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Kentucky Transportation Cabinet Project Manager  
Louisville Southern Indiana Ohio River Bridges Project

**Date:** October 17, 2011

**From:** Tim Sorenson, P.E.

**Subject:** **Louisville Southern Indiana Ohio River Bridges Project**  
**Revenue Estimates and Indicative Financial Capacity**  
**SEIS Modified Selected Alternative Tolloed Scenario**

The Louisville-Southern Indiana Ohio River Bridges (LSIORB) project is a construction/reconstruction project being undertaken jointly by the Kentucky Transportation Cabinet (KYTC) and the Indiana Department of Transportation (INDOT). The purpose of the project is to address long-term cross-river transportation needs in the Louisville metropolitan area.

The LSIORB project includes construction of a new 6-lane downtown bridge for northbound I-65 traffic. The existing I-65 Bridge will be reconfigured to six lanes to serve southbound traffic. Another new 4-lane bridge, the East End Bridge, will link the extended KY 841 with IN 265 in Indiana. With construction of the two new bridges and reconfiguration of the existing downtown bridge, roadway work will be completed for the approaches in Kentucky and Indiana. In addition, the existing Kennedy Interchange, where I-64, I-65, and I-71 converge in downtown Louisville, will be reconstructed. Collectively, these improvements are referred to as the Modified Selected Alternative.

This alternative assumes a \$1.50 (2010 dollars) toll for passenger cars on the new East End Bridge once it opens to traffic in 2017. The new I-65 northbound Bridge and the rehabilitated southbound I-65 Bridge would both be tolled beginning in 2020 at a toll for passenger cars of \$1.50 as well.

Wilbur Smith Associates (WSA) was asked to provide preliminary revenue estimates and indicative financial capacity for the Modified Selected Alternative to support the Supplemental Environmental Impact Statement (SEIS) analysis, which compares the 2003 Selected Alternative to the new Modified Selected Alternative. In the SEIS, only the Modified Selected Alternative includes tolling. This indicative financial capacity uses a net present value analysis to estimate the potential level of funding that can be contributed to this project based on the use of bonds supported by toll revenue.

## METHODOLOGY

The revenue estimates were developed based on the traffic estimates for the SEIS which used the traffic model developed specifically for the LSIORB project. The LSIORB Time-of-Day Travel Demand Model Phase 1 (September, 2011) and Phase 2 (October, 2011) reports discuss the methods used to develop the model and provide an overview of new traffic and socioeconomic data that were used to support the model. The details of the SEIS traffic forecasts can be found in the LSIORB Traffic Forecasting Report (October 2011).

In order to develop project revenue by year, the 2030 traffic forecasts were used with additional travel demand model runs made for two future years: (1) 2017, when the new East End Bridge is expected to open and (2) 2020, when the new I-65 Bridge is expected to open. A yearly gross revenue stream was estimated by interpolation and extrapolation of the model year estimates. Toll operations and maintenance costs and roadway maintenance costs were estimated and subtracted from the gross toll revenue stream to obtain an estimated net revenue stream.

## TRAFFIC VOLUMES ON BRIDGES

**Table 1** presents the forecast bridge volumes for years 2017, 2020, and 2030. (Darker shaded cells represent tolled facilities).

**Table 1 - Average Daily Traffic Volumes on Bridges**

| Modified Build (\$1.5<br>2010 dollars) | I-64    | US 31  | I-65    | East End |
|----------------------------------------|---------|--------|---------|----------|
| 2017                                   | 92,200  | 14,200 | 127,500 | 29,500   |
| 2020                                   | 108,100 | 34,700 | 92,300  | 44,700   |
| 2030                                   | 122,800 | 35,200 | 102,600 | 49,800   |

