

North Carolina Department of Transportation



## ***I-95 Planning and Finance Study***

*STIP Project No. I-5133*

### ***Financial Plan Update***

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*Submitted by the  
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# Executive Summary

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## NOTE

This report updates the *I-95 Financial Plan* prepared in July 2013 as one element of the I-95 Planning and Finance Study, following the I-95 Environmental Assessment (January 2012). This update reflects new NCDOT funding programs, revised tolling structure and updated phasing plans, cost estimates, cash flow analysis, and financial feasibility analysis. Reference can be made to the July 2013 version of the report for further comparison.

## INTRODUCTION

Based on the evaluation of existing and future conditions, the North Carolina Department of Transportation (NCDOT) has identified a need for over \$4.5 billion (2011 dollars) in improvements to the 182-mile portion of Interstate 95 (I-95) from South Carolina to Virginia. Much of I-95 remains the same as when it was built, and many of its sections do not meet current standards, in terms of design, physical condition, and/or levels of congestion.

NCDOT has determined that it does not have sufficient funding to make the needed improvements, if traditional revenue sources must be relied upon. Of the range of financing options available that were examined in this study, tolling was identified as the revenue source that would best allow NCDOT to address the long-term needs of the corridor in a timely manner.

In February 2012, the Federal Highway Administration (FHWA) granted NCDOT a conditional provisional reservation to toll I-95 under the terms of the Interstate System Renewal and Replacement Pilot Program (ISRRPP). As part of this conditional provisional reservation, FHWA directed NCDOT to prepare a project finance plan and provide other information for FHWA review and approval. This resulting *Financial Plan Update* for the I-95 improvement program provides a screening of potential funding options, implementation plan, cost and revenue projections, financing assumptions and analyses, and a description of risk and mitigating factors. One measure of the new federal transportation authorization bill, the Fixing America's Surface Transportation (FAST) Act, place time limits on states to complete their implementation process under ISRRPP. For states already in the program, such as North Carolina, the required tolling agreement with FHWA must be executed within one year of FAST enactment, which was December 4, 2015. FHWA is authorized to extend the deadline by one year if the state has shown progress toward the agreement and makes such a request.

## I-95 IMPROVEMENT FUNDING OPTIONS

Six funding alternatives were identified and evaluated. Table ES-1 summarizes the six alternatives.

1. **Continued project programming at existing funding levels.** To begin addressing the \$4.5 billion needed for capital improvements on I-95, NCDOT has programmed an estimated \$172.7 million in projects in its 2016-2025 State Transportation Improvement Program (STIP); however, \$7.3 million of that amount is unfunded. The funded amount represents just 3% of necessary I-95 improvement funds needed. At current programming rates, improvements would never be completed because over time, additional needs will accumulate, rendering current funding needs estimates grossly underestimated.

2. **Increase appropriation of current state funds for I-95** by shifting funding from other projects. This extra funding for the I-95 improvements would come from NCDOT's annual operating budget. However, the backlog of needed transportation improvements across the state, plus the limitations on funding allocation changes, would restrict NCDOT's ability to program a greater portion to I-95.
3. **Special federal funding.** Recent trends in federal budgetary processes have diminished states' ability to program major capital improvements through federal earmarks or special appropriations. While FAST created several competitive grant programs, it does not provide earmarks or special federal funding for projects such as I-95, and thus, North Carolina cannot depend on federal earmarks to accelerate the I-95 improvements.
4. **Increased local funding** from existing revenue streams or new sales taxes. Two major local revenue sources are property taxes and local option sales and use taxes. Since the majority of roads in NC are owned and maintained by the NCDOT, local governments' responsibility and funding for roads is limited. This option would impose a substantial drain on local governments' ability to fund other programs. Given the current economic or political climate, it is unlikely that an increase in existing taxes or new sales taxes would be passed by all local governments along the corridor. Finally, local funding of I-95 highway improvements is seen as an inappropriate use of local funds, given the statewide and national importance and use of this roadway.
5. **Application of user fees (tolling).** For I-95 improvements, general tolling across all traffic lanes is an extremely robust funding source. Toll revenue can generate a self-sustaining funding source to finance expansion and reconstruction of the entire I-95 corridor, freeing existing transportation improvement funds for other needs. Compared to \$13 million per year that NCDOT is currently able to program for I-95 improvements, toll revenue would gross \$168 million in 2022 and \$928 million in 2040. Tolling I-95 to fund the improvements is not considered double-taxation since motor fuel taxes and registration fees are not collected to finance specific facilities, and gas taxes collected along the I-95 corridor would become available for other needed roadway improvements within the corridor. I-95 tolling is also seen as an equity measure; due to higher motor fuels tax rates in North Carolina than in neighboring states, many interstate travelers fuel up outside of the state, effectively offering no compensation for use of I-95 in the state. Tolling becomes a way to recoup a portion of the costs incurred due to interstate travelers.
6. **Combination of local funding and STIP allocations.** To test the ability of combined state and local funds to address I-95 needs, existing state funding plus equal local funds were evaluated. While such a funding package would allow an improvement program to be accelerated, neither NCDOT nor local governments along the corridor have additional funding for I-95 improvements. NCDOT's funding situation is challenging; due to STI, increasing STIP allocations to I-95 is not a viable option. Local governments are not responsible for funding maintenance and improvements to I-95, and their funding is also challenging.

This assessment of I-95 funding options has led NCDOT to the conclusion that, of the studied funding options, only tolling will allow the accelerated programming of I-95 improvements that provide for the safe and efficient highway necessary to meet the economic objectives of North Carolina and the eastern seaboard. The backlog of transportation improvements and statutory limitations restrict NCDOT's ability to program a greater portion of its funds to I-95. There is little likelihood for special federal earmarks for I-95, and only a dramatic increase in local taxation would generate sufficient funding.

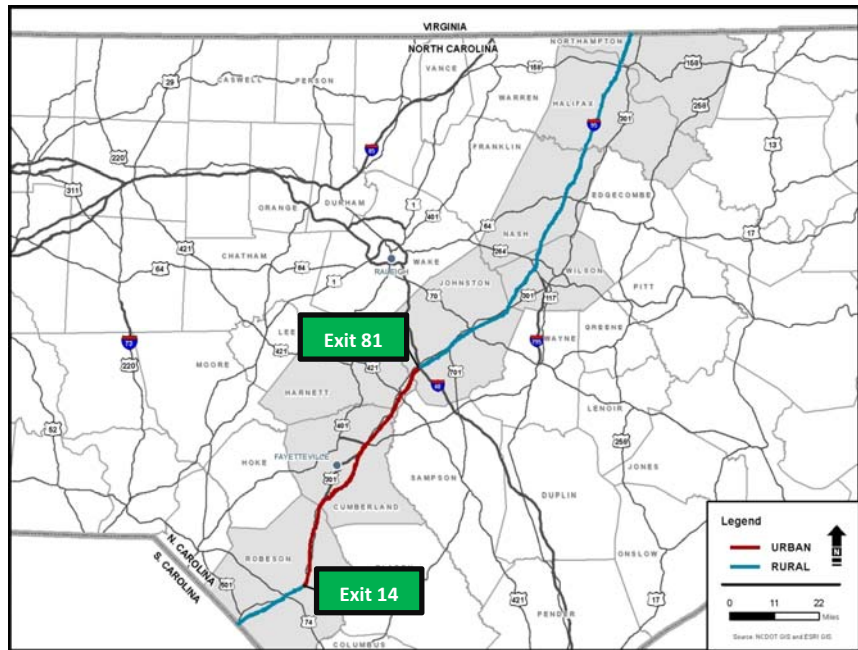
Table ES-1: Summary of Funding Alternatives Evaluations

Funding Alternative	Ability to Generate Sufficient I-95 Funding?	Preservation of Funding for Other Programs
1. Continued existing state funding	No – Not in a timely manner	Yes – No impact on other programs
2. Increased state funding	No – NCDOT’s funding gap would not allow sufficient fund transfers without adverse impact on other programs	No – Hampers ability to address other critical needs
3. Special federal funding	No – Recent trends diminished states’ ability to program improvements through earmarks/special appropriations	No – Diminishes funding of other projects
4. Increased local funding	No – Not sufficient or likely to be passed by local governments. Funding of I-95 is not a local responsibility.	No – Imposes drain on local programs
5. User fees (tolling)	Yes – Financial analysis indicates ability of tolls to generate needed funds	Yes – No impact on other programs
6. Combination of local and state funding	No – Existing NCDOT backlog, decreasing local receipts, statutory restrictions and no local responsibility for Interstate funding make this option unrealistic	No – Impacts state programs and local governments’ budgets

## PROJECT DESCRIPTION AND CONSTRUCTION COST

The improvements needed along I-95 were identified through a detailed needs assessment and are reflected in a design concept for the 182-mile corridor that includes added general use lanes, pavement reconstruction, bridge replacement, and modernization.

The improvements will be divided into two phases: Phase 1, to reconstruct and widen 67 miles of I-95 between Lumberton and I-40 in Johnston County; and Phase 2, divided into 8 major projects to improve and reconstruct the rest of the corridor. Several tolling options were considered, with factors such as cost, likelihood of implementation, and revenue-generation potential used to select the 10-mile mainline gantry spacing with no ramp tolling as the preferred tolling plan.



The capital cost of the selected design concept is estimated to be \$4.5 billion in 2011 dollars, with Phase 1 costing \$1.95 billion, and Phase 2 (accomplished through 8 major projects) costing \$2.59 billion.

## OTHER PROGRAM COSTS

The Financial Plan must account for and incorporate anticipated Operation & Maintenance (O&M) costs and long-term lifecycle Renewal and Replacement (R&R) costs of the I-95 improvement program. O&M costs include routine maintenance (e.g., pothole repair, crack sealing and chip seals), non-pavement maintenance activities (e.g., sweeping, trash collection, weed control, snow removal, guardrail repair, mowing, fence and snow fence repair, paint striping), and tolling expenses. Funds in the R&R account maintain an above-average quality of service along the corridor (e.g., re-paving the toll lanes, surface resealing, bridge repairs and painting, upgrading and replacing tolling equipment and signs). As shown in Table ES-2, the combined 2022-2070 O&M and R&R obligation is about \$10 billion.

Table ES-2: Summary of Operations and Maintenance Cost Estimate (YOE \$Millions)

Period	Operations & Maintenance (O&M)			Renewal and Replacement (R&R)				Total O&M and R&R
	Operations	Maintenance	Total O&M	Roadway (non-Pav't)	Facilities	Pavement	Total R&R	
2022-29	\$260.45	\$104.20	\$364.65	\$27.08	\$39.09	\$25.83	\$92.00	\$456.65
2030-39	\$683.34	\$299.05	\$982.39	\$76.64	\$112.18	\$142.53	\$331.35	\$1,313.75
2040-49	\$1,039.10	\$436.78	\$1,475.87	\$111.71	\$163.85	\$243.55	\$519.11	\$1,994.98
2050-59	\$1,335.22	\$559.11	\$1,894.33	\$143.00	\$209.74	\$316.89	\$669.63	\$2,563.96
2060-70	\$1,904.32	\$797.48	\$2,701.80	\$203.97	\$299.16	\$451.99	\$955.12	\$3,656.92
<b>Total</b>	<b>\$5,222.42</b>	<b>\$2,196.62</b>	<b>\$7,419.04</b>	<b>\$562.40</b>	<b>\$824.01</b>	<b>\$1,180.80</b>	<b>\$2,567.21</b>	<b>\$9,986.25</b>

## IMPLEMENTATION PLAN

When preparing the Finance Plan, it is necessary to estimate annual cash flow requirements based on an assumed corridor improvement schedule. Initial financial analyses revealed that toll rates consistent with rates being planned on other NC toll roads would generate revenues that would allow an aggressive schedule, allowing acceleration of all critical elements. While the start and end dates can vary, this financial plan is based on a 2015 start of preliminary engineering and 2038 completion of the entire improvement program, with intermediate milestones as follow:

- NEPA and Preliminary engineering begins 2015
- Phase 1 construction begins 2018
- Phase 1 construction complete 2021
- Phase 2 construction begins 2020
- Tolls imposed on Phase 1 2021
- Phase 2 construction complete 2038



## PROJECT FINANCING, REVENUES, AND CASH FLOW

The primary objective of the Financial Plan is to establish a funding program that will allow accelerated construction of I-95 improvements and will fund ongoing maintenance and operations from toll revenues, removing any need for use of other NCDOT funds, such as gas taxes Table ES-3. Phase 1 will be financed through toll debt

Table ES-3: Funding Source (YOE \$Millions)

Item	Phase 1 (YOE)	Phase 2 (YOE)	Total (YOE)
Funding Requirement	\$2,412M	\$4,185 M	\$6,597M
<b>Funding Sources:</b>			
Toll Revenue Bonds	\$1,616 M	\$2,939 M	\$4,555 M
Federal Loan	\$796 M	\$0 M	\$796 M
Excess Toll Revenue	\$0 M	\$1,2469 M	\$1,246 M
<b>Total Sources</b>	<b>\$2,412 M</b>	<b>\$4,185 M</b>	<b>\$6,597 M</b>

instruments and a federal loan, while Phase 2 will be financed through a combination of toll debt instruments and toll equity. While toll revenues are projected to fully support the project's needs, the financing assumes NCDOT provides an indirect public equity back-up pledge of non-toll revenues to cover O&M and R&R expenses, in the event toll revenues are insufficient, and to support the credit for short term financing needs. Such back-up pledges are typically used for new toll road projects to enhance feasibility. As an example, NCDOT has provided a back-up pledge of non-toll revenues for the Triangle Expressway project.

It is estimated that tolls will generate \$35.56 billion in gross revenue from 2022 through 2058 (the last year of substantial debt service payments). This revenue will be available to pay debt service on the bonds issued to finance Phase 1 and Phase 2 projects, contribute toll equity to Phase 2 construction, and fund O&M and R&R expenses. Toll revenues will also finance O&M and R&R reserves. The residual revenue generated by the I-95 improvement program after debt service, O&M, and R&R is estimated at \$12.36 billion in year of expenditure (YOE) dollars. This money can be spent for other projects within the I-95 corridor, or to reduce the tolls if there are limitations on use of the balance.

## RISK IDENTIFICATION AND MITIGATION FACTORS

An improvement program of this magnitude could face external risks that, if not mitigated, would adversely influence the cash flow projections. NCDOT has identified and examined a set of potential risks and mitigation strategies associated with the I-95 improvement program, falling under three categories (schedule, cost, and financing and revenue) and has concluded that the risks are highly manageable and consistent with risks faced by NCDOT on any other major project or program. Active monitoring of schedule and costs will mitigate risk of delays and cost overruns, while financing and revenue projections have enough contingencies and conservative assumptions built in to accommodate potential risk concerns. A summary of identified key risks and mitigation strategies is provided in Table ES-4.

Table ES-4: Summary of Identified Key Risks and Mitigation Strategies

Risk Category	Description	Mitigation
Schedule	Ability to secure all required approvals and permits	NCDOT has initiated NEPA review process
	Scheduling and coordination - critical in meeting milestones and deadlines	NCDOT will actively monitor and update schedule
Cost	Construction costs may escalate as contracts execute	NCDOT will review their potential to affect cost. Estimates include contingencies to address unknowns.
	Phase 1 cost overruns	Cost will be closely monitored
	Higher than assumed inflation rate could result in cost increases and delays	Recent construction inflation trends used. Reserves to compensate for higher inflation.
	O&M and R&R cost increases could lower revenue available to repay debt	Higher than existing level of maintenance is assumed
Financing and Revenue	Access to capital can be difficult for start-up toll projects	Matching demand for bonds for tolling projects with supply has not been an issue. Multiple debt issuances will ease risk concerns.
	If interest rates are higher than assumed, more toll revenues will be needed to repay debt	There is enough contingency built in the financial model to address interest rate increases
	Toll revenues could be lower than expected	Financing is based on reasonable forecasts
	Issues with toll equipment could affect payments' collection	Assumed 5% lost revenue

# 1 Introduction

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## 1.1 I-95 IMPROVEMENT PROGRAM OVERVIEW

The North Carolina Department of Transportation (NCDOT) has identified the need for over \$4.5 billion (2011 dollars) in improvements to the 182-mile portion of Interstate Highway 95 (I-95) that traverses the eastern part of the state from South Carolina to Virginia. Roadway construction was initiated in the mid-1950s, with final sections constructed in the 1980s. Much of the corridor remains basically the same four-lane divided highway as when it was built, and there are sections that do not meet current standards in terms of design, physical condition, and levels of congestion.

The need for an I-95 improvement program in North Carolina is based on the evaluation of existing and future conditions along I-95; this aging facility has geometric deficiencies, structural deficiencies, a higher than statewide average fatal crash rate for interstates, and capacity deficiencies. Specifically, portions of this aging facility do not meet current roadway geometric requirements, including horizontal and vertical alignments, horizontal clearances, sight distances, interchange ramp designs, and interchange spacing. Many of its bridges are substandard, having a remaining life of less than 20 years. Some bridges have less than five years of remaining life. There are sections in need of resurfacing or more extensive pavement reconstruction. A safety analysis of the I-95 corridor revealed that fatal crashes are an issue in certain counties. Traffic operations and excessive congestion and delay are already an issue during certain times and in certain locations, and are predicted to deteriorate in the future. Finally, NCDOT's State Transportation Improvement Program (STIP) only has funding to address a small portion of the immediate needs for I-95.

