HIGHLIGHTS

Table of Contents

Tables

Figures

8.0 CONSIDERATIONS FOR PROJECT PRIORITIZATION

This report documents the method for prioritization of projects for National Highway Freight Program (NHFP) funding, and offers alternative approaches to finalizing selection among projects achieving high priority. First, a multi-criteria analysis was developed and applied to evaluate all projects in the first five years of the Oklahoma Department of Transportation (ODOT) 8 Year Construction Work Plan (CWP) according to specific freight criteria. Then, the resulting ranking was used along with various management considerations to present different options for allocating the NHFP funds. This document does not provide an ultimate recommendation for the projects that should receive these funds, but instead offers guidance to ODOT for making these determinations.

In addition, this chapter reviews freight bottlenecks defined in Technical Report 7, Bottlenecks and Facility Conditions, that are not otherwise addressed in the CWP, and that are candidates for the development of improvement projects in the future.

Finally, the chapter describes innovative Intelligent Transportation System solutions employed by ODOT that improve freight operations, augment the gains from other investments, and are a necessity for contending with the technological changes transforming the transportation system locally, nationally and globally. This chapter does not present rail and waterway projects, which appear in a subsequent section.

8.1 PROJECT EVALUATION OVERVIEW

A multi-criteria analysis was used to rank projects according to how well they scored along seven freight goal areas. These goal areas considered the criteria listed in **Table 8-1**, which focused on identifying projects that are desirable from a freight perspective and that are likely to contribute toward achieving the goals and objectives of this Plan. Specific measures were selected to fit with the evaluation framework that is being used by ODOT to rank projects along broader non-freight criteria.

