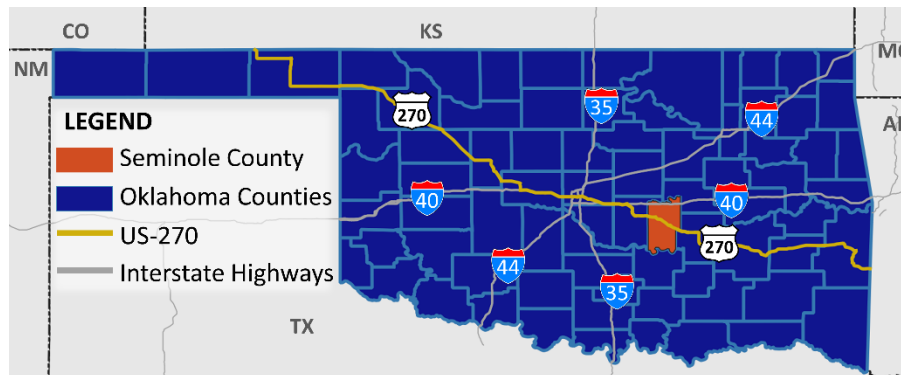




## Application for the Competitive Highway Bridge Program – Seminole County

Project Name	Oklahoma, Seminole County US-270 Bundled Bridge Project
State Priority Ranking (maximum of 3)	2 of 3
Previously Incurred Project Eligible Costs	\$1,851,883
Future Eligible Project Costs	\$13,121,550
Total Project Cost	\$14,973,433
Program Grant Request Amount	\$6,812,584
Federal (DOT) Funding including Program Funds Requested	\$8,984,050

### Location of Seminole County, Oklahoma



**National Bridge Inventory (NBI) numbers of bridges:** 10053, 12934, 12980, 13079, 13653, 13783, 13925

This application was submitted by the Oklahoma Department of Transportation to Grants.gov at <http://www.grants.gov> on December 4, 2018



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# Project Narrative

## PROJECT DESCRIPTION

### CONCISE DESCRIPTION

The Oklahoma Department of Transportation (ODOT) proposes to utilize grant funding from the Competitive Highway Bridge Program for bridge bundling to improve a series of seven bridges along a crucial stretch of US-270 in Seminole County. The seven-bridge package will be referred to hereafter as the US-270 Bundled Bridge Project. With receipt of grant funding for the seven bridges included in the US-270 Bundled Bridge Project, ODOT commits to fully fund the remainder of the US-270 corridor project that has been planned and needed for at least 15 years.

US-270 in Seminole County is part of a statewide diagonal route that extends from the Oklahoma panhandle through Oklahoma City to southeast Oklahoma. The US-270 corridor from Seminole to just west of Wewoka has experienced increased traffic volumes over the years and has a history of numerous crashes. ODOT has recognized the issues along the corridor, and in 2003 began efforts to widen and improve the corridor by including it in ODOT's Eight Year Construction Work Plan. The corridor widening and improvement project will be referred to hereafter as the Corridor Project.

The Corridor Project extents anticipated by ODOT are on US-270 in Seminole County from the junction at SH-270A in Seminole, east to the "Y" at US-270B west of Wewoka. Included in the original (prior to development of the US-270 Bundled Bridge Project) Corridor Project extents were the seven bridges that are the subject of this application, and proposed roadway widening improvements. (There are four other structures that will be addressed in the updated Corridor Project – two will be removed and two will be downsized to less than 20 feet in length.) The existing roadway has two 12-foot-wide driving lanes with 10-foot-wide paved shoulders. Proposed improvements to US-270 for the Corridor Project include expanding and widening the existing two-lane road to four lanes, 12-foot-wide driving lanes with 10-foot-wide shoulders on the existing and off-set alignments alternating to the north and south. The off-set alignment was chosen instead of a symmetrical widening in order to maintain through traffic during construction. The Union Pacific Railroad is located parallel to US-270 on the south side. A 16-foot-wide paved center median will be constructed from the SH-270A junction extending east approximately 3.25 miles. The remaining improvement will be a four-lane undivided open section with 12-foot lanes and 10-foot shoulders. County road intersections with poor geometry will be improved, and left turn lanes will be added as warranted.



The seven bridges within the grant application for the US-270 Bundled Bridge Project are distributed across the length of the seven-mile Corridor Project. The total US-270 Bundled Bridge Project cost is \$14.97 million; the application seeks \$6.81 million in grant funds.

The Corridor Project is intended to accommodate increasing traffic volumes and to address the current geometric and capacity deficiencies along the existing facility. The project's purpose is to provide improved efficiency and safety for the US-270 corridor. A Documented Categorical Exclusion (DCE) for the project (including highway and bridge improvements) was signed by the Federal Highway Administration (FHWA) on September 20, 2017.

## **ANTICIPATED TRANSPORTATION CHALLENGES**

As is typically the case with transportation projects, local landowners and business owners have expressed concern regarding the upcoming project. Apprehension was expressed at a public meeting for the project regarding achieving adequate traffic safety goals, displacing or disrupting local businesses and residents, and receiving sufficient compensation for the costs of relocation and right-of-way acquisition. Most concerns were related to the construction phase of the project and how traffic would be affected.

Traffic safety and increased volumes over time represent challenges across the spectrum of all transportation projects. Safety is at the forefront of concern and consideration as all transportation officials at every level strive to improve safety.

## **Transportation Challenges Addressed**

All individuals that expressed concern during the environmental clearance process regarding displacements, sufficient compensation for relocation, and right-of-way acquisition were contacted by ODOT right-of-way service providers. Each individual was provided with information regarding the right-of-way acquisition process, including relocation efforts, and was assured that determinations regarding specifics for each case would occur in the negotiation and acquisition phase.

Regarding traffic safety and the handling of traffic during construction, ODOT takes into consideration the impact of road closures and detours on the traveling public and businesses located along and near a transportation project. Due to the characteristics of the corridor and the need for continued service, an off-set alignment was chosen instead of a symmetrical widening to allow through traffic during construction. Construction traffic control signage and traffic shifts will follow the guidance of the Manual of Uniform Traffic Control Devices as well as ODOT standard practices to ensure the safety of the traveling public. As a result of these efforts and commitments, traffic will be able to utilize the corridor throughout the duration of construction, with access provided to all adjacent properties.

Traffic safety will be enhanced with this project by the addition of left turn lanes, geometric improvements, and improvements to vertical and horizontal sight distance. Roadway expansion and geometric improvement will facilitate increased traffic volumes.



## LIST OF BRIDGES

Below is a summary of the bridges to be bundled as part of the US-270 Bundled Bridge Project. Information was obtained from ODOT's bridge inspection reports. More detailed information for each bridge can also be found in **Table 1**.

- US-270 over Carter Creek – NBI number 13079, Structure number 6702 0402 X

Located 1.7 miles east of SH-3, this bridge was built in 1953 and is a structure with six 25' concrete slab spans and two 18' safety curbs. The bridge has a 31' approximate deck width to accommodate a 28' clear roadway. Current Annual Average Daily Traffic (AADT) is 6,500, and Annual Average Daily Truck Traffic (AADTT) is 780. This bridge is considered Structurally Deficient and is proposed to be replaced.

The deck is rated Poor, the superstructure rated Fair, and the substructure rated Poor. This bridge has a Sufficiency Rating of 30.2 and a Health Index of 80.3.

- US-270 over Unnamed Creek – NBI number 10053, Structure number 6702 0419 X

This bridge is located 1.9 miles east of SH-3 and was built in 1943. It has three culvert barrels of dimensions 10'x11'x44' constructed as a reinforced concrete box with parapets (safety barriers installed at the edge of a bridge). The bridge has a 44' approximate deck width to accommodate a 44' clear roadway. Current AADT is 6,500, and AADTT is 780. This bridge is considered Structurally Deficient and is proposed to be replaced. The bridge has a Sufficiency Rating of 62.0 and a Health Index of 82.6.

- US-270 over Unnamed Creek – NBI number 12934, Structure number 6702 0543 X

Located 3.2 miles east of SH-3, this bridge was built in 1953. It has two culvert barrels of dimensions 10'x10'x44' constructed as a reinforced concrete box skewed 45 degrees with parapets. The bridge has a 44' approximate deck width to accommodate a 44' clear roadway. Current AADT is 6,300, and AADTT is 760. This bridge is considered Not Deficient and is proposed to be replaced. The bridge has a Sufficiency Rating of 84.3 and a Health Index of 75.0.

- US-270 over Unnamed Creek – NBI number 12980, Structure number 6702 0707 X

Located 4.9 miles east of SH-3, this bridge was built in 1953. It has three culvert barrels of dimensions (12'-14'-12') x14'x52' constructed as a reinforced concrete box. The bridge has a 44' approximate deck width to accommodate a 44' clear roadway. Current AADT is 6,300, and AADTT is 760. This bridge is considered Not Deficient and is proposed to be rehabilitated. The bridge has a Sufficiency Rating of 94.9 and a Health Index of 97.4.