To address the identified immediate and long-term needs of the corridor, NCDOT prepared an alternatives evaluation that examined a range of multimodal improvement options. These alternatives were presented for public comment as part of the *I-95 Planning and Finance Study Environmental Assessment (I-95 EA*, January 2012). The recommended design concept calls for widening of the entire corridor from the current four lanes to either six or eight general purpose lanes, replacing nearly all bridges, and reconstructing aging pavement to bring the corridor to current geometric and safety standards.

Evaluation of traditional funding sources (primarily federal and state motor fuels taxes) and fund allocation provisions available through federal-aid highway programs and NCDOT's matching Highway Trust Fund, has led NCDOT to conclude that new funding sources will be needed to address the substantial cost within a reasonable time frame.

## 1.2 FHWA CONDITIONAL APPROVAL TO TOLL

In 2005, Congress authorized the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU) which included the Interstate System Rehabilitation and Renewal Pilot Program (ISRRPP). The ISRRPP allows for conversion of existing free Interstate highways to tolled facilities in order to fund necessary improvements. In September 2011, NCDOT submitted to the Federal Highway Administration (FHWA) an application to toll the I-95 corridor through the ISRRPP, citing improvement program costs and the lack of funds needed to address those improvement costs. In February 2012, NCDOT received from FHWA a conditional, provisional reservation to participate in the ISRRPP.

The approval directed that NCDOT document the following items in either the Financial Plan or other subsequent planning documents:

- An analysis that demonstrates that the facility could not be maintained or improved to meet current or future needs from the State's Federal-aid apportionments and allocations, and from revenues for highways from any other source, without toll revenues. In addition, FHWA requested an explanation of how NCDOT will address the issue of maintenance of effort on the tolled portion of I-95.
- A plan to implement tolls on the facility, including the identification of tolling locations and NCDOT's reasons for selecting these particular locations
- A schedule and finance plan for the reconstruction or rehabilitation of the facility using toll revenues, including the identification of specific improvements and an explanation of how they will support the creation of new capacity on the facility
- A demonstration of how the plan for implementing tolls takes into account the interests of local, regional, and interstate travelers

This report is intended to address the first three of these requirements. The fourth was addressed by NCDOT's parallel economic impact analysis, which was completed in June 2013<sup>1</sup> and is incorporated into this Financial Plan by reference.

One measure of the new federal transportation authorization bill, the Fixing America's Surface Transportation (FAST) Act, place time limits on states to complete their implementation process under ISRRPP. For states already in the program, such as North Carolina, the required tolling agreement with FHWA must be executed within one year of FAST enactment, which was December 4, 2015. FHWA is authorized to extend the deadline by one year if the state has shown progress toward the agreement and makes such a request.

### 1.3 PURPOSE AND ORGANIZATION OF REPORT

The purpose of the *I-95 Financial Plan Update* is to present a finance plan for reconstruction and improvement of I-95 in eastern North Carolina that is predicated on the collection of toll revenue as the basis for funding a sustainable improvement program.

This financial plan builds on previous work completed as part of the *I-95 EA* (January 2012). This plan includes a screening of potential funding options, an implementation plan, cost estimates, financial and revenue analysis based on use of toll revenue, and a discussion of risk identification and risk mitigation factors.

This document demonstrates NCDOT's commitment to the I-95 improvement program and to sound financial planning, as required by Section 106 of Title 23 and modified by Section 1305 (b) of the Transportation Equity Act for the 21st Century (TEA-21) and Section 1904 of SAFETEA-LU. The *I-95 Financial Plan Update* is organized as follows:

- **Chapter 1. Introduction** – This chapter provides context for the I-95 improvement program, and the purpose and content of this Financial Plan.

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<sup>1</sup> North Carolina I-95 Economic Assessment, Cambridge Systematics, June 2013.

- **Chapter 2. Evaluation of Options for Funding the Proposed I-95 Improvement Program -** This chapter lists financing goals and objectives, describes six funding alternatives that were evaluated, and closes with a recommended funding strategy.
- **Chapter 3. I-95 Improvement Program Description** – This chapter focuses on describing the preferred I-95 improvement program, including its design and scope and funding approach.
- **Chapter 4: Cost Estimate** – This chapter presents the cost estimate for the I-95 improvement program based on a conceptual level of design and preliminary phasing plans. It also provides detail on key cost-related assumptions.
- **Chapter 5. Implementation Plan** – This chapter outlines the anticipated I-95 improvement program schedule and proposed phasing approach, including information regarding the assignment of responsibilities and a summary of the necessary permits and approvals.
- **Chapter 6. I-95 Improvement Program Financing, Revenue, and Cash Flow** – This chapter analyzes the financial capability of the I-95 improvement program under a traditional tax-exempt structure, focusing on project financing and revenues. It provides an annual construction cash flow schedule and an overview of the planned sources of funds.
- **Chapter 7. Risk Identification and Other Factors** – This chapter identifies anticipated risks that could affect the I-95 improvement program and potential mitigation measures and strategies to address them.

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## 2 Evaluation of Funding Options

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I-95 is a critical highway corridor not only for North Carolina, but also for the eastern seaboard of the US. State and regional economies depend on the safe and efficient flow of people and goods along this corridor. Recognizing the importance of the corridor, but also facing a demonstrated and severe funding shortfall to maintain and improve it through its traditional STIP, NCDOT is using this document to evaluate and recommend alternative, sustainable funding options. Adding to that urgency is the fact that key elements of the corridor, particularly aging bridges and pavement, exacerbate the need for an infusion of funds sooner rather than later.

### 2.1 FUNDING GOALS AND OBJECTIVES

In conducting financial analyses for an I-95 improvement program, the following financing objectives were provided by NCDOT to the analysis team:

- Complete a full reconstruction of the I-95 improvement program as soon as possible
- Create a funding solution for the life cycle costs of the I-95 improvement program that excludes any direct investment of “public equity” funds
- Develop a Finance Plan that is basic in nature and significantly conservative

As defined in the *I-95 EA*, the following objectives were considered to evaluate funding options for the I-95 improvement program:

- Ability of the financing option to generate sufficient funds to make needed corridor capital improvements and fund ongoing maintenance and infrastructure preservation consistent with the preferred design concept and scope
- Preservation of anticipated state and federal funding for other critical highway corridor improvements and transportation programs

Based upon the information provided in this *I-95 Financial Plan Update*, NCDOT believes that the I-95 improvement program can be completed in accordance with the proposed implementation schedule. Future updates to the Financial Plan will reflect any changes to anticipated funding sources and uses, project delivery methods, cost estimates and schedule. NCDOT is committed to delivering the I-95 improvement program in a timely and cost-effective manner that meets its goals and objectives.

### 2.2 FUNDING ALTERNATIVES EVALUATED

To address the \$4.5 billion (2011 dollars) in capital needs on the I-95 corridor by year 2040, six funding alternatives, including one combination of options, were identified and evaluated.

1. **Continued project programming at existing funding levels (status quo)** – this funding option would continue “traditional funding” through the STIP, reflecting changes in resource allocation resulting from enactment in 2013 of the “Strategic Prioritization Funding Plan for Transportation Investments” (Session Law 2013-183, Section 1.1(a)). This bill, known as Strategic Transportation Investments (STI), allocates state transportation project funding from the Highway Trust Fund based on a

Transportation Mobility Formula, which has been implemented by NCDOT through its Project Prioritization process for scheduling and funding of transportation projects.

To begin addressing the previously referenced \$4.5 billion needed for capital improvements on I-95 through its current funding framework, NCDOT has programmed through the project prioritization process 22 improvement and pavement rehabilitation projects along I-95 at a cost of approximately \$173 million. This represents a reduction of \$324 million in I-95 funding compared to the previous NCDOT work program, which was based on the Equity Formula that was eliminated under the 2013 bill. As shown in Table 2-1, \$34 million of this amount has already been spent on projects through Fiscal Year (FY) 2015. Another \$77 million is currently programmed for expenditure within the current 5-year work program from FY 2016-2020. \$53.9 million in anticipated but not programmed funds has been identified in the Developmental Program, but this funding is not committed. To complete the projects currently identified in the STIP will require another \$7.3 million that is currently unfunded.

NCDOT has no policy or programming commitment to fund needed I-95 improvements beyond projects identified as funded in the STIP. These programmed projects are only a portion of the total improvements needed along I-95 and include no highway widening.

Conclusion: The \$131 million currently programmed or anticipated in the STIP represents just 3% of the \$4.5 billion needed. Because of legislative restrictions on the amounts of state and federal funds that have been programmed through the STIP for I-95 projects, if this total is annualized, this amounts to \$13 million per year in current dollars for each of the 10 programmed years. At current programming rates, the program would never be completed because over time, additional needs will accumulate, rendering current funding needs estimates substantially underestimated.

Table 2-1: NCDOT Funding for I-95 Projects, FY 2016-2025

Funding Year	Annual Funding Amount (2015\$ in millions)	Program Funding Subtotals (2015\$ in millions)
Total STIP Projects Cost		\$172.7
<b>Programmed Funds</b>		
FY 2015 and before	\$34.4	\$34.4 (already spent)
FY 2016	\$33.3	5-Year Work Program total \$77.1 (programmed funding)
FY 2017	\$24.5	
FY 2018	\$0.2	
FY 2019	\$0.0	
FY 2020	\$19.3	
FY 2021	\$1.6	Developmental Program total \$53.9 (anticipated funding)
FY 2022	\$9.5	
FY 2023	\$15.8	
FY 2024	\$18.0	
FY 2025	\$9.0	
<b>Total Funded STIP Projects</b>		<b>\$131.0 (programmed and anticipated)</b>
<b>Unfunded Future</b>		<b>\$7.3</b>

Source: 2016-2025 State Transportation Improvement Program (NCDOT, December 2015)



2. **Increased appropriation of current state funds to I-95** – this option would increase the allocation of existing NCDOT funding away from other projects to the I-95 corridor.

In order to fund its current STIP, the NCDOT has forecasted combined NC Highway Trust Fund and Federal Aid increasing from \$1.68 billion in FY2016 to \$1.999 billion in 2026, a total of \$18.497 billion, all in 2015 dollars.<sup>2</sup>

Project needs statewide far exceed available funding when assessing mid-term and long-term statewide transportation needs. In 2012, during the development of its 10-year Program and Resource Plan (*From Policies to Projects*), NCDOT identified state highway capital needs for the 2018-2022 time period of more than \$51 billion. Over the same period, NCDOT's projected budget for these programs is approximately \$9 billion.

Looking beyond the 10-year Program and Resource Plan, NCDOT's funding situation remains challenging without a significant influx of new funding. In August 2012, the North Carolina Board of Transportation adopted the updated Statewide Transportation Plan, called the 2040 Plan. The 2040 Plan estimates that over the next 30 years, North Carolina will require nearly \$123 billion (in 2011 dollars) to bring its transportation system to the 'Target Levels of Service' (LOS) (set based on analyses conducted by each of NCDOT's business units) for all modes.

NCDOT estimates that its baseline revenue (federal allocations, state motor fuels taxes at current tax rates, and other traditional transportation revenues) through the year 2040 available for program delivery (construction, maintenance, and operation of multimodal systems) will be \$54 billion. Comparing NCDOT's 30-year multimodal transportation needs to the baseline revenue forecast of traditional funding sources reveals a significant long-term funding gap. Additional funding will be imperative: the gap to fund Target LOS needs is \$60 billion; just maintaining existing quality of service will require an additional \$32 billion.

Also affecting NCDOT's ability to increase funds allocation to I-95 are statutory requirements imposed by STI. The STI established the Strategic Mobility Formula to allocate available revenues based on data-driven scoring and local input. The Strategic Mobility Formula funds projects in three categories: Statewide Mobility, Division Needs, and Regional Impact. The Statewide Mobility category funds improvements to facilities of statewide significance, such as all Interstate improvements, and receives 40% of Highway Trust Fund revenue. Projects within the Division Needs and Regional Impact categories each receive 30% of the construction funds.

Another provision of STI is a restriction on the amount of total funding that can be applied to any given project or corridor. STI directs that "no more than ten percent (10%) of the funds projected to be allocated to the Statewide Mobility category over any five-year period may be assigned to any contiguous project or group of projects in the same corridor within a Highway Division or within adjoining Highway Divisions."<sup>3</sup> Based on the \$1.68 billion FY2016 capital budget cited above, this would cap I-95 allocations to \$168 million.

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<sup>2</sup> State Transportation Improvement Program, 2015, NCDOT, June 2015.

<sup>3</sup> NC General Statutes; Chapter 136-189.11.(d) (1) (b) Transportation Investment Strategy Formula, Project Cap

**Conclusion:** While the funding needs for I-95 are demonstrably large, there is little likelihood that significant additional funding to address these needs could be obtained through NCDOT’s traditional funding mechanisms for two primary reasons. The combination of statewide funding pressure (including significant highway needs in Highway Divisions 4 and 6 above and beyond I-95), plus the corridor spending cap restriction of the Strategic Mobility Formula, make any increased appropriations from NCDOT’s traditional funds for I-95 improvements very unlikely.

3. **Special federal funding** – this option would rely on successfully obtaining special federal appropriations.

Recent trends in federal budgetary processes have diminished states’ ability to program major capital improvements through federal earmarks or other special appropriations. In December 2015, a new federal transportation authorization was enacted. While the FAST Act created several competitive grant programs, it does not provide earmarks or special federal funding for projects such as I-95, and thus, North Carolina cannot depend on federal earmarks to accelerate the I-95 improvements.

**Conclusion:** The current federal legislative environment makes it extremely unlikely that special federal funding could be targeted to fund I-95 improvements, especially without a coordinated multistate funds-procurement effort. While the I-95 Corridor Coalition, a coordinated alliance of transportation agencies, toll authorities, and related organizations from Maine to Florida, has achieved success in stimulating operational consistency improvements, it has not set as an objective encouraging focused federal funding in the corridor. For these reasons, this funding option holds little promise.

4. **Increased local funding** – this option would rely on local government revenues to fund portions of the improvement program from either existing revenue streams (e.g., property tax) or from special assessments or new sales taxes.

Two major local revenue sources in North Carolina are property taxes and local option sales and use taxes. They comprise the bulk of revenue for local governments. The property tax is supervised by the state, while the assessment and collection are administered by the counties and municipalities. The local option sales and use tax is levied by the counties and shared with most municipalities within the taxing county.

The statewide magnitude of local revenue potential from property tax and sales and use tax is shown in Table 2-2, with \$10.44 billion in revenue in FY 2010. Notably, sales and use taxes have decreased in recent years across the state. Within the I-95 improvement program corridor study area, eight counties collected \$473 million in property taxes in FY 2009 and \$432 million in sales and use taxes in FY 2015, as shown in Table 2-3.

Table 2-2: NC Property Tax and Sales Tax Revenue, FY 2008-2010 (\$ in Billions)

Fiscal Year	Property Tax	Annual % Change	% of Local Tax Receipts	Sales and Use Taxes	Annual % Change	% of Local Tax Receipts
2007-08	\$ 7.47	8.1%	69%	\$2.71	3.4%	25%
2008-09	\$ 8.03	7.4%	71%	\$2.46	-9.2%	22%
2009-10	\$8.19	2.1%	73%	\$2.25	-8.4%	20%

Source: North Carolina Office of State Budget and Management, *North Carolina Tax Guide*, (2008, 2009, 2010)

Note: The North Carolina Tax Guides have not been produced by the Office of State Budget and Management since 2010. Current comparable data could not be found to update the property tax data to 2015.

Table 2-3: I-95 Corridor Property Tax and Sales Tax Revenue, (\$ in Millions)

County	Property Tax 2009	Sales and Use Taxes 2015
Northampton	\$14.51	\$3.67
Halifax	\$24.15	\$21.46
Nash	\$46.45	\$43.95
Wilson	\$46.37	\$39.63
Johnston	\$91.13	\$68.99
Harnett	\$49.66	\$33.69
Cumberland	\$157.02	\$176.11
Robeson	\$43.23	\$44.13
<b>I-95 Project Area Total</b>	<b>\$472.51</b>	<b>\$431.63</b>
I-95 Project Area as Percent of State Total	5.9%	7.5%

Sources: North Carolina Office of State Budget and Management and North Carolina Department of Revenue, *State Sales and Use Tax Statistics*, (2014-2015)

Note: The North Carolina Tax Guides have not been produced by the Office of State Budget and Management since 2010. Current comparable data could not be found to update the property tax data to 2015.

In North Carolina, these local government tax revenues are used to finance local government administered programs such as education, public health, public safety, and the general services of county and municipal government. Since the vast majority of roadways in the state are owned and maintained by the NCDOT, local governments' responsibility and funding for roadways is very limited.