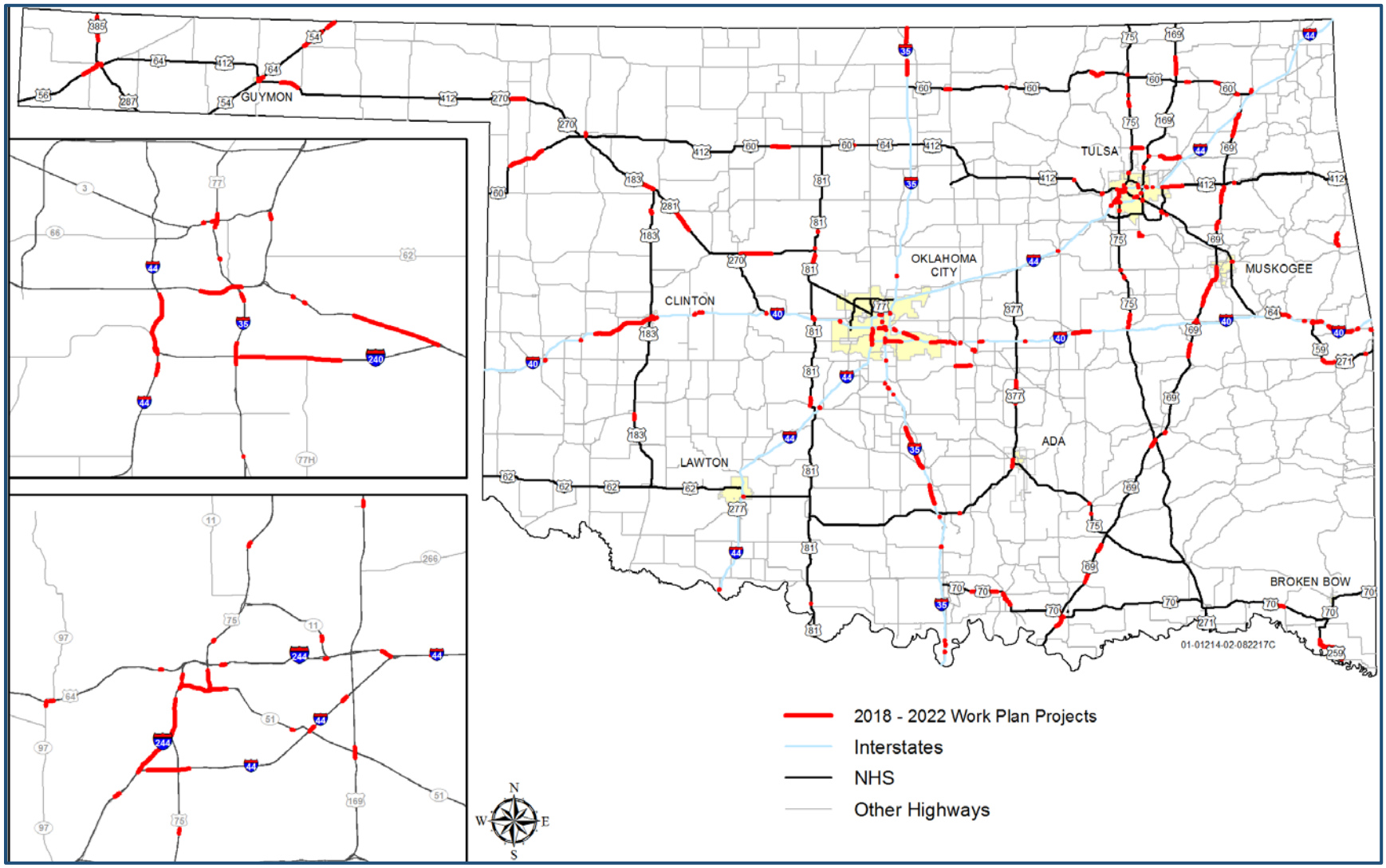
Table 8-1: Evaluation Criteria

Goal Areas	Measures	Calculation
Safety and Security	Unpaved Shoulder	Number of shoulder miles unpaved (10 feet for interstates and 4 feet for other), along the project segment
	Expected Change in Truck Crash Injuries	Crash Reduction Factor for Injuries times base injury rate (over 5 years)
	Expected Change in Truck Crash Fatalities	Crash Reduction Factor for Fatalities times base fatality rate (over 5 years)
Infrastructure Preservation	Bridges in Poor Condition	Federal measure
	Pavement Condition – International Roughness Index (IRI)	Average IRI throughout project segment
	Heavy-Loaded Truck Routes	Average volume of heavy-loaded trucks
Mobility	Identified Bottleneck	Does project segment coincide with identified bottleneck
	Truck Proportion	Average truck proportion throughout project segment
	Percent Truck Volume Increase - 2025	Average percentage increase in truck traffic in project segment (5 million tons or more)
Economic Vitality	Identified Bottleneck	Does project segment coincide with identified bottleneck?
	Proximity to Key Industry	Number of jobs in key industries within 3 miles
	Proximity to Multimodal and Military Facilities	Number of multimodal and military facilities within 75 miles
Environmental Responsibility	Proximity to Compressed Natural Gas (CNG) Stations	Number of CNG stations within 5 miles
	Proximity to Electric Vehicle (EV) fast charging stations	Number of EV fast charging stations within 5 miles
Strategic Value	Strategic Value	Grant a bonus for example to 1) corridors of regional significance; 2) for geographic balance; and 3) for transformative projects, such as preparation of roadways for vehicle-to-infrastructure technology.

Only projects in the 8 Year CWP located on the National Highway System were considered. The analysis was performed on projects scheduled during the first five years of the Work Plan (**Figure 8-1**). In total, 190 roadway and bridge projects were considered. These included:

- Improvements to grades, drainage, and surface
- Interchange improvements or additions
- Resurfacing and pavement rehabilitation
- Reconstruction within and without lane additions
- Bridge rehabilitations
- Improvement of bridge approaches

Figure 8-1: Projects Evaluated



8.2 PROJECT EVALUATION CRITERIA

8.2.1 SAFETY AND SECURITY

Improving the safety and security of roads is one of ODOT's top priorities. In following the evaluation framework, projects were scored on two measures: how they affected the incidence of crashes and the availability of paved shoulders. The incidence of crashes was quantified using Crash Reduction Factors for projects that were likely to result in safety improvements. These Crash Reduction Factors were used to calculate the decrease of injuries and fatalities over a five-year horizon resulting from project improvements. Crash totals were used instead of crash rates (per vehicle miles traveled) to give preference to projects that led to larger overall reductions in injuries and fatalities.

The presence and condition of roadway shoulders was also included because it has a substantial effect on safety. Being able to pull to the side of the road in case of accidents or mechanical issues, with ample space away from the flow of traffic, has been observed to improve safety and reduce the incidence of secondary crashes. As such, an additional measure was added that quantified the length of unpaved shoulder (which is associated with a higher safety risk) before project implementation. This measure was calculated from the Highway Performance Monitoring System (HPMS) for the state.

Measures

- Expected change in injuries over 5 years
- Expected change in fatalities over 5 years
- Unpaved shoulder mileage (10 feet for interstate, 4 feet for other)

8.2.2 INFRASTRUCTURE PRESERVATION

To preserve the state of good repair of Oklahoma's highway assets, it is important to target investments in places that are approaching the end of their useful life. Interim rehabilitation and operational improvements are also critical to maximizing infrastructure investments. In accordance with the evaluation framework, two measures were added that considered pavement and bridge condition. For bridges, a simple binary measure was used that indicated whether a bridge was in "poor" condition or not, per federal reporting guidelines. For pavement condition, a measure was used that reported the average International Roughness Index over the project segment. This data came from a detailed database of pavement condition[1] maintained by ODOT.

A third measure was included to identify routes that are extensively used by heavy-loaded trucks. These types of trucks cause a disproportionate impact on pavements because deterioration is approximately proportional to a fourth-power function of axle loads. Tracking where these trucks travel is important to target investments where they are most likely to be needed in the future. The truck traffic database TRANSEARCH was used to identify the main heavy-loaded routes in Oklahoma by focusing on shipments of bulk commodities.

Measures:

- Bridges in poor condition
- Average pavement condition - IRI
- Average yearly quantity (tonnage) of heavy-loaded trucks

8.2.3 MOBILITY

Improving traffic conditions allows trucks to complete deliveries faster and more reliably. A detailed analysis of truck speeds and unreliability throughout Oklahoma was performed in Technical Report 7 of this Plan. This analysis identified 108.6 miles of the National Highway System in the state as freight bottlenecks, where truck operations were observed from GPS data to be unreliable and experience delay. The results of this analysis are considered as a measure in the mobility goal area. Projects located on a previously identified bottleneck, or immediately adjacent to it, were given an extra point in their mobility score. The identification of bottlenecks considered where trucking activity was concentrated throughout the state.

Two other measures were also considered to complement the results of the bottleneck analysis. One of these was the forecasted growth in truck volumes out to 2025. Considering in the prioritization criteria that some roads are expected to see faster increases in truck volumes than others helps steer investments toward projects in higher demand areas. The data for this measure came from the TRANSEARCH database. Roads carrying less than 5 million tons of freight per year were excluded from this analysis to avoid reporting high percentage increases of small truck volumes.

The second complementary measure considered was the proportion of trucks in the vehicle stream. This measure was calculated using HPMS.

Measures

- Freight bottleneck identified through delay and unreliability
- Forecasted percent increase in freight volume out to 2025
- Percent of trucks on the highway

8.2.4 ECONOMIC VITALITY

Projects that improve freight movement have a direct positive economic impact on the economy. Companies would pay less to acquire inputs for production and have lower distribution costs for their finished products. This increases the size and reach of markets while improving the productivity and competitiveness of industry in Oklahoma. Some of these savings will also reach consumers in terms of cheaper retail prices.

Several criteria were introduced to capture some of these positive impacts to the regional economy. The results of the bottleneck analysis were used again since trucking bottlenecks have a significant effect on industry productivity. Using this measure twice in the evaluation underscores its importance to the freight sector.

