

# APPENDIX Q-1

## *Project Cost Estimates Memorandum*

**Clarification Note for Central Alternative 1:**

Central Alternatives 1A and 1B as described in the DEIS/FEIS are physically the same alternative. The only difference between them is that Central Alternative 1A would include tolls on both the new I-69 bridge and on the US 41 bridge. Central Alternative 1B would only include tolls on the new I-69 bridge. Any reference in this document to Central Alternative 1 applies to both Central Alternative 1A and Central Alternative 1B.

This document was completed before the development of Central Alternative 1B Modified (Selected); therefore, the alternative is not included in the document. Applicable information regarding Central Alternative 1B Modified (Selected) is provided in Appendix Q2 and the FEIS.



## MEMORANDUM

**To:** Janelle Lemon – INDOT PM, Marshall Carrier – KYTC PM  
**From:** Steven Nicaise, PE – Consultant Team PM  
**Date:** August 24, 2018  
**Subject:** Project Cost Estimates

---

Parsons and its construction group prepared construction cost estimates and roadway and bridge operations and maintenance cost estimates for the three DEIS alternatives based on conceptual design information provided by the roadway and bridge engineering teams. The full construction cost estimate is included in a report entitled “**Probable Construction Cost Estimate**” dated January 11, 2018. The Probable Construction Cost Estimate report includes the full detail of estimate methodology, references and detailed cost data. The roadway and bridge operations and maintenance cost estimates for the US 41 bridge are included in a report entitled “**US 41 Existing Bridges Evaluation Report**” dated February 21, 2018. Roadway and bridge operations and maintenance cost estimates for the new I-69 bridge and roadways were based on the Louisville-Southern Indiana Ohio River Bridges project. The following is a summary of the detailed estimate.

### *Basis of Estimate*

The current cost estimate is based on the conceptual designs developed for the DEIS as of January 11, 2018. While the design drawings appear to be quite detailed, many design details have not been considered, such as foundation designs which require extensive geotechnical exploration data, bridge type, construction phasing, and access and maintenance of traffic plans. Costs estimates, therefore, included contingencies based on similar projects to account for these elements. In addition, the design has relied on LiDAR for topographical data; no detailed surveys have been performed. Also note that the construction cost estimates have not been updated to reflect recent changes to the DEIS alternatives since January 11, 2018, since the changes were relatively minor in terms of the overall scope of the project.

### *Implementation Schedule*

While each of the build alternatives would construct a new I-69 roadway and bridge over the Ohio River, there are distinct differences in factors that would determine the implementation schedule of each. Whereas most of the construction for the West Alternatives would be located within the largely developed US 41 corridor, Central Alternative 1 would be built primarily within agricultural and undeveloped lands. This results in several factors that are expected to require longer implementation schedules for the West Alternatives compared to Central Alternative 1.

West Alternative 1 and West Alternative 2 would require 242 and 96 residential relocations and 25 and 62 commercial relocations, respectively, compared to four residential relocations and zero commercial relocations for Central Alternative 1. As a result, it is anticipated that the right-of-way process for each of the West Alternatives would take three years, whereas it would take only two years to complete the right-of-way acquisition process for Central Alternative 1.

The location of the West Alternatives within the existing US 41 corridor, which serves as the primary north-south artery in Henderson, results in more complex construction sequencing. This corridor includes urban utilities – water, sewer, gas, and electric – that must be relocated while avoiding service outages. Similarly, accessibility for both through and local traffic must be maintained throughout construction. In contrast, Central Alternative 1 would have limited involvement with utilities and local streets aside from an electric transmission line that would require relocation and an adjacent gas transmission pipeline that would need to be avoided. Based on these factors, it is anticipated that West Alternative 1 and West Alternative 2 would each require a 4-year construction period, while Central Alternative 1 could be completed in three years.

The total timeframe for right-of-way, utilities and construction indicates West Alternative 1 or West Alternative 2 could be completed and opened to traffic in 2027, and Central Alternative 1 could be opened to traffic in 2025.

Roadway and bridge operations and maintenance costs were forecasted to include a 35-year period following construction through 2062.

#### *Inflation Assumptions*

On projects that are implemented over many years, the effect of construction cost inflation can be substantial. Inflation rates vary over time with underlying economic conditions and within different geographic and construction market segments. FHWA tracks inflation rates in the highway industry through the National Highway Construction Cost Index (NHCCI), which estimates that costs have risen an average of 4 percent per year over the last 15 years.