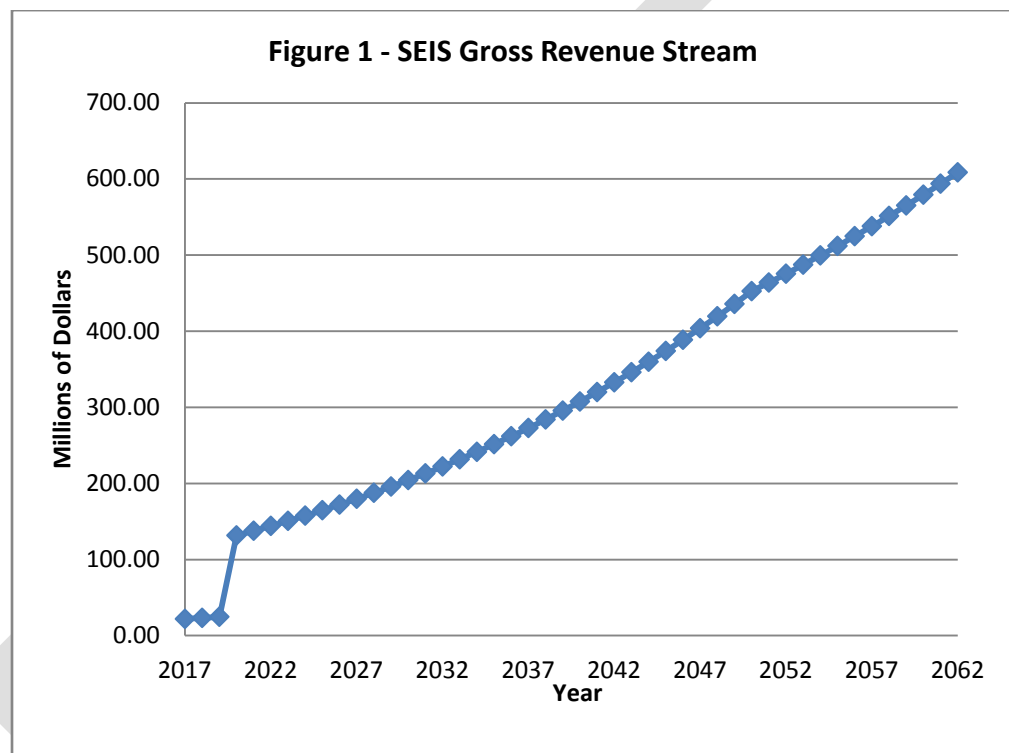
## GROSS TOLLING REVENUES

A set of basic assumptions were developed to generate gross revenues based on the forecast traffic volumes.

- Tolls will be collected electronically, by transponder account or through video identification. A single toll rate by vehicle type will be collected, regardless of the collection method used.
- Truck tolls are 2 and 4 times the car rates, for light and heavy trucks respectively.
- The same toll rates will be in effect at all times throughout the day (no time-of-day variations).
- Tolls are collected in both directions.

- The toll rates in the analysis are for passenger cars in 2010 dollars. Toll rates are assumed to be increased annually according to the Consumer Price Index (CPI), assumed at 2.5% yearly growth for this analysis.

Using the traffic volumes from the SEIS and projected by the model, gross revenues from toll collections were estimated for the Modified Selected Alternative based on a baseline toll rate of \$1.50 (2010 dollars) for passenger cars. The results are shown in **Figure 1**.



### **LSIORB PROPOSED TOLL COLLECTION SYSTEM**

An all electronic tolling system is assumed (where motorists are charged through an in-vehicle transponder or traced to an account by a video image of their license plate). For the purposes of this exercise, it is estimated that the cost to process each transaction and maintain the toll collection system would be \$0.38 when the East End Bridge is open and \$0.285 when both bridges are open (2010 dollars). The cost per transaction goes down as the number of transactions increases because of economies of scale. The cost per transaction does not include the initial cost of construction and installation of the toll collection system.