A measure was also included to focus on key industries in Oklahoma. County Business Patterns data from the U.S. Census Bureau was used to calculate employment in certain industries within 3 miles of the projects (despite its name, this source reports business establishments by 5-digit zip code). This captures locations that are substantial generators or attractors of shipments. The industries considered were:

- Agriculture, Forestry, Fishing and Hunting (NAICS 11)
- Mining, Quarrying, and Oil and Gas Extraction (NAICS 21)
- Utilities (NAICS 22)
- Construction (NAICS 23)

- Manufacturing (NAICS 31, 32 and 33)
- Waste (NAICS 652)
- Hospitals (NAICS 622)
- Food Services (NAICS 722)

The proximity to multimodal facilities was also considered because improving access to them can have a multiplicative impact on the economy from improving regional and even national accessibility. The multimodal facilities considered were: major river ports, airports, and rail transload facilities (excluding grain elevators because they are numerous and spread out throughout the state, and therefore add no "unique" benefit to the measuring system). Important military establishments were also added as they are substantial freight users of national strategic significance.

Measures

- Freight bottleneck identified through delay and unreliability
- Number of jobs in key industries within a 3 mile
- Number of multimodal facilities and major military establishments within 75 miles

8.2.5 ENVIRONMENTAL RESPONSIBILITY

Environmental impacts were considered indirectly in the mobility measures given that reducing congestion also decreases air emissions. However, additional measures were included to raise the score of projects that improved accessibility to Compressed Natural Gas (CNG) stations or EV fast charging stations.[2]

Measures

- Number of CNG stations within 5 miles
- Number of EV fast charging stations within 5 miles

8.2.6 STRATEGIC VALUE

Certain projects are expected to have benefits that cannot be quantified by the criteria listed above. Projects can also have long-term strategic value that make them desirable from a policy point of view. A measure was added to allow the project evaluation to consider these factors that are hard to quantify. Some cases where this measure could be used include: corridors of regional significance where neighboring states are investing, balancing the priorities of rural and urban areas, and preparing roadways for emerging vehicle-to-infrastructure technology, for example. This measure was designed as an optional bonus in the project score.

Measures

- Strategic value bonus

8.3 PROJECT SCORING

The first five years of projects in the 8 Year CWP were evaluated based on the criteria listed above. A GIS database was created that collected all the relevant information for each project and an Excel workbook was developed that scored the projects and displayed results. The scoring procedure first calculated the percentile rank of each project according to each of the measures listed above, and then summed those percentile ranks using the following weights by

goal area, which reflect Freight Advisory Committee (FAC) goal priorities and were established by ODOT management:

- Safety and Security: 30%
- Infrastructure Preservation: 25%
- Mobility: 20%
- Economic Vitality: 10%
- Environmental Responsibility: 5%
- Strategic Value: 10%

The scoring approach used has several advantages relative to other approaches that could be used in a multi-criteria analysis. First, this approach does not depend on analyst input to define thresholds or individual measure weights. The scores for each of the measures is normalized to 100, where the project that had the highest values for that metric receives 100 and the lowest gets 0. Different measures within the same goal area are weighed equally. In the traditional multi-criteria analysis where measures are multiplied by analyst-defined factors, there is more latitude in affecting the relative importance of these factors and modifying the final ranking. However, a drawback of that approach is that outliers in any measure (either positive or negative) can have an undue influence on the ranking. This is not an issue in our approach as scores are naturally normalized to 100 percent.

For ranking, projects were divided into those that add capacity and those that make operational improvements. **Table 8-2** lists the top capacity projects and **Table 8-3** lists the top operational improvement projects.

Table 8-2: Top-Ranked Capacity Projects

Score	County	ODOT Division	Job Piece No.	Type	Project Description	Plan Year	Plan Cost Est. (USD)
1.20	Beckham	5	30998(04)	11: BRIDGE & APPROACHES	I-40: S.H. 6 BOTH NB & SB BRIDGES OVER I-40 IN ELK CITY	2018	$9,337,944
1.27	Grady	7	24428(05)	86: RIGHT OF WAY	U.S. 81 REALIGNMENT FROM 1 MI. N. OF THE U.S. 81/U.S. 277 JCT. S. OF CHICKASHA EXT. N. 8.63 MI. TO .85 MI. N OF THE U.S. 62/U.S. 81 JCT. (R/W)**		$11,510,000
1.06	Oklahoma	4	27905(04)	39: GRADE, DRAIN & SURFACE	I-235: NB OFFRAMP IMPROVEMENTS AT N. 23RD ST.		$500,000
1.46	Oklahoma	4	27897(04)	11: BRIDGE & APPROACHES	I-35:NB & SB OVER DEEP FORK CR SERVICE RD, 4.6 MI N OF I-40 JUNCTION		$33,000,000
1.32	Sequoyah	1	10618(07)	06: INTERCHANGE	I-40 INTERCHANGE @ U.S. 64 IN SALLISAW (BR @ U.S. 64 & LITTLE SALLISAW CR)		$25,900,000
1.14	Texas	6	14971(36)	86: RIGHT OF WAY	U.S. 54: BEG APPROX 10.5 MI N of JCT of US54/US64W and EXTEND N 3.6 MI; ROW		$800,000
1.14	Texas	6	20839(08)	07: GRADE, DRAINING, BRIDGE & SURFACE	U.S. 54; BEGIN APPROX. 8.5 MI. NORTH OF U.S. 64 & EXTEND N 2.0 MILES THROUGH TYRONE		$9,420,945
1.22	Tulsa	8	28859(04)	11: BRIDGE & APPROACHES	129TH E. AVE I-244 UNDER, 1.54 MI EAST OF JCT U.S. 169		$6,291,240
1.72	Bryan	2	31855(04)*	07: GRADE, DRAINING, BRIDGE & SURFACE	U.S. 69 BEGIN AT SOUTH END OF CALERA AND EXTEND NORTH TO U.S. 70 INTERCHANGE (FASTLANE @ $62M)	2019	$120,000,000
1.07	Pittsburg	2	14999(09)	06: INTERCHANGE	U.S. 69 CONSTRUCTION INTERCHANGE @ KINKEAD ROAD IN MCALESTER		$20,000,000
1.07	Canadian	4	30715(04)	06: INTERCHANGE	I-40: INTERCHANGE AT FRISCO ROAD, 4.5 MILES WEST OF THE KILPATRICKTURNPIKE JUNCTION.	2020	$17,360,000
0.88	Dewey	5	17671(41)	07: GRADE, DRAINING, BRIDGE & SURFACE	U.S. 270, BEGIN 0.4 MI SE OF THE S.H. 51 E JCT AND EXTEND SE 4.9 MILES.TURNKEY PROJECT (CONSTRUCT AS 4 LANE DIV & REHAB EXISTING)		$20,000,000
1.27	Grady	7	24428(06)	91: UTILITIES	U.S. 81 REALIGNMENT FROM 1 MI. N. OF THE U.S. 81/U.S. 277 JCT. S. OF CHICKASHA EXT. N. 8.63 MI. TO .85 MI. N OF THE U.S. 62/U.S. 81 JCT. (UTILITIES)		$6,300,000
1.50	Muskogee	1	27108(04)	07: GRADE, DRAINING, BRIDGE & SURFACE	U.S. 69: BEGIN 0.1 MI N OF U.S. 64 E (PEAK BLVD) & EXT N 2.5 MILES		$4,000,000
1.10	Rogers	8	27031(04)	07: GRADE, DRAINING, BRIDGE & SURFACE	S.H. 20: FROM 4 MILES EAST OF TULSA COUNTY LINE EAST TO 1 MILE EAST OF VERDIGRIS RIVER		$52,485,436