- US-270 over Union Pacific Railroad – NBI number 13653, Structure number 6702 0880 X

Located 6.6 miles southeast of SH-3, this bridge was built in 1956. It is a 45'-50'-45' I-beam span structure skewed 60 degrees with two 18' safety curbs. The bridge has a 31' approximate deck width to accommodate a 28' clear roadway. Current AADT is 6,000, and AADTT is 720. This bridge is considered Structurally Deficient and is proposed to be replaced.

The deck is rated Poor, the superstructure rated Satisfactory, and the substructure rated Fair. This bridge has a Sufficiency Rating of 59.7 and a Health Index of 77.9.

- US-270 over Wewoka Creek – NBI number 13925, Structure number 6702 0894 X

Located 6.7 miles southeast of SH-3, this bridge was built in 1957. It is a 4-100' continuous I-beam span structure with two 18' safety curbs. The bridge has a 31' approximate deck width to



## Seven Bridges, US-270 Seminole County, Oklahoma








accommodate a 28' clear roadway. Current AADT is 6,000, and AADTT is 720. This bridge is considered Structurally Deficient and is proposed to be replaced.

Data from inspection reports indicate the deck is rated Poor, the superstructure rated Fair, and the substructure rated Fair. This bridge has a Sufficiency Rating of 58.1. Health Index is 64.4.

- US-270 over Unnamed Creek – NBI number 13783, Structure number 6702 1082 X

Located 8.5 miles southeast of SH-3, this bridge was built in 1957 and is a (13'-17'-13') x14'x44' roadway constructed of a reinforced concrete box with parapets and 4' curtain walls. The bridge has a 44' approximate deck width to accommodate a 44' clear roadway. Current AADT is 6,000, and AADTT is 720. This bridge is considered Not Deficient and is proposed to be rehabilitated. The bridge has a Sufficiency Rating of 98.3 and a Health Index of 90.3.

Table 1: Bridge Inventory Data

	NBI Number	Structure No.	Facility Carried	Load Posting Information	Functional Classification	AADT	AADTT	Work Planned
	13079	6702 0402 X	US-270 over Carter Creek, located 1.7 miles East of SH-3	4 M 18 (H 20)	14 Urban Other Princ	6,500	780	Replacement
	10053	6702 0419 X	US-270 over Unnamed Creek, located 1.9 miles East of SH-3	4 M 18 (H 20)	14 Urban Other Princ	6,500	780	Replacement
	12934	6702 0543 X	US-270 over Unnamed Creek, located 3.2 miles East of SH-3	5 MS 18 (HS 20)	06 Rural Minor Arterial	6,300	760	Replacement
	12980	6702 0707 X	US-270 over Unnamed Creek, located 4.9 miles East of SH-3	5 MS 18 (HS 20)	06 Rural Minor Arterial	6,300	760	Rehabilitation
	13653	6702 0880 X	US-270 over Union Pacific Railroad, located 6.6 miles Southeast of SH-3	4 M 18 (H 20)	06 Rural Minor Arterial	6,000	720	Replacement
	13925	6702 0894 X	US-270 over Wewoka Creek, located 6.7 miles Southeast of SH-3	M 18 (H 20)	06 Rural Minor Arterial	6,000	720	Replacement
	13783	6702 1082 X	US-270 over Unnamed Creek, located 8.5 miles Southeast of SH-3	5 MS 18 (HS 20)	06 Rural Minor Arterial	6,000	720	Rehabilitation

Note: Under “Load Posting Information,” the codes including ‘M’ refer to metric loading, and the codes including ‘H’ refer to English equivalents. The codes can be interpreted as follows. ‘H20’ refers to a single-unit truck with Gross Vehicle Weight (GVW) equal to 20 tons defined by AASHTO as a design live load for load factor design and allowable stress design of highway bridges. ‘HS20’ refers to a tractor plus semi-trailer combination vehicle with GVW equal to 36 tons defined by AASHTO as a design live load for load factor design and allowable stress design of highway bridges.





## PROJECT LOCATION

### DETAILED DESCRIPTION OF LOCATION

The project extent is on US-270 in Seminole County from the junction at SH-270A in Seminole, east to the “Y” at US-270B west of Wewoka, and includes bridges over Wewoka Creek, tracks owned by the Union Pacific Railroad, Carter Creek, and four unnamed creeks. The existing roadway has two 12-foot-wide driving lanes with 10-foot-wide paved shoulders. This project begins at the primary intersection in the southeast portion of Seminole Oklahoma, and extends approximately seven miles to the southeast along US-270 to just east of the “Y” junction of US-270 with Business US-270 which provides the primary east-west access into Wewoka Oklahoma. Seminole and Wewoka are the two largest communities in Seminole County. Wewoka also serves as the county seat with all associated governmental responsibilities. Seminole is home to the offices of the Seminole Nation of Oklahoma, including all associated governmental offices, Tribal courts and various services for Tribal members. As such this route is a critical link for the people and governmental functions of Seminole County, the Seminole Nation, and the State of Oklahoma.

This application for grant funding is seeking funding for seven bridges. NBI number 13079 over Carter Creek has a clear roadway width of 28 feet and is structurally deficient with a sufficiency rating of 30.2. NBI number 10053 over an unnamed creek has a clear roadway width of 44 feet and is structurally deficient with a sufficiency rating of 64.8. NBI number 12934 over an unnamed creek has a clear roadway width of 44 feet, is not deficient and has a sufficiency rating of 84.3. NBI number 12980 over an unnamed creek has a clear roadway width of 44 feet, is not deficient, and has a sufficiency rating of 94.9. NBI number 13653 over the Union Pacific Railroad has a clear roadway width of 28 feet and is structurally deficient with a sufficiency rating of 59.9. A draft agreement covering the demolition of the existing bridge and the construction of a new bridge over Union Pacific’s track has been written, with signature by ODOT and the railroad pending. The agreement is in the [Appendix](#) . NBI number 13925 over Wewoka Creek has a clear roadway width of 28 feet and is structurally deficient with a sufficiency rating of 58.1. NBI number 13783 over an unnamed creek has a clear roadway width of 44 feet and is not structurally deficient with a sufficiency rating of 98.3.

### PROPOSED PROJECT AND GEOSPATIAL DATA

The US-270 Bundled Bridge Project consists of five bridge replacements and two bridge extensions and rehabilitations. As previously noted, the bridges are as follows:

- Replacement of US-270 over Carter Creek – NBI number 13079, Structure number 6702 0402 X, Located 1.7 miles east of SH-3
- Replacement of US-270 over Unnamed Creek – NBI number 10053, Structure number 6702 0419 X, Located 1.9 miles east of SH-3
- Replacement of US-270 over Unnamed Creek – NBI number 12934, Structure number 6702 0543 X, Located 3.2 miles east of SH-3
- Extend and Rehabilitate US-270 over Unnamed Creek – NBI number 12980, Structure number 6702 0707 X, Located 4.9 miles east of SH-3
- Replacement of US-270 over Union Pacific Railroad – NBI number 13653, Structure number 6702 0880 X, Located 6.6 miles southeast of SH-3

