling to move longer through freight trains between major terminals. To handle longer trains, more or longer passing sidings, additional main line tracks, and/or improved interchange tracks are necessary. These types of projects are reflected in many of the projects enumerated in the SRIP.

The ability to move longer unit trains impacts many of the customer groups that railroads serve in Oklahoma. Customers dealing with origin or destination of grain, coal, aggregates, and oil products among others can benefit from economies of scale from being able to accept unit trains. To the extent that unit train customers are on a Class I railroad, there must be sufficient rail infrastructure and material handling capacity at or near the loading/unloading site to handle the volume of cars and material generated in unit train service (up to 100 to 120 cars per train, depending on commodity). In the case of customers located on a short-line (Class III) railroad, appropriate interchange facilities are an issue. In general, Oklahoma's short lines were created in the 1980s, as branch lines were spun off from Class I railroads. Since the lines were historically a contiguous part of the former owner, a location to "interchange" entire trains of traffic from the care and control of one railroad to another were not particularly robust. The use of unit trains for these commodities has grown exponentially in the past four decades and therefore the ability to hand over unit trains of traffic (loaded and empty) between railroads is a growing problem. As such there are several projects in the SRIP to improve interchanges and generally to address unit train concerns.

Increased train lengths and track capacity issues are particular concerns for the Class I railroads. A significant number of initiatives in the SRIP address capacity concerns, including adding wye[38] tracks, a bridge over the Oklahoma River, grade separating a BNSF/UP level crossing, and additional main line track.

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[38] A wye is an arrangement of railroad tracks in the form of a "Y", used for turning engines, cars, and trains.

5.2.3 Infrastructure (Bridges or Track Structure) Unable to Support Current Generation Railcars

The SRIP includes multiple projects either seeking to maintain a State Of Good Repair, or to address infrastructure to accommodate 286,000-pound railcars. When the majority of Oklahoma's short lines were created, the industry standard for branch lines were an infrastructure that could support moving 263,000-pound railcars. In the intervening years, the industry has moved toward the 286,000-pound car as the industry standard. Therefore, customers who are limited to 263,000-pound cars must pay a premium by moving additional railcars than customers with access to lines upgraded for 286,000-pound cars. While there is savings to the railroad in improved infrastructure and (initially) lower maintenance costs, a large portion of the benefit accrues to the customers themselves.

Table 5-3. Long-Range Freight Rail Studies and Projects (2026 to 2041)

Studies and Projects	Description	General Project Benefits	Estimated Capital Cost, if Known
Oklahoma Intermodal Facility	Develop a new intermodal facility in the state of Oklahoma at a location to be determined.	Enhance multimodal capacity, availability of transloading and intermodal service, and rail system access.	To be determined (TBD)
Arkansas-Oklahoma Railroad Co. Bridge Upgrades	Rehabilitate and/or replace structural components of two bridges Arkansas-Oklahoma Railroad Co. bridges in Wilburton.	Preserves state investment in the state rail network and improves freight service for shippers.	$250,000
BNGR Rail Improvements	Upgrade main line track to include 115-pound rail, tie replacement, ballast placement, and surfacing to increase operating speeds on 17 miles of track from Blackwell to OK/KS state line.	Preserves state investment in the state rail network and improves freight service for shippers.	$27,000,000
Add a Second BNSF Railway Bridge over Arkansas River in Tulsa	There is only one freight rail crossing of the Arkansas River in Tulsa.	Added capacity benefits shippers and improves efficiency.	TBD
Add a second main track on BNSF between Edmond and BNSF Flynn Yard, south of Oklahoma City	Add a second main track on BNSF between Edmond and BNSF Flynn Yard, south of Oklahoma City.	Added capacity benefits shippers and improves efficiency; improves reliability of Heartland Flyer passenger rail service.	TBD
BNSF Grade Separation of US 64/77 in Perry	No grade- separated crossings of the BNSF exist in Perry.	Public benefit - highway and safety improvement.	TBD
Siding extensions along BNSF Cherokee Subdivision	Extend sidings to accommodate longer trains and enhance capacity for meet-pass events between trains.	Added capacity benefits shippers and improves efficiency.	TBD