Table 8-2: Top-Ranked Capacity Projects (continued)

Score	County	ODOT Division	Job Piece No.	Type	Project Description	Plan Year	Plan Cost Est. (USD)
1.05	Custer	5	31060(04)	11: BRIDGE & APPROACHES	AIRPORT ROAD OVER I-40 LOCATED 4.3 MILES EAST OF S.H. 54 IN WEATHERFORD.	2021	$6,320,387
0.90	Dewey	5	17671(13)	39: GRADE, DRAIN & SURFACE	U.S. 270 FROM 5.4 MI SOUTH OF S.H. 51 EAST JCT & EXT SE 3.0 MILES.TURNKEY PROJECT (CONSTRUCT AS 4 LANE DIV & REHAB EXISTING)		$14,170,000
1.62	Oklahoma	4	26422(05)	82: RECONSTRUCT-ADDED LANES	I-40: FROM MI MARKER 171 EAST TO MI MARKER 173 (RECONSTRUCT & ADD LANES & RECONSTRUCT, HARRAH/NEWALLA INTERCHANGE		$20,600,000
0.93	Rogers	8	26242(04)	07: GRADE, DRAINING, BRIDGE & SURFACE	S.H. 20 / S.H. 66 CONNECTION		$32,700,000
1.03	McClain	3	19314(04)	06: INTERCHANGE	I-35/S.H. 9 INTERCHANGE (PHASE III)	2022	$7,175,000
0.89	Oklahoma	4	29843(04)	11: BRIDGE & APPROACHES	I-35: NB & SB BRIDGES OVER WATERLOO ROAD AT LOGAN C/L		$28,000,000
1.39	Oklahoma	4	29844(04)	11: BRIDGE & APPROACHES	I-35: NB & SB BRIDGES OVER 63RD STREET 5.0 MIS. N. OF I-40 INCLUDING RECONFIGURATION OF I-35/I-44 INTERCHANGE TO ACCOMODATE BRIDGES		$33,000,000
1.18	Pottawatomie	3	21007(07)	82: RECONSTRUCT-ADDED LANES	I-40: FROM OKLAHOMA C/L, EAST 5.0 MI TO S.H. 102S (MP172.89 TO MP 177.89)		$16,000,000
0.79	Rogers	8	31093(04)	25: INTERSECT MODIF	U.S. 412 ADD J-TURNS AT 265TH E AVE & 289TH E AVE. APPROX. 2.8 MI & 4.3 MI EAST OF I 44 JCT		$250,000
1.12	Tulsa	8	29694(04)	11: BRIDGE & APPROACHES	UNION AVE OVER I-44, 1.6 MILES EAST OF S.H. 66		$10,550,458
						Total	**$505,671,410**