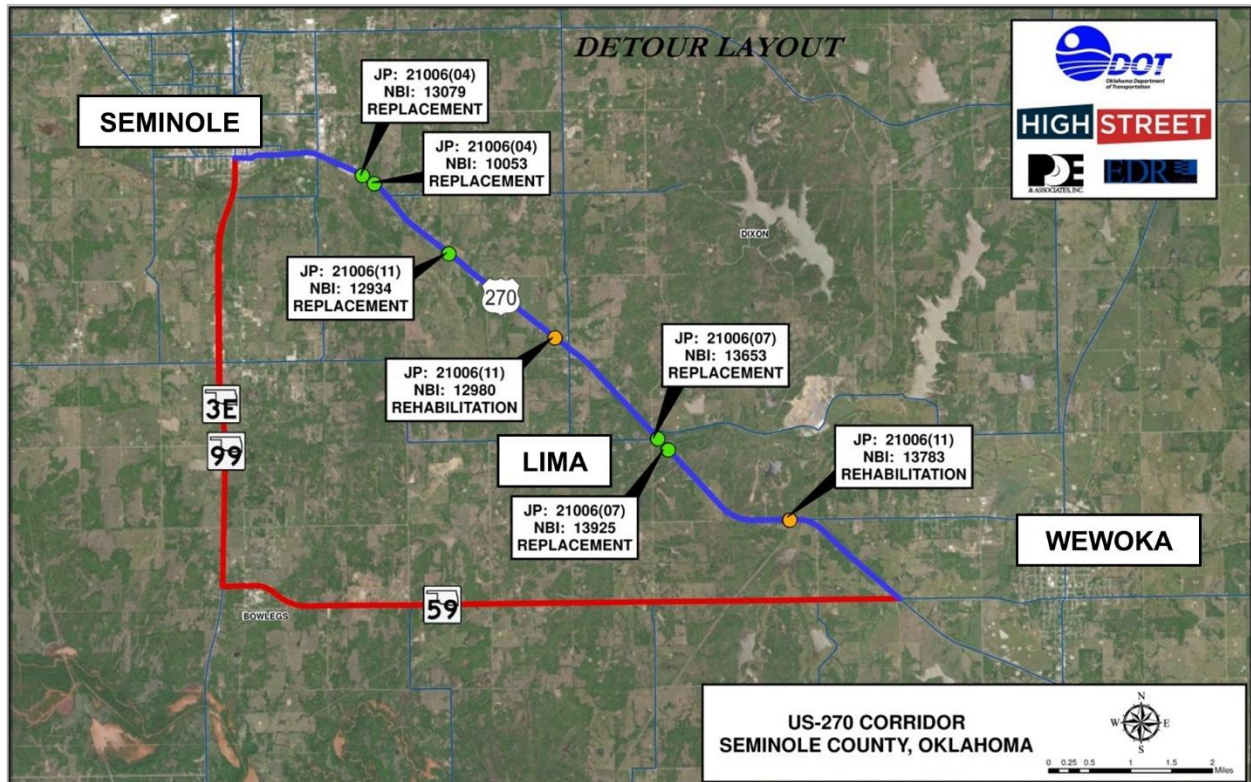
- Replacement of US-270 over Wewoka Creek – NBI number 13925, Structure number 6702 0894 X, Located 6.7 miles southeast of SH-3
- Extend and Rehabilitate US-270 over Unnamed Creek – NBI number 13783, Structure number 6702 1082 X, Located 8.5 miles southeast of SH-3.

This project will be constructed independently of, and prior to, the overall Corridor Project. Funding of the US-270 Bundled Bridge Project will allow for ODOT to commit to financing the remainder of the Corridor Project to ensure that the full benefits of the improvement are experienced by the traveling public.

## MAP

**Figure 1** is a map indicating the location of the overall project as well as indicating each of the bridge locations for the seven-bridge bundle included in this application for grant funding. Additional project maps corresponding with individual bridges are provided in the [Appendix](#).

**Figure 1: Project Location**



## PROJECT PARTIES

The following organizations have committed to provide financial resources to the US-270 Bridge Bundle Project:

1. Oklahoma Department of Transportation
2. Federal Highway Administration



## Seven Bridges, US-270 Seminole County, Oklahoma

Additionally, the City of Seminole, the City of Wewoka, the Seminole Chamber of Commerce, the Seminole County Commissioners Districts 1 and 2, and the Central Oklahoma Regional Planning Organization have declared their support of the US-270 Bridge Bundle Project in written letters. These letters are enclosed in the [Appendix](#).

## GRANT FUNDS, SOURCES AND USES OF PROJECT FUNDS

ODOT has developed a detailed budget for the US-270 Bundled Bridge Project which represents the previously incurred and anticipated future costs attributed to the bundled bridges as indicated in this grant application. The detailed cost estimates are included in the [Appendix](#), and it provides the individual costs anticipated for each aspect of each of the seven bridges within the US-270 Bundled Bridge Project. The summary information is compiled below in a succinct Funding Sources and Uses table (**Table 2**).



**Seven Bridges, US-270  
Seminole County, Oklahoma**

**Table 2: Funding Sources and Uses (Bundled)**

USES \ SOURCES	STATE FUNDS		FORMULA FEDERAL FUNDS		CHBP FUNDS	TOTAL PROJECT COST
	Previously Incurred	Future	Previously Incurred	Future	Future	
All Bridges						
Engineering Cost	\$255,639	\$28,404	\$1,022,555	\$113,617		\$1,420,215
ROW	\$410,445	\$45,605				\$456,051
Utilities	\$32,649	\$10,883	\$130,595	\$43,532		\$217,659
Construction		\$5,085,959		\$741,369	\$6,812,584	\$12,639,912
Pavement Reconstruction		\$119,799		\$119,799		\$239,597
<b>Total</b>	<b>\$698,733</b>	<b>\$5,290,650</b>	<b>\$1,153,150</b>	<b>\$1,018,316</b>	<b>\$6,812,584</b>	<b>\$14,973,433</b>

*Note: Numbers are rounded to the nearest dollar*

**Funding Shares:**

Percent State =  $\$5,989,383 / \$14,973,433 = 40.0\%$

Percent Federal Formula =  $\$2,171,466 / \$14,973,433 = 14.5\%$

Percent CHBP Funds =  $\$6,812,574 / \$14,973,433 = 45.5\%$



ODOT has already demonstrated a dedication to the completion of the US-270 corridor project. This has occurred through the previously incurred costs of \$1,851,883, of which \$1,153,150 are federal funds and \$698,733 are state funds.

The above table has extrapolated the amount of previously incurred costs for the US-270 corridor project that should be attributed to the seven bridge locations included in the US-270 Bundled Bridge Project as well as the anticipated construction costs. As can be seen, the anticipated construction cost for the US-270 Bundled Bridge Project is \$12,639,912 when applying the 11 percent savings for bundling.

Receipt of the requested \$6,812,584 from the Competitive Highway Bridge Program would allow for ODOT to commit additional formula federal funds in the amount of \$1,018,316 to be utilized as part of the funding for the US-270 Bundled Bridge Project. The State will also contribute an additional \$5,290,650 to support the project. Summing previously incurred and future costs shows that the State contribution will be 40 percent of the total project cost. Since the total project cost, including engineering, right-of-way, utilities, and construction is \$14,973,433, the request of Competitive Highway Bridge Program funds of \$6,812,584 represents just under half of the total cost of the project.

## SELECTION CRITERIA

### INNOVATION

#### *Technologies*

The US-270 Bundled Bridge Project is introducing innovative bridge technologies related to corrosion resistance, **lightweight granular backfill** that reduces pressure behind abutments, and the use of soil additives to stabilize the soil as needed. The bridges will use corrosion-resistant materials, such as weathering steel for diaphragm bolts, plate washers, and anchor plates for fixed bearing assemblies where applicable. Stainless steel will also be used for fixed and expansion bearing assemblies for span bridges. Both materials reduce corrosion and defer repairs and eventual replacements. Unpainted weathering steel has been shown to help bridges achieve design lives of 120 years with only nominal maintenance (Dolling and Hudson 2003). The use of weathering steel and stainless steel for these components do not require additional permitting.

The bridges are also expected to employ lightweight granular backfill to build the grade and cover the bridge box where applicable. Bridge components' size is heavily influenced by the extent of lateral pressure behind abutments. Lightweight granular backfill reduces pressure compared with traditional backfill materials and therefore allows for a reduction in the size of other bridge components, producing material cost savings related to foundations, abutment walls, and wing walls. Additional material costs due to lightweight granular backfill have been shown to be offset in many cases by reduced build time and reduced cost for materials in other bridge components (Davies, Bull and Kucki 2010). Use of lightweight granular backfill does not require additional permitting.

Finally, the contractor will test the soil and ensure its stability before progressing with construction. The contractor will add the appropriate mixture of additives as needed based on the site conditions. These soil additives do not require supplemental permitting.

## *Project Delivery*

The project delivery has three elements that produce large cost savings and/or reduce construction-related disruptions to the traveling public. The first innovation in project delivery is the use of **incentives to encourage early completion** of the project. ODOT expects to approve an incentive equal to five percent of contract value that the contractor can earn if the project is completed 100 calendar days early. The incentive is prorated within the timeframe between the project completion date and 100 days before that date. For a project of this scale, a completion 100 days early represents a shortening of the total delivery period of approximately 14 percent. After the project completion date, the contractor is subject to an equivalent penalty totaling five percent of the contract value 100 days after the project completion date. The penalty is also prorated. The project incentives have a history of producing early deliveries. During the past three years, three bridge projects in Division 3 (the ODOT division including Seminole County) have included early-completion incentives. The projects with incentives were delivered in 25 percent less time than allowed by contract. Bridge projects with incentives were completed an average of 27 days earlier than bridge projects without incentives. Similar results are expected for the US-270 Bundled Bridge Project.

The second innovation in project delivery is **project bundling**. In addition to reducing project costs, bundling also reduces the impact on the traveling public by coordinating construction times and the public engagement process. In the case of the US-270 Bundled Bridge Project, bundling has allowed for a simplified process for the public living along and traveling on the corridor by consolidating public meetings for multiple bridges and corridors changes. According to the Documented Categorical Exclusion (DCE), 41 people attended the meeting for the US-270 Corridor Project held on September 29, 2015, which included work by the three design teams. Eight additional written comments were received in the two weeks following the meeting, and four responses to the 26 solicitation letters mailed to 26 federal, state, and local officials were received.