Studies and Projects	Description	General Project Benefits	Estimated Capital Cost, if Known
BNSF Red Rock Subdivision Double-Tracking	Add second main track to BNSF Red Rock Subdivision to alleviate rail traffic and grade crossing congestion.	Public benefits include reduced crossing delays and safety; private benefits include reduced train delays and lower cost of operations.	TBD
Grade Separate US-64 / BNSF Crossing in Enid	Construct a roadway overpass for US-64 over the BNSF in Enid.	Public benefit - highway and safety improvement.	TBD
Improve overall capacity on BNSF, UP, Arkansas-Oklahoma Railroad Co., and Stillwater Central Railroad in Oklahoma City	Improve overall capacity on all railroads in Oklahoma City.	Added capacity benefits shippers and improves operating efficiency; improves reliability of Heartland Flyer passenger rail service.	TBD
Improve overall capacity on BNSF, UP, and Grainbelt Corporationin Enid.	Improve overall capacity on all railroads in Enid; lengthen or add tracks to accommodate unit trains (typically 100 to 120 cars; up to 8,000 feet clear for each track). This will allow for the efficient interchange of unit trains between Grainbelt and its Class I partners.	Added capacity benefits shippers and improves efficiency.	TBD
Improve main line capacity on KCS Railway between Shady Point and Heavener	Improve main line capacity on KCS Railway between Shady Point and Heavener by constructing passing siding(s) or a second main track.	Added capacity benefits shippers and improves efficiency.	TBD
Bridge upgrades on Northwestern Oklahoma Railroad in Woodward	Rehabilitate and/or replace structural components of bridges to accommodate 286,000-pound rail cars.	Public benefits include reduced transit times and capacity for larger freight cars; private benefits include reduced labor costs and lower operations and maintenance costs.	$1,000,000
Upgrade 0.4 mile of track on Northwestern Oklahoma Railroad in Woodward	Perform tie replacement, ballast placement, and surfacing to increase operating speeds.	Public benefits include reduced transit times and capacity for larger freight cars; private benefits include reduced crew costs and lower operations and maintenance costs.	TBD
Stillwater Central Railroad River Bridge in Oklahoma City	Add second bridge over river in Oklahoma City to provide Stillwater Central Railroad with its own river crossing.	Added capacity benefits shippers and improves efficiency.	TBD

Studies and Projects	Description	General Project Benefits	Estimated Capital Cost, if Known
Add track capacity on Stillwater Central Railroad in Oklahoma City area	Expand number and length of tracks available in Oklahoma City area to accommodate greater volumes of traffic.	Added capacity benefits shippers and improves efficiency.	TBD
Redevelop Former Gerdau Mill Site in Sand Springs	Redevelop brownfield site for potential new customers.	Enhance rail capacity and access.	$1,000,000
Construct customer-funded transload facility on Tulsa-Sapulpa Union Railway Co in Tulsa area	Develop a new transload facility in Oklahoma.	Enhance rail capacity and access.	TBD
Construct UP Washita/ Chickasha Run-Through Terminal	Construct terminal upgrades on UP at Chickasha.	Terminal improvements benefit shippers by reducing total time; private benefits include improved safety and reduced costs.	$43,000,000
Grade Separate State Route 66 / UP Crossing in Claremore	Grade separate State Route 66 and UP crossing in Claremore.	Public benefits include reduced crossing delays and safety; private benefits include reduced train delays.	TBD
Restore out of service UP track from Shawnee to McAlester	Clear vegetation, repair washouts, replace ties, and upgrade rail and bridges as necessary to return track to service.	Public benefits through new east-west service and enhanced rail access and capacity.	$39,500,000
Grade Separate BNSF and UP Crossing in Claremore	Construct a rail overpass to grade separate the UP and BNSF main lines in Claremore.	Public benefits include reduced crossing delays and safety; private benefits include reduced train delays and enhanced capacity.	$63,700,000

Source: Oklahoma DOT, Rail Programs Division

5.3 WATER CONCERNS

5.3.1 Resolve MKARNS Maintenance Backlog

As noted in Chapter 2, while the MKARNS offers strong performance and high reliability, it also faces a significant maintenance backlog. Although Oklahoma's ports have different individual plans and needs, there is agreement that the single most important priority is to preserve the safe, reliable, and productive operation of the MKARNS itself.