*Project has been awarded a FASTLANE Grant

Table 8-3: Top-Ranked Operational Improvement Projects

Score	County	ODOT Division	Job Piece No.	Type	Project Description	Plan Year	Plan Cost Est. (USD)
1.57	Oklahoma	4	28855(04)	15: BRIDGE REHABILITATION	I-44: EB, WB & ON-RAMP BRIDGES OVER DEEP FORK CREEK 6.7 MIS. N. OF I-40	2018	$4,000,000
1.32	Oklahoma	4	30444(06)	21: WIDEN & RESURFACE	I-35: ADD CAPACITY TO EXISTING BRIDGES AT I-35/I-40 INTERCHANGE - INTERIM IMPROVEMENT		$5,000,000
1.47	Okmulgee	1	29673(04)	11: BRIDGE & APPROACHES	U.S. 75: BRIDGES OVER KO & G R.R. (ABANDONED RR), 1.2 MILES NORTH OF I-40		$4,714,251
1.28	Sequoyah	1	28961(04)	11: BRIDGE & APPROACHES	I-40: BRIDGE OVER CO. RD. (OLD U.S. 64) & KCS R.R., 1.40 MI. E. OF JCT. U.S. 59		$10,890,190
1.27	Tulsa	8	28881(04)	15: BRIDGE REHABILITATION	I-444 OVER 11TH AND 6TH STREET, .3 MILE NORTH OF S.H. 51		$4,200,000
1.31	Tulsa	8	28900(04)	76: PAVEMENT REHABILITATION	I-444 FROM ARKANSAS RIVER EXTEND EAST APROX. 1.68 MILES (SOUTH LEG OF THE IDL)		$20,500,000
1.20	Washita	5	29003(04)	11: BRIDGE & APPROACHES	I-40 NORTH FRONTAGE ROAD: BRIDGE AND APPROACHES OVER SAND CREEKLOCATED 0.11 MILE EAST OF S.H. 44.		$742,630
1.36	Canadian	4	27004(04)	11: BRIDGE & APPROACHES	I-40B: OVER THE UP RAILROAD ON THE SOUTH EDGE OF EL RENO	2019	$7,575,000
1.46	Oklahoma	4	31019(04)	15: BRIDGE REHABILITATION	I-44: NB AND SB BRIDGE REHABILITATION OVER S.59TH ST, 0.75 MILES SOUTH OF THE S.H. 152 JCT		$1,515,000
1.51	Oklahoma	4	31006(04)	76: PAVEMENT REHABILITATION	I-44: DOWEL BAR RETROFIT AND DIAMOND GRINDING FROM SW 74TH ST, NORTH TO OKLAHOMA RIVER, ADDED LANE ON SB FROM 0.5 SOUTH OF SW74TH ST		$10,100,000
1.30	Oklahoma	4	9033(11)	07: GRADE, DRAINING, BRIDGE & SURFACE	I-235: NB TO WB & EB TO NB FLYOVER BRIDGES I-235/I-44 INTERCHANGE (SEGMENT 2B)		$35,350,000
1.56	Oklahoma	4	9033(27)	07: GRADE, DRAINING, BRIDGE & SURFACE	I-235: MAINLINE THRU I-44 INTERCHANGE (SEGMENT 8)		$45,450,000
1.14	Texas	6	14971(37)	91: UTILITIES	U.S. 54: BEG APPROX 10.5 MI N of JCT of US54/US64W and EXTEND N 3.6 MI; UT		$370,000
1.14	Texas	6	14971(41)	18: RESURFACE	U.S. 54: BEG APPROX 10.5 MI N of JCT of U.S. 54/U.S. 64W and EXTEND N 3.6 MI; (SURFACE FOR SB LANES)		$3,000,000

Table 8-3: Top-Ranked Operational Improvement Projects (continued)

Score	County	ODOT Division	Job Piece No.	Type	Project Description	Plan Year	Plan Cost Est. (USD)
1.35	Garvin	3	20970(08)	83: RECONSTRUCT-NO ADDED LANES	I-35: FROM S.H. 19, NORTH 3.21 MI	2020	$15,548,850
1.40	Muskogee	1	31211(04)	76: PAVEMENT REHABILITATION	U.S. 69: NORTHBOUND - FROM 4.5 MI. N. OF MUSKOGEE C/L N. 8.5 MI., SOUTHBOUND - FROM 8.5 MI. N OF MUSKOGEE C/L N. 4.5 MI.		$6,000,000
1.26	Oklahoma	4	9032(05)	06: INTERCHANGE	I-35: OVER THE I-240 JCT. RECONSTR INTERCHANGE (PHASE IB)		$12,240,000
1.27	Oklahoma	4	9033(28)	07: GRADE, DRAINING, BRIDGE & SURFACE	I-44: WB TO NB RAMPS AT I-44/I-235 INTERCHANGE (SEGMENT 3A)		$15,810,000
1.25	Texas	6	20947(04)	03: GRADE & DRAIN	U.S. 54 FROM 4.8 MI. N of U.S. 64 EXTEND N 3.7 MI, GRADE, DRAIN		$3,250,000
1.22	Oklahoma	4	9032(07)	06: INTERCHANGE	I-35 @ THE I-240 JCT (PHASE III) RECONST INTERCHG.	2021	$16,480,000
1.22	Oklahoma	4	9032(06)	06: INTERCHANGE	I-35: OVER THE I-240 JCT. (PHASE II) RECONST INTERCHG.		$24,720,000
1.22	Oklahoma	4	9032(08)	06: INTERCHANGE	I-35 @ THE I-240 JCT (PHASE IV) RECONST INTERCHG		$31,930,000
1.25	Texas	6	20947(08)	42: R/R CROSSING SURF	U.S. 54 FROM 4.8 MI. N of U.S. 64 EXTEND N 3.7 MI, RR		$139,400
1.25	Texas	6	20947(07)	16: SURFACE	U.S. 54 FROM 4.8 MI. N of U.S. 64, EXTEND N 3.7 MI; SURFACE		$9,310,000
1.46	Canadian	4	27959(04)	11: BRIDGE & APPROACHES	U.S. 281 SPUR: BRIDGE OVER I-40 4.1 MIS. E. OF THE CADDO C/L	2022	$4,000,000
1.34	Oklahoma	4	31013(06)	76: PAVEMENT REHABILITATION	I-240: DIAMOND GRINDING FROM 0.15 MILE EAST OF I-35, EXTEND WEST 5.75 MILES TO THE WEST SIDE OF AIR DEPOT		$1,500,000
1.45	Oklahoma	4	31018(04)	15: BRIDGE REHABILITATION	I-44: BRIDGE REHABILITATION OVER I-240, 1.3 MILES NORTH OF THECLEVELAND COUNTY LINE INCL. RAMP AND NB MAINLINE		$3,030,000
1.14	Texas	6	14971(35)	03: GRADE & DRAIN	U.S. 54: BEG APPROX 10.5 MI N of JCT of U.S. 54/U.S. 64W and EXTEND N 3.6 MI; GR, DR, SURF		$2,490,000
1.14	Texas	6	14971(42)	16: SURFACE	U.S. 54: BEG APPROX 10.5 MI N of JCT of U.S. 54/U.S. 64W and EXTEND N 3.6 MI; SURF.		$11,130,000
						Total	**$310,985,321**

8.4 PROJECT SELECTION ALTERNATIVES

This section provided guidance on how to select projects for NHFP funding. Candidate projects were the 54 top-rated projects eligible for NHFP funding, taken from the first five years of the Oklahoma DOT 8 Year CWP.[3] Because projects considered were in the CWP, the purpose was not to consider what projects would be funded in general, but specifically for which projects should the NHFP funds be applied. If NHFP funding was not applied to a given project, it was assumed that project would be funded through other sources. Project selection also could serve to highlight those projects that were particularly well suited to freight. With one exception, this section did not recommend specific projects for selection; rather, it outlined a number of approaches ODOT management could use to make that selection.