In North Carolina, authority for counties to impose special local taxes must be granted by the General Assembly. In 2009, the NC General Assembly passed the Congestion Relief and Intermodal Transportation 21st Century Fund and authorized Wake, Durham, and Orange Counties to fund public transportation systems by via a ½ cent sales tax, with voter approval of a referendum for the sales tax. Mecklenburg County voters approved a ½ cent sales tax in 1998 to finance construction of the LYNX light rail system in Charlotte. In November 2011, the voters in Durham County approved the ½ cent sales tax for transit, projected to generate over \$18 million annually over the next 30 years (*Mobilizing for the Future of Transit in the Research Triangle*, ULI Infrastructure 2012).

In the eight-county I-95 improvement program corridor, the potential revenue from the ½ cent sales tax increase is approximately \$22 million annually, based on sales tax revenue shown in Table 2-3. This would not be sufficient to generate a significant portion of needed funds and is not likely to be passed by all the local governments along the corridor. Programmed funds for I-95 projects in the STIP are about \$46 million per year. In order for the sales tax revenue to generate funds equal to current STIP funding for I-95 as described in Option 1 and accelerate the existing funding program, the sales tax increase needed to match STIP funding would need to be closer to 1 cent.

Conclusion: The option that would require local governments to fund portions of the improvement program from existing or increased local taxes is not typically used for projects such as I-95. Funding improvements and maintenance of interstate highways such as I-95 is a state/national responsibility, not a local responsibility. If implemented successfully, this option would impose substantial drain on ability of local governments to fund other needed programs. Given the current economic or political

climate, is not likely that an increase in existing local taxes or special assessments or new sales taxes could successfully be passed by all the local governments along the corridor.

A 1 cent local sales tax increase needed to match STIP programmed funds would be equivalent to about 14% of current collections in the eight-county project area and could raise funds that could potentially accelerate the I-95 improvement program. Yet since the I-95 improvements would not just benefit the counties along the I-95 corridor, placing the financing burden on the counties within the corridor would not be an equitable way to raise the necessary funds for Interstate improvements. For these reasons, this funding option holds little promise and a lot of potential local opposition.

5. **Application of user fees (tolling)** – this option would apply direct fees to users of the corridor, most specifically through the collection of tolls.

Application of direct user fees, in which users of a public service or facility pay for each use of that service or facility, is gaining acceptance as an approach to funding construction or operation of highways. In the US, toll roads are the most prevalent example of highway user fees. North Carolina, long reliant on the use of motor fuels taxes for its highway program, opened its first modern toll road in 2011 and has other tolling projects in development, including implementation of tolled managed lanes in several heavily-congested urban corridors. In establishing the NC Turnpike Authority, the NC General Assembly recognized that continued reliance solely on motor fuels taxes and vehicle registration fees would not provide sufficient funding to address all of the state’s highway needs. Use of tolls to finance highway projects is recognition that this “new” approach is needed to supplement the more traditional funding sources and to fast-track critical projects.

For I-95 improvements, tolling would be an extremely robust funding source. Unlike any of the other options examined here, tolling at levels consistent with tolls applied on similar facilities can be expected to generate the majority of funds needed to finance expansion and reconstruction of the entire I-95 corridor. Compared to the \$13 million per year that NCDOT has programmed for I-95 improvements through the current STIP, toll revenue under a phased implementation approach outlined later in this report would gross \$168 million in the first year (2022) and increase to \$928 million in 2040.

Admittedly, conversion of a previously untolled highway to a tolled highway, especially an interstate highway, has not been successfully attempted to date, at least in the US. Typically, tolls are used to finance new facilities. NCDOT recognizes that travel patterns and business location decisions have been made along the I-95 corridor within an untolled environment. In order to address these concerns, NCDOT has prepared an economic assessment to investigate the impacts associated with different methods of funding improvements to I-95.

It has also been stated by opponents of I-95 tolling that it would amount to double taxation on two bases: first, that the road was built with motor fuels taxes and therefore should not be converted to a toll road, and second, that users of I-95 would be required to pay both gas tax and tolls as they traveled along the corridor. The motor fuel taxes and registration fees are collected to finance the overall transportation system, not specific facilities, and gas taxes collected along the I-95 corridor would become available for other needed roadway improvements within the corridor.

Conclusion: It is NCDOT’s position that neither of the double-taxation charges or that tolling of an existing roadway is defensible and legitimate, as long as those tolls are specifically being collected to improve and maintain that particular facility. While I-95 was constructed with gas taxes, the original

facility has long since been “consumed”, and supplemental funding, regardless of the source, is needed to maintain mobility, replace pavement and bridges, and bring the roadway up to modern standards. Use of tolls for these purposes would not be double-taxation. Motor fuels taxes and registration fees are collected to finance the overall transportation system, not specific facilities.

6. **Combination of local funding and STIP allocations.** To test the ability of combined state and local funds to address I-95 needs, existing state funding plus equal local funds were evaluated. Since special federal funding would be expected to be limited (current federal aid funding for transportation in North Carolina is just over \$1 billion) and likely would occur as one-time allocations, this option would rely on local funding and increased STIP allocations (combining Options 2 and 4).

As discussed in Option 4, local funding for a project of statewide/national importance is not equitable; however, if local jurisdictions were to choose to implement a tax, it could be used to accelerate segments within their county or to add additional aesthetic features or other elements that would not normally be funded from state or federal sources.

As discussed in Option 2, I-95 improvement program needs far exceed available funding when assessing mid-term and long-term statewide transportation needs. The ability to redirect or increase existing statewide funding sources to I-95 through STIP allocations would also be difficult given the critical needs across the state and statutory transportation funding equity requirements. At an annualized spending level of \$46 million per year, existing STIP funds for I-95 projects are only about a fraction of the identified need. Even doubling this amount per year would not provide sufficient funding for the \$4.4 billion in identified I-95 capital improvements by 2040.

If, in addition to doubling STIP allocation for I-95, a local sales tax increase of 1 cent was implemented within the eight counties along the I-95 improvement program corridor, it would further accelerate the existing funding program. Yet, even the combination of local funding and increased STIP allocation would not be enough to fully finance the identified need by 2040.

Conclusion: Combination of increased appropriation of existing state funding sources and special federal funding would not provide sufficient funds to construct/operate/maintain the proposed I-95 improvements by 2040. While such a funding package would allow an improvement program to be accelerated, neither NCDOT nor local governments in the counties located along the corridor are in a position to allocate any additional funding for I-95 improvements. NCDOT’s funding situation already remains challenging without a significant influx of new funding, and redirecting or increasing STIP allocations to I-95 improvements is not a viable option in the foreseeable future. The backlog of needed transportation improvements across the state, plus the limitations on funding allocation changes imposed by the Equity Formula, restrict NCDOT’s ability to program a greater portion of the STIP to I-95. Local governments are not responsible for funding of improvements and maintenance of I-95 and their funding for other local needs is already challenging.

The six I-95 funding options are summarized in Table 2-4.

Table 2-4: Summary of Funding Alternatives Evaluation

Funding Alternative	Ability to Generate Sufficient I-95 Funding?	Preservation of Funding for Other Programs	Other Comments
1. Continued project programming through the STIP at the current funding rate (Status quo)	No – This alternative would not provide sufficient funds to finance needed capital and maintenance requirements in a timely manner	Yes – Continued programming through the STIP at the current rate would not affect funding for other programs	None
2. Increased appropriation of current state funds to I-95	No – NCDOT faces a large transportation funding gap during the proposed study period, leading to the conclusion in the current adopted statewide plan that many critical programs and corridors cannot be fully funded. It is not feasible to expect that sufficient fund transfers could be made without severe adverse impact on other critical programs.	No – Would severely hamper ability to address other critical non-I-95 needs	Statutory transportation funding equity requirements severely restrict NCDOT's ability to transfer funds between Divisions and budgetary programs.
3. Special federal funding	No – Recent trends in federal budgetary processes have diminished states' ability to program major capital improvements through earmarks or other special appropriations. The recently passed MAP-21 relaxes the general prohibition against tolling on the national highway system: HOV-HOT conversions are permitted, tolls can be used to pay back TIFIA loans, and congestion pricing projects are eligible for CMAQ and TMP funding. Yet MAP-21 does not provide earmarks or special federal funding that could come anywhere close to meeting the funding need.	No – In current budgetary environment, there is strong likelihood that a major federal earmark would diminish the potential for targeted funding of other projects	None
4. Increased local funding through local tax programs	No – NCDOT has been advised during public outreach activities that local tax capacity (sales tax, special use, etc.) is not sufficient to generate a significant portion of needed funds or likely to be passed by all the local governments along the corridor.	No – Would impose substantial drain on ability of local governments to fund other needed programs	Funding of interstate highways is a state/national responsibility, not a local responsibility
5. Application of user fees (tolling)	Yes – Financial analysis indicates strong likelihood of ability of tolls to generate needed funds. MAP-21 offers strong support for tolling as revenue source.	Yes – Would not impact funding of other programs	FHWA allows interstate tolling under terms of the Interstate System Rehabilitation and Renewal Pilot Program if program requirements are met.
6. Combination of Local Funding and Increased STIP Allocations	No – While the combined increase in STIP allocations and a local funding sales tax increase of 1% would nearly close the funding gap associated with I-95 capital improvements, the option is considered to be unattainable and unrealistic given the existing NCDOT backlog for other projects and decreasing local receipts.	No – Would impact other programs currently funded by NCDOT. In addition, it would cause drain on local governments' budgets and disallow them to dedicate funding to other local uses.	Equity Formula restrictions and lack of local responsibility for Interstate funding makes this option unrealistic on a statewide and local level.

## 2.3 RECOMMENDED FUNDING STRATEGY

NCDOT concludes from the assessment of the I-95 funding options above that only the utilization of a user-fee (tolling) revenue generation program for all or a majority of the financing for I-95 improvements will allow for the accelerated programming of needed improvements in this critical highway corridor without adversely impacting the Department's traditional funding streams or local government revenue coffers. The backlog of needed transportation improvements across the state, plus the project funding caps imposed by STI, restrict NCDOT's ability to program a greater portion of the STIP to I-95. Additionally, there is little likelihood of special federal appropriations earmarked for I-95, and only a dramatic increase in local taxation would generate local funding sufficient to provide meaningful revenue. Reliance on local funding for what is considered to be a route of statewide and national significance is neither equitable nor fair, and should not be pursued.

Based on these conclusions, the remainder of this *I-95 Financial Plan Update* examines the ability of a user fee financing program to fund the proposed I-95 improvements, based on imposition of tolls and the initiation of a combination of debt-financing and pay-as-you-go financing.

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## 3 I-95 Improvement Program Description

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The evaluation of options for funding the I-95 improvement program determined that using only traditional funding was not a feasible funding strategy, and identified tolling as the preferred funding strategy. Based on these conclusions, the remainder of this Financial Plan examines the ability of a user fee financing program to fund the proposed I-95 improvements, based on imposition of tolls and the initiation of a combination of debt-financing and pay-as-you-go financing.

### 3.1 DESIGN CONCEPT AND SCOPE

Based on a detailed needs assessment and alternatives screening (with details of the screening process presented in the *I-95 EA*), a preferred design concept and scope for the I-95 improvement program includes a combination of general use lane additions, pavement reconstruction, bridge replacement, and modernization of geometric conditions. NCDOT has further determined that a toll collection concept based on 10-mile spacing of mainline gantries with no ramp tolling will be the basis for evaluation of funding options. This section describes that chosen design concept and scope.

### 3.2 MAINLINE IMPROVEMENTS

Conceptual designs (15%) have been prepared for the entire corridor. The 15% plans have been the basis for operations analysis, environmental screening, and cost estimates. The conceptual design is based on widening to the maximum extent possible within existing right of way. Two basic typical sections were developed for the 6-lane and 8-lane segments: one for widening into the median with a depressed grass median, and one for widening into the median with a hard median (concrete barrier). Widening would take place in the median wherever possible to minimize the need for additional right of way acquisition.

Mainline lane addition recommendations were developed based on preliminary 2040 traffic forecasts, along with requirements for safety, lane continuity, and driver expectation. An assessment of mainline lane requirements was performed to determine the minimum number of lanes for each freeway segment for acceptable traffic operations on a section by section basis, where a section is defined as the portion of the mainline between interchanges. In order to maintain an acceptable freeway LOS of C for rural areas and D for the more developed urban areas throughout the bond period (until 2056), the assessment of the 59 mainline segments showed:

- Nine segments will maintain acceptable LOS with the existing 4 lanes
- Thirty-five segments will require 6 lanes
- Fourteen segments will require 8 lanes
- One segment between Exit 46 and Exit 49 will require 10 lanes (8 lanes, plus an auxiliary lane in each direction).

The recommended mainline widening is shown in Figure 3-1. The corridor will be widened to eight lanes between Saint Pauls (Exit 31) in Robeson County and its intersection with I-40 (Exit 81) in Johnston County, and to six lanes throughout the remainder of the corridor. In addition to the eight general purpose lanes, one northbound and one southbound auxiliary lane would be constructed between Exits 46 and 49.

The section of I-95 that requires more than six lanes by 2040 has been identified as the Phase 1 project. The remainder of the corridor, divided into 8 major projects, has been defined as the Phase 2 projects.

### 3.2.1 Interchange Improvements

In total, 17 interchanges would need to be upgraded to enhanced forms for improved operation. Modifications to interchanges would address the geometric deficiencies and accommodate projected future traffic. All other interchanges would undergo improvements as well, including ramp and service road modifications for modernization and improved operation. A summary of recommended interchange modifications is provided in the following sections.

#### 3.2.1.1 Interchange Form Modification

Conceptual design interchange form modifications were developed both to address design deficiencies identified in the *I-95 Study Area Needs Assessment* (September 2010) and to address operational deficiencies based on an assessment of preliminary traffic estimates, as described in the *Interchange Form Analysis Technical Memorandum* (June 2011). Necessary interchange modifications are listed in Table 3-1.

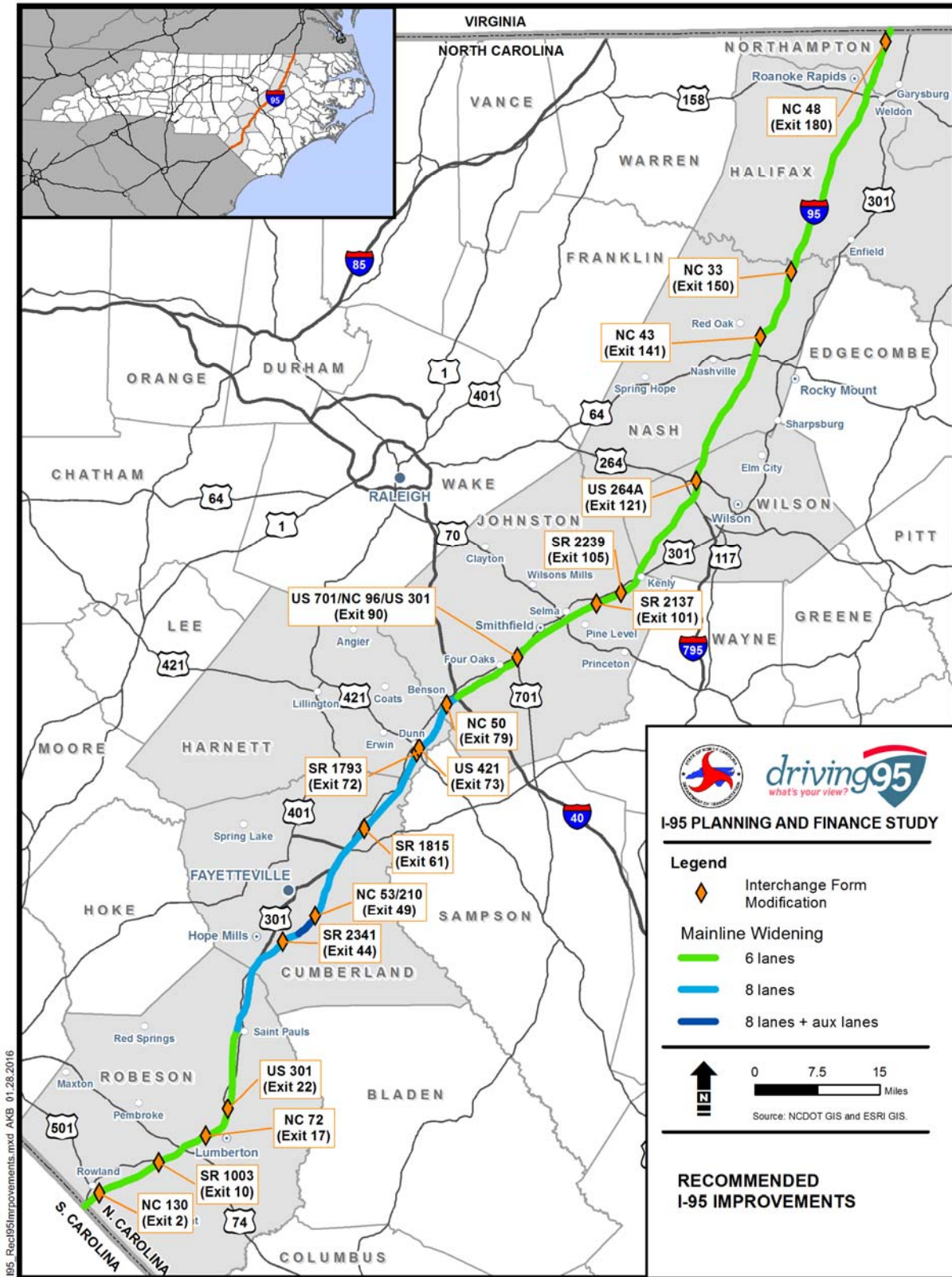
Table 3-1: Interchange Form Modifications