## NET REVENUE STREAM

The gross revenue stream less the annual cost of toll collection operations and maintenance and the annual cost of roadway operations and maintenance yields a net revenue stream. The roadway operations and maintenance cost reflects the need to keep the roadway in operating condition and preserve the investment in new infrastructure. These costs do not include major repairs or replacement during the years in which revenue is used to support bonding (40 or 50 years). For this analysis, an annual cost of \$4,500/lane-mile (2010 dollars) was used and inflated by 2.5% per year. Based on information provided by KYTC, 63 lane miles would be operational by 2017 and 140 lanes miles by 2020 for the entire LSIORB project. These are total project lane-miles, representing an increase of 3 to 60 lane-miles compared to existing conditions. Results are presented through year 2062 in **Table 2**.

**Table 2 –Net Revenue Stream for SEIS Modified Build Alternative**  
(In millions of dollars)

| Year | Gross Revenue | Tolling O&M | Roadway O&M | Net Revenue |
|------|---------------|-------------|-------------|-------------|
| 2017 | \$21.86       | \$4.64      | \$0.30      | \$16.92     |
| 2018 | \$23.24       | \$4.99      | \$0.30      | \$17.95     |
| 2019 | \$24.67       | \$5.34      | \$0.30      | \$19.02     |
| 2020 | \$131.56      | \$18.25     | \$0.40      | \$112.91    |
| 2021 | \$137.72      | \$18.89     | \$0.40      | \$118.43    |
| 2022 | \$144.11      | \$19.57     | \$0.80      | \$123.75    |
| 2023 | \$150.74      | \$20.26     | \$0.80      | \$129.68    |
| 2024 | \$157.60      | \$20.97     | \$0.90      | \$135.73    |
| 2025 | \$164.72      | \$21.71     | \$0.90      | \$142.11    |
| 2026 | \$172.09      | \$22.47     | \$0.90      | \$148.72    |
| 2027 | \$179.73      | \$23.26     | \$0.90      | \$155.57    |
| 2028 | \$187.64      | \$24.07     | \$1.00      | \$162.57    |
| 2029 | \$195.84      | \$24.91     | \$1.00      | \$169.93    |
| 2030 | \$204.33      | \$25.77     | \$1.00      | \$177.56    |
| 2031 | \$213.12      | \$26.66     | \$1.00      | \$185.45    |
| 2032 | \$222.22      | \$27.58     | \$1.10      | \$193.54    |
| 2033 | \$231.64      | \$28.53     | \$1.10      | \$202.01    |
| 2034 | \$241.40      | \$29.51     | \$1.10      | \$210.79    |
| 2035 | \$251.50      | \$30.53     | \$1.10      | \$219.88    |
| 2036 | \$261.95      | \$31.57     | \$1.20      | \$229.19    |
| 2037 | \$272.77      | \$32.64     | \$1.20      | \$238.93    |
| 2038 | \$283.97      | \$33.76     | \$1.20      | \$249.01    |
| 2039 | \$295.56      | \$34.90     | \$1.30      | \$259.35    |

|      |          |         |        |          |
|------|----------|---------|--------|----------|
| 2040 | \$307.54 | \$36.08 | \$1.30 | \$270.16 |
| 2041 | \$319.95 | \$37.30 | \$1.30 | \$281.34 |
| 2042 | \$332.78 | \$38.56 | \$1.40 | \$292.82 |
| 2043 | \$346.05 | \$39.86 | \$1.40 | \$304.79 |
| 2044 | \$359.78 | \$41.19 | \$1.40 | \$317.18 |
| 2045 | \$373.97 | \$42.57 | \$1.50 | \$329.90 |
| 2046 | \$388.66 | \$44.00 | \$1.50 | \$343.16 |
| 2047 | \$403.84 | \$45.47 | \$1.50 | \$356.87 |
| 2048 | \$419.54 | \$46.98 | \$1.60 | \$370.96 |
| 2049 | \$435.77 | \$48.54 | \$1.60 | \$385.63 |
| 2050 | \$452.55 | \$50.15 | \$1.70 | \$400.70 |
| 2051 | \$463.86 | \$51.40 | \$1.70 | \$410.76 |
| 2052 | \$475.46 | \$52.69 | \$1.70 | \$421.07 |
| 2053 | \$487.35 | \$54.00 | \$1.80 | \$431.54 |
| 2054 | \$499.53 | \$55.35 | \$1.80 | \$442.37 |
| 2055 | \$512.02 | \$56.74 | \$1.90 | \$453.38 |
| 2056 | \$524.82 | \$58.16 | \$1.90 | \$464.76 |
| 2057 | \$537.94 | \$59.61 | \$2.00 | \$476.33 |
| 2058 | \$551.39 | \$61.10 | \$2.00 | \$488.29 |
| 2059 | \$565.17 | \$62.63 | \$2.10 | \$500.44 |
| 2060 | \$579.30 | \$64.19 | \$2.10 | \$513.01 |
| 2061 | \$593.78 | \$65.80 | \$2.20 | \$525.78 |
| 2062 | \$608.63 | \$67.44 | \$2.20 | \$538.98 |