The costs of the 54 top projects total $816.7 million. No more than 80 percent of costs can be covered from NHFP funds, and one project (in Bryan County, explained below) is subject to further limits. The maximum costs eligible for funding thus total $591.3 million, which is nearly six times the approximately $101 million in NHFP funds available. As such, application of these funds must be prioritized.

The top-rated capacity-enhancing project has been awarded a FASTLANE grant. This is an improvement to a four-mile segment of US 69/75 in Bryan County, which removes a bottleneck by making the segment fully access controlled, with grade separations and functional frontage roads. Existing corridor sections to the north and south are already access controlled, but the four-mile segment currently is not. As the top-rated project, situated on a high freight volume rural corridor and having a grant-related ODOT commitment, this was the one project the Plan recommended to receive freight program funds regardless of the approach taken with others. The total cost of this project is $120 million, but after the grant and required state match is considered, the level of NHFP dollars applied may not exceed $34 million.

The expected timing of the 54 top-rated freight projects in the first five years of the Work Plan is shown in **Table 8-4**. The estimated cost varies significantly by year from a low of $117 million in FY2022 to high of $243 million in FY2019. The higher cost in FY2019 is primarily associated with the $120 million US 69/75 Bryan County project, of which $62 million will be funded through the FASTLANE grant. The total cost for FY2019 after subtracting the FASTLANE grant is $181 million.

Table 8-4: Five-Year Freight Projects and Costs

Draft Work Plan Year	Capacity Projects	Operational Projects	Total
Number of Projects			
FFY2018	8	7	15
FFY2019	2	7	9
FFY2020	5	5	10
FFY2021	4	5	9
FFY2022	6	5	11
Total	**25**	**29**	**54**
Draft Work Plan Cost			
FFY2018	$96,760,129	$50,047,071	$146,807,200
FFY2019	$140,000,000	$103,360,000	$243,360,000
FFY2020	$100,145,436	$52,848,850	$152,994,286
FFY2021	$73,790,387	$82,579,400	$156,369,787
FFY2022	$94,975,458	$22,150,000	$117,125,458
Total	**$505,671,410**	**$310,985,321**	**$816,656,731**

Following are alternative methodologies for the allocation of FAST LANE funding for Oklahoma's freight projects. In each case, the allocations could be no more than the maximum amounts allowed for each project, and could be less according to the method considered. ODOT management could adopt one of these methods or a hybrid, it could adjust allocations for individual projects, or it could simply use these approaches to help think through their decision. The alternatives are:

- Level annual funding
- Corridor focus
- Geographic diversification
- Highest scoring
- Stakeholder priorities
- Large project or small project concentration
- Designation of Critical Rural Freight Corridors

8.4.1 LEVEL ANNUAL FUNDING

One alternative for project selection was to spread NHFP funding evenly across five years, selecting the highest ranked projects of each year. Because the total NHFP funding is $101 million, each year projects would receive $20 million from this source. Because the costs of projects differ significantly, NHFP funds in one year might cover a portion of a project, while in other years, this source might cover multiple projects to the maximum allowable share of 80 percent per project.

8.4.2 CORRIDORS

Project selection could focus on corridors to leverage synergies and increase mobility and accessibility benefits of investments. Several corridors identified previously in the Plan as being of strategic importance included multiple highly rated projects. Most of the 54 projects were along the interstate corridors that pass through Oklahoma, including I-35, I-40, and I-44. Other projects were on the U.S. 69/U.S. 75 corridor, U.S. 54, U.S. 81 and a smattering of additional roadways. One approach could be to allocate funding evenly between major corridors, then select the highest ranked projects for each corridor until its allocation is used up.

8.4.3 DIVERSITY

Project selection could spread investment among Oklahoma DOT divisions, or cover different improvement types. For example, Grade Drainage, Bridge and Surface projects account for the largest cost among capacity-enhancing projects, and Pavement Resurface projects have the highest share among non-capacity-enhancing projects. Oklahoma DOT could decide to split funding evenly across project types, or the state could want to emphasize certain projects types over others.

Alternately, in the interest of geographic diversity, the state could choose to allocate projects as evenly as possible by Oklahoma DOT division.

8.4.4 LEADING SCORERS

Projects could be selected purely based on score. For example, the top five capacity and operational improvement projects could be selected. To prevent large projects from absorbing all available NHFP funding, they could be partially funded through the NHFP, so that other projects among the top five could be receive such funds as well.

An alternate approach could be to select projects by certain criteria. For example, if ODOT wished to emphasize safety and economic vitality, the top projects with those implications could be selected.

8.4.5 STAKEHOLDER INPUT

Project selection could incorporate the priorities of the division offices throughout the state. Division engineers had identified a set of projects that they believed would benefit freight dependent businesses in their divisions. Several of the identified projects are the same as or overlap with the 54 top-ranked freight projects that provide the pool of potential NHFP projects in this chapter. Funds could be divided to support all or a portion of these projects.

8.4.6 PROJECT SIZE

Targeting of federal freight funds could focus on partially funding a limited number of large projects or funding a larger number of small projects. The latter could have the additional benefit of spreading funding across divisions, since most ODOT divisions are represented among the smaller projects. Alternately, ODOT could choose to concentrate freight investment by dividing funds among the largest projects and satisfying all or much of their needs.

8.4.7 CRITICAL RURAL FREIGHT CORRIDORS

Oklahoma DOT could want to consider the location of freight projects when establishing Critical Rural Freight Corridors (CRFC), since this in turn affects the eligibility of projects for use of NHFP funds. The majority of the 54 top-ranked projects considered in this section are on interstate highways, but 22 are on non-interstate facilities eligible for designation as CRFCs. ODOT could select projects in order to confer CRFC designation on certain facilities; conversely, any projects selected on non-interstate rural facilities requires CRFC route designation in order to receive program funds.