The project cost estimates assume this historical rate of inflation will continue through the construction period. Looking at historical trends and variability in inflation rates in the NHCCI, the Bureau of Labor Statistics Consumer Price Indexes (CPI), and other similar databases, inflation trends are rarely a straight line and often vary considerably year over year and with economic cycles. Forecasting a straight-line 4 percent inflation rate over an extended period of time was considered overly conservative; therefore, the cost estimates incorporate a 2.5 percent rate of inflation during the period 2028 through 2062, which corresponds roughly to the 35-year operations and maintenance period for the project.

#### *Construction Cost estimate*

The project cost estimate summary shown in **Table** below includes all costs associated with construction of the project. This includes completion of the NEPA process, design of the selected alternative, right-of-way acquisition, permitting and mitigation, procurement, and construction inspections. Construction costs include all roadway, bridge and toll system installation costs.

(Costs presented here do not include the operation and administration of the toll system; those costs are discussed in a subsequent section.)

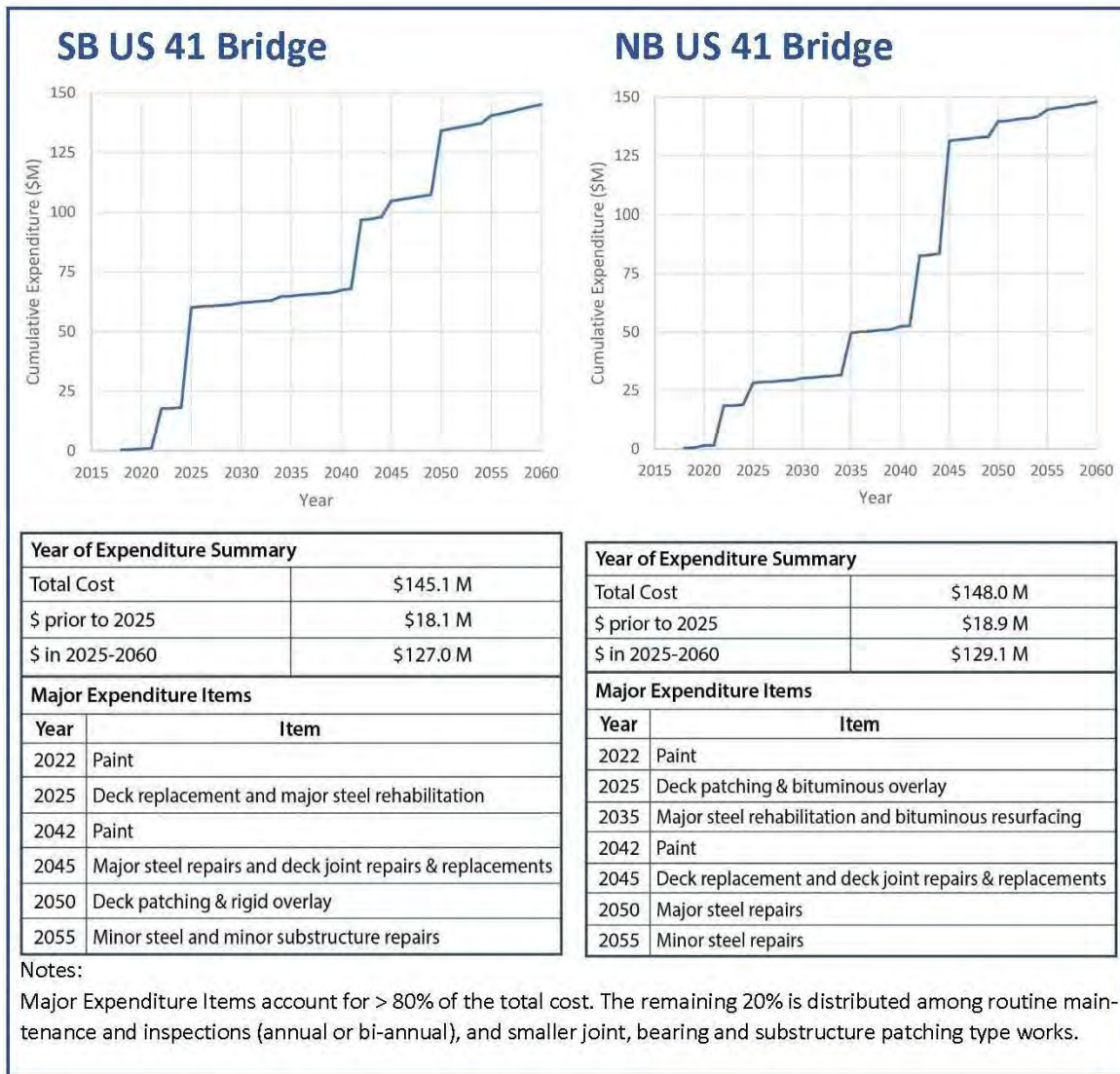
*Roadway and Bridge Operations and Maintenance*

The cost of operations and maintenance of the new I-69 Ohio River Crossing bridge and approach roadways was estimated based on costs from the Louisville-Southern Indiana Ohio River Bridges Project's (LSIORBP) East End Crossing.