The third project delivery innovation is that the **project will be built without closing any lanes** during the construction phase of any of the seven bridges. ODOT is using two methods to avoid lane closure. The first is due to the fact that US-270 is being simultaneously widened from two lanes to four. For most bridges, a new bridge carrying two new lanes will be built parallel to the existing bridge. Once the new bridge is completed, traffic will be diverted to the new bridge, and the old bridge will be replaced or rehabilitated. In the case of one bridge, a new alignment is used, allowing traffic to continue to use the original alignment during construction. If the bridges were closed entirely during construction, then through traffic would have to detour around the bridge, adding approximately 36 percent to the through-distance along the entire route using the expected detour route. Bridge engineers estimate that a traditional construction method building the new bridge on the site of the one being replaced would require bridge closure for approximately 200 days.



## SUPPORT FOR ECONOMIC VITALITY

This corridor of US-270 has about 6,000 AADT with approximately 12 percent trucks. The AADT on this corridor is expected to increase to over 8,000 by 2055. This corridor is an important improvement corridor in Oklahoma and connects Seminole and Wewoka. It provides access to residents and agricultural uses along the corridor. There is no active rail service along the US-270 corridor, which heightens the importance to improve the bridges along the corridor to provide reliable commercial vehicle travel.

US-270 provides access to numerous recreational attractions in Seminole County including the Sportsman Lake Recreation Area, Seminole Municipal County Club, the Oklahoma Oil Museum, and Jasmine Moran Children’s Museum. This corridor also provides access to several Seminole Nation programs and services in the region.

In addition to services and recreational facilities, US-270 between Seminole and Wewoka also provides important connections for local employers, namely Integris Seminole Medical Group - serving more than 30,000 residents in the County, the Seminole State College – one of the region’s largest employers, and the VF/Wrangler warehouse.

Based on the benefit-cost analysis (BCA), the expected benefits of this comprehensive program of bridge replacements include the following:

- Avoiding travel time increases and vehicle operating costs from future detours, when bridges are weight-restricted and eventually closed
- Safety improvements as a result of reduced exposure to crashes from avoided detours
- Long-term savings in operations and maintenance costs, including consideration of higher maintenance costs for poor condition bridges
- Additional non-quantifiable benefits including access to residential and agricultural destinations along the corridor, access to municipal and county government offices and services, access to recreational attractions, and connection to tribal programs and other services in the region.

### *Benefit-Cost Analysis (BCA) Summary*

The full BCA technical memo is provided the [Appendix](#). **Table 3** summarizes the total benefits of rehabilitating and replacing the seven bridges included in this grant application, using a seven percent discount rate. The project is forecast to deliver \$57.0 million in benefits, expressed in present value terms. The majority of benefits are generated by a reduction in vehicle operating costs, travel time and safety costs. These benefits are driven by the avoided detours enabled by the bridge replacements.

**Table 3: Summary of Benefits (7% Discount Rate)**

<b>Benefit Type</b>	<b>Value (millions of \$)</b>
Vehicle Operating Costs	\$21.6
Personal & Crew Time	\$19.1
Logistics/ Freight Costs	\$5.6
Safety	\$13.5
Environmental	\$1.7
<b>Total Benefits</b>	<b>\$61.5</b>

When compared to discounted total project costs (**Table 4**), including reductions in operating and maintenance costs over the analysis period (reflected as negative values), **the combined benefits of all seven bridge improvements exceed costs by a ratio of 6.4, yielding a project net present value of \$51.9 million.** Because the expected life of a bridge after replacement is 75 years, there is some additional “useful life” beyond the year 2050 (analysis end year). The value of this remaining useful life beyond the year 2050 is referred to as the “Residual Value” reflecting the remaining value of the bridge that has not yet been depreciated.

**Table 4: Summary of Benefits and Costs (7% Discount Rate)**

<b>Benefit &amp; Costs Categories</b>	<b>Value (millions of \$)</b>
Total Benefits	\$61.5
Capital Investments	\$10.8
Operations & Maintenance Costs	-\$0.3
Residual Value	-\$0.9
<b>Total Costs</b>	<b>\$9.6</b>
<b>Net Present Value</b>	<b>\$51.9</b>
<b>Benefit-cost Ratio</b>	<b>6.4</b>

## LIFE-CYCLE COSTS AND STATE OF GOOD REPAIR

### State of Good Repair

Four of the bridges are in poor condition. This includes both bridges with NBI numbers 13079, 103653, 13657, and 13925. The lowest-rated bridge elements are the deck, substructure, and culvert. The bridges’ condition is summarized in **Table 5**, and **Table 6** provides additional details relevant to condition components.





**Table 5: Bridge Conditions – Summary**

NBI Number	Planned Action	Condition	Lowest Rated Element(s)
13079	Replacement	Poor	Deck and substructure (tie)
10053	Replacement	Poor	Culvert
13653	Replacement	Poor	Deck
13925	Replacement	Poor	Deck
12934	Replacement	Fair	Culvert
12980	Rehabilitation	Good	Culvert
13783	Rehabilitation	Fair	Culvert

**Table 6: Bridge Conditions – Details**

NBI Number	Condition - Deck	Condition - Superstructure	Condition - Substructure	Condition - Culvert	Posted Status
13079	4	5	4	NA	A. Open, no restriction
10053	NA	NA	NA	4	A. Open, no restriction
13653	4	6	5	NA	A. Open, no restriction
13925	4	5	5	NA	A. Open, no restriction
12934	NA	NA	NA	5	A. Open, no restriction
12980	NA	NA	NA	7	A. Open, no restriction
13783	NA	NA	NA	6	A. Open, no restriction

None of the bridges are load restricted. However, the bridges’ age ranges from a low of 61 years to a high of 75 years. The bridges’ age suggests that, adjusting for current performance, the first bridges are likely to be load posted by 2023 and closed approximately 10 years thereafter. Because the bridges are part of a corridor, the corridor will essentially close to some trucks when the corridor is load posted, and it will close to all traffic when the first bridge is closed around 2033. The bridges’ age is in **Table 7**.

**Table 7: Bridges' Age and Expected Year of Load Posting**

NBI Number	Year Built	Current Age in Years
13079	1953	65
10053	1943	75
13653	1956	62
13925	1957	61
12934	1953	65
12980	1953	65
13783	1957	61

Bridge inspectors have documented distressed deck area and patching (including NBI number 13653 and 13925). At least three bridges exhibit deterioration or an out-of-alignment condition

for parapets and/or guardrails (10053, 12934, 13783). Another has curb deterioration and gutter blockage (13079).

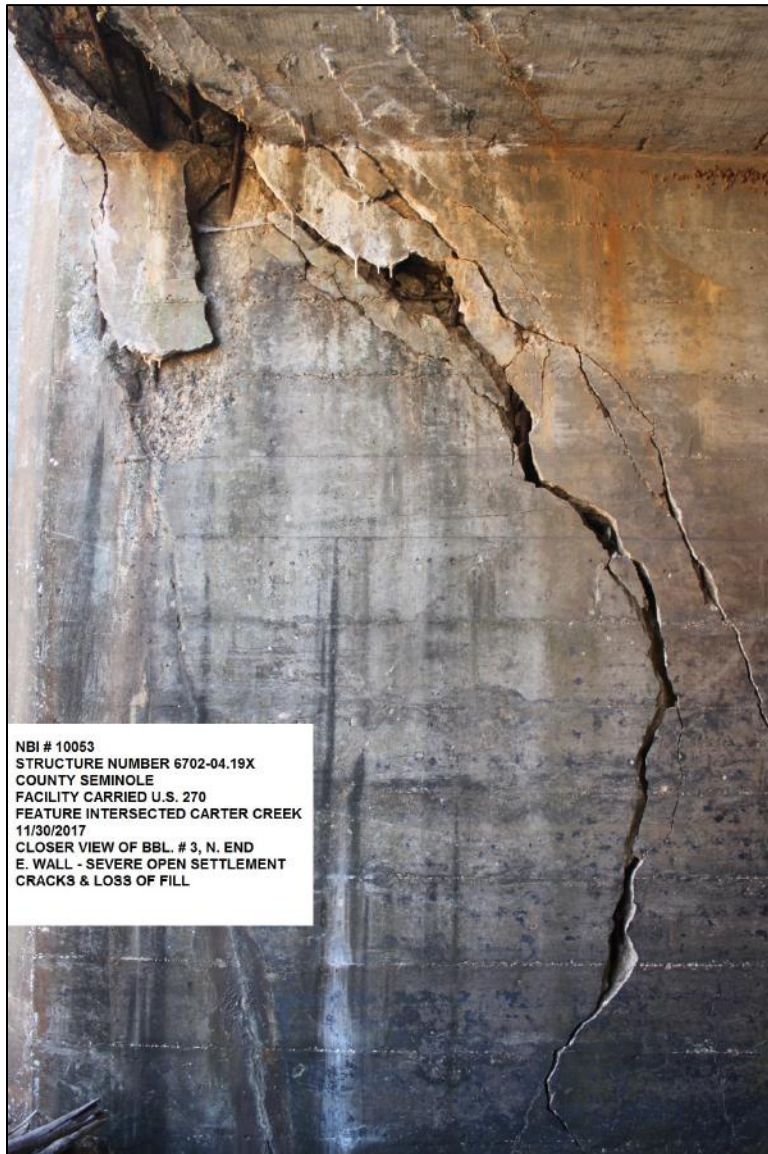
Although not the lowest-rated element on any bridges, the superstructures also exhibit signs of lack of state of good repair, with leaching and efflorescence (salt deposits) on the soffit (13079), soffit deterioration (13653), and exposed reinforcement (10053). **Figure 2** depicts soffit deterioration of the bridge with NBI number 13653.