Interchange	Existing Form	Conceptual Design <sup>1</sup>
NC 130 (Exit 2)	Parclo-A 2-quadrant	Parclo-A 4-quadrant
SR 1003 (Exit 10)	Diamond	Parclo-AB 2-quadrant
NC 72 (Exit 17)	Diamond	Parclo-A 2-quadrant
US 301 (Exit 22)	Diamond	Diverging Diamond
SR 2341 (Exit 44)	Diamond	Parclo-B 2-quadrant
NC 53/210 (Exit 49)	Single Loop 3-quadrant	Parclo-AB 2-quadrant
SR 1815 (Exit 61)	Diamond	Parclo-B 2-quadrant
SR 1793 (Exit 72)	Diamond	Split Diamond with southbound on-loop
US 421 (Exit 73)	Diamond	
NC 50 (Exit 79)	Single Loop 3-quadrant	Parclo-B 2-quadrant
US 701 / NC 96 / US 301 (Exit 90)	Modified Single Loop 3-quadrant	Parclo-AB 2-quadrant
SR 2137 (Exit 101)	Diamond	Parclo-AB 2-quadrant
SR 2239 (Exit 105)	Diamond	Parclo-AB 2-quadrant
US 264A (Exit 121)	Diamond	Parclo-B 2-quadrant
NC 43 (Exit 141)	Diamond	Diamond with Single Loop
NC 33 (Exit 150)	Diamond	Parclo-B 2-quadrant
NC 48 (Exit 180)	Diamond	Single Loop 3-quadrant

Source: *I-95 Conceptual Designs Packet* (July 2011)

1. Parclo stands for Partial Cloverleaf Interchange

Figure 3-1: Recommended I-95 Improvements



### 3.2.1.2 Interchange Consolidation

Under the current design concept and scope, no existing interchanges would be closed to provide additional spacing. However, two adjacent diamond interchanges would be combined into a split diamond interchange at existing Exits 72 and 73. This change would remove the tight weaving segment between those two interchanges.

### 3.2.1.3 Interchange Geometric Improvements

Geometric improvements, such as ramp modifications to meet current design standards for adequate sight distance, and acceleration or deceleration lane length, would be made at most interchanges. Further, consistent with current NCDOT practice, future loops would generally be accommodated within each ramp quadrant to prevent major reconstruction in the event further interchange modifications are needed in the future. In accordance with this practice, many ramps would be modified to accommodate potential future loops.

### 3.2.1.4 Service Road Modifications

Under existing conditions, there are several locations along the corridor that have service roads tying into interchange ramps. This approach is no longer practiced by NCDOT due to the safety concerns of motorists heading down ramps and the interstate in the wrong direction. As an element of the conceptual design, all such combined ramp/service road conditions would be made consistent with current standards. Where practical, connectivity of service roads would be preserved at the interchanges. A detailed study of service road locations would be completed as part of future project-level analyses to determine the cost feasibility of maintaining connectivity at each location.

## 3.3 TOLLING APPROACH

### 3.3.1 Tolling Scenarios Considered

Once the conclusion was reached that only tolling of I-95 would generate the funds needed for timely completion of the needed improvement program, the Financial Plan examined alternative collection methods and scenarios for a user fee (tolling) program to fund those improvements. Predicated on the understanding that application of tolls and initiation of a combination of debt-financing and pay-as-you-go financing would allow ongoing programming of needed improvements, two principal tolling collection methods were considered:

1. **Entry-Exit Systems**. An entry-exit system detects vehicles at every entrance and exit to calculate the trip length and thus the toll due (traditionally known as a “ticket system” because of paper tickets handed out on older toll facilities). Entry-exit ticket systems with cash collection are prohibitively expensive to build and operate, and have not been built in the United States since the 1960s. All Electronic Toll (AET) entry-exit systems require the matching of two discrete transaction messages to create one toll, and thus are much more complex to implement than an AET barrier system. Toll gantries and tolling infrastructure would be required on each ramp at each interchange on the facility. AET entry-exit systems are avoided by most AET toll operators because of higher capital and operating costs and the potential for ‘orphan’ transactions, which increase leakage.

The capital and operating costs of this type of facility were evaluated as a part of this study and found to be prohibitive. An entry-exit system is not considered to be a viable toll collection method.

2. **Barrier Systems.** In a barrier system, each barrier charges the rate due for a specific segment of the toll facility. For example, a 20-mile road with 2 barrier plazas would charge the nominal per-mile rate times 10 miles at each location (assuming mainline toll zones were approximately equidistant).

If there are multiple interchanges in between these barrier plazas, there are typically some “ramp” plazas located away from the mainline barrier plazas which capture traffic that might otherwise be allowed to use the facility toll free. North Carolina’s Triangle Expressway employs this mix of mainline and ramp toll locations. If the barrier system is a cash barrier system, it requires construction of a large paved area, a toll plaza, and an administration building. The barriers are typically placed at the greatest intervals possible to reduce capital and operating costs. The economics of cash plaza facilities require mainline spacing to be as far apart as possible. The trade-off is that tolls are not perfectly equitable with a barrier system, and the further apart the tolling points, the less equitable they are for short-distance drivers.

With AET, the economics shift. Capital costs still rise with more toll zones, but at a much lower absolute value than with cash collection facilities. Operating costs also increase with the number of toll zones and transactions, but are more greatly impacted by other factors.

In examining the two tolling system options described above, NCDOT chose to focus its analysis on the barrier system approach, because of its strong desire to allow some untolled movements along I-95 by local roadway users (i.e., those using I-95 for short distance trips). Four barrier system AET tolling plans were considered for this study, reflecting variation in barrier spacing, ramp tolling, and toll implementation timing. Revenue, capital, and operating cost estimates were developed for each scenario:

1. **20-mile barrier spacing with select ramp tolls and full tolling upon Phase 1 completion.** This barrier system configuration would include mainline toll zones and ramp toll zones at adjacent interchanges. This concept would reduce the number of untolled movements, but would also reduce toll diversion, thereby reducing impact on local road networks. This concept was presented in the I-95 EA as the basis for assessing toll financing feasibility in that document. Based on comments regarding ramp tolling received during public hearings, NCDOT expanded its tolling analysis to include the following two alternative scenarios.
2. **20-mile barrier spacing with no ramp tolling and full tolling upon Phase 1 completion.** This barrier system configuration would maintain the same 20-mile mainline toll spacing, but would eliminate the selected ramp tolls. This concept would allow many more trips to enter and exit the system without paying a toll. It would likely encourage much greater toll diversion with a resultant impact on the local road network. It would generate significantly less toll revenue than the first scenario.
3. **10-mile barrier spacing with no ramp tolling and full tolling upon Phase 1 completion.** This barrier system configuration would include only mainline toll zones, spaced in approximately 10-mile intervals. While the scenario would still experience significant toll diversion, it would be reduced in comparison to the 20-mile/no ramp toll option. This scenario would generate more toll revenue than scenario #2, but less than scenario #1.

4. **10-mile barrier spacing with no ramp tolling and section tolling upon improvement phase completion.** This barrier system configuration would include only mainline toll zones, spaced in approximately 10-mile intervals. Unlike Scenario #3, tolls would be collected only upon completion of the improvements for individual construction phases.

### 3.3.2 Tolling Scenarios Analysis

In analyzing the four AET tolling scenarios, factors such as cost, likelihood of implementation, revenue-generation potential, and ability of the scenario to generate sufficient revenue to fully fund the construction program without injection of other, non-toll revenues were considered in choosing the 10-mile spacing with no ramp tolling and deferred mainline tolling until improvement completion as the preferred AET tolling plan for the I-95 corridor. The financial analysis considered the following: ability of toll revenues to finance needed improvements and to fund ongoing O&M, R&R program, and reserves. The financial analysis tested a gross pledge (assuming an indirect back-up pledge of O&M and R&R costs by NCDOT from non-toll sources) and senior lien bond financing structure, and the likely number of debt issuances, with assumed 30 to 40 year debt terms. A further analysis of the 10 mile spacing with no ramp tolling scenario tested the impacts of a subordinate TIFIA loan on the financing. As shown in Table 3-2, the I-95 improvement scenario using 10-mile toll gantry spacing with no ramp tolling and either full initial or partially deferred tolling could be fully funded through tolls, similar to the 20-mile spacing with select ramp tolling scenario that was documented in the I-95 EA.

Table 3-2: Tolling Plans: Capital Funds Revenue Sufficiency

Scenario	Funding
20-mile spacing with select ramp tolls; full I-95 tolling upon completion of Phase 1 improvements	Fully funded by toll revenue
20-mile spacing with no ramp tolling; full I-95 tolling upon completion of Phase 1 improvements	NCDOT public equity requirement: \$325 million
10-mile spacing with no ramp tolling; full I-95 tolling upon completion of Phase 1 improvements	Fully funded by toll revenue
10-mile spacing with no ramp tolling, with Phase 2 segment fixed rate tolling upon completion of segment improvements	Fully funded by toll revenue

### 3.3.3 Other Tolling Considerations

In addition to selection of a tolling method (AET), spacing of collection points, and initial toll rates, assumptions have been made regarding other factors that will affect the financial analysis. These are discussed below.

#### 3.3.3.1 Collection Methods, Rates, Accounts, and Customer Service

It is anticipated that toll collection on I-95 would be operated within the overall North Carolina Turnpike Authority (NCTA) toll system. Toll collection would be collected using an AET system, with overhead toll gantries located within toll zones throughout the 182-mile corridor. Customers would have the option to pay their

tolls via an electronic toll collection (ETC) method which utilizes a pre-paid transponder-based account or through video tolling.

Toll accounts and transponders from North Carolina's transponder program, NC Quick Pass, would be accepted. In addition, other transponder programs that are interoperable with NC Quick Pass, expected to include EZ-Pass and SunPass, would also be accepted. Customers using I-95 that do not have a transponder would be detected at the toll zones and an image of their license plates would be captured. These customers would pay their tolls through the 'Bill by Mail' process that mails an invoice for the toll amount to the address of the vehicle owner. Toll rates for 'Bill by Mail' customers would be higher than the transponder-based rate due to the increased processing costs. Three vehicle toll classes would be set: two-axle vehicles, three-axle vehicles, and four or more axle vehicles. Toll rates would be generally set at the mainline toll zones based on their interval distance and the nominal rate/mile.

It is anticipated that the NCTA would operate a staffed Customer Service Center (CSC) storefront at one rest area in each direction of I-95 (possibly at Welcome Centers), and unattended kiosks at the six other rest areas. Drivers would be able to gain information, open and replenish NC Quick Pass toll accounts, and pay Bill by Mail invoices at these locations. There may be one additional storefront in the Fayetteville area at a commercial or retail location, and retail outlets such as convenience stores or pharmacies may be used under contract to support customer account management. In addition, NC Quick Pass replenishments and Bill by Mail invoice payments can be made online and through the mail.

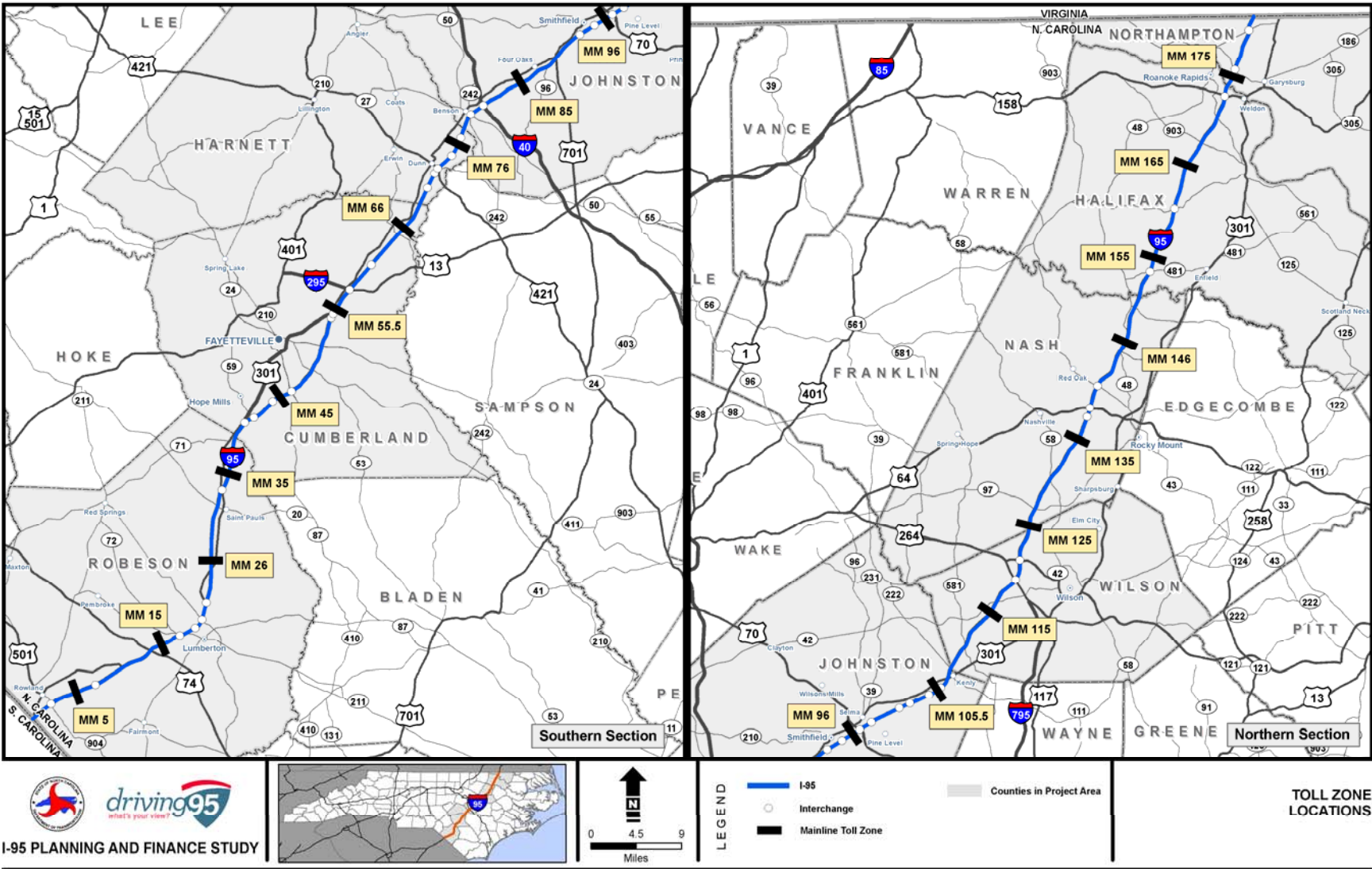
### 3.3.3.2 Toll Interoperability

The proposed system is consistent with tolling approaches throughout the country. With a proposed schedule to begin operating the improved I-95 facility as a tolled highway beginning in 2022, regional and perhaps national toll interoperability is assumed, particularly given that the NCTA, as a part of NCDOT, has been a leader in the Alliance for Toll Interoperability (ATI). The ATI includes 31 agencies in 20 states with a focus on state-to-state toll interoperability through technology enhancement and the ability to enact legislation for reciprocity agreements to pursue toll violators and establish toll collection technology standards. In December 2011, a 3.5 mile segment of the Triangle Expressway opened in the Raleigh area as an AET system with dual protocol readers able to read both E-Z Pass (northeastern US) and SunPass (Florida) transponders. The NCTA is actively pursuing agreements with all tolling programs along the I-95 corridor for interoperability on the Triangle Expressway and other planned facilities. It is anticipated that multi-protocol readers would be deployed on I-95.

The analyzed tolling plan is shown in Figure 3-2. Toll zone locations are preliminary and subject to change based on further analysis. These toll zone locations (and toll rates, described in **Chapter 6**) have been used for the initial tests. Additional testing will be required. The 18 mainline toll zones would be placed at intervals of approximately 10 miles. This 10-mile spacing scenario would have no tolled ramps at any interchanges.



Figure 3-2: Toll Zone Locations





## 4 I-95 Program Cost Estimates

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This chapter presents cost estimates for the full I-95 improvement program, including capital, operating and maintenance, and renewal and replacement costs. Capital costs are based on a conceptual level of design and preliminary phasing plans, with an activity breakdown by major project element for feasibility studies, preliminary engineering, environmental planning, right-of-way acquisition, construction, construction engineering and inspection, project management, contingencies, and ITS activities. Selection of this concept was summarized in the previous chapter. All cost estimates are in 2011 dollars.