"Critical Work" is defined as that work required to repair a component or system for which 1) consensus is that there is a greater than 50 percent chance that the component or system will fail within 5 years, and 2) failure means stopping or significantly affecting the ability to operate the lock or maintain navigation pool. The current total of needed expenditures to address critical backlog on the MKARNS is $301.7 million systemwide, with $160.4 million of that amount on the Oklahoma segment. Rehabilitation and repair projects for Tainter gates (radial arm floodgates used to control water flows) at each of Oklahoma's five locks and dams are among the USACE MKARNS Top 30 Critical Backlog Maintenance Items for fiscal year 2024. Rehabilitation of Tainter gates and miter gates (pairs of gates which swing out from the side walls of a lock structure to control water flows) are also needed on the Arkansas segment.

The critical backlog list includes the following projects on the Oklahoma segment of the MKARNS:

- Webbers Falls Lock and Dam (Lock 16) – dewater miter gates, rehabilitate and paint Tainter gates, lighting
- Robert S. Kerr Lock and Dam (Lock 15) – rehabilitate and paint Tainter gates, analysis and repair of Tainter gate 18, spillway bridge
- Newt Graham Lock and Dam (Lock 18) – rehabilitate and paint Tainter gates, bridge bearing pad replacement
- W. D. Mayo Lock and Dam (Lock 14) – rehabilitate and paint Tainter gates
- Choteau Lock and Dam (Lock 17) – mooring cells to extend lock wall, Stillin Basin scour repair
- Multiple locations – rehabilitate Tainter valves, procure stoplogs, security and fencing

5.3.2 Implement MKARNS Deepening

As noted in Chapter 2, plans to deepen the MKARNS to 12 feet received a significant boost from the BIL, which allocated an additional $168.5 million for the USACE Little Rock District, of which $62.7 million is for operations and maintenance to provide reliable navigation and $92.6 million is for the 12-foot channel deepening project. Estimated cost to complete the deepening project is currently $1,003,314,000.

5.3.3 Address Port-Identified Needs

Interviews with Oklahoma ports were conducted to review and update the following needs identified in the previous Oklahoma Freight Transportation Plan:

- General Port Concerns:
  - The age of the waterway, at 50 years, was a concern mentioned by all participants. The age emphasizes the need for lock and dam repairs.
  - Restoration of the channel after flood events was identified as a top priority.
  - Depth of the channel and dredging were concerns of all participants. The 9-foot depth of the channel must be maintained.
- For the Tulsa Ports:
  - It was suggested that ODOT consider funding post-flood dredging to begin closer to the ports, possibly at the state line. USACE dredging must start downstream and takes

a long time to reach the Oklahoma ports. Private dredgers could be hired and reimbursed later by federal funds.

- The U.S. Corps of Engineers project to renovate 18 fixtures that allow locks and dams to dewater was emphasized.
- The port has a Foreign Trade Zone with no current users and has a strong interest in attracting users who can benefit from the designation.

- For the Port of Muskogee:
  - After the 2019 flood, the port cannot use dockside rail at the main dock. The foundation underneath is failing.
  - Mooring modernization is needed to replace every mooring structure.
- For Oakley's Port 33:
  - Completion of a planned overpass at the intersection of Hwy 412 and N 305th East Avenue, to the west of their facility in Catoosa, was identified as a top need to help reduce accidents and congestion for trucks accessing the port.
  - Lock closures that last longer than 14 days cause significant issues.
  - Parking and mooring for barges were identified as needing funding.

5.4 AIRPORT ACCESS CONCERNS

As described in Chapter 2 of this Plan, the state has three primary commercial service airports: Lawton-Fort Sill Regional in Lawton, Will Rogers World Airport in Oklahoma City, and Tulsa International in Tulsa. These airports, shown in Figure 5-5, provide air cargo service to the state.

The truck bottlenecks identified in Section 5.1.1 were reviewed to determine whether any of them affected the airports. Will Rogers World Airport is near the interchange of I-44 and I-240, which is in proximity to a bottleneck segment (see Figure 5-3 earlier in this report). In addition, on I-44 just north of the interchange is a series of bottlenecks. Trucks accessing Tulsa International Airport could be affected by bottlenecks on US-169 north of I-244 (see Figure 5-4 earlier in this report). There are no discernible bottlenecks in the vicinity of Lawton-Fort Sill Regional Airport. The nearest bottleneck is at the intersection of US-277 and I-44 about 12 miles to the south of the airport (see Figure 5-2 earlier in this report).

Figure 5-5. Major Cargo Airports in Oklahoma