**Figure 2: Soffit Deterioration (NBI 13653)**



Inspectors have noted signs of deterioration on several bridge substructures. These include large delaminations in piles (13079), leaching and efflorescence on pier walls (13079, 10053) and cracks in the pier wall (10053, 12934). Bridge inspectors report large delaminations are found on numerous pilings of the bridge with NBI number 13079. In the case of the bridge with NBI number 10053, the bridge inspector classified the open settlement cracks and loss of fill as being “severe” (**Figure 3**).

Figure 3: Severe Open Settlement Cracks and Loss of Fill (NBI 10053)



Inspectors have documented signs of lack of state of good repair for culverts, including open settlement cracks and loss of fill (10053) and obstruction of culvert barrels (12980). Two of the three barrels of the culvert for the bridge with NBI number 12980 are obstructed due to silt buildup, diverting all water flow through a single barrel. **Figure 4** below displays the culvert for the bridge with NBI number 12980, for which two of the three barrels are blocked due to silt buildup.

Figure 4: Silt-Obstructed Culvert Barrels (NBI 12980)



The four bridges in poor condition are all planned for replacement. Additionally, one bridge in fair condition, which exhibits open settlement cracks and other signs of deterioration, will be replaced. The remaining two structures are planned for extension and rehabilitation, and they feature signs of deck deterioration (13783) and severe silt buildup (12980). Additional photos taken by bridge inspectors are located in the [Appendix](#).

The bridge replacements will also improve the condition of bridge approaches. Approaches for three of the five bridges planned for replacement are in poor condition according to the Pavement Quality Index (PQI), where a PQI score below 75 is considered poor. These include pavements near bridges with NBI numbers 13079, 10053, and 12934. Replacing these bridges is expected to improve approach pavement condition sufficiently to remain in good condition for much of their life (PQI above 90). **Table 8** details the current condition of bridge approaches.

**Table 8. Approach Condition of Bridges**

NBI Number	Planned Action	Current PQI	Condition
13079	Replacement	71.2	Poor
10053	Replacement	72.9	Poor
13653	Replacement	86.1	Fair
13925	Replacement	90.2	Fair
12934	Replacement	71.9	Poor
12980	Rehabilitation	83.9	Fair
13783	Rehabilitation	85.0	Fair

The approach improvements are also expected to result in sustained long-term improvements in approach condition assuming preventive maintenance. In fact, the PQI of the bridge approaches is forecasted to be 11 percent better in 2040 than today even assuming that only preventive maintenance (no rehabilitation) is conducted on approach pavements between 2020 and 2040. **Table 9** below shows predicted approach pavement condition for 2020, 2030, and 2040 for each bridge.

**Table 9: Predicted Condition of Bridge Approaches**

NBI Number	Predicted PQI - Year 2020	Predicted PQI - Year 2030	Predicted PQI - Year 2040	Predicted Percent Improvement in PQI between 2018 and 2040
13079	100	93.0	82.1	15%
10053	100	93.0	82.1	13%
13653	100	93.0	93.0	8%
13925	100	93.0	93.0	3%
12934	100	93.0	89.9	25%
12980	100	93.0	89.9	7%
13783	100	93.0	89.9	6%



## Life Cycle Costs

Construction costs are expected to be incurred over an 18-month period for the seven bridges from 2020 until 2022. Total unbundled and bundled construction costs are in **Table 10** below.

**Table 10: Bundled and Unbundled Construction Costs (Discounted Values)**

Bridge NBI Number	Unbundled Construction Costs	Bundled Construction Costs
13079	\$2,458,043	\$2,187,658
10053	\$1,682,747	\$1,497,645
13653	\$2,648,986	\$2,357,598
13925	\$4,480,223	\$3,987,398
12934	\$1,077,249	\$958,752
12980	\$845,560	\$752,548
13783	\$1,009,340	\$898,313
Total	\$14,202,148	\$12,639,912

Bundling is estimated to save 11 percent of construction costs compared with costs that would be incurred with separate contracts. Therefore, bundling is expected to save \$1.6 million by reducing total construction costs for the seven bridges from \$14.2 million to \$12.6 million. This savings was estimated by examining optional tie project bids in Oklahoma. In optional tie project bids, contractors may bid on a project individually or as a bundle. A savings range of 11 percent to 15 percent was identified by comparing bids received by ODOT for bundled and unbundled optional tie projects that were let in 2012, 2013, and 2015. Details of the prediction of cost savings attributable to project bundling are described in the [Appendix](#) as both a [memo](#) and a complete [spreadsheet](#) with calculation details. An additional [spreadsheet](#) with costs and funding sources for each bridge both bundled and unbundled is included.

## PROJECT READINESS

### Project Feasibility

#### Feasibility of the Project with Status of the Project in Engineering & Design Phases

The status for the US-270 Bundled Bridge Project is directly tied to the status of the overall US-270 Corridor Project that ODOT has been working on for many years. ODOT placed the project into the Eight Year Construction Work Plan in 2003 with the intention of completing the entire corridor improvements. Design firms CP&Y and Tetra Tech were engaged to design portions of the corridor improvements, and both firms have bridges that are incorporated into the US-270 Bundled Bridge Project. As initial designs were being formulated, ODOT began to pursue the environmental clearance for the corridor. Field environmental studies began in June 2015, and the Bureau of Land Management and the Bureau of Indian Affairs were notified of the project in July 2015. A public meeting was held on September 29, 2015. The completed Documented Categorical Exclusion (DCE) form was submitted to the FHWA on September 13, 2016, and final signatures for all involved parties were obtained on the DCE on September 20,

2017. The DCE document is included in the [Appendix](#). Design plans by both firms for the overall corridor project have been through all of the plan development reviews and final plans, specifications and estimates (PS&E) for submittal prior to bid opening are due from CP&Y on January 1, 2019 and Tetra Tech on March 4, 2019. Each of the designers will be required to modify the plans to provide for a combined US-270 Bundled Bridge Project to be let by ODOT. However, the risk and level of difficulty is low because the modifications will consist of extraction of existing information. Final plans are expected by early spring of 2019.

The bundling of the seven bridge projects supports constructability. Bundling will allow for the single contractor to efficiently mobilize and schedule work within the corridor. Bundling will also reduce costs for ODOT. Finally, the construction will employ individuals along the corridor and spread ancillary economic benefits throughout the community.

### **Basis for Cost Estimate**

The cost estimate was developed on the foundation of ODOT's bid tabulation history and experience. The use of recent bid history for designed bridges let to construction through the ODOT competitive bidding process, coupled with the ODOT's prior experience of including multiple bridges within one package, indicated that an 11 percent reduction in construction costs could be readily achieved by bundling multiple bridges into a single contract. The anticipated 11 percent construction cost savings are within the range of savings obtained by other states. The estimation of the 11 percent construction cost savings is described in the [Appendix](#) with a [memo](#) and a [spreadsheet](#).

### **Scope, Schedule, Budget Risk-Mitigation Measures**

**Scope** risk is extremely low. There is little risk that the scope of the project will significantly change because ODOT has already engaged design firms that are approaching plan completion and has already obtained a signed DCE from the FHWA. Review of environmental comments and commitments will occur as the plans for the US-270 Bundled Bridge Project are assembled and prepared for letting. Any necessary adjustment can be addressed through the design contracts and a submittal delivery plan established to maintain the project scope.