8.5 PROJECT GAPS

The analysis described in Technical Report 7 identified 153 roadway segments as bottlenecks, totaling 108.6 miles of the National Highway System in the state. This analysis looked at GPS data showing how fast and reliably trucks travel throughout the state, in order to identify roads with performance issues. For a road to be identified as a bottleneck, it had to place in the top 5 percent of roadway segments in terms of delay or unreliability. Therefore, these are the places in Oklahoma's roadway network that are causing the most chokepoints in the movement of freight by truck.

Of these identified bottlenecks, only 25 did not have a project associated with that location in the first five years of the CWP. These locations are listed in **Table 8-5** and marked as red in **Figure 8-2**. The Traffic Management Channel (TMC, indicating location) codes can be used to pinpoint these segments in the National Performance Management Research Data Set network. Ten of them are located on interstates; others appear on routes eligible for designation as CRFCs. Eleven bottlenecks are in Oklahoma County and five in Tulsa County. The map in **Figure 8-2** shows cutouts of these two urban locations.

Different options should be assessed by Oklahoma DOT for resolving the traffic issues occurring at these 25 bottleneck locations. An engineering analysis is required to assess the causes behind the performance issues observed from GPS data, and to develop feasible solutions for resolving these issues. It is possible that solutions are too expensive or are infeasible (which would help explain why there are not associated projects in the Work Plan), although this is a determination that can only be made after looking into each location individually. Viable projects arising from engineering analysis would become candidates for the next annual iteration of the CWP.

Figure 8-2: Bottleneck Locations Without Project

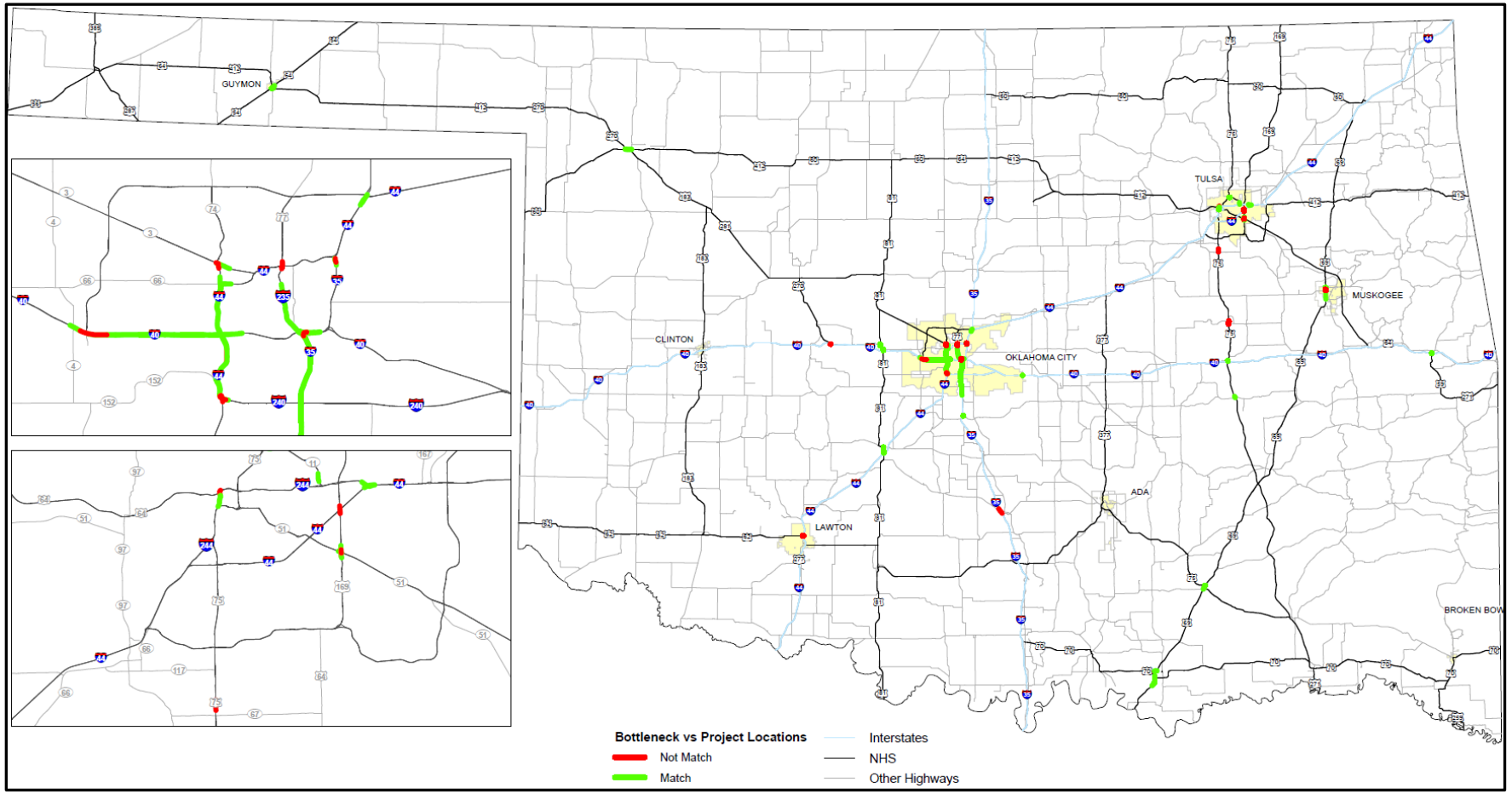


Table 8-5: Bottleneck Locations without Project

TMC	Type of Roads	Road	County
111N07741	Other Highway	U.S. 69	Atoka
111P05404	Interstates	I-40	Canadian
111P11938	Interstate, U.S. Highway	I-40/U.S. 281 spur	
111P11780	Other Highway	U.S. 62	Comanche
111P05502	Interstates	I-35	Garvin
111P09177	Other Highway	U.S. 62	Muskogee
111N04916	Interstates	I-35	Oklahoma
111N05129	Interstates	I-44	
111N05200	Interstates	I-235	
111N05201	Other Highway	U.S. 77	
111P04928	Interstates	I-35	
111P04929	Interstates	I-35/I-40	
111P05171	Interstates	I-240	
111P05200	Interstates	I-235	
111P06710	Other Highway	OK-3	
111P18697	Interstate	I-44	
111P18871	Interstates	I-235/I-40/I-35	
111P08737	Other Highway	U.S. 75	Okmulgee
111N07088	Other Highway	U.S. 412	Texas
111N08591	Other Highway	U.S. 54	
111N05012	Interstates	I-244	Tulsa
111N05034	Other Highway	U.S. 64	
111P05219	Other Highway	U.S. 169	
111P05223	Other Highway	U.S. 169	
111P08745	Other Highway	U.S. 75	

