HNTB

Louisiana Transportation Authority (LTA) Evaluation of the Baton Rouge Urban Renewal and Mobility Plan (BUMP) to Develop the Project as a Public Private Partnership (P3)

October 20, 2015 – Final (With Redactions)

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EXECUTIVE SUMMARY

On December 29, 2014, AECOM submitted an unsolicited proposal for a Public-Private Partnership (P3) to the Louisiana Transportation Authority (LTA). AECOM's proposal is referred to as the **Baton Rouge Urban Renewal and Mobility Plan** (BUMP Proposal or Proposal).

R.S. Title 48, Section 2076 requires the LTA to substantiate the Project need through an economic feasibility study. This report includes a summary of the BUMP Proposal and HNTB's analysis of the Project's feasibility.

Proposal Overview

[redacted] The Proposal indicates that the Project connects regional interstate systems on each side of the Mississippi River, provides I-10 drivers with an alternative free-flow river crossing and relieves congestion in the US-61 corridor in East Baton Rouge Parish (See Chapter 2, Figure 2-1).

The Project generally will consist of two tolled lanes in each direction. The Proposal presents the tolled lanes as a free-flow component of the system which will utilize all-electronic tolling (AET). Additionally, the Project will incorporate un-tolled frontage roads on both sides of the tolled facility. Signalized intersections along the frontage roads allowing U-turns will be incorporated at various points to maintain and provide access to residences and businesses. Fourteen access points will provide ingress and egress to and from the tolled lanes (see Chapter 2, Figure 2-4).

Construction Cost

The Proposal identified an estimated construction range of $720 to 800 million. HNTB conducted an independent cost analysis which estimated construction costs at $775 million in 2015 dollars. HNTB's analysis is based on a conceptual design of the Project developed by HNTB. The HNTB conceptual design used the BUMP Proposal as a baseline. Where necessary, due to ambiguity as a result of the conceptual level of the Project or Proposal detail, the various infrastructure elements were further refined by HNTB to incorporate additional considerations that are necessary to meet the design and construction standards and maintain traffic operations consistent with similar facilities of this type and to meet the intent of the Proposal.

Tolling

The Proposal indicates that drivers using the non-toll frontage roads will be able to cross the US-190 Mississippi River Bridge and travel from levee to levee without paying a toll and identifies no improvements to the segment between LA-1 and I-110. Since no improvements are anticipated to the existing US-190 Mississippi River Bridge, HNTB has assumed this segment will not be tolled and it was excluded from HNTB's analysis related to toll costs and traffic and revenue.

Both the BUMP Proposal and HNTB's analysis assume that the Project will be tolled using an AET, free-flow toll collection system that does not require drivers to stop at traditional toll collection booths to pay tolls. AET collection systems identify each vehicle as it passes under toll gantries at highway speeds. The Project will not provide an option for drivers to stop and pay a toll collector or use an automatic toll payment machine. Drivers will pay tolls using a transponder system (GeauxPass) or an image based invoicing system. Image based systems use cameras located on the toll gantries to capture an image of the driver's license plate. The license plate information is used to identify the registered owner of the vehicle and the owner is invoiced for the toll.

HNTB conducted a sketch-level planning estimate for toll system capital costs. Capital costs are estimated at $18.0 million (in 2014 dollars). This includes the acquisition and implementation costs for both the roadside toll collection system and the necessary back office system upgrades.

Traffic and Revenue (T&R)

HNTB also conducted a Level 1 traffic and revenue (T&R) study to examine the preliminary feasibility of the BUMP Project. A sketch level T&R spreadsheet model was developed based on travel demand data, estimated travel time savings and other behavior characteristics obtained from the Baton Rouge Metropolitan Planning Organization (MPO) travel demand model. HNTB adopted several assumptions [redacted]: 2022 project open year; 5% truck traffic; a truck toll rate of 2.5 times the auto rate.

Other assumptions or parameters used in the HNTB study were developed based on data collection efforts, discussion within the study team and peer review team, and regional or national best practices. The toll rate per mile is assumed to be $0.20 for autos and $0.50 for trucks. Considering all assumptions, it is estimated that an average of 40% of the auto traffic would choose to use the BUMP tolled lanes in 2017. This number rises to 43% in 2037.

According to the HNTB T&R, this level of usage results in estimated revenues of $27M in the opening year and $1.1B over the 30-year term through 2051.

Feasibility

[redacted]

HNTB conducted a financial feasibility evaluation to assess the upfront financing potential of the Project through a revenue risk Design-Build-Finance-Operate-Maintain (DBFOM) P3 structure. Two scenarios were analyzed to establish a range of upfront proceeds financed exclusively from the Project's toll revenues. $485-593 million of the Project's $877 capital costs can potentially be financed through the toll P3 representing 55-68% of the Project's capital costs.

Findings

[redacted] after conducting an independent preliminary analysis, HNTB has determined that gap funding ranging from $284 -$397 will be required. Given the preliminary nature of the BUMP Proposal, it is likely that future refinements will made. Feasibility of the project will affected by any future refinements which decrease costs or increase revenue.

1.0 CHAPTER ONE – STATE & FEDERAL LEGISLATION SUMMARY

This chapter summarizes State and Federal law related to P3, tolling and the LTA's authority to accept the BUMP Proposal.

1.1 Louisiana State Legislation

In 2001, the Louisiana State Legislature established the LTA in Chapter 30 of Title 48, R.S. 48:2071–2083. Pursuant to this Chapter, the LTA may consider P3s that supplement public revenue sources and may pursue alternative and innovative funding sources, including user fees. The intent of the legislation and goal of the LTA is to encourage investment in the state of Louisiana by private entities and to facilitate to the greatest extent feasible the financing, development, and operation of transportation facilities.

The LTA has established **Public-Private Partnership Guidelines**[1]. The Guidelines set forth the criteria the LTA shall consider in determining the suitability of P3 projects including:

- Stakeholder desires and commitment;
- Political and institutional support;
- Demonstrated transportation need with respect to congestion, safety, economic opportunity, and connectivity;
- Adequate funding potential with respect to tolling or availability payments;
- Ability to leverage public resources and transfer cost/schedule risks to the private sector;
- Potential to expedite the project schedule through access to capital markets and innovative project delivery;
- Potential for increased cost-effectiveness through private sector innovation and creativity;
- Lack of internal resources to deliver a project in a timely manner; and
- Any other factors considered relevant by the Authority.

Additionally, R.S. 48:2076 requires that feasibility be established for all projects through meeting both of the following criteria:

- Inclusion in the approved transportation plan and program of the Department of Transportation and Development; and
- Substantiation of the project need through an economic feasibility study conducted by LTA.

R.S. 48:2084.5 allows a private entity to impose a user fee or toll on a roadway within a P3 project. That Section states, "The private entity shall be authorized to develop or operate the

[1] http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Administration/LTA/Pages/default.aspx

qualifying transportation facility, impose user fees, and enter into service contracts in connection with the use of the transportation facility. No tolls or user fees may be imposed by the private entity on any existing free road or system of roads, bridge, tunnel, or overpass unless such road or system of roads, bridge, tunnel, or overpass is improved or expanded."

In accordance with the Louisiana R.S. 48:2084.D, the LTA may approve a P3 proposal, but the LTA must determine that any proposal serves a public purpose in accordance with the following factors:

- There is a public need for a transportation facility or facilities of the type the private entity proposes to develop or operate as a transportation facility.
- The transportation facility or facilities and the proposed interconnections with existing transportation facilities, and the private entity's plans for operation of the qualifying transportation facility or facilities are reasonable and not incompatible with the state transportation plan and with the local governmental entity's comprehensive plan or plans.
- The estimated cost of the transportation facility or facilities is reasonable in relation to other similar facilities.
- The private entity's proposal will result in the timely development or more efficient operation of the transportation facility.

Prior to the LTA approving a proposal to develop or operate a transportation facility as a P3, the LTA must submit the proposal to the House and Senate Committees on Transportation, Highways and Public Works for a public hearing. Upon LTA approval of a P3 proposal, R.S. 48:2084.6 allows the LTA to enter into Comprehensive Development Agreements (CDA) and Pre-Development Agreements (PDA) with private entities. A CDA is an agreement between the LTA and one or more private entities for the acquisition, planning, design, development, financing, construction, reconstruction, extension, expansion, maintenance, or operation of all or part of a transportation facility or multiple transportation facilities. A PDA may permit the private entity to commence preliminary activities, including project planning and development, advance right-of-way acquisition, preliminary design. It may also allow the private entity to conduct transportation and revenue studies, ascertain the availability of financing for the proposed facility or facilities and establish the process for negotiation of the CDA.

1.2 Federal Legislation

Title 23 of the United States Code Section 129 sets forth the mainstream federal tolling programs and provides for conversion of existing free facilities to tolled facilities under certain circumstances. Three of those programs address conditions that would potentially allow the BUMP Project to be tolled. Section 129(a)(1)(E) permits the reconstruction or replacement of a toll-free bridge or tunnel and conversion of the bridge or tunnel to a toll facility. Section 129(a)(1)(F) permits the reconstruction of a toll-free Federal-aid highway (other than a highway on the Interstate System) and conversion of the highway to a toll facility is permitted for Federal participation. Additionally, 23 U.S.C. 129 (a)(1)(B) permits tolling when new lanes are added to an existing facility provided the number of toll-free lanes, excluding auxiliary lanes, after the construction is not less than the number of toll-free lanes, excluding auxiliary lanes, before the construction.

1.3 Project-specific Legislative Issues

The development and construction of free-flow toll lanes considered by the BUMP Proposal appear to be consistent with State and Federal legislation. However, in accordance with R.S. 48:2084.5, no tolls or user fees may be imposed by the private entity on any existing free road or system of roads, bridge, tunnel, or overpass unless such road or system of roads, bridge, tunnel, or overpass is improved or expanded. This section is also consistent with the provisions in 23 USC 129(a)(1)(F). However, the Proposal does not contemplate reconstruction of the existing US-190 Bridge over the Mississippi River. Therefore, in accordance with R.S. 48:2084.5 and USC 129(a)(1)(F), the traffic on the free-flow tolled lanes would need to merge with the BUMP frontage road lanes prior to the river crossing. The combined traffic flows would cross the river and tolls would not be collected over this portion of the BUMP corridor.

2.0 CHAPTER TWO – BUMP PROPOSAL SUMMARY

This chapter provides a summary of key components of the BUMP Proposal. This summary is based strictly on information included in the preliminary unsolicited proposal submittal by AECOM. This is a conceptual plan and will likely be refined as project development continues. Further HNTB analysis related to the feasibility of the BUMP Project and its various component elements are addressed in subsequent chapters.

[redacted]

2.1 Project Concept

As described in the BUMP Proposal, the Project generally will consist of two tolled lanes in each direction. Additionally, the Project will incorporate un-tolled frontage roads with signalized intersections parallel to the tolled lanes on both sides of the facility to maintain and provide access to residences and businesses. The BUMP Proposal presents the tolled lanes as a free-flow component of the system which will utilize AET. The Proposal identifies two (2) discrete projects or Segments of Independent Utility (SIUs) for development of the Project.

2.1.1 SIU-1

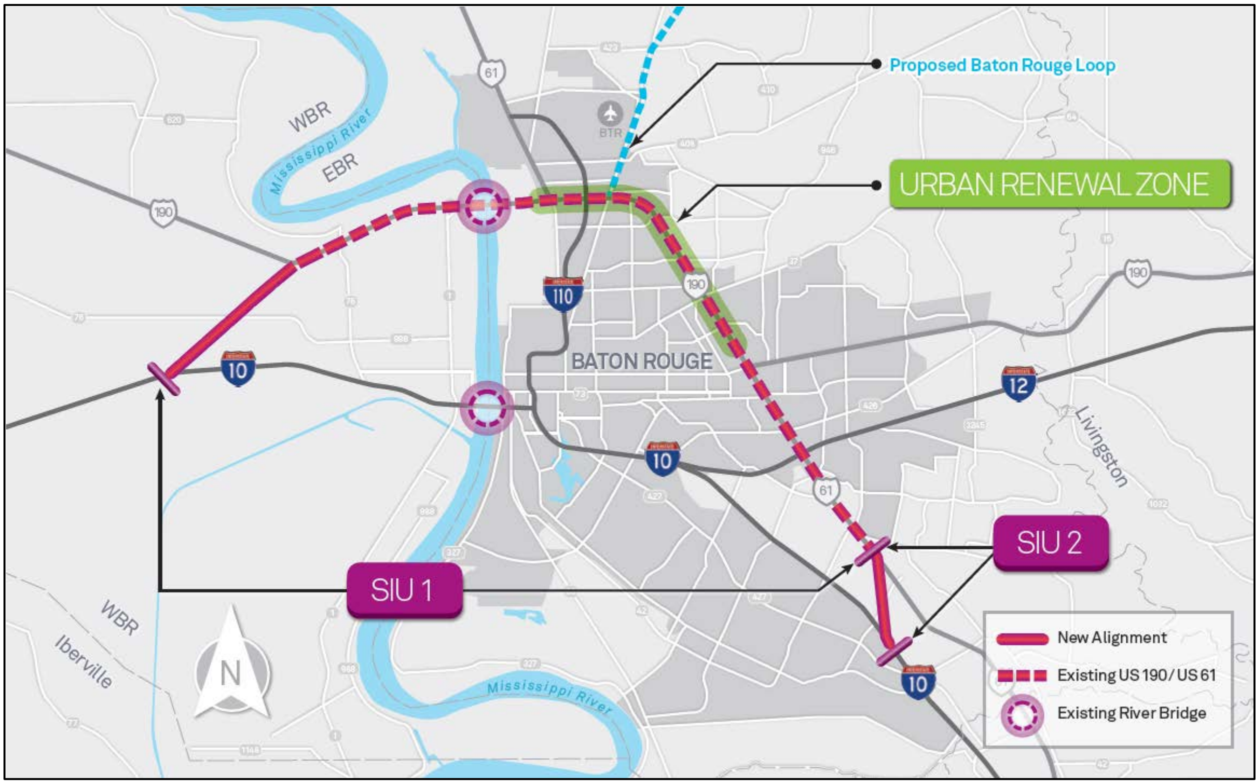
SIU-1 is the primary focus of the Proposal. SIU-1 is approximately 21 miles in length and is described in the Proposal as a functional stand-alone project capable of providing an immediate impact by relieving traffic congestion on the existing I-10 Mississippi River Bridge (New Bridge) and US-61 in East Baton Rouge Parish.

The Proposal describes the route as beginning at I-10, approximately 8 miles west of the New Bridge. The proposed route will intersect US-190 and follow this route across the US-190 Mississippi River Bridge (Old Bridge). The Proposal does not include any structural modifications to the Old Bridge. The proposed route then follows US-61 (Airline Highway) to the terminus of SIU-1 on US-61 just south of Jefferson Highway.

2.1.2 SIU-2

SIU-2 is proposed to connect US-61 from the terminus of SIU-1 to I-10 between the Highland Road interchange and the Pecue Lane overpass. SIU-2 will be further refined during future planning phases. SIU-2 is not considered in traffic and financial projections presented in the BUMP Proposal.

Figure 2-1: BUMP Project (exhibit from BUMP Proposal)



[redacted] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

2.3 Costs – Construction and Operations and Maintenance (O&M)

The BUMP Proposal includes a planning level capital construction cost estimate for SIU-1. The cost estimate was determined based on assumed per mile costs of $25 - $30 million and other costs related to system and service interchange improvements. The estimated capital construction costs are between $720 and $800 million.

The Proposal also addresses operating expenditures (OpEx), including customer service, toll collections, and Intelligent Transportation Systems (ITS) operations costs. Annual OpEx are estimated at $10 million. However, the Proposal deferred details of routine maintenance components until negotiations related to the Comprehensive Development Agreement.

2.4 Sources of Funding

The Proposal identifies tolls as the primary source of funding for the Project, but also identifies other potential funding sources. [redacted]

2.5 Project Schedule

The Proposal states that three months will be needed to complete the CDA process and assumes an additional 21 months to complete the National Environmental Policy Act (NEPA) process. See Figure 2-2 for additional anticipated schedule milestones identified in the Proposal.

[redacted]

2.6 Design and Construction

2.6.1 Alignment and Typical Section

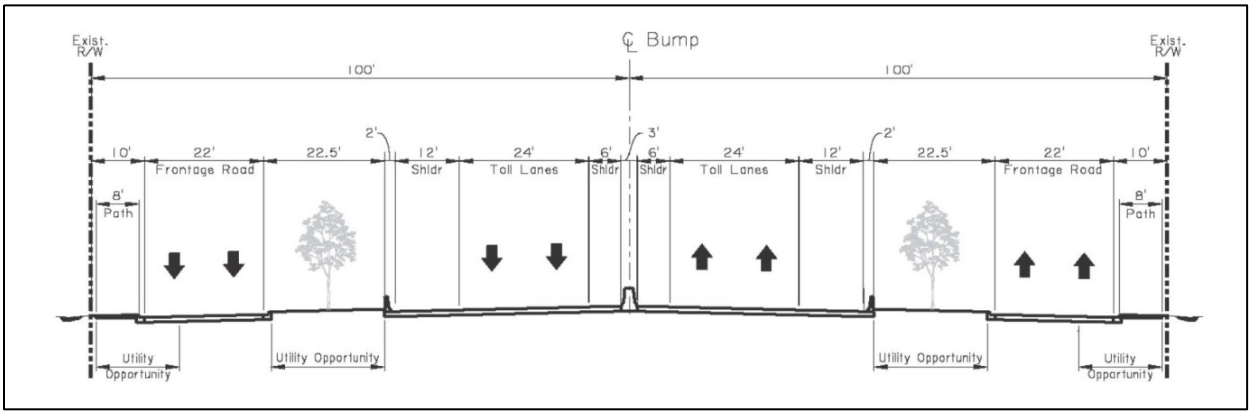
The BUMP Project alignment will utilize the existing US-190 and the existing US-61 (Airline Highway) corridor which is currently a 4-lane divided highway with open drainage systems in the median and on each side of the roadway. While the existing typical section along this corridor consists of four lanes, there are locations where the corridor widens to six lanes and the median becomes raised. The design anticipated in the BUMP Proposal appears to generally maintain the existing horizontal and vertical geometry. Table 2-2 summarizes the BUMP typical section in each major portion of the SIU-1 corridor.

Based on the Proposal, the anticipated lane configuration and other typical section components will require approximately 200’ of right-of-way (ROW). Within this section, the BUMP tolled lanes, frontage roads, sidewalks and utility corridors will be incorporated (see Figure 2-3).

[redacted]

[redacted]

Figure 2-3: BUMP Typical Section – 200' ROW Section (exhibit from BUMP Proposal)

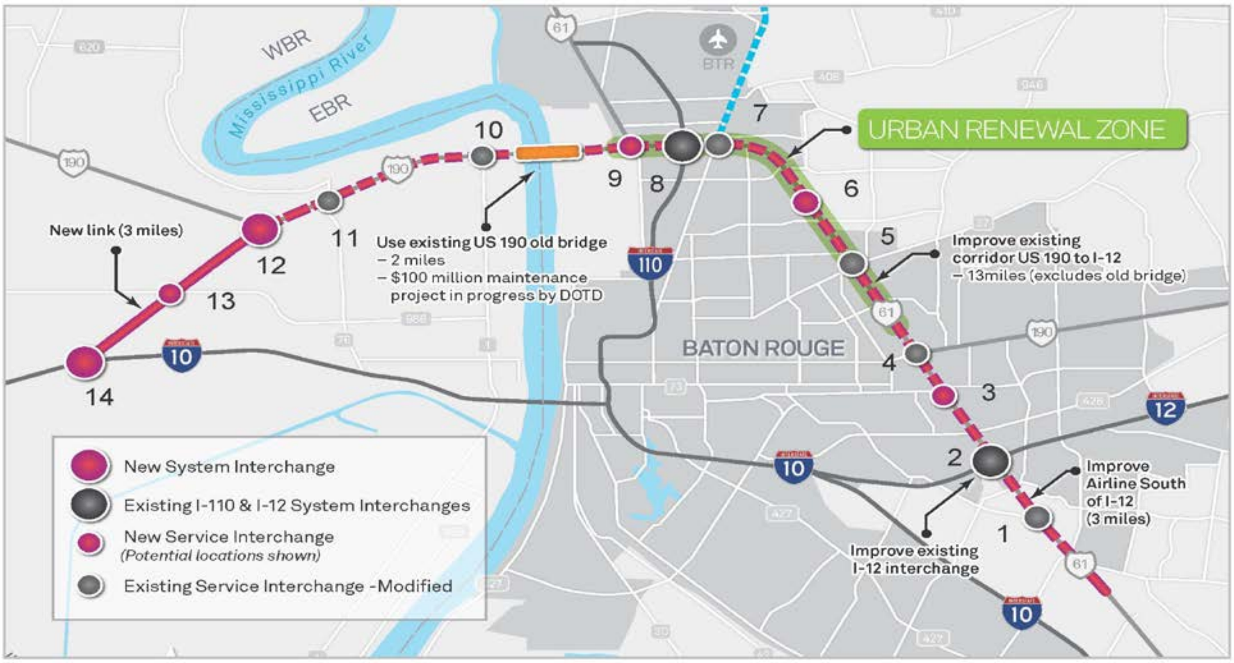


2.6.2 Access

The Proposal identifies new and improved system interchanges and service interchanges to improve operations and facilitate free-flow traffic through the limits of the Project. System interchanges provide freeway-to-freeway (or tollway) connections. Service interchanges provide connections from the freeway/tollway to the parallel signalized frontage road(s) or directly to cross streets.

As noted in Table 2-3 below, the BUMP Proposal identifies 14 access points in the revised US-190/US-61 configuration which provide ingress and egress to and from the BUMP Project corridor. Eight of the access locations are existing interchanges that will be modified to provide access to the BUMP tolled lanes while maintaining their existing movements. Traffic on the BUMP tolled lanes will be able to enter and exit the roadway through acceleration/deceleration lanes connected to the frontage roads which maintain and provide access to residences and businesses. The six new access points will provide ingress and egress access to the BUMP tolled lanes only and will permit U-turns from the frontage roads. The service interchanges identified in Table 2-3 will not have the same complexity level as the existing interchanges. Table 2-3, along with Figure 2-4 provides the location and description of each interchange within the BUMP corridor.