### 4.1 CAPITAL COST BY MAJOR I-95 IMPROVEMENT PROGRAM ELEMENT

The total capital cost of the refined preferred design concept and scope is estimated at \$4.5 billion, in 2011 dollars. It includes improvements to the entire 182 mile I-95 corridor from the border of South Carolina to Virginia. The capital cost estimate summary is presented in Table 4-1.

Table 4-1: I-95 Improvement Program Capital Cost Estimate (2011 \$Millions)

Activity	Assumed Responsible Party	Cost
Project Engineering	NCDOT	237
Right of Way	NCDOT	355
Design-Build Construction Contract <sup>1</sup>	Design-Build Team	3,459
Construction Engineering & Inspection	NCDOT	407
<b>Total, Non-Toll Roadway</b>	-	<b>4,458</b>
Toll Equipment <sup>2</sup>	Design Build Team	85
<b>Total, Toll</b>	-	<b>4,543</b>

Notes:

1. Construction cost includes roadway and structures, water and sewer utility construction, Intelligent Transportation Systems (ITS), miscellaneous items and mobilization, and contingencies. It also includes cost to relocate power, communication, and gas utilities.
2. Toll equipment costs for the entire corridor are assumed in Phase 1

### 4.2 CONSTRUCTION COST BY PROGRAM PHASE AND PROJECT

The major elements of the analyzed tolling plan, the barrier system with only mainline tolling, include:

- Phase 1 project, I-95 from Exit 14 (US 74) to Exit 81 (I-40). It includes toll equipment costs for the entire I-95 improvement program corridor.
- Phase 2 Projects, remainder of the corridor, including the following eight segments:
  - Project 1: I-95 from Exit 81 (I-40) to Exit 95 (NC 210)
  - Project 2: I-95 from Exit 95 (NC 210) to Exit 108 (NC 222)
  - Project 3: I-95 from Exit 108 (NC 222) to Exit 120 (US 264)
  - Project 4: I-95 from Exit 120 (US 264) to Exit 139 (US 64)
  - Project 5: I-95 from Exit 139 (US 64) to Exit 154 (NC 481)
  - Project 6: I-95 from Exit 154 (NC 481) to Exit 173 (NC 158)
  - Project 7: I-95 from Exit 173 (NC 158) to Exit 181 (NC 48)
  - Project 8: I-95 from Exit 181 (NC 48) to Exit 14 (US 74)

The capital cost of Phase 1, the reconstruction of the 67 miles of I-95 from MP 14 to MP 81, is estimated at approximately \$1.95 billion, as shown in Table 4-2. Phase 2 includes the improvement and reconstruction of the remainder of the I-95 corridor. This reconstruction will follow the completion of Phase 1 and will be accomplished through a series of eight projects that address the capacity, safety, and obsolescence needs of the corridor. The overall cost estimate for Phase 2 projects is \$2.59 billion.

**Table 4-2: Capital Cost Estimate by Activity and Construction Segment (2011 \$Millions)**

Activity	Phase 1 Total	Phase 2								Phase 2 Total	Grand Total
		Project									
		1	2	3	4	5	6	7	8		
Project Engineering	97	17	17	14	24	19	23	10	16	140	237
Right of Way	188	28	41	8	13	6	48	21	4	168	355
Design-Build Contract	1,413	249	250	200	347	272	341	150	236	2,045	3,459
Construction Engineering & Inspection	166	29	29	23	41	32	40	18	28	241	407
Toll Equipment <sup>1</sup>	85	-	-	-	-	-	-	-	-	-	85
Total	1,949	323	337	245	425	328	453	199	283	2,594	4,543

### 4.3 OPERATIONS AND MAINTENANCE COST ESTIMATE

The estimated O&M cost estimates span the 48-year period from 2022, when tolls would be imposed on the Phase 1 improvements, to 2070. The O&M costs include routine roadway maintenance such as minor pavement maintenance (e.g., pothole repair, crack sealing and chip seals), non-pavement maintenance activities (e.g., sweeping, trash collection, weed control, snow removal, guardrail repair, mowing, fence and snow fence repair, paint striping), and other annually recurring costs of preserving the roadway surface investment, functionality, and safety of I-95. O&M also includes tolling expenses, including general and administrative expenses, staffing, toll system maintenance, enforcement and courtesy patrol, and transaction and violation processing.

The O&M analysis yielded the required annual outlays to maintain the road at acceptable levels and structured the annual roadway O&M outlays. The estimated annual O&M costs are shown in Table 4-3. The annual O&M cost breakdown estimates are presented in mid-year of construction dollars based on the assumed project schedule and with a 2.5% inflation factor applied annually. The estimated total 2022-2070 cost for Operations is \$5.22 billion. The total for Maintenance is \$2.20 billion, yielding the total combined O&M cost of nearly \$7.42 billion.

Table 4-3: Operations and Maintenance Cost Estimate (YOE \$Millions)

Year	Operations	Maintenance	Total O&M Cost Estimate
	10 Mile Spacing - no ramp tolls	Routine Roadway Maintenance	
2022	24.94	9.25	34.2
2023	24.98	9.48	34.46
2024	25.02	9.72	34.74
2025	29.43	12.01	41.44
2026	33.11	13.3	46.41
2027	36.83	14.65	51.48
2028	41.08	16.9	57.98
2029	45.06	18.89	63.95
2030	49.1	20.96	70.05
2031	52.52	24.08	76.6
2032	57.1	26.42	83.52
2033	63.73	28.86	92.59
2034	66.12	29.58	95.7
2035	68.59	30.32	98.91
2036	73.81	31.81	105.62
2037	79.32	33.35	112.67
2038	84.05	35.65	119.7
2039	89.01	38.04	127.04
2040	92.27	38.99	131.26
2041	94.72	39.96	134.68
2042	97.21	40.96	138.17
2043	99.76	41.98	141.74
2044	102.36	43.03	145.39
2045	105.01	44.11	149.12
2046	107.73	45.21	152.94

Year	Operations	Maintenance	Total O&M Cost Estimate
	10 Mile Spacing - no ramp tolls	Routine Roadway Maintenance	
2047	110.5	46.34	156.84
2048	113.33	47.5	160.83
2049	116.22	48.69	164.91
2050	119.17	49.91	169.08
2051	122.18	51.15	173.34
2052	125.26	52.43	177.69
2053	128.4	53.74	182.15
2054	131.61	55.09	186.7
2055	134.89	56.46	191.35
2056	138.23	57.88	196.11
2057	141.65	59.32	200.97
2058	145.13	60.8	205.94
2059	148.69	62.33	211.02
2060	152.43	63.88	216.31
2061	156.26	65.48	221.74
2062	160.19	67.12	227.31
2063	164.22	68.8	233.02
2064	168.35	70.52	238.87
2065	172.59	72.28	244.86
2066	176.93	74.08	251.01
2067	181.38	75.94	257.31
2068	185.94	77.84	263.77
2069	190.61	79.78	270.4
2070	195.41	81.78	277.18
Total	5,222.42	2,196.62	7,419.04

Notes: 2.5% inflation rate applied to O&M

#### 4.4 RENEWAL AND REPLACEMENT (R&R) COST ESTIMATE

R&R funds will be set aside each year, in addition to O&M funds, to finance major roadway and toll system rehabilitation projects required to maintain an above average level of service along the I-95 corridor. The R&R projects are recurring, non-annual maintenance activities needed to maintain the roadway and toll collection system, such as repaving the toll lanes, surface resealing/mill & overlay, bridge repairs and painting, and upgrading & replacing tolling equipment or toll rate signs. Unlike routine roadway maintenance, such as minor pavement maintenance that will be covered by the O&M funds, typical R&R

projects require a separate reserve account. It is assumed that the replacement cost of any item, including the toll software, is equivalent to the current cost, adjusted for inflation at 2.5% annually.

Annual R&R cost estimates are equivalent to the current cost dollars with a 2.5% annual inflation factor. Total R&R costs through the end of 2038, when the final Phase 2 projects are projected open to traffic, are approximately \$380 million. The overall R&R cost from 2022 through 2070 is estimated at nearly \$2.57 billion, as shown in Table 4-4. On an annual basis, the full cost of R&R along the corridor ranges from a low of \$5.9 million in 2022 to a high of \$97.9 million in 2070.

Table 4-4: Renewal and Replacement Cost Estimate (YOE \$Millions)

Year	Roadway (non-Pav't)	Facilities	Pavement	Total	Year	Roadway (non-Pav't)	Facilities	Pavement	Total
2022	2.42	3.47	0	5.9	2047	11.85	17.38	26.27	55.5
2023	2.49	3.56	0	6.04	2048	12.15	17.82	26.92	56.89
2024	2.55	3.65	0	6.19	2049	12.45	18.26	27.6	58.31
2025	3.13	4.51	2.82	10.46	2050	12.76	18.72	28.29	59.77
2026	3.46	4.99	2.89	11.34	2051	13.08	19.19	28.99	61.26
2027	3.8	5.49	5.93	15.22	2052	13.41	19.67	29.72	62.8
2028	4.37	6.34	6.71	17.42	2053	13.75	20.16	30.46	64.37
2029	4.87	7.08	7.48	19.43	2054	14.09	20.66	31.22	65.98
2030	5.4	7.86	8.32	21.58	2055	14.44	21.18	32	67.62
2031	6.19	9.03	9.74	24.96	2056	14.8	21.71	32.8	69.32
2032	6.78	9.91	10.94	27.62	2057	15.17	22.25	33.62	71.05
2033	7.4	10.83	11.82	30.04	2058	15.55	22.81	34.46	72.82
2034	7.58	11.1	13.9	32.58	2059	15.94	23.38	35.32	74.64
2035	7.77	11.37	15.31	34.46	2060	16.34	23.96	36.21	76.51
2036	8.15	11.93	16.53	36.61	2061	16.75	24.56	37.11	78.42
2037	8.54	12.51	18.05	39.1	2062	17.17	25.18	38.04	80.38
2038	9.12	13.37	18.51	41	2063	17.6	25.81	38.99	82.39
2039	9.73	14.27	19.41	43.41	2064	18.04	26.45	39.97	84.45
2040	9.97	14.62	19.9	44.49	2065	18.49	27.11	40.97	86.56
2041	10.22	14.99	21.76	46.97	2066	18.95	27.79	41.99	88.73
2042	10.48	15.37	22.3	48.14	2067	19.42	28.49	43.04	90.95
2043	10.74	15.75	23.8	50.28	2068	19.91	29.2	44.12	93.22
2044	11.01	16.14	24.39	51.54	2069	20.41	29.93	45.22	95.55
2045	11.28	16.55	25	52.83	2070	20.92	30.68	46.35	97.94
2046	11.56	16.96	25.63	54.15	Total	562.4	824.01	1,180.80	2,567.21

## 5 Implementation Plan

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This chapter outlines the anticipated project schedule, proposed phasing approach, and associated construction cost estimates, and is the basis, together with revenue forecasts, of the Financial Plan presented in Chapter 6. All cost estimates presented in this section are based on the assumption that the 10-mile spacing with no ramp tolling is the chosen toll scenario.

Capital cost estimates presented in **Chapter 4** have been converted from the current dollar basis (2011 dollars) developed for the *I-95 EA* to Year of Expenditure (YOE) dollars adjusted for inflation to the mid-year of each construction phase as defined in the phasing approach, below.

### 5.1 PHASING APPROACH AND PROGRAM SCHEDULE

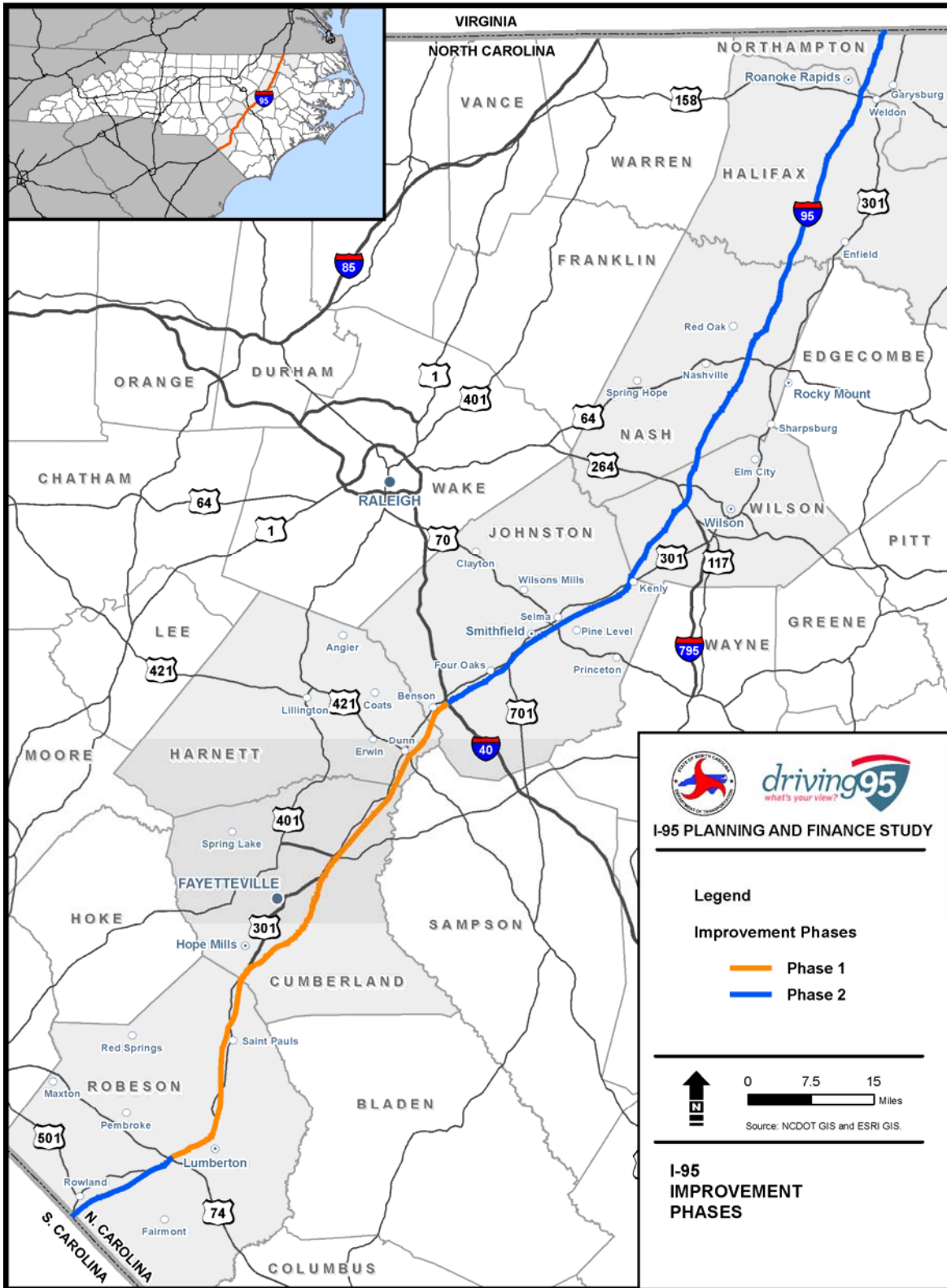
The proposed I-95 improvement financing program will finance the approximately \$5.99 billion (in YOE) cost of the proposed capital improvements to the I-95 corridor in North Carolina. The anticipated I-95 improvement program is proposed to be divided into two phases from a construction and financing perspective: Phase 1, the reconstruction and widening of 67 miles of I-95 as a single construction project, as further described below, will address immediate traffic congestion problems in the high traffic, high congestion area of the I-95 corridor in the state. Phase 2 projects will be divided into eight smaller projects spread over a longer timeframe, and will result in reconstruction of and improvements to the entire corridor. The limits of these two areas are shown in Figure 5-1.

#### 5.1.1 Phase 1 Project – Exit 14 (NC 211) to Exit 81 (I-40)

Phase 1 includes the reconstruction of the I-95 corridor with the necessary improvements to meet the 2040 non-tolled capacity requirements, from Exit 14 to Exit 81 (interchange with I-40), a length of approximately 67 miles. This is the portion of the corridor with the highest level of existing traffic, the highest traffic growth rate and the most immediate need for widening to meet the desired level of service.

Assumptions regarding the I-95 improvement program delivery and schedule were developed to facilitate cost inflation to construction years as an input to the finance analysis. It is assumed that Phase 1 would be completed through a Design-Build delivery process. For the purposes of schedule development, it is assumed that the NCDOT will be responsible for completion of the NEPA process, acquisition of the required right of way and acquisition of the required environmental permits.