**Schedule** risk is extremely low. There is little risk that the schedule of the project will significantly change because ODOT has already engaged design firms that are approaching plan completion and has already obtained a signed DCE from the FHWA. Review of environmental comments and commitments will occur as the plans for the US-270 Bundled Bridge Project are assembled and prepared for letting. Any necessary adjustment can be addressed through the design contracts and a submittal delivery plan established to maintain the project schedule. Right-of-way acquisition and subsequent utility relocation will proceed as scheduled due to the receipt of the Documented Categorical Exclusion (DCE).

**Budget** risk is extremely low. There is little risk that the budget of the project will significantly change because ODOT has already engaged design firms that are nearing complete plans and has already obtained a signed DCE from the FHWA. Final plans have effectively been developed with appropriate reviews conducted as necessary. Defined estimates and pay items are very well developed. Review of environmental comments and commitments will occur as the plans for the US-270 Bundled Bridge Project are assembled and prepared for letting. Any adjustment would likely be minimal and have small to negligible budgetary impact.

## Bridge Projects to Be Bundled and Constructed

Below is a list of the bridges to be bundled as part of the US-270 Bundled Bridge Project. A description of each bridge is available in the Project Description section on page 1.

- US-270 over Carter Creek – NBI number 13079, Structure number 6702 0402 X
- US-270 over Unnamed Creek – NBI number 10053, Structure number 6702 0419 X
- US-270 over Unnamed Creek – NBI number 12934, Structure number 6702 0543 X
- US-270 over Unnamed Creek – NBI number 12980, Structure number 6702 0707 X
- US-270 over Union Pacific Railroad – NBI number 13653, Structure number 6702 0880 X
- US-270 over Wewoka Creek – NBI number 13925, Structure number 6702 0894 X
- US-270 over Unnamed Creek – NBI number 13783, Structure number 6702 1082 X

## Project Schedule

The US-270 Bundled Bridge Project is on track to be let in mid-2020 and to complete construction in late 2022. Several steps will occur in the first half of 2019, including the review of environmental comments and commitments, the start of right-of-way acquisition, and receipt of final plans from the design teams. Utility relocation is scheduled to begin in July 2019. The project schedule is summarized in **Table 11** and a detailed schedule is provided in the [Appendix](#).

**Table 11: Project Schedule**

Step	Date
Review of environmental comments and commitments	January 2019
Receipt of final PS&E from CP&Y (corridor)	January 2019
Receipt of final PS&E from Tetra Tech (corridor)	March 2019
Completion of ROW acquisition	April 2019
Completion of utility relocation	July 2019
Letting of US-270 Bundled Bridge Project through competitive bid	June 2020
Completion of construction	October 2022

## Required Approvals

### Environmental Approvals

The US-270 Bundled Bridge Project has three outstanding environmental activities. It has already received a signed DCE document from the FHWA. These activities and any associated permits or approvals are summarized below:

- **Clean Water Act Section 404:** The permit related to Clean Water Act Section 404 will need to be coordinated with the US Army Corps of Engineers.
- **American burying beetle:** ODOT will withdraw necessary credits from the established bank of credits for impacts to habitat of the American burying beetle.
- **Nesting Birds:** Several of these bridge structures have had observed migratory bird nesting activity. Evaluation prior to construction will determine whether proposed work





would disrupt nesting birds. If work may harm nesting birds, the bridges may be netted prior to April 1 to prevent nesting or work may be delayed until after nesting season.

## State and Local Approvals

This application is consistent with the Oklahoma Long Range Transportation Plan 2015 - 2040, specifically the policy calling to “improve safety and bridge conditions by replacing or rehabilitating structurally deficient bridges on the State Highway System.”

Additionally, the application supports the mobility/connectivity/accessibility and economic vitality goals of the Oklahoma Freight Transportation Plan, 2018-2022.

These bridge improvements are part of ODOT’s Eight Year Construction Work Plan with construction programmed to begin in 2020. Subject to grant approval, the State Transportation Improvement Program (STIP) will be amended to include this project.

## Other Approvals

The US-270 Bundled Bridge Project has a single notice to file related to airport proximity, and there is a draft agreement related to bridge demolition and construction over Union Pacific track. The notice and agreement are described below:

- **Federal Aviation Administration:** The project is located within four miles of Seminole Municipal Airport. It is necessary to notify the Federal Aviation Administration (FAA) prior to construction via Form FAA 7460-1 (“Notice of Proposed Construction or Alteration”).
- **Union Pacific Railroad:** There is a draft agreement between ODOT and the Union Pacific Railroad on the demolition of the bridge with NBI number 13653 and construction of a new bridge over Union Pacific track. Signatures for both parties are pending.

# BENEFIT-COST ANALYSIS SUMMARY

## BENEFIT-COST ANALYSIS INTRODUCTION

This application for the FHWA’s Competitive Highway Bridge Program Grant (CHBP) is for the replacement of seven rural bridges along US-270 in Seminole County, southeast of Oklahoma City, which are being bundled together to achieve cost savings. Two of the bridges will be extended and rehabilitated, while the other five will be replaced. These bridges are part of an important corridor that connects Seminole and Wewoka as well as serving pass-through traffic.

Without replacement, these bridges will first be posted to a weight limit of 20 tons by the year 2023, effectively closing them to truck traffic. After further deterioration, by 2033, these bridges are expected to be closed to all traffic, forcing users to detour. Given the magnitude of traffic disruption this would cause along US-270, renovation and replacement of these bridges is a priority.

The expected benefits of this comprehensive program of bridge replacements include the following:

- Avoiding travel time increases and vehicle operating costs from future detours, when bridges are weight-restricted and eventually closed
- Safety improvements as a result of reduced exposure to crashes from avoided detours
- Long-term savings in operations and maintenance costs, including consideration of higher maintenance costs for poor condition bridges
- Additional non-quantifiable benefits including access to residential and agricultural destinations along the corridor, access to municipal and county government offices and services, access to recreational attractions, and connection to tribal programs and other services in the region

## *Methodology*

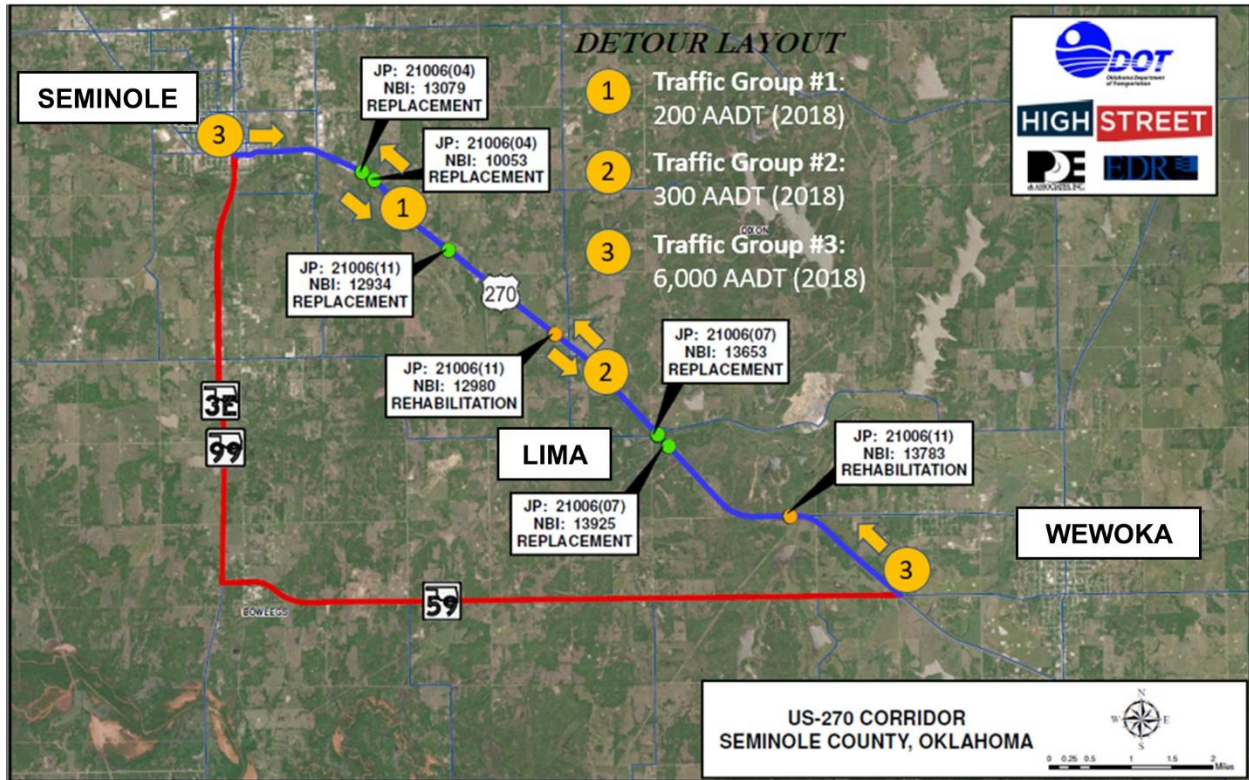
Because all seven of these bridges are located along US-270 within a single contiguous corridor, the BCA needs to consider the implications of bridge postings and closures holistically.