Figure 2-4: BUMP Project Access Points (Exhibit from BUMP Proposal)



[redacted]

[redacted]

[redacted]

2.6.3 Utilities

The Proposal addresses utilities at a conceptual level. However, the locations of various utilities that will or could intersect with the BUMP Project alignment were identified, demonstrating some level of field research. Further efforts are anticipated regarding identification of Project impacts caused by utilities and would be made after Pre-Development Agreement is established. No major utility relocations were identified in the Proposal that will significantly impact the project cost or schedule. Utility relocations are expected to follow standard utility relocation protocols and procedures.

2.6.4 Right-of-Way (ROW)

The Proposal indicates the Project will require varying widths of ROW along the Project alignment. Existing ROW width varies throughout the corridor. East of the river the existing ROW corridor width varies from approximately 440 feet to approximately 164 feet. West of the river, existing ROW width is more consistently measured at approximately 200 feet.

The proposed typical section for the BUMP Project requires a minimum of 200 feet of right way on both sides of the river. Based on the existing ROW corridor width, there is a possibility that some property acquisition will be necessary to accommodate the BUMP Project typical section. The largest potential acquisition will be on the west side of the Mississippi River on the new segment of roadway from US-190 to I-10. The Proposal indicated this segment will be approximately 3 miles long and will require a ROW corridor width of 300 feet. Table 2-4 summarizes the approximate existing ROW widths throughout the Project and possible locations where acquisition may be required to accommodate the Project.

[redacted]

2.6.5 Railroad

The BUMP Proposal anticipates several rail crossings required for the Project. Additionally, the Old Bridge accommodates vehicle and rail traffic.

There will be three locations where the BUMP Project must provide consideration for existing rail facilities. The rail crossings are located at:

- US-61 and South Choctaw Drive – Existing at-grade rail crossing;
- The LA-76 interchange – Existing US-190 alignment is elevated over the existing rail line; and
- The BUMP as it approaches I-10.

Proper vertical clearance will be provided and minimal rail disruption will have to be a priority.

2.6.6 Environmental

Since SIU-1 primarily utilizes the existing ROW corridor, the Proposal notes that there will be significantly fewer community and environmental impacts than other projects of a similar nature. The Proposal concludes there will be no environmental impact to items such as wetlands and endangered species. However, this assumption does not appear to be based on any field work or detailed analysis.

The Proposal notes that the Project must be "cleared" through the NEPA process as an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

3.0 CHAPTER THREE – ROADWAY CONSTRUCTION AND OPERATIONS & MAINTENANCE ANALYSIS

This chapter summarizes the HNTB analysis of roadway construction costs and O&M costs related to the BUMP proposal. The HNTB estimate should be considered a planning level estimate based on the currently available level of detail. The analysis considers the information provided in the Proposal and also addresses costs for elements necessary to develop, design, construct, and operate the Project in a manner similar to other facilities of this type.

3.1 Capital Cost Estimate

As noted in Chapter 2, the Proposal established a construction cost estimate of $720 to 800 million. The HNTB estimated total capital cost is provided in Table 3-1 below:

Table 3-1: HNTB Capital Cost Estimate

Description	Cost (2015 dollars)
Capital Cost of Roadway Construction	$553,753,275
Engineering Fees (10% of Capital Cost)	$55,375,327
Construction Cost Contingency (30% of Capital Cost)	$166,125,982
HNTB Total Construction Cost Estimate:	**$775,254,585**

The financial feasibility analysis inflates the base year capital costs of $775 million to $856 million by applying an annual inflation rate of 2.5% through the midpoint of construction in 2019.

This estimate does not include the capital costs associated with the tolling system. Those costs are found in Chapter 4. Summary costs are provided in each segment summary in the following sections of this chapter and a more detailed cost summary can be found in APPENDIX B – Construction Costs.

3.2 HNTB Methodology – Construction Costs

3.2.1 HNTB Conceptual Design and Construction Considerations

HNTB analysis of the construction cost estimates was based on a conceptual design of the Project developed by HNTB. The HNTB conceptual design used the BUMP Proposal as a baseline. Where necessary, due to ambiguity as a result of the conceptual level of the Project or Proposal detail, the various infrastructure elements were further refined by HNTB to incorporate additional considerations that are necessary to meet the design/construction standards and maintain traffic operations consistent with similar facilities of this type and to meet the intent of the Proposal.

The proposed Project alignment follows either existing US-190 or existing US-61 (Airline Highway) for most of its length. While most of the proposed alignment follows existing four-lane divided highways, neither of the existing roadways are limited access facilities. Additionally, both of the existing facilities have at-grade cross-traffic flows with signalized intersections and left-turn lanes that encroach into the center median. Crossing streets and driveways will need to connect directly to the frontage roads or to the interchanges along the proposed alignment.

The BUMP tolled lanes will be a limited-access facility with the ability to maintain traffic at high speeds (60 to 70 mph). In order to achieve an appropriate level of safety for this type of facility, significant redesign of existing roadway elements will be required in many areas. The level of effort required to reconstruct the existing lanes will depend on the current roadway configuration and the condition of the existing roadway. In some areas, improvements may be limited to resurfacing and restriping. In other locations, it may be necessary to adjust the alignment and profile to provide a safe facility for high-speed traffic and ensure proper drainage.

Anticipated work outside the existing paved areas may also be significant. Work will include relocation of existing driveways to allow connection to the proposed frontage road, construction of an enclosed storm drainage system, construction of curb and gutter, and construction of outside barriers. Where new frontage roads are required, the existing surface drainage swales will be replaced by a new enclosed storm drainage system. Construction for the frontage roads will include a new section wide enough to accommodate two travel lanes with curb and gutter on each side.

Intersections with roads along the existing alignment will be designed in a manner to maintain or improve existing operations to the extent practicable. For locations with a high level of cross-traffic, the new BUMP toll lanes will be elevated over the existing intersection. The frontage roads will need to cross the BUMP at access points using free-flow U-turn lanes that will be provided in advance of signalized cross street intersections. The existing traffic control system will also need to be updated.

At locations where the level of service is lower, the BUMP toll lanes may not accommodate the existing traffic patterns. Vehicles will continue on the frontage road until the next available U-turn location. [redacted]

The interchange improvements are each unique and range from minimal improvements to significant replacements. Each existing interchange along the BUMP corridor is described below, along with the proposed improvements/modifications. Detailed design, beyond the scope of this report, will be necessary to reconcile all of the issues that may be encountered. The interchange descriptions provided below are based on interpretations of the BUMP Proposal. Interchanges are presented from West to East as follows:

3.2.1.1 US-190/LA-415 (Lobdell Highway)

This interchange currently connects US-190 with LA-415 (Lobdell Highway). There are two main ramps in this interchange, an on-ramp that connects northbound LA-415 to westbound US-190, and an off-ramp connecting eastbound US-190 to southbound LA-415. Access to eastbound US-190 from LA-415 can be accomplished via northbound Plantation Road which connects to US-190 approximately 0.5 miles east of the interchange. In the same manner, access to southbound LA-415 from US-190 can be accomplished by exiting on Loop Road which connects to Plantation Road, also approximately 0.5 miles east of the interchange. Modifications to the interchange will include the addition of the northbound and southbound frontage roads which will provide for continuity of US-190, as it is replaced by the BUMP tolled lanes. To the east of the interchange, both northbound and southbound roadways will be elevated over the railroad tracks in the same manner as the existing mainline bridge. A new bridge will also be required as the eastbound frontage road approaches the interchange and the BUMP continues to the south towards I-10. The proposed eastbound frontage road bridge will be on the second level while the BUMP tolled lanes remain at ground level.

3.2.1.2 US-190/LA-1

No modifications will be required at this interchange. The eastbound and westbound frontage roads begin and end just west of the intersection. At this location, motorists will be using the existing US-190 lanes and will not be tolled.

3.2.1.3 US 61/Scenic Highway

This interchange is the last one on the east side of the river to be modified. It is another cloverleaf interchange, but very compressed and the reduced space will limit modifications to the interchange. By introducing the proposed BUMP typical section with frontage roads, the mainline will be widened and consequently will encroach into the loop ramps. The proposed typical section will also require the existing bridge over Scenic Hwy. to be widened on the north and south sides to accommodate the proposed outside shoulders.

Being restricted by the existing right of way conditions, a viable alternative is to convert the interchange to a diamond interchange and signalize all approaches at the Scenic Highway intersection. A left turn lane must be introduced on Scenic Highway to allow northbound traffic to access the free portion of the BUMP to cross the bridge. In the same manner, the southbound traffic will access eastbound frontage roads to continue to the east or enter the BUMP.

3.2.1.4 US-61/I-110

This existing interchange is known as a four level stack interchange. Other than the BUMP, the rest of the interchange is elevated. The proposed BUMP tolled lanes and the frontage roads will be at grade through the interchange. Modifications to the interchange include the addition of the frontage roads parallel to the BUMP tolled lanes, and the new connections from the frontage roads to the directional ramps. Similar to the other modified interchanges, the slip ramps to and from the BUMP tolled lanes will be constructed prior to the interchange for safety reasons.

3.2.1.5 US-61/LA-67 (Plank Road)

This interchange is a cloverleaf interchange where the BUMP tolled lanes will pass below an elevated section of LA-67. The existing bridge will accommodate the proposed frontage roads as it currently does today. The only modifications to this interchange are the “tie-ins” to the existing loop ramps. Additionally, the slip ramps to and from the BUMP tolled lanes will have to be positioned before the interchange to safely enter into the frontage roads.

3.2.1.6 US- 61/LA-37 (Greenwell Springs Road)

Similar to the US-190 interchange, the Greenwell Springs interchange is a cloverleaf interchange. However, at this location, the BUMP tolled lanes are at ground level and the crossing roadway, Greenwell Springs, is elevated. This situation creates a connectivity problem for movements involving the frontage roads to the existing loop ramps. In this case, a possible alternative is to replace the existing bridges over US-61 with longer bridges to allow the frontage roads to flow under the bridge, similar to the mainline. This will be a more cost effective solution than elevating the frontage roads to the third level over the existing bridge. Once new bridges are in place, the frontage roads can tie back to the existing loop ramps.

3.2.1.7 US-61/US-190 (Florida Boulevard) Interchange

At this interchange, the BUMP tolled lanes will remain on the existing US-61 alignment and will continue using the existing bridge over Florida Boulevard. Minor bridge modifications may be required. The northbound and southbound frontage roads will remain parallel to the BUMP, but will have to be elevated to clear Florida Boulevard. The proposed frontage roads will tie into the existing loop ramps. Slip ramps to enter and exit the BUMP tolled lanes will have to be introduced before the interchange is reached to allow exiting vehicles to safely take the ramps to Florida Boulevard.

3.2.1.8 US-61/I-12 Interchange

This existing interchange will undergo extensive modifications. Directional elevated ramps will be introduced to and from the BUMP tolled lanes to I-12. Directional ramps will also be developed for the connection between the US-61 frontage roads and the proposed I-12 frontage roads between Drusilla Lane and Sherwood Forest Boulevard. All existing ramps for the cloverleaf interchange will be removed in the redesign of the interchange.

3.2.1.9 US-61/Coursey Boulevard

This intersection is not an existing interchange. However, it is important to mention since there will be drastic changes. As the BUMP alignment approaches Coursey Boulevard at grade, it will begin to elevate south of the intersection and it will be on structure from this point, north over I-12 and just past Old Hammond Highway where it will descend to existing at-grade level, a distance of approximately 1.3 miles.

3.2.1.10 US-61/Jefferson Highway System Interchange

Just south of Jefferson Highway, the existing US-61 lanes become frontage roads as described in the typical section. A slip ramp is developed to the inside as it opens into the BUMP tolled lanes in the wide median. The BUMP tolled lanes begin at grade and are elevated over the north US-61 to west Jefferson Highway ramp. Once the BUMP tolled lanes clear the ramp, these lanes will return to grade alongside the northbound and southbound frontage roads.

There are five railroad crossings along the alignment. While many of these are not at-grade crossings, new structure work will be required to accommodate the BUMP tolled lanes and frontage roads. The crossings are identified in Table 3-2 and are discussed in further detail later in this chapter.

Table 3-2: Railroad Crossings

Crossing Location	Description
Segment 1 Near new intersection of BUMP and US-190	Segment 1 does not include frontage roads. The elevated portion required to span the railroad which runs parallel to US-190 will only require four lanes and associated shoulders.
Segment 2 Near LA-415/ N. Lobdell Hwy.	The existing US-190 alignment is elevated to cross railroad tracks which run parallel to N. Lobdell Hwy. Four lanes of frontage roads will be required to provide the same level of access.
Segment 3 Near LA-1	Tracks pass over the existing eastbound US-190 lanes and proceed across the river on the Old River Bridge. No additional work is anticipated on this segment.
Segment 3 Near Sanchez St.	There are three crossings near this location. The westernmost pair, the Canadian National and Kansas City Southern, are separated from US-190 by elevated crossings. The third, another Kansas City Southern track, has an at-grade crossing close to Sanchez St. which will require elevating the roadway.
Segment 4 At Choctaw Dr.	The Canadian National railroad has an at-grade crossing at the intersection of US-61 and Choctaw Dr. This crossing will require elevating the BUMP over the crossing.

3.2.2 HNTB Quantities and Cost Development

The BUMP Proposal requires the construction of new frontage roads along the majority of the proposed roadway. [redacted] The typical section provided within the Proposal was applied to generate construction quantities along the BUMP alignment.

HNTB estimated the cost of new construction elements and updating existing elements to meet necessary design and operational standards for the BUMP Project. Quantities calculated from the refined HNTB conceptual design were used to develop preliminary construction cost estimates. Costs were developed based on per linear feet or per area quantities generated by the conceptual design. The estimate should be considered a planning level estimate based on the currently available level of detail.

For portions of the BUMP alignment where existing road will be utilized, costs include the following:

- Reconstruction of the median to include a barrier and inside shoulders;
- Repaving and restriping the existing road;
- Upgrading the outside shoulders;
- Adding enclosed subsurface drainage;
- Adding curb and gutter; and
- Adding an outside barrier.

For new frontage roads, the estimate includes the following:

- Travel lanes;
- Inside and outside shoulders;
- New subsurface drainage; and
- New curb and gutter.

For portions of the BUMP alignment where new roads will be constructed, additional quantities beyond those mentioned above were added to accommodate construction of a new roadway subsurface base. The estimate also includes the removal of existing infrastructure (i.e. driveways) and intersection improvements where required. Intersection improvements include relocating the intersection to align with the new frontage roads and providing new signals, signage and striping.

For both the tolled and frontage roads, the majority of elevated structures were estimated at $120 per square foot and the quantities include only the number of additional lanes required. However, due to complexity of construction in some areas, portions of the elevated sections were estimated at $365 per square foot construction cost. For example, the higher structure cost was utilized at the I-12 interchange for any structures at Level 3 or above (with Level 1 being the ground, Level 2 being the I-12 overpass, etc.).

For purposes of estimating the construction costs, HNTB divided the BUMP Project into eight segments. The extent of each segment was established based on the need to modify construction requirements or assumptions. For example, the westernmost portion of the proposed BUMP alignment crosses undeveloped land and represents all-new construction. In contrast, one of the easternmost segments requires an elevated roadway section nearly 1.25 miles long. The differences in construction requirements were taken into account for each of the segments. A brief introduction to the segments is found in Table 3-3 and each segment is described in further detail later in this chapter.

Table 3-3: BUMP Segments

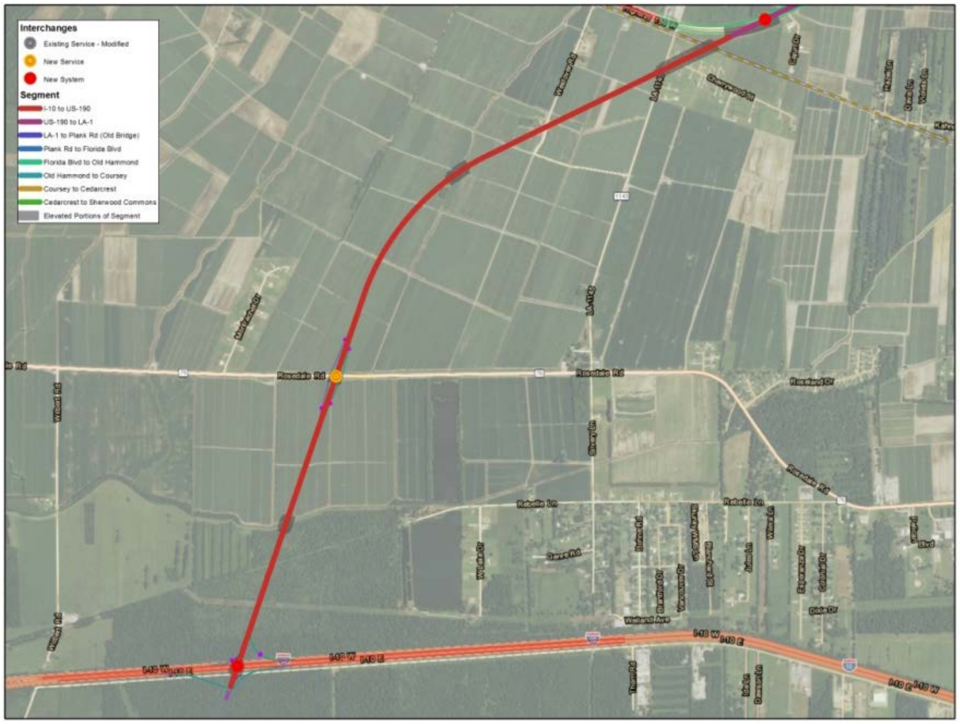
Segment	Construction Requirements (lane miles)	Key Features & Assumptions
Segment 1 Western BUMP terminus at I-10 to intersection with US-190	New Frontage: 0 New Tolled: 14 Frontage on Existing: 0 Tolled on Existing:0	New interchanges with I-10 and LA-76 with elevated sections crossing both. Two small bridges at water crossings. Elevated section to cross a railroad before connecting to the existing roadway at US-190. No frontage roads.
Segment 2 BUMP/US-190 intersection to transition point for Old Bridge (Approximately one mile west of Old Bridge)	New Frontage: 12 New Tolled: 0 Frontage on Existing: 0 Tolled on Existing: 12	Begins at US-190 interchange with a new elevated section crossing the BUMP, connecting US-190 to new frontage road. BUMP will be on current US-190 alignment. Elevated section required for frontage to match existing crossing over LA-415. Segment ends and frontage roads merge with BUMP before existing US-190 splits near LA-1, approximately 1 mile west of Old Bridge.
Segment 3 Approximately one mile west of Old Bridge to Plank Rd.	New Frontage: 7.5 New Tolled: 0 Frontage on Existing: 0 Tolled on Existing: 0	No tolls on this section. Updates to the interchanges, including elevated sections, at LA-61, I-110, and Plank Rd.
Segment 4 Plank Rd. to Florida Blvd.	New Frontage: 19.4 New Tolled: 0 Frontage on Existing: 0 Tolled on Existing: 19.4	BUMP toll lanes will be elevated at Evangeline to provide cross-BUMP access. BUMP toll lanes will also be elevated to cross over

Segment	Construction Requirements (lane miles)	Key Features & Assumptions
		the existing railroad tracks at Choctaw Dr. Frontage roads at both locations will remain at grade.
Segment 5 Florida Blvd. to Old Hammond Hwy.	New Frontage: 8 New Tolled: 0 Frontage on Existing: 0 Tolled on Existing: 8	BUMP will be on existing road which is elevated over Florida Blvd. Assumed the frontage road will be at grade and a new signalized intersection will be built. This will require the redesign of the existing ramp structures at the Florida Blvd. intersection.
Segment 6 Old Hammond Hwy. to Coursey Blvd.	New Frontage: 0 New Tolled: 5 Frontage on Existing: 5 Tolled on Existing: 0	Elevated structure will be required for the BUMP. The proposal indicates this structure will pass over the existing elevated structure at I-12. Additional cost is added due to the height. Elevated ramp structures are proposed for the I-12 interchange. Although the estimate shows frontage on existing, it is assumed that the frontage will be a combination of existing and new roads
Segment 7 CourseyBlvd. to Cedarcrest Ave.	New Frontage: 0 New Tolled: 0.96 Frontage on Existing: 0.96 Tolled on Existing: 0	Frontage roads will use the existing US-61 facilities. BUMP will be built in the existing median. Although existing frontage is available, this segment includes area where the BUMP will be ramping up to go over Coursey Blvd. and has additional complications due to the elimination of the median in the existing roadway. New frontage may be required.
Segment 8 Cedarcrest Ave. to the end of SIU-1 near Sherwood Commons	New Frontage: 0 New Tolled: 3.3 Frontage on Existing: 3.3 Tolled on Existing: 0	The BUMP will be built in the median and will require a short portion of the BUMP lanes to be elevated to clear the existing Jefferson Hwy. exit ramp.

3.2.3 Segment 1 – Western BUMP Terminus at I-10 to Intersection with US-190

New Frontage: 0
New Elevated Frontage: 0
New Tolled: 14 lane miles
New Elevated Toll: 175,750 sq.ft.

Frontage on Existing: 0
Tolled on Existing: 0
Estimated Frontage Lanes Cost: $0
Estimated Toll Lanes Cost: $71,227,301.54



The proposed BUMP Project begins with a new interchange located at I-10, approximately 3.5 miles west of LA-415. The interchange will include access ramps for both east and westbound traffic on I-10. It is proposed that the BUMP will be elevated over I-10 to provide access to and from the BUMP for eastbound I-10 traffic. From this interchange, the BUMP proceeds northeast to US-190.