The cost of operations and maintenance of the existing US 41 bridge were developed in the “**US 41 Existing Bridges Evaluation Report**” (Evaluation Report) dated February 21, 2018, which included three operating scenarios. The three scenarios looked at the potential benefits of shifting some of the truck traffic to a new I-69 crossing and reducing the volume of heavy truck traffic on US 41. The preferred alternative would convert one of the US 41 bridges to a two-way bridge but would not prohibit trucks. As such, a single bridge would likely carry similar total truck volumes as one of a pair of bridges under the No-Build condition. Therefore Scenario 1 from the Evaluation Report is most relevant here.

**Figure 1** below from the Evaluation Report shows the operations and maintenance costs for the US 41 bridges under Scenario 1, which is most applicable operating scenario for the DEIS alternatives.

Figure 1 – US 41 Bridges Operations and Maintenance Costs



*Project Cost Summary*

**Table 1** below shows the estimated construction costs of the DEIS alternatives and the 35-year cost of operations and maintenance costs of the new I-69 segment and existing US 41 bridges. Central Alternative 1 is the lowest cost build alternative. West Alternative 2 would cost approximately \$183 million (12%) more and West Alternative 1 would cost \$313 million (21%) more than Central Alternative 1. The No Build Alternative, which includes the cost of completing the NEPA process as well as maintaining the existing US 41 bridges until 2062, would cost \$310 million over the same period.

Table 1. Estimated Project Costs (in millions)

<b>COST CATEGORY</b>	<b>NO BUILD ALTERNATIVE</b>	<b>WEST ALTERNATIVE 1</b>	<b>WEST ALTERNATIVE 2</b>	<b>CENTRAL ALTERNATIVE 1</b>
<b>Design, Approvals, Right of Way, Mitigation, Procurement, Construction Inspection<sup>1</sup></b>				
NEPA Phase	\$ 17	\$ 17	\$ 17	\$ 17
Preliminary Design, Approvals, Mitigation, Procurement, Final Design, Other Development Costs	\$ 0	\$ 110	\$ 110	\$ 95
Right-of-Way	\$ 0	\$ 103	\$ 144	\$ 19
Construction Inspection	\$ 0	\$ 82	\$ 81	\$ 69
<b>Subtotal Design, etc.</b>	<b>\$ 17</b>	<b>\$ 312</b>	<b>\$ 352</b>	<b>\$ 200</b>
<b>Construction Cost (Roadway, Bridge, Toll System, Utilities)</b>				
Utilities (\$2017)	\$ 0	\$ 25	\$ 25	\$ 40
Toll System (\$2017)	\$ 0	\$ 18	\$ 18	\$ 18
Indirect Costs (\$2017)	\$ 0	\$ 110	\$ 110	\$ 88
Approach Roads (\$2017)	\$ 0	\$ 192	\$ 220	\$ 131
Main River Bridge (\$2017)	\$ 0	\$ 134	\$ 124	\$ 119
Other Bridges (\$2017)	\$ 0	\$ 196	\$ 176	\$ 217
Contingencies (\$2017)	\$ 0	\$ 184	\$ 180	\$ 177
Margin (Profit) (\$2017)	\$ 0	\$ 21	\$ 21	\$ 18
Inflation	\$ 0	\$ 366	\$ 347	\$ 255
<b>Subtotal Construction</b>	<b>\$ 0</b>	<b>\$1,246</b>	<b>\$1,221</b>	<b>\$1,063</b>
<b>Roadway and Bridge Operations and Maintenance (35 years)</b>				
US 41 Bridge	\$ 293	\$ 148	\$ 0	\$ 148
I-69 Roadway and Bridges	\$ 0	\$ 104	\$ 107	\$ 86
<b>Subtotal O&amp;M</b>	<b>\$ 293</b>	<b>\$ 252</b>	<b>\$ 107</b>	<b>\$ 234</b>
<b>Total Project Costs</b>	<b>\$ 310</b>	<b>\$ 1,810</b>	<b>\$ 1,680</b>	<b>\$ 1,497</b>

Note: All costs expressed in year of expenditure dollars, unless otherwise specified.

1. Each of the alternatives, including the no build alternative, includes costs associated with the completion of the NEPA process.