8.6 INNOVATIVE OPERATIONAL AND INTELLIGENT TRANSPORTATION SYSTEMS SOLUTIONS

The ODOT Intelligent Transportation Systems (ITS) program is part of the ODOT Maintenance Division. It currently employs and maintains a number of technologies that benefit freight and plans to increase its efforts. This program works in parallel with the projects identified in the previous section to improve the operations of the state's roadways. Improvements will benefit freight considerably under the evaluation criteria listed in **Table 8-1**, particularly safety and security, mobility and economic vitality.

ODOT manages 2,600 linear miles of fiber optics and has 64 Dynamic Message Signs (DMS) installed statewide. While these ITS technologies help trucks along with general traffic, ODOT has freight specific applications.

For example, ODOT is adding permanent full-size DMS in both directions near the Ports of Entry (POE) around the state. Currently, there are 14 signs as well as Closed Circuit Television (CCTV) poles at each entry with web cameras and Pan-Tilt Zoom cameras. The POE will be able to view and control the cameras.

ODOT is expanding the Land Mobile Radio (LMR) system to be statewide on a mesh network of Multiprotocol Label Switching equipment. LMR, also called public land mobile radio or private land mobile radio, is a wireless communications system intended for use in vehicles or on foot. Such systems are used by emergency first responder organizations such as police, fire, and ambulance services, public works and highway maintenance crews. In terms of traffic incident management, ODOT is replacing its static, public facing map with one that will report the latest road and weather conditions in real-time.[4]

The Road Weather Information System (RWIS) expansion project will add 16 new sites at critical bridges along I-35 border to border in addition to the six current sites. The RWIS provides pavement, bridge deck and subsurface temperatures, moisture and air temperatures. This data will be available to field divisions to inform decisions about deployment of roadway maintenance personnel. In addition to being more efficient, it will improve roadway operations and safety, a significant factor for trucking.[5]

ODOT has a contract with universities in the state for various ITS projects. One project involves installation of Bluetooth sensors along I-35, I-44 and in the Oklahoma City and Tulsa metropolitan areas. As a result of the data collected, ODOT will be able to extract commercial motor vehicle origin and destination (O-D) information. Another demonstration project on vehicle signatures will investigate using inductive loop detectors to develop computer recognition of vehicle classification. Signatures are capable of distinguishing dozens of truck types, many of them characteristic of particular industry and commodity groups. They are thus able to improve ODOT's real-time visibility into how industry is using roadway infrastructure and how it is affected by performance challenges such as bottlenecks. Another effort will test on-board and roadside units in order to monitor vehicle-to-infrastructure communications in newer vehicles.

Technologies of these kinds are part of the first wave of applications likely to come from the revolution in transportation represented by connected and autonomous vehicles. Federal Highway Administration today is testing in Texas a smartphone 'app' that calculates for truck drivers and dispatchers the buffer time they need to navigate construction work zones based on immediate conditions. Separately, a commercial vendor is offering an inexpensive retrofit that enables two manned trucks to travel together safely with the headway between them shortened enough to achieve significant improvements in fuel efficiency from air drafting. This is clearly a step toward truck platooning in what amounts to a phased strategy to develop experience and acceptance. More developments in this vein must be expected: the gains in freight operational efficiency are substantial and the technology is well beyond the conceptual stage. ODOT's current programs exist in an expanding envelope and are a foundation which is of interest to the freight and logistics industry.

8.7 CONCLUSIONS

The results of the project prioritization analysis set forth in this chapter can be used to inform multiple freight planning processes and activities. One of the main uses of this analysis is to assist allocation of funds from the NHFP. Funds available through this program would be targeted according to freight goals and priorities articulated in this freight plan. Projects in the first 5 years of the Oklahoma CWP were ranked based on these freight criteria:

- Safety and Security
- Infrastructure Preservation
- Mobility
- Economic Vitality
- Environmental Responsibility
- Strategic Value

Because projects considered are in the CWP, the purpose is not to consider what projects will be funded in general, but specifically which projects merit NHFP funds. If NHFP funding is not applied to a given project, it is assumed that project will be funded through other sources.

Project selection also highlights those projects that are particularly well suited for freight. The use of freight specific criteria in the prioritization process ensures that resources are being allocated to improve freight movement. In addition to helping designate NHFP, this helps organize projects within the larger work plan, so that Oklahoma DOT advances projects with freight benefits.

Endnotes

[1] Pavement Management Branch maintains the pavement management system.
[2] See http://www.fhwa.dot.gpv/environment/alternative fuel corridors/ for information on access to CNG and Electric Vehicle fast-charge stations in Oklahoma.
[3] During the Oklahoma Freight Transportation Plan development, the applicable work plan was the 8 Year Construction Work Plan: 2017-2014. The projects for the years 2018-2022, the first five years of the OFTP, were subject to the evaluation.
[4] Currently available at OKroads.org http://ok.maps.arcgis.com/apps/Viewer/index.html?appid=023e821ebf7b4acd999ccfd58d92c3da
[5] ODOT is considering reducing the number sites initially and contracting for weather prediction service in order to compare the two sources and determine the most efficient method.