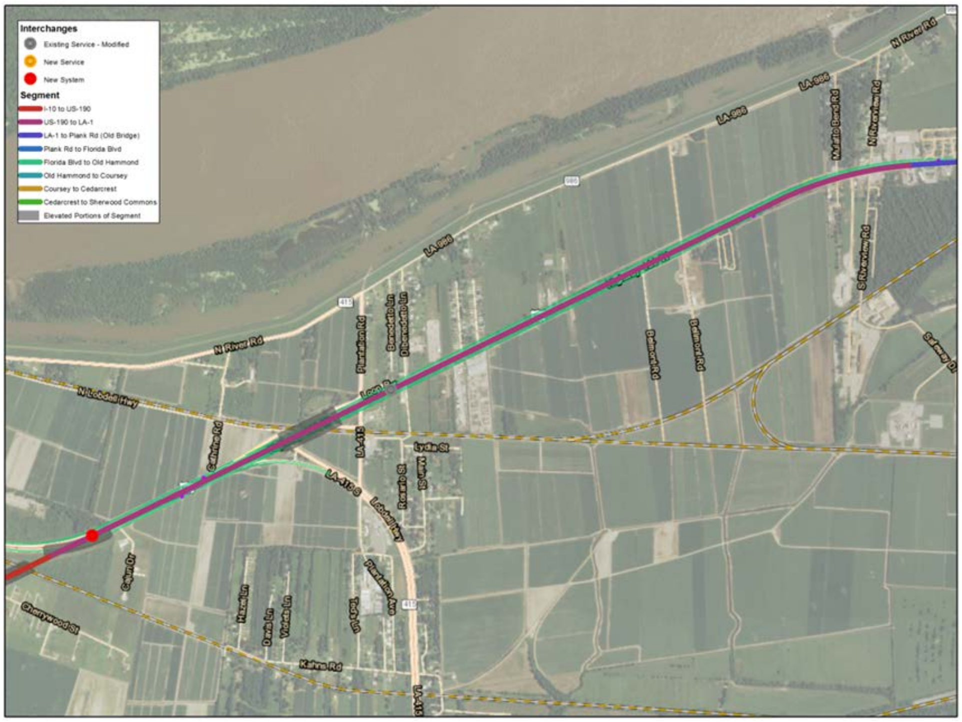
Segment 1 will be on new alignment. The segment length is approximately 3.4 miles long. The Proposal suggests use of a 300-foot wide right of way corridor which results in potential acquisition of 123.4 acres.

HNTB assumed that frontage roads will not be incorporated into Segment 1. Therefore, the major portion of the new construction will be the approximately 14 lane miles of toll road and the ramps necessary for interchanges at I-10 and LA-76. Segment 1 will require an elevated section at the LA-76 interchange, two small bridges at water crossings, and an elevated section to cross a railroad before connecting to the existing roadway at US-190. Cross-traffic flows are accommodated at I-10 and LA-76.

3.2.4 Segment 2 – Bump/US-190 Intersection to Transition Point for Old Bridge (Approximately One Mile West of Old Bridge)

New Frontage: 12 lane miles
New Elevated Frontage: 163,052 sq.ft.
New Tolled: 0
New Elevated Toll: 0

Frontage on Existing: 0
Tolled on Existing: 12 lane miles
Estimated Frontage Lanes Cost: $12,974,916
Estimated Toll Lanes Cost: $65,088,274



At US-190, the BUMP will transition from new roadway alignment to the existing US-190 roadway. Frontage roads will be constructed to accommodate local traffic flow to LA-415, LA-1 and the Old Bridge. While there are some opportunities to incorporate existing frontage road facilities, approximately 12 lane miles of new frontage road construction will be required.

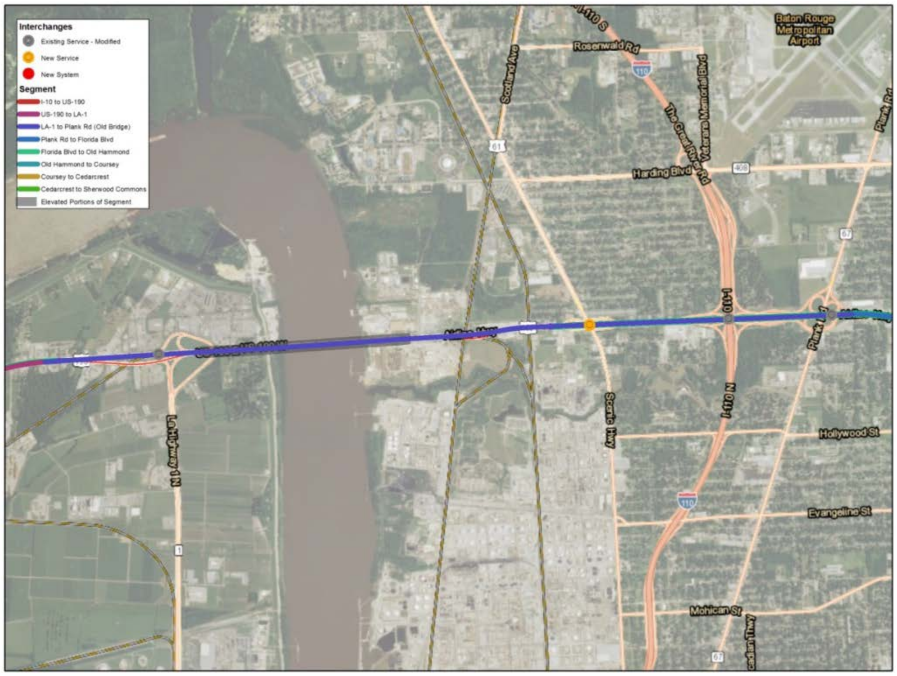
The existing US-190 alignment is elevated over LA-415, N. Lobdell Highway, and the railroad. It is expected that the new frontage roads will also be elevated at this location, requiring the construction of four new lanes of elevated roadway. This elevated segment will also provide turn-around access across the BUMP tolled lanes for the frontage roads which will maintain access to residences and businesses.

East of LA-415, all traffic must be transitioned from the BUMP into a 4-lane system (2 lanes in each direction) to cross the unimproved Old Bridge. The nearest turn-around points will be either LA-415 to the west or the LA-1 interchange to the east. The distance between these turn-around points is 2.83 miles.

3.2.5 Segment 3 – Approximately One Mile West of Old Bridge to Plank Road

New Frontage: 7.5 lane miles
New Elevated Frontage: 19,286 sq.ft.
New Tolled: 0
New Elevated Toll: 0

Frontage on Existing: 0
Tolled on Existing: 0
Estimated Frontage Lanes Cost: $9,212,778
Estimated Toll Lanes Cost: $22,028,473



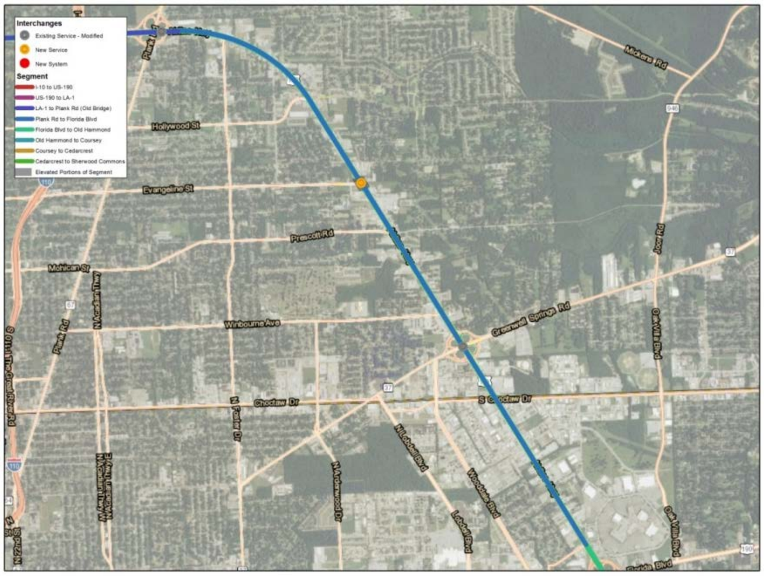
One mile west of the Old Bridge crossing the Mississippi River, the new frontage roads and the BUMP tolled lanes will merge. From this point to approximately 0.7 miles east of the Old Bridge, existing facilities will be used and the system will be toll-free. Although there are several railroad crossings in the area, only the Kansas City Southern crossing just west of Sanchez Street is at-grade. The existing road will be elevated over the tracks to maintain the intended expressway-level of service. This will require 19,286 square feet of new elevated roadway in the toll-free portion of this segment.

HNTB assumed that future improvements or major rehabilitations, routine maintenance and operations of the toll-free portion of the facility will remain the responsibility of LADOTD. With no updates anticipated for the Old Bridge crossing, it is expected that the current level of service will be maintained and the 45 mph maximum speed across the Old Bridge will remain unchanged.

The existing roadway will transition back to a configuration that includes toll lanes and frontage roads near Sanchez Street. It is expected that 7.5 lane miles of new frontage road construction will be required to provide free/untolled movement from the Old Bridge to Plank Road. This includes updates to the interchanges at LA-61, I-110, and Plank Road.

3.2.6 Segment 4 – Plank Road to Florida Boulevard

New Frontage: 19.4 lane miles
New Tolled: 0
New Elevated Toll: 19,875 sq.ft.
Frontage on Existing: 0
Tolled on Existing: 19.4 lane miles
Estimated Frontage Lanes Cost: $24,149,815
Estimated Toll Lanes Cost: $66,809,726



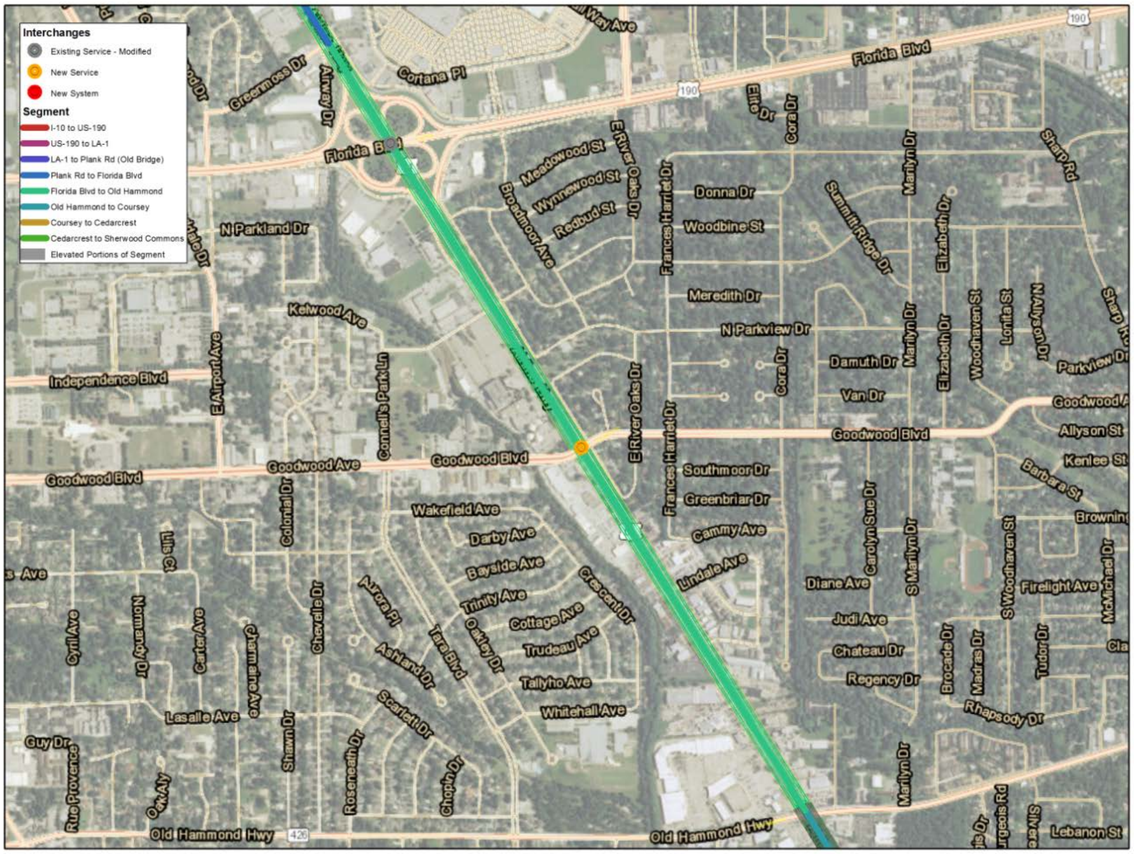
From Plank Road east to Florida Boulevard, the BUMP tolled lanes will utilize existing facilities and approximately 19 lane miles of new frontage roads will be constructed. Multiple existing intersections will be diverted along the frontage roads, including Foster, McClelland, Hollywood, Prescott, Winbourne, Tom, and Florline. Access across the BUMP tolled lanes to these intersecting roads from the frontage roads will be maintained through the use of existing or new elevated segments at Evangeline Street, Greenwell Springs Road, and Choctaw Drive. Although the Proposal does not specifically identify a need to elevate toll lanes at Evangeline, HNTB recommends the BUMP tolled lanes be elevated at this location for operational considerations. Without the ability to cross the BUMP at Evangeline Street, the BUMP would create a barrier from Plank Road to Greenwell Springs Road, a distance of 3.6 miles. By providing the ability for frontage roads to cross the BUMP tolled lanes at Evangeline Street, the cross-service interruption is reduced to 1.98 miles between Plank and Evangeline and 1.38 miles between Evangeline and Greenwell Springs Road.

The BUMP tolled lanes will pass under Greenwell Springs Road with the new frontage roads tying into the existing ramps and providing additional free lanes under Greenwell Springs Road. The Canadian National railroad tracks adjacent to Choctaw Drive are at grade and HNTB recommends that the BUMP tolled lanes should be elevated over the tracks to provide uninterrupted free flowing service. It is expected that the new frontage roads at Choctaw Drive will remain at grade.

3.2.7 Segment 5 – Florida Boulevard to Old Hammond Highway

New Frontage: 8
New Tolled: 0
Frontage on Existing: 0

Tolled on Existing: 8
Estimated Frontage Lanes Cost: $9,967,542
Estimated Toll Lanes Cost: $23,930,123



From Florida Boulevard to Old Hammond Highway, nearly eight lane miles of new frontage road construction will be required. The BUMP tolled lanes will utilize the existing elevated segment over Florida Boulevard. It is assumed that the frontage system will also need to cross Florida Boulevard which will require expansion of the existing elevated roadway to accommodate the additional lanes. The frontage roads will also be tied to the existing ramps to provide access to Florida Boulevard.

Opportunities for the frontage roads to cross the BUMP tolled lanes are provided at Florida Boulevard and Old Hammond Highway, a distance of 1.72 miles.

3.2.8 Segment 6 – Old Hammond Highway to Coursey Boulevard

New Frontage (Including frontage along I-12): 7 lane miles surface, 1.5 lane miles elevated
New Tolled: 5 lane miles (all elevated)
Frontage on Existing: 5 lane miles

Tolled on Existing: 0
Estimated Frontage Lanes Cost: $124,067,546
Estimated Toll Lanes Cost: $70,993,306

The proposal calls for the BUMP tolled lanes to be elevated from Old Hammond Highway to Coursey Boulevard, a distance of 1.25 miles. Five lane miles of elevated structure will be required for the BUMP tolled lanes and additional elevated ramp structures are proposed for the I-12 interchange. HNTB assumed that the frontage roads will be a combination of existing and new roads.

HNTB assumed that existing alignments will be utilized for frontage roads and the BUMP tolled alignment would be elevated as noted in the Proposal. The Proposal indicates the BUMP would be elevated above the existing I-12 overpass and additional high-level ramps would be constructed for access between I-12 and the BUMP.

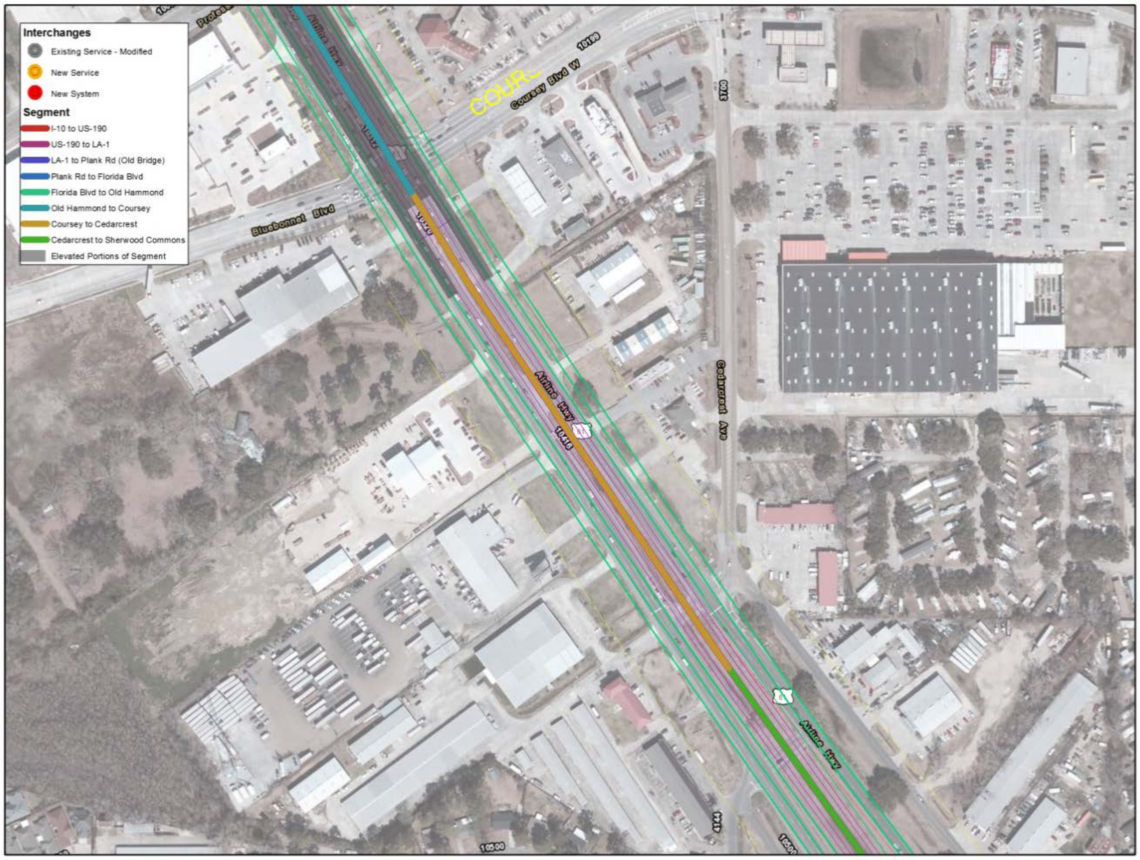
Additional frontage roads were included along I-12 east to Sherwood Forest Boulevard and west to Jefferson Highway. Existing frontage roads were determined to be inadequate to provide the necessary connections.

Although the Proposal is silent regarding points where frontage roads could cross the BUMP tolled lanes, HNTB assumed that such flows would not be disrupted as the elevated tolled lanes would not hinder cross-traffic movements.

3.2.9 Segment 7 – Coursey Boulevard to Cedarcrest Avenue

New Frontage: 0
New Tolled: 0.96 lane miles
Frontage on Existing: 0.96 lane miles

Tolled on Existing: 0
Estimated Frontage Lanes Cost: $1,142,329
Estimated Toll Lanes Cost: $3,227,792



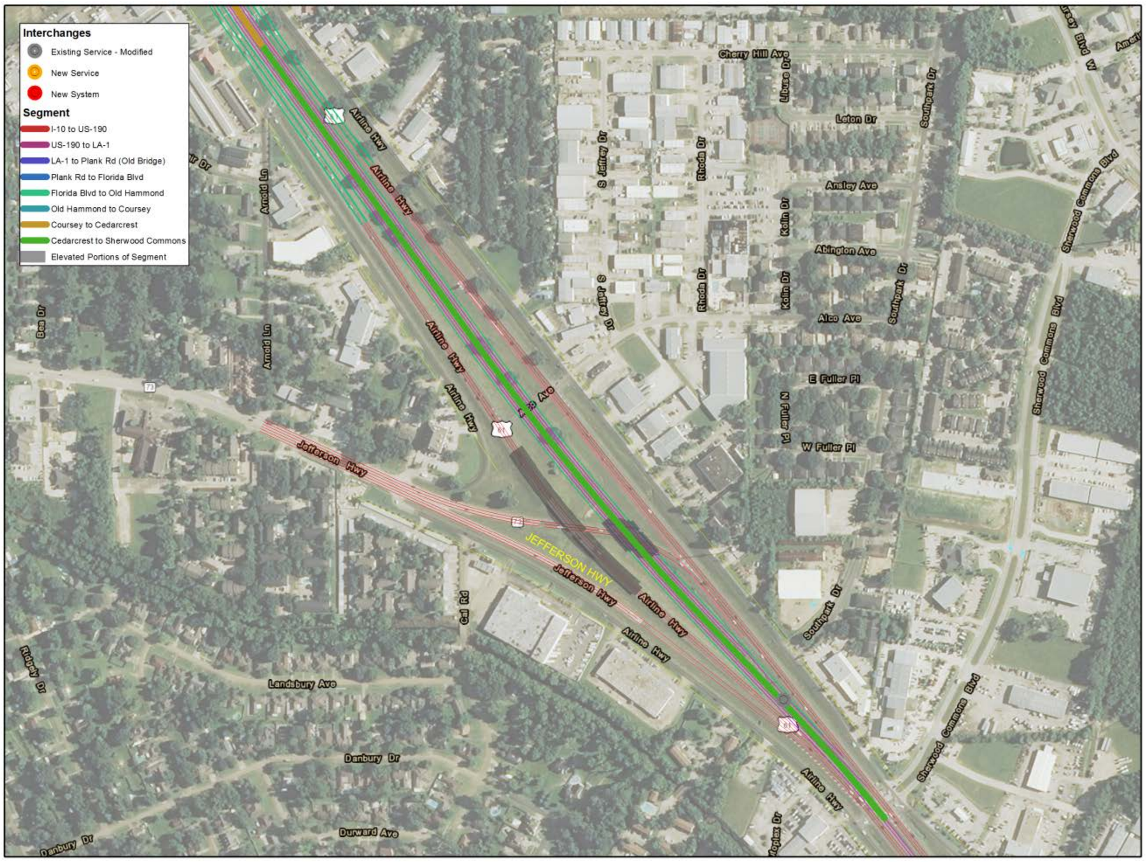
Along Segment 7, the BUMP tolled lanes would be new construction along the widening median with the frontage roads being placed on the existing US-61 alignment. This is treated as a separate segment due to the transition of the BUMP tolled alignment from the elevated structure to the ground level. It is assumed that the frontage roads would transition from new construction in the western half of the alignment to the existing US-61 roadway in the eastern half of the alignment.

Points where the frontage roads could cross the BUMP tolled lanes would be restricted along this segment to Corsey. The next cross-traffic access point would be on the next segment at Telesmar, a distance of 1.24 miles.

3.2.10 Segment 8 – Cedarcrest Avenue to the End of SIU-1 Near Sherwood Commons

New Frontage: 0
New Tolled: 3.3 lane miles
Frontage on Existing: 3.3 lane miles

Tolled on Existing: 0
Estimated Frontage Lanes Cost: $1,345,065
Estimated Toll Lanes Cost: $22,116,151



From Cedarcrest Avenue to the terminus of SIU-1 near Sherwood Commons, the frontage roads will use the existing US-61 facilities with minor modifications. Approximately 3.3 lane miles of new toll road will be constructed in the median before merging with US-61 near Sherwood Commons. A short portion of the BUMP tolled lanes will be elevated to clear the existing Jefferson Highway exit ramp.