Figure 5-1: I-95 Improvement Program Phases



The overall estimated costs and phasing for Phase I are presented in Table 5-1. Based on the assumed project schedule, the total cost estimate for Phase I is \$2.41 billion. The proposed schedule for the toll financing analysis assumes that the NEPA process begins in 2015 and takes three years. The financial analysis assumes NCDOT will issue bond anticipation notes (BANs) secured by a back-up pledge of non-toll revenues to provide interim financing through 2017. The first long term bond issuance in 2018 is structured to repay the BANs and provide additional proceeds to fund construction. Construction duration was estimated at 48 months; Phase 1 is projected to be open to traffic in January 2022. Changes to this schedule will affect inflation impacts and costs:

- NEPA and Preliminary Engineering begins 2015
- Phase 1 construction begins 2018
- Phase 2 improvements begins 2020
- Phase 1 construction complete 2021
- Tolls imposed on Phase 1 2021
- Phase 2 construction complete 2038

Table 5-1: Phase 1 Capital Cost and Phasing - Exit 14 (US 74) to Exit 81 (I-40)

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$109.7	Jan-15	Jul-18
Right of Way	NCDOT	\$222.9	Dec-17	May-19
Design Build Construction	Design Build Team	\$1,763.3	Sep-18	Jan-22
Construction Engineering & Inspection	NCDOT	\$207.6	Sep -2016	Jan -2020
Toll Equipment <sup>1</sup>	Design Build Team	\$108.8	Sep-18	Jan-22
Total	-	\$2,412.4		

Notes:

<sup>1</sup> Toll equipment costs for the entire corridor are assumed during Phase 1

Inflation rate: 2.5%

### 5.1.2 Phase 2

Phase 2 includes the reconstruction of the remainder of the I-95 corridor, approximately 114 miles that were not reconstructed as part of Phase 1. This reconstruction will follow the completion of Phase 1 and will be accomplished through a series of eight projects addressing the capacity, safety, and obsolescence needs of the corridor. Under the current implementation plan, preliminary engineering for Phase 2 will begin in 2018, with construction of the first Phase 2 project beginning in late 2021. By 2038, all construction of Phase 2 will be complete.

Phase 2 will be completed through a Design-Build project delivery process. It is assumed that they will be delivered using a combination of toll revenue bond funds and available toll equity from I-95 toll collections. A schedule will be developed to prioritize the needs and use the available toll equity funds to address these requirements. The overall cost estimate for Phase 2 (Projects 1-8) is \$4.18 billion, as shown in Table 5-2, based on the assumed project schedule beginning in 2018 with preliminary engineering and running through 2038. Table 5-3 through Table 5-10 show detailed cost and phasing information for each of the eight projects.

**Table 5-2: Capital Cost and Phasing - Phase 2 Summary (Exit 81 (I-40) to Exit 181 (NC 48); Exit 1 (NC 301/ NC 501) to Exit 14 (US 74))**

Activity	Assumed Responsible Party	YOE Cost (\$M)
Project Engineering	NCDOT	\$207.51
Right of Way	NCDOT	\$248.31
Design Build Contract	Design Build Team	\$3,336.40
Construction Engineering & Inspection	NCDOT	\$392.52
Toll Equipment <sup>1</sup>	Design Build Team	\$0.00
Total	-	\$4,184.74

Notes:

<sup>1</sup> Toll equipment costs for the entire corridor are assumed during Phase 1 Project

Inflation rate: 2.5%

**Table 5-3: Capital Cost and Phasing - Phase 2/ Project 1 (EXIT 81 (I-40) to Exit 95 (NC 210))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$21.4	Jan-18	Jul-21
Right of Way	NCDOT	\$36.3	Jan-20	Jun-22
Design Build Contract	Design Build Team	\$343.6	Sep-21	Jan-25
Construction Engineering & Inspection	NCDOT	\$40.4	Sep-21	Jan-25
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$441.8	-	-

**Table 5-4: Capital Cost and Phasing - Phase 2/Project 2 (Exit 95 (NC 210) to Exit 108 (NC 222))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$23.1	Jul-19	Jan-23
Right of Way	NCDOT	\$55.1	Jul-21	Dec-23
Design Build Contract	Design Build Team	\$371.0	Mar-23	Jul-26
Construction Engineering & Inspection	NCDOT	\$43.6	Mar-23	Jul-26
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$492.8	-	-



**Table 5-5: Capital Cost and Phasing - Phase 2/Project 3 (Exit 108 (NC 222) to Exit 120 (US 264))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$18.4	Jan-21	Jul-24
Right of Way	NCDOT	\$11.5	Jan-23	Jun-25
Design Build Contract	Design Build Team	\$296.5	Sep-24	Jan-28
Construction Engineering & Inspection	NCDOT	\$34.9	Sep-24	Jan-28
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$361.3	-	-

**Table 5-6: Capital Cost and Phasing - Phase 2/Project 4 (Exit 120 (US 264) to Exit 139 (US 64))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$34.5	Jul-22	Jan-26
Right of Way	NCDOT	\$18.5	Jul-24	Dec-26
Design Build Contract	Design Build Team	\$528.3	Mar-26	Jul-29
Construction Engineering & Inspection	NCDOT	\$62.2	Mar-26	Jul-29
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$643.5	-	-

**Table 5-7: Capital Cost and Phasing - Phase 2/Project 5 (Exit 139 (US 64) to Exit 154 (NC 481))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$27.0	Jan-24	Jul-27
Right of Way	NCDOT	\$9.3	Jan-26	Jun-28
Design Build Contract	Design Build Team	\$444.9	Sep-27	Jan-31
Construction Engineering & Inspection	NCDOT	\$52.3	Sep-27	Jan-31
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$533.6	-	-

**Table 5-8: Capital Cost and Phasing - Phase 2/Project 6 (Exit 154 (NC 481) to Exit 173 (NC 158))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$36.6	Jul-25	Jan-29
Right of Way	NCDOT	\$75.4	Jul-27	Dec-29
Design Build Contract	Design Build Team	\$602.6	Mar-29	Jul-32
Construction Engineering & Inspection	NCDOT	\$70.9	Mar-29	Jul-32
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$785.4	-	-

**Table 5-9: Capital Cost and Phasing - Phase 2/Project 7 (Exit 173 (NC 158) to Exit 181 (NC 48))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$17.3	Jul-29	Jan-33
Right of Way	NCDOT	\$35.6	Jul-31	Dec-33
Design Build Contract	Design Build Team	\$279.0	Mar-33	Jul-36
Construction Engineering & Inspection	NCDOT	\$32.8	Mar-33	Jul-36
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$364.8	-	-

**Table 5-10: Capital Cost and Phasing - Phase 2/Project 8 (Exit 1 (NC 301/ NC 501) to Exit 14 (US 74))**

Activity	Assumed Responsible Party	YOE Cost (\$M)	Begin Date	End Date
Project Engineering	NCDOT	\$29.2	Jul-31	Jan-35
Right of Way	NCDOT	\$6.6	Jul-33	Dec-35
Design Build Contract	Design Build Team	\$470.4	Mar-35	Jul-38
Construction Engineering & Inspection	NCDOT	\$55.3	Mar-35	Jul-38
Toll Equipment	Design Build Team	\$0.0	-	-
Total	-	\$561.7	-	-

## 5.2 ANNUAL CASH FLOW REQUIREMENTS

The annual capital expense cash flow requirements resulting from the phasing plan described above are shown in Table 5-11. By the end of 2038, all segments of the corridor will be completed and opened to traffic. The maximum annual required capital for reconstruction of the I-95 improvement program will be \$780 million, occurring in 2021, when the final portion of Phase 1 is complete and construction of Phase 2 accelerates.

Table 5-11: Annual Capital Expense Requirements (YOE \$Millions)

Period (Ending 12/31)	Phase 1	Total Remaining Phase 1 Cost	Phase 2	Total Remaining Phase 2 Cost	Total Remaining Project Cost	Annual Project Cost
2015	31.35	2,381.08	0.00	4,184.74	6,565.82	31.35
2016	31.35	2,349.73	0.00	4,184.74	6,534.47	31.35
2017	44.46	2,305.26	0.00	4,184.74	6,490.00	44.46
2018	370.11	1,935.15	6.10	4,178.64	6,113.79	376.21
2019	643.74	1,291.41	9.40	4,169.24	5,460.65	653.14
2020	591.30	700.11	27.73	4,141.51	4,841.62	619.03
2021	700.11	-	79.75	4,061.76	4,061.76	779.86
2022			164.57	3,897.19	3,897.19	164.57
2023			270.12	3,627.07	3,627.07	270.12
2024			326.01	3,301.07	3,301.07	326.01
2025			393.35	2,907.72	2,907.72	393.35
2026			350.29	2,557.43	2,557.43	350.29
2027			349.05	2,208.38	2,208.38	349.05
2028			279.96	1,928.42	1,928.42	279.96
2029			350.18	1,578.24	1,578.24	350.18
2030			356.18	1,222.06	1,222.06	356.18
2031			218.54	1,003.52	1,003.52	218.54
2032			129.06	874.46	874.46	129.06
2033			101.19	773.27	773.27	101.19
2034			104.65	668.62	668.62	104.65
2035			227.51	441.11	441.11	227.51
2036			204.51	236.60	236.60	204.51
2037			157.73	78.87	78.87	157.73
2038			78.87	-	-	78.87
<b>Total</b>	<b>2,412.42</b>		<b>4,184.75</b>	<b>-</b>	<b>-</b>	<b>6,597.17</b>

Inflation rate: 2.5%

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## 6 I-95 Improvement Program Financing, Revenues, and Cash Flow

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This chapter presents the preliminary financing plan for the I-95 improvement program under a senior lien tax-exempt and subordinate lien TIFIA loan structure, including funding sources, revenue streams, and cash flow analysis.

A comprehensive financial model to assist in identifying and evaluating alternative project financing strategies has been developed. Key inputs to the development of appropriate financing options include the results of the traffic and revenue forecasts, the cost of construction and right of way, operations & maintenance (O&M) expenses, renewal & rehabilitation (R&R) costs, and project construction schedules. The financial model has been developed to test and evaluate various project financing variables such as:

- Traffic and revenue assumptions
- Anticipated toll rates and duration of toll collection
- Operating and maintenance strategies and costs
- Capital costs
- Implementation or phasing options
- Need for supplemental, non-toll revenue sources
- Project debt structures
- Identification and assessment of the Finance Plan risks and risk mitigation strategies
- Refinement of the Finance Plan outputs to facilitate evaluation of alternatives and selection of a preferred strategy

Although several alternative project phasing and implementation plans were developed to identify the strategy that best meets NCDOT's project goals, initial plans tested determined that development of a set of projects that would be reconstructed along the entire corridor simultaneously was not feasible from a finance standpoint and would most likely not be implementable due to the very large volume of construction resources required to accomplish this effort.

Therefore, corridor needs were examined to determine appropriate sequencing and timing of improvements. The financing plan presented in this document includes an initial project to meet immediate capacity and/or pavement and bridge reconstruction needs (Phase 1), followed by a series of subsequent projects, to bring the corridor to its ultimate configuration (Phase 2, comprised of eight segments). It is based on costs for the selected design concept and scope of facility improvements and rehabilitation, toll revenues dedicated to I-95 improvement program financing as generated by a 10-mile toll gantry spacing concept with no ramp tolling, and a 16-year phased construction program. It is intended that Phase 1 will be financed with senior lien tax exempt bonds and a Transportation Infrastructure Finance and Innovation Act loan (TIFIA), both secured by toll revenues. Phase 2 will be funded using a combination of senior lien tax exempt bonds and toll equity (excess toll revenues) on a "pay as you go" basis.

This chapter is divided into the following sections:

- Financing assumptions - describing assumptions that were built into the financial model to forecast project financing and revenues.

- Overall Financial Plan - providing an overview of how the project will be financed during the 16-year construction period. As described in the section, the entire I-95 improvement program will be fully funded, financed through a combination of toll debt and toll equity with no other direct funding sources projected to be required. However, the financing assumes NCDOT provides an indirect public equity pledge of non-toll revenues to cover O&M and rehabilitation and replacement expenses in the event toll revenues are insufficient. This credit enhancement allows the bonds to be secured by a gross pledge of toll revenues and provides the ability to generate additional proceeds to finance the project.
- Annual Funding Plan - detailing planned borrowing and debt service commitments. This section discusses both the direct project expenditures that will be required during the 16-year construction period for the two program phases, and the revenues required for the period after construction to repay project debt.
- Cash Flow Analysis - presenting analysis of the overall revenue sources that will ultimately pay the costs of the I-95 improvement program, along with the cash flow projections used to arrive at net operating revenues available to structure the financing.

## 6.1 FINANCING ASSUMPTIONS

A set of standard assumptions typically used in similar types of projects was built onto the financial model to estimate the construction funds that could be made available from issuing bonds repayable with toll revenues. The list of major assumptions used in the financial model based on similar types of projects, as shown in Table 6-1, included the following, organized by category (note: there were also numerous assumptions that were used in the modeling and revenue estimation processes, described in Section 6.4.1):

- **Phase 1 and Phase 2 debt structure, rates, and credit.** Funding for Phase 1, will consist of interim funding via tax-exempt bond anticipation notes (BAN) and senior tax-exempt bonds and a subordinate TIFIA loan, both secured by project toll revenue, as well as STIP funds. The BANs are secured by the commitment to issue long-term toll revenue bonds to provide permanent financing and by a back-up pledge of non-toll sources. Approximately \$66 million in STIP funds are needed as an interim financing source to pay for Phase 2's pre-development costs from 2018 to 2021; the STIP funds will be reimbursed to NCDOT with long-term toll revenue Bonds in 2023. Phase 2 will be financed from a combination of senior tax-exempt bonds and toll equity. The senior lien bonds, given the back-up pledge provided by NCDOT to cover any deficiencies in operating and maintenance and rehabilitation and replacement expenses, are secured by a gross pledge of toll revenues, while the TIFIA loan is repaid on a subordinate basis to the bonds.
- **Project financing mechanisms** include a combination of TIFIA loan, BANs, Current Interest Bonds (CIBs), Convertible Capital Appreciation Bonds (CCABs), and Capital Appreciation Bonds (CABs):
  - BANs will finance pre-2018 I-95 improvement program costs. BANs will have 'AA' rating assuming NCDOT's support. BANs will be issued in 2015 and be taken out by a long-term bond issues in 2018.
  - Toll Revenue Bonds, Series 2018 and Series 2021 are repaid with Phase 1 toll revenues only. Series 2018 repays 2015 BAN and pays for Phase 1 construction costs. Series 2021 pays the remaining Phase 1 costs as well as a portion of Phase 2 costs.

- The TIFIA loan will cover 33% of Phase 1's hard construction costs and paid after senior bonds. The TIFIA loan will have a debt term of 32 years at a 4.25% annual interest.
  - Toll Revenue Bonds, Series 2023, 2023, 2028, 2030 and 2036 will finance Phase 2 (a portion of Series 2023 will be used to reimburse the STIP funds), and these bonds are paid with aggregate toll revenues generated by Phase 1 and 2.
- Multiple debt products are utilized: Current Interest Bonds (CIBs), Convertible Capital Appreciation Bonds (CCABs), and Capital Appreciation Bonds (CABs). CCABs are a hybrid bond product that are a blend of 0% coupon CABs and CIBs. With CIBs, interest costs incurred on the bonds are due and payable on the first semi-annual payment date and thereafter. For 0% coupon CABs, interest accretes over the life of the bonds and is paid only at maturity along with principal. With CCABs, interest incurred on the bonds is not immediately due and payable; instead, the unpaid interest incurred on each maturity accretes similar to a CAB until a pre-determined Conversion Date. At that time, the CCABs are "converted" to CIBs, and semi-annual interest payments commence. The Bonds are assumed to carry BBB credit ratings; historical average interest rates are used.
- **Credit support.** The O&M and R&R backstop is assumed to allow the gross pledge. The Bonds will be issued on a senior lien, and the TIFIA loan will be issued on a subordinated lien.
- **Reserve requirement.** This category includes size assumptions for O&M, R&R, and General Reserve Fund reserves (all funded by toll revenues):
  - Common Debt Service Reserve Fund (DSRF) will be sized equal to the lesser of (1) maximum aggregate debt service (2) 125% of annual aggregate average debt service (3) 10% aggregate par
  - O&M Reserve Fund will be sized as its 3 months budget
  - R&R Reserve Fund will be sized as its 3 months budget
  - General Reserve Fund will have no size requirements
- **Fund earning rate.** This category includes assumed earning rates for DSRF, Construction Fund, O&M, R&R, and General Reserve Fund reserves:
  - Common DSRF fund earning rate is assumed to be 3%
  - Construction Fund earning rate is assumed to be 0.5%
  - O&M Fund earning rate is assumed to be 1%
  - R&R Fund earning rate is assumed to be 1%
  - General Reserve Fund earning rate is assumed to be 1%
- **Financing cost.** Cost of bond issuance is assumed at \$3 per bond, with an underwriting discount of \$5 per bond.
- **Debt Service Coverage:** Minimum debt service coverage on the senior bonds is set at 1.50x, while combined senior and TIFIA coverage equals a minimum of 1.40x. From these minimums, senior coverage grows to 1.70x-2.00x, while subordinate coverage increases to 1.50x-2.00x.