### POTENTIAL FUNDING FOR CONSTRUCTION

Using the net revenue stream derived from the work above, an analysis can be done to provide an estimated range of potential funding available for construction. A net present value analysis was used to determine the potential financing capacity of the toll revenues. This level of analysis is considered indicative of the potential dollars available to support construction. To help cover a number of options, four sets of assumptions were used and are shown on **Table 3**. These assumptions were based on the following:

- The revenue stream outlined in the previous section
- Project financing beginning in 2013, which means the bonds would be sold in 2013 with proceeds going to construction
- Two different combinations of coverage ratios and discount rates to reflect a more public bond approach (8% discount rate, 1.5 coverage ratio) and a more private bond approach (6.5% discount rate, 1.75 coverage ratio)
- Two different lengths of bonding, 40 and 50 years

**Table 3 – Indicative Financial Capacity Based on Coverage Ratio  
SEIS Modified Build Alternative**

| Assumptions                                                                   |             | Option 1 | Option 2 | Option 3 | Option 4 |
|-------------------------------------------------------------------------------|-------------|----------|----------|----------|----------|
| First Year of Revenue                                                         | East End    | 2017     | 2017     | 2017     | 2017     |
|                                                                               | Downtown    | 2020     | 2020     | 2020     | 2020     |
| Toll Rates (in 2010 dollars)                                                  | Car         | \$1.50   | \$1.50   | \$1.50   | \$1.50   |
|                                                                               | Small Truck | \$3.00   | \$3.00   | \$3.00   | \$3.00   |
|                                                                               | Large Truck | \$6.00   | \$6.00   | \$6.00   | \$6.00   |
| Toll Escalation                                                               |             | 2.50%    | 2.50%    | 2.50%    | 2.50%    |
| Initial Year of Financing                                                     |             | 2013     | 2013     | 2013     | 2013     |
| O&M Tolls Included                                                            |             | YES      | YES      | YES      | YES      |
| O&M Roadway Included                                                          |             | YES      | YES      | YES      | YES      |
| Discount Rate                                                                 |             | 8.00%    | 6.50%    | 8.00%    | 6.50%    |
| Coverage Ratio                                                                |             | 1.5      | 1.75     | 1.5      | 1.75     |
| Years of bonding after bond issue                                             |             | 40       | 40       | 50       | 50       |
| Results (2013 dollars)                                                        |             | Option 1 | Option 2 | Option 3 | Option 4 |
| Net Present Value (millions of dollars)                                       |             | \$1,277  | \$1,716  | \$1,424  | \$1,992  |
| Indicative Financial Capacity (based on coverage ratio) (millions of dollars) |             | \$851    | \$980    | \$949    | \$1,138  |

The indicative financing capacity analysis presented here is conceptual-level and is intended only for planning purposes to provide a reasonable range estimate. Based on the analysis summarized above, the net revenue streams shown in **Table 2** can yield a range of possible construction funding. Depending on the type of bonding structure used, an estimated \$0.85 billion to \$1.1 billion could be available to finance construction, as shown in **Table 3**.