Cross-BUMP traffic would be restricted to Telesmar Road to the southeast and Coursey Boulevard to the northwest, a distance of 1.24 miles. Additional cross-traffic flows would be allowed for westbound traffic to exit at Old Jefferson. Old Jefferson is not accessible to eastbound traffic from either the frontage road or the BUMP tolled lanes.

3.3 Delivery & Construction Schedule

The Project delivery schedule needs to accommodate additional design development, procurement and the NEPA process. Estimates in the Proposal and presented in Figure 2-2 of this report assume a starting point of late 2014 which has already passed. The Proposal's estimated duration of approximately 42 months for procurement, further design development and the NEPA decision appear reasonable. However, the starting point for the schedule shown in Figure 2-2 likely moves to the fourth quarter of calendar year 2015 or first quarter of calendar year 2016. The resulting shift likely moves the milestones for reaching Financial Close and the beginning of the final design/construction phase of the project to the beginning of calendar year 2020. Additionally, there are many potential obstacles that may need to be overcome to maintain the proposed development schedule. Negotiations surrounding the CDA, decisions surrounding various design issues, potential unforeseen ROW acquisition, environmental challenges, and environmental mitigation may slow the Project delivery process. [redacted]

The construction schedule for the BUMP tolled lanes and frontage roads vary by segment due to differences in existing infrastructure, opportunities to reuse existing infrastructure, potential problems with surrounding land uses and the amount of elevated roadway. HNTB considered these factors and developed a construction time estimate based on the segments in Table 3-4. The overall time to complete construction will depend on how many of the segments are being conducted simultaneously. The estimate for each segment is based on using a single paving crew and a single elevated crew. HNTB estimates that the longest time for completion could be segment 4, a period of 80 months. This duration could be shortened to 44 months if two crews were working on this segment simultaneously.

With six (6) paving crews working and multiple segments being conducted simultaneously, HNTB estimates all construction could be completed within 48 months, including all elevated portions.

Table 3-4: Construction Duration Estimate

Segment	1	2	3	4	5	6	6a (I-12 West)	6b (I-12 East)	7	8
Surface	36	44	32	80	33	10	7	8	4	21
Elevated	8	8	0	4	0	24	4	4	3	4

The construction schedule identified should be viewed as a preliminary estimate. Decisions regarding maintenance of traffic, incorporation of additional scope requirements by local municipalities or regulatory agencies, and meeting potential NEPA commitments may increase the construction duration significantly. Specifically, maintenance of traffic considerations will play a significant role in how the construction work is staged. In order to maintain desired traffic operations, implementation of full closures of certain roads may not be permitted which will increase construction duration.

3.4 Additional Construction Cost Considerations

Assumptions were made for each segment when developing the cost estimate and quantities. Most of the assumptions would be considered part of the normal design process. However, the assumptions were not explicitly specified within the Proposal. Examples of these include bridges crossing waterways and reconfiguring intersections. HNTB assumptions were made to maintain consistency with the overall intent of the Proposal. When determining costs, HNTB assumed that LADOTD would accept the approach to the primary design elements and design configuration presented in the Proposal.

Table 3-5 addresses assumptions that resulted in more significant cost impacts.

Table 3-5: HNTB Assumptions

Segment	Assumptions	
Segment 1	The Proposal is silent regarding frontage roads along this segment. HNTB assumed the level of service of the existing roads was adequate and the additional cost resulted in little benefit. Elevated section crosses a railroad and provides cross-BUMP access before connecting to the existing roadway at US-190. This elevated segment maintains free-flow access for tolled lanes.	If frontage is required for Segment 1, the additional cost is estimated to be $16 million If the elevated section of the BUMP toll lanes crossing the railroad is kept at-grade, the estimated savings is $624,584
Segment 2	Elevated sections of US-190 & frontage required to prevent interruption of BUMP toll traffic flow and to match existing crossing over LA-415.	If the elevated sections were kept at-grade, the estimated savings is $585,342
Segment 3	Updates to the interchanges at LA-61, I-110, and Plank Rd. to provide adequate frontage system and provide frontage road access on/off BUMP tolled lanes. Elevated segment at Sanchez St. required to provide tolled road free-flow access over existing at-grade railroad crossing.	If the elevated section over the railroad were kept at-grade, the estimated savings would be $157,146

Segment	Assumptions	
Segment 4	BUMP tolled lanes will be elevated at Evangeline to provide frontage roads ability to cross BUMP tolled lanes. This prevents BUMP from blocking cross-traffic for over three miles. BUMP toll lanes will also be elevated to cross over the existing railroad tracks at Choctaw Dr., providing free-flow traffic on toll lanes.	Keeping Evangeline at grade would save $248,946. Keeping Choctaw Dr. at grade would save $170,226 Keeping existing Greenwell Springs bridge and reconfiguring frontage lanes to tie into existing ramps with new signals would save $124,000
Segment 5	BUMP will be on existing bridge which is elevated over Florida Blvd. Assumed the existing bridge would be expanded to accommodate the frontage lanes. This limits the impact on the existing ramp structures at the Florida Blvd. intersection.	Keeping the frontage roads at-grade and tying them into the existing ramps would save $160,000
Segment 6	Although the Proposal shows frontage on existing, it is assumed that the frontage roads will be a combination of existing and new roads which extend to the next intersections east and west of the current US-61 alignment.	There is little opportunity for cost savings. Our estimates show approximately 95% of the frontage roads must be new construction.
Segment 7	Frontage roads will use the existing US-61 facilities. BUMP will be built in the existing median. Although existing frontage is available, this segment includes area where the BUMP will be ramping up to go over Coursey Blvd. and has additional complications due to the elimination of the median in the existing roadway. New frontage may be required.	There is little opportunity for cost savings. The toll alignment will be all new and overlaps between the frontage alignment and existing pavement only account for 40% of the work.
Segment 8	The BUMP will be built in the median and will require a short portion of the BUMP lanes to be elevated to clear the existing Jefferson Highway exit ramp.	The toll alignment requires the elevated portion. There are no additional cost-saving opportunities.

Given the proposed design elements, existing infrastructure and development along the project corridor, construction costs must be considered preliminary at this phase of development. Incorporating new drainage systems, barriers, utility easements, tolling infrastructure and other necessary roadway elements within the existing corridor will likely result in challenges with existing utilities, environmental features, subsurface conditions, existing access to properties, pedestrian access and other features that have yet to be identified based on the level of Project development. Additionally, the requirements of local agencies and regulatory agencies may expand the scope and requirements of the Project beyond those contemplated in the Proposal. While HNTB used a contingency for construction costs of 30%, the unknowns regarding the scope of work and design challenges ahead may ultimately result in the Project costs exceeding the estimated amount.

[redacted]

3.5 Baseline [redacted] Operations & Maintenance Cost

[redacted] HNTB assumed that upon completion of construction, the O&M responsibilities, including rehabilitation and reconstruction costs, for all frontage roadways and elements associated with the frontage roads would be transferred to LADOTD. The O&M costs developed by HNTB and considered for the financial feasibility analysis for maintenance, repair, renewal, and rehabilitation reflect only the tolled lanes of the BUMP.

The financial feasibility analysis does not include any of O&M costs related to the frontage road system, the free segments of the BUMP, or any of the additional roadways or ramps constructed to provide connectivity between existing facilities and the BUMP such as I-12, I-110, and Plank Road. While the costs of maintaining the frontage system will be transferred to LADOTD, the BUMP Project includes replacement of various components and upgrades to the existing US-61 corridor. These replacements and upgrades will offset impacts related to future maintenance expenditures by LADOTD.

Estimated costs for renewal and replacement of the entire BUMP facility (tolled lanes and frontage roads) are provided in Table 3-8 for the Department's reference. However, as stated above, it is not incorporated into the financial feasibility analysis at this time.

3.5.1 Routine Maintenance Costs

HNTB calculated routine maintenance at a flat rate of $30k per lane mile per year (2014 dollars). Maintenance rates on similar projects range from $18k to $40k per lane mile, depending on size and condition of the system. Estimated maintenance costs are ramped up from 10% of the expected maintenance cost in year one to the full rate of $30k per lane mile in year 10 to reflect the low maintenance costs of a newly constructed system. Maintenance expenditures are not increased over time. With the expected opening year of 2022, the starting rate for routine maintenance costs is $40,492 per lane mile in 2022 dollars.

Table 3-6: Routine Maintenance Costs

Year (Year 1 is 2022)	Maintenance Expense (2014 dollars)
5	$1,044,843
10	$2,089,687
15	$2,089,687
20	$2,089,687
25	$2,089,687
30	$2,089,687
35	$2,089,687
40	$2,089,687

3.5.2 Renewal Works Costs

HNTB assumed annual roadway/bridge renewal and replacement (R&R) costs to equal 0.05% of cumulative construction costs annually beginning 10 years after initial construction. The R&R costs are estimated to grow by 0.05% annually until reaching a maximum of 0.75% annually.

The annual R&R cost below is based on an estimated construction cost of $775 million (cost of construction with engineering costs and contingency factors applied). The R&R costs for the BUMP tolled lanes are provided in Table 3-7. For informational purposes only, the R&R costs for the full facility (frontage roads and tolled lanes) are provided in Table 3-8.

The estimate does not cover the free-movement portion of the BUMP system from approximately LA-1, over the Old Mississippi River Bridge, through the interchange at Plank Road.

Table 3-7: Annual R&R Costs – BUMP Tolled Lanes

Year	2014 dollars	% increase
5	$2,410,000	
10	$2,410,000	
15	$2,595,939	0.025
20	$3,157,992	0.050
25	$4,326,246	0.075
30	$6,210,886	0.075
35	$8,916,530	0.075
40	$12,800,832	0.075

Table 3-8: Annual R&R Costs – Full BUMP Facility

Year	2014 dollars	% increase
5	$3,875,000	
10	$3,875,000	
15	$4,173,969	0.025
20	$5,077,685	0.050
25	$6,956,101	0.075
30	$9,986,383	0.075
35	$14,336,744	0.075
40	$20,582,251	0.075

3.5.3 Rehabilitation of Existing Bridge

LADOTD is in the process of rehabilitating the existing US-190 bridge. The rehabilitation includes painting and performing structural steel repairs to the roadway portion of the bridge and approaches. LADOTD lists the current project cost as $74.8 million as provided at the following site:

http://wwwapps.dotd.la.gov/administration/public_info/projects/home.aspx?key=40

The intention of the rehabilitation project is to make necessary repairs to increase the life of the bridge by another 30-40 years. It should be noted that DOTD did not complete all structural repairs on the approaches and it could be assumed DOTD will incur some additional maintenance costs due to the increased ADT caused by the BUMP. HNTB estimates that additional structural repairs will cost less than $5M.

It is reasonable to assume that additional rehabilitation work may be needed within a shorter time frame than is expected as a result of the additional traffic loads anticipated when the BUMP is open to traffic.

4.0 CHAPTER FOUR – GENERAL OVERVIEW OF TOLLING APPROACH

Both the Bump Proposal and HNTB's analysis assume that the Project will be tolled using an AET, free-flow toll collection system that does not require drivers to stop at traditional toll collection booths to pay tolls. AET collection systems identify each vehicle as it passes under toll gantries at highway speeds. The Project will not provide an option for drivers to stop and pay a toll collector or use an automatic toll payment machine. Drivers will pay tolls using a transponder system (GeauxPass or similar) or an image based invoicing system. Image based systems use cameras located on the toll gantries to capture an image of the driver's license plate. The license plate information is used to identify the registered owner of the vehicle and the owner is invoiced for the toll. Violation enforcement efforts, including collections, occur only after the owner fails to pay the invoice.

Based on recent federal initiatives and industry advancements, it is assumed that regional, and possibly national, interoperability will exist by the proposed opening date of 2022. This would allow drivers from other states with valid transponders and toll accounts to seamlessly use the facility and have tolls deducted from the home state account. It is also assumed that enabling legislation, interoperability agreements and business rules necessary for capturing information, processing transactions and enforcing violations will be in place.

4.1 Tolling Locations

[redacted] HNTB has assumed toll locations in an effort to reduce capital and operating costs based on industry best practices. Toll locations will be located throughout the corridor for the following segments:

- Western Section: between I-10 (west of Baton Rouge) and LA-1; and
- Eastern Section: between I-110 to south of I-12.

The Proposal indicates that drivers using the non-toll frontage roads will be able to cross the Old Bridge and travel from levee to levee without paying a toll. [redacted] HNTB has assumed this Section will not be tolled.

The HNTB assumed toll locations include a combination of mainline toll zones (spanning the mainline travel lanes) and ramp toll zones (over selected entrance and exit ramps). HNTB's preliminary tolling concept includes eight mainline toll zones (four northbound/eastbound and four southbound/westbound), six entrance ramp toll zones and five exit ramp toll zones. Each toll location will require overhead gantry structures to support the installation and operations of tolling equipment, roadside equipment cabinets, electrical power and communications infrastructure. Special pavement may also be required through the toll zones.

The locations of the proposed toll zones are depicted in Figure 4-1. Figure 4-2 depicts the configuration and equipment related to a typical ramp toll zone.

4.2 Tolling Methodology and Cost Forecasts

4.2.1 Tolling Capital Expenditures (CapEx)

Toll system capital costs are estimated at $18.0 million (in 2014 dollars). This includes the acquisition and implementation costs for both the roadside toll collection system (RTCS) and the necessary back office system (BOS) upgrades. It is assumed that LADOTD’s current BOS (IETCS-II serving the LA-1 toll facility) will be upgraded to receive and process toll transactions from the BUMP facility in a manner that is consistent with the business rules anticipated to be in place.

At each gantry location, toll equipment will be installed over all travel lanes and shoulders wider than six feet to ensure that vehicles do not use shoulders to evade tolls. The major components related to the RTCS CapEx costs include the following:

- Overhead gantry structures (one pair at each toll location);
- Transponder antennas and RF modules;
- Equipment cabinets and generators;
- Front and rear cameras;
- Automatic vehicle classification system;
- Video audit system;
- Vehicle presence detectors and separators;
- Host computers; and
- Installation and testing of all componen[redacted]

The BOS includes the customer service center and video processing system. CapEx costs related to the BOS include upgrading computer software, hardware and other components needed to process toll transactions and manage customer accounts.

4.2.2 Tolling Operating Expenditures (OpEx)

O&M expenditures are divided between the RTCS and BOS since they are distinct systems and services. The RTCS O&M expenditures are primarily maintenance related services including preventative, predictive and emergency repairs to roadside toll equipment. This includes active spare parts inventory and management. Annual costs are allocated for these services based on the actual number of toll lanes. The estimated annual O&M costs for the RTCS are $558,000 per year (in 2014 dollars).

Figure 4-1: HNTB Proposed Toll Locations

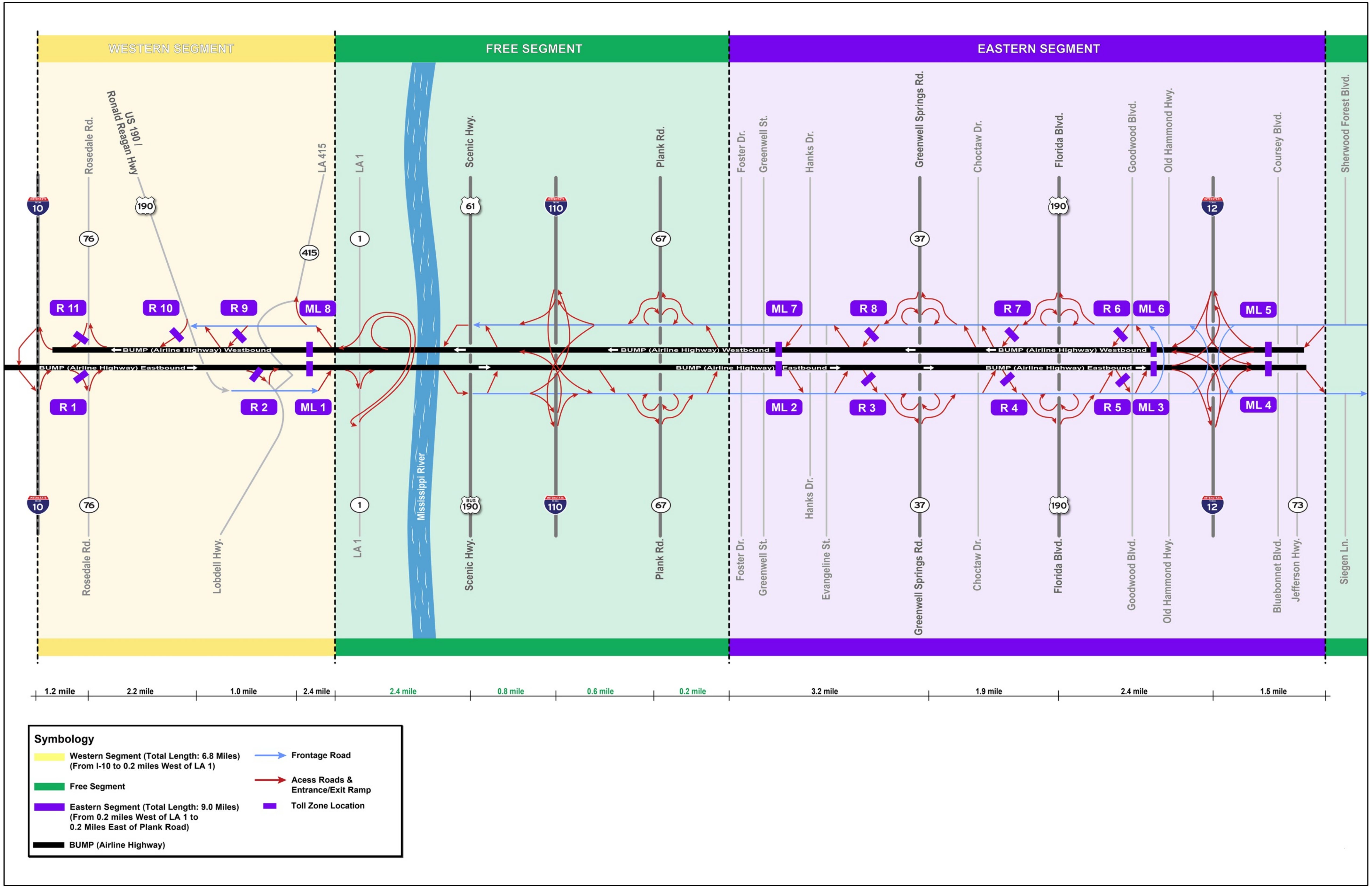
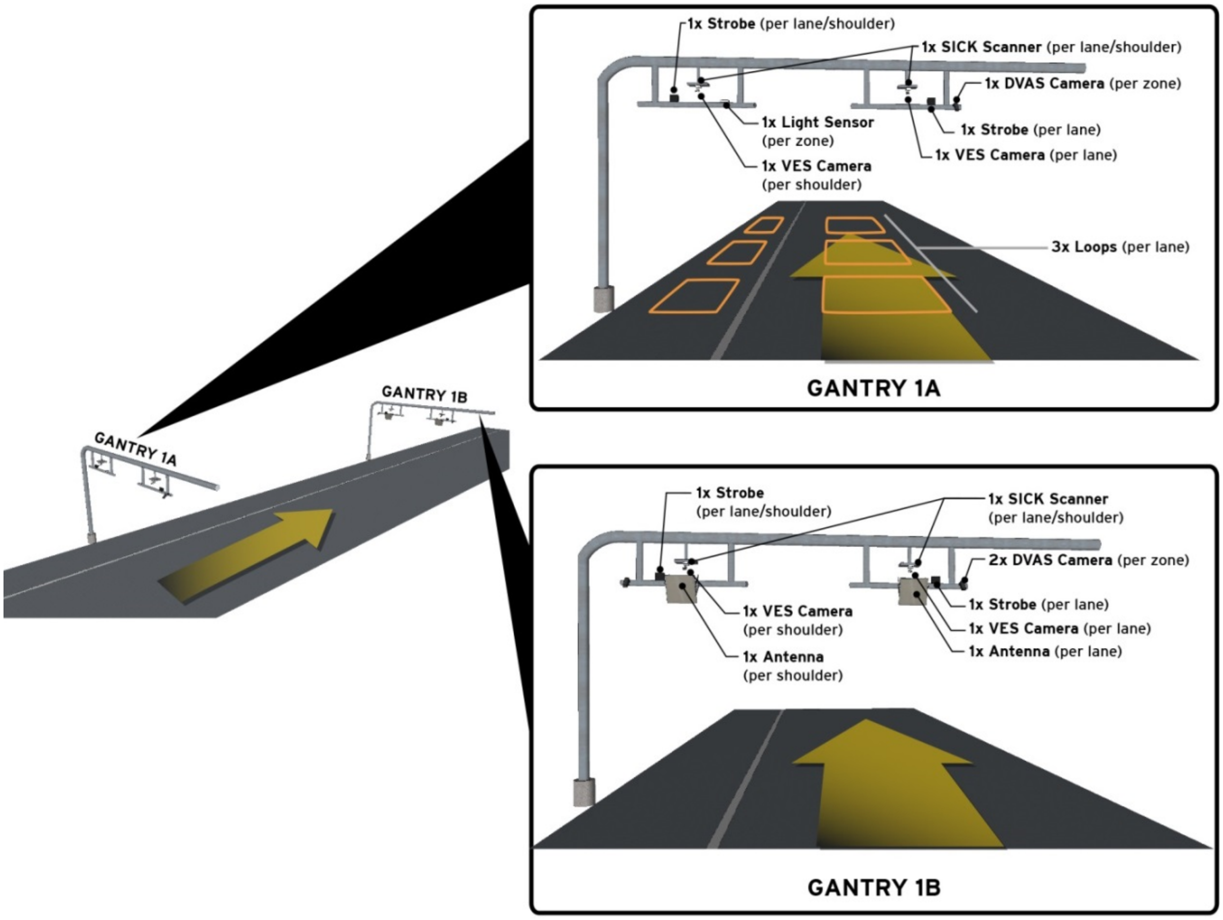


Figure 4-2: Typical Ramp Toll Zone Configuration and Equipment



The BOS is more labor intensive than the RTCS. It includes customer service representatives to answer calls and communicate with customers, fulfill transponder orders, review license plate images, generate invoices, and process payments. These ongoing costs are commonly estimated based on the quantity of toll transactions processed through the BOS.

HNTB expects that most tolls will be transponder transactions with image based transactions accounting for a small portion of total toll transactions. Although image based transactions are more costly to process and a small portion of these transactions will not be collectable, the toll differential for image based transactions and additional invoicing and violation fees will result in no net revenue loss for the BUMP facility. .

For this tolling analysis, HNTB adopted a sketch-level planning approach that assumed a toll rate differential for non-transponder transactions would be established to offset all additional costs, fees, and leakage for processing and collecing image based transactions. As a result, the BOS O&M cost estimate is based on a cost of 9 cents per transaction for all transactions. The estimated annual BOS O&M costs are presented in Table 4-1.

Table 4-1: Annual BOS and O&M Costs

	Estimated Toll Costs (2014$)			
	RTCS - OpEx		BOS - OpEx	
Year	O&M	Lifecycle/Replacement	O&M	Lifecycle/Replacement
2020				
2021				
2022	$558,000		$2,432,000	
2023	$558,000		$2,789,000	
2024	$558,000		$3,148,000	
2025	$558,000		$3,509,000	
2026	$558,000		$3,520,000	$1,000,000
2027	$558,000		$3,532,000	
2028	$558,000		$3,543,000	
2029	$558,000		$3,555,000	
2030	$558,000		$3,566,000	
2031	$558,000	$10,933,400	$3,578,000	$1,000,000
2032	$558,000		$3,590,000	
2033	$558,000		$3,601,000	
2034	$558,000		$3,613,000	
2035	$558,000		$3,624,000	
2036	$558,000		$3,636,000	$1,000,000
2037	$558,000		$3,646,000	
2038	$558,000		$3,658,000	
2039	$558,000		$3,669,000	
2040	$558,000		$3,681,000	
2041	$558,000	$10,933,400	$3,692,000	$1,000,000
2042	$558,000		$3,704,000	
2043	$558,000		$3,715,000	
2044	$558,000		$3,727,000	
2045	$558,000		$3,738,000	
2046	$558,000		$3,750,000	$1,000,000
2047	$558,000		$3,761,000	
2048	$558,000		$3,773,000	
2049	$558,000		$3,784,000	
2050	$558,000		$3,796,000	
2051	$558,000	$10,933,400	$3,808,000	$1,000,000

4.2.3 Tolling Lifecycle Costs

Based on experiences with other electronic tolling systems, it is anticipated that the RTCS initially installed will perform as intended for 10 years with adequate maintenance. The ongoing O&M including replacement of key parts will ensure system performance. However, it is recommended to replace the entire RTCS every 10 years. The BOS hardware and software on the other hand will likely need replacement or significant upgrades every 5 years. The estimated periodic RTCS and BOS lifecycle/replacement costs are presented in Table 4-1 as well.

5.0 CHAPTER FIVE – TRAFFIC AND REVENUE

HNTB conducted a Level 1 T&R study to examine the preliminary revenue potential of the BUMP Project. This Chapter is a summary of HNTB's Level 1 T&R study. A Level 1 T&R study is appropriate only for use in planning-level evaluation. It is not intended to support project related funding and financing decisions.

5.1 Study Corridor

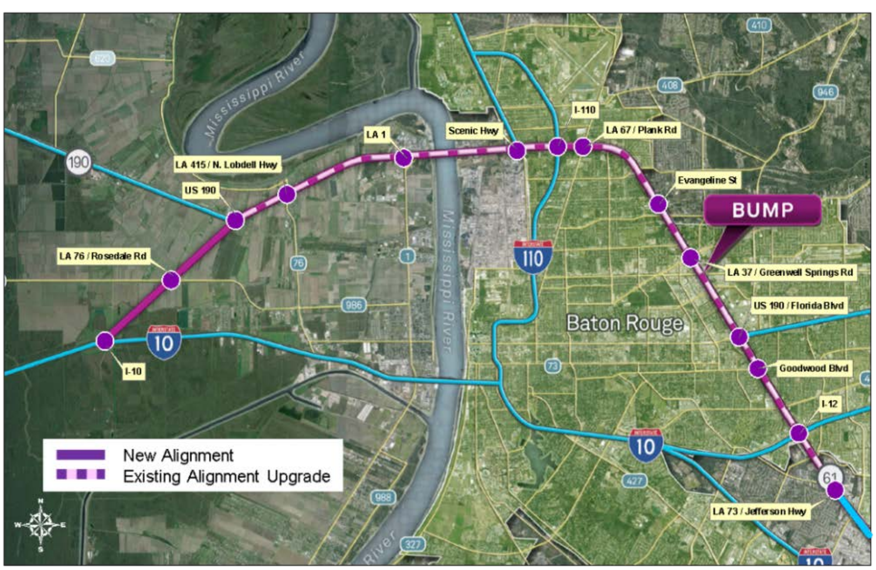
The study corridor is based on two tolled lanes in each direction between SIU-1's western terminus at I-10 and SIU-1's eastern terminus near LA-73/Jefferson Highway.

The BUMP Proposal presents the tolled lanes as a free-flow component of the system which will utilize AET. Additionally, the Project will incorporate toll-free frontage roads with signalized intersections on both sides of the roadway to maintain and provide access to residences and businesses.

The Proposal indicates that drivers using the non-toll frontage roads will be able to cross the Old Bridge and travel from levee to levee without paying a toll. [redacted] HNTB has assumed this segment will not be tolled and it was excluded from the HNTB T&R Study.

The T&R Study is based on the 14 access points which provide ingress and egress to and from the BUMP Project corridor. Chapter 2, Table 2-3 provides the location and description of each access point within the BUMP corridor. Figure 5-1 below depicts the study corridor and access points.

Figure 5-1: Study Corridor and Access Points



5.2 Modeling Data and Assumptions

A sketch level T&R spreadsheet model was developed based on travel demand data from the Baton Rouge MPO travel demand model, estimated travel time savings, and other travel behavior characteristics. The BUMP Proposal includes estimated high-level T&R projections for the Project. The HNTB study incorporates the following T&R assumptions and parameters identified in the Proposal:

- Project Open Year - 2022;
- Toll Rates in Current Year Dollars – revenue forecast did not assume any toll rate inflation; inflation of 2.5% was applied in the financial feasibility model;
- Truck Traffic Percent – 5% ; and,
- Truck Toll Rates Determination – 2.5 times the auto toll rates in average.

Other assumptions or parameters used in the HNTB study were developed based on data collection efforts, discussion within the study team and peer review team, and regional or national best practices. Details on these assumptions are provided throughout this Chapter. See APPENDIX C – T&R Peer Review for peer review documentation.

5.2.1 Travel Demand Data

The Baton Rouge MPO travel demand model was used to develop the travel demand for the BUMP Project. Travel demand models use socioeconomic data including population and employment data as one of the major inputs to forecast future traffic volumes. For the HNTB study, it is necessary to understand the MPO's projection for future socioeconomic growth. Growth assumptions provide insight into corridor travel demand growth. Table 5-1 summarizes the population and employment estimates for 2017 and 2037 in the Baton Rouge region. The MPO projected that the population and employment would increase over 20% from 2017 and 2037, which indicates annual growth rates of approximately 1%.

Table 5-1: Baton Rouge Travel Demand Model Inputs, 2017 and 2037 Socioeconomic Data

Study Corridor Segments	2017	2037	Percent Change
Total Population	726,326	891,030	23%
Total Employment	364,407	441,757	21%
Retail	78,270	96,010	23%
Agriculture, Mining and Construction Employees	32,849	41,796	27%
Manufacturing, Transportation/Communications/Utilities, and Wholesale Employees	63,121	77,907	23%
Office and Services, Government Employees	188,268	223,697	19%
Non-classified Employment	1,897	2,344	24%

***Source: The Baton Rouge Travel Demand Model**

HNTB coded the BUMP corridor with assumed access locations into the 2017 and 2037 networks. Additionally, a series of frontage roads were also coded into the model which best represents the conditions identified in the Proposal. Since no tolling components were included in the MPO's travel demand model, the BUMP corridor was coded as a toll-free new facility. Through the model's assignment process, trips were distributed onto the frontage roads and the BUMP corridor. The travel volumes on BUMP corridor generated by the models were considered as the potential travel demand and used as an input to the sketch level traffic and revenue spreadsheet tool. Table 5-2 represents the typical weekday travel volume for both directions along each segment on the BUMP corridor for both 2017 and 2037. Based on the model estimation, the travel demand from 2017 to 2037 on the east Baton Rouge (Segment 1 to Segment 9) shows lower growth rates than the west area (Segment 10 to Segment 13). The travel demand patterns between two forecast years would be consistent or similar on the traffic revenue generation if other assumptions are consistent.

Table 5-2: Travel Demand on BUMP Corridor in 2017 and 2037

Study Corridor Segments	2017	2037	Percent Change
1 - LA-73 to I-12	89,440	91,020	2%
2 - I-12 to Goodwood Blvd	97,770	105,700	8%
3 - Goodwood Blvd. to -190 (Florida Blvd.)	106,160	106,120	0%
4 - US-190 to LA 37 (Greenwell Springs Rd.)	86,470	91,310	6%
5 - LA-37 to Evangeline St. (North of Prescott)	87,510	94,620	8%
6 - Evangeline St. to LA-67	71,810	79,550	11%
7 - LA-67 to I-110	36,810	45,740	24%
8 - I-110 to US-61 (Scenic Hwy.)	35,050	46,980	34%
9 - US 61 to LA-1*	-	-	-
10 - LA-1 to LA-415 (N. Lobdell Hwy.)	24,640	36,450	48%
11 - LA-415 to US-190	26,600	34,680	30%
12 - US-190 to LA-986 (Rosedale Rd.) **	13,930	20,220	45%
13 - LA-986 to I-10 **	14,930	21,000	41%

***Excluded from the T&R study; **Proposed new construction**

The travel demand data on the BUMP corridor represented in Table 5- 2 was the aggregation of the morning, midday, afternoon and nighttime time periods. In the T&R spreadsheet model, travel demand data for the four time periods were used to develop the travel time savings and toll rate structure, which is further discussed below in the Traffic and Revenue Results Section. The time periods are consistent with the MPO model assumption:

- Morning Peak Period: 6:00am to 9:00am
- Midday Period: 9:00am to 3:00pm
- Afternoon Peak Period: 3:00pm to 6:00pm
- Nighttime Period: 6:00pm to 6:00am

5.2.2 Truck Percent

Truck traffic was assumed to be 5% of the total traffic demand along the study corridor. [redacted]

5.2.3 Forecast Years and Opening Year

Since the forecast years defined by the MPO travel demand model are 2017 and 2037, the HNTB model used 2017 and 2037 as two forecast years for corridor demand estimation. The HNTB study estimates actual revenue from the opening year (2022) identified in the BUMP Proposal.

5.2.4 Value of Time (VOT)

In developing a toll rate structure it is important to understand an individual's willingness to pay a toll and the individual's value of time. There are individuals who are not willing to pay a toll and will go out of their way to avoid toll facilities. Other individuals may be willing to pay a toll, up to a threshold amount based on their value of time and potential travel time savings. Typically, value of time for auto drivers is estimated using stated preference data that vary by time of day, trip purpose, and trip distance. Commercial vehicle values of time can vary by trip distance and vehicle size (number of axles). Mean value of time for autos (at average incomes and trip distances) typically vary from $7 to $15 per hour, while a 5-axle commercial vehicle making an average trip distance may have a value of time of $60 or more per hour.

A stated preference survey for the Baton Rouge area has not been conducted. [redacted] HNTB conducted a review of regional studies and national practice conducted and determined that national averages for value of time would be used in the HNTB study. These values can be found below in Table 5-3. It is assumed that the value of time will remain constant from 2017 to 2037.

Table 5-3: Mean Value of Time

Vehicle Class	Mean Value of Time
Passenger Cars	$10.00/Hour
Trucks	$35.00/Hour

5.2.5 Travel Time

Travel time data were collected based on Google Map's historical traffic data for a typical weekday travel time along the existing alignment between Jefferson Highway and I-10 for each segment during the four time periods. The collected travel time data was used as travel condition of an alternative route to BUMP corridor. Travel time savings are often the major benefit of a roadway project, especially for toll facilities. It helps determine a drive's probability of using toll facilities based on the driver's value of time, toll cost and other trip characteristics. Table 5-4 represents the collected travel time along the existing frontage road during the four times periods for each segment.

Table 5-4: Travel Time on Frontage Road (in minutes)

Segment	Morning (6:00AM-9:00AM)		Midday (9:00AM-3:00PM)		Afternoon (3:00PM-6:00PM)		Nighttime (6:00PM-6:00AM)	
	NB/ WB	SB/ EB	NB/ WB	SB/ EB	NB/ WB	SB/ EB	NB/ WB	SB/ EB
1 - LA-73 to I-12	4.0	4.5	5	4	5.0	4.5	3.0	2.5
2 - I-12 to Goodwood Blvd	4.5	4.5	5	5	5.5	7.5	3.0	3.0
3 - Goodwood Blvd. to US-190 (Florida Blvd.)	2.0	2.0	2	2	2.0	3.0	2.0	2.0
4 - US-190 to LA-37 (Greenwell Springs Rd.)	4.0	5.0	7	5	6.5	5.5	3.5	3.5
5 - LA-37 to Evangeline St. (N. of Prescott Rd.)	3.0	4.0	3	4	3.0	5.0	2.0	2.0
6 - Evangeline St. to LA-67	5.0	4.5	6	5	5.5	6.5	3.0	2.5
7 - LA-67 to I-110	1.0	1.0	1	1	1.0	2.0	1.0	1.0
8 - I-110 to US-61 (Scenic Hwy.)	1.0	1.0	1	1	1.0	1.0	1.0	1.0
9 - US-61 to LA-1	No Tolls							
10 - LA-1 to LA-415 (N. Lobdell Hwy.)	4.0	4.0	4	4	4.0	4.0	2.0	3.0
11 - LA-415 to US-190	2.0	2.0	2	2	2.0	2.0	1.0	1.0
12 - US-190 to LA-986 (Rosedale Rd.) new link	3.0	3.0	3	3	3.0	3.0	2.5	2.5
13 - LA-986 to I-10 new link	3.0	3.0	3	3	3.0	3.0	2.5	2.5
Total	**36.5**	**38.5**	**40.5**	**39.0**	**41.5**	**47.0**	**26.5**	**26.5**

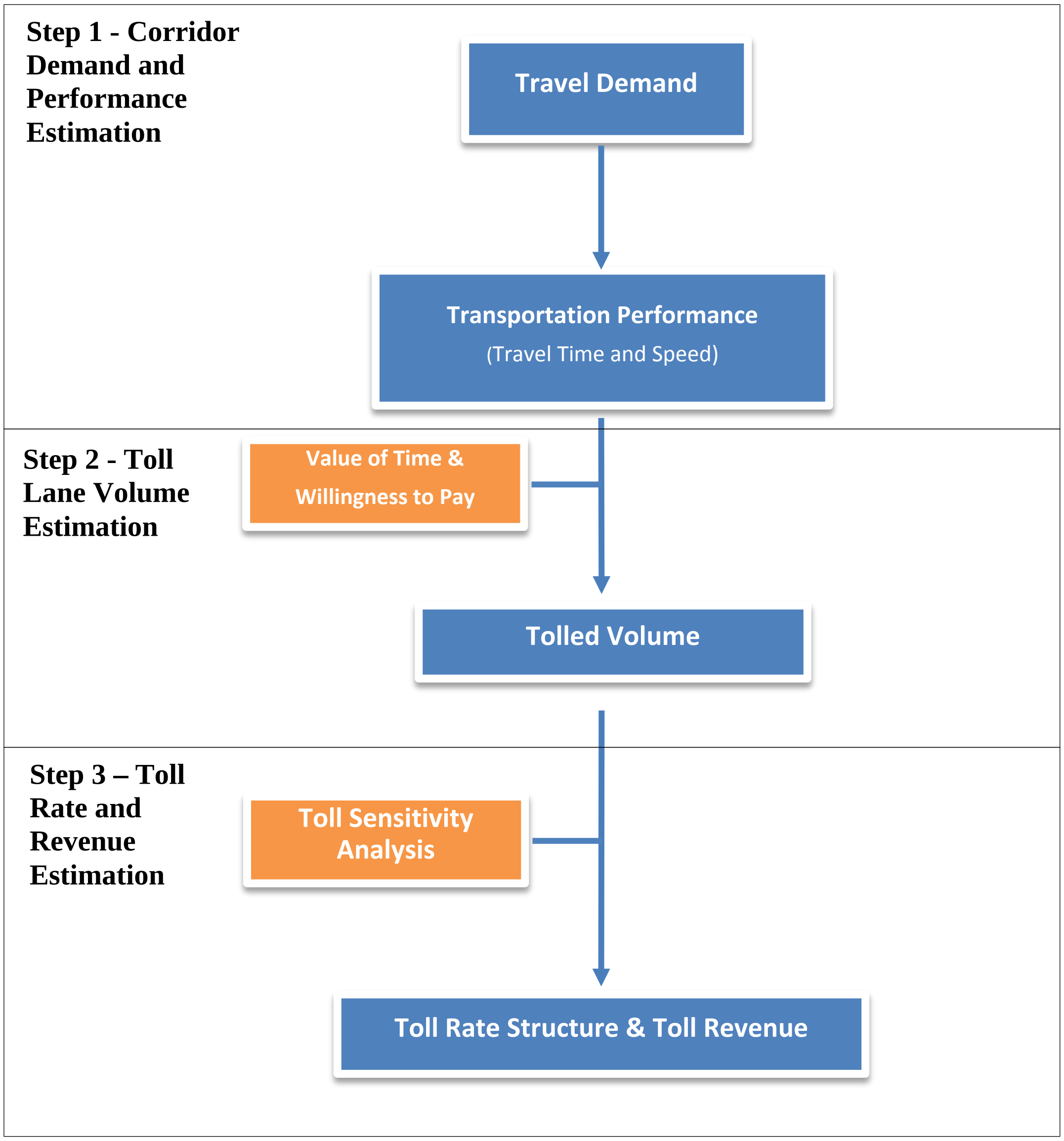
NB – Northbound, SB – Southbound, EB – Eastbound, WB – Westbound

5.3 Traffic and Toll Revenue Analysis

The data and assumptions served as input to a sketch level spreadsheet model that was developed for the HNTB study. The spreadsheet model estimates the four time periods, toll traffic and revenue in the corridor and assess the willingness to pay, diversion to parallel roads and the revenue on the toll facility.

The flow diagram shown in Figure 5-2 illustrates the steps included in the spreadsheet model to estimate the toll revenues. The first step in the model assesses the future travel demand and performance of the BUMP corridor. The second step estimates the tolled volume on the facility based on the value of time and willingness to pay module. The toll sensitivity module in the third step estimates the toll traffic capture rates based on the toll rates, travel time savings and national average willingness to pay curve. The final toll revenues were aggregated based on the selected toll rates and assumed parameters including days per year, and ramp-up factors.

Figure 5-2: Traffic and Revenue Model Flow Diagram



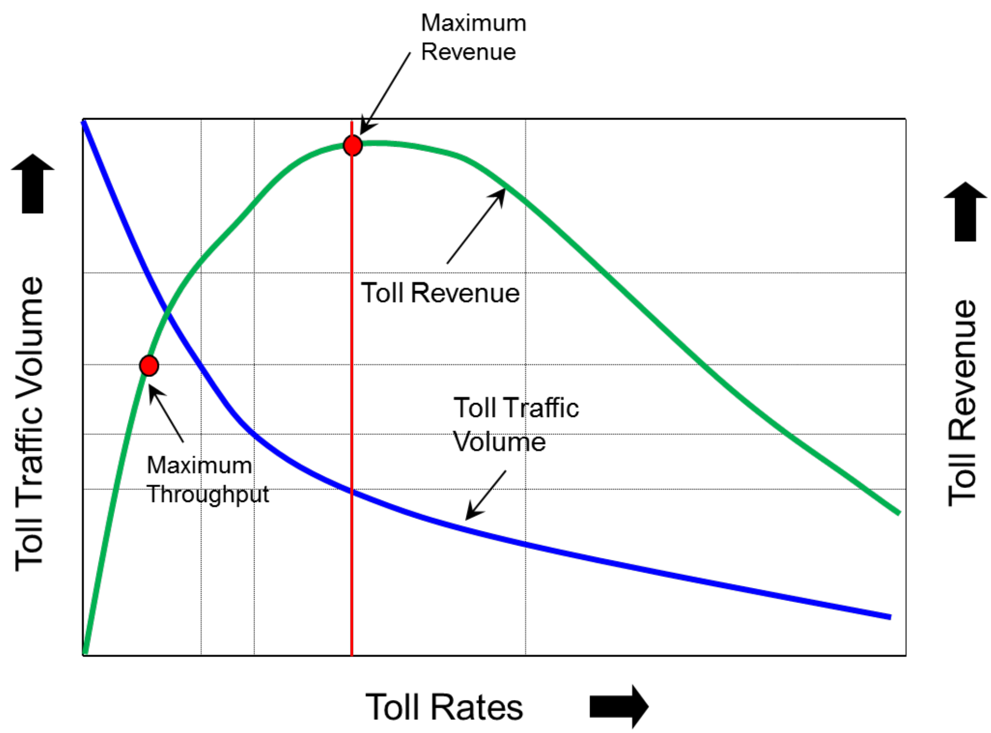
5.3.1 Toll Rate and Revenue Estimation

5.3.1.1 Toll Sensitivity Analysis

Toll sensitivity tests were conducted under different toll rates. The goal of performing a toll sensitivity analysis is to provide an understanding of the relationship between toll rates, traffic impacts and revenue levels.

Figure 5-3 shows an example of a toll sensitivity curve (in green) and associated toll traffic volume curve (in blue), with toll rates on the x-axis and revenue/toll traffic volume on the y-axis. As seen from the toll traffic volume curves, lower toll rates in the toll lanes result in higher usage (higher toll volume) while higher toll rates result in lower usage (lower toll volume). As the x-axis values (toll rates) increase from left to right, revenue increases to a high point and then begins to decline. The toll sensitivity curve illustrates the relative levels of potential toll revenue and the traffic associated with each hypothetical toll charge.

Figure 5-3 Toll Sensitivity Curve



A series of toll sensitivity curves were created by time period for 2017 to illustrate the relationships between the toll rates, traffic volumes and revenue. Based on these toll sensitivity curves, toll rates were set to target the specific levels of service and revenue objectives. In the HNTB study toll rates were established to achieve a conservative balance of optimum level of service and higher toll revenue. Toll sensitivity curves for four time periods in 2017 are provided in the Traffic and Revenue Results Section.