Most of the traffic volume on this segment of US-270 (6,000 AADT in 2018) travels along the entire corridor crossing all seven bridges. The remaining traffic (500 AADT in 2018) exits/enters at different points along US-270, identified on the basis of observed volumes. To correctly determine the detour implications of bridge postings and closures, three groups of traffic volumes were organized based on origins, destinations, and associated bridges. **Figure 5** illustrates these three groups of traffic volumes.

- Traffic Group #1 (200 AADT): This group of traffic is between Seminole and an exit off US-270 after bridge 10053.
- Traffic Group #2 (300 AADT): This group of traffic is between Seminole and an exit off US-270 near the Town of Lima.
- Traffic Group #3 (6,000 AADT): This group of traffic travels the entire US-270 segment from Seminole to the West side of Wewoka.

**Figure 5** also presents the detour route for Traffic Group #3. Detour routes for Traffic Groups #1 and #2 are included in [Appendix](#).

Figure 5: Map of Traffic Flow Groups and Primary Detour Route



After assigning the most likely detour routes for each traffic group, the benefits associated with rehabilitating and replacing the bridges was estimated to avoid costs associated with the detours. Benefits by traffic group were then assigned to the associated bridges by equally dividing benefits across each bridge for each traffic group. For example, the estimated benefits for Traffic Group #1 based on the 200 AADT were equally assigned to bridges 13079 and 10053, the two bridges along the portion of the corridor traversed by the 200 AADT. **Table 12** below outlines the characteristics of each traffic volume group by associated origin/destination, AADT, detour length, and associated bridges. Detours were calculated in accordance with NBI guidance. After including capital and operating and maintenance costs, individual benefit cost analysis results were estimated for each bridge as well as for the entire program of all seven bridges.



**Table 12: Traffic Volume Groups by Origin, Destination, AADT, and Detour Length**

Traffic Flow	Traffic Group #1		Traffic Group #2		Traffic Group #3
	From Seminole to exit after bridge 10053 (#1.1)	From exit after bridge 10053 to Seminole (#1.2)	From Seminole to Lima (#2.1)	From Lima to Seminole (#2.2)	From Seminole to Wewoka & Wewoka to Seminole (#3)
<b>2018 AADT</b>	100	100	150	150	6,000
<b>Bridge NBI Number</b>	<b>Detour Length</b>				
<b>13079</b>	3.6	3.6	1.9	1.9	3.1
<b>10053</b>					
<b>12934</b>					
<b>12980</b>					
<b>13653</b>					
<b>13925</b>					
<b>13783</b>					

### *Analysis Approach*

The BCA of the project was prepared per the U.S. DOT’s *Benefit-Cost Analysis Guidance for Discretionary Grant Programs* published in June 2018 and in reference to OMB Circulars A-4 and A-94 concerning BCA. It is also in accordance with specific BCA guidance related to the definition of base and project cases outlined by the FHWA for the CHBP.<sup>1</sup> **Table 13** provides the required Project Matrix summarizing the analysis of impacts from changes due to the ODOT Competitive Highway Bridge Program between the Baseline (maintain existing conditions) and the Build scenarios (rehabilitation and replacement of seven bridges).

<sup>1</sup> <https://www.fhwa.dot.gov/bridge/chbp/bca.pdf>

**Table 13: Project Summary Matrix**

Current Status / Baseline & Problem to be Addressed	Change to Baseline/ Alternatives	Type of Impacts
There are seven bridges along US-270 in Seminole County southeast of Oklahoma City that require rehabilitation or replacement. Without these improvements, these bridges will be first closed to truck traffic (due to weight restrictions) and eventually closed to all traffic. In addition, these bridges currently require higher maintenance costs, based on their conditions.	The rehabilitation and replacement of these bridges will improve state of good repair and will enable future traffic to avoid traveling additional distance required by alternative detour routes and the associated costs from the additional mileage.	Instead of requiring posted weight limits or full bridge closure, the project will rehabilitate or replace these seven bridges, creating structurally sufficient conditions, and avoiding the additional vehicle operating, freight and time costs, accidents, and emissions associated with a detour. The project will also provide lifecycle cost savings associated with state of good repair.

**Table 14** summarizes the types of outcomes that have been identified for the project and the assessment approach used to prepare the BCA. The quantification of benefits involves both spreadsheet evaluations and qualitative consideration of additional benefits that are not directly quantified in economic terms within the BCA. The [BCA Technical Memo](#) and the interactive [spreadsheet](#), both located in the [Appendix](#), provide additional details regarding methodology.

**Table 14: Project Outcomes**

Societal Benefit	Description
State of Good Repair	Maintenance and repair savings reduce overall life-cycle costs.
Vehicle Operating Costs	Reduction in fuel and non-fuel related vehicle expenditures associated with detour.
Travel Time	Passenger, crew and freight time savings from avoided detour distance.
Safety	Reduction in crashes, fatalities and injury accidents from less vehicle miles of travel.
Environmental	Emissions benefits from reduction in vehicle miles travelled.

### *Summary of Benefits and Costs*

**Table 15** summarizes the total benefits of rehabilitating two and replacing five bridges included in this grant application, using a seven percent discount rate. The project is forecast to deliver \$61.5 million in benefits, expressed in present value terms. The majority of benefits are generated by a reduction in vehicle operating costs, travel time, and safety costs. These benefits are driven by the avoided detours enabled by the bridge replacements.

**Table 15: Summary of Benefits (7% Discount Rate)**

<b>Benefit Type</b>	<b>Value (millions of \$)</b>
Vehicle Operating Costs	\$21.6
Personal & Crew Time	\$19.1
Logistics/ Freight Costs	\$5.6
Safety	\$13.5
Environmental	\$1.7
<b>Total Benefits</b>	<b>\$61.5</b>

When compared to total project costs (**Table 16**), including reductions in operating and maintenance costs over the analysis period, the **combined benefits of all seven bridge improvements exceed costs by a ratio of 6.6, yielding a project net present value of \$52.1 million.**

**Table 16: Summary of Benefits and Costs (7% Discount Rate)**

<b>Benefit &amp; Costs Categories</b>	<b>Value (millions of \$)</b>
Total Benefits	\$61.5
Capital Investments	\$10.8
Operations & Maintenance Costs	-\$0.3
Residual Value	-\$0.9
Total Costs	\$9.6
Net Present Value	\$51.9
Benefit-cost Ratio	6.4

This concludes the summary of the BCA. Full details of the US-270, Seminole County Oklahoma BCA can be found at in the [BCA Technical Memo](#). Calculation details are also provided in the [BCA spreadsheet](#) in the [Appendix](#).

## **ASSESSMENT OF PROJECT RISKS AND MITIGATION STRATEGIES**

This section assesses potential risks to the project and documents mitigation strategies, which are also summarized in **Table 17**.

**Table 17: Summary of Potential Project Risks**

<b>Potential Project Risks</b>	<b>Mitigation Strategies</b>
<b>Procurement delays:</b> Failure by a design consultant to produce final design plans	The Project Management Division tracks progress, and develops and enforces a recovery schedule if needed.
<b>Environmental:</b> Revisiting of environmental comments and commitments	The Environmental Programs Division and the appropriate Design Division can address issues in a timely manner.
<b>Environmental:</b> Clean Water Act Section 404 permit	No items of concern or unique features were noted during the environmental clearance process. ODOT staff understands the procedures well and allows for a timely receipt of the permit.
<b>Environmental:</b> Credits related to the American burying beetle	ODOT is able to withdraw an appropriate number of credits from its pre-approved mitigation bank account.
<b>Environmental:</b> Bird nesting	ODOT Biologist and resident engineers are available to evaluate before construction whether contractors' work will disrupt nesting activity. Contractors will be appropriately advised regarding netting or avoidance of structures with nests.
<b>Financial:</b> Increases in real estate acquisition costs	Major right-of-way changes are unlikely because project is well defined and at an advanced stage in the project development process. Moreover, land values in the county are moderate.
<b>Financial:</b> Uncommitted non-federal match	Sufficient funding is identified within the fiscally constrained document to ensure financial feasibility.
<b>Legislative:</b> Lack of legislative approval	The Oklahoma Legislature has allowed ODOT to pursue projects included in the Eight Year Construction Work Plan and has not introduced legislative approval into the project selection process.
<b>Other:</b> Inability to obtain materials	Other major road and bridge construction work in the state will be nearing completion when the US-270 Bridge Bundle Project is let, making it likely that contractors will have capacity to build and supply the project.