Table 6-1: Plan of Finance Assumptions

Financing Assumption Category	Assumption		
<i>Project Data:</i>			
Phase 1 Project Completion	12/31/2021		
Phase 2 Projects Completion	12/31/2038		
Scenario	Lane additions, interchange improvements, other reconstruction, and 10 mile toll gantry spacing without ramp tolls		
<b>Global Financing Assumptions</b>			
<i>Reserve Requirement:</i>			
Common Debt Service Reserve Fund (DSRF)	Three lesser test		
O&M Reserve Fund	Reserve size equal to 3 months budget		
R&R Reserve Fund	Reserve size equal to 3 months budget		
General Reserve Fund	None		
<i>Fund Earning Rate:</i>			
Common DSRF	3%		
Construction Fund	0.5%		
O&M and R&R Reserve Funds	1.0%		
General Reserve Fund	1.0%		
<i>Financing Cost:</i>			
Cost of Issuance	\$3 per bond		
Underwriter Discount	\$5 per bond		
<b>Phase 1 Financing Assumption - Public Financing</b>	Funding consists of TIFIA, Tax-Exempt Bonds and Equity		
	<i>Maximum Term</i>	<i>Rate</i>	
	TIFIA (33% of Phase 1 Cost)	32 yrs.	4.25%
	Current Interest Bonds (CIB)	40 yrs.	BBB rated, 10-yr MMD average plus 200 bps spread
	Capital Appreciation Bonds (CAB)	40 yrs.	BBB rated, 10-yr MMD average plus 300 bps spread
	Convertible Capital Appreciation Bonds (CAB)	40 yrs.	BBB rated, 10-yr MMD average plus 270 bps spread
	Credit Support	Assume O&M and R&R backstop to allow gross pledge	
<b>Phase 2 Financing Assumption - Public Financing</b>	Funding consists of Phase 1 Project bonds' remaining proceeds, Tax-Exempt Bonds and Pay-Go cash.		
	<i>Maximum Term</i>	<i>Rate</i>	
	Current Interest Bonds (CIB)	40 yrs.	10-yr MMD average plus 200 bps spread
	Capital Appreciation Bonds (CAB)	40 yrs.	10-yr MMD average plus 300 bps spread
	Credit Support	Assume O&M and R&R backstop to allow gross pledge	

## 6.2 OVERALL FINANCIAL PLAN

The primary objective of the finance plan is to establish a funding program that will allow accelerated I-95 improvements and also fund ongoing maintenance and operations from toll revenues, removing any need for use of other direct NCDOT funds, such as gas taxes. The entire I-95 improvement program financing is



based on a conceptual, non-risk adjusted financing wherein Phase 1 will be financed through senior lien tax-exempt bonds and a TIFIA loan, while Phase 2 will be financed through a combination of toll debt and toll equity. Phase 1 is projected to be 100% debt financed, from a combination of toll revenue bonds (67% of the total) and TIFIA loan (33% of the total). Phase 2 will be financed from a combination of toll revenue bonds (approximately 74% of the total) and toll equity (the remaining 26% of the total). Neither phase will require permanent public funding (including gas tax), other than the user tolls. Funding sources summary is shown in Table 6-2.

**Table 6-2: Funding Sources (YOE \$Millions)**

Item	Phase 1	Phase 2	Total
Funding Cost Requirement	2,412	4,185	6,597
<b>Funding Sources</b>			
Toll Revenue Bonds	1,616	2,939	4,555
TIFIA Loan	796	0	796
Excess Revenue (toll equity)	0	1,246	1,246
Total	2,412	4,185	6,597

### 6.3 ANNUAL FUNDING PLAN

Capital costs for the I-95 improvement program are estimated at nearly \$6.60 billion, with nearly \$2.41 billion projected during construction of Phase 1 and nearly \$4.18 billion during construction of Phase 2.

The proposed debt structure and available resources are more than adequate to support the I-95 improvement program. From 2015 through 2036, a total of 8 bond issuances are envisioned, with total debt proceeds of \$6.51 billion, as shown in Table 6-3:

- BAN 2015, \$115 million in proceeds, taken out by Bond Series 2018
- Bond Series 2018 \$2.58 billion in proceeds, \$796 million TIFIA loan
- Bond Series 2021 \$535 million in proceeds
- Bond Series 2023 \$850 million in proceeds
- Bond Series 2026 \$626 million in proceeds
- Bond Series 2028 \$597 million in proceeds
- Bond Series 2030 \$636 million in proceeds
- Bond Series 2036 \$80 million in proceeds

Once the tolls are imposed on Phase 1 in 2022, and as additional segments are tolled over time, project fund proceeds from bonds issuance will be augmented with Pay-Go deposits totaling approximately \$1.25 billion from 2023 through 2038.

Table 6-4 shows the detailed breakdown for sources and uses for the debt issuance assuming revenue maximizing toll rates, which includes totals for the various types of bonds and other sources including BANs, Current Interest Bonds (CIBs), Convertible Capital Appreciation Bonds (CCABs), Capital Appreciation Bonds (CABs), and interest investment earnings on the construction fund during construction (Phase 1 and Phase 2 Fund Earnings), as well as a TIFIA loan.

The identified uses include construction expenditures (totaling \$6.60 billion), capitalized interest, debt service reserve funds, cost of issuance, and a Phase 2 deposit contingency. The difference between projected

uses and sources shows no resulting funding gap, reflecting that the I-95 is expected to be fully funded with the proposed toll revenue sources including repayment of any interim financing.

**Table 6-3: Annual Funding Plan (YOE \$Millions)**

Period ending 12/31	Sources				Uses			Funding Sufficiency
	Debt	Project Fund Proceeds	Withdraw from General Reserve	Total	Phase 1 Project Capital Expenditure	Phase 2 Project Capital Expenditure	Total	
2015	BAN 2015 (Taken Out by Bond Series 2017)	31.35		31.35	31.35		31.35	Fully Funded
2016	BAN 2015 (Taken Out by Bond Series 2017)	31.35		31.35	31.35		31.35	Fully Funded
2017	BAN 2015 (Taken Out by Bond Series 2017)	44.46		44.46	44.46		44.46	Fully Funded
2018	Bond Series 2018 (Excluding BAN Take Out), TIFIA, and STIP Funds*	376.21		376.21	370.11	6.10	376.21	Fully Funded
2019	Bond Series 2018 (Excluding BAN Take Out), TIFIA, and STIP Funds*	653.14		653.14	643.74	9.40	653.14	Fully Funded
2020	Bond Series 2018 (Excluding BAN Take Out), TIFIA, and STIP Funds*	619.03		619.03	591.30	27.73	619.03	Fully Funded
2021	Bond Series 2018 and 2021 (Excluding BAN Take Out), TIFIA, and STIP Funds*	779.86		779.86	700.11	79.75	779.86	Fully Funded
2022	Bond Series 2021	164.57		164.57		164.57	164.57	Fully Funded
2023	Bond Series 2021 and 2023 (Exclude STIP Funds Reimbursement)	202.36	67.75	270.12		270.12	270.12	Fully Funded
2024	Bond Series 2021 and 2023 (Exclude STIP Funds Reimbursement)	326.01		326.01		326.01	326.01	Fully Funded
2025	Bond Series 2023 (Exclude STIP Funds Reimbursement)	393.35		393.35		393.35	393.35	Fully Funded
2026	Bond Series 2026	209.14	141.15	350.29		350.29	350.29	Fully Funded
2027	Bond Series 2026	349.05		349.05		349.05	349.05	Fully Funded
2028	Bond Series 2028	182.78	97.18	279.96		279.96	279.96	Fully Funded
2029	Bond Series 2028	350.18		350.18		350.18	350.18	Fully Funded
2030	Bond Series 2030	219.62	136.56	356.18		356.18	356.18	Fully Funded
2031	Bond Series 2030	218.54		218.54		218.54	218.54	Fully Funded
2032	Bond Series 2030	129.06		129.06		129.06	129.06	Fully Funded
2033			101.19	101.19		101.19	101.19	Fully Funded
2034			104.65	104.65		104.65	104.65	
2035			227.51	227.51		227.51	227.51	
2036	Bond Series 2036	31.40	173.11	204.51		204.51	204.51	
2037	Bond Series 2036	40.13	117.60	157.73		157.73	157.73	
2038			78.87	78.87		78.87	78.87	Fully Funded
	<b>Total</b>	<b>5,351.60</b>	<b>1,245.57</b>	<b>6,597.17</b>	<b>2,412.43</b>	<b>4,184.74</b>	<b>6,597.17</b>	

Note: \*STIP funds are reimbursed by Bond Series 2023

Table 6-4: Funding Sources and Uses (YOE \$Millions)

Sources and Uses	Aggregate	2015 BAN <sup>1</sup>	Series 2018 <sup>2</sup>	Series 2021	Series 2023 <sup>3</sup>	Series 2026	Series 2028	Series 2030	Series 2036
<b>Sources</b>									
Senior Toll Revenue Bonds									
CIBS Par Amount	3,993.12	115.21	1,579.80	373.62	589.50	430.77	411.30	437.73	55.19
CAB Par Amount	1,419.39		393.82	161.20	260.03	195.01	186.19	198.16	24.99
CCAB Par Amount	284.49		284.49						
+Premium/-Discount									
Bond Proceeds	5,697.00	115.21	2,258.11	534.81	849.53	625.78	597.49	635.89	80.18
<i>CAB/CCAB Percentage</i>			<i>30.0%</i>	<i>30.1%</i>	<i>30.6%</i>	<i>31.2%</i>	<i>31.2%</i>	<i>31.2%</i>	<i>31.2%</i>
TIFIA	796.10		796.10						
Construction Fund Earnings	13.13		8.43	4.71					
<b>Total Sources</b>	<b>6,506</b>	<b>115</b>	<b>3,063</b>	<b>540</b>	<b>850</b>	<b>626</b>	<b>597</b>	<b>636</b>	<b>80</b>
<b>Uses</b>									
Phase 1 Construction Fund	2,412.43	107.17	2,305.26						
Phase 2 Construction Fund	2,872.68			451.50	691.29	558.20	532.96	567.22	71.52
<b>Total Project Construction Deposit</b>	<b>5,285.11</b>	<b>107.17</b>	<b>2,305.26</b>	<b>451.50</b>	<b>691.29</b>	<b>558.20</b>	<b>532.96</b>	<b>567.22</b>	<b>71.52</b>
STIP Fund Reimbursement	66.49				66.49				
2015 BAN Take Out	115.21		115.21						
Capitalized Interest Deposit Funded w/ Debt	404.39	8.04	374.08	22.27					
Debt Service Reserve Deposit (Bonds and TIFIA)	590.18		249.89	61.40	84.95	62.58	59.75	63.59	8.02
Cost of Issuance	16.82		6.77	1.68	2.55	1.88	1.79	1.91	0.24
Underwriter's Discount	27.91		11.29	2.67	4.25	3.13	2.99	3.18	0.40
<b>Total Uses</b>	<b>6,506.24</b>	<b>115.21</b>	<b>3,062.64</b>	<b>539.52</b>	<b>849.53</b>	<b>625.78</b>	<b>597.49</b>	<b>635.89</b>	<b>80.18</b>

Notes: 1. The 2015 BAN is secured with NCDOT funds and taken out by Series 2018.  
 2. Include a TIFIA Loan  
 3. Series 2023 bonds reimburses NCDOT for the \$66M STIP funds.

## 6.4 CASH FLOW ANALYSIS

This section describes a cash flow pro forma that indicates the operating sources and uses for the I-95 improvement program on an annual basis over the period of the Financial Plan. Toll revenues are by far the largest source of operating revenue; interest earnings are also incorporated. The pro forma includes beginning and ending balances, a comparison of cumulative planned expenditures (uses) to the cumulative sources of funds on an annual basis through the I-95 improvement program completion, and annual change in financial position. Based on the cash flow analysis, the identified sources of funds will sufficiently cover expenditures on an annual basis throughout the life of the I-95 improvement program.

### 6.4.1 Toll Revenue Projections

Revenue projections have been provided for this analysis by the I-95 Planning and Finance Study traffic and revenue team. Gross toll revenues were the starting point for the calculation of cash flow that will be available for debt service. The I-95 study traffic model was used to project both non-tolled and tolled traffic within the corridor. Revenue schedules were then developed, reflecting the following assumptions:

- A multi-year revenue schedule was developed out to 2070 in order to test a 48 year operating period toll concession.
- Traffic forecasts were developed for 2020 and 2040, and straight line growth between and beyond these years was assumed.
- All tolls will be collected electronically. A ‘leakage’ rate of 5% was assumed. Leakage is defined as revenue that is lost due to non-payment or inability to collect the revenue the facility will collect if all vehicles paid the proper toll. The approach used is consistent with the approach used for the Triangle Expressway. There are separate ‘ramp-up’ periods for Phase 1 and Phase 2 due to the different toll rates. Ramp-up assumptions account for potential fluctuations in traffic volume and growth in the first several years due to tolling the facility.
- Project financing will be based on a gross pledge.
- Initiation of tolling would correspond to completion of improvements on various segments of the corridor. Phase 1 tolling would begin in 2022. For current Traffic and Revenue estimates, different per mile toll rates assumed for Phase 1 versus the remainder of the corridor. The Phase 1 rate has been set with an initial toll rate comparable to the Triangle Expressway. Initially, several different toll rates were tested. Phase 1 was tested at 2012 rates of \$0.10 and \$0.15 per mile. These tests determined that the higher rate of \$0.15 per mile does not appreciably divert traffic away from the corridor or away from the Phase 1 limits. Therefore, that rate was used for the analysis. The remainder of the corridor was tested at \$0.075 per mile at 2012 rates. These rates equate to \$0.195 per mile within the Phase 1 limits, which, for this analysis, was considered to be the first year of tolling. Toll rates will adjust annually to match inflation, assumed to be 2.5% per year.
- The 18 mainline toll zones have been tentatively spaced approximately 10 miles apart (details were provided in Section 3.2.3, Tolling Scenarios Conclusion). Each of the seven mainline toll zones within Phase 1 would charge a toll when opened to traffic in 2022 of \$1.95 per zone (10 miles tolled at \$0.195 per mile). The 11 mainline gantries in the remainder of the corridor would be tolled when respective projects are opened to traffic Tolling rates for trucks would be based on a higher per mile toll rate in both the Phase 1 and Phase 2 sections.

The cash flow forecasts were extended until 2070. It is estimated that tolls will generate \$66.02 billion in gross tolling revenue from 2022 through 2070. After deducting the expenditures, the total residual I-95 Project cash flow revenue decreases to \$38.68 billion. To provide context to the magnitude of the expected remaining revenue, the Present Value (PV) calculation estimates the PV of the residual 2022-2070 cash flow to be just \$13.28 billion when revenues are discounted at 2.5% to 2017 dollars.

## **6.4.2 Cash Flow Projections**

Gross tolling revenue, estimated at \$66.02 billion total in YOE dollars from 2022 through 2070, will be available to pay debt service on the bonds issued to finance both Phase 1 and Phase 2, contribute toll equity to Phase 2 construction, and fund O&M and R&R expenses. The projected toll revenues will also finance O&M and R&R reserves, estimated at \$69 and \$24 million, respectively. The residual revenue, or General Reserve balance, generated by the I-95 improvement program after debt service, O&M, R&R, and Phase 2 capital expenditures, is estimated at approximately \$38.68 billion in YOE dollars.

Exhibit 6-1 shows a graphic depiction of the cash flow calculation overview as modeled for the I-95 toll facility from 2022 (when toll collection begins) through 2070 (key assumptions for debt financing were shown in Table 6-1). With a 40 year debt term assumed for both Phase 1 and Phase 2 financing, there is no upfront funding gap. In terms of the flow of funds annually, toll revenue and other income matches or exceeds the projected expenses since the Phase 2 Pay-As-You-Go concept would be initiated in 2023.

For the I-95 improvement program, a key feasibility metric of the projected cash flow was debt service coverage from 2022 to 2070. Exhibit 6-2 is a graphic representation of the projected cash from toll operations along the I-95 corridor in North Carolina that will be available for debt service. The green line exemplifies the gross tolling cash revenue that remains above the annual debt service payments, well above the coverage ratio required for all debt. Annual debt service payments are projected to continue increasing each year based on revenue and cost growth; after topping out in 2047, the annual debt service payments will gradually begin to decrease, while cash generated from tolling operations along the I-95 corridor will continue to increase, resulting in a net increase in the remaining Revenue Deposit.

A detailed debt service schedule and overall I-95 improvement program flow of funds is shown in Table 6-5. The annual anticipated cumulative revenues are projected to exceed required expenditures, with the substantial reduction in risk after the I-95 improvement program is completed afforded by the expected Revenue Deposit. Excess toll revenue can be spent to fund other projects within the I-95 corridor, or to reduce the tolls if there are limitations on use of the excess revenue.