Annual Revenue and Revenue Stream Projections

Based on the toll rates assumed by HNTB, the average weekday gross revenue was estimated independently for each forecast year (2017 and 2037). The HNTB study then established several parameters to estimate annual gross revenue and generate the 30-year gross revenue stream. This section provides an overview of the parameters including the annualization factor, ramp-up schedule, and revenue development methodology.

Annualization Factor

The spreadsheet model produces traffic and revenue estimates for a typical weekday. In order to convert this estimate to an annual value, an annualization factor was used. The estimated annual gross revenues were calculated by multiplying this factor by the typical weekday revenue. Based on the strong midday traffic, it was assumed similar conditions would also be present during the weekends. This condition along with the peer review by Baez Consulting resulted in the use of an annualization factor of 315 days that was used to convert the daily traffic and revenue values to annual values.

Ramp-up Schedule

Traffic and toll revenue in the first few years after opening were adjusted by using a ramp-up methodology. Ramp-up considers the time that it takes the driving public to recognize any potential benefits of using a new toll facility. It is also the time before traffic reaches its full potential without considering nominal growth. Typical ramp-up periods vary by facility depending on traffic growth, development, traffic characteristics and other local considerations. Generally a ramp-up period is two to five years for new facilities. Upgraded facilities which were already part of an existing roadway network generally reach equilibrium faster resulting in lower ramp-up time. This study used a three-year ramp-up period based on coordination with the peer review. It was assumed that 70% of the traffic would be realized in Year 1 (2022), 80% in Year 2 (2023), and 90% in Year 3 (2024).

Revenue Streams

Based on the estimated revenues for 2017 and 2037, revenue streams were developed by linearly interpolating for the intermediate years from 2017 to 2036 and then extrapolating the data linearly through the year 2051. Since the open year is assumed to be 2022, the revenue numbers of the first three years, 2022 through 2024, were then factored down according to the assumed ramp-up schedule.

5.4 Traffic and Revenue Results

This section includes the toll rates structure and revenue estimation results based on the previously discussed methodology and assumptions.

5.4.1 Toll Sensitivity Results

Figure 5-4 to Figure 5-7 illustrate 2017 toll sensitivity analysis results based on different toll rates and time periods for the BUMP corridor. Toll rates for 2017 were determined based on these curves for each time period during a typical weekday. The toll rates for 2037 were assumed to remain consistent with 2017 structure since 2037 travel time and willingness to pay patterns were consistent.

Figure 5-4: 2017 AM Toll Sensitivity Curve

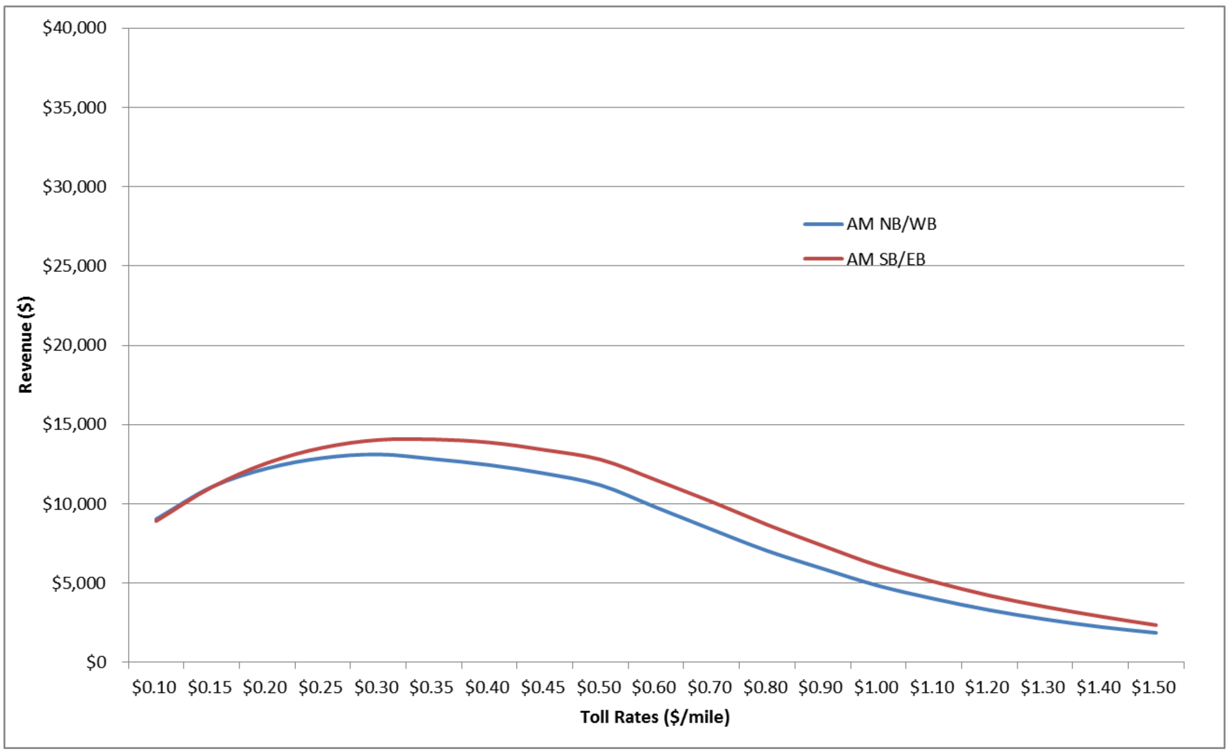


Figure 5-5: 2017 Midday Toll Sensitivity Curve

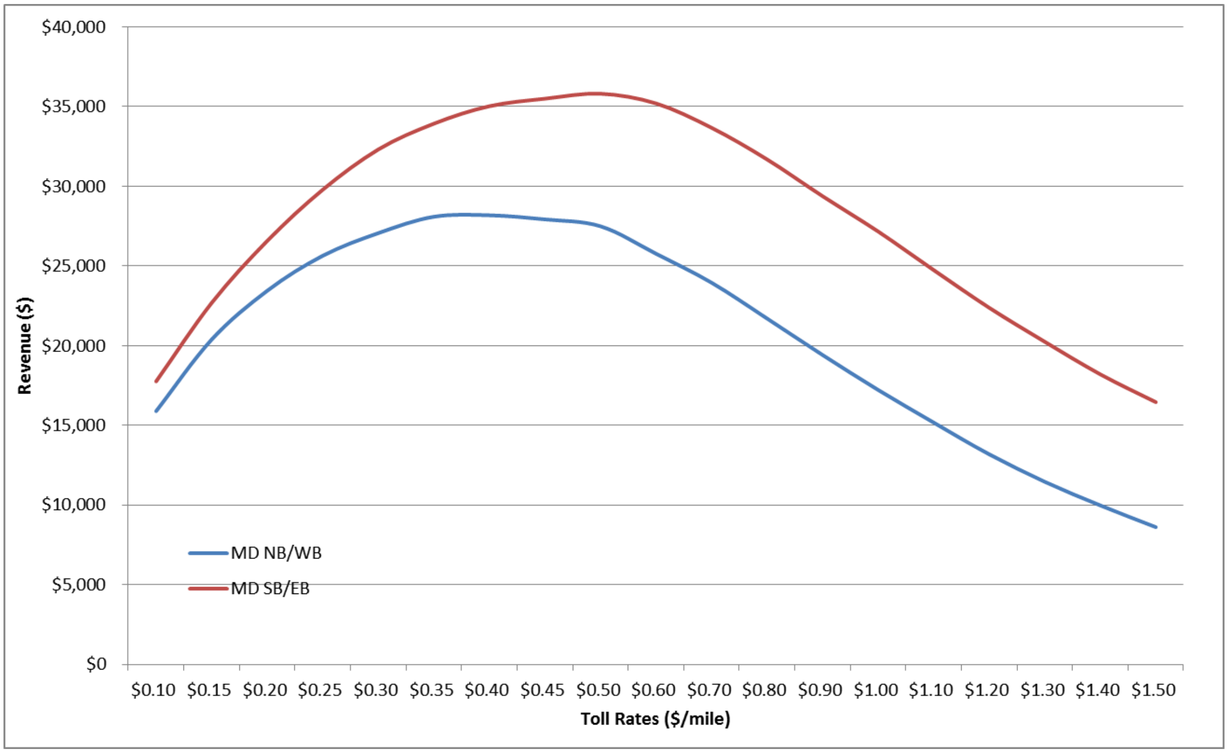


Figure 5-6: 2017 PM Toll Sensitivity Curve

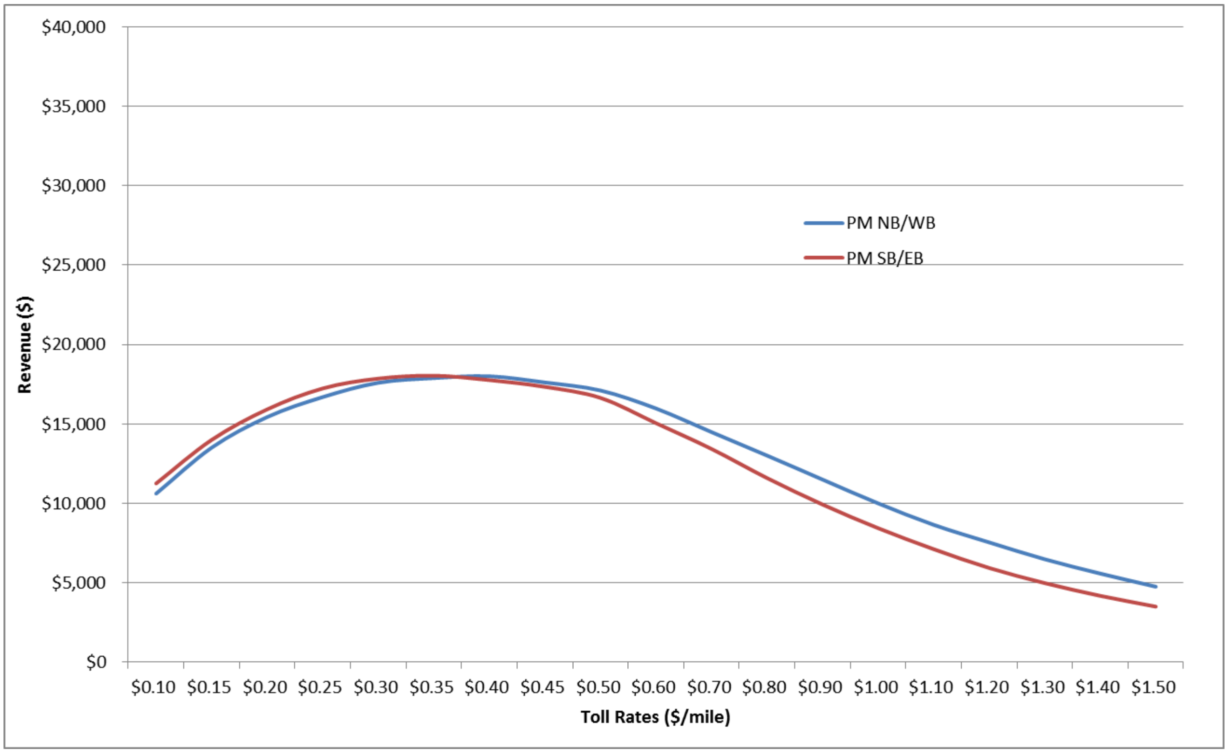
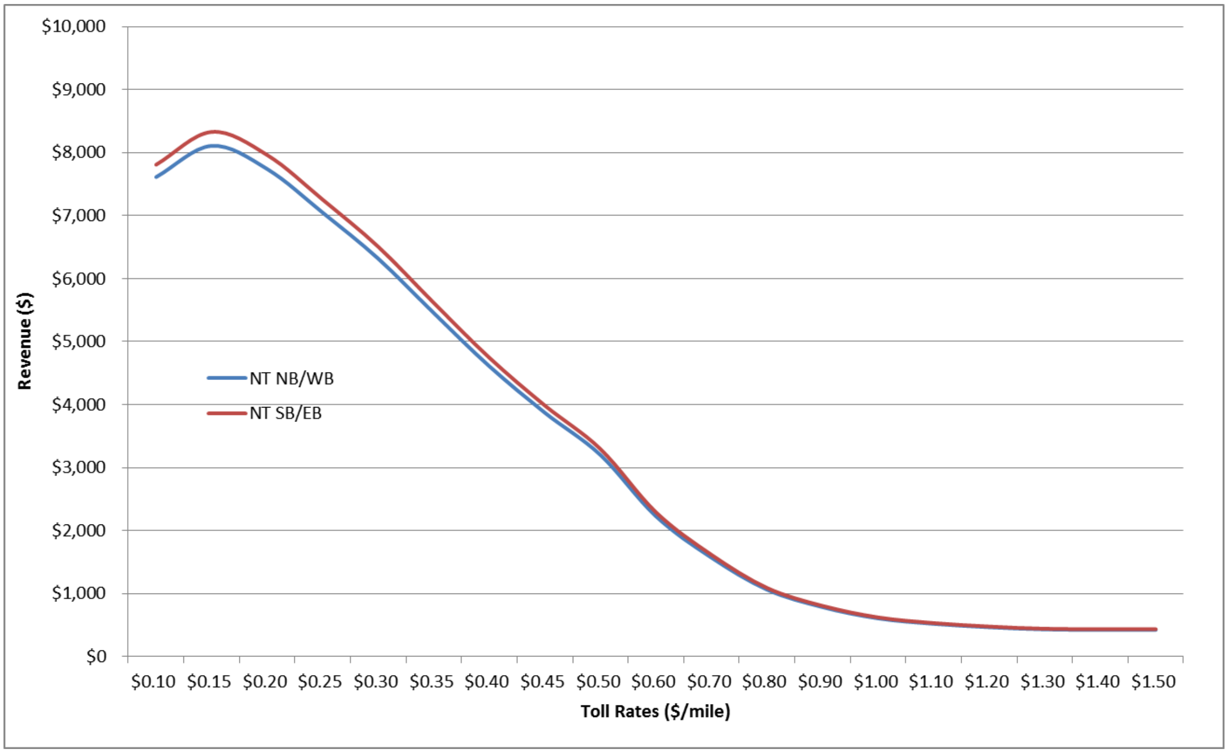


Figure 5-7: 2017 Nighttime Toll Sensitivity Curve



5.4.2 Toll Rates Structure

Table 5-5 illustrate the per mile toll rates assumed by HNTB and the corridor travel time savings during the specific time of day based on the toll sensitivity results. The toll rates are assumed to be flat for all the forecast years. Truck toll is assumed to be an average 2.5 times the auto toll. The toll rate per mile is assumed to be $0.20 for autos and $0.50 for trucks. However, the toll rate per mile may be higher than the assumed values for shorter trips; a minimum toll of $0.15 is assumed for autos and $0.40 for trucks. For a trip traveling the entire corridor, the total cost for autos would be approximately $3.60 during morning, midday and afternoon, and $2.00 during nighttime and the total costs for trucks would be $9.00 and $5.30 respectively.

Travel time savings based on the assumed rates structure for each time period are provided in Table 5-5. The travel time savings are the comparison between the tolled BUMP corridor and the alternate frontage roads or local roads. It is anticipated that for the shorter trips, the competing free option to tolled BUMP corridor would be the frontage roads or local roads along the BUMP corridor.

Table 5-5: Toll Rates (in 2014 dollar, flat for all forecast years) and Corresponding Travel Time Savings

Time of Day	Auto Toll Rates ($/mile)	Truck Toll Rates ($/mile)	Maximum Travel Time Savings (BUMP vs. Frontage Rd.)
Morning	$0.20	$0.50	NB/WB: 21 minutes SB/EB: 23 minutes
Afternoon	$0.20	$0.50	NB/WB: 26 minutes SB/EB: 31.5 minutes
Midday	$0.20	$0.50	NB/WB: 25 minutes SB/EB: 23.5 minutes
Nighttime	$0.20	$0.50	NB/WB: 11 minutes SB/EB: 11 minutes

In addition to the BUMP frontage roads, another alternate route for long and regional trips (from I-12 to I-10 west) is the existing I-10 corridor. The Proposal states, "The BUMP will give drivers an attractive free flow option to I-10 when crossing the Mississippi River in Baton Rouge" [redacted]. The HNTB study also assessed the travel time savings compared to the existing I-10 corridor from the travel demand model outputs. The average daily travel time savings for the entire trip along the BUMP corridor compared to the I-10 corridor is approximately 12 minutes for northbound/westbound and 8 minutes for southbound/eastbound. [redacted] based on the travel patterns illustrated in the regional travel demand model, it is anticipated that there will be more short trips along the BUMP corridor than the regional through trips.

5.4.2.1 Traffic and Revenue Results Summary

The HNTB study analyzed the toll traffic diversion from the tolled BUMP corridor to the alternate routes based on factors such as toll rates, travel time saving, value of time and drivers' willingness to pay. Under the toll rate structure in Table 5-5, in 2017, of the total volume that a limited access BUMP would attract, an average of 40% of the auto traffic would choose to remain on the BUMP with a toll of $0.20 per mile. In 2037, the weighted average capture rate is 43% of the entire corridor demand.

Tolled volumes along the BUMP corridor have been assessed for each segment for an overview of the BUMP corridor performance. The worst volume to capacity ratios for each time period during 2017 and 2037 are provided in Table 5-6. Table 5-6 also provides the revenue distribution over four time periods during a typical weekday. In 2017, approximately 78% of the toll revenue is generated during the daytime. Among those, 21% of the revenue is anticipated to be generated during the 3-hour morning peak, 38% during the 6-hour midday period and 28% during the 3-hour afternoon peak. The distribution is similar in 2037.

Table 5-6: Summary of Traffic and Revenue Results on BUMP

Time of Day		AM (6AM-9AM)	Midday (9AM-3PM)	PM (3PM-6PM)	Nighttime (6PM-6AM)
Worst Volume to Capacity Ratios on BUMP(1)	2017	0.56 (NB/WB)	0.50 (SB/EB)	0.74 (SB/EB)	0.11 (NB/WB)
	2037	0.52 (NB/WB)	0.50 (SB/EB)	0.76 (SB/EB)	0.13 (NB/WB)
Capture Rates(2)	2017	56%	58%	65%	28%
	2037	54%	56%	63%	26%
Revenue Distribution	2017	21%	38%	28%	13%
	2037	21%	37%	29%	13%

Notes:

(1) The capacity on the BUMP is assumed at 2,220 vehicles per hour per lane, based on the Baton Rouge MPO Travel Demand Model input data.

(2) Capture rates were calculated based on the weighted corridor averaged toll volume on the limited access BUMP divided by the volume of a toll-free limited access BUMP.

5.4.2.2 Annual Gross Revenue Estimates

Table 5-7 highlights the detailed annual gross revenue streams from the opening forecast year of 2022 to a future horizon year of 2051. It includes daily gross revenue, annual gross revenue and cumulative gross revenue. All revenue numbers are in current dollars. Annual and accumulative gross revenue numbers are rounded to the nearest ten dollars.

All revenue numbers in the tables are in 2014 dollars, with no inflation. Annual inflation of 2.5% is applied to the revenue numbers in the financial feasibility model.

As with any sketch level feasibility study, the resulting traffic and toll revenue forecasts are based on a variety of fundamental assumptions and estimates such as future roadway networks increasing capacity in the region, user's willingness to pay, ADT growth, annualization factor, and ramp-up factors, among others. The results included in this Section provide a solid foundation for understanding the revenue generating potential of the BUMP Project under the baseline scenario using the identified assumptions. Once preliminary feasibility is determined under the baseline scenario, sensitivity analysis can be carried out as a next step to gain an understanding of the sensitivities of some of the forecast's underlying assumptions and determine the revenue changes.

Table 5-7: Annual and Accumulated Gross Toll Revenue (in 2014 $)

Year	Daily Gross Revenue	Annual Gross Revenue	Accumulative Gross Revenue
2022	$85,950	$27,074,250	$27,074,250
2023	$98,590	$31,055,850	$58,130,100
2024	$111,320	$35,065,800	$93,195,900
2025	$124,140	$39,104,100	$132,300,000
2026	$124,590	$39,245,850	$171,545,850
2027	$125,040	$39,387,600	$210,933,450
2028	$125,490	$39,529,350	$250,462,800
2029	$125,940	$39,671,100	$290,133,900
2030	$126,390	$39,812,850	$329,946,750
2031	$126,840	$39,954,600	$369,901,350
2032	$127,290	$40,096,350	$409,997,700
2033	$127,740	$40,238,100	$450,235,800
2034	$128,190	$40,379,850	$490,615,650
2035	$128,640	$40,521,600	$531,137,250
2036	$129,090	$40,663,350	$571,800,600
2037	$129,540	$40,805,100	$612,605,700
2038	$129,990	$40,946,850	$653,552,550
2039	$130,440	$41,088,600	$694,641,150
2040	$130,890	$41,230,350	$735,871,500
2041	$131,340	$41,372,100	$777,243,600
2042	$131,790	$41,513,850	$818,757,450
2043	$132,240	$41,655,600	$860,413,050
2044	$132,690	$41,797,350	$902,210,400
2045	$133,140	$41,939,100	$944,149,500
2046	$133,590	$42,080,850	$986,230,350
2047	$134,040	$42,222,600	$1,028,452,950
2048	$134,490	$42,364,350	$1,070,817,300
2049	$134,940	$42,506,100	$1,113,323,400
2050	$135,390	$42,647,850	$1,155,971,250
2051	$135,840	$42,789,600	$1,198,760,850

6.0 CHAPTER SIX – FINANCIAL FEASIBILITY

This section evaluates the preliminary feasibility potential of the BUMP Project as a standalone toll P3 project based on HNTB's assessment of project costs, revenues and financial structure. The feasibility analysis will evaluate the upfront financing capacity of the Project and determine the amount of any gap funding required to fully fund the Project's development costs. This analysis evaluates the financing potential of the Project based solely on toll revenues and does not contemplate any public funding contributions or credit support. Given the preliminary nature of the BUMP Proposal, it is likely that future refinements will made. Feasibility of the project will affected by any future refinements which decrease costs or increase revenue.

HNTB developed an Excel-based financial model to evaluate various financing and structuring options for the project. The model structures debt and private equity against forecasted net toll revenues to evaluate the financing potential of the Project. This analysis presents two financing scenarios for a revenue risk Design-Build-Finance-Operate-Maintain (DBFOM) Toll Concession to illustrate a range of financing capacity based on the financial market conditions assumed in each scenario. The assumptions used in the model are based on observable market indicators as well as qualitative factors pertinent to this project and its future timing.

6.1 Financial Model Inputs

The HNTB Project analysis detailed earlier in this report forms the basis for the financial evaluation of the Project. The following project-specific cost and revenue forecasts were included in the feasibility analysis:

Table 6-1: Project Specific Cost and Revenue Forecasts

Input	Description	Timing
Project Capital Cost	- $775.255 million project capital cost in 2015$ $855.736 million escalated to construction midpoint (2019) with 2.5% inflation - $18.009 million RTCS equipment in 2014$ $21.276 million escalated to 2020 and 2021 with 2.5% inflation - $877.013 million total project development costs in year of expenditure $	- 4-year construction schedule from 2018-2021
O&M and Lifecycle Costs	- Roadway Routine O&M and Renewal and Replacement (R&R) cost forecast escalated at 2.5% annually - Toll RTCS and Back Office System	- Year 1 of operations is 2022

	O&M and R&R escalated at 2.5% annually	
Traffic & Revenue Forecast	- Toll Revenue forecast escalated at 2.5% annually	- Year 1 of operations is 2022

6.2 Financing Structure and Assumptions

While P3s can be structured in a variety of ways, this analysis assumes a revenue risk P3 DBFOM structure [redacted]. The basic P3 financial structuring terms are below:

- 50-Year Toll Concession
- 40-Year Private Activity Bonds as Senior Debt
- Federal TIFIA Loan as Subordinate Debt
- 2 financing scenarios analyzed
  - Market Stabilized Case (normalized over time for conservatism)
  - Attractive Financing Case (current rates and higher leverage environment)

The assumptions governing the two financing scenarios are presented in the following table:

Table 6-2: Financing Scenario Assumptions

Item	Mkt. Stabilized	Attractive
Sr. Debt Rate	5.50%	4.75%
Sr. Coverage	2.10x	2.00x
TIFIA Debt Rate	4.00%	3.00%
TIFIA Coverage	1.50x	1.35x
Private Equity IRR	13%	12%

6.3 Preliminary Financial Feasibility Results

HNTB’s proprietary financial model was utilized to assess the upfront financing capacity for each of the financing cases. HNTB’s model is designed to evaluate preliminary feasibility by structuring debt and equity against a net revenue stream and evaluating the total upfront financing proceeds against the project’s capital costs. As the results in the following table demonstrate, the upfront toll financing proceeds are insufficient to fully fund the Project’s capital costs so gap funding is required to deliver the Project.

Table 6-3: Preliminary Financial Feasibility Results

($m)	Mkt. Stabilized	Attractive
Capital Cost (esc)	**877**	**877**
Sr. Debt Proceeds	195	250
TIFIA Debt Proceeds	185	240
Private Equity	100	103
Total Upfront Proceeds	480	593
Required Gap Funding	397	284
Feasibility Percentage*	55%	68%

*Note: Feasibility Percentage is the ratio of Total Upfront Proceeds over Capital Cost

The Project's net toll revenues are able to support a large P3 financing but gap funding ranging from $284 to $397 million would be required to fully fund the Project based on the forecasted costs, revenues and financial assumptions.

HNTB makes no assertion or claim that the assumptions utilized in the model represent current or actual financial market terms or interest rates. The results of the HNTB model are presented solely for illustration purposes and do not represent terms for an actual transaction. HNTB is not a registered financial advisor and the results of this analysis are not intended to be utilized to justify a financing or P3 transaction.

7.0 CHAPTER SEVEN – FINDINGS

HNTB conducted an independent analysis of the BUMP Proposal. As part of the analysis, HNTB performed the following tasks:

- Reviewed the proposed conceptual design
- Developed a construction cost estimate
- Developed a roadway O&M and estimate
- Developed a roadway R&R estimate
- Developed a toll system capital cost estimate
- Developed a toll system O&M cost estimate
- Conducted a Level 1 T&R study
- Examined financial feasibility

The findings included in this report are appropriate only for use in planning-level evaluation. They are preliminary in nature and not intended to support project related funding and financing decisions.

7.1 Review of Proposed Conceptual Design

HNTB reviewed the Proposal and developed a conceptual design for the purposes of performing various costs estimates. The HNTB conceptual design is based on the conceptual design identified in the Bump Proposal. Due to ambiguity as a result of the conceptual level of the Proposal, various infrastructure elements were further refined by HNTB to incorporate additional considerations that are necessary to meet design and construction standards, provide for all electronic toll collection, and maintain traffic operations consistent with similar facilities of this type.

7.2 Construction Cost Estimate

The Proposal identified an estimated construction cost range of $720 to 800 million. HNTB conducted an independent cost analysis which estimated construction costs at $775 million.

Table 7-1 Table 3-1: HNTB Capital Cost Estimate

Description	Cost (2015 dollars)
Capital Cost of Roadway Construction	$553,753,275
Engineering Fees (10% of Capital Cost)	$55,375,327
Construction Cost Contingency (30% of Capital Cost)	$166,125,982
HNTB Total Capital Cost Estimate:	**$775,254,585**

7.3 Roadway and Tolling Cost Estimates for O&M and R&R

HNTB developed annual cost forecasts for routine and major maintenance for the roadway and tolling project components. These costs were developed only for the tolled lanes of the BUMP and were incorporated into the net revenue forecast utilized in the financial feasibility model.

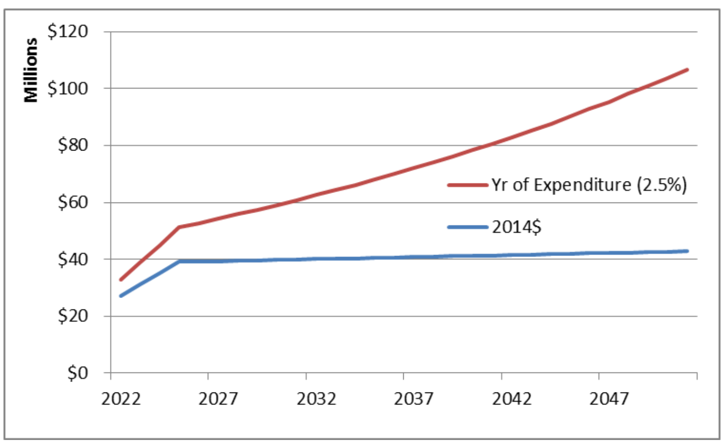
7.4 Level 1 T&R Study

HNTB developed a sketch level T&R spreadsheet model based on travel demand data from the Baton Rouge MPO travel demand model, estimated travel time savings, and other travel behavior characteristics. The BUMP Proposal includes estimated high-level T&R projections for the Project. The HNTB study utilized the following T&R assumptions and parameters:

- Project Open Year - 2022;
- Auto Toll Rate $0.20 per mile
- Truck Toll Rate $0.50 per mile
- Truck Traffic Percent – 5% ; and,
- Value of Time of $10 per hour for autos.

Other assumptions or parameters used in the HNTB study were developed based on data collection efforts, discussion within the study team and peer review team, and regional or national best practices. Figure 7-1 highlights the detailed annual gross revenue streams from the opening forecast year of 2022 to a future horizon year of 2051.

Figure 7-1: Annual Gross Toll Revenue (in 2014 $ and Year of Expenditure)



7.5 Financial Feasibility

HNTB evaluated the preliminary feasibility potential of the BUMP Proposal as a standalone toll P3 based on HNTB's assessment of project costs, revenues and financial structure. HNTB developed an Excel-based financial model to evaluate various financing and structuring options for the project. The financial model utilized assumptions based on current market conditions, observed transactions and other qualitative aspects.

Feasibility was analyzed based on two financing cases. A more conservative Market Stabilized case was evaluated using interest rates and leverage seen over the last five years and a more aggressive Attractive Market case reflects the current low interest rate and higher leverage environment.

Table 7-2: Financial Feasibility Results

($m)	Mkt. Stabilized	Attractive
Capital Cost (esc)	**877**	**877**
Total Upfront Proceeds	485	593
Required Gap Funding	397	284
Feasibility Percentage	55%	68%

*Note: Feasibility Percentage is the ratio of Total Upfront Proceeds over Capital Cost

7.6 Conclusion

[redacted] after conducting an independent preliminary analysis, HNTB has determined that gap funding ranging from $284 to $397 will be required.

As previously discussed, the findings included in this report are appropriate only for use in planning-level evaluation. They are preliminary in nature and not intended to support project related funding and financing decisions.

APPENDIX A – ACRONYM LIST

All-Electronic Tolling (AET)

Average Daily Traffic (ADT)

Back Office System (BOS)

Baton Rouge Urban Renewal and Mobility Plan (BUMP)

Capital Expenditures (CapEx)

Comprehensive Development Agreements (CDA)

Design-Build-Finance-Operate-Maintain (DBFOM)

Environmental Assessment (EA)

Environmental Impact Statement (EIS)

Intelligent Transportation Systems (ITS)

Louisiana Transportation Authority (LTA)

Metropolitan Planning Organization (MPO)

National Environmental Policy Act (NEPA)

Operating Expenditures (OpEx)

Operations and Maintenance (O&M)

Pre-Development Agreements (PDA)

Public-Private Partnerships (P3)

Right-of-Way (ROW)

Roadside Toll Collection System (RTCS)

Segment of Independent Utility (SIU)

Tax Increment Financing (TIF)

Traffic and Revenue (T&R)

Urban Renewal Zone (URZ)

Value of Time (VOT)

West Side Expressway (WSE)

APPENDIX B – CONSTRUCTION COSTS

Row Labels	Sum of Segment 1 -BUMP - (US 190 TO I-10) ITEM COST	Sum of Segment 2 - US 190 (Miss River Bridge to US 190 Split) ITEM COST	Sum of Segment 3 - Airline Hwy/ US 61 (east of Plank to Miss River Bridge) ITEM COST	Sum of Segment 4 - Airline Hwy/ US 61 (just west of Florida to east of Plank) ITEM COST	Sum of Segment 5 - Airline Hwy/ US 61 (Old Hammond Hwy to just west of Florida) ITEM COST	Sum of Segment 6 - Airline Hwy/ US 61 (Coursey to Old Hammond Hwy) ITEM COST
Both	**$ 9,034,789.07**	**$ 9,176,288.29**	**$ 3,076,437.67**	**$ 15,909,228.07**	**$ 4,404,332.41**	**$ 38,343,809.49**
CATCH BASINS (CB-06)	$ -	$ 570,000.00	$ -	$ 969,000.00	$ 197,600.00	$ 114,000.00
DRAIN MANHOLES (R-CB-11)	$ -	$ 585,000.00	$ -	$ 994,500.00	$ 202,800.00	$ 117,000.00
MOBILIZATION	$ 3,011,596.36	$ 1,723,762.76	$ 1,025,479.22	$ 3,033,576.02	$ 1,008,477.47	$ 12,514,269.83
STORM DRAIN PIPE (24")	$ -	$ 2,850,000.00	$ -	$ 4,845,000.00	$ 978,500.00	$ 570,000.00
TEMPORARY SIGNS AND BARRICADES	$ 6,023,192.72	$ 3,447,525.53	$ 2,050,958.45	$ 6,067,152.04	$ 2,016,954.94	$ 25,028,539.66
Frontage	**$ 11,210,365.00**	**$ 9,925,107.66**	**$ 10,716,745.09**	**$ 19,766,401.56**	**$ 9,477,258.88**	**$ 139,432,944.18**
CLASS II BASE COURSE (8" THICK) (STONE OR RECYCLED PORTLAND CEMENT CONCRETE) (FREE)	$ 5,232,975.00	$ 1,625,989.00	$ 1,422,235.93	$ 3,632,377.10	$ 1,425,321.98	$ 942,119.48
CONCRETE CURB (BARRIER) (FREE)		$ 603,581.16	$ 411,598.11	$ 1,069,046.16	$ 424,612.65	$ 261,656.85
CONCRETE DRIVEWAY (8" THICK)	$ -	$ -	$ -	$ 646,000.00	$ 306,000.00	$ 212,500.00
CONCRETE WALK (6" THICK)	$ -	$ 1,885,222.50	$ 1,219,549.10	$ 2,663,630.90	$ 1,259,543.60	$ 782,523.70
ELEVATED ROADWAY	$ 4,912,680.00	$ -	$ 3,063,360.00	$ -	$ 1,440,240.00	$ -
ELEVATED ROADWAY - HIGH LEVEL	$ -	$ -	$ -	$ -	$ -	$ 134,172,138.50
GEOGRID (FREE)		$ 282,000.00	$ 204,000.00	$ 528,000.00	$ 216,000.00	$ 150,000.00
HANDICAPPED CURB RAMPS	$ -	$ -	$ -	$ -	$ -	$ -
PCCP (10"MIN THICKNESS) (FREE)	$ 1,064,710.00	$ 5,528,315.00	$ 4,396,001.95	$ 11,227,347.40	$ 4,405,540.65	$ 2,912,005.65
SUPERPAVE ASPHALTIC CONCRETE (DRIVES, TURNOUTS, AND MISC.)	$ -	$ -	$ -	$ -	$ -	$ -
Toll	**$ 49,021,562.15**	**$ 23,196,728.75**	**$ 10,917,813.52**	**$ 38,477,281.05**	**$ 10,751,763.17**	**$ 110,972,053.25**
CLASS II BASE COURSE (8" THICK) (STONE OR RECYCLED PORTLAND CEMENT CONCRETE) (TOLL)	$ 344,475.00	$ 1,357,922.25	$ 882,056.45	$ 2,843,435.93	$ 932,763.43	$ -
COLD PLANING ASPHALTIC PAVEMENT (2" AVG. DEPTH)	$ -	$ 457,897.98	$ 307,468.02	$ 815,629.32	$ 248,414.64	$ -
CONCRETE BARRIER (DOUBLE FACED)	$ 5,907,650.30	$ 4,248,480.00	$ 3,571,325.50	$ 6,785,640.35	$ 2,745,058.15	$ 1,754,551.75
CONCRETE BARRIER (SINGLE FACED)	$ 4,488,547.50	$ 3,723,498.75	$ 2,396,231.25	$ 6,412,797.50	$ 2,589,680.00	$ 1,655,237.50
CONCRETE CURB (BARRIER) (TOLL)	$ 191,250.15	$ 63,889.77	$ -	$ -	$ -	$ -
ELEVATED ROADWAY	$ 21,089,989.20	$ 10,874,040.00	$ -	$ 8,772,360.00	$ -	$ 106,903,320.00
GANTRY - MAIN LINE	$ -	$ -	$ -	$ -	$ -	$ -
GANTRY - RAMP	$ -	$ -	$ -	$ -	$ -	$ -
GEOGRID (TOLL)	$ 825,000.00	$ 423,000.00	$ 321,000.00	$ 747,000.00	$ 339,000.00	$ -
PCCP (10"MIN THICKNESS) (TOLL)	$ 16,174,650.00	$ -	$ 2,726,356.30	$ 8,788,801.95	$ 2,883,086.95	$ -
REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	$ -	$ 2,048,000.00	$ 713,376.00	$ 3,311,616.00	$ 1,013,760.00	$ 658,944.00
TOLLING EQUIPMENT	$ -	$ -	$ -	$ -	$ -	$ -
Grand Total	**$ 69,266,716.22**	**$ 42,298,124.70**	**$ 24,710,996.28**	**$ 74,152,910.67**	**$ 24,633,354.45**	**$ 288,748,806.91**

Row Labels	Sum of I-12 (West of BUMP) ITEM COST	Sum of I-12 (East of BUMP) ITEM COST	Sum of Segment 7 - Airline Hwy/ US 61 (Cedarcrest to Coursey) ITEM COST	Sum of Segment 8 - Airline Hwy/ US 61 (Sherwood Commons to Cedarcrest) ITEM COST
Both	**$ 776,160.10**	**$ 654,429.10**	**$ 570,019.01**	**$ 2,753,633.19**
CATCH BASINS (CB-06)	$ -	$ -	$ 22,800.00	$ 152,000.00
DRAIN MANHOLES (R-CB-11)	$ -	$ -	$ 23,400.00	$ 156,000.00
MOBILIZATION	$ 258,720.03	$ -	$ 136,606.34	$ 561,877.73
STORM DRAIN PIPE (24")	$ -	$ -	$ 114,000.00	$ 760,000.00
TEMPORARY SIGNS AND BARRICADES	$ 517,440.07	$ 654,429.10	$ 273,212.67	$ 1,123,755.46
Frontage	**$ 3,163,603.49**	**$ 3,625,875.62**	**$ 827,624.57**	**$ 773,636.48**
CLASS II BASE COURSE (8" THICK) (STONE OR RECYCLED PORTLAND CEMENT CONCRETE) (FREE)	$ 678,965.93	$ 793,378.03	$ 136,840.00	$ 127,034.60
CONCRETE CURB (BARRIER) (FREE)	$ 287,015.61	$ 257,238.24	$ 46,806.27	$ 1,723.68
CONCRETE DRIVEWAY (8" THICK)	$ -	$ -	$ 38,250.00	$ 136,000.00
CONCRETE WALK (6" THICK)	$ -	$ -	$ 157,268.30	$ 83,225.80
ELEVATED ROADWAY	$ -	$ -	$ -	$ -
ELEVATED ROADWAY - HIGH LEVEL	$ -	$ -	$ -	$ -
GEOGRID (FREE)	$ 99,000.00	$ 123,000.00	$ 25,500.00	$ 33,000.00
HANDICAPPED CURB RAMPS	$ -	$ -	$ -	$ -
PCCP (10"MIN THICKNESS) (FREE)	$ 2,098,621.95	$ 2,452,259.35	$ 422,960.00	$ 392,652.40
SUPERPAVE ASPHALTIC CONCRETE (DRIVES, TURNOUTS, AND MISC.)	$ -	$ -	$ -	$ -
Toll	**$ 2,297,812.80**	**$ 3,175,653.60**	**$ 1,926,276.41**	**$ 9,397,641.79**
CLASS II BASE COURSE (8" THICK) (STONE OR RECYCLED PORTLAND CEMENT CONCRETE) (TOLL)	$ -	$ -	$ 261,240.93	$ 1,007,963.55
COLD PLANING ASPHALTIC PAVEMENT (2" AVG. DEPTH)	$ -	$ -	$ -	$ -
CONCRETE BARRIER (DOUBLE FACED)	$ -	$ -	$ 338,659.40	$ 2,403,202.85
CONCRETE BARRIER (SINGLE FACED)	$ -	$ -	$ 335,556.25	$ 935,333.75
CONCRETE CURB (BARRIER) (TOLL)	$ -	$ -	$ 6,179.88	$ 28,079.94
ELEVATED ROADWAY	$ 2,297,812.80	$ 3,175,653.60	$ -	$ 1,604,538.00
GANTRY - MAIN LINE	$ -	$ -	$ -	$ -
GANTRY - RAMP	$ -	$ -	$ -	$ -
GEOGRID (TOLL)	$ -	$ -	$ 42,000.00	$ 303,000.00
PCCP (10"MIN THICKNESS) (TOLL)	$ -	$ -	$ 807,471.95	$ 3,115,523.70
REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	$ -	$ -	$ 135,168.00	$ -
TOLLING EQUIPMENT	$ -	$ -	$ -	$ -
Grand Total	**$ 6,237,576.39**	**$ 7,455,958.31**	**$ 3,323,919.98**	**$ 12,924,911.46**

		Sub Total	$ 553,753,275.37
	10%	Engineering	$ 55,375,327.54
	30%	Contingency	$ 166,125,982.61
		Grand Total	**$ 775,254,585.52**
Toll Only (with drainage)		Sub Total	$ 344,833,712.86
	10%	Engineering	$ 34,483,371.29
	30%	Contingency	$ 103,450,113.86
		Grand Total	**$ 482,767,198.01**
Frontage Only		Sub Total	$ 208,919,562.51
	10%	Engineering	$ 20,891,956.25
	30%	Contingency	$ 62,675,868.75
		Grand Total	**$ 292,487,387.51**

APPENDIX C – BATON ROUGE URBAN RENEWAL AND MOBILITY PLAN PROJECT: TRAFFIC AND TOLL REVENUE SKETCH LEVEL PEER REVIEW

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September 1, 2015

FINAL

Mr. John Basilica, Jr.
BUMP Project Manager
Vice President
Gulf Coast District Leader
HNTB CORPORATION
10000 Perkins Row, Suite 640
Baton Rouge, LA 70810

Reference: **Baton Rouge Urban Renewal and Mobility Plan Project: Traffic and Toll Revenue Sketch Level Peer Review**

Dear Mr. Basilica:

Per your request, Baez Consulting (Baez) is pleased to submit this letter report presenting the findings of a general review of the sketch level traffic and revenue estimates developed by HNTB for the Baton Rouge Urban Renewal and Mobility Plan Project (BUMP).

BACKGROUND OF THE PROJECT

The proposed BUMP project is a four-lane semi-loop toll facility located in Baton Rouge, Louisiana (see Figure 1). The BUMP will relieve the existing traffic congestion on US-61/US-190 between I-110 and I-12. It will also provide an alternative route for through trips using I-10 for those wishing to avoid the congestion around the Baton Rouge central business district.

The proposed BUMP toll corridor is 20 miles, composed of a toll-free section (in the US 190 Mississippi River crossing section), with an effective total toll distance of 18 miles. The BUMP toll facility will have four-lanes in both directions with a two-lane frontage road in each direction.

The number of lanes and frontage road configurations of the BUMP project is typical of toll projects currently in operation in Texas. The frontage roads provide access to local businesses and for short trips while the toll main lanes provide circulation to "through" traffic (long and medium distance trips).

SCOPE OF THE WORK

The purpose of this analysis is to review the sketch level traffic and toll revenue estimates calculated by HNTB for the proposed BUMP toll project. The scope of work includes reviewing the general assumptions, parameters, factors, and traffic and toll revenue estimates, as well as recommending revisions based on expertise accumulated by Baez Consulting through several years of experience evaluating toll projects.

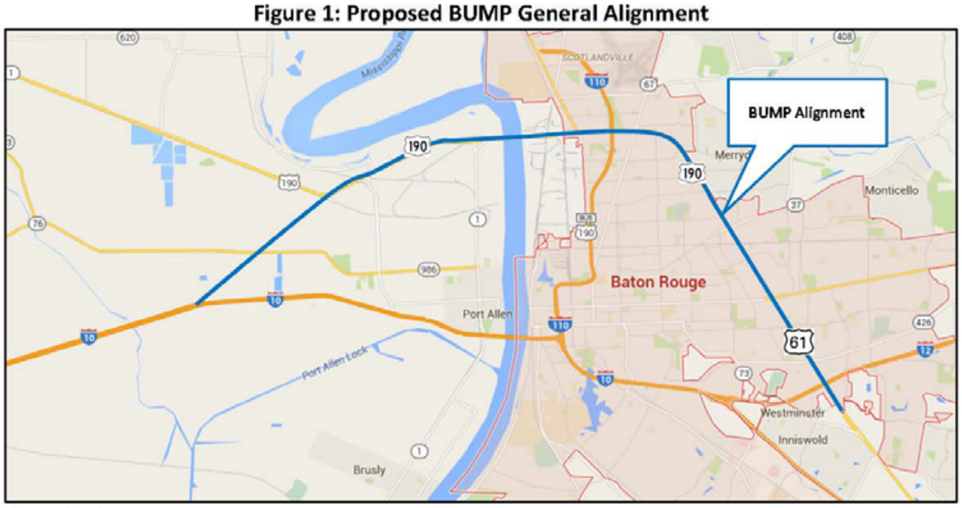
All the recommendations provided by Baez in this letter report are based on rule-of-thumb and historical information gathered from existing toll facilities. The recommendations are not based on a comprehensive travel demand and toll revenue forecast process.

INFORMATION RECEIVED FROM HNTB

Baez received several documents from HNTB including:

- Traffic and Revenue Summary (version 3) PDF file. It includes the traffic and revenue process, assumptions, toll sensitivity results, performance summary, and annual transactions and revenue estimates
- Stick diagram illustrating potential ramp and mainlane gantry locations
- 2014 AADT along the corridor
- 2017 and 2037 demographic summary from the travel demand model
- AECOM feasibility study assumptions
- AECOM BUMP Proposal (2 PDF documents)

Figure 1: Proposed BUMP General Alignment



Source: Google Maps

INFORMATION COLLECTED BY BAEZ CONSULTING

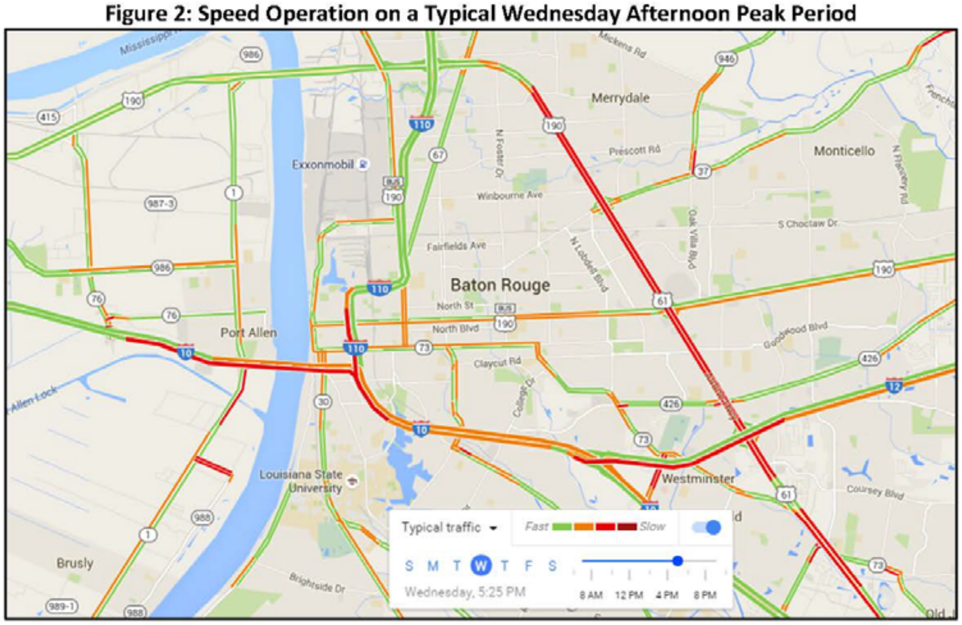
To complement the evaluation, Baez collected the following information:

- Historical traffic counts from the Louisiana Department of Transportation
- Historical population from the US Census Bureau
- Metropolitan Transportation Plan 2037 developed by the Baton Rouge Metropolitan Planning Organization
- 2014 Occupational and Employment wages released by the US Department of Labor
- Historical traffic and revenue performance from several existing toll facilities

EXISTING TRAFFIC OPERATION CONDITIONS

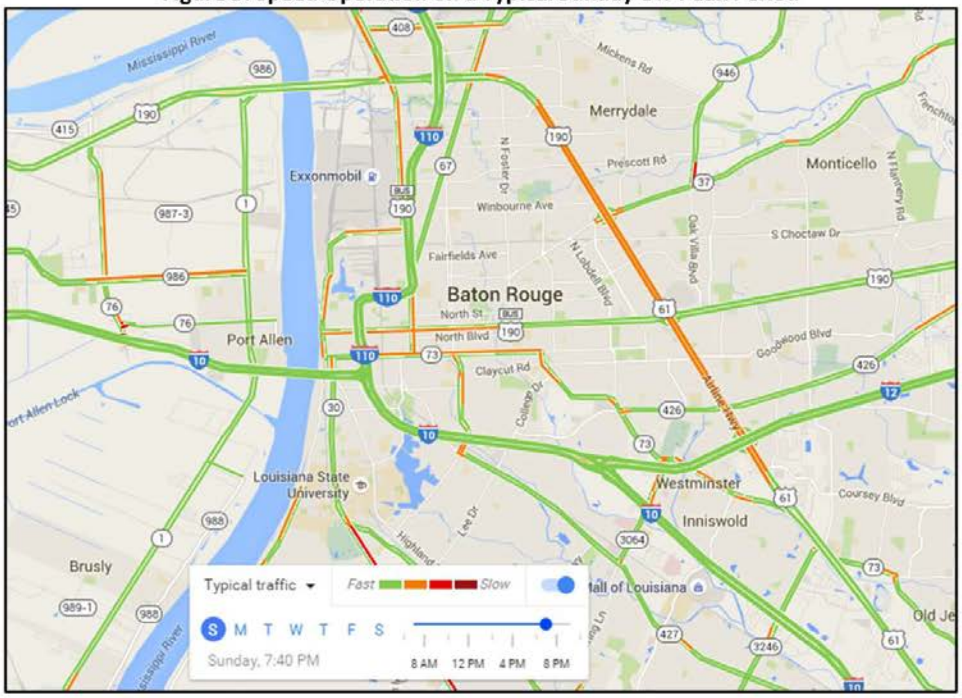
The existing traffic conditions on US-61/US-190 between I-12 and I-110 are very poor. The presence of several traffic lights and intense land-use patterns in this part of the corridor creates traffic delays along the corridor during peak and off-peak periods. Figures 2 and 3 illustrate the speed operation of the corridor during an afternoon peak period and during a Sunday afternoon off-peak period.

Figure 2: Speed Operation on a Typical Wednesday Afternoon Peak Period



Source: Google Maps

Figure 3: Speed Operation on a Typical Sunday Off-Peak Period



Source: Google Maps

HISTORICAL AND FUTURE POPULATION GROWTH

Table 1 shows the historical population growth for the East and West Baton Rouge Parishes and the state of Louisiana. In the long-term, from 1960 to 2010, the population in Baton Rouge area has increased annually at a maximum rate of 1.3%. From 2000 to 2010, the population annual growth increased by 0.6% and 1.0% for East and West Baton Rouge, respectively. In comparison with the state of Louisiana, the population annual growth in Baton Rouge was higher (see Table 1).

Between 2017 and 2037, the population in the Baton Rouge region is expected to increase at annual compound rate of 1.0%, which is lower than the historical annual population growth of 1.3% (see Tables 1 and 2).

Table 1: Historical Population

Jurisdiction	1960	2000	2010	Annual Compound Growth 1960-2010	Annual Compound Growth 2000-2010
East Baton Rouge Parish	230,058	412,919	440,171	1.3%	0.6%
West Baton Rouge Parish	14,796	21,564	23,788	1.0%	1.0%
Total Baton Rouge	244,854	434,483	463,959	1.3%	0.7%
Lousiana	3,257,022	4,472,000	4,533,372	0.7%	0.1%

Source: US Decennial Census

Table 2: Future Population

Jurisdiction	2017	2037	Annual Compound Growth 2017-2037
Baton Rouge Metropolitan Area	726,326	891,030	1.0%

Source: the Baton Rouge MPO Travel Demand Model input data

HISTORICAL TRAFFIC COUNT GROWTH

Table 3 shows historical average annual daily traffic (AADT) in the US 61/US 190 corridor, I-10 and I-110, released by the Louisiana Department of Transportation.

From 1999 to 2014, in the US 61/US 190 corridor, from south of I-12 in the east to Belmond Road in the west, the AADT has increased annually by only 0.3%. Some segments of the corridor have experienced AADT decreases. The annual compound traffic growth has been less than the historical annual population growth of the region (see Table 3).

Traffic counts on I-10 revealed an annual compound AADT increment of 2.7%. The I-10 segment located in the proximity of the east BUMP connection experienced the highest annual growth rate, 4.6%.

For the period between 1999 and 2014, the AADT for the I-110 segment located south of US 61 increased at an annual rate of 1.0%.

The average AADT annual traffic growth for all the locations incorporated in Table 3 is 1.3%. From the locations located in Table 3, it can be concluded that the east-west traffic (I-10) has been increasing faster than the north-south traffic (I-110, US 61).

Table 3: Traffic Counts at Specific Corridors

Traffic Counts on the US-61/US 190 Corridor				
Locations		AADT		
From	TO	1999	2014	Annual Compound Growth
Coursy Blvd	I-12	46,648	40,811	-0.9%
I-12	Old Hammond Hwy	50,444	59,855	1.1%
Old Hammond Hwy	Goodwood Ave	48,731	58,570	1.2%
Goodwood Ave	SH 190	55,680	56,700	0.1%
SH 190	Tom Dr	50,647	44,619	-0.8%
Tom Dr	Greenwell Springs	46,675	44,484	-0.3%
Greenwell Springs	Winbourne/Maribel	45,955	55,178	1.2%
Winbourne/Maribel	Evangeline	44,135	40,411	-0.6%
Evangeline	Plank	41,180	38,602	-0.4%
Plank	I-110	11,915	27,448	5.7%
I-110	Scenic Hwy (190)	26,787	31,179	1.0%
Scenic Hwy (190)	LA Hwy 1	26,703	26,553	0.0%
LA Hwy 1*	Belmond Rd.	18,726	16,117	-1.0%
Average on US60/US 190		**39,556**	**41,579**	**0.3%**
Traffic Counts on I-10				
Locations		**1995**	**2013**	**Annual Compound Growth**
At the Missippippi River Crossing		79,894	102,350	1.4%
		1998	2013	
At the East BUMP Connection		36,570	71,401	4.6%
		1997	2014	
Before the I-12 Split		126,055	177,908	2.0%
Average on I-10				**2.7%**
Traffic Counts on I-110				
Locations		**1999**	**2014**	**Annual Compound Growth**
South of US 61/US 190		57,917	66,837	1.0%
Average All Locations				**1.3%**

Source: Louisiana Department of Transportation & Development; http://wwwapps.dotd.la.gov/engineering/tatv/

Note: *From 1998 to 2013

REVIEW OF METHODOLOGY AND ASSUMPTIONS

Based on the documents provided by HNTB and gathered for this evaluation, Baez reviewed and evaluated the consistency of the methodology and assumptions expected for a sketch level traffic and toll revenue study.

Value of Time (VOT): In traffic and revenue studies, VOT represents the willingness of travelers to pay for travel time savings. The higher the VOT, the higher is the probability that drivers would use a toll facility to save travel time. Traditionally, the average VOT for toll feasibility evaluations ranges from 40% to 70% of the average hourly wage of its users.

According to the US Department of Labor, the 2014 average hourly wage for all occupations in Baton Rouge was $20.50. The VOT incorporated into the HNTB evaluation was $10.00 per hour, which corresponds to approximately 50% of the average 2014 hourly wage.

Baez believes that the VOT incorporated into the HNTB evaluation is reasonable for a traffic and toll revenue study.

Toll Sensitivity Curves and Toll Rates: Baez Consulting did not have access to the Baton Rouge regional travel demand model to evaluate the future global demand in the corridor or to test the changes in travel demand when increasing the toll rates.

The toll sensitivity curve provided by HNTB corresponding to a VOT of $10 per hour is consistent with the toll sensitivity curves developed by Baez in urban corridors with similar traffic operation conditions.

The sketch level evaluation recommended toll rates of $0.20 per mile for all the periods: AM (6:00 - 9:00 am), PM (3:00 - 6:00 pm), MD (9:00 am - 3:00 pm), and NT (6:00 pm - 6:00 am). The $0.20 per mile rate is consistent with the toll sensitivity curve and existing toll rates in many urban toll facilities around the country.

Baez concurs keeping $0.20 per mile for all the periods. There are several toll facilities in operation in Texas, with a similar configuration to the BUMP, which operate with constant toll rates during the day.

Traffic Capture Rates: The traffic capture rate is defined here as the amount of traffic remaining in the toll facility after imposing a toll rate. The traffic capture rates are: 56%, 65%, 59%, and 50% for the AM, MD, PM and NT periods, respectively. The daily weighted traffic capture rate is approximately 56%.

During the last ten years, many toll facilities in Texas have been opened as toll-free facilities during a provisional or incentive period (usually 2-4 weeks). The actual daily traffic capture on those existing facilities ranged from approximately 40% to 80%.

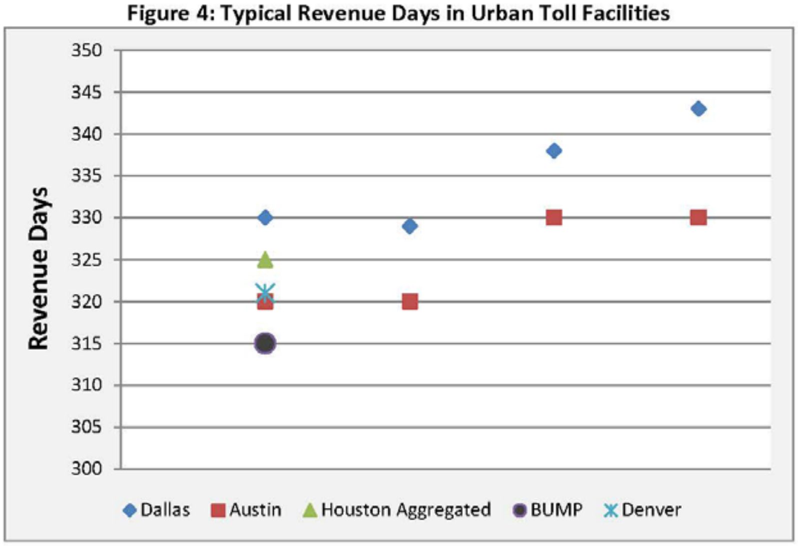
The BUMP traffic capture rate is within the range experienced in other toll facilities at the daily level. Baez recommends reviewing the traffic capture rate for the specific periods. It seems that the capture rate, in the AM and PM periods may be in the lower range, while the capture rate for the MD period may be in the higher range.

Revenue Daily Distribution: The revenue daily distribution is correlated to the daily traffic capture rate. As mentioned above, Baez recommends reviewing the traffic daily distribution for the AM, PM and MD periods.

Revenue Days Factor: The revenue days factor converts average weekday daily traffic to annual traffic. It represents the traffic activity during the weekend days. Figure 4 illustrates existing typical revenue days in urban facilities.

The revenue days factor incorporated into the BUMP toll revenue analysis is 315 revenue days. Given that weekend traffic counts are not available for this evaluation, Baez concurs keeping the revenue days factor to 315 revenue days.

Figure 4: Typical Revenue Days in Urban Toll Facilities



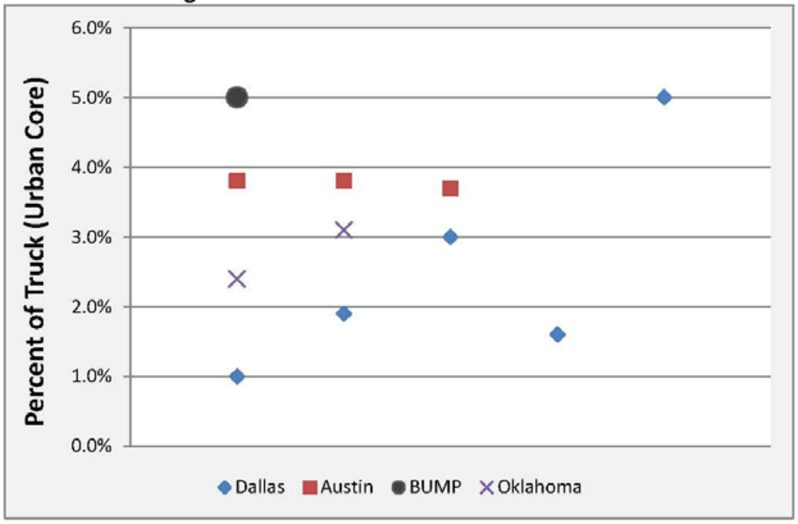
Ramp-up Factor: The ramp-up factor is used to take into account the time period that drivers will recognize the travel time saving benefits offered by a new toll facility. The ramp-up factor reduces the initial travel demand for a period of time. The higher the economic development is in a corridor, the lower is the ramp-up factor.

Given the existing defined travel patterns and intense economic activity in the BUMP corridor, Baez concurs keeping the ramp-up factor to 70%, 80%, 90% for the first, second and third years, respectively.

Truck Percent: Urban toll facilities tend to carry a relatively low truck percent as compared to toll-free highway facilities or toll facilities located outside the urban core. The BUMP traffic and revenue study assumed 5.0% of truck traffic and a 3.5 axle factor. Figure 5 shows truck percents in several facilities located in the urban core of metropolitan areas. The truck percentage values range from 1.0% to 5.0%. The 5.0% value corresponds to a toll facility where many distribution warehouses are located.

The 5.0% truck value assumed for the BUMP traffic and revenue analysis may be an upper threshold value. Baez recommends reconsidering the truck percent incorporated into the traffic and toll revenue estimates. Baez believes that the 3.5 axle factor is consistent with axle factors in other urban toll facilities.

Figure 5: Truck Percent in Urban Toll Facilities



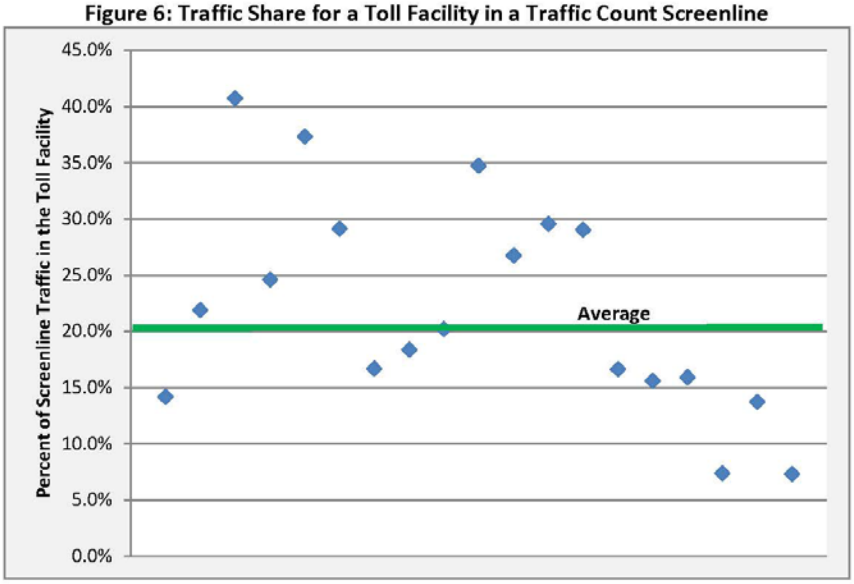
Long Term Traffic Growth: The annual traffic growth incorporated into the BUMP traffic and toll revenue analysis was approximately 0.3% after the ramp-up period. This percent is similar to the historical annual traffic growth for the US 61/US 190 facility (see Table 3), but it is lower than the historical regional traffic growth (1.3%). The BUMP facility is expected to capture north-south and east-west traffic.

Baez recommends increasing the annual traffic growth to a higher percent for the first 20 years of the forecast period. It is important to mention that Baez does not have the regional Baton Rouge regional travel demand model to justify a higher percent growth. This recommendation is based on historical trends which may or may not occur in the future.

Average Daily Traffic for Opening Year: A toll facility containing frontage roads will attract traffic to its lanes depending on many variables such as: traffic congestion in alternative routes, travel time savings, traffic patterns, value of time and others.

In a traffic count screenline analysis, the share of the traffic that the toll facility will attract depends on the type of facilities included in the traffic count screenline. Figure 6 shows the traffic share distribution in toll facilities containing frontage roads. The traffic share of the toll facilities range from approximately 7.0% to 41%. For example, if a traffic count screenline includes only arterials, then the toll facility will contain a high share of the traffic in the screenline. The average traffic share of several screenlines for different toll facilities containing frontage roads is approximately 20%.

Figure 6: Traffic Share for a Toll Facility in a Traffic Count Screenline



Based on the information discussed in this report, Baez estimated average weekday traffic for the BUMP corridor for three scenarios: a conservative, likely and aggressive (see Table 4). These are aggregated estimates to provide a sense of the potential travel demand for the corridor. As mentioned above, Baez did not have the Baton Rouge regional travel demand model to investigate in detail the potential future travel demand for the BUMP corridor.

Table 4: Average Weekday Traffic Ranges

Scenario	Opening Year* Average Weekday Traffic	Assumptions
Conservative	13,900	Assuming 10% of the traffic screenline will be in the BUMP, annual traffic between 2014 and 2022 will increase at an annual rate of 0.65%. The traffic growth between 2014 and 2022 account for the additional demand attracted to the BUMP.
Likely	29,300	Assuming 20% of the traffic screenline will be in the BUMP, annual traffic between 2014 and 2022 will increase at an annual rate of 1.3%. The traffic growth between 2014 and 2022 account for the additional demand attracted to the BUMP.
Aggressive	46,400	Assuming 30% of the traffic screenline will be in the BUMP, annual traffic between 2014 and 2022 will increase at an annual rate of 2.0%. The traffic growth between 2014 and 2022 account for the additional demand attracted to the BUMP.

Note: *Does not include ramp-up factor

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I trust this report meets your requirements. If you have any questions or require additional information, please feel free to contact me.

Sincerely,

Gustavo A. Baez
President

Disclaimer

Traffic estimates included in this report represent a generalized view of the potential travel demand for the BUMP toll facility. The traffic estimates are not a product of a comprehensive and detailed travel demand forecast analysis.