## PROCUREMENT DELAYS

Procurement delays are a project risk if the design consultant fails to produce final design plans. ODOT is mitigating this risk through the work of its Project Management Division. The ODOT project manager is continually overseeing design and has the ability to develop and enforce a recovery schedule for late work. Specifically, ODOT's Project Management Division oversees the plan development processes of their selected design consultants. The Project Management Division has individuals assigned to each Field Division that coordinate the preconstruction project delivery processes and schedules. As such, each designer is provided with input and assistance from ODOT ensuring maximum opportunity for project success. Any indication that



project delivery will be delayed affords the Project Manager the ability to develop, present and enforce a recovery schedule.

## ENVIRONMENTAL UNCERTAINTIES

Environmental uncertainties are limited because the corridor has been previously studied and has already received a signed DCE document from the FHWA. However, the several environmental issues remain to be addressed, including obtaining a Clean Water Act Section 404 permit from the US Army Corps of Engineers, withdrawal of credits from the established bank of credits for impacts to habitat of the American burying beetle, revisiting environmental comments, evaluation of the effects of construction on bird nesting, and any accompanying measures to minimize that effect. The following actions will be taken to mitigate environmental uncertainties.

- **Revisit environmental comments and commitments:** ODOT commonly engages in revisiting environmental comments and commitments to ensure that all project requirements are met. Any indication of additional concerns or delays would be handled by the Environmental Programs Division and the appropriate design division to ensure issues or concerns are properly addressed in a timely and effective manner. Any reevaluations are addressed as needed and processed as necessary.
- **Clean Water Act Section 404 permit:** ODOT has an extensive history of obtaining Section 404 permits from the US Army Corps of Engineers for projects statewide. ODOT staff understands the procedures well and allows for a timely receipt of the permit. No items of concern or unique features were noted during the environmental clearance process to indicate that this permit will be unduly difficult to obtain for the US-270 Bridge Bundle Project.
- **Credits related to the American burying beetle:** ODOT has an extensive history of addressing the issues associated with the American burying beetle habit issues. Due to the presence of the American burying beetle in the eastern portion of Oklahoma, ODOT has elected to obtain mitigation credits for use on projects that have an impact to beetle habitat. Upon determination of the exact acreage of incidental take of habitat, ODOT is able to withdraw an appropriate number of credits from its pre-approved mitigation bank account. ODOT will also incorporate notes within the plans that limit artificial lighting and stipulate that carcasses and food trash shall be removed from the right-of-way during project activities. These restrictions limit the attractiveness of the project site to the burying beetle.
- **Bird nesting:** The presence of swallows nesting on bridges within projects is a common issue faced by ODOT. Resident engineers for ODOT have been trained to evaluate contractors' work methods and determine if any work will pose a disruption to any nesting birds prior to construction. They are assisted in this endeavor by the ODOT Biologist as necessary. ODOT has found that netting of the bridges anticipated for rehabilitation or replacement is an effective deterrent when properly utilized. Depending upon the start time for construction, contractors will be appropriately advised regarding netting or avoidance of structures with nests.

## FINANCIAL RISKS

ODOT is mitigating several possible financial risks. The first is increases in real estate acquisition costs that might cause right-of-way acquisition to become too expensive to complete





the project. ODOT procedures for right-of-way acquisition meet all federal rules and conform to the requirements of the Uniform Relocation Act. Since the overall corridor project is well defined and advanced in the project development process, significant changes to the right-of-way footprint are unlikely. Adjustments due to discovered materials or utilities may cause minor impacts to right-of-way, but large changes remain unlikely. Property values within the corridor are moderate. According to the Oklahoma State Extension office, agricultural land sales in Seminole County indicate an average of under \$1,800 per acre in 2017. The median home value in Seminole County is approximately \$50,000. As such, expansion of the right-of-way necessary for the project does not represent a significant financial risk.

ODOT has made provision within the Eight Year Construction Work Plan to provide construction funds for the US-270 corridor project. As such, sufficient funding is identified within the fiscally constrained document that ODOT rebalances on an annual basis to ensure financial feasibility and achievable schedule expectations.

## **LEGISLATIVE RISKS**

Lack of legislative approval is a potential risk area. However, history shows it to be very minor. The Oklahoma Legislature has allowed ODOT to pursue projects included in the Eight Year Construction Work Plan and has not introduced legislative approval into the project selection process. ODOT has committed to completing projects once they are incorporated into the Eight Year Construction Work Plan and has an exemplary record of doing so for the last sixteen years.

## **OTHER RISKS**

It could become difficult or impossible to obtain the necessary materials and components in adequate supply to complete construction. Oklahoma has seen a flurry of construction activity due to the progress being made on the Oklahoma Turnpike Authority's Driving Forward program. Construction of the seven corridors that comprise this program has tasked regional contractors and suppliers with providing the necessary labor and materials. However, the US-270 Bundled Bridge Project's timing is beneficial in that the vast majority of the work for the \$1.4 billion turnpike expansion program will be winding down when this project is ready for letting. As such, contractors and suppliers will have the capacity and availability to effectively and efficiently bid and supply this project.

## **OTHER**

### **USE OF SYSTEM FOR AWARD MANAGEMENT (SAM)**

ODOT is familiar with the SAM and has used it successfully in previous grant applications. Standard Forms SF 424 and SF 424C have been submitted.



## REFERENCES

- Davies, Luke, Jamie Bull, and Tomasz Kucki. 2010. "Lightweight Backfill Materials in Integral Bridge Construction." *Proceedings of the Institution of Civil Engineers* 167 (1). Accessed 11 15, 2018. doi:10.1680/bren.10.00051.
- Dolling, C. N., and R. M. Hudson. 2003. "Weathing Steel Bridges." *Proceedings of the Institution of Civil Engineers - Bridge Engineering* 156 (1): 29-44. Accessed 11 18, 2018. doi:10.1680/bren.2003.156.1.39.

# Appendices

All appendices are listed and available for review at the following URL:

[https://www.ok.gov/odot/About\\_ODOT/Contact\\_ODOT\\_Divisions/US\\_270\\_Corridor\\_Seminole\\_County\\_Oklahoma.html](https://www.ok.gov/odot/About_ODOT/Contact_ODOT_Divisions/US_270_Corridor_Seminole_County_Oklahoma.html)

Direct Links to Each Document Are Provided Below:

- Benefit-Cost Analysis
  - [BCA Technical Memo](#)
  - [Benefit-Cost Analysis Spreadsheet Tool](#)
- Costs
  - [Funding Sources and Uses \(Bundled\)](#)
  - [Bundled and Unbundled Costs by Bridge](#)
  - [Memo on Savings due to Bundling](#)
  - [Spreadsheet with Bridge Bundling Cost Analysis](#)
- Bridge Inspection Reports
  - [NBI 10053](#)
  - [NBI 12934](#)
  - [NBI 12980](#)
  - [NBI 13079](#)
  - [NBI 13653](#)
  - [NBI 13783](#)
  - [NBI 13925](#)
- Bridge Location Map
  - [County Map with Bridges \(Seminole Co. Map\)](#)
  - [NBI 10053](#)
  - [NBI 12934](#)
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  - [NBI 13653](#)
  - [NBI 13783](#)
  - [NBI 13925](#)
  - [KMZ File with Bridge Locations](#)
- Detours
  - [Detour Routes \(PDF\)](#)
  - [KMZ File of Detour Route \(US-270 Corridor Detours KMZ file\)](#)
- Bridge Photos by NBI Number
  - [NBI 10053](#)
  - [NBI 12934](#)
  - [NBI 12980](#)
  - [NBI 13079](#)
  - [NBI 13653](#)
  - [NBI 13783](#)
  - [NBI 13925](#)



- Collision Data Report
  - [NBI 10053](#)
  - [NBI 12934](#)
  - [NBI 12980](#)
  - [NBI 13079](#)
  - [NBI 13653](#)
  - [NBI 13783](#)
  - [NBI 13925](#)
- [Traffic Counts and Forecast \(Seminole CO. AADTS\)](#)
- [Approach Pavement Data](#)
- Engineering Plans
  - [NBIs 10053 and 13079](#)
  - [NBIs 12934, 12980, and 13783](#)
  - [NBIs 13653 and 13925](#)
- [NEPA Document / Documented Categorical Exclusion](#)
- [Draft Agreement with Union Pacific Railroad](#)
- Schedule
  - [Schedule Gantt Chart \(bundled\)](#)
  - [Schedule Excel Chart \(bundled and unbundled\)](#)
- Letters of Support
  - [Central Oklahoma Regional Planning Organization](#)
  - [City of Seminole](#)
  - [City of Wewoka](#)
  - [Seminole Chamber of Commerce](#)
  - Seminole County Commission (Commissioners from [District 1](#) and [District 2](#))