Exhibit 6-1: Flow of Funds (YOY \$Millions)

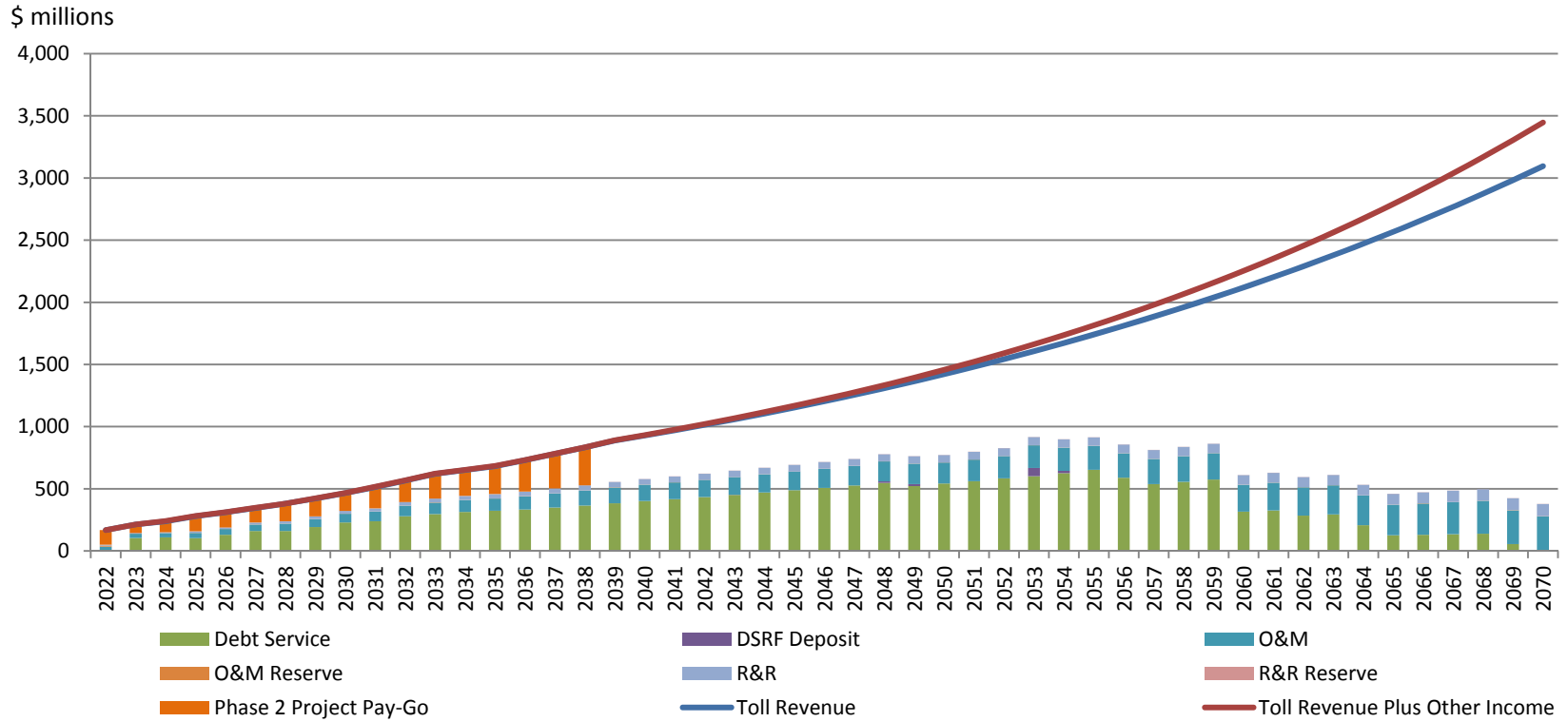
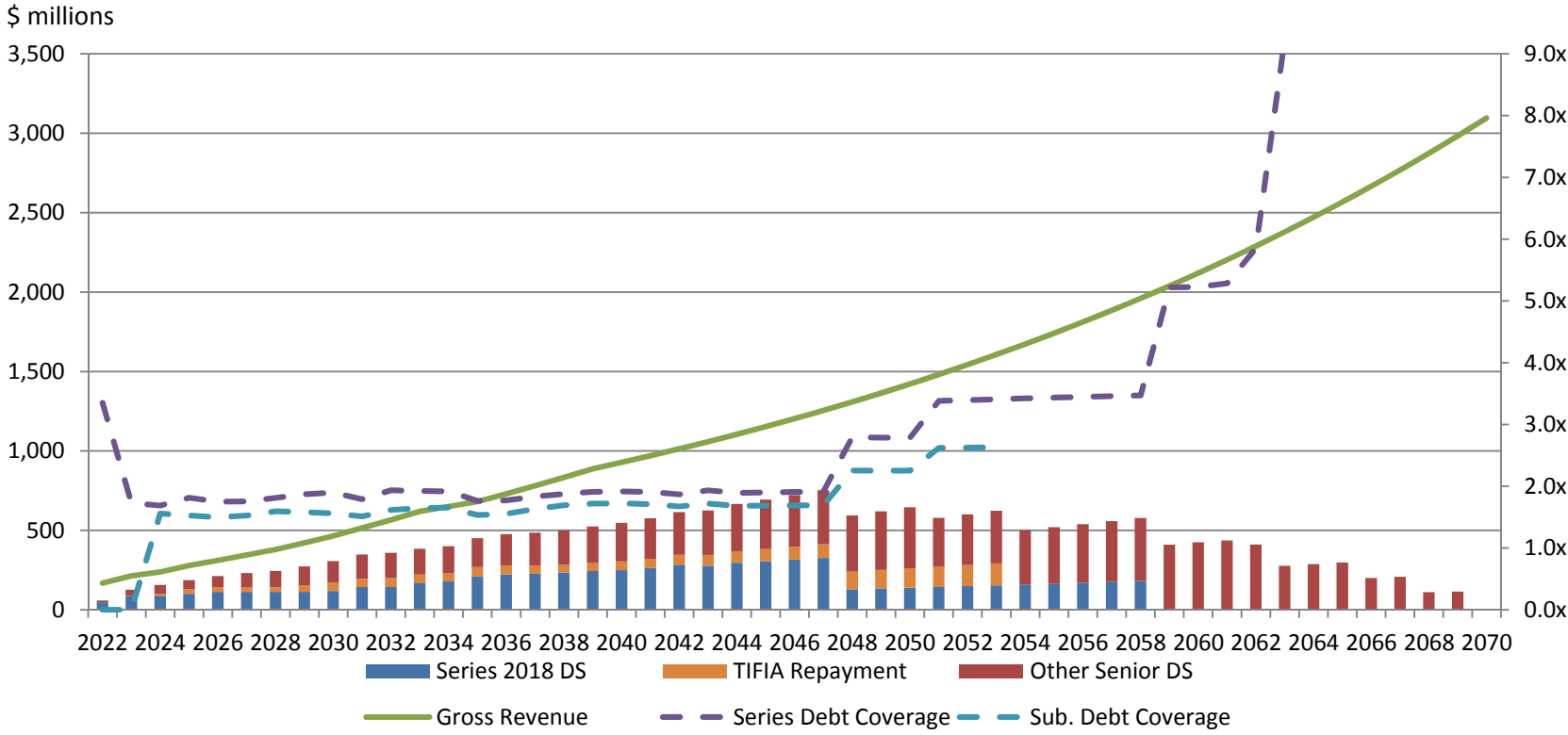


Exhibit 6-2: Debt Service and Coverage Ratio (YOE \$Millions)



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Ending 12/31 20XX	Revenues			Gross Senior Debt Service	DSRF Income and Release	Net Senior Debt Service	Senior DSRF Ongoing Deposit	TIFIA Repayment	Remaining Revenues	O&M Expenditure			O&M Reserve Deposit	R&R Expenditure			R&R Reserve Deposit	O&M and R&R Reserve Income	General Reserve Fund Income	Construction Fund Income	Remaining Revenue	General Reserve Beginning Balance	Residual Revenue Deposit	Rural Project Withdrawal from General Reserve	Reimburse to DOT	General Reserve Ending Balance	Senior Debt Coverage	Sub. Debt Coverage
	Phase 1 Project	Phase 2 Projects	Total							Phase 1 Project	Phase 2 Projects	Total		Phase 1 Project	Phase 2 Projects	Total												
60	1,268.31	850.85	2,119.16	425.65	20.27	405.39			1,713.77	78.71	137.60	216.31	1.32	28.47	48.04	76.51	0.47	0.73	134.12		1,554.01	13,412.37	1,554.01			14,966.38	5.23x	
61	1,318.80	884.01	2,202.80	437.02	20.27	416.76			1,786.05	80.68	141.06	221.74	1.36	29.18	49.25	78.42	0.48	0.75	149.66		1,634.46	14,966.38	1,634.46			16,600.84	5.29x	
62	1,371.02	918.29	2,289.31	411.25	20.27	390.99			1,898.32	82.71	144.60	227.31	1.39	29.91	50.48	80.38	0.49	0.77	166.01		1,755.52	16,600.84	1,755.52			18,356.36	5.86x	
63	1,425.03	953.73	2,378.76	277.91	20.27	257.65			2,121.11	84.79	148.23	233.02	1.43	30.66	51.74	82.39	0.50	0.79	183.56		1,988.12	18,356.36	1,988.12			20,344.48	9.23x	
64	1,480.88	990.37	2,471.25	288.20	20.27	267.93			2,203.32	86.92	151.95	238.87	1.46	31.42	53.03	84.45	0.51	0.81	203.44		2,082.27	20,344.48	2,082.27			22,426.75	9.22x	
65	1,538.64	1,028.24	2,566.88	298.87	20.27	278.60			2,288.28	89.10	155.77	244.86	1.50	32.21	54.36	86.56	0.53	0.83	224.27		2,179.92	22,426.75	2,179.92			24,606.68	9.21x	
66	1,598.35	1,067.40	2,665.75	201.37	20.27	181.10			2,484.65	91.33	159.68	251.01	1.54	33.01	55.72	88.73	0.54	0.85	246.07		2,389.74	24,606.68	2,389.74			26,996.42	14.72x	
67	1,660.10	1,107.86	2,767.96	208.82	20.27	188.56			2,579.40	93.63	163.69	257.31	1.58	33.84	57.11	90.95	0.55	0.87	269.96		2,499.85	26,996.42	2,499.85			29,496.27	14.68x	
68	1,723.93	1,149.68	2,873.61	112.90	20.27	92.64			2,780.97	95.98	167.80	263.77	1.62	34.68	58.54	93.22	0.57	0.89	294.96		2,717.65	29,496.27	2,717.65			32,213.92	31.02x	
69	1,789.91	1,192.91	2,982.81	117.08	20.27	96.82			2,886.00	98.39	172.01	270.40	1.66	35.55	60.00	95.55	0.58	0.91	322.14		2,840.87	32,213.92	2,840.87			35,054.78	30.81x	
70	1,858.11	1,237.57	3,095.68	11.10	570.43	(559)			3,655.01	100.86	176.33	277.18	1.70	36.44	61.50	97.94	0.60	0.94	350.55		3,629.07	35,054.78	3,629.07			38,683.85		
Total	40,427.68	25,592.34	66,020.03	18,762.10	1,439.70	17,322.40	125.35	2,016.72	46,555.56	2,906.96	4,512.08	7,419.04	69.30	1,026.64	1,540.56	2,567.21	24.49	24.97	3,441.86	11.07	39,929.43		39,929.43	1,245.57				

## 7 Risk Identification and Mitigation Factors

The cash flow analysis describes all the projected revenues that will offset the anticipated I-95 tolling facility expenditures through the end of the I-95 improvement program. However, an improvement program of this magnitude could face a variety of external risks that, if not mitigated, could adversely influence the cash flow projections. If shortfalls in the projected revenues are realized in the future, this I-95 Financial Plan is committed to identifying the underlying causes for such shortfalls and acting upon them in a timely manner, with potential mitigation measures and strategies to address the potential risks described below.

Based on the funding sources described in the previous section, Table 7-1 summarizes the potential risks associated with the I-95 improvement program. The risks fall under one or more of the following categories:

- Schedule
- Cost
- Financing and revenue

The table also identifies potential mitigation measures and strategies to address the potential risks. The identified risks are highly manageable and consistent with risks faced by NCDOT on any other major project or program. Active monitoring of schedule and costs will mitigate risk of delays and cost overruns, while financing and revenue projections have enough contingencies and conservative assumptions built in to accommodate potential risk concerns.

Table 7-1: Summary of Identified Key Risks and Mitigation Strategies

Risk Category	Description / Potential Risks	Risk Mitigation
Schedule	<b>Ability to secure all required approvals and permits</b> for constructing the I-95 improvement program might cause unforeseen delays with implementation.	NCDOT has initiated the NEPA review process, with issuance of the Environmental Assessment in January 2012 to gain clearance for tolling as principal potential funding mechanism. NCDOT has prepared a draft Finding of No Significant Impact to advance tolling as the preferred funding mechanism.
	<b>Project schedule</b> – Due to the size and complexity of the I-95 improvement program, project scheduling and coordination will be critical in meeting milestones and deadlines. Any potential delays will adversely affect the overall schedule, cost estimates, and revenue projections.	NCDOT will actively monitor and update the I-95 improvement program schedule to ensure that any issues that could affect project implementation are identified and addressed in a timely manner. Routine schedule reporting and management interfaces between the involved parties will help ensure the I-95 improvement program remains on schedule.
Cost	<b>Construction costs</b> – Estimated costs may escalate as Design-Build (DB) contracts proceed, and final cost estimates are approximate and subject to change. The actual construction bids could be higher than the initial cost estimates presented in the Financial Plan.	The I-95 improvement program scope will be well defined prior to bid submission. NCDOT will review each D&B estimate for their potential to affect the I-95 improvement program cost. The I-95 improvement program is divided into multiple segments and as each of those segments is completed, even more accurate cost estimates can be projected. Given the evidence from recent years, it is likely that competition may result in lower, rather than higher, construction bids.  A variety of techniques, such as value engineering, constructability reviews, and cost reporting will be used throughout the duration of the I-95 improvement program to ensure it remains on budget. Construction estimates include a level of contingency to address unknowns as the project progresses. Design and CE&I estimates are conservative.

Risk Category	Description / Potential Risks	Risk Mitigation
	<p><b>Cost overruns during Phase 1</b> – Phase 1 of the I-95 improvement program is scheduled to be 100% debt financed, and unforeseen cost increases in the first few years of the implementation plan might result in funding issues to complete the I-95 improvement program.</p>	<p>The ongoing I-95 improvement program costs will be closely monitored. Bond proceeds and TIFIA loans will be used to finance Phase 1 construction and Phase 2 Pay-As-You-Go concept will be initiated in 2022.</p>
	<p><b>Inflation</b> – Inflation rate was assumed at 2.5% annually. If the actual inflation rate will be higher than assumed, it could result in escalated I-95 improvement program costs and possible delays in schedule.</p>	<p>Recent trends in construction inflation were used to prepare cost estimates. Any overruns in the I-95 improvement program costs will be identified early and addressed in a timely manner. It should be noted that design and construction reserve deposits are set in place to compensate for higher than anticipated inflation, along with other potential unexpected costs or cost increases.</p>
	<p><b>Lifecycle cost</b> – O&amp;M and R&amp;R costs increases could potentially lower the net revenue available for debt service</p>	<p>Maintenance and R&amp;R costs have been estimated assuming a higher level of maintenance than existing, and roadway assets are replaced/ rehabilitated as their useful life expires. Operation costs are based on existing processes which should become more efficient in the future.</p>
<p><b>Financing and Revenue</b></p>	<p><b>Capital markets accessibility</b> - Access to the bond market for bonding of toll revenues can be challenging for low investment-grade credits, including start-up toll projects. Limited access to financing and/or increased financing costs could be the result of inability to access bond markets.</p>	<p>The market has typically had no difficulties matching demand for bonds for tolling projects with supply. Multiple debt issuances will help ease risk concerns on the demand side. However, the initial size of the Series 2017 issuance may pose a challenge for the market to absorb and may need to be divided into two or more series</p>
	<p><b>Interest rate</b> – If the actual interest rates are higher than assumed, a larger portion of the expected toll revenues will be required for debt service and coverage ratio will increase.</p>	<p>Interest rates reflect 10-year historical average plus spread for a 'BBB' credit. There is enough contingency built into the financial model to address any future interest rate increases beyond those that were assumed.</p>
	<p><b>Toll revenues</b> – Toll revenues during the Phase 1 and Phase 2 could be lower than the financial forecasts in the Financial Plan. This could put at risk the ability for the I-95 improvement program to service its debt.</p>	<p>The I-95 improvement program financing depends on what are believed to be reasonable toll revenue estimates, but developing accurate traffic and revenue forecasts typically bears inherent risk. Realistic, investment-grade forecasts should alleviate concerns regarding toll revenue estimates.</p>
	<p><b>Toll collection</b> – Issues with toll collection equipment could affect the ability to collect the payments.</p>	<p>A 'leakage' rate (revenue that is lost due to non-payment or inability to collect the revenue) of 5% of revenue was assumed in the financial forecasts.